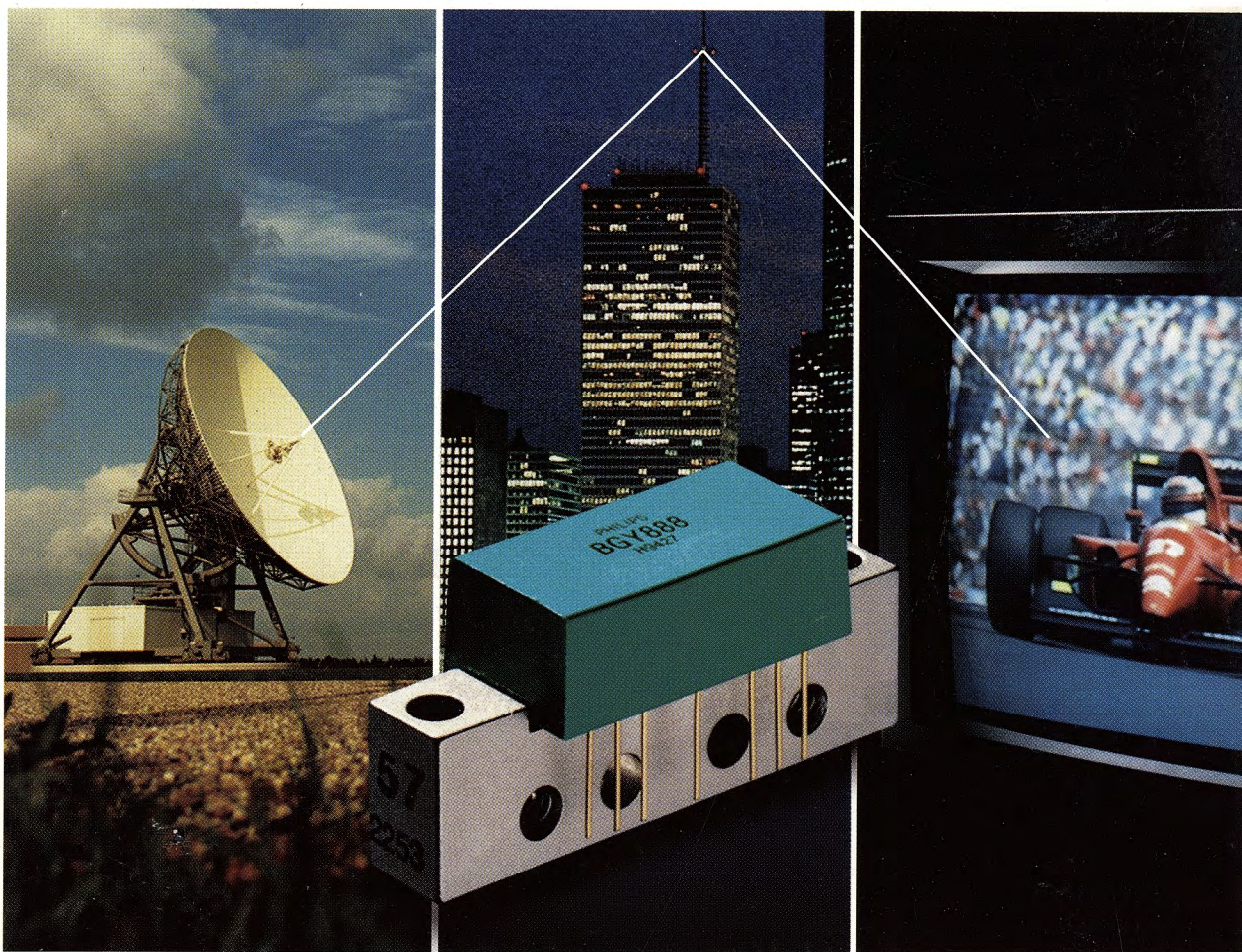


DISCRETE SEMICONDUCTORS

# Wideband Hybrid IC Modules



1997

Data Handbook SC16

Philips  
Semiconductors



*Let's make things better.*

# PHILIPS

## **QUALITY ASSURED**

Our quality system focuses on the continuing high quality of our components and the best possible service for our customers. We have a three-sided quality strategy: we apply a system of total quality control and assurance; we operate customer-oriented dynamic improvement programmes; and we promote a partnering relationship with our customers and suppliers.

## **PRODUCT SAFETY**

In striving for state-of-the-art perfection, we continuously improve components and processes with respect to environmental demands. Our components offer no hazard to the environment in normal use when operated or stored within the limits specified in the data sheet.

Some components unavoidably contain substances that, if exposed by accident or misuse, are potentially hazardous to health. Users of these components are informed of the danger by warning notices in the data sheets supporting the components. Where necessary the warning notices also indicate safety precautions to be taken and disposal instructions to be followed. Obviously users of these components, in general the set-making industry, assume responsibility towards the consumer with respect to safety matters and environmental demands.

All used or obsolete components should be disposed of according to the regulations applying at the disposal location. Depending on the location, electronic components are considered to be 'chemical', 'special' or sometimes 'industrial' waste. Disposal as domestic waste is usually not permitted.

# Wideband Hybrid IC Modules

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## DEFINITIONS

| <b>Data sheet status</b>  |   |
|---|---|
| Objective specification   | This data sheet contains target or goal specifications for product development.       |
| Preliminary specification   | This data sheet contains preliminary data; supplementary data may be published later. |
| Product specification   | This data sheet contains final product specifications.                                |
| <b>Application information</b>  |   |
| Where application information is given, it is advisory and does not form part of the specification. |   |

## LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

## INDEX



## Wideband Hybrid IC Modules

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## Wideband Hybrid IC Modules

## Selection guide

## CATV AMPLIFIER MODULES

| TYPE NUMBER             | FREQUENCY RANGE | POWER GAIN AT<br>f = 50 MHz<br>(Gp)<br>(dB) | SLOPE CABLE<br>EQUIVALENT<br>(SL)<br>(dB) | APPLICATION                  | PAGE |
|-------------------------|-----------------|---|---|------------------------------|------|
| BGD102                  | 40 to 450       | 18 to 19                                    | 0.5 to 2.5                                | power doubler                | 34   |
| BGD104                  | 40 to 450       | 19.5 to 20.5                                | 0.5 to 2.5                                | power doubler                | 34   |
| BGD106                  | 40 to 450       | 21.5 to 22.5                                | 0 to 2                                    | power doubler                | 36   |
| BGD108                  | 40 to 450       | 35 to 37                                    | 0.2 to 2.2                                | power doubler                | 38   |
| BGD502 <sup>(1)</sup>   | 40 to 550       | 18 to 19                                    | 0.2 to 2.2                                | power doubler                | 40   |
| BGD504 <sup>(1)</sup>   | 40 to 550       | 19.5 to 20.5                                | 0.2 to 2.2                                | power doubler                | 40   |
| BGD506                  | 40 to 550       | 21.5 to 22.5                                | 0 to 2                                    | power doubler                | 43   |
| BGD508 <sup>(1)</sup>   | 40 to 550       | 35 to 37                                    | 0.2 to 2.2                                | power doubler                | 45   |
| BGD601 <sup>(2)</sup>   | 40 to 600       | 12 to 13                                    | 0.2 to 2.2                                | power doubler                | 49   |
| BGD602 <sup>(2)</sup>   | 40 to 600       | 18 to 19                                    | 0.2 to 2.2                                | power doubler                | 53   |
| BGD602D <sup>(2)</sup>  | 40 to 600       | 17.5 to 18.5                                | 0.2 to 2.2                                | power doubler,<br>darlington | 57   |
| BGD702 <sup>(3)</sup>   | 40 to 750       | 18 to 19                                    | 0.2 to 2                                  | power doubler                | 61   |
| BGD702D <sup>(4)</sup>  | 40 to 750       | 18 to 19                                    | 0.2 to 4                                  | amplifier                    | 66   |
| BGD702MI <sup>(3)</sup> | 40 to 750       | 18 to 19                                    | 0.2 to 2                                  | amplifier                    | 70   |
| BGD704 <sup>(3)</sup>   | 40 to 750       | 19.5 to 20.5                                | 0 to 2                                    | power doubler                | 75   |
| BGD802 <sup>(5)</sup>   | 40 to 860       | 18 to 19                                    | 0.2 to 2                                  | amplifier                    | 80   |
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| BGD804 <sup>(5)</sup>   | 40 to 860       | 19.5 to 20.5                                | 0.2 to 2                                  | amplifier                    | 88   |
| BGD885                  | 40 to 860       | 16.5 to 17.5                                | 0.2 to 1.6                                | power doubler                | 94   |
| BGE884                  | 40 to 860       | 16.5 to 17.5                                | 0.2 to 1.4                                | amplifier                    | 97   |
| BGE885                  | 40 to 860       | 16.5 to 17.5                                | 0.2 to 1.2                                | amplifier                    | 99   |
| BGE887                  | 470 to 860      | 22.5 to 25 <sup>(8)</sup>                   | -0.2 to +1                                | amplifier                    | 102  |
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| BGY61                   | 5 to 200        | 12.5 to 13.5 <sup>(9)</sup>                 | -0.2 to +0.5                              | reverse amplifier            | 110  |
| BGY65                   | 5 to 200        | 18 to 19 <sup>(9)</sup>                     | -0.2 to +0.5                              | reverse amplifier            | 112  |
| BGY66B                  | 5 to 120        | 24.5 to 25.5                                | -0.2 to +0.5                              | reverse amplifier            | 114  |
| BGY67                   | 5 to 200        | 21.5 to 22.5 <sup>(9)</sup>                 | -0.2 to +0.5                              | reverse amplifier            | 116  |
| BGY67A                  | 5 to 200        | 23.5 to 24.5 <sup>(9)</sup>                 | -0.2 to +0.5                              | reverse amplifier            | 118  |
| BGY67BO                 | 5 to 300        | -   | -   | optical receiver             | 120  |
| BGY68                   | 5 to 75         | 29.2 to 30.8                                | -0.2 to +0.5                              | reverse amplifier            | 122  |
| BGY80                   | 40 to 450       | 12 to 13                                    | 0.2 to 1.5                                | pre-amplifier                | 124  |
| BGY81                   | 40 to 450       | 12 to 13                                    | 0.2 to 1.5                                | final amplifier              | 124  |
| BGY82                   | 40 to 450       | 13.5 to 14.5                                | 0.2 to 1.5                                | amplifier                    | 126  |
| BGY83                   | 40 to 450       | 13.5 to 14.5                                | 0.2 to 1.5                                | amplifier                    | 126  |
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## Wideband Hybrid IC Modules

## Selection guide

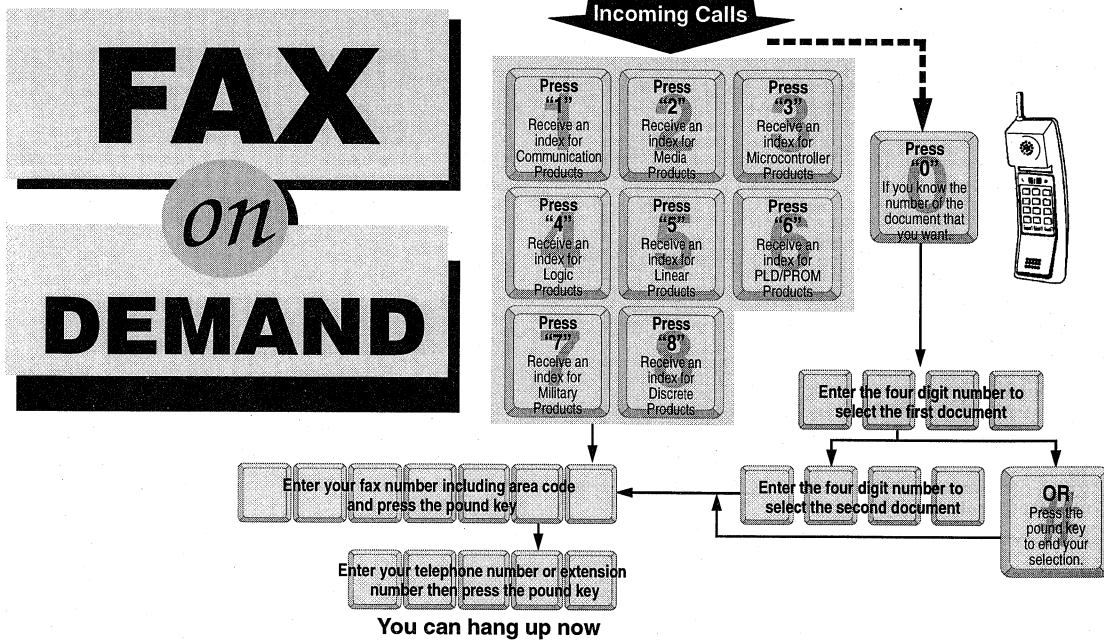
| TYPE NUMBER                | FREQUENCY RANGE | POWER GAIN AT<br>f = 50 MHz<br>(Gp)<br>(dB) | SLOPE CABLE<br>EQUIVALENT<br>(SL)<br>(dB) | APPLICATION          | PAGE |
|----------------------------|-----------------|---|---|----------------------|------|
| BGY84A                     | 40 to 450       | 18 to 18.8                                  | 0.3 to 1.5                                | pre-amplifier        | 130  |
| BGY85                      | 40 to 450       | 16.5 to 17.5                                | 0.5 to 1.5                                | final amplifier      | 128  |
| BGY85A                     | 40 to 450       | 18 to 18.8                                  | 0.3 to 1.5                                | final amplifier      | 130  |
| BGY86                      | 40 to 450       | 21.5 to 22.5                                | 0 to 1.5                                  | pre-amplifier        | 132  |
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| BGY87B                     | 40 to 450       | 26.2 to 27.8                                | 0.5 to 2.5                                | amplifier            | 134  |
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| BGY89                      | 40 to 450       | 37 to 39                                    | 0 to 2.5                                  | line extender        | 138  |
| BGY580                     | 40 to 550       | 12 to 13                                    | 0.5 to 2                                  | pre-amplifier        | 140  |
| BGY581                     | 40 to 550       | 12 to 13                                    | 0.5 to 2                                  | final amplifier      | 140  |
| BGY582                     | 40 to 550       | 13.5 to 14.5                                | 0.2 to 1.5                                | amplifier            | 142  |
| BGY583                     | 40 to 550       | 13.5 to 14.5                                | 0.2 to 1.5                                | amplifier            | 142  |
| BGY584 <sup>(1)</sup>      | 40 to 550       | 16.5 to 17.5                                | 0.5 to 2                                  | pre-amplifier        | 144  |
| BGY584A <sup>(1)</sup>     | 40 to 550       | 17.7 to 18.7                                | 0.5 to 2                                  | pre-amplifier        | 147  |
| BGY585 <sup>(1)</sup>      | 40 to 550       | 16.5 to 17.5                                | 0.5 to 2                                  | final amplifier      | 144  |
| BGY585A <sup>(1)</sup>     | 40 to 550       | 17.7 to 18.7                                | 0.5 to 2                                  | final amplifier      | 147  |
| BGY586                     | 40 to 550       | 21.5 to 22.5                                | 0.2 to 1.5                                | pre-amplifier        | 150  |
| BGY587                     | 40 to 550       | 21.5 to 22.5                                | 0.2 to 1.5                                | final amplifier      | 150  |
| BGY587B                    | 40 to 550       | 26.2 to 27.8                                | 0.5 to 2.5                                | amplifier            | 152  |
| BGY588 <sup>(1)</sup>      | 40 to 550       | 33.5 to 35.5                                | 0 to 2.5                                  | line extender        | 154  |
| BGY681 <sup>(2)</sup>      | 40 to 600       | 12 to 13                                    | 0.7 to 2.2                                | amplifier            | 157  |
| BGY683 <sup>(2)</sup>      | 40 to 600       | 13.5 to 14.5                                | 0.2 to 1.7                                | amplifier            | 161  |
| BGY685 <sup>(2)</sup>      | 40 to 600       | 16.5 to 17.5                                | 0.5 to 2.2                                | amplifier            | 165  |
| BGY685A <sup>(2)</sup>     | 40 to 600       | 17.7 to 18.7                                | 0.5 to 2.2                                | amplifier            | 169  |
| BGY685AD <sup>(2)</sup>    | 40 to 600       | 18 to 19                                    | 0.2 to 2.2                                | darlington amplifier | 173  |
| BGY685AL <sup>(2)</sup>    | 40 to 600       | 18 to 19                                    | 0.5 to 2                                  | amplifier            | 177  |
| BGY687                     | 40 to 600       | 21 to 22                                    | 0.8 to 2.2                                | amplifier            | 181  |
| BGY687B                    | 40 to 600       | 26.2 to 27.8                                | 0.8 to 2.8                                | amplifier            | 183  |
| BGY785A <sup>(3)</sup>     | 40 to 750       | 18 to 19                                    | 0 to 2                                    | amplifier            | 187  |
| BGY785AD <sup>(3)</sup>    | 40 to 750       | 18 to 19                                    | 0.2 to 2                                  | amplifier            | 192  |
| BGY785AD/8M <sup>(5)</sup> | 40 to 870       | 18 to 19                                    | 0.2 to 2                                  | amplifier            | 197  |
| BGY787 <sup>(3)</sup>      | 40 to 750       | 21 to 22                                    | 0 to 1.5                                  | amplifier            | 201  |
| BGY883                     | 40 to 860       | 14.5 to 15.5                                | 0 to 2                                    | amplifier            | 206  |
| BGY885A <sup>(6)</sup>     | 40 to 860       | 18 to 19                                    | 0 to 2                                    | amplifier            | 208  |
| BGY885B                    | 40 to 860       | 19.5 to 20.5                                | 0 to 2                                    | amplifier            | 214  |
| BGY887 <sup>(7)</sup>      | 40 to 860       | 21 to 22                                    | 0.2 to 2                                  | amplifier            | 216  |
| BGY887B <sup>(7)</sup>     | 40 to 860       | 28.5 to 29.5                                | 0.5 to 2.5                                | amplifier            | 221  |
| BGY887BO                   | 40 to 860       | –   | –   | optical receiver     | 226  |

| TYPE NUMBER           | FREQUENCY RANGE | POWER GAIN AT<br>f = 50 MHz<br>(Gp)<br>(dB) | SLOPE CABLE<br>EQUIVALENT<br>(SL)<br>(dB) | APPLICATION      | PAGE |
|-----------------------|-----------------|---|---|------------------|------|
| BGY887BO/FC           | 40 to 860       | –   | –   | optical receiver | 228  |
| BGY887BO/SC           | 40 to 860       | –   | –   | optical receiver | 231  |
| BGY888 <sup>(7)</sup> | 40 to 860       | 33.5 to 34.5                                | 0.5 to 2.5                                | amplifier        | 233  |
| BGY1085A              | 40 to 1000      | 18 to 19                                    | 0 to 2                                    | amplifier        | 238  |

**Notes**

1. Specifications also supplied for 450 MHz bandwidth operation.
2. Specifications also supplied for 450 and 550 MHz bandwidth operation.
3. Specifications also supplied for 450, 550 and 600 MHz bandwidth operation.
4. Specifications also supplied for 550 and 600 MHz bandwidth operation.
5. Specifications also supplied for 550, 650 and 750 MHz bandwidth operation.
6. Specifications also supplied for 450, 550, 600 and 750 MHz bandwidth operation.
7. Specifications also supplied for 600 and 750 MHz bandwidth operation.
8. Power gain measured at f = 470 MHz.
9. Power gain measured at f = 10 MHz.

# FAX-on-DEMAND System



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## Who do I contact if I have a question about FAX-on-DEMAND?

Contact your local Philips sales office.

## FAX-on-DEMAND phone numbers:

|                                      |                  |
|--------------------------------------|------------------|
| England<br>(United Kingdom, Ireland) | 44-181-730-5020  |
| France                               | 33-1-40-99-60-60 |
| Italy                                | 39-167-295502    |
| North America                        | 1-800-282-2000   |

## Locations soon to be in operation:

Hong Kong  
Japan  
The Netherlands

## Internet World Wide Web Home Page

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You can find us in the Product category of Discretes.

## GENERAL

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**QUALITY****Total Quality Management**

Philips Semiconductors is a Quality Company, renowned for the high quality of our products and service. We keep alive this tradition by constantly aiming towards one ultimate standard, that of zero defects. This aim is guided by our Total Quality Management (TQM) system which is described in our Quality manuals. The basis is outlined in the following paragraphs.

**QUALITY ASSURANCE**

Based on ISO 9000 standards, customer standards such as FDC, QS9000 and IBM MDQ. Our factories are certified to ISO 9000 by external inspectorates.

**PARTNERSHIPS WITH CUSTOMERS**

PPM co-operations, design-in agreements, ship-to-stock, just-in-time, self-qualification programmes and application support.

**PARTNERSHIPS WITH SUPPLIERS**

Ship-to-stock, statistical process control and ISO 9000 audits.

**QUALITY IMPROVEMENT PROGRAMME**

Continuous process and system improvement, design improvement, complete use of statistical process control, realization of our final objective of zero defects, and logistics improvement by ship-to-stock and just-in-time agreements.

**Advanced quality planning**

During the design and development of new products and processes, quality is built-in by advanced quality planning. Through failure-mode-and-effect analysis the critical parameters are detected and measures taken to ensure good performance on these parameters. The capability of process steps is also planned in this phase in preparation for production under statistical process control.

**Product conformance**

The assurance of product conformance is an integral part of our quality assurance (QA) practice. This is achieved by:

- Incoming material management through partnerships with suppliers
- In-line quality assurance to monitor process reproducibility during manufacture and initiate any

necessary corrective action. Process steps are under statistical process control

- Acceptance tests on finished products to verify conformance with the device specification. The test results are used for quality feedback and corrective actions. The inspection and test requirements are detailed in the general quality specifications SNW-EQ-611 part A
- Periodic inspections to monitor and measure the conformance of products
- Qualification tests (see SNW-EQ-611 part A).

**Product reliability**

With the increasing complexity of Original Equipment Manufacturer (OEM) equipment, component reliability must be extremely high. Our research laboratories and development departments study the failure mechanisms of semiconductors. Their studies result in design rules and process optimization for the highest built-in product reliability. Highly accelerated tests are applied to the products reliability evaluation. Rejects from reliability tests and from customer complaints are submitted to failure analysis, to result in corrective action.

**Customer response**

Our quality improvement depends on joint action with our customer. We need our customer's inputs and we invite constructive comments on all aspects of our performance. Please contact our local sales representative.

**Recognition**

The high quality of our products and services is demonstrated by many Quality Awards granted by major customers and international organizations.

**PRO ELECTRON TYPE NUMBERING SYSTEM****Basic type number**

This type designation code applies to discrete semiconductor devices (not integrated circuits), multiples of such devices, semiconductor chips and Darlington transistors.

**FIRST LETTER**

The first letter gives information about the material for the active part of the device.

- |   |  |
|---|--|
| A | Germanium or other material with a band gap of 0.6 to 1 eV |
|---|--|



- B Silicon or other material with a band gap of 1 to 1.3 eV
- C Gallium arsenide (GaAs) or other material with a band gap of 1.3 eV or more
- R Compound materials, e.g. cadmium sulphide.

## SECOND LETTER

The second letter indicates the function for which the device is primarily designed. The same letter can be used for multi-chip devices with similar elements.

In the following list low power types are defined by  $R_{th\ j-mb} > 15\ K/W$  and power types by  $R_{th\ j-mb} \leq 15\ K/W$ .

- A Diode; signal, low power
- B Diode; variable capacitance
- C Transistor; low power, audio frequency
- D Transistor; power, audio frequency
- E Diode; tunnel
- F Transistor; low power, high frequency
- G Multiple of dissimilar devices/miscellaneous devices; e.g. oscillators. Also with special third letter; see under Section "Serial number".
- H Diode; magnetic sensitive
- L Transistor; power, high frequency
- N Photocoupler
- P Radiation detector; e.g. high sensitivity photo-transistor; with special third letter
- Q Radiation generator; e.g. LED, laser; with special third letter
- R Control or switching device; e.g. thyristor, low power; with special third letter
- S Transistor; low power, switching
- T Control or switching device; e.g. thyristor, power; with special third letter
- U Transistor; power, switching
- W Surface acoustic wave device
- X Diode; multiplier, e.g. varactor, step recovery
- Y Diode; rectifying, booster
- Z Diode; voltage reference or regulator, transient suppressor diode; with special third letter.

## THIRD LETTER

The third letter indicates a common feature of a group of devices:

- D For power-doubler modules

- E For economical modules
- X For cascade push-pull modules
- Y For cascode push-pull modules.

## SERIAL NUMBER

The number comprises two to four digits:

- 6x For reverse amplifiers
- 8x For 40 to 450 MHz forward amplifiers
- 1xx For 40 to 450 MHz power doublers
- 5xx For 40 to 550 MHz amplifiers
- 6xx For 40 to 600 MHz amplifiers
- 7xx For 40 to 750 MHz amplifiers
- 8xx For 40 to 860 MHz amplifiers
- 10xx For 40 to 1000 MHz amplifiers.

## Suffix letter(s)

One or two letters may be added to the basic type number to indicate a specific feature of the device:

- D For Darlington modules
- BO For optical modules

## RATING SYSTEMS

The rating systems described are those recommended by the International Electrotechnical Commission (IEC) in its publication number 134.

## Definitions of terms used

## ELECTRONIC DEVICE

An electronic tube or valve, transistor or other semiconductor device. This definition excludes inductors, capacitors, resistors and similar components.

## CHARACTERISTIC

A characteristic is an inherent and measurable property of a device. Such a property may be electrical, mechanical, thermal, hydraulic, electro-magnetic or nuclear, and can be expressed as a value for stated or recognized conditions. A characteristic may also be a set of related values, usually shown in graphical form.

## BOGEY ELECTRONIC DEVICE

An electronic device whose characteristics have the published nominal values for the type. A bogey electronic device for any particular application can be obtained by

considering only those characteristics that are directly related to the application.

#### RATING

A value that establishes either a limiting capability or a limiting condition for an electronic device. It is determined for specified values of environment and operation, and may be stated in any suitable terms. Limiting conditions may be either maxima or minima.

#### RATING SYSTEM

The set of principles upon which ratings are established and which determine their interpretation. The rating system indicates the division of responsibility between the device manufacturer and the circuit designer, with the object of ensuring that the working conditions do not exceed the ratings.

#### Absolute maximum rating system

Absolute maximum ratings are limiting values of operating and environmental conditions applicable to any electronic device of a specified type, as defined by its published data, which should not be exceeded under the worst probable conditions.

These values are chosen by the device manufacturer to provide acceptable serviceability of the device, taking no responsibility for equipment variations, environmental variations, and the effects of changes in operating conditions due to variations in the characteristics of the device under consideration and of all other electronic devices in the equipment.

The equipment manufacturer should design so that, initially and throughout the life of the device, no absolute maximum value for the intended service is exceeded with any device, under the worst probable operating conditions with respect to supply voltage variation, equipment component variation, equipment control adjustment, load variations, signal variation, environmental conditions, and variations in characteristics of the device under consideration and of all other electronic devices in the equipment.

#### Design maximum rating system

Design maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electronic device of a specified type as defined by its published data, and should not be exceeded under the worst probable conditions.

These values are chosen by the device manufacturer to provide acceptable serviceability of the device, taking responsibility for the effects of changes in operating conditions due to variations in the characteristics of the electronic device under consideration.

The equipment manufacturer should design so that, initially and throughout the life of the device, no design maximum value for the intended service is exceeded with a bogey electronic device, under the worst probable operating conditions with respect to supply voltage variation, equipment component variation, variation in characteristics of all other devices in the equipment, equipment control adjustment, load variation, signal variation and environmental conditions.

#### Design centre rating system

Design centre ratings are limiting values of operating and environmental conditions applicable to a bogey electronic device of a specified type as defined by its published data, and should not be exceeded under normal conditions.

These values are chosen by the device manufacturer to provide acceptable serviceability of the device in average applications, taking responsibility for normal changes in operating conditions due to rated supply voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all electronic devices.

The equipment manufacturer should design so that, initially, no design centre value for the intended service is exceeded with a bogey electronic device in equipment operating at the stated normal supply voltage.

#### LETTER SYMBOLS

The letter symbols for transistors and signal diodes detailed in this section are based on IEC publication number 148.

#### Letter symbols for currents, voltages and powers

##### BASIC LETTERS

I, i current

V, v voltage

P, p power.

Upper-case letter symbols are used to represent all values except instantaneous values that vary with time, these are represented by lower-case letters.

## SUBSCRIPTS

|              |  |
|--------------|--|
| A, a         | anode terminal   |
| (AV), (av)   | average value  |
| B, b         | base terminal  |
| C, c         | collector terminal   |
| D, d         | drain terminal   |
| E, e         | emitter terminal   |
| F, f         | forward  |
| G, g         | gate terminal  |
| K, k         | cathode terminal   |
| M, m         | peak value   |
| O, o         | as third subscript: the terminal not mentioned is open-circuit   |
| R, r         | as first subscript: reverse. As second subscript: repetitive. As third subscript: with a specified resistance between the terminal not mentioned and the reference terminal                                |
| (RMS), (rms) | root-mean-square value   |
| S, s         | as first or second subscript: source terminal (FETs only). As second subscript: non-repetitive (not FETs). As third subscript: short circuit between the terminal not mentioned and the reference terminal |
| X, x         | specified circuit  |
| Z, z         | replaces R to indicate the actual working voltage, current or power of voltage reference and voltage reference diodes.   |

No additional subscript is used for DC values.

Upper-case subscripts are used for the indication of:

- Continuous (DC) values (without signal), e.g.  $I_B$
- Instantaneous total values, e.g.  $i_B$
- Average total values, e.g.  $I_{B(AV)}$
- Peak total values, e.g.  $I_{BM}$
- Root-mean-square total values, e.g.  $I_{B(RMS)}$

Lower-case subscripts are used for the indication of values applying to the varying component alone:

- Instantaneous values, e.g.  $i_b$
- Root-mean-square values, e.g.  $i_{b(rms)}$
- Peak values, e.g.  $i_{bm}$
- Average values, e.g.  $i_{b(av)}$

If more than one subscript is used, the subscript for which both styles exist are either all upper-case or all lower-case.

## ADDITIONAL RULES FOR SUBSCRIPTS

*Transistor currents*

If it is necessary to indicate the terminal carrying the current, this should be done by the first subscript (conventional current flow from the external circuit into the terminal is positive).

Examples:  $I_B, i_B, I_b, I_{bm}$ .

*Diode currents*

To indicate a forward current (conventional current flow into the anode terminal), the subscript F or f should be used. For a reverse current (conventional current flow out of the anode terminal), the subscript R or r should be used.

Examples:  $I_F, I_R, I_f, I_{f(rms)}$ .

*Transistor voltages*

If it is necessary to indicate the points between which a voltage is measured, this should be done by the first two subscripts. The first subscript indicates the terminal at which the voltage is measured and the second the reference terminal or the circuit node. Where there is no possibility of confusion, the second subscript may be omitted.

Examples:  $V_{BE}, V_{BE}, V_{be}, V_{bem}$ .

*Diode voltages*

To indicate a forward voltage (anode positive with respect to cathode), the subscript F or f should be used. For a reverse voltage (anode negative with respect to cathode), the subscript R or r should be used.

Examples:  $V_F, V_R, V_f, V_{rm}$ .

*Supply voltages or currents*

Supply voltages or supply currents are indicated by repeating the appropriate terminal subscript.

Examples:  $V_{CC}, I_{EE}$ .

If it is necessary to indicate a reference terminal, this should be done by a third subscript.

Example:  $V_{CCE}$ .

*Subscripts for devices with more than one terminal of the same kind*

If a device has more than one terminal of the same kind, the subscript is formed by the appropriate letter for the



The static value is the slope of the line from the origin to the operating point on the appropriate characteristic curve, i.e. the quotient of the appropriate electrical quantities at the operating point.

The lower-case variant of a subscript is used for the designation of small-signal values.

Examples:

$h_{fe}$  small-signal value of the short-circuit forward current transfer ratio in common-emitter configuration

$Z_e = R_e + jX_e$  small-signal value of the external impedance.

If more than one subscript is used, subscripts for which both styles exist are either all upper-case or all lower-case.

Examples:  $h_{FE}$ ,  $y_{RE}$ ,  $h_{fe}$ .

#### *Subscripts for four-pole matrix parameters*

The first letter subscript (or double numeric subscript) indicates input, output, forward transfer or reverse transfer.

Examples:  $h_i$  (or  $h_{i1}$ ),  $h_o$  (or  $h_{o2}$ ),  $h_f$  (or  $h_{f1}$ ),  $h_r$  (or  $h_{r2}$ ).

A further subscript is used for the identification of the circuit configuration. When no confusion is possible, this further subscript may be omitted.

Examples:  $h_{fe}$  (or  $h_{21e}$ ),  $h_{FE}$  (or  $h_{21E}$ ).

#### DISTINCTION BETWEEN REAL AND IMAGINARY PARTS

If it is necessary to distinguish between real and imaginary parts of electrical parameters, no additional subscripts should be used. If basic symbols for the real and imaginary parts exist, these may be used.

Examples:  $Z_i = R_i + jX_i$ ,  $y_{fe} = g_{fe} + jb_{fe}$ .

If such symbols do not exist, or if they are not suitable, the following notation is used:

Examples:

Re ( $h_{ib}$ ) etc. for the real part of  $h_{ib}$

Im ( $h_{ib}$ ) etc. for the imaginary part of  $h_{ib}$ .

## CATV PARAMETERS

### Gain ( $G_p$ )

#### DEFINITION

The power gain, expressed in dB, is the ratio of output and input power of a module, operating in a  $75 \Omega$  ( $Z_0$ ) system.

#### MEASUREMENT

The power gain is measured at several frequencies throughout the band, although the gain performances are mostly given only at the start and stop frequencies. The gain is measured by applying a single tone signal to the module and measuring the output power. The input power is measured before connecting the module using a thru-line and feeding the system with exactly the same signals.

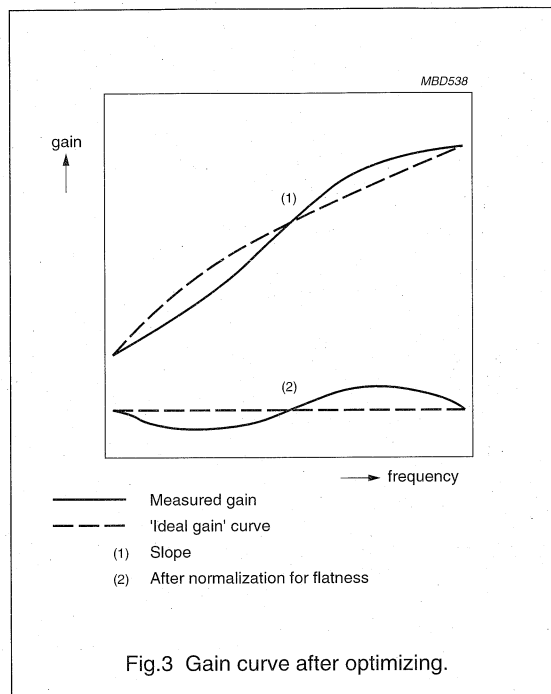
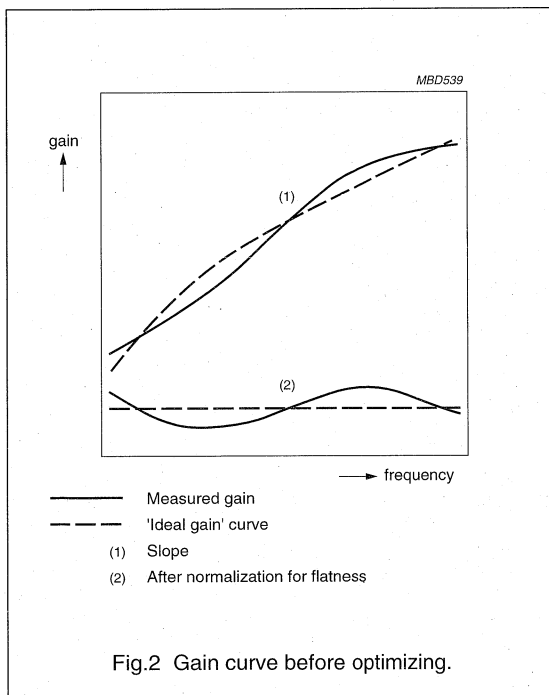
#### EQUIPMENT

Input and output power levels are measured with a power meter.

### Flatness of frequency response (FL)

#### DEFINITION

The flatness of gain of a CATV amplifier module is defined as the maximum deviation from an absolute flat gain over a given frequency range, after the slope of the amplifier over this frequency range has been optimized and equalized by means of a certain cable length to give the best result for flatness (see Fig.2 and Fig.3). This means that an 'ideal gain curve' for the module is calculated and the flatness is the maximum deviation of this 'ideal gain' curve.



**CALCULATION**

To determine the flatness, the measured gain values are compared with an 'ideal gain' curve derived from a mathematical model. The formula used is as follows:

$$\text{Gain} = G + C \sqrt{\frac{f_x}{f_1}}$$

where

G = constant gain (frequency independent)

C = cable constant

$f_x$  = desired frequency

$f_1$  = start frequency.

The cable constant (C) must be optimized during the flatness determination so that the gain curve best fits the measured gain figures. The start value for C is calculated using the formula:

$$C_{\text{start}} = \frac{G_n - G_1}{\sqrt{\frac{f_n}{f_1} - 1}}$$

where

$G_n$  = the measured gain at stop frequency

$G_1$  = the measured gain at start frequency

$f_n$  = stop frequency.

The value of G is chosen so that the maximum positive deviation of the measured gain from the 'ideal gain' curve is the same as the maximum negative deviation. The value of C is adapted by  $\pm 0.001$  until the 'ideal gain' curve best fits the measured curve.

The flatness of the module gain is the maximum deviation in measured gain from the optimized gain formula.

**Slope (SL)**

**DEFINITION**

The slope of a module is the difference between the 'ideal gain' at the start frequency and the 'ideal gain' at the stop frequency (see 'Flatness').

**Flatness (S-curve method)**

## DEFINITION

For some high-slope modules the flatness is calculated according to the 'S-curve' method. The ideal S-curve is defined as:

$$G_f = G_{f_1} + \delta G \cdot a \cdot (f - f_1) + \delta G \cdot b \cdot (f - f_1)^2 + \delta G \cdot c \cdot (f - f_1)^3$$

where

$$\delta G = G_{f_n} - G_{f_1}$$

$f_1$  = start frequency

$f_n$  = stop frequency

$a = 3.1224 \times 10^{-3}$

$b = 1.9932 \times 10^{-6}$

$c = -8.934 \times 10^{-9}$

The flatness is the maximum deviation between the measured gain and the 'ideal gain' curve.

**Delta gain**

## DEFINITION

Delta gain is the difference in gain between two given frequencies (mostly the start and stop frequencies).

**Intermodulation distortion ( $d_{im}$ )**

In accordance with DIN 45004B 6.3, 3-tone.

## DEFINITION

The intermodulation distortion product is the difference in dB between the peak of the RF signal in the measuring channel and the peak of the distortion signal caused by the influence of a signal in a neighbouring channel (see Fig.4).

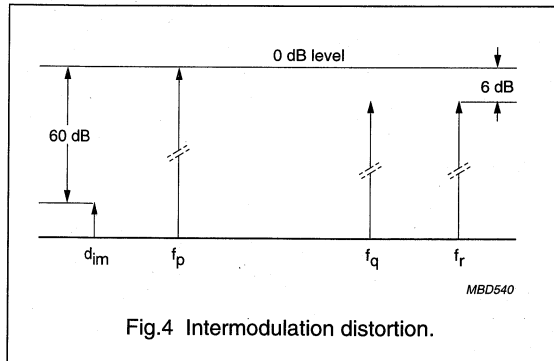


Fig.4 Intermodulation distortion.

To measure 3-tone  $d_{im}$ , three CW signals are applied to the module:

$f_p = f$  level = 0 dB

$f_q = f + 7$  MHz level = -6 dB

$f_r = f + 9$  MHz level = -6 dB.

The distortion product is measured at  $f - 2$  MHz. This distortion product consists of the  $(f_p + f_q - f_r)$  beats and is expressed in dB referenced to the 0 dB level (the  $f_p$  signal level).

This 0 dB level should be chosen so that the distortion product ( $d_{im}$ ) is -60 dB. For practical reasons the given output level ( $V_o$ ) for 3-tone distortion is defined as the 0 dB level and the modules are rejected if the distortion level is worse than -60 dB.

## EQUIPMENT

Spectrum analyzer with settings:

|                      |         |
|----------------------|---------|
| Internal attenuator  | 40 dB   |
| Resolution bandwidth | 3 kHz   |
| Video bandwidth      | 100 Hz  |
| Span                 | 50 kHz. |

The three signals are obtained from three different generators (see Appendix A).

**Composite third order distortion: composite triple beat (CTB) in CW carriers**

In accordance with National Cable Television Association recommendations.

**DEFINITION**

Composite third order modulation is the amplitude distortion of desired signals, caused by third order curvature of non-linear transfer characteristics in system equipment. It is the ratio, expressed in dB, of the peak level of the RF signal to the peak level of the cluster of distortion components centered around the carrier.

**MEASUREMENT**

To measure the CTB, a signal at the measuring frequency is set to the specified  $V_o$  level. This output level is defined as the 0 dB level. During the measurement<sup>(1)</sup> all channels in the band are set to the specified  $V_o$  level, see Appendix E. Now, at the measuring frequency, the distortion product is measured with a spectrum analyzer or distortion analyzer.

The CTB distortion is measured high in the band because here the distortion products have most amplitude (although the greatest number of beats ( $f_1 \pm f_2 \pm f_3$  and  $2 \times f_1 \pm f_2$ ) are found in the centre of the band).

**EQUIPMENT**

Spectrum analyzer with settings:

|                      |          |
|----------------------|----------|
| Resolution bandwidth | 30 kHz   |
| Video bandwidth      | 100 kHz  |
| Span                 | 500 kHz. |

A bandpass filter is used to eliminate the distortion products caused by the spectrum analyzer itself. If desired, a distortion analyzer can be used instead of the spectrum analyzer.

The carrier signals are obtained from a multi-channel generator. The frequency deviation of each channel must be less than 5 kHz.

(1) In the USA, an equally spaced frequency raster is used with a space of 6 MHz between the channels. In Germany frequency distribution of the space between the channels is 7 MHz up to 300 MHz, and 8 MHz above 300 MHz. In general, the Philips measurements are made in accordance with the American frequency raster. For the German market, measurements can be made with a set-up which approximates as closely as possible to the German raster. A list of both rasters is given in Appendix D.

**Composite third order distortion: cross modulation ( $X_{mod}$ ) in modulated carriers**

**DEFINITION**

Cross modulation distortion is a form of distortion where modulation of interfering stations appears as a modulation of the desired station, caused by third order curvature of non-linear transfer characteristics in system equipment. It is the ratio, expressed in dB, of the peak level of the modulated RF signal to the peak level of the distortion components centered around the carrier (Figs. 5, 6 and 7).

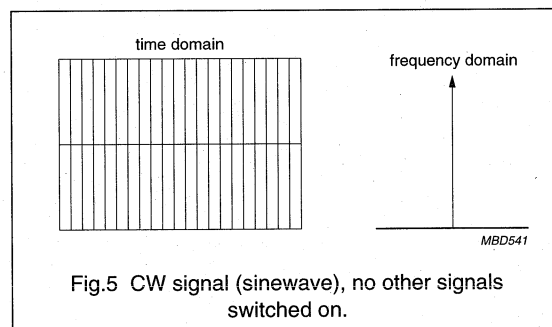


Fig.5 CW signal (sinewave), no other signals switched on.

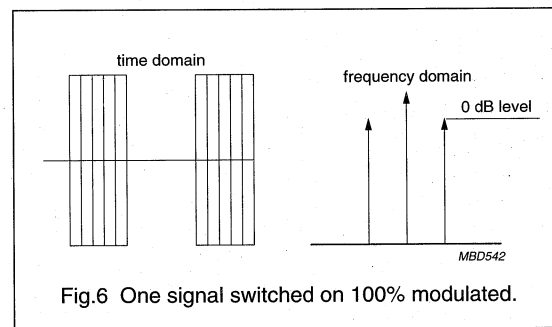


Fig.6 One signal switched on 100% modulated.

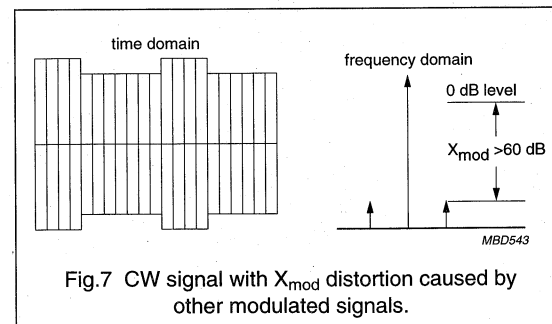


Fig.7 CW signal with  $X_{mod}$  distortion caused by other modulated signals.



## MEASUREMENT

To measure  $X_{\text{mod}}$ , the carrier of the desired channel is set to the specified  $V_o$  level. This channel is then 100% modulated with a 15.75 kHz square wave<sup>(1)</sup>. The peak level of this modulation signal (15.75 kHz on the carrier) is defined as the 0 dB level. The distortion product is now measured by setting each individual CW channel to the specified  $V_o$  level and switching them on in modulated mode, see Appendix E. Only the carrier in the channel where the  $X_{\text{mod}}$  distortion is to be measured, is not modulated. The  $X_{\text{mod}}$  distortion peak now appears as 15.75 kHz on the carrier.

The  $X_{\text{mod}}$  distortion is most easily measured at the low end of the frequency band.

## EQUIPMENT

Bandpass filter:

Tuned to the channel in which the distortion product is to be measured.

Spectrum analyzer with settings (for most types):

|                      |         |
|----------------------|---------|
| Resolution bandwidth | 300 kHz |
| Video bandwidth      | 30 Hz   |
| Span                 | 5 kHz.  |

A multi-channel generator is required for the test signals.

A distortion analyzer will be required if the  $X_{\text{mod}}$  is to be measured at a high frequency in the band. This is because phase noise will make spectrum analyzer measurements inaccurate.

**Second order distortion ( $d_2$ )**

In accordance with DIN 45004-A1.

## DEFINITION

The second order distortion product is the difference in dB between the peak level of an RF signal at the measuring frequency, and the peak level of the signal at the measuring frequency caused by two CW signals with their

second order modulation product ( $f_1 \pm f_2$ ) at the measuring frequency (see Fig.8).

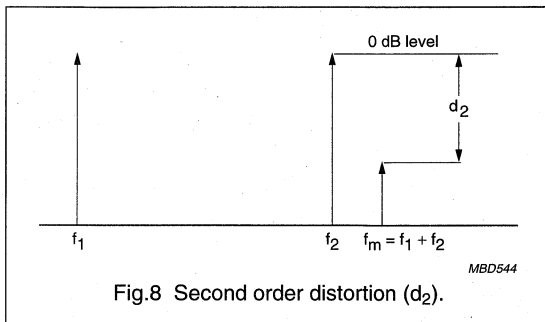


Fig.8 Second order distortion ( $d_2$ ).

## MEASUREMENT

Second order modulation is measured at the frequency in the band where the distortion product is found to be worst. In general this will be at the high end of the band.

In most cases the measuring procedure will be as follows:

Signals  $f_1$  and  $f_2$  are chosen so that  $f_1$  is the lowest channel in the band and  $f_2$  is the highest. This means that  $f_1 + f_2$  lays within the band.

The peak levels of  $f_1$  and  $f_2$  are equal and are defined as the 0 dB level. For frequency sets, see Appendix B.

## EQUIPMENT

Spectrum analyzer with settings:

|                      |         |
|----------------------|---------|
| Resolution bandwidth | 3 kHz   |
| Video bandwidth      | 100 Hz  |
| Span                 | 50 kHz. |

A tunable bandpass filter is used to eliminate the distortion caused by the spectrum analyzer.

**Composite second order (CSO) distortion**

## DEFINITION

Composite second order distortion is the ratio, expressed in dB, of the peak level of the RF signal to the peak level of the cluster of distortion components centered around the desired signal. This distortion is caused by a compilation of components of second order intermodulation products of interfering signals with frequencies  $f_1$  and  $f_2$ , so that

$$f_m = f_1 \pm f_2 \text{ Or}$$

$$f_m = 2 \times f_1 \text{ Or}$$

$$f_m = 2 \times f_2.$$

(1) The 15.75 kHz square wave modulation signal, used with  $X_{\text{mod}}$  measurements, found its origin in the American broadcasting method. Using the NTSC system, the 15.75 kHz is defined by the 60 Hz mains frequency and the number of 525 TV lines, i.e. (NTSC) =  $60 \times 525 + 2 = 15.75$  KHz. The modulation frequency for PAL (one of the European methods) is 15.625 kHz. This is because in Europe the mains frequency is 50 Hz and the number of TV lines using PAL is 625.

## MEASUREMENT

Measurement is made by setting a signal with the desired frequency to the specified level for  $V_0$ . This  $V_0$  level is defined as the 0 dB level.

During the measurement, all channels in the band are levelled to the specified  $V_0$ . Now at the measurement frequency, the distortion product is measured by use of a spectrum analyzer.

The CSO distortion is measured high in the band because it is here that this distortion product has most influence, see Appendix E.

## EQUIPMENT

Spectrum analyzer with settings:

|                      |          |
|----------------------|----------|
| Resolution bandwidth | 30 kHz   |
| Video bandwidth      | 100 Hz   |
| Span                 | 400 kHz. |

A bandpass filter is used at the input of the spectrum analyzer.

**S-parameters  $S_{11}$  and  $S_{22}$  (return losses)**

In accordance with IEC 747-7.

## DEFINITION

The return losses or reflection coefficients of a module can be defined as the  $S_{11}$  and the  $S_{22}$  of a two-port network (see Fig.9).

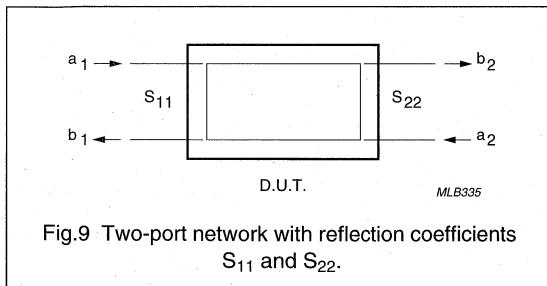


Fig.9 Two-port network with reflection coefficients  $S_{11}$  and  $S_{22}$ .

$$b_1 = S_{11} \cdot a_1 + S_{12} \cdot a_2 \quad (1)$$

$$b_2 = S_{21} \cdot a_1 + S_{22} \cdot a_2 \quad (2)$$

where:

$$a_1 = \frac{1}{2 \cdot \sqrt{Z_0}} \cdot (V_1 + Z_0 \cdot i_1) = \text{signal into port 1} \quad (3)$$

$$a_2 = \frac{1}{2 \cdot \sqrt{Z_0}} \cdot (V_2 + Z_0 \cdot i_2) = \text{signal into port 2} \quad (4)$$

$$b_1 = \frac{1}{2 \cdot \sqrt{Z_0}} \cdot (V_1 + Z_0 \cdot i_1) = \text{signal out of port 1}$$

$$b_2 = \frac{1}{2 \cdot \sqrt{Z_0}} \cdot (V_2 + Z_0 \cdot i_2) = \text{signal out of port 2}$$

From (1) and (2) formulae for the return losses can be derived:

$$S_{11} = \left. \frac{b_1}{a_1} \right|_{a_2 = 0} \quad (5)$$

$$S_{22} = \left. \frac{b_2}{a_2} \right|_{a_1 = 0} \quad (6)$$

In (5),  $a_2 = 0$  means output port terminated with  $Z_0$  (derived from formula (4)).

In (6),  $a_1 = 0$  means input port terminated with  $Z_0$  (derived from formula (3)).

## MEASUREMENT

The return losses are measured with a network analyzer after calibration, where the influence of the test jig is eliminated. The necessary termination of the other port with  $Z_0$  is done automatically by the network analyzer.

The network analyser must have a directivity of at least 40 dB to obtain an accuracy of 0.5 dB when measuring return loss figures of 20 dB. A full two-port correction method can be used to improve the accuracy.

**Noise figure (F)**

In accordance with IEC 747-7.

## DEFINITION

The noise figure is defined as the ratio of the total available noise power output from the module when connected to a noise source to that which is generated solely by the noise source.

## MEASUREMENT

Noise figure is measured with a noise figure meter at the output of the module, while a noise is connected to the input of the module. Measurements should be done in an electrically-shielded room to prevent pick-up of unwanted signals.

**APPENDIX A - COMMON FREQUENCY SETS FOR  $d_{dim}$  MEASUREMENTS**

| $f_m$ (MHz) | $f_p$ (MHz) | $f_q$ (MHz) | $f_r$ (MHz) |
|-------------|-------------|-------------|-------------|
| 33.25       | 35.25       | 42.25       | 44.25       |
| 163.25      | 165.25      | 172.25      | 174.25      |
| 185.25      | 187.25      | 194.25      | 196.25      |
| 285.25      | 287.25      | 294.25      | 296.25      |
| 335.25      | 337.25      | 344.25      | 346.25      |
| 339.25      | 341.25      | 348.25      | 350.25      |
| 385.25      | 387.25      | 394.25      | 396.25      |
| 438.25      | 440.25      | 447.25      | 449.25      |
| 481.25      | 483.25      | 490.25      | 492.25      |
| 538.25      | 540.25      | 547.25      | 549.25      |
| 849.25      | 851.25      | 858.25      | 860.25      |

**APPENDIX B - COMMON FREQUENCY SETS FOR  $d_2$  MEASUREMENTS**

| $f_p$ (MHz) | $f_q$ (MHz) | $f_m$ (MHz) |
|-------------|-------------|-------------|
| 83.25       | 109.25      | 192.50      |
| 66.00       | 144.00      | 210.00      |
| 55.25       | 211.25      | 266.50      |
| 55.25       | 343.25      | 398.50      |
| 55.25       | 391.25      | 446.50      |
| 55.25       | 493.25      | 548.50      |
| 300.00      | 450.00      | 750.00      |

**APPENDIX C - DISTORTION RESULTS USING THE CENELEC FREQUENCY RASTER**

The CENELEC Frequency Raster is increasingly being used in Europe. This raster has less channels and these are no longer equally spaced as with the USA Frequency Raster. This results generally in much better distortion readings.

The distortion figures of the CATV hybrids are measured using the standard USA Frequency Raster. A different number of channels is used, however, depending on the frequency range.

The following table based on calculations and correlation measurements using several different hybrid types provides a means of converting the standard measured distortion figures (USA Frequency Raster) into CENELEC Frequency Raster readings.

| FREQUENCY RANGE (MHz) | CHANNELS |         | CTB (dB) | $X_{mod}$ (dB) | CSO (dB) |
|-----------------------|----------|---------|----------|----------------|----------|
|                       | USA      | CENELEC |          |                |          |
| 40 - 600              | 85       | 29      | -11.00   | -8.00          | -6.00    |
| 40 - 750              | 110      | 35      | -12.00   | -9.00          | -9.00    |
| 40 - 860              | 49       | 42      | +2.00    | -1.00          | +1.00    |

## Wideband Hybrid IC Modules

General

## APPENDIX D - LIST OF FREQUENCY RASTERS FOR USA AND GERMANY

| USA     |                 |
|---------|-----------------|
| CHANNEL | FREQUENCY (MHz) |
| 2       | 55.25           |
| 3       | 61.25           |
| 4       | 67.25           |
| 5       | 77.25           |
| 6       | 83.25           |
| A2      | 109.25          |
| A1      | 115.25          |
| A       | 121.25          |
| B       | 127.25          |
| C       | 133.25          |
| D       | 139.25          |
| E3      | 145.25          |
| F       | 151.25          |
| G       | 157.25          |
| H       | 163.25          |
| I       | 169.25          |
| 7       | 175.25          |
| 8       | 181.25          |
| 9       | 187.25          |
| 10      | 193.25          |
| 11      | 199.25          |
| 12      | 205.25          |
| 13      | 211.25          |
| J       | 217.25          |
| K       | 223.25          |
| L       | 229.25          |
| M       | 235.25          |
| N       | 241.25          |
| O       | 247.25          |
| P       | 253.25          |
| Q       | 259.25          |
| R       | 265.25          |
| S       | 271.25          |
| T       | 277.25          |
| U       | 283.25          |
| V       | 289.25          |
| W       | 295.25          |

| USA (CONTINUED) |                 |
|-----------------|-----------------|
| CHANNEL         | FREQUENCY (MHz) |
| X               | 301.25          |
| Y               | 307.25          |
| Z               | 313.25          |
| H1              | 319.25          |
| H2              | 325.25          |
| H3              | 331.25          |
| H4              | 337.25          |
| H5              | 343.25          |
| H6              | 349.25          |
| H7              | 355.25          |
| H8              | 361.25          |
| H9              | 367.25          |
| H10             | 373.25          |
| H11             | 379.25          |
| H12             | 385.25          |
| H13             | 391.25          |
| H14             | 397.25          |
| H15             | 403.25          |
| H16             | 409.25          |
| H17             | 415.25          |
| H18             | 421.25          |
| H19             | 427.25          |
| H20             | 433.25          |
| H21             | 439.25          |
| H22             | 445.25          |
| H23             | 451.25          |
| H24             | 457.25          |
| H25             | 463.25          |
| 14              | 469.25          |
| 15              | 475.25          |
| 16              | 481.25          |
| 17              | 487.25          |
| 18              | 493.25          |
| 19              | 499.25          |
| 20              | 505.25          |
| 21              | 511.25          |
| 22              | 517.25          |
| 23              | 523.25          |
| 24              | 529.25          |

## Wideband Hybrid IC Modules

## General

| USA (CONTINUED) |                 |
|-----------------|-----------------|
| CHANNEL         | FREQUENCY (MHz) |
| 25              | 535.25          |
| 26              | 541.25          |
| 27              | 547.25          |
| 28              | 553.25          |
| 29              | 559.25          |
| 30              | 565.25          |
| 31              | 571.25          |
| 32              | 577.25          |
| 33              | 583.25          |
| 34              | 589.25          |
| 35              | 595.25          |
| 36              | 601.25          |
| 37              | 607.25          |
| 38              | 613.25          |
| 39              | 619.25          |
| 40              | 625.25          |
| 41              | 631.25          |
| 42              | 637.25          |
| 43              | 643.25          |
| 44              | 649.25          |
| 45              | 655.25          |
| 46              | 661.25          |
| 47              | 667.25          |
| 48              | 673.25          |
| 49              | 679.25          |
| 50              | 685.25          |
| 51              | 691.25          |
| 52              | 697.25          |
| 53              | 703.25          |
| 54              | 709.25          |
| 55              | 715.25          |
| 56              | 721.25          |
| 57              | 727.25          |
| 58              | 733.25          |
| 59              | 739.25          |
| 60              | 745.25          |
| 61              | 751.25          |
| 62              | 757.25          |
| 63              | 763.25          |

| USA (CONTINUED) |                 |
|-----------------|-----------------|
| CHANNEL         | FREQUENCY (MHz) |
| 64              | 769.25          |
| 65              | 775.25          |
| 66              | 781.25          |
| 67              | 787.25          |
| 68              | 793.25          |
| 69              | 799.25          |
| 70              | 805.25          |
| 71              | 811.25          |
| 72              | 817.25          |
| 73              | 823.25          |
| 74              | 829.25          |
| 75              | 835.25          |
| 76              | 841.25          |
| 77              | 847.25          |
| 78              | 853.25          |
| 79              | 859.25          |
| 80              | 865.25          |
| 81              | 871.25          |
| 82              | 877.25          |
| 83              | 883.25          |
| 84              | 889.25          |
| 85              | 895.25          |

| GERMANY |                 |
|---------|-----------------|
| CHANNEL | FREQUENCY (MHz) |
| K2      | 48.25           |
| K3      | 55.25           |
| K4      | 62.25           |
| -       | 69.25           |
| -       | 76.25           |
| S2      | 112.25          |
| S3      | 119.25          |
| S4      | 126.25          |
| S5      | 133.25          |
| S6      | 140.25          |
| S7      | 147.25          |
| S8      | 154.25          |
| S10     | 168.25          |

## Wideband Hybrid IC Modules

General

| GERMANY (CONTINUED) |                 |
|---------------------|-----------------|
| CHANNEL             | FREQUENCY (MHz) |
| K5                  | 175.25          |
| K6                  | 182.25          |
| K7                  | 189.25          |
| K8                  | 196.25          |
| K9                  | 203.25          |
| K10                 | 210.25          |
| K11                 | 217.25          |
| K12                 | 224.25          |
| S11                 | 231.25          |
| S12                 | 238.25          |
| S13                 | 245.25          |
| S14                 | 252.25          |
| S15                 | 259.25          |
| S16                 | 266.25          |
| S17                 | 273.25          |
| S18                 | 280.25          |
| S19                 | 287.25          |
| S20                 | 294.25          |
| S21                 | 303.25          |

| GERMANY (CONTINUED) |                 |
|---------------------|-----------------|
| CHANNEL             | FREQUENCY (MHz) |
| S22                 | 311.25          |
| S23                 | 319.25          |
| S24                 | 327.25          |
| S25                 | 335.25          |
| S26                 | 343.25          |
| S27                 | 351.25          |
| S28                 | 359.25          |
| S29                 | 367.25          |
| S30                 | 375.25          |
| S31                 | 383.25          |
| S32                 | 391.25          |
| S33                 | 399.25          |
| S34                 | 407.25          |
| S35                 | 415.25          |
| S36                 | 423.25          |
| S37                 | 431.25          |
| S38                 | 439.25          |
| S39                 | 445.25          |

## APPENDIX E - TEST CHANNELS

Channels used during CTB,  $X_{\text{mod}}$  and CSO measurements

| RANGE                        | NAMES    | FREQUENCIES (MHz) | CHANNELS |
|------------------------------|----------|-------------------|----------|
| 5 - 200 MHz<br>22 channels   | T7 - T13 | 7.00 - 43.00      | 7        |
|                              | 2 - 4    | 55.25 - 67.25     | 3        |
|                              | 5 - 6    | 77.25 - 83.25     | 2        |
|                              | A - 7    | 121.25 - 175.25   | 10       |
| 40 - 300 MHz<br>32 channels  | 2 - 4    | 55.25 - 67.25     | 3        |
|                              | 5 - 6    | 77.25 - 83.25     | 2        |
|                              | A2       | 109.25            | 1        |
|                              | A - F    | 121.25 - 151.25   | 6        |
|                              | H - S    | 163.25 - 271.25   | 19       |
| 40 - 450 MHz<br>52 channels  | 2 - 4    | 55.25 - 67.25     | 3        |
|                              | 5 - 6    | 77.25 - 83.25     | 2        |
|                              | A2       | 109.25            | 1        |
|                              | A - F    | 121.25 - 151.25   | 6        |
|                              | H - H14  | 163.25 - 397.25   | 40       |
| 40 - 450 MHz<br>60 channels  | 2 - 4    | 55.25 - 67.25     | 3        |
|                              | 5 - 6    | 77.25 - 83.25     | 2        |
|                              | A - H22  | 121.25 - 445.25   | 55       |
| 40 - 550 MHz<br>77 channels  | 2 - 4    | 55.25 - 67.25     | 3        |
|                              | 5 - 6    | 77.25 - 83.25     | 2        |
|                              | A - 27   | 121.25 - 547.25   | 72       |
| 40 - 600 MHz<br>85 channels  | 2 - 4    | 55.25 - 67.25     | 3        |
|                              | 5 - 6    | 77.25 - 83.25     | 2        |
|                              | A - 35   | 121.25 - 595.25   | 80       |
| 40 - 750 MHz<br>110 channels | 2 - 4    | 55.25 - 67.25     | 3        |
|                              | 5 - 6    | 77.25 - 83.25     | 2        |
|                              | A - 60   | 121.25 - 745.25   | 105      |

Continued on next page



## Wideband Hybrid IC Modules

General

## APPENDIX E - TEST CHANNELS (CONTINUED)

Channels used during CTB,  $X_{\text{mod}}$  and CSO measurements

| RANGE                       | NAMES | FREQUENCIES (MHz) | CHANNELS |
|-----------------------------|-------|-------------------|----------|
| 40 - 860 MHz<br>49 channels | 2     | 55.25             | 1        |
|                             | 4     | 67.25             | 1        |
|                             | 6     | 83.25             | 1        |
|                             | 7     | 175.25            | 1        |
|                             | 9     | 187.25            | 1        |
|                             | 12    | 205.25            | 1        |
|                             | J     | 217.25            | 1        |
|                             | M     | 235.25            | 1        |
|                             | O     | 247.25            | 1        |
|                             | R     | 265.25            | 1        |
|                             | T     | 277.25            | 1        |
|                             | W     | 295.25            | 1        |
|                             | Y     | 307.25            | 1        |
|                             | H2    | 325.25            | 1        |
|                             | H4    | 337.25            | 1        |
|                             | H7    | 355.25            | 1        |
|                             | H9    | 367.25            | 1        |
|                             | H12   | 385.25            | 1        |
|                             | H14   | 397.25            | 1        |
|                             | H17   | 415.25            | 1        |
|                             | H19   | 427.25            | 1        |
|                             | H22   | 445.25            | 1        |
|                             | H24   | 457.25            | 1        |
|                             | 15    | 475.25            | 1        |
|                             | 17    | 487.25            | 1        |
|                             | 20    | 505.25            | 1        |
|                             | 22    | 517.25            | 1        |
|                             | 25    | 535.25            | 1        |
|                             | 27    | 547.25            | 1        |
|                             | 30    | 565.25            | 1        |
|                             | 32    | 577.25            | 1        |
|                             | 35    | 595.25            | 1        |
|                             | 37    | 607.25            | 1        |
|                             | 40    | 625.25            | 1        |
|                             | 42    | 637.25            | 1        |
|                             | 45    | 655.25            | 1        |
|                             | 47    | 667.25            | 1        |
|                             | 50    | 685.25            | 1        |
|                             | 52    | 697.25            | 1        |
|                             | 55    | 715.25            | 1        |
|                             | 57    | 727.25            | 1        |
|                             | 60    | 745.25            | 1        |
|                             | 62    | 757.25            | 1        |
|                             | 65    | 775.25            | 1        |
|                             | 67    | 787.25            | 1        |
|                             | 70    | 805.25            | 1        |
|                             | 73    | 823.25            | 1        |
|                             | 76    | 841.25            | 1        |
|                             | 79    | 859.25            | 1        |

Continued on next page

**APPENDIX E - TEST CHANNELS (CONTINUED)**Channels used during CTB,  $X_{\text{mod}}$  and CSO measurements

| RANGE                      | NAMES     | FREQUENCIES (MHz) | CHANNELS |
|----------------------------|-----------|-------------------|----------|
| 40 - 860 MHz               | 2 - 4     | 55.25 - 67.25     | 3        |
| 129 channels               | 5 - 6     | 77.25 - 83.25     | 2        |
|                            | A - 79    | 121.25 - 859.25   | 124      |
| 40 - 450 MHz               | 2 - 3     | 55.25 - 61.25     | 2        |
| 36 channels                | C - F     | 133.25 - 151.25   | 4        |
| German raster              | H         | 163.25            | 1        |
|                            | 7         | 175.25            | 1        |
| (For test purposes, USA    | 9         | 187.25            | 1        |
| frequency rasters are used | 12        | 205.25            | 1        |
| to emulate the German      | J         | 217.25            | 1        |
| raster)                    | L - M     | 229.25 - 235.25   | 2        |
|                            | O - S     | 247.25 - 271.25   | 5        |
|                            | U - X     | 283.25 - 301.25   | 4        |
|                            | Z - H2    | 313.25 - 325.25   | 3        |
|                            | H4        | 337.25            | 1        |
|                            | H6        | 349.25            | 1        |
|                            | H8 - H10  | 361.25 - 373.25   | 3        |
|                            | H12 - H13 | 385.25 - 391.25   | 2        |
|                            | H16 - H18 | 409.25 - 421.25   | 3        |
|                            | H20       | 433.25            | 1        |

**DEVICE DATA**

in alphanumeric sequence

## CATV power doubler amplifier modules

## BGD102; BGD104

## FEATURES

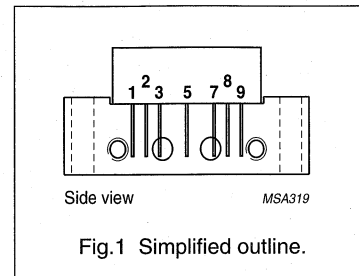
- Excellent linearity
- High output level
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

## DESCRIPTION

Power doubler amplifier modules for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain<br>BGD102<br>BGD104 | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                |                       | 19.5 | 20.5 | dB   |
|                  | power gain<br>BGD102<br>BGD104 | f = 450 MHz           | 19.2 | 21.2 | dB   |
|                  |                                |                       | 20.5 | 22.5 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | —    | 435  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | —    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | -40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | -20  | +100 | °C   |

## CATV power doubler amplifier modules

## BGD102; BGD104

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER                      | CONDITIONS                                 | MIN. | MAX. | UNIT |
|-----------|--------------------------------|--|------|------|------|
| $G_p$     | power gain                     | f = 50 MHz                                 |      |      |      |
|           | BGD102                         |  | 18   | 19   | dB   |
|           | BGD104                         |  | 19.5 | 20.5 | dB   |
|           | power gain                     | f = 450 MHz                                |      |      |      |
|           | BGD102                         |  | 19.2 | 21.2 | dB   |
|           | BGD104                         |  | 20.5 | 22.5 | dB   |
| SL        | slope cable equivalent         | f = 40 to 450 MHz                          | 0.5  | 2.5  | dB   |
| FL        | flatness of frequency response | f = 40 to 450 MHz                          | –    | ±0.3 | dB   |
| $S_{11}$  | input return losses            | f = 40 to 80 MHz                           | –    | 20   | dB   |
|           |                                | f = 80 to 160 MHz                          | –    | 19   | dB   |
|           |                                | f = 160 to 450 MHz                         | –    | 18   | dB   |
| $S_{22}$  | output return losses           | f = 40 to 80 MHz                           | –    | 20   | dB   |
|           |                                | f = 80 to 160 MHz                          | –    | 19   | dB   |
|           |                                | f = 160 to 450 MHz                         | –    | 18   | dB   |
| $S_{21}$  | phase response                 | f = 50 MHz                                 | +135 | +225 | deg- |
| CTB       | composite triple beat          | 60 channels flat;                          |      |      |      |
|           |                                | $V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –65  | dB   |
|           | BGD104                         |  | –    | –64  | dB   |
| $X_{mod}$ | cross modulation               | 60 channels flat;                          |      |      |      |
|           |                                | $V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –67  | dB   |
|           | BGD104                         |  | –    | –66  | dB   |
| $d_2$     | second order distortion        | note 1                                     | –    | –73  | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60$ dB; note 2                  |      |      |      |
|           |                                |  | 65   | –    | dBmV |
|           | BGD104                         |  | 64.5 | –    | dBmV |
| F         | noise figure                   | f = 40 to 450 MHz                          | –    | 7    | dB   |
| $I_{tot}$ | total current consumption (DC) | note 3                                     | –    | 435  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_o = 46$  dBmV;  
 $f_q = 343.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 398.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The modules normally operate at  $V_B = 24$  V, but are able to withstand supply transients up to 30 V.

## CATV power doubler amplifier module

BGD106

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TlPtAu metallized crystals ensure optimal reliability.

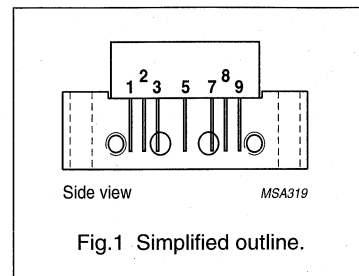
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 21.5 | 22.5 | dB   |
|                  |                                | f = 450 MHz            | 22.1 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 435  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |

## CATV power doubler amplifier module

BGD106

## CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz;  $T_{\text{case}} = 35\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\text{ }\Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 21.5 | 22.5      | dB   |
|                  |                                   | $f = 450\text{ MHz}$   | 22.1 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }450\text{ MHz}$                                      | 0    | 2         | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }450\text{ MHz}$                                      | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                       | –    | 20        | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                      | –    | 19        | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                     | –    | 18        | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                       | –    | 20        | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                      | –    | 19        | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                     | –    | 18        | dB   |
| CTB              | composite triple beat             | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 446.5 MHz | –    | –63       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz | –    | –63       | dB   |
| CSO              | composite second order distortion | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 446.5 MHz | –    | –59       | dB   |
| $d_2$            | second order distortion           | $V_o = 46\text{ dBmV}$ ; note 1  | –    | –68       | dB   |
| $V_o$            | output voltage                    | $d_{\text{in}} = -60\text{ dB}$ ; note 2                               | 66.5 | –         | dBmV |
| F                | noise figure                      | $f = 450\text{ MHz}$   | –    | 6.5       | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                                | –    | 435       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o = 66.5\text{ dBmV}$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGD108

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

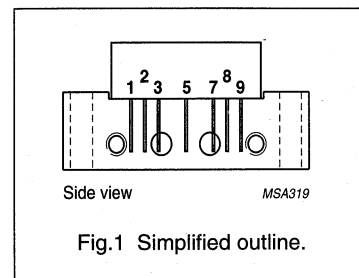
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 35   | 37   | dB   |
|                  |                                | f = 450 MHz            | 36.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 625  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |



## CATV amplifier module

BGD108

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 450 MHz;  $T_{\text{case}} = 35\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\text{ }\Omega$ ;  $V_B = +24\text{ V}$ 

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|---|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$   | 35   | 37        | dB   |
|                  |                                   | $f = 450\text{ MHz}$  | 36.5 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }450\text{ MHz}$                                       | 0.2  | 2.2       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }450\text{ MHz}$                                       | –    | $\pm 0.4$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$  | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                      | 18   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$  | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                      | 18   | –         | dB   |
| CTB              | composite triple beat             | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –64       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –65       | dB   |
| CSO              | composite second order distortion | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 446.5 MHz  | –    | –62       | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –73       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                                | 67   | –         | dBmV |
| F                | noise figure                      | $f = 450\text{ MHz}$  | –    | 7         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                                 | –    | 625       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV power doubler amplifier modules

## BGD502; BGD504

## FEATURES

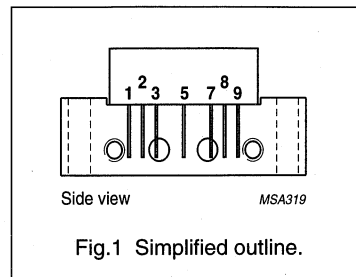
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  | BGD502                         |                       | 19.5 | 20.5 | dB   |
|                  | BGD504                         |                       |      |      |      |
|                  | power gain                     | f = 550 MHz           | 18.8 | 20.8 | dB   |
|                  | BGD502                         |                       | 20.2 | 22.2 | dB   |
|                  | BGD504                         |                       |      |      |      |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 435  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV power doubler amplifier modules

## BGD502; BGD504

**CHARACTERISTICS**Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER   | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|-----------|---|---|------|------|------|------|
| $G_p$     | power gain<br>BGD502<br>BGD504                        | f = 50 MHz  | 18   | –    | 19   | dB   |
|           |   |   | 19.5 | –    | 20.5 | dB   |
|           | power gain<br>BGD502<br>BGD504                        | f = 550 MHz   | 18.8 | –    | 20.8 | dB   |
|           |   |   | 20.2 | –    | 22.2 | dB   |
| SL        | slope cable equivalent                                | f = 40 to 550 MHz   | 0.2  | –    | 2.2  | dB   |
| FL        | flatness of frequency response                        | f = 40 to 550 MHz   | –    | –    | ±0.3 | dB   |
| $S_{11}$  | input return losses                                   | f = 40 to 80 MHz  | 20   | –    | –    | dB   |
|           |   | f = 80 to 160 MHz   | 19   | –    | –    | dB   |
|           |   | f = 160 to 550 MHz  | 18   | –    | –    | dB   |
| $S_{22}$  | output return losses                                  | f = 40 to 80 MHz  | 20   | –    | –    | dB   |
|           |   | f = 80 to 160 MHz   | 19   | –    | –    | dB   |
|           |   | f = 160 to 550 MHz  | 18   | –    | –    | dB   |
| $S_{21}$  | phase response  | f = 50 MHz  | +135 | –    | +225 | deg  |
| CTB       | composite triple beat<br>BGD502<br>BGD504             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –    | –65  | dB   |
|           |   |   | –    | –    | –64  | dB   |
| $X_{mod}$ | cross modulation<br>BGD502<br>BGD504                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –68  | dB   |
|           |   |   | –    | –    | –67  | dB   |
| CSO       | composite second order distortion<br>BGD502<br>BGD504 | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –    | –62  | dB   |
|           |   |   | –    | –    | –60  | dB   |
| $d_2$     | second order distortion<br>BGD502<br>BGD504           | note 1  | –    | –    | –72  | dB   |
|           |   |   | –    | –    | –70  | dB   |
| $V_o$     | output voltage<br>BGD502<br>BGD504                    | $d_{im} = -60$ dB; note 2                                       | 64   | –    | –    | dBmV |
|           |   |   | 63.5 | –    | –    | dBmV |
| F         | noise figure  | f = 550 MHz   | –    | –    | 8    | dB   |
| $I_{tot}$ | total current consumption (DC)                        | note 3  | –    | 415  | 435  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  $f_q = 493.25$  MHz;  $V_q = 44$  dBmV; measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  $f_p = 540.25$  MHz;  $V_p = V_o$ ;  $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB; measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The modules normally operate at  $V_B = 24$  V, but are able to withstand supply transients up to 30 V.

## CATV power doubler amplifier modules

## BGD502; BGD504

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER   | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|---|---|------|------|-----------|------|
| $G_p$     | power gain<br>BGD502<br>BGD504                        | $f = 50$ MHz  | 18   | –    | 19        | dB   |
|           |   |   | 19.5 | –    | 20.5      | dB   |
|           | power gain<br>BGD502<br>BGD504                        | $f = 450$ MHz   | 18.6 | –    | 20.6      | dB   |
|           |   |   | 20   | –    | 22        | dB   |
| SL        | slope cable equivalent<br>BGD502<br>BGD504            | $f = 40$ to 450 MHz   | 0.2  | –    | 1.8       | dB   |
|           |   |   | 0    | –    | 1.65      | dB   |
| FL        | flatness of frequency response                        | $f = 40$ to 450 MHz   | –    | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses                                   | $f = 40$ to 80 MHz  | 20   | –    | –         | dB   |
|           |   | $f = 80$ to 160 MHz   | 19   | –    | –         | dB   |
|           |   | $f = 160$ to 450 MHz  | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses                                  | $f = 40$ to 80 MHz  | 20   | –    | –         | dB   |
|           |   | $f = 80$ to 160 MHz   | 19   | –    | –         | dB   |
|           |   | $f = 160$ to 450 MHz  | 18   | –    | –         | dB   |
| $S_{21}$  | phase response  | $f = 50$ MHz  | +135 | –    | +225      | deg  |
| CTB       | composite triple beat<br>BGD502<br>BGD504             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –    | –67       | dB   |
|           |   |   | –    | –    | –66       | dB   |
| CSO       | composite second order distortion<br>BGD502<br>BGD504 | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 548.5 MHz  | –    | –    | t.b.f.    | dB   |
|           |   |   | –    | –    | t.b.f.    | dB   |
| $X_{mod}$ | cross modulation<br>BGD502<br>BGD504                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –67       | dB   |
|           |   |   | –    | –    | –66       | dB   |
| $d_2$     | second order distortion<br>BGD502<br>BGD504           | note 1  | –    | –    | –75       | dB   |
|           |   |   | –    | –    | –73       | dB   |
| $V_o$     | output voltage<br>BGD502<br>BGD504                    | $d_{im} = -60$ dB; note 2                                       | 67   | –    | –         | dBmV |
|           |   |   | 66.5 | –    | –         | dBmV |
| F         | noise figure  | $f = 450$ MHz   | –    | –    | 7         | dB   |
| $I_{tot}$ | total current consumption (DC)                        | note 3  | –    | 415  | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  $f_q = 391.25$  MHz;  $V_q = 46$  dBmV; measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  $f_p = 440.25$  MHz;  $V_p = V_o$ ;  $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB; measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The modules normally operate at  $V_B = 24$  V, but are able to withstand supply transients up to 30 V.

# CATV amplifier module

# BGD506

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

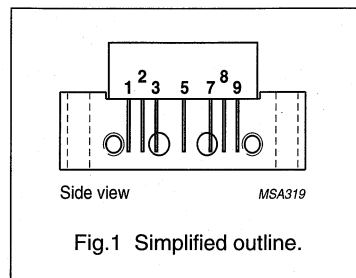
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 21.5 | 22.5 | dB   |
|                  |                                | f = 550 MHz           | 22.1 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24V | –    | 435  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |
| V <sub>B</sub>   | DC supply voltage                   | –    | +28  | V    |

## CATV amplifier module

BGD506

## CHARACTERISTICS

Table 1 Bandwidth 40 to 550 MHz;  $T_{\text{case}} = 35\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 21.5 | 22.5      | dB   |
|                  |                                   | $f = 550\text{ MHz}$   | 22.1 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }550\text{ MHz}$                                    | 0    | 2         | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }550\text{ MHz}$                                    | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | –    | 20        | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | –    | 19        | dB   |
|                  |                                   | $f = 160\text{ to }550\text{ MHz}$                                   | –    | 18        | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | –    | 20        | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | –    | 19        | dB   |
|                  |                                   | $f = 160\text{ to }550\text{ MHz}$                                   | –    | 18        | dB   |
| CTB              | composite triple beat             | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 547.25 MHz | –    | –62       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –63       | dB   |
| CSO              | composite second order distortion | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 548.5 MHz  | –    | –55       | dB   |
| $d_2$            | second order distortion           | $V_o = 44\text{ dBmV}$ ; note 1                                      | –    | –66       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 62.5 | –         | dBmV |
| F                | noise figure                      | $f = 550\text{ MHz}$   | –    | 7         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 435       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 493.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 548.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 540.25\text{ MHz}$ ;  $V_o = V_p$ ;  
 $f_q = 547.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 549.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 538.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGD508

## FEATURES

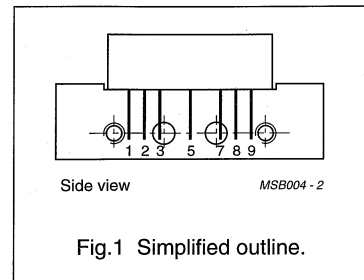
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115C

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 35   | 37   | dB   |
|                  |                                | f = 550 MHz           | 36.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 625  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGD508

## CHARACTERISTICS

Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 35   | 37        | dB   |
|           |                                   | $f = 550$ MHz   | 36.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz   | 0.2  | 2.2       | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz   | –    | $\pm 0.4$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz  | 18   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz  | 18   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –62       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –65       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –60       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 63   | –         | dBmV |
| F         | noise figure                      | $f = 550$ MHz   | –    | 7.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 625       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 393.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.



## CATV amplifier module

BGD508

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|-----------|-----------------------------------|---|------|------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 35   | 37   | dB   |
|           |                                   | f = 450 MHz   | 36.5 | –    | dB   |
| SL        | slope cable equivalent            | f = 40 to 450 MHz   | 0.2  | 2.2  | dB   |
| FL        | flatness of frequency response    | f = 40 to 450 MHz   | –    | ±0.4 | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –    | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –    | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –    | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –    | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45  | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –64  | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –65  | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV<br>measured at 446.5 MHz   | –    | –62  | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –73  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 67   | –    | dBmV |
| F         | noise figure                      | f = 450 MHz   | –    | 7    | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 625  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

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**CATV amplifier module****BGD508**

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**HANDLING**

As the BGD508 is a high gain amplifier with doubled output power and 15 W dissipation, it is necessary to ground the heatsink when the power supply is switched on or off.

**Switching on**

1. Ensure the 24 V (DC) supply is disconnected from the PCB or test jig.
2. Ground the heatsink and the common pins (pins 2, 3, 7 and 8) of the module. Connect input and output pins (pins 1 and 9) to a 75  $\Omega$  source and load.
3. Connect the 24 V (DC) to the module.

Permanent damage to the amplifier can be caused by switching on the supply voltage when the heatsink is not fully grounded.

**Switching off**

1. Disconnect the 24 V (DC) supply from the PCB or test jig.
2. Disconnect the module.

Permanent damage to the amplifier can be caused by disconnecting ground from the heatsink and common pins before the module supply voltage is switched off.

## CATV amplifier module

## BGD601

## FEATURES

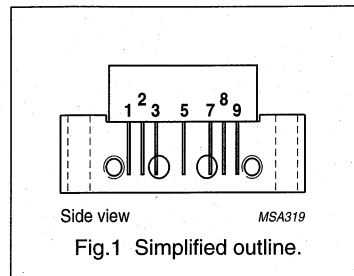
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high dynamic range amplifier module designed for applications in CATV systems operating over a frequency range of 40 to 600 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 12   | 13   | dB   |
|                  |                                | f = 600 MHz           | 12.7 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 435  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGD601

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 12   | 13        | dB   |
|           |                                   | $f = 600$ MHz   | 12.7 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 600 MHz   | 0.2  | 2.2       | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 600 MHz  | 18   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 600 MHz  | 18   | –         | dB   |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –62       | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –66       | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –60       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 63   | –         | dBmV |
| F         | noise figure                      | $f = 600$ MHz   | –    | 9.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD601

**Table 2** Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 12   | 13        | dB   |
|           |                                   | $f = 550$ MHz   | 12.5 | 14.5      | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz  | 18   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz  | 18   | –         | dB   |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –65       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –68       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –64       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64   | –         | dBmV |
| F         | noise figure                      | $f = 550$ MHz   | –    | 9         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGD601

**Table 3** Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 12   | 13        | dB   |
|           |                                   | f = 450 MHz   | 12.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 450 MHz   | 0.2  | 1.5       | dB   |
| FL        | flatness of frequency response    | f = 40 to 450 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –         | dB   |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –67       | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –67       | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –65       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –75       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 67   | –         | dBmV |
| F         | noise figure                      | f = 450 MHz   | –    | 8         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGD602

## FEATURES

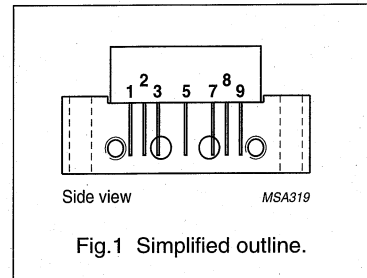
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high dynamic range amplifier module designed for applications in CATV systems with a bandwidth of 40 to 600 MHz operating with a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 600 MHz           | 19   | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 435  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGD602

**CHARACTERISTICS**Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|-----------|-----------------------------------|---|------|------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19   | dB   |
|           |                                   | $f = 600$ MHz   | 19   | –    | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 600 MHz   | 0.2  | 2.2  | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | ±0.3 | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|           |                                   | $f = 160$ to 600 MHz  | 18   | –    | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|           |                                   | $f = 160$ to 600 MHz  | 18   | –    | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45  | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –62  | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –66  | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –60  | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 63   | –    | dBmV |
| F         | noise figure                      | $f = 600$ MHz   | –    | 8    | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.



## CATV amplifier module

BGD602

**CHARACTERISTICS**Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 550$ MHz   | 18.8 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz   | 0.2  | 2.2       | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz  | 18   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz  | 18   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –66       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –68       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –62       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64   | –         | dBmV |
| F         | noise figure                      | $f = 550$ MHz   | –    | 7.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGD602

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|-----------|-----------------------------------|---|------|------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 18   | 19   | dB   |
|           |                                   | f = 450 MHz   | 18.6 | –    | dB   |
| SL        | slope cable equivalent            | f = 40 to 450 MHz   | 0.2  | 1.8  | dB   |
| FL        | flatness of frequency response    | f = 40 to 450 MHz   | –    | ±0.3 | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –    | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –    | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –    | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –    | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45  | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –67  | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –66  | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV<br>measured at 446.5 MHz   | –    | –60  | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –75  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 67   | –    | dBmV |
| F         | noise figure                      | f = 450 MHz   | –    | 7    | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGD602D

## FEATURES

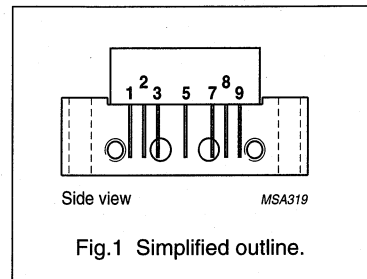
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high dynamic range cascode amplifier module with darlington configuration for CATV systems operating over a frequency range of 40 to 600 MHz at a supply voltage of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 17.5 | 18.5 | dB   |
|                  |                                | f = 600 MHz           | 18.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 440  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGD602D

**CHARACTERISTICS**Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|------------------|-----------------------------------|---|------|------|------|
| $G_p$            | power gain                        | $f = 50$ MHz  | 17.5 | 18.5 | dB   |
|                  |                                   | $f = 600$ MHz   | 18.5 | –    | dB   |
| SL               | slope cable equivalent            | $f = 40$ to 600 MHz   | 0.2  | 2.2  | dB   |
| FL               | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | ±0.3 | dB   |
| $S_{11}$         | input return losses               | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|                  |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|                  |                                   | $f = 160$ to 600 MHz  | 18   | –    | dB   |
| $S_{22}$         | output return losses              | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|                  |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|                  |                                   | $f = 160$ to 600 MHz  | 18   | –    | dB   |
| $S_{21}$         | phase response                    | $f = 50$ MHz  | –45  | +45  | deg  |
| CTB              | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –68  | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –61  | dB   |
| CSO              | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –64  | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –76  | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60$ dB; note 2                                | 66   | –    | dBmV |
| F                | noise figure                      | $f = 50$ MHz  | –    | 5.5  | dB   |
|                  |                                   | $f = 600$ MHz   | –    | 7    | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3  | –    | 440  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD602D

**CHARACTERISTICS**Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 17.5 | 18.5      | dB   |
|           |                                   | f = 550 MHz   | 18.3 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 550 MHz   | 0.2  | 2.2       | dB   |
| FL        | flatness of frequency response    | f = 40 to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 550 MHz  | 18   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 550 MHz  | 18   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –69       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –62       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –66       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –78       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 67   | –         | dBmV |
| F         | noise figure                      | f = 50 MHz  | –    | 5.5       | dB   |
|           |                                   | f = 550 MHz   | –    | 7         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 440       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGD602D

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|-----------|-----------------------------------|---|------|------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 17.5 | 18.5 | dB   |
|           |                                   | $f = 450$ MHz   | 18.1 | –    | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 450 MHz   | 0.2  | 1.8  | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 450 MHz   | –    | ±0.3 | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|           |                                   | $f = 160$ to 450 MHz  | 18   | –    | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|           |                                   | $f = 160$ to 450 MHz  | 18   | –    | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45  | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –68  | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –59  | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV<br>measured at 446.5 MHz   | –    | –66  | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –80  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 67   | –    | dBmV |
| F         | noise figure                      | $f = 50$ MHz  | –    | 5.5  | dB   |
|           |                                   | $f = 450$ MHz   | –    | 6.5  | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 440  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD702

## FEATURES

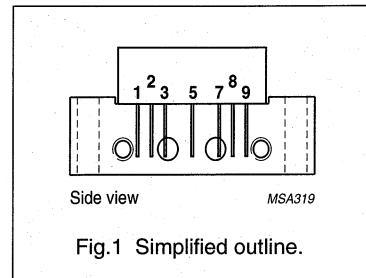
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid amplifier module designed for CATV systems operating over a frequency range of 40 to 750 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 750 MHz           | 18.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 435  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

## BGD702

## CHARACTERISTICS

Table 1 Bandwidth 40 to 750 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz   | 18   | 19        | dB   |
|           |                                   | $f = 750$ MHz  | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 750 MHz  | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 750 MHz  | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz                                       | 18   | –         | dB   |
|           |                                   | $f = 320$ to 640 MHz                                       | 17   | –         | dB   |
|           |                                   | $f = 640$ to 750 MHz                                       | 16   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz                                       | 18   | –         | dB   |
|           |                                   | $f = 320$ to 640 MHz                                       | 17   | –         | dB   |
|           |                                   | $f = 640$ to 750 MHz                                       | 16   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz   | –45  | +45       | deg  |
| CTB       | composite triple beat             | 110 channels flat; $V_o = 44$ dBmV; measured at 745.25 MHz | –    | –58       | dB   |
| $X_{mod}$ | cross modulation                  | 110 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz  | –    | –62       | dB   |
| CSO       | composite second order distortion | 110 channels flat; $V_o = 44$ dBmV; measured at 746.5 MHz  | –    | –58       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –68       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                  | 61   | –         | dBmV |
| F         | noise figure                      | $f = 50$ MHz   | –    | 5.5       | dB   |
|           |                                   | $f = 450$ MHz  | –    | 6.5       | dB   |
|           |                                   | $f = 550$ MHz  | –    | 6.5       | dB   |
|           |                                   | $f = 600$ MHz  | –    | 7         | dB   |
|           |                                   | $f = 750$ MHz  | –    | 8.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 435       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.



## CATV amplifier module

## BGD702

**Table 2** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 600$ MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 600 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –         | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 17   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –         | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 17   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –65       | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –65       | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –60       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGD702

**Table 3** Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 550$ MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –         | dB   |
|           |                                   | $f = 320$ to 550 MHz  | 17   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –         | dB   |
|           |                                   | $f = 320$ to 550 MHz  | 17   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –67       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –67       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –62       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64.5 | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD702

**Table 4** Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 18   | 19        | dB   |
|           |                                   | f = 450 MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 450 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 450 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 18   | –         | dB   |
|           |                                   | f = 320 to 450 MHz  | 17   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 18   | –         | dB   |
|           |                                   | f = 320 to 450 MHz  | 17   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –68       | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –65       | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV<br>measured at 446.5 MHz   | –    | –65       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –75       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 67   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

# CATV amplifier module

# BGD702D

### FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

### APPLICATIONS

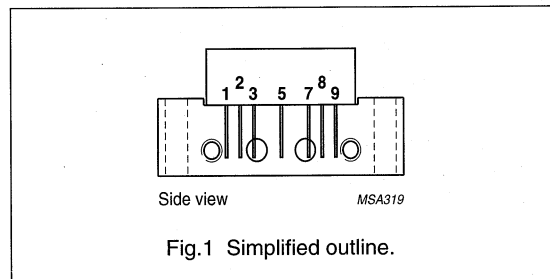
CATV systems in the 40 to 750 MHz frequency range.

### DESCRIPTION

Hybrid high dynamic range cascode amplifier module with darlington pre-stage dies operating at a voltage supply of 24 V (DC).

### PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



### QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 750 MHz           | 20   | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | 400  | 435  | mA   |

### LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>B</sub>   | supply voltage                      | –    | 25   | V    |
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGD702D

## CHARACTERISTICS

Table 1 Bandwidth 40 to 750 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz   | 18   | 19        | dB   |
|           |                                   | f = 750 MHz  | 20   | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 750 MHz  | 2    | 4         | dB   |
| FL        | flatness of frequency response    | f = 40 to 750 MHz  | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | f = 640 to 750 MHz   | 14   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | f = 640 to 750 MHz   | 14   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz   | –45  | +45       | deg  |
| CTB       | composite triple beat             | 110 channels flat; $V_o = 44$ dBmV; measured at 745.25 MHz | –    | –62       | dB   |
| $X_{mod}$ | cross modulation                  | 110 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz  | –    | –59       | dB   |
| CSO       | composite second order distortion | 110 channels flat; $V_o = 44$ dBmV; measured at 746.5 MHz  | –    | –62       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                  | 64   | –         | dBmV |
| F         | noise figure                      | f = 50 MHz   | –    | 5.5       | dB   |
|           |                                   | f = 750 MHz  | –    | 7         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | 400  | 435       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD702D

**Table 2** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 600$ MHz   | 19.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 600 MHz   | 1.5  | 3.5       | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –68       | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –61       | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –62       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –74       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 68   | –         | dBmV |
| F         | noise figure                      | $f = 50$ MHz  | –    | 5.5       | dB   |
|           |                                   | $f = 600$ MHz   | –    | 6         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | 400  | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD702D

**Table 3** Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 550$ MHz   | 19   | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz   | 1    | 3         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 550 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 550 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –69       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –62       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –66       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –78       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 69   | –         | dBmV |
| F         | noise figure                      | $f = 50$ MHz  | –    | 5.5       | dB   |
|           |                                   | $f = 550$ MHz   | –    | 5.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | 400  | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## Hybrid CATV amplifier module

BGD702MI

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability
- Mirrored image pinning of the BGD702.

## APPLICATIONS

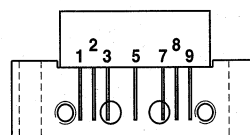
- CATV systems operating in the 40 to 750 MHz frequency range.

## DESCRIPTION

Hybrid amplifier module in a SOT115J package operating at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | output          |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | input           |



Side view

MSA319

Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 750 MHz           | 18.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 435  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |



## Hybrid CATV amplifier module

BGD702MI

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 750 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 18   | 19        | dB   |
|           |                                   | f = 750 MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 750 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 750 MHz   | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 18   | –         | dB   |
|           |                                   | f = 320 to 640 MHz  | 17   | –         | dB   |
|           |                                   | f = 640 to 750 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 18   | –         | dB   |
|           |                                   | f = 320 to 640 MHz  | 17   | –         | dB   |
|           |                                   | f = 640 to 750 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 110 channels flat; $V_o = 44$ dBmV;<br>measured at 745.25 MHz | –    | –58       | dB   |
| $X_{mod}$ | cross modulation                  | 110 channels flat; $V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –62       | dB   |
| CSO       | composite second order distortion | 110 channels flat; $V_o = 44$ dBmV;<br>measured at 746.5 MHz  | –    | –58       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –68       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                     | 61   | –         | dBmV |
| F         | noise figure                      | f = 50 MHz  | –    | 5.5       | dB   |
|           |                                   | f = 450 MHz   | –    | 6.5       | dB   |
|           |                                   | f = 550 MHz   | –    | 6.5       | dB   |
|           |                                   | f = 600 MHz   | –    | 7         | dB   |
|           |                                   | f = 750 MHz   | –    | 8.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## Hybrid CATV amplifier module

BGD702MI

**Table 2** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$  Ω

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|-----------|-----------------------------------|---|------|------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19   | dB   |
|           |                                   | $f = 600$ MHz   | 18.5 | –    | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 600 MHz   | 0.2  | 2    | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | ±0.3 | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –    | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 17   | –    | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –    | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 17   | –    | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45  | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –65  | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –65  | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –60  | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64   | –    | dBmV |
| F         | noise figure                      | see Table 1   | –    | –    | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## Hybrid CATV amplifier module

## BGD702MI

**Table 3** Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 550$ MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –         | dB   |
|           |                                   | $f = 320$ to 550 MHz  | 17   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –         | dB   |
|           |                                   | $f = 320$ to 550 MHz  | 17   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –67       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –67       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –62       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64.5 | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## Hybrid CATV amplifier module

## BGD702MI

**Table 4** Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 450$ MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 450 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 450 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –         | dB   |
|           |                                   | $f = 320$ to 450 MHz  | 17   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –         | dB   |
|           |                                   | $f = 320$ to 450 MHz  | 17   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –68       | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –65       | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –65       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –75       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 67   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGD704

## FEATURES

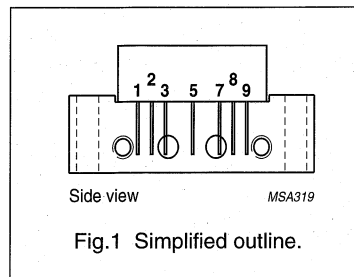
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

- CATV systems in the frequency range of 40 to 750 MHz.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## DESCRIPTION

Hybrid amplifier module operating at a voltage supply of +24 V (DC) encapsulated in a SOT115J package.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 19.5 | 20.5 | dB   |
|                  |                                | f = 750 MHz            | 20   | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 435  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGD704

## CHARACTERISTICS

Table 1 Bandwidth 40 to 750 MHz;  $V_B = +24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 19.5 | 20.5      | dB   |
|           |                                   | $f = 750$ MHz   | 20   | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 750 MHz   | 0    | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 750 MHz   | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –         | dB   |
|           |                                   | $f = 320$ to 640 MHz  | 17   | –         | dB   |
|           |                                   | $f = 640$ to 750 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 18   | –         | dB   |
|           |                                   | $f = 320$ to 640 MHz  | 17   | –         | dB   |
|           |                                   | $f = 640$ to 750 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 110 channels flat; $V_o = 44$ dBmV;<br>measured at 745.25 MHz | –    | –57       | dB   |
| $X_{mod}$ | cross modulation                  | 110 channels flat; $V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –61       | dB   |
| CSO       | composite second order distortion | 110 channels flat; $V_o = 44$ dBmV;<br>measured at 746.5 MHz  | –    | –56       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –66       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                     | 60.5 | –         | dBmV |
| F         | noise figure                      | $f = 50$ MHz  | –    | 5         | dB   |
|           |                                   | $f = 450$ MHz   | –    | 6.5       | dB   |
|           |                                   | $f = 550$ MHz   | –    | 7         | dB   |
|           |                                   | $f = 600$ MHz   | –    | 7         | dB   |
|           |                                   | $f = 750$ MHz   | –    | 8.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 435       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = +24$  V, but is able to withstand supply transients up to +30 V.

## CATV amplifier module

## BGD704

**Table 2** Bandwidth 40 to 600 MHz;  $V_B = +24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|------------------|-----------------------------------|---|------|------|------|
| G <sub>p</sub>   | power gain                        | f = 50 MHz  | 19.5 | 20.5 | dB   |
|                  |                                   | f = 600 MHz   | 20   | –    | dB   |
| SL               | slope cable equivalent            | f = 40 to 600 MHz   | 0    | 2    | dB   |
| FL               | flatness of frequency response    | f = 40 to 600 MHz   | –    | ±0.3 | dB   |
| S <sub>11</sub>  | input return losses               | f = 40 to 80 MHz  | 20   | –    | dB   |
|                  |                                   | f = 80 to 160 MHz   | 19   | –    | dB   |
|                  |                                   | f = 160 to 320 MHz  | 18   | –    | dB   |
|                  |                                   | f = 320 to 600 MHz  | 17   | –    | dB   |
| S <sub>22</sub>  | output return losses              | f = 40 to 80 MHz  | 20   | –    | dB   |
|                  |                                   | f = 80 to 160 MHz   | 19   | –    | dB   |
|                  |                                   | f = 160 to 320 MHz  | 18   | –    | dB   |
|                  |                                   | f = 320 to 600 MHz  | 17   | –    | dB   |
| S <sub>21</sub>  | phase response                    | f = 50 MHz  | –45  | +45  | deg  |
| CTB              | composite triple beat             | 85 channels flat; V <sub>o</sub> = 44 dBmV;<br>measured at 595.25 MHz | –    | –64  | dB   |
| X <sub>mod</sub> | cross modulation                  | 85 channels flat; V <sub>o</sub> = 44 dBmV;<br>measured at 55.25 MHz  | –    | –64  | dB   |
| CSO              | composite second order distortion | 85 channels flat; V <sub>o</sub> = 44 dBmV;<br>measured at 596.5 MHz  | –    | –58  | dB   |
| d <sub>2</sub>   | second order distortion           | note 1  | –    | –68  | dB   |
| V <sub>o</sub>   | output voltage                    | d <sub>im</sub> = –60 dB; note 2                                      | 63   | –    | dBmV |
| F                | noise figure                      | see Table 1   | –    | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC)    | note 3  | –    | 435  | mA   |

**Notes**

- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV;  
f<sub>q</sub> = 541.25 MHz; V<sub>q</sub> = 44 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 596.5 MHz.
- Measured according to DIN45004B:  
f<sub>p</sub> = 590.25 MHz; V<sub>p</sub> = V<sub>o</sub>;  
f<sub>q</sub> = 597.25 MHz; V<sub>q</sub> = V<sub>o</sub> – 6 dB;  
f<sub>r</sub> = 599.25 MHz; V<sub>r</sub> = V<sub>o</sub> – 6 dB;  
measured at f<sub>p</sub> + f<sub>q</sub> – f<sub>r</sub> = 588.25 MHz.
- The module normally operates at V<sub>B</sub> = +24 V, but is able to withstand supply transients up to +30 V.

## CATV amplifier module

## BGD704

**Table 3** Bandwidth 40 to 550 MHz;  $V_B = +24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz   | 19.5 | 20.5      | dB   |
|           |                                   | f = 550 MHz  | 20   | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 550 MHz  | 0    | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 550 MHz  | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 19   | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 18   | –         | dB   |
|           |                                   | f = 320 to 550 MHz   | 17   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 19   | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 18   | –         | dB   |
|           |                                   | f = 320 to 550 MHz   | 17   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz   | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat; $V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –66       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat; $V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –66       | dB   |
| CSO       | composite second order distortion | 77 channels flat; $V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –60       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                    | 63.5 | –         | dBmV |
| F         | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = +24$  V, but is able to withstand supply transients up to +30 V.



## CATV amplifier module

## BGD704

**Table 4** Bandwidth 40 to 450 MHz;  $V_B = +24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz   | 19.5 | 20.5      | dB   |
|           |                                   | $f = 450$ MHz  | 20   | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 450 MHz  | 0    | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 450 MHz  | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz   | 18   | –         | dB   |
|           |                                   | $f = 320$ to 450 MHz   | 17   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 19   | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz   | 18   | –         | dB   |
|           |                                   | $f = 320$ to 450 MHz   | 17   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz   | –45  | +45       | deg  |
| CTB       | composite triple beat             | 60 channels flat; $V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –67       | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat; $V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –64       | dB   |
| CSO       | composite second order distortion | 60 channels flat; $V_o = 46$ dBmV<br>measured at 446.5 MHz   | –    | –63       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –73       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                    | 66   | –         | dBmV |
| F         | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 435       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = +24$  V, but is able to withstand supply transients up to +30 V.

## CATV amplifier module

BGD802

## FEATURES

- Excellent linearity.
- Extremely low noise
- Excellent return loss properties
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

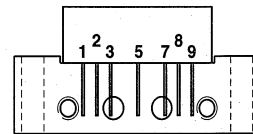
- CATV systems operating in the 40 to 860 MHz frequency range.

## DESCRIPTION

Hybrid amplifier module in a SOT115J package operating with a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



Side view

MSA319

Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 860 MHz           | 18.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 410  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>B</sub>   | supply voltage                      | –    | 25   | V    |
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

## BGD802

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX. | UNIT |
|------------------|-----------------------------------|--|------|------|------|
| G <sub>p</sub>   | power gain                        | f = 50 MHz   | 18   | 19   | dB   |
|                  |                                   | f = 860 MHz  | 18.5 | –    | dB   |
| SL               | slope cable equivalent            | f = 40 to 860 MHz  | 0.2  | 2    | dB   |
| FL               | flatness of frequency response    | f = 40 to 860 MHz  | –    | ±0.5 | dB   |
| S <sub>11</sub>  | input return losses               | f = 40 to 80 MHz   | 20   | –    | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –    | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –    | dB   |
|                  |                                   | f = 320 to 640 MHz   | 15.5 | –    | dB   |
|                  |                                   | f = 640 to 860 MHz   | 14   | –    | dB   |
| S <sub>22</sub>  | output return losses              | f = 40 to 80 MHz   | 20   | –    | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –    | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –    | dB   |
|                  |                                   | f = 320 to 640 MHz   | 15.5 | –    | dB   |
|                  |                                   | f = 640 to 860 MHz   | 14   | –    | dB   |
| S <sub>21</sub>  | phase response                    | f = 50 MHz   | –45  | +45  | deg  |
| CTB              | composite triple beat             | 49 channels flat; V <sub>o</sub> = 47 dBmV; measured at 859.25 MHz | –    | –63  | dB   |
| X <sub>mod</sub> | cross modulation                  | 49 channels flat; V <sub>o</sub> = 47 dBmV; measured at 55.25 MHz  | –    | –62  | dB   |
| CSO              | composite second order distortion | 49 channels flat; V <sub>o</sub> = 47 dBmV; measured at 860.5 MHz  | –    | –60  | dB   |
| d <sub>2</sub>   | second order distortion           | note 1   | –    | –69  | dB   |
| V <sub>o</sub>   | output voltage                    | d <sub>im</sub> = –60 dB; note 2                                   | 61.5 | –    | dBmV |
| F                | noise figure                      | f = 50 MHz   | –    | 5.5  | dB   |
|                  |                                   | f = 550 MHz  | –    | 6    | dB   |
|                  |                                   | f = 650 MHz  | –    | 7    | dB   |
|                  |                                   | f = 750 MHz  | –    | 7.5  | dB   |
|                  |                                   | f = 860 MHz  | –    | 9    | dB   |
| I <sub>tot</sub> | total current consumption (DC)    | note 3   | –    | 410  | mA   |

## Notes

- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV;  
f<sub>q</sub> = 805.25 MHz; V<sub>q</sub> = 44 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 860.5 MHz.
- Measured according to DIN45004B:  
f<sub>p</sub> = 851.25 MHz; V<sub>p</sub> = V<sub>o</sub>;  
f<sub>q</sub> = 858.25 MHz; V<sub>q</sub> = V<sub>o</sub> – 6 dB;  
f<sub>r</sub> = 860.25 MHz; V<sub>r</sub> = V<sub>o</sub> – 6 dB;  
measured at f<sub>p</sub> + f<sub>q</sub> – f<sub>r</sub> = 849.25 MHz.
- The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD802

**Table 2** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz   | 18   | 19        | dB   |
|           |                                   | $f = 860$ MHz  | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 860 MHz  | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 860 MHz  | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz   | 17   | –         | dB   |
|           |                                   | $f = 320$ to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | $f = 640$ to 860 MHz   | 14   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz   | 17   | –         | dB   |
|           |                                   | $f = 320$ to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | $f = 640$ to 860 MHz   | 14   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz   | –45  | +45       | deg  |
| CTB       | composite triple beat             | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 859.25 MHz | –    | –54       | dB   |
| $X_{mod}$ | cross modulation                  | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –59       | dB   |
| CSO       | composite second order distortion | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 860.5 MHz  | –    | –56       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –69       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2  | 61.5 | –         | dBmV |
| F         | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 410       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD802

**Table 3** Bandwidth 40 to 750 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50$ MHz   | 18   | 19        | dB   |
|                  |                                   | $f = 750$ MHz  | 18.5 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40$ to 750 MHz  | 0.2  | 2         | dB   |
| FL               | flatness of frequency response    | $f = 40$ to 750 MHz  | –    | $\pm 0.5$ | dB   |
| $S_{11}$         | input return losses               | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|                  |                                   | $f = 80$ to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | $f = 160$ to 320 MHz   | 17   | –         | dB   |
|                  |                                   | $f = 320$ to 640 MHz   | 15.5 | –         | dB   |
|                  |                                   | $f = 640$ to 750 MHz   | 14   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|                  |                                   | $f = 80$ to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | $f = 160$ to 320 MHz   | 17   | –         | dB   |
|                  |                                   | $f = 320$ to 640 MHz   | 15.5 | –         | dB   |
|                  |                                   | $f = 640$ to 750 MHz   | 14   | –         | dB   |
| $S_{21}$         | phase response                    | $f = 50$ MHz   | –45  | +45       | deg  |
| CTB              | composite triple beat             | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 745.25 MHz | –    | –58       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –60       | dB   |
| CSO              | composite second order distortion | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 746.5 MHz  | –    | –60       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –72       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60$ dB; note 2                                 | 64   | –         | dBmV |
| F                | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3   | –    | 410       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD802

**Table 4** Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 18   | 19        | dB   |
|           |                                   | f = 550 MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 550 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 550 MHz  | 16   | –         | dB   |
| $S_{22}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 550 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –65       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –63       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –63       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 65   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 410       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## Hybrid CATV amplifier module

BGD802MI

## FEATURES

- Excellent linearity
- Extremely low noise
- Excellent return loss properties
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability
- Mirrored image pinning of the BGD802.

## APPLICATIONS

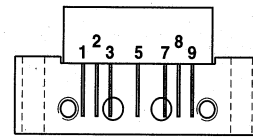
- CATV systems operating in the 40 to 860 MHz frequency range.

## DESCRIPTION

Hybrid amplifier module in a SOT115J2 package operating with a voltage supply of 24 V (DC).

## PINNING - SOT115J2

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | output          |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | input           |



Side view

MSA319

Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 860 MHz           | 18.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 410  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>B</sub>   | supply voltage                      | –    | 25   | V    |
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## Hybrid CATV amplifier module

BGD802MI

## CHARACTERISTICS

Table 1 Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz   | 18   | 19        | dB   |
|           |                                   | f = 860 MHz  | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 860 MHz  | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 860 MHz  | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz   | 14   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz   | 14   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz   | –45  | +45       | deg  |
| CTB       | composite triple beat             | 49 channels flat; $V_o = 47$ dBmV;<br>measured at 859.25 MHz | –    | –61       | dB   |
| $X_{mod}$ | cross modulation                  | 49 channels flat; $V_o = 47$ dBmV;<br>measured at 55.25 MHz  | –    | –61       | dB   |
| CSO       | composite second order distortion | 49 channels flat; $V_o = 47$ dBmV;<br>measured at 860.5 MHz  | –    | –60       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –69       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                    | 61.5 | –         | dBmV |
| F         | noise figure                      | f = 50 MHz   | –    | 5.5       | dB   |
|           |                                   | f = 550 MHz  | –    | 6         | dB   |
|           |                                   | f = 650 MHz  | –    | 7         | dB   |
|           |                                   | f = 750 MHz  | –    | 7.5       | dB   |
|           |                                   | f = 860 MHz  | –    | 9         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 410       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.



## Hybrid CATV amplifier module

## BGD802MI

**Table 2** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz   | 18   | 19        | dB   |
|           |                                   | f = 860 MHz  | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 860 MHz  | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 860 MHz  | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz   | 14   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz   | 14   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz   | –45  | +45       | deg  |
| CTB       | composite triple beat             | 129 channels flat;<br>$V_o = 42$ dBmV;<br>measured at 859.25 MHz | –    | –58       | dB   |
| $X_{mod}$ | cross modulation                  | 129 channels flat;<br>$V_o = 42$ dBmV;<br>measured at 55.25 MHz  | –    | –63       | dB   |
| CSO       | composite second order distortion | 129 channels flat;<br>$V_o = 42$ dBmV;<br>measured at 860.5 MHz  | –    | –58       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –69       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2  | 61.5 | –         | dBmV |
| F         | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 410       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGD804

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

CATV systems in the 40 to 860 MHz frequency range.

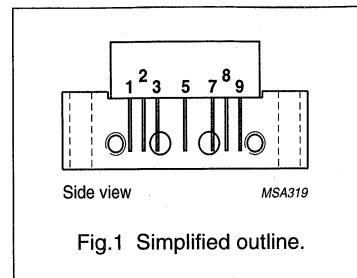
## DESCRIPTION

Hybrid amplifier module in a SOT115J package operating at a voltage supply of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 19.5 | 20.5 | dB   |
|                  |                                | f = 860 MHz            | 20   | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 410  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |
| V <sub>B</sub>   | supply voltage                      | –    | 25   | V    |

## CATV amplifier module

BGD804

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 860 MHz;  $V_B = +24\text{ V}$ ;  $T_{\text{case}} = 35\text{ }^\circ\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 19.5 | 20.5      | dB   |
|                  |                                   | $f = 860\text{ MHz}$   | 20   | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }860\text{ MHz}$                                    | 0.2  | 2         | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }860\text{ MHz}$                                    | –    | $\pm 0.5$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 18.5 | –         | dB   |
|                  |                                   | $f = 160\text{ to }320\text{ MHz}$                                   | 17   | –         | dB   |
|                  |                                   | $f = 320\text{ to }640\text{ MHz}$                                   | 15.5 | –         | dB   |
|                  |                                   | $f = 640\text{ to }860\text{ MHz}$                                   | 14   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 18.5 | –         | dB   |
|                  |                                   | $f = 160\text{ to }320\text{ MHz}$                                   | 17   | –         | dB   |
|                  |                                   | $f = 320\text{ to }640\text{ MHz}$                                   | 15.5 | –         | dB   |
|                  |                                   | $f = 640\text{ to }860\text{ MHz}$                                   | 14   | –         | dB   |
| $S_{21}$         | phase response                    | $f = 50\text{ MHz}$  | –45  | +45       | deg  |
| CTB              | composite triple beat             | 49 channels flat; $V_o = 47\text{ dBmV}$ ;<br>measured at 859.25 MHz | –    | –61       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 49 channels flat; $V_o = 47\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –62       | dB   |
| CSO              | composite second order distortion | 49 channels flat; $V_o = 47\text{ dBmV}$ ;<br>measured at 860.5 MHz  | –    | –58       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –67       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 60   | –         | dBmV |
| F                | noise figure                      | $f = 50\text{ MHz}$  | –    | 5         | dB   |
|                  |                                   | $f = 550\text{ MHz}$   | –    | 6         | dB   |
|                  |                                   | $f = 650\text{ MHz}$   | –    | 6         | dB   |
|                  |                                   | $f = 750\text{ MHz}$   | –    | 6.5       | dB   |
|                  |                                   | $f = 860\text{ MHz}$   | –    | 7.5       | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3   | –    | 410       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 805.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 860.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 851.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 858.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 860.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 849.25\text{ MHz}$ .
- The module normally operates at  $V_B = 24\text{ V}$ , but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD804

**Table 2** Bandwidth 40 to 860 MHz;  $V_B = +24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 19.5 | 20.5      | dB   |
|           |                                   | f = 860 MHz   | 20   | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 860 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 860 MHz   | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz  | 14   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz  | 14   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 129 channels flat; $V_o = 44$ dBmV;<br>measured at 859.25 MHz | –    | –53       | dB   |
| $X_{mod}$ | cross modulation                  | 129 channels flat; $V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –61       | dB   |
| CSO       | composite second order distortion | 129 channels flat; $V_o = 44$ dBmV;<br>measured at 860.5 MHz  | –    | –54       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –67       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                     | 60   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 410       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B;  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD804

**Table 3** Bandwidth 40 to 750 MHz;  $V_B = +24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.       | UNIT |
|-----------|-----------------------------------|---|------|------------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 19.5 | 20.5       | dB   |
|           |                                   | $f = 750$ MHz   | 20   | –          | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 750 MHz   | 0.2  | 2          | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 750 MHz   | –    | $\pm 0.45$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –          | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –          | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –          | dB   |
|           |                                   | $f = 320$ to 640 MHz  | 15.5 | –          | dB   |
|           |                                   | $f = 640$ to 750 MHz  | 14   | –          | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –          | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –          | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –          | dB   |
|           |                                   | $f = 320$ to 640 MHz  | 15.5 | –          | dB   |
|           |                                   | $f = 640$ to 750 MHz  | 14   | –          | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45        | deg  |
| CTB       | composite triple beat             | 110 channels flat; $V_o = 44$ dBmV;<br>measured at 745.25 MHz | –    | –57        | dB   |
| $X_{mod}$ | cross modulation                  | 110 channels flat; $V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –62        | dB   |
| CSO       | composite second order distortion | 110 channels flat; $V_o = 44$ dBmV;<br>measured at 746.5 MHz  | –    | –56        | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –68        | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                     | 63   | –          | dBmV |
| F         | noise figure                      | see Table 1   | –    | –          | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 410        | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B;  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD804

**Table 4** Bandwidth 40 to 650 MHz;  $V_B = +24$  V;  $T_{\text{case}} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.       | UNIT |
|------------------|-----------------------------------|--|------|------------|------|
| $G_p$            | power gain                        | f = 50 MHz   | 19.5 | 20.5       | dB   |
|                  |                                   | f = 650 MHz  | 20   | –          | dB   |
| SL               | slope cable equivalent            | f = 40 to 650 MHz  | 0.2  | 2          | dB   |
| FL               | flatness of frequency response    | f = 40 to 650 MHz  | –    | $\pm 0.35$ | dB   |
| $S_{11}$         | input return losses               | f = 40 to 80 MHz   | 20   | –          | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –          | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –          | dB   |
|                  |                                   | f = 320 to 650 MHz   | 15   | –          | dB   |
| $S_{22}$         | output return losses              | f = 40 to 80 MHz   | 20   | –          | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –          | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –          | dB   |
|                  |                                   | f = 320 to 650 MHz   | 15   | –          | dB   |
| $S_{21}$         | phase response                    | f = 50 MHz   | –45  | +45        | deg  |
| CTB              | composite triple beat             | 94 channels flat; $V_o = 44$ dBmV;<br>measured at 649.25 MHz | –    | –60        | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 94 channels flat; $V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –62        | dB   |
| CSO              | composite second order distortion | 94 channels flat; $V_o = 44$ dBmV;<br>measured at 650.5 MHz  | –    | –58        | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –69        | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60$ dB; note 2                             | 65   | –          | dBmV |
| F                | noise figure                      | see Table 1  | –    | –          | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3   | –    | 410        | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 595.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 650.5$  MHz.
- Measured according to DIN45004B;  
 $f_p = 640.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 647.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 649.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 638.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGD804

**Table 5** Bandwidth 40 to 550 MHz;  $V_B = +24$  V;  $T_{case} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.       | UNIT |
|-----------|-----------------------------------|--|------|------------|------|
| $G_p$     | power gain                        | $f = 50$ MHz   | 19.5 | 20.5       | dB   |
|           |                                   | $f = 550$ MHz  | 20   | –          | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz  | 0.2  | 2          | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz  | –    | $\pm 0.35$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz   | 20   | –          | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 18.5 | –          | dB   |
|           |                                   | $f = 160$ to 320 MHz   | 17   | –          | dB   |
|           |                                   | $f = 320$ to 550 MHz   | 16   | –          | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz   | 20   | –          | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 18.5 | –          | dB   |
|           |                                   | $f = 160$ to 320 MHz   | 17   | –          | dB   |
|           |                                   | $f = 320$ to 550 MHz   | 16   | –          | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz   | –45  | +45        | deg  |
| CTB       | composite triple beat             | 77 channels flat; $V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –64        | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat; $V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –64        | dB   |
| CSO       | composite second order distortion | 77 channels flat; $V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –62        | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –72        | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                    | 66   | –          | dBmV |
| F         | noise figure                      | see Table 1  | –    | –          | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 410        | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B;  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGD885

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid amplifier module for CATV/MATV systems operating over a frequency range of 40 to 860 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115D

| PIN | DESCRIPTION                  |
|-----|------------------------------|
| 1   | input (note 1)               |
| 2   | common                       |
| 3   | common                       |
| 4   | 10 V, 200 mA supply terminal |
| 5   | common                       |
| 6   | common                       |
| 7   | common                       |
| 8   | +V <sub>B</sub>              |
| 9   | output (note 1)              |

## Note

1. Pins 1 and 9 carry DC voltages.

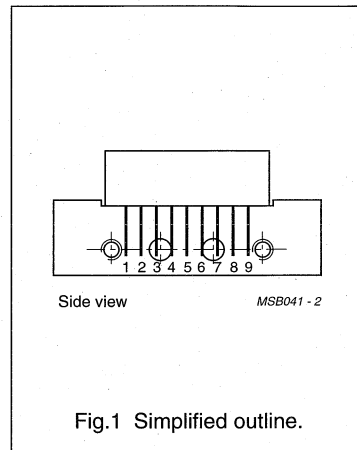


Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 16.5 | 17.5 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 450  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>B</sub>   | DC supply voltage                   | –    | 26   | V    |
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |



## CATV amplifier module

BGD885

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

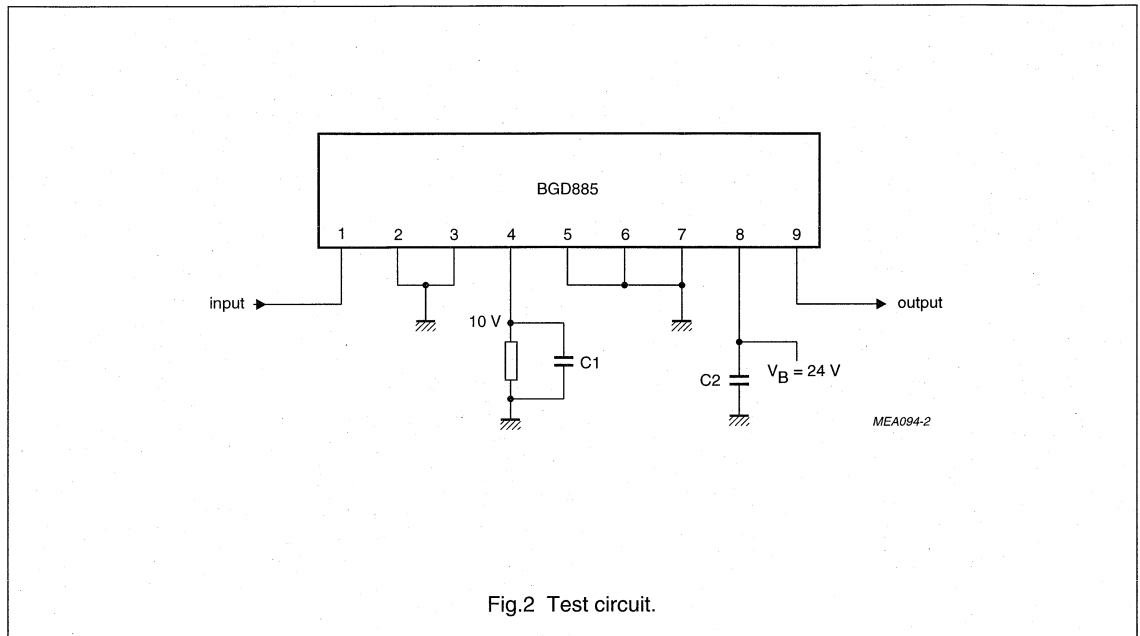
| SYMBOL    | PARAMETER                      | CONDITIONS                | MIN. | MAX.      | UNIT |
|-----------|--------------------------------|---------------------------|------|-----------|------|
| $G_p$     | power gain                     | $f = 50$ MHz              | 16.5 | 17.5      | dB   |
| SL        | slope cable equivalent         | $f = 40$ to 860 MHz       | 0.2  | 1.6       | dB   |
| FL        | flatness of frequency response | $f = 40$ to 860 MHz       | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses            | $f = 40$ MHz; note 1      | 20   | –         | dB   |
|           |                                | $f = 800$ to 860 MHz      | 10   | –         | dB   |
| $S_{22}$  | output return losses           | $f = 40$ MHz; note 1      | 20   | –         | dB   |
|           |                                | $f = 800$ to 860 MHz      | 10   | –         | dB   |
| $d_2$     | second order distortion        | note 2                    | –    | –53       | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60$ dB; note 3 | 64   | –         | dBmV |
|           |                                | $d_{im} = -60$ dB; note 4 | 63   | –         | dBmV |
| F         | noise figure                   | $f = 50$ MHz              | –    | 8         | dB   |
|           |                                | $f = 550$ MHz             | –    | 8         | dB   |
|           |                                | $f = 650$ MHz             | –    | 8         | dB   |
|           |                                | $f = 750$ MHz             | –    | 8         | dB   |
|           |                                | $f = 860$ MHz             | –    | 8         | dB   |
| $I_{tot}$ | total current consumption (DC) | note 5                    | –    | 450       | mA   |

## Notes

- Decrease per octave of 1.5 dB.
- $V_p = 59$  dBmV at  $f_p = 349.25$  MHz;  
 $V_q = 59$  dBmV at  $f_q = 403.25$  MHz;  
measured at  $f_p + f_q = 752.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 341.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 348.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 350.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 339.25$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGD885



## List of components (see Fig.2)

| COMPONENT | DESCRIPTION                  | VALUE       |
|-----------|------------------------------|-------------|
| C1        | ceramic multilayer capacitor | 1 nF (max.) |
| C2        | ceramic multilayer capacitor | 1 nF        |
| R         | resistor                     | 56 Ω, 2 W   |

## CATV amplifier module

BGE884

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

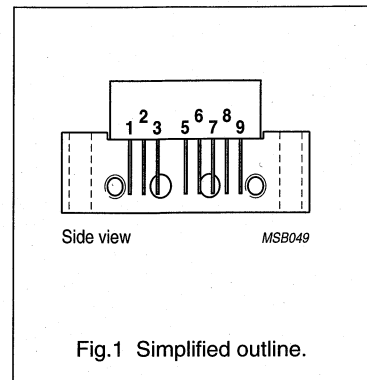
Hybrid amplifier module for CATV/MATV systems operating over a frequency range of 40 to 860 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115G

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input (note 1)  |
| 2   | common          |
| 3   | common          |
| 5   | common          |
| 6   | common          |
| 7   | common          |
| 8   | +V <sub>B</sub> |
| 9   | output (note 1) |

## Note

1. Pins 1 and 9 carry DC voltages.



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 16.5 | 17.5 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 150  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>B</sub>   | DC supply voltage                   | –    | 26   | V    |
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGE884

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                      | CONDITIONS                       | MIN. | MAX.      | UNIT |
|-----------|--------------------------------|----------------------------------|------|-----------|------|
| $G_p$     | power gain                     | $f = 50$ MHz                     | 16.5 | 17.5      | dB   |
| SL        | slope cable equivalent         | $f = 40$ to 860 MHz              | 0.2  | 1.4       | dB   |
| FL        | flatness of frequency response | $f = 40$ to 860 MHz              | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses            | $f = 40$ MHz; note 1             | 20   | –         | dB   |
|           |                                | $f = 800$ to 860 MHz             | 10   | –         | dB   |
| $S_{22}$  | output return losses           | $f = 40$ to 860 MHz              | 15   | –         | dB   |
| $d_2$     | second order distortion        | note 2                           | –    | –60       | dB   |
| $V_o$     | output voltage                 | $d_{in} = -60$ dB; notes 3 and 4 | 55   | –         | dBmV |
| F         | noise figure                   | $f = 350$ MHz                    | –    | 7.5       | dB   |
|           |                                | $f = 860$ MHz                    | –    | 8         | dB   |
| $I_{tot}$ | total current consumption (DC) | note 5                           | –    | 150       | mA   |

## Notes

- Decreases by 1.5 dB per octave.
- $f_p = 349.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 403.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 752.5$  MHz.
- $f_p = 341.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 348.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 350.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 339.25$  MHz.
- $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGE885

## FEATURES

- Excellent linearity
- Extremely low noise
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

## DESCRIPTION

Hybrid amplifier module for use in CATV systems operating over a frequency range of 40 to 860 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115D

| PIN | DESCRIPTION                 |
|-----|-----------------------------|
| 1   | input; note 1               |
| 2   | common                      |
| 3   | common                      |
| 4   | 12 V, 60 mA supply terminal |
| 5   | common                      |
| 6   | common                      |
| 7   | common                      |
| 8   | +V <sub>B</sub>             |
| 9   | output; note 1              |

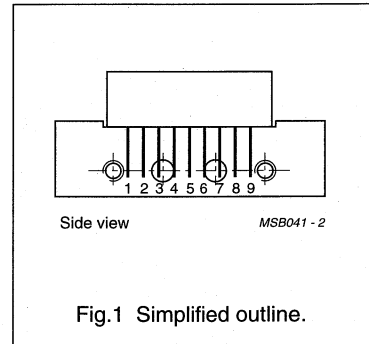


Fig.1 Simplified outline.

## Note

1. Pins 1 and 9 carry DC voltages.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 16.5 | 17.5 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>B</sub>   | DC supply voltage                   | –    | 28   | V    |
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGE885

**CHARACTERISTICS**Bandwidth 40 to 860 MHz;  $T_{mb} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ .

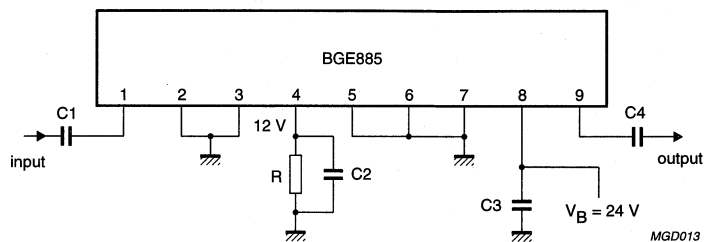
| SYMBOL    | PARAMETER                      | CONDITIONS                         | MIN. | MAX.      | UNIT |
|-----------|--------------------------------|------------------------------------|------|-----------|------|
| $G_p$     | power gain                     | $f = 50\text{ MHz}$                | 16.5 | 17.5      | dB   |
| SL        | slope cable equivalent         | $f = 40\text{ to }860\text{ MHz}$  | 0.2  | 1.2       | dB   |
| FL        | flatness of frequency response | $f = 40\text{ to }860\text{ MHz}$  | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses            | $f = 40\text{ to }450\text{ MHz}$  | –    | 14        | dB   |
|           |                                | $f = 450\text{ to }860\text{ MHz}$ | –    | 10        | dB   |
| $S_{22}$  | output return losses           | $f = 40\text{ to }450\text{ MHz}$  | –    | 14        | dB   |
|           |                                | $f = 450\text{ to }860\text{ MHz}$ | –    | 10        | dB   |
| $d_2$     | second order distortion        | note 1                             | –    | –53       | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60\text{ dB}$ ; note 2  | –    | 59        | dBmV |
| F         | noise figure                   | $f = 350\text{ MHz}$               | –    | 7.5       | dB   |
|           |                                | $f = 860\text{ MHz}$               | –    | 8         | dB   |
| $I_{tot}$ | total current consumption (DC) | note 3                             | –    | 240       | mA   |

**Notes**

- $f_p = 349.25\text{ MHz}$ ;  $V_p = 59\text{ dBmV}$ ;  
 $f_q = 403.25\text{ MHz}$ ;  $V_q = 59\text{ dBmV}$ ;  
 measured at  $f_p + f_q = 752.5\text{ MHz}$ .
- Measured according to DIN45004B:  
 $f_p = 851.25\text{ MHz}$ ;  $V_p = V_o = 59\text{ dBmV}$ ;  
 $f_q = 858.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 860.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
 measured at  $f_p + f_q - f_r = 849.25\text{ MHz}$ .
- The module normally operates at  $V_B = 24\text{ V}$ , but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGE885



Pins 1 and 9 carry DC voltages.

Fig.2 Test circuit.

**List of components** (see Fig.2)

| COMPONENT  | DESCRIPTION                  | VALUE              |
|------------|------------------------------|--------------------|
| C1, C3, C4 | ceramic multilayer capacitor | 1 nF               |
| C2         | ceramic multilayer capacitor | 1 nF (max.)        |
| R          | resistor                     | 200 $\Omega$ , 1 W |

## CATV amplifier module

BGE887

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

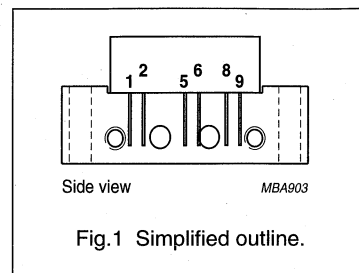
## DESCRIPTION

Hybrid amplifier module intended for use in the UHF part of VHF/UHF split-band CATV systems over a frequency range of 470 to 860 MHz with a voltage supply of +24 V (DC).

## PINNING - SOT115H

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 5   | +V <sub>B</sub> |
| 6   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS                     | MIN. | MAX. | UNIT |
|------------------|--------------------------------|--------------------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 470 MHz                    | 22.5 | 25   | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V; note 1 | –    | 280  | mA   |

## Note

1. The module normally operates at V<sub>B</sub> = +24 V, but is able to withstand supply transients up to +30 V.

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |
| V <sub>B</sub>   | DC supply voltage                   | –    | +28  | V    |



## CATV amplifier module

BGE887

## CHARACTERISTICS

Table 1  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                      | CONDITIONS                               | MIN. | MAX.      | UNIT |
|------------------|--------------------------------|--|------|-----------|------|
| $G_p$            | power gain                     | $f = 470\text{ MHz}$                     | 22.5 | 25        | dB   |
| SL               | slope cable equivalent         | $f = 470\text{ to }860\text{ MHz}$       | -0.2 | +1        | dB   |
| FL               | flatness of frequency response | $f = 470\text{ to }860\text{ MHz}$       | -    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses            | $f = 470\text{ to }860\text{ MHz}$       | 12   | -         | dB   |
| $S_{22}$         | output return losses           | $f = 470\text{ to }860\text{ MHz}$       | 17   | -         | dB   |
| $V_o$            | output voltage                 | $d_{\text{im}} = -60\text{ dB}$ ; note 1 | 60.5 | -         | dBmV |
|                  |                                | $d_{\text{im}} = -60\text{ dB}$ ; note 2 | 60.5 | -         | dBmV |
| F                | noise figure                   | $f = 470\text{ MHz}$                     | -    | 8         | dB   |
|                  |                                | $f = 860\text{ MHz}$                     | -    | 8.5       | dB   |
| $I_{\text{tot}}$ | total current consumption      | DC value; $V_B = +24\text{ V}$ ; note 3  | -    | 280       | mA   |

## Notes

- $f_p = 483.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 490.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 492.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
 measured at  $f_p + f_q - f_r = 481.25\text{ MHz}$ .
- $f_p = 851.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 858.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 860.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
 measured at  $f_p + f_q - f_r = 849.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGX881

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

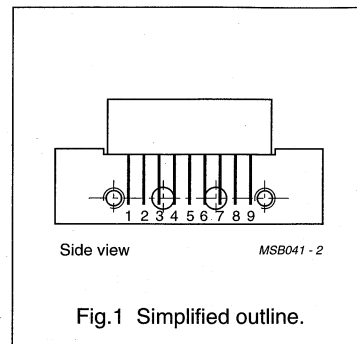
Hybrid amplifier module for CATV/MATV systems operating over a frequency range of 40 to 860 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115D

| PIN | DESCRIPTION                 |
|-----|-----------------------------|
| 1   | input; note1                |
| 2   | common                      |
| 3   | common                      |
| 4   | 12 V, 60 mA supply terminal |
| 5   | common                      |
| 6   | common                      |
| 7   | common                      |
| 8   | +V <sub>B</sub>             |
| 9   | output; note1               |

## Note

1. Pins 1 and 9 carry DC voltages.



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 12   | 13   | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>B</sub>   | DC supply voltage                   | –    | 26   | V    |
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGX881

**CHARACTERISTICS**Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$  Ω.

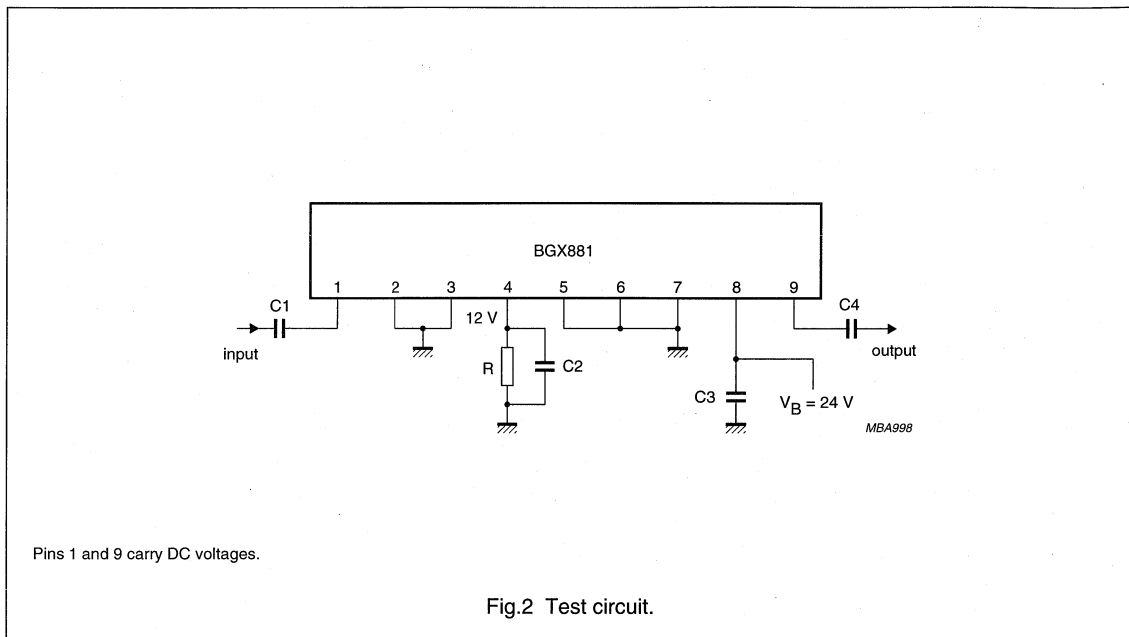
| SYMBOL    | PARAMETER                      | CONDITIONS                | MIN. | MAX. | UNIT |
|-----------|--------------------------------|---------------------------|------|------|------|
| $G_p$     | power gain                     | $f = 50$ MHz              | 12   | 13   | dB   |
| SL        | slope cable equivalent         | $f = 40$ to 860 MHz       | 0.2  | 1.2  | dB   |
| FL        | flatness of frequency response | $f = 40$ to 860 MHz       | –    | ±0.3 | dB   |
| $S_{11}$  | input return losses            | $f = 40$ MHz; note 1      | 20   | –    | dB   |
|           |                                | $f = 800$ to 860 MHz      | 10   | –    | dB   |
| $S_{22}$  | output return losses           | $f = 40$ MHz; note 1      | 20   | –    | dB   |
|           |                                | $f = 640$ to 860 MHz      | 15   | –    | dB   |
| $d_2$     | second order distortion        | note 2                    | –    | –53  | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60$ dB; note 3 | 60.5 | –    | dBmV |
|           |                                | $d_{im} = -60$ dB; note 4 | 59.5 | –    | dBmV |
| F         | noise figure                   | $f = 350$ MHz             | –    | 8.5  | dB   |
|           |                                | $f = 860$ MHz             | –    | 9    | dB   |
| $I_{tot}$ | total current consumption (DC) | note 5                    | –    | 240  | mA   |

**Notes**

- Decreases 1.5 dB per octave.
- $f_p = 349.25$  MHz;  $V_p = 59$  dBmV;  
 $f_q = 403.25$  MHz;  $V_q = 59$  dBmV;  
measured at  $f_p + f_q = 752.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 341.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 348.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 350.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 339.25$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGX881



## List of components (see Fig.2)

| COMPONENT  | DESCRIPTION                  | VALUE              |
|------------|------------------------------|--------------------|
| C1, C3, C4 | ceramic multilayer capacitor | 1 nF               |
| C2         | ceramic multilayer capacitor | 1 nF (max.)        |
| R          | resistor                     | 200 $\Omega$ , 1 W |

## CATV amplifier module

BGX885N

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

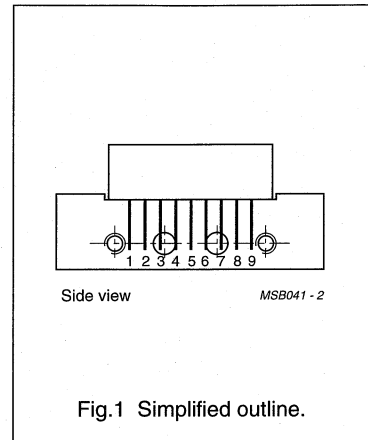
Hybrid amplifier module for CATV/MATV systems operating over a frequency range of 40 to 860 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115D

| PIN | DESCRIPTION           |
|-----|-----------------------|
| 1   | input (note 1)        |
| 2   | common                |
| 3   | common                |
| 4   | 60 mA supply terminal |
| 5   | common                |
| 6   | common                |
| 7   | common                |
| 8   | +V <sub>B</sub>       |
| 9   | output (note 1)       |

## Note

1. Pins 1 and 9 carry DC voltages.



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 16.5 | 17.5 | dB   |
|                  |                                | f = 750 MHz           | 17.3 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>B</sub>   | DC supply voltage                   | –    | 26   | V    |
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

## BGX885N

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$  Ω

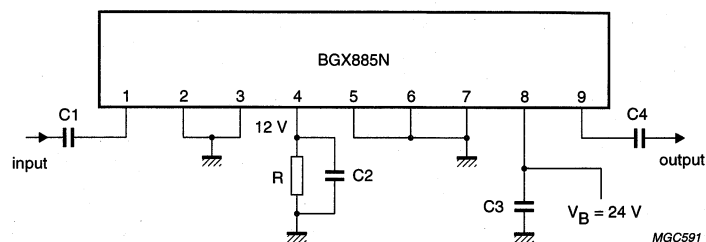
| SYMBOL    | PARAMETER                      | CONDITIONS                | MIN. | MAX. | UNIT |
|-----------|--------------------------------|---------------------------|------|------|------|
| $G_p$     | power gain                     | $f = 50$ MHz              | 16.5 | 17.5 | dB   |
|           |                                | $f = 750$ MHz             | 17.3 | –    | dB   |
| SL        | slope cable equivalent         | $f = 40$ to 860 MHz       | 0.2  | 1.4  | dB   |
| FL        | flatness of frequency response | $f = 40$ to 860 MHz       | –    | ±0.3 | dB   |
| $S_{11}$  | input return losses            | $f = 40$ MHz; note 1      | 20   | –    | dB   |
|           |                                | $f = 800$ to 860 MHz      | 10   | –    | dB   |
| $S_{22}$  | output return losses           | $f = 40$ MHz; note 1      | 20   | –    | dB   |
|           |                                | $f = 640$ to 860 MHz      | 15   | –    | dB   |
| $d_2$     | second order distortion        | note 2                    | –    | –53  | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60$ dB; note 3 | 61   | –    | dBmV |
|           |                                | $d_{im} = -60$ dB; note 4 | 60   | –    | dBmV |
| F         | noise figure                   | $f = 50$ MHz              | –    | 7.5  | dB   |
|           |                                | $f = 350$ MHz             | –    | 7.5  | dB   |
|           |                                | $f = 550$ MHz             | –    | 7.5  | dB   |
|           |                                | $f = 650$ MHz             | –    | 7.5  | dB   |
|           |                                | $f = 750$ MHz             | –    | 8    | dB   |
|           |                                | $f = 860$ MHz             | –    | 8    | dB   |
| $I_{tot}$ | total current consumption (DC) | note 5                    | –    | 240  | mA   |

## Notes

- Decrease per octave of 1.5 dB.
- $f_p = 349.25$  MHz;  $V_p = V_o = 59$  dBmV;  
 $f_q = 403.25$  MHz;  $V_q = V_o$ ;  
measured at  $f_p + f_q = 752.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 341.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 348.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 350.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 339.25$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGX885N



Pins 1 and 9 carry DC voltages.

Fig.2 Test circuit.

**List of components** (see Fig.2)

| COMPONENT  | DESCRIPTION                  | VALUE              |
|------------|------------------------------|--------------------|
| C1, C3, C4 | ceramic multilayer capacitor | 1 nF (max.)        |
| C2         | ceramic multilayer capacitor | 1 nF               |
| R          | resistor                     | 200 $\Omega$ , 1 W |

## CATV amplifier module

BGY61

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

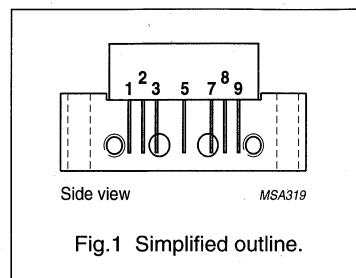
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 5 to 200 MHz at a voltage supply of +24 V (DC). The device is intended as a reverse amplifier for use in two way systems.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 10 MHz             | 12.5 | –    | 13.5 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 215  | 230  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +90  | °C   |



## CATV amplifier module

BGY61

## CHARACTERISTICS

**Table 1** Bandwidth 5 to 200 MHz;  $T_{mb} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL    | PARAMETER                      | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|--------------------------------|---|------|------|-----------|------|
| $G_p$     | power gain                     | $f = 10\text{ MHz}$   | 12.5 | –    | 13.5      | dB   |
| SL        | slope cable equivalent         | $f = 5\text{ to }200\text{ MHz}$  | –0.2 | –    | +1        | dB   |
| FL        | flatness of frequency response | $f = 5\text{ to }200\text{ MHz}$  | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses            | $f = 5\text{ to }200\text{ MHz}$  | 20   | –    | –         | dB   |
| $S_{22}$  | output return losses           | $f = 5\text{ to }200\text{ MHz}$  | 20   | –    | –         | dB   |
| CTB       | composite triple beat          | 22 channels flat;<br>$V_o = 50\text{ dBmV}$ ;<br>measured at 175.25 MHz | –    | –    | –68       | dB   |
| $X_{mod}$ | cross modulation               | 22 channels flat;<br>$V_o = 50\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –61       | dB   |
| $d_2$     | second order distortion        | $V_o = 50\text{ dBmV}$ ; note 1   | –    | –    | –72       | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60\text{ dB}$ ; note 2                                       | 67   | –    | –         | dBmV |
|           |                                | $d_{im} = -60\text{ dB}$ ; note 3                                       | 64   | –    | –         | dBmV |
| F         | noise figure                   | $f = 200\text{ MHz}$  | –    | –    | 7         | dB   |
| $I_{tot}$ | total current consumption      | DC value; $V_B = +24\text{ V}$ ; note 4                                 | –    | 215  | 230       | mA   |

## Notes

- $f_p = 83.25\text{ MHz}$ ;  $V_p = 50\text{ dBmV}$ ;  
 $f_q = 109.25\text{ MHz}$ ;  $V_q = 50\text{ dBmV}$ ;  
measured at  $f_p + f_q = 192.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 35.25\text{ MHz}$ ;  $V_o = V_p$ ;  
 $f_q = 42.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 44.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 33.25\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 187.25\text{ MHz}$ ;  $V_o = V_p$ ;  
 $f_q = 194.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 196.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 185.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY65

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

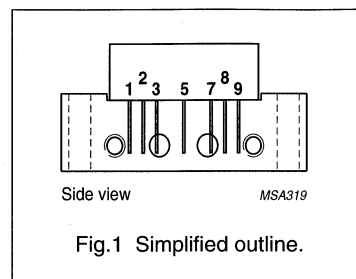
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 5 to 200 MHz at a voltage supply of +24 V (DC). The device is intended as a reverse amplifier for use in two way systems.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 10 MHz             | 18   | –    | 19   | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 215  | 230  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +90  | °C   |

## CATV amplifier module

BGY65

## CHARACTERISTICS

**Table 1** Bandwidth 5 to 200 MHz;  $T_{mb} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL    | PARAMETER                      | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|--------------------------------|---|------|------|-----------|------|
| $G_p$     | power gain                     | $f = 10\text{ MHz}$   | 18   | –    | 19        | dB   |
| SL        | slope cable equivalent         | $f = 5\text{ to }200\text{ MHz}$  | -0.2 | –    | +0.5      | dB   |
| FL        | flatness of frequency response | $f = 5\text{ to }200\text{ MHz}$  | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses            | $f = 5\text{ to }200\text{ MHz}$  | 20   | –    | –         | dB   |
| $S_{22}$  | output return losses           | $f = 5\text{ to }200\text{ MHz}$  | 20   | –    | –         | dB   |
| CTB       | composite triple beat          | 22 channels flat;<br>$V_o = 50\text{ dBmV}$ ;<br>measured at 175.25 MHz | –    | –    | -68       | dB   |
| $X_{mod}$ | cross modulation               | 22 channels flat;<br>$V_o = 50\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | -61       | dB   |
| $d_2$     | second order distortion        | $V_o = 50\text{ dBmV}$ ; note 1   | –    | –    | -72       | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60\text{ dB}$ ; note 2                                       | 67   | –    | –         | dBmV |
|           |                                | $d_{im} = -60\text{ dB}$ ; note 3                                       | 64   | –    | –         | dBmV |
| F         | noise figure                   | $f = 200\text{ MHz}$  | –    | –    | 5.5       | dB   |
| $I_{tot}$ | total current consumption      | DC value; $V_B = +24\text{ V}$ ; note 4                                 | –    | 215  | 230       | mA   |

## Notes

- $f_p = 83.25\text{ MHz}$ ;  $V_p = 50\text{ dBmV}$ ;  
 $f_q = 109.25\text{ MHz}$ ;  $V_q = 50\text{ dBmV}$ ;  
measured at  $f_p + f_q = 192.5\text{ MHz}$ .
- Measured according to DIN45004B:  
 $f_p = 35.25\text{ MHz}$ ;  $V_o = V_p$ ;  
 $f_q = 42.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 44.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 33.25\text{ MHz}$ .
- Measured according to DIN45004B:  
 $f_p = 187.25\text{ MHz}$ ;  $V_o = V_p$ ;  
 $f_q = 194.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 196.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 185.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

## BGY66B

## FEATURES

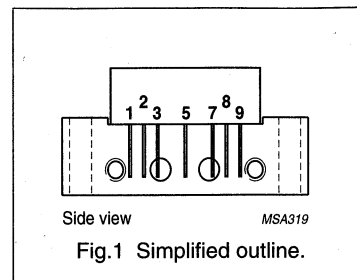
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

- Intended as a reverse amplifier for use in two-way systems.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## DESCRIPTION

Hybrid high dynamic range amplifier module designed for applications in CATV systems with a bandwidth of 5 to 120 MHz operating with a voltage supply of 24 V (DC).

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 10 MHz            | 24.5 | 25.5 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | 115  | 135  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | -    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | -40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | -20  | +100 | °C   |

## CATV amplifier module

BGY66B

## CHARACTERISTICS

Table 1 Bandwidth 5 to 120 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                      | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|--------------------------------|--|------|-----------|------|
| $G_p$     | power gain                     | $f = 10$ MHz   | 24.5 | 25.5      | dB   |
| SL        | slope cable equivalent         |  | -0.2 | +0.5      | dB   |
| FL        | flatness of frequency response |  | -    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses            |  | 20   | -         | dB   |
| $S_{22}$  | output return losses           |  | 20   | -         | dB   |
| CTB       | composite triple beat          | 14 channels flat;<br>$V_o = 48$ dBmV;<br>measured at 67.25 MHz | -    | -66       | dB   |
| $X_{mod}$ | cross modulation               | 14 channels flat;<br>$V_o = 48$ dBmV;<br>measured at 67.25 MHz | -    | -54       | dB   |
| $d_2$     | second order distortion        | note 1   | -    | -70       | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60$ dB; note 2                                      | 60   | -         | dBmV |
| F         | noise figure                   | $f = 120$ MHz  | -    | 5         | dB   |
| $I_{tot}$ | total current consumption (DC) | note 3   | 115  | 135       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 48$  dBmV;  
 $f_q = 61.25$  MHz;  $V_q = 48$  dBmV;  
measured at  $f_p + f_q = 116.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 111.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 118.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 120.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 109.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY67

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

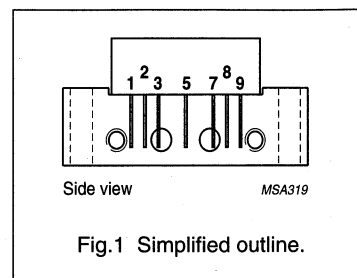
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 5 to 200 MHz at a voltage supply of +24 V (DC). The device is intended as a reverse amplifier for use in two way systems.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 10 MHz             | 21.5 | –    | 22.5 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 215  | 230  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +90  | °C   |

## CATV amplifier module

## BGY67

## CHARACTERISTICS

Table 1 Bandwidth 5 to 200 MHz;  $T_{mb} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL    | PARAMETER                      | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|-----------|--------------------------------|--|------|------|-----------|------|
| $G_p$     | power gain                     | $f = 10\text{ MHz}$  | 21.5 | –    | 22.5      | dB   |
| SL        | slope cable equivalent         | $f = 5\text{ to }200\text{ MHz}$                                     | -0.2 | –    | +0.5      | dB   |
| FL        | flatness of frequency response | $f = 5\text{ to }200\text{ MHz}$                                     | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses            | $f = 5\text{ to }200\text{ MHz}$                                     | 20   | –    | –         | dB   |
| $S_{22}$  | output return losses           | $f = 5\text{ to }200\text{ MHz}$                                     | 20   | –    | –         | dB   |
| CTB       | composite triple beat          | 22 channels flat; $V_o = 50\text{ dBmV}$ ;<br>measured at 175.25 MHz | –    | –    | -67       | dB   |
| $X_{mod}$ | cross modulation               | 22 channels flat; $V_o = 50\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | -60       | dB   |
| $d_2$     | second order distortion        | $V_o = 50\text{ dBmV}$ ; note 1                                      | –    | –    | -67       | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60\text{ dB}$ ; note 2                                    | 67   | –    | –         | dBmV |
|           |                                | $d_{im} = -60\text{ dB}$ ; note 3                                    | 64   | –    | –         | dBmV |
| F         | noise figure                   | $f = 200\text{ MHz}$   | –    | –    | 5.5       | dB   |
| $I_{tot}$ | total current consumption      | DC value; $V_B = +24\text{ V}$ ; note 4                              | –    | 215  | 230       | mA   |

## Notes

- $f_p = 83.25\text{ MHz}$ ;  $V_p = 50\text{ dBmV}$ ;  
 $f_q = 109.25\text{ MHz}$ ;  $V_q = 50\text{ dBmV}$ ;  
measured at  $f_p + f_q = 192.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 35.25\text{ MHz}$ ;  $V_o = V_p$ ;  
 $f_q = 42.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 44.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 33.25\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 187.25\text{ MHz}$ ;  $V_o = V_p$ ;  
 $f_q = 194.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 196.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 185.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY67A

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

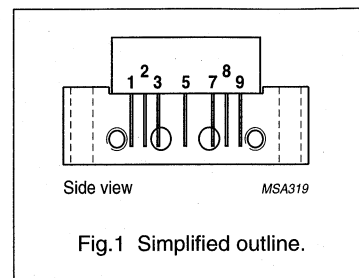
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 5 to 200 MHz at a voltage supply of +24 V (DC). The device is intended as a reverse amplifier for use in two way systems.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 10 MHz             | 23.5 | –    | 24.5 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 215  | 230  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +90  | °C   |



## CATV amplifier module

BGY67A

## CHARACTERISTICS

Table 1 Bandwidth 5 to 200 MHz;  $T_{mb} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL    | PARAMETER                      | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|-----------|--------------------------------|--|------|------|-----------|------|
| $G_p$     | power gain                     | $f = 10\text{ MHz}$  | 23.5 | –    | 24.5      | dB   |
| SL        | slope cable equivalent         | $f = 5\text{ to }200\text{ MHz}$                                     | -0.2 | –    | +0.5      | dB   |
| FL        | flatness of frequency response | $f = 5\text{ to }200\text{ MHz}$                                     | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses            | $f = 5\text{ to }200\text{ MHz}$                                     | 20   | –    | –         | dB   |
| $S_{22}$  | output return losses           | $f = 5\text{ to }200\text{ MHz}$                                     | 20   | –    | –         | dB   |
| CTB       | composite triple beat          | 22 channels flat; $V_o = 50\text{ dBmV}$ ;<br>measured at 175.25 MHz | –    | –    | -67       | dB   |
| $X_{mod}$ | cross modulation               | 22 channels flat; $V_o = 50\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | -59       | dB   |
| $d_2$     | second order distortion        | $V_o = 50\text{ dBmV}$ ; note 1                                      | –    | –    | -67       | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60\text{ dB}$ ; note 2                                    | 67   | –    | –         | dBmV |
|           |                                | $d_{im} = -60\text{ dB}$ ; note 3                                    | 64   | –    | –         | dBmV |
| F         | noise figure                   | $f = 200\text{ MHz}$   | –    | –    | 5.5       | dB   |
| $I_{tot}$ | total current consumption      | DC value; $V_B = +24\text{ V}$ ; note 4                              | –    | 215  | 230       | mA   |

## Notes

- $f_p = 83.25\text{ MHz}$ ;  $V_p = 50\text{ dBmV}$ ;  
 $f_q = 109.25\text{ MHz}$ ;  $V_q = 50\text{ dBmV}$ ;  
measured at  $f_p + f_q = 192.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 35.25\text{ MHz}$ ;  $V_o = V_p$ ;  
 $f_q = 42.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 44.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 33.25\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 187.25\text{ MHz}$ ;  $V_o = V_p$ ;  
 $f_q = 194.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 196.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 185.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## Optical receiver module

BGY67BO

## FEATURES

- Excellent linearity
- Extremely low noise
- Excellent flatness
- Standard CATV outline
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

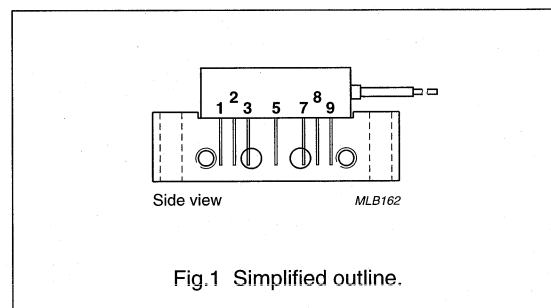
- Reverse receiver amplifier in two-way CATV systems in the 5 to 300 MHz frequency range.

## DESCRIPTION

Hybrid high dynamic range optical amplifier module in a SOT115M package operating at a voltage supply of +24 V (DC). The module contains a monomode optical input suitable for wavelengths from 1290 to 1600 nm, a terminal to monitor the pin diode current and an electrical output with an impedance of 75  $\Omega$ .

## PINNING - SOT115M

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | monitor current |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT                   |
|------------------|--------------------------------|-----------------------|------|------|------------------------|
| f                | frequency range                |                       | 5    | 300  | MHz                    |
| S <sub>22</sub>  | output return losses           | f = 5 to 300 MHz      | 13   | –    | dB                     |
|                  | optical input return losses    |                       | 40   | –    | dB                     |
| d <sub>2</sub>   | second order distortion        |                       | –    | –70  | dBc                    |
| F                | equivalent noise input         | f = 10 to 300 MHz     | –    | 7    | pA/ $\sqrt{\text{Hz}}$ |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | 150  | 180  | mA                     |

## HANDLING

Fibreglass optical coupling: maximum tensile strength = 5 N; minimum bending radius = 35 mm.

## CAUTION

The device is supplied in an antistatic package and must be protected against static discharge during transport or handling.

## Optical receiver module

BGY67BO

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | CONDITIONS                                  | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|---|------|------|------|
| f                | frequency range                     |   | 5    | 300  | MHz  |
| T <sub>stg</sub> | storage temperature                 |   | -40  | +85  | °C   |
| T <sub>mb</sub>  | operating mounting base temperature |   | -20  | +85  | °C   |
| P <sub>in</sub>  | optical input power                 | continuous                                  | -    | 5    | mW   |
| ESD              | ESD sensitivity                     | human body model;<br>R = 1.5 kΩ; C = 100 pF | 500  | -    | V    |

## CHARACTERISTICS

**Table 1** Bandwidth 5 to 300 MHz; V<sub>B</sub> = 24 V; T<sub>mb</sub> = 30 °C; Z<sub>L</sub> = 75 Ω

| SYMBOL           | PARAMETER                      | CONDITIONS                     | MIN. | MAX. | UNIT   |
|------------------|--------------------------------|--------------------------------|------|------|--------|
| S                | responsivity                   | λ = 1300 nm                    | 800  | -    | V/W    |
| FL               | flatness of frequency response |                                | -    | ±0.3 | dB     |
| S <sub>22</sub>  | output return losses           | f = 5 to 300 MHz               | 15   | -    | dB     |
|                  | optical input return losses    |                                | 40   | -    | dB     |
| d <sub>2</sub>   | second order distortion        | note 1                         | -    | -70  | dB     |
| d <sub>3</sub>   | third order distortion         | note 2                         | -    | -80  | dB     |
| F                | equivalent noise input         | f <sub>1</sub> = 50 to 300 MHz | -    | 7    | pA/√Hz |
| S <sub>λ</sub>   | spectral sensitivity           | λ = 1310 ±20 nm                | 0.85 | -    | A/W    |
|                  |                                | λ = 1350 ±20 nm                | 0.9  | -    | A/W    |
| λ                | optical wavelength             |                                | 1290 | 1600 | nm     |
| L                | length of optical fibre        | fibre; SM type; 9/125 μm       | 1    | -    | m      |
| I <sub>tot</sub> | total current consumption (DC) | note 3                         | 150  | 180  | mA     |

## Notes

- Two laser test; each laser with 40% modulation index;  
f<sub>p</sub> = 20.25 MHz; P<sub>p</sub> = 0.5 mW;  
f<sub>q</sub> = 34 MHz; P<sub>q</sub> = 0.5 mW;  
measured at f<sub>p</sub> + f<sub>q</sub> = 54.25 MHz.
- Three laser test; each laser with 40% modulation index;  
f<sub>p</sub> = 125.25 MHz; P<sub>p</sub> = 0.33 mW;  
f<sub>q</sub> = 110.25 MHz; P<sub>q</sub> = 0.33 mW;  
f<sub>r</sub> = 135.25 MHz; P<sub>r</sub> = 0.33 mW;  
measured at f<sub>p</sub> + f<sub>q</sub> + f<sub>r</sub> = 100.25 MHz.
- The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

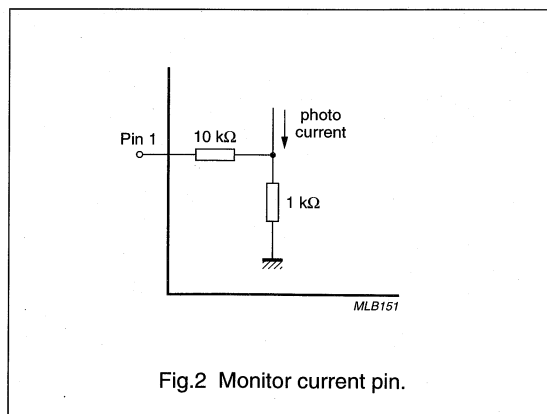


Fig.2 Monitor current pin.

## CATV amplifier module

BGY68

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

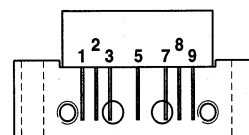
Reverse amplifier in two-way CATV systems in the 5 to 75 MHz frequency range.

## DESCRIPTION

Hybrid high dynamic range amplifier module in a SOT115J package operating at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



Side view

MSA319

Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 10 MHz            | 29.2 | 30.8 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 135  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY68

## CHARACTERISTICS

**Table 1** Bandwidth 5 to 75 MHz;  $V_B = +24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                      | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|--------------------------------|---|------|-----------|------|
| $G_p$     | power gain                     | $f = 10$ MHz  | 29.2 | 30.8      | dB   |
| SL        | slope cable equivalent         | $f = 5$ to 75 MHz                                       | -0.2 | +0.5      | dB   |
| FL        | flatness of frequency response | $f = 5$ to 75 MHz                                       | -    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses            | $f = 5$ to 75 MHz                                       | 20   | -         | dB   |
| $S_{22}$  | output return losses           | $f = 5$ to 50 MHz                                       | 20   | -         | dB   |
|           |                                | $f = 50$ to 75 MHz                                      | 18   | -         | dB   |
| CTB       | composite triple beat          | 4 channels flat; $V_o = 50$ dBmV;<br>measured at 25 MHz | -    | -68       | dB   |
| $X_{mod}$ | cross modulation               | 4 channels flat; $V_o = 50$ dBmV;<br>measured at 25 MHz | -    | -60       | dB   |
| $d_2$     | second order distortion        | note 1  | -    | -70       | dB   |
| F         | noise figure                   | $f = 75$ MHz  | -    | 3.5       | dB   |
| $I_{tot}$ | total current consumption (DC) | note 2  | -    | 135       | mA   |

## Notes

- $f_p = 19$  MHz;  $V_p = 50$  dBmV;  
 $f_q = 31$  MHz;  $V_q = 50$  dBmV;  
measured at  $f_p + f_q = 50$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier modules

## BGY80; BGY81

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of (DC). The BGY80 is intended for use as a 12.5 dB pre-amplifier and the BGY81 as a 12.5 dB final amplifier.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN.  | TYP. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|-------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 12    | –    | 13   | dB   |
|                  |                                | f = 450 MHz           | 12.5  | –    | 14   | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V |       |      |      |      |
|                  |                                |                       | BGY80 | –    | 180  | 200  |
|                  | BGY81                          | –                     | 220   | 240  | mA   |      |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier modules

## BGY80; BGY81

## CHARACTERISTICS

Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER   | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|---|---|------|------|-----------|------|
| $G_p$     | power gain  | f = 50 MHz  | 12   | –    | 13        | dB   |
|           |   | f = 450 MHz   | 12.5 | –    | 14        | dB   |
| SL        | slope cable equivalent                              | f = 40 to 450 MHz   | 0.2  | –    | 1.5       | dB   |
| FL        | flatness of frequency response                      | f = 40 to 450 MHz   | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses                                 | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |   | f = 160 to 450 MHz  | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses                                | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |   | f = 160 to 450 MHz  | 18   | –    | –         | dB   |
| $S_{21}$  | phase response                                      | f = 50 MHz  | –45  | –    | +45       | deg  |
| CTB       | composite triple beat<br>BGY80<br>BGY81             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –    | –54       | dB   |
|           |   |   | –    | –    | –58       | dB   |
| $X_{mod}$ | cross modulation<br>BGY80<br>BGY81                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –59       | dB   |
|           |   |   | –    | –    | –62       | dB   |
| CSO       | composite second order distortion<br>BGY80<br>BGY81 | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –    | –58       | dB   |
|           |   |   | –    | –    | –61       | dB   |
| $d_2$     | second order distortion<br>BGY80<br>BGY81           | note 1  | –    | –    | –72       | dB   |
|           |   |   | –    | –    | –74       | dB   |
| $V_o$     | output voltage<br>BGY80<br>BGY81                    | $d_{im} = -60$ dB; note 2                                       | 61.5 | –    | –         | dBmV |
|           |   |   | 64   | –    | –         | dBmV |
| F         | noise figure<br>BGY80<br>BGY81                      | f = 450 MHz   | –    | –    | 7.5       | dB   |
|           |   |   | –    | –    | 8         | dB   |
| $I_{tot}$ | total current consumption (DC)<br>BGY80<br>BGY81    | note 3  | –    | 180  | 200       | mA   |
|           |   |   | –    | 220  | 240       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  $f_q = 391.25$  MHz;  $V_q = 46$  dBmV; measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  $f_p = 440.25$  MHz;  $V_p = V_o$ ;  $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB; measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The modules normally operate at  $V_B = 24$  V, but are able to withstand supply transients up to 30 V.

## CATV amplifier modules

## BGY82; BGY83

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Optimal reliability ensured by TiPtAu metallized crystals.

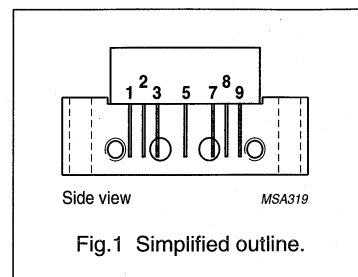
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS                       | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|----------------------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz                       | 13.5 | –    | 14.5 | dB   |
|                  |                                | f = 450 MHz                      | 14.5 | –    | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | DC value; V <sub>B</sub> = +24 V | –    | 180  | 200  | mA   |
|                  | BGY82                          |                                  |      |      |      |      |
|                  | BGY83                          |                                  | –    | 220  | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL            | PARAMETER                           | MIN. | MAX. | UNIT |
|-------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>    | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub>  | storage temperature                 | –40  | +100 | °C   |
| T <sub>case</sub> | mounting base operating temperature | –20  | +100 | °C   |



## CATV amplifier modules

## BGY82; BGY83

## CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER   | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|------------------|---|--|------|------|-----------|------|
| $G_p$            | power gain  | $f = 50\text{ MHz}$  | 13.5 | –    | 14.5      | dB   |
|                  |   | $f = 450\text{ MHz}$   | 14.5 | –    | –         | dB   |
| SL               | slope cable equivalent                              | $f = 40\text{ to }450\text{ MHz}$                                    | 0.2  | –    | 1.5       | dB   |
| FL               | flatness of frequency response                      | $f = 40\text{ to }450\text{ MHz}$                                    | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses                                 | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|                  |   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|                  |   | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –    | –         | dB   |
| $S_{22}$         | output return losses                                | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|                  |   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|                  |   | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –    | –         | dB   |
| CTB              | composite triple beat<br>BGY82<br>BGY83             | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –    | –55       | dB   |
|                  |   |  | –    | –    | –59       | dB   |
| $X_{\text{mod}}$ | cross modulation<br>BGY82<br>BGY83                  | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –56       | dB   |
|                  |   |  | –    | –    | –59       | dB   |
| CSO              | composite second order distortion<br>BGY82<br>BGY83 | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 446.25 MHz | –    | –    | –55       | dB   |
|                  |   |  | –    | –    | –59       | dB   |
| $d_2$            | second order distortion<br>BGY82<br>BGY83           | note 1   | –    | –    | –72       | dB   |
|                  |   |  | –    | –    | –74       | dB   |
| $V_o$            | output voltage<br>BGY82<br>BGY83                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 61.5 | –    | –         | dBmV |
|                  |   |  | 64   | –    | –         | dBmV |
| F                | noise figure<br>BGY82<br>BGY83                      | $f = 450\text{ MHz}$   | –    | –    | 7         | dB   |
|                  |   |  | –    | –    | 8         | dB   |
| $I_{\text{tot}}$ | total current consumption<br>BGY82<br>BGY83         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 180  | 200       | mA   |
|                  |   |  | –    | 220  | 240       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ; measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The modules normally operate at  $V_B = +24\text{ V}$ , but are able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier modules

## BGY84; BGY85

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Optimal reliability ensured by TiPtAu metallized crystals.

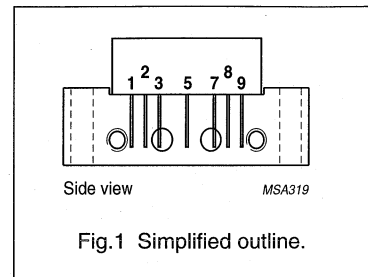
## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of +24 V (DC). is intended for use as an input amplifier module and BGY85 as an output amplifier module.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | TYP. | MAX. | UNIT |       |
|------------------|--------------------------------|------------------------|------|------|------|------|-------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 16.5 | –    | 17.5 | dB   |       |
|                  |                                | f = 450 MHz            | 17.3 | –    | 18.8 | dB   |       |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 180  | 200  | mA   |       |
|                  |                                |                        |      |      |      |      | BGY82 |
|                  |                                |                        |      |      |      |      | BGY83 |
|                  |                                |                        | –    | 220  | 240  | mA   |       |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |

## CATV amplifier modules

## BGY84; BGY85

## CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz;  $T_{mb} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\text{ }\Omega$ 

| SYMBOL    | PARAMETER                                   | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|-----------|---|--|------|------|-----------|------|
| $G_p$     | power gain                                  | $f = 50\text{ MHz}$  | 16.5 | –    | 17.5      | dB   |
|           |   | $f = 450\text{ MHz}$   | 17.3 | –    | 18.8      | dB   |
| SL        | slope cable equivalent                      | $f = 40\text{ to }450\text{ MHz}$                                    | 0.5  | –    | 1.5       | dB   |
| FL        | flatness of frequency response              | $f = 40\text{ to }450\text{ MHz}$                                    | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses                         | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|           |   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|           |   | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses                        | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|           |   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|           |   | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –    | –         | dB   |
| CTB       | composite triple beat<br>BGY84<br>BGY85     | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –    | –55       | dB   |
|           |   |  | –    | –    | –58       | dB   |
| $X_{mod}$ | cross modulation<br>BGY84<br>BGY85          | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –57       | dB   |
|           |   |  | –    | –    | –60       | dB   |
| $d_2$     | second order distortion                     | note 1   | –    | –    | –70       | dB   |
| $V_o$     | output voltage<br>BGY84<br>BGY85            | $d_{im} = -60\text{ dB}$ ; note 2                                    | 60   | –    | –         | dBmV |
|           |   |  | 62.5 | –    | –         | dBmV |
| F         | noise figure<br>BGY84<br>BGY85              | $f = 450\text{ MHz}$   | –    | –    | 6.5       | dB   |
|           |   |  | –    | –    | 7         | dB   |
| $I_{tot}$ | total current consumption<br>BGY84<br>BGY85 | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 180  | 200       | mA   |
|           |   |  | –    | 220  | 240       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 343.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 398.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The modules normally operate at  $V_B = +24\text{ V}$ , but are able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier modules

## BGY84A; BGY85A

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Optimal reliability ensured by TiPtAu metallized crystals.

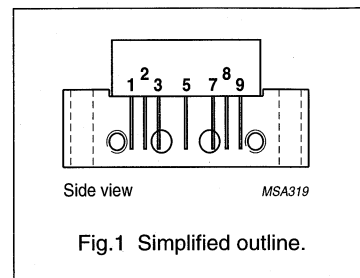
## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of +24 V (DC). BGY84A is intended for use as an input amplifier module and BGY85A as an output amplifier module.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN.   | TYP. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|--------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 18     | –    | 18.8 | dB   |
|                  |                                | f = 450 MHz            | 18.7   | –    | 20.2 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V |        |      |      |      |
|                  |                                |                        | BGY84A | –    | 180  | 200  |
|                  | BGY85A                         | –                      | 220    | 240  | mA   |      |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |

## CATV amplifier modules

## BGY84A; BGY85A

## CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz;  $T_{mb} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\text{ }\Omega$ 

| SYMBOL    | PARAMETER                                     | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|-----------|---|--|------|------|-----------|------|
| $G_p$     | power gain                                    | $f = 50\text{ MHz}$  | 18   | –    | 18.8      | dB   |
|           |   | $f = 450\text{ MHz}$   | 18.7 | –    | 20.2      | dB   |
| SL        | slope cable equivalent                        | $f = 40\text{ to }450\text{ MHz}$                                    | 0.3  | –    | 1.5       | dB   |
| FL        | flatness of frequency response                | $f = 40\text{ to }450\text{ MHz}$                                    | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses                           | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|           |   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|           |   | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses                          | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|           |   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|           |   | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –    | –         | dB   |
| CTB       | composite triple beat<br>BGY84A<br>BGY85A     | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –    | –55       | dB   |
|           |   |  | –    | –    | –59       | dB   |
| $X_{mod}$ | cross modulation<br>BGY84A<br>BGY85A          | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –58       | dB   |
|           |   |  | –    | –    | –61       | dB   |
| $d_2$     | second order distortion                       | note 1   | –    | –    | –72       | dB   |
| $V_o$     | output voltage<br>BGY84A<br>BGY85A            | $d_{im} = -60\text{ dB}$ ; note 2                                    | 60   | –    | –         | dBmV |
|           |   |  | 62.5 | –    | –         | dBmV |
| F         | noise figure<br>BGY84A<br>BGY85A              | $f = 40\text{ to }450\text{ MHz}$                                    | –    | –    | 6.5       | dB   |
|           |   |  | –    | –    | 7         | dB   |
| $I_{tot}$ | total current consumption<br>BGY84A<br>BGY85A | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 180  | 200       | mA   |
|           |   |  | –    | 220  | 240       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 343.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 398.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The modules normally operate at  $V_B = +24\text{ V}$ , but are able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier modules

## BGY86; BGY87

## FEATURES

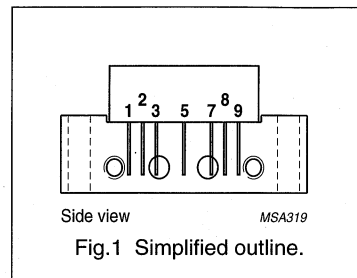
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of 24 V (DC). The BGY86 is intended for use as a pre-amplifier and BGY87 as a final amplifier.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN.  | TYP. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|-------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 21.5  | –    | 22.5 | dB   |
|                  |                                | f = 450 MHz           | 21.7  | –    | 23.5 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V |       |      |      |      |
|                  |                                |                       | BGY86 | –    | 180  | 200  |
|                  | BGY87                          | –                     | 220   | 240  | mA   |      |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier modules

## BGY86; BGY87

## CHARACTERISTICS

Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER   | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|---|---|------|------|-----------|------|
| $G_p$     | power gain  | $f = 50$ MHz  | 21.5 | –    | 22.5      | dB   |
|           |   | $f = 450$ MHz   | 21.7 | –    | 23.5      | dB   |
| SL        | slope cable equivalent                              | $f = 40$ to 450 MHz   | 0    | –    | 1.5       | dB   |
| FL        | flatness of frequency response                      | $f = 40$ to 450 MHz   | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses                                 | $f = 40$ to 80 MHz  | 20   | –    | –         | dB   |
|           |   | $f = 80$ to 160 MHz   | 19   | –    | –         | dB   |
|           |   | $f = 160$ to 450 MHz  | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses                                | $f = 40$ to 80 MHz  | 20   | –    | –         | dB   |
|           |   | $f = 80$ to 160 MHz   | 19   | –    | –         | dB   |
|           |   | $f = 160$ to 450 MHz  | 18   | –    | –         | dB   |
| $S_{21}$  | phase response                                      | $f = 50$ MHz  | +135 | –    | +225      | deg  |
| CTB       | composite triple beat<br>BGY86<br>BGY87             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –    | –54       | dB   |
|           |   |   | –    | –    | –58       | dB   |
| $X_{mod}$ | cross modulation<br>BGY86<br>BGY87                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –51       | dB   |
|           |   |   | –    | –    | –55       | dB   |
| CSO       | composite second order distortion<br>BGY86<br>BGY87 | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –    | –53       | dB   |
|           |   |   | –    | –    | –57       | dB   |
| $d_2$     | second order distortion<br>BGY86<br>BGY87           | note 1  | –    | –    | –68       | dB   |
|           |   |   | –    | –    | –72       | dB   |
| $V_o$     | output voltage<br>BGY86<br>BGY87                    | $d_{im} = -60$ dB; note 2                                       | 61.5 | –    | –         | dBmV |
|           |   |   | 64   | –    | –         | dBmV |
| F         | noise figure<br>BGY86<br>BGY87                      | $f = 450$ MHz   | –    | –    | 6         | dB   |
|           |   |   | –    | –    | 6.5       | dB   |
| $I_{tot}$ | total current consumption (DC)<br>BGY86<br>BGY87    | note 3  | –    | 180  | 200       | mA   |
|           |   |   | –    | 220  | 240       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  $f_q = 391.25$  MHz;  $V_q = 46$  dBmV; measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  $f_p = 440.25$  MHz;  $V_p = V_o$ ;  $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB; measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The modules normally operate at  $V_B = 24$  V, but are able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY87B

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

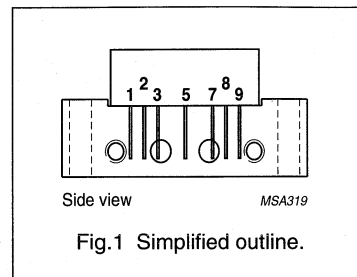
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of +24 V.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS                     | MIN. | MAX. | UNIT |
|------------------|--------------------------------|--------------------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz                     | 26.2 | 27.8 | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V; note 1 | –    | 340  | mA   |

## Note

1. The module normally operates at V<sub>B</sub> = +24 V, but is able to withstand supply transients up to +30 V.

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |



## CATV amplifier module

BGY87B

## CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz;  $T_{\text{case}} = 35\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 26.2 | 27.8      | dB   |
|                  |                                   | $f = 450\text{ MHz}$   | 27.5 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }450\text{ MHz}$                                    | 0.5  | 2.5       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }450\text{ MHz}$                                    | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | –    | 20        | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | –    | 19        | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                   | –    | 18        | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | –    | 20        | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | –    | 19        | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                   | –    | 18        | dB   |
| CTB              | composite triple beat             | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –58       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –58       | dB   |
| CSO              | composite second order distortion | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 446.5 MHz  | –    | –60       | dB   |
| $d_2$            | second order beat                 | $V_o = 46\text{ dBmV}$ ; note 1                                      | –    | –70       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 64   | –         | dBmV |
| F                | noise figure                      | $f = 450\text{ MHz}$   | –    | 6         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$                                       | –    | 340       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .

## CATV amplifier module

BGY88

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

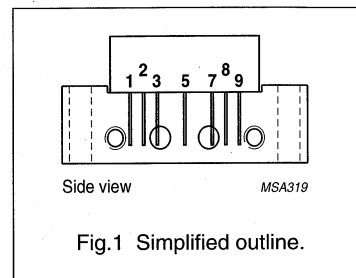
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of +24 V and intended for use as a line-extender.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 33.5 | –    | 35.5 | dB   |
|                  |                                | f = 450 MHz            | 35   | –    | 37   | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 320  | 340  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY88

## CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz;  $T_{mb} = 35\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\text{ }\Omega$ 

| SYMBOL    | PARAMETER                      | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|-----------|--------------------------------|--|------|------|-----------|------|
| $G_p$     | power gain                     | $f = 50\text{ MHz}$  | 33.5 | –    | 35.5      | dB   |
|           |                                | $f = 450\text{ MHz}$   | 35   | –    | 37        | dB   |
| SL        | slope cable equivalent         | $f = 40\text{ to }450\text{ MHz}$                                    | 0.5  | –    | 2.5       | dB   |
| FL        | flatness of frequency response | $f = 40\text{ to }450\text{ MHz}$                                    | –    | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses            | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|           |                                | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|           |                                | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses           | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|           |                                | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|           |                                | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –    | –         | dB   |
| CTB       | composite triple beat          | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –    | –58       | dB   |
| $X_{mod}$ | cross modulation               | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –59       | dB   |
| $d_2$     | second order distortion        | note 1   | –    | –    | –70       | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60\text{ dB}$ note 2                                      | 62   | –    | –         | dBmV |
| F         | noise figure                   | $f = 450\text{ MHz}$   | –    | –    | 6         | dB   |
| $I_{tot}$ | total current consumption      | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 320  | 340       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 343.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 398.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o = 62\text{ dBmV}$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY89

## FEATURES

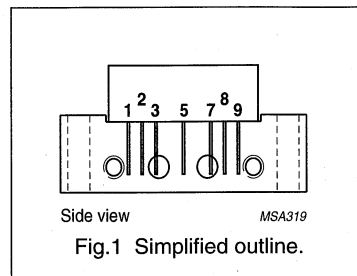
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 450 MHz at a voltage supply of 24 V (DC). The module is intended for use as a line-extender.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 37   | –    | 39   | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 320  | 340  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY89

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 37   | –    | 39        | dB   |
|           |                                   | f = 450 MHz   | 37   | –    | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 450 MHz   | 0    | –    | 2.5       | dB   |
| FL        | flatness of frequency response    | f = 40 to 450 MHz   | –    | –    | $\pm 0.4$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –    | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | –    | +45       | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –    | –58       | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –58       | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –    | –58       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 63   | –    | –         | dBmV |
| F         | noise figure                      | f = 450 MHz   | –    | –    | 5.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 320  | 340       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 343.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 398.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o = 63$  dBmV;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier modules

## BGY580; BGY581

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Optimal reliability ensured by TiPtAu metallized crystals.

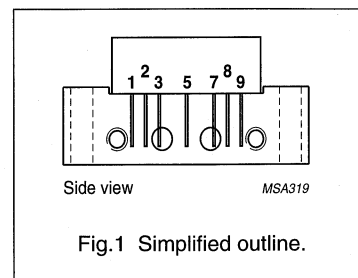
## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of +24 V (DC). The BGY580 is intended for use as a pre-amplifier and BGY581 as a final amplifier.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER  | CONDITIONS             | MIN. | TYP. | MAX. | UNIT |
|------------------|--|------------------------|------|------|------|------|
| G <sub>p</sub>   | power gain   | f = 50 MHz             | 12   | –    | 13   | dB   |
|                  |  | f = 550 MHz            | 12.5 | –    | 14.5 | dB   |
| I <sub>tot</sub> | total current consumption (DC)<br>BGY580<br>BGY581 | V <sub>B</sub> = +24 V | –    | 180  | 200  | mA   |
|                  |  |                        | –    | 220  | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL            | PARAMETER                  | MIN. | MAX. | UNIT |
|-------------------|----------------------------|------|------|------|
| V <sub>i</sub>    | RF input voltage           | –    | 65   | dBmV |
| T <sub>stg</sub>  | storage temperature        | –40  | +100 | °C   |
| T <sub>case</sub> | case operating temperature | –20  | +100 | °C   |

## CATV amplifier modules

## BGY580; BGY581

## CHARACTERISTICS

Table 1 Bandwidth 40 to 550 MHz;  $T_{case} = 30^{\circ}C$ ;  $Z_S = Z_L = 75\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz   | 12   | –    | 13        | dB   |
|           |                                   | $f = 550$ MHz  | 12.5 | –    | 14.5      | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz  | 0.5  | –    | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz  | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz   | 20   | –    | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 19   | –    | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz   | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz   | 20   | –    | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 19   | –    | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz   | 18   | –    | –         | dB   |
| CTB       | composite triple beat             | 77 channels flat; $V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –    | –52       | dB   |
|           | BGY580<br>BGY581                  |  | –    | –    | –56       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat; $V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –59       | dB   |
|           | BGY580<br>BGY581                  |  | –    | –    | –62       | dB   |
| CSO       | composite second order distortion | 77 channels flat; $V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –    | –56       | dB   |
|           | BGY580<br>BGY581                  |  | –    | –    | –59       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –    | –70       | dB   |
|           | BGY580<br>BGY581                  |  | –    | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                    | 59   | –    | –         | dBmV |
|           | BGY580<br>BGY581                  |  | 61.5 | –    | –         | dBmV |
| F         | noise figure                      | $f = 550$ MHz  | –    | –    | 8.5       | dB   |
|           | BGY580<br>BGY581                  |  | –    | –    | 9         | dB   |
| $I_{tot}$ | total current consumption         | DC value; $V_B = +24$ V; note 3                              | –    | 180  | 200       | mA   |
|           | BGY580<br>BGY581                  |  | –    | 220  | 240       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B;  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  $f_q = 547.25$  MHz;  $V_q = V_p - 6$  dB;  $f_r = 549.25$  MHz;  $V_r = V_p - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The modules normally operate at  $V_B = +24$  V, but are able to withstand supply transients up to +30 V.

## CATV amplifier modules

## BGY582; BGY583

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Optimal reliability ensured by TiPtAu metallized crystals.

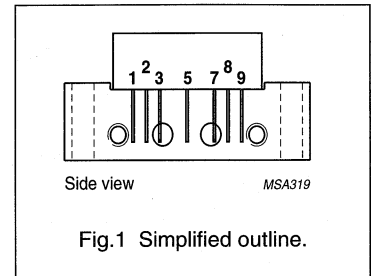
## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 13.5 | –    | 14.5 | dB   |
|                  |                                | f = 550 MHz            | 14.5 | –    | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 180  | 200  | mA   |
|                  | BGY582                         |                        |      |      |      |      |
|                  | BGY583                         |                        | –    | 220  | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |



## CATV amplifier modules

## BGY582; BGY583

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 550 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER   | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|------------------|---|--|------|------|-----------|------|
| $G_p$            | power gain  | $f = 50\text{ MHz}$  | 13.5 | –    | 14.5      | dB   |
|                  |   | $f = 550\text{ MHz}$   | 14.5 | –    | –         | dB   |
| SL               | slope cable equivalent                                | $f = 40\text{ to }550\text{ MHz}$                                    | 0.2  | –    | 1.5       | dB   |
| FL               | flatness of frequency response                        | $f = 40\text{ to }550\text{ MHz}$                                    | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses                                   | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|                  |   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|                  |   | $f = 160\text{ to }550\text{ MHz}$                                   | 18   | –    | –         | dB   |
| $S_{22}$         | output return losses                                  | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|                  |   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|                  |   | $f = 160\text{ to }550\text{ MHz}$                                   | 18   | –    | –         | dB   |
| CTB              | composite triple beat<br>BGY582<br>BGY583             | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 547.25 MHz | –    | –    | –55       | dB   |
|                  |   |  | –    | –    | –59       | dB   |
| $X_{\text{mod}}$ | cross modulation<br>BGY582<br>BGY583                  | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –58       | dB   |
|                  |   |  | –    | –    | –61       | dB   |
| CSO              | composite second order distortion<br>BGY582<br>BGY583 | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 548.5 MHz  | –    | –    | –55       | dB   |
|                  |   |  | –    | –    | –59       | dB   |
| $d_2$            | second order distortion<br>BGY582<br>BGY583           | note 1   | –    | –    | –70       | dB   |
|                  |   |  | –    | –    | –72       | dB   |
| $V_o$            | output voltage<br>BGY582<br>BGY583                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 59   | –    | –         | dBmV |
|                  |   |  | 61.5 | –    | –         | dBmV |
| F                | noise figure<br>BGY582<br>BGY583                      | $f = 550\text{ MHz}$   | –    | –    | 7.5       | dB   |
|                  |   |  | –    | –    | 8.5       | dB   |
| $I_{\text{tot}}$ | total current consumption<br>BGY582<br>BGY583         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 180  | 200       | mA   |
|                  |   |  | –    | 220  | 240       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  $f_q = 493.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 548.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  $f_q = 447.25\text{ MHz}$ ;  $V_q = V_p - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_p - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The modules normally operate at  $V_B = +24\text{ V}$ , but are able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier modules

## BGY584; BGY585

## FEATURES

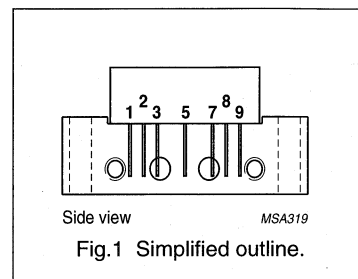
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of 24 V (DC). The BGY584 is intended for use as a pre-amplifier and BGY585 as a final amplifier.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 16.5 | –    | 17.5 | dB   |
|                  |                                | f = 550 MHz           | 17.6 | –    | 19   | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V |      |      |      |      |
|                  | BGY584                         |                       | –    | 180  | 200  | mA   |
|                  | BGY585                         | –                     | 220  | 240  | mA   |      |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier modules

## BGY584; BGY585

## CHARACTERISTICS

Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER   | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|---|---|------|------|-----------|------|
| $G_p$     | power gain  | f = 50 MHz  | 16.5 | –    | 17.5      | dB   |
|           |   | f = 550 MHz   | 17.6 | –    | 19        | dB   |
| SL        | slope cable equivalent                                | f = 40 to 550 MHz   | 0.5  | –    | 2         | dB   |
| FL        | flatness of frequency response                        | f = 40 to 550 MHz   | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses                                   | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |   | f = 160 to 550 MHz  | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses                                  | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |   | f = 160 to 550 MHz  | 18   | –    | –         | dB   |
| $S_{21}$  | phase response  | f = 50 MHz  | –45  | –    | +45       | deg  |
| CTB       | composite triple beat<br>BGY584<br>BGY585             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –    | –56       | dB   |
|           |   |   | –    | –    | –59       | dB   |
| $X_{mod}$ | cross modulation<br>BGY584<br>BGY585                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –59       | dB   |
|           |   |   | –    | –    | –62       | dB   |
| CSO       | composite second order distortion<br>BGY584<br>BGY585 | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –    | –56       | dB   |
|           |   |   | –    | –    | –59       | dB   |
| $d_2$     | second order distortion<br>BGY584<br>BGY585           | note 1  | –    | –    | –68       | dB   |
|           |   |   | –    | –    | –70       | dB   |
| $V_o$     | output voltage<br>BGY584<br>BGY585                    | $d_{im} = -60$ dB; note 2                                       | 58.5 | –    | –         | dBmV |
|           |   |   | 61   | –    | –         | dBmV |
| F         | noise figure<br>BGY584<br>BGY585                      | f = 550 MHz   | –    | –    | 7         | dB   |
|           |   |   | –    | –    | 8         | dB   |
| $I_{tot}$ | total current consumption (DC)<br>BGY584<br>BGY585    | note 3  | –    | 180  | 200       | mA   |
|           |   |   | –    | 220  | 240       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  $f_q = 493.25$  MHz;  $V_q = 44$  dBmV; measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  $f_p = 540.25$  MHz;  $V_p = V_o$ ;  $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB; measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The modules normally operate at  $V_B = 24$  V, but are able to withstand supply transients up to 30 V.

## CATV amplifier modules

## BGY584; BGY585

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER   | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|-----------|---|---|------|------|------|------|
| $G_p$     | power gain  | f = 50 MHz  | 16.5 | –    | 17.5 | dB   |
|           |   | f = 450 MHz   | 17.4 | –    | 18.8 | dB   |
| SL        | slope cable equivalent                                | f = 40 to 450 MHz   | 0.5  | –    | 1.8  | dB   |
| FL        | flatness of frequency response                        | f = 40 to 450 MHz   | –    | –    | ±0.2 | dB   |
| $S_{11}$  | input return losses                                   | f = 40 to 80 MHz  | 20   | –    | –    | dB   |
|           |   | f = 80 to 160 MHz   | 19   | –    | –    | dB   |
|           |   | f = 160 to 450 MHz  | 18   | –    | –    | dB   |
| $S_{22}$  | output return losses                                  | f = 40 to 80 MHz  | 20   | –    | –    | dB   |
|           |   | f = 80 to 160 MHz   | 19   | –    | –    | dB   |
|           |   | f = 160 to 450 MHz  | 18   | –    | –    | dB   |
| $S_{21}$  | phase response  | f = 50 MHz  | –45  | –    | +45  | deg  |
| CTB       | composite triple beat<br>BGY584<br>BGY585             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –    | –58  | dB   |
|           |   |   | –    | –    | –61  | dB   |
| $X_{mod}$ | cross modulation<br>BGY584<br>BGY585                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –57  | dB   |
|           |   |   | –    | –    | –60  | dB   |
| CSO       | composite second order distortion<br>BGY584<br>BGY585 | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –    | –58  | dB   |
|           |   |   | –    | –    | –61  | dB   |
| $d_2$     | second order distortion<br>BGY584<br>BGY585           | note 1  | –    | –    | –73  | dB   |
|           |   |   | –    | –    | –75  | dB   |
| $V_o$     | output voltage<br>BGY584<br>BGY585                    | $d_{im} = -60$ dB; note 2                                       | 61.5 | –    | –    | dBmV |
|           |   |   | 64   | –    | –    | dBmV |
| F         | noise figure<br>BGY584<br>BGY585                      | f = 450 MHz   | –    | –    | 6    | dB   |
|           |   |   | –    | –    | 7    | dB   |
| $I_{tot}$ | total current consumption (DC)<br>BGY584<br>BGY585    | note 3  | –    | 180  | 200  | mA   |
|           |   |   | –    | 220  | 240  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  $f_q = 391.25$  MHz;  $V_q = 46$  dBmV; measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  $f_p = 440.25$  MHz;  $V_p = V_o$ ;  $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB; measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The modules normally operate at  $V_B = 24$  V, but are able to withstand supply transients up to 30 V.

## CATV amplifier modules

## BGY584A; BGY585A

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Optimal reliability ensured by TiPtAu metallized crystals.

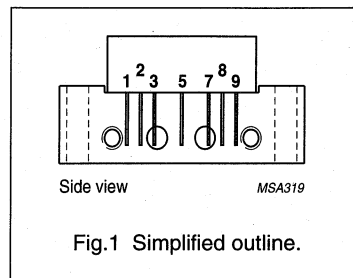
## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of +24 V (DC). The BGY584A is intended for use as a pre-amplifier and BGY585A as a final amplifier.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN.    | TYP. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|---------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 17.7    | –    | 18.7 | dB   |
|                  |                                | f = 550 MHz            | 18.8    | –    | 20   | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V |         |      |      |      |
|                  |                                |                        | BGY584A | –    | 180  | 200  |
|                  | BGY585A                        | –                      | 220     | 240  | mA   |      |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL            | PARAMETER                  | MIN. | MAX. | UNIT |
|-------------------|----------------------------|------|------|------|
| V <sub>i</sub>    | RF input voltage           | –    | 65   | dBmV |
| T <sub>stg</sub>  | storage temperature        | –40  | +100 | °C   |
| T <sub>case</sub> | case operating temperature | –20  | +100 | °C   |

## CATV amplifier modules

## BGY584A; BGY585A

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 550 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER   | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|------------------|---|--|------|------|-----------|------|
| $G_p$            | power gain  | $f = 50\text{ MHz}$  | 17.7 | –    | 18.7      | dB   |
|                  |   | $f = 550\text{ MHz}$   | 18.8 | –    | 20        | dB   |
| SL               | slope cable equivalent                                  | $f = 40\text{ to }550\text{ MHz}$                                    | 0.5  | –    | 2         | dB   |
| FL               | flatness of frequency response                          | $f = 40\text{ to }550\text{ MHz}$                                    | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses                                     | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|                  |   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|                  |   | $f = 160\text{ to }550\text{ MHz}$                                   | 18   | –    | –         | dB   |
| $S_{22}$         | output return losses                                    | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|                  |   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|                  |   | $f = 160\text{ to }550\text{ MHz}$                                   | 18   | –    | –         | dB   |
| CTB              | composite triple beat<br>BGY584A<br>BGY585A             | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 547.25 MHz | –    | –    | –56       | dB   |
|                  |   |  | –    | –    | –59       | dB   |
| $X_{\text{mod}}$ | cross modulation<br>BGY584A<br>BGY585A                  | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –59       | dB   |
|                  |   |  | –    | –    | –62       | dB   |
| CSO              | composite second order distortion<br>BGY584A<br>BGY585A | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 548.5 MHz  | –    | –    | –55       | dB   |
|                  |   |  | –    | –    | –59       | dB   |
| $d_2$            | second order distortion<br>BGY584A<br>BGY585A           | note 1   | –    | –    | –70       | dB   |
|                  |   |  | –    | –    | –72       | dB   |
| $V_o$            | output voltage<br>BGY584A<br>BGY585A                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 59   | –    | –         | dBmV |
|                  |   |  | 61.5 | –    | –         | dBmV |
| F                | noise figure<br>BGY584A<br>BGY585A                      | $f = 550\text{ MHz}$   | –    | –    | 7         | dB   |
|                  |   |  | –    | –    | 8         | dB   |
| $I_{\text{tot}}$ | total current consumption<br>BGY584A<br>BGY585A         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 180  | 200       | mA   |
|                  |   |  | –    | 220  | 240       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  $f_q = 493.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ; measured at  $f_p + f_q = 548.5\text{ MHz}$ .
- Measured according to DIN45004B;  $f_p = 540.25\text{ MHz}$ ;  $V_p = V_o$ ;  $f_q = 547.25\text{ MHz}$ ;  $V_q = V_p - 6\text{ dB}$ ;  $f_r = 549.25\text{ MHz}$ ;  $V_r = V_p - 6\text{ dB}$ ; measured at  $f_p + f_q - f_r = 538.25\text{ MHz}$ .
- The modules normally operate at  $V_B = +24\text{ V}$ , but are able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier modules

## BGY584A; BGY585A

**Table 2** Bandwidth 40 to 450 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER   | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|------------------|---|--|------|------|-----------|------|
| $G_p$            | power gain  | f = 50 MHz   | 17.7 | –    | 18.7      | dB   |
|                  |   | f = 450 MHz  | 18.6 | –    | 19.8      | dB   |
| SL               | slope cable equivalent                                  | f = 40 to 450 MHz  | 0.5  | –    | 1.8       | dB   |
| FL               | flatness of frequency response                          | f = 40 to 450 MHz  | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses                                     | f = 40 to 80 MHz   | 20   | –    | –         | dB   |
|                  |   | f = 80 to 160 MHz  | 19   | –    | –         | dB   |
|                  |   | f = 160 to 450 MHz   | 18   | –    | –         | dB   |
| $S_{22}$         | output return losses                                    | f = 40 to 80 MHz   | 20   | –    | –         | dB   |
|                  |   | f = 80 to 160 MHz  | 19   | –    | –         | dB   |
|                  |   | f = 160 to 450 MHz   | 18   | –    | –         | dB   |
| CTB              | composite triple beat<br>BGY584A<br>BGY585A             | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –    | –57       | dB   |
|                  |   |  | –    | –    | –61       | dB   |
| $X_{\text{mod}}$ | cross modulation<br>BGY584A<br>BGY585A                  | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –58       | dB   |
|                  |   |  | –    | –    | –61       | dB   |
| CSO              | composite second order distortion<br>BGY584A<br>BGY585A | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 446.5 MHz  | –    | –    | –58       | dB   |
|                  |   |  | –    | –    | –61       | dB   |
| $d_2$            | second order distortion<br>BGY584A<br>BGY585A           | note 1   | –    | –    | –73       | dB   |
|                  |   |  | –    | –    | –75       | dB   |
| $V_o$            | output voltage<br>BGY584A<br>BGY585A                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 61.5 | –    | –         | dBmV |
|                  |   |  | 64   | –    | –         | dBmV |
| F                | noise figure<br>BGY584A<br>BGY585A                      | f = 450 MHz  | –    | –    | 6         | dB   |
|                  |   |  | –    | –    | 7         | dB   |
| $I_{\text{tot}}$ | total current consumption<br>BGY584A<br>BGY585A         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 180  | 200       | mA   |
|                  |   |  | –    | 220  | 240       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_p - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_p - 6\text{ dB}$ ; measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The modules normally operate at  $V_B = +24\text{ V}$ , but are able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier modules

## BGY586; BGY587

## FEATURES

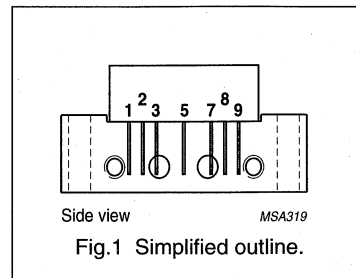
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

## DESCRIPTION

Hybrid amplifier modules for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of 24 V (DC). The BGY586 is intended for use as a pre-amplifier and BGY587 as a final amplifier.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN.   | TYP. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|--------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 21.5   | –    | 22.5 | dB   |
|                  |                                | f = 550 MHz           | 22     | –    | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V |        |      |      |      |
|                  |                                |                       | BGY586 | –    | 180  | 200  |
|                  | BGY587                         | –                     | 220    | 240  | mA   |      |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |



## CATV amplifier modules

## BGY586; BGY587

**CHARACTERISTICS**Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER   | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|-----------|---|---|------|------|------|------|
| $G_p$     | power gain  | f = 50 MHz  | 21.5 | –    | 22.5 | dB   |
|           |   | f = 550 MHz   | 22   | –    | –    | dB   |
| SL        | slope cable equivalent                                | f = 40 to 550 MHz   | 0.2  | –    | 1.5  | dB   |
| FL        | flatness of frequency response                        | f = 40 to 550 MHz   | –    | –    | ±0.2 | dB   |
| $S_{11}$  | input return losses                                   | f = 40 to 80 MHz  | 20   | –    | –    | dB   |
|           |   | f = 80 to 160 MHz   | 19   | –    | –    | dB   |
|           |   | f = 160 to 550 MHz  | 18   | –    | –    | dB   |
| $S_{22}$  | output return losses                                  | f = 40 to 80 MHz  | 20   | –    | –    | dB   |
|           |   | f = 80 to 160 MHz   | 19   | –    | –    | dB   |
|           |   | f = 160 to 550 MHz  | 18   | –    | –    | dB   |
| $S_{21}$  | phase response  | f = 50 MHz  | +135 | –    | +225 | deg  |
| CTB       | composite triple beat<br>BGY586<br>BGY587             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –    | –53  | dB   |
|           |   |   | –    | –    | –57  | dB   |
| $X_{mod}$ | cross modulation<br>BGY586<br>BGY587                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –55  | dB   |
|           |   |   | –    | –    | –58  | dB   |
| CSO       | composite second order distortion<br>BGY586<br>BGY587 | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –    | –50  | dB   |
|           |   |   | –    | –    | –54  | dB   |
| $d_2$     | second order distortion<br>BGY586<br>BGY587           | note 1  | –    | –    | –62  | dB   |
|           |   |   | –    | –    | –66  | dB   |
| $V_o$     | output voltage<br>BGY586<br>BGY587                    | $d_{im} = -60$ dB; note 2                                       | 58.5 | –    | –    | dBmV |
|           |   |   | 61   | –    | –    | dBmV |
| F         | noise figure<br>BGY586<br>BGY587                      | f = 550 MHz   | –    | –    | 6.5  | dB   |
|           |   |   | –    | –    | 7    | dB   |
| $I_{tot}$ | total current consumption (DC)<br>BGY586<br>BGY587    | note 3  | –    | 180  | 200  | mA   |
|           |   |   | –    | 220  | 240  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  $f_q = 493.25$  MHz;  $V_q = 44$  dBmV; measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  $f_p = 540.25$  MHz;  $V_p = V_o$ ;  $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB; measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The modules normally operate at  $V_B = 24$  V, but are able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY587B

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

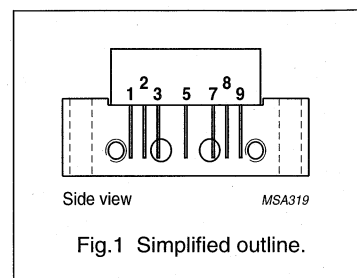
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 26.2 | 27.8 | dB   |
|                  |                                | f = 550 MHz            | 27.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 340  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |
| V <sub>B</sub>   | DC supply voltage                   | –    | +28  | V    |

## CATV amplifier module

BGY587B

## CHARACTERISTICS

Table 1 Bandwidth 40 to 550 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 26.2 | 27.8      | dB   |
|                  |                                   | $f = 550\text{ MHz}$   | 27.5 |           | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }550\text{ MHz}$                                    | 0.5  | 2.5       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }550\text{ MHz}$                                    | –    | $\pm 0.4$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }550\text{ MHz}$                                   | 18   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }550\text{ MHz}$                                   | 18   | –         | dB   |
| CTB              | composite triple beat             | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 547.25 MHz | –    | –57       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –60       | dB   |
| CSO              | composite second order distortion | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 548.5 MHz  | –    | –57       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –68       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 61   | –         | dBmV |
| F                | noise figure                      | $f = 550\text{ MHz}$   | –    | 6.5       | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 340       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 493.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 548.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 540.25\text{ MHz}$ ;  $V_p = V_o = 66.5\text{ dBmV}$ ;  
 $f_q = 547.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 549.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 538.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY588

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- TiPtAu metallized crystals ensure optimal reliability.

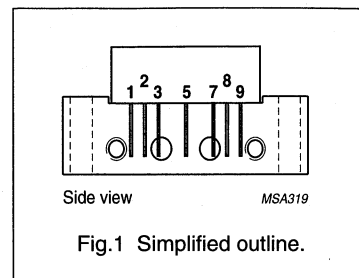
## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 550 MHz at a voltage supply of +24 V (DC) and intended for use as a line-extender.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 33.5 | –    | 35.5 | dB   |
|                  |                                | f = 550 MHz            | 35   | –    | 37   | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 320  | 340  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY588

## CHARACTERISTICS

Table 1 Bandwidth 40 to 550 MHz;  $T_{case} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|------|-----------|------|
| $G_p$     | power gain                        | $f = 50\text{ MHz}$  | 33.5 | –    | 35.5      | dB   |
|           |                                   | $f = 550\text{ MHz}$   | 35   | –    | 37        | dB   |
| SL        | slope cable equivalent            | $f = 40\text{ to }550\text{ MHz}$                                    | 0    | –    | 2.5       | dB   |
| FL        | flatness of frequency response    | $f = 40\text{ to }550\text{ MHz}$                                    | –    | –    | $\pm 0.4$ | dB   |
| $S_{11}$  | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|           |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|           |                                   | $f = 160\text{ to }550\text{ MHz}$                                   | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|           |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|           |                                   | $f = 160\text{ to }550\text{ MHz}$                                   | 18   | –    | –         | dB   |
| CTB       | composite triple beat             | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 547.25 MHz | –    | –    | –57       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –59       | dB   |
| CSO       | composite second order distortion | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 548.5 MHz  | –    | –    | –57       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –    | –68       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60\text{ dB}$ ; note 2                                    | 61   | –    | –         | dBmV |
| F         | noise figure                      | $f = 550\text{ MHz}$   | –    | –    | 6.5       | dB   |
| $I_{tot}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 320  | 340       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 493.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 548.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 540.25\text{ MHz}$ ;  $V_p = V_o = 66.5\text{ dBmV}$ ;  
 $f_q = 547.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 549.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 538.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY588

**Table 2** Bandwidth 40 to 450 MHz;  $T_{\text{case}} = 35\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | TYP. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 33.5 | –    | 35.5      | dB   |
|                  |                                   | $f = 450\text{ MHz}$   | 35   | –    | 37        | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }450\text{ MHz}$                                    | 0.5  | –    | 2.5       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }450\text{ MHz}$                                    | –    | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –    | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –    | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –    | –         | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –    | –         | dB   |
| CTB              | composite triple beat             | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –    | –61       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –59       | dB   |
| CSO              | composite second order distortion | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 446.5 MHz  | –    | –    | –59       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –    | –72       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 64   | –    | –         | dBmV |
| F                | noise figure                      | $f = 450\text{ MHz}$   | –    | –    | 6         | B    |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 320  | 340       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- Measured according to DIN45004B;  
 $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o = 66.5\text{ dBmV}$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY681

## FEATURES

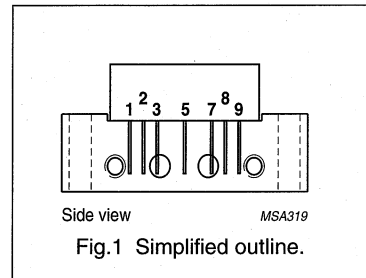
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high dynamic range amplifier module designed for CATV systems operating over a frequency range of 40 to 600 MHz operating with a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 12   | 13   | dB   |
|                  |                                | f = 600 MHz           | 12.7 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY681

**CHARACTERISTICS**Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 12   | –    | 13        | dB   |
|           |                                   | f = 600 MHz   | 12.7 | –    | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 600 MHz   | 0.7  | –    | 2.2       | dB   |
| FL        | flatness of frequency response    | f = 40 to 600 MHz   | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | f = 160 to 600 MHz  | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | f = 160 to 600 MHz  | 18   | –    | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | –    | +45       | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –    | –52       | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –58       | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –    | –57       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 59.5 | –    | –         | dBmV |
| F         | noise figure                      | f = 600 MHz   | –    | –    | 9.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 220  | 240       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.



## CATV amplifier module

BGY681

**CHARACTERISTICS**Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 12   | –    | 13        | dB   |
|           |                                   | f = 550 MHz   | 12.5 | –    | 14.5      | dB   |
| SL        | slope cable equivalent            | f = 40 to 550 MHz   | 0.5  | –    | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 550 MHz   | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | f = 160 to 550 MHz  | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | f = 160 to 550 MHz  | 18   | –    | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | –    | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –    | –56       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –62       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –    | –59       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 61.5 | –    | –         | dBmV |
| F         | noise figure                      | f = 550 MHz   | –    | –    | 9         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 220  | 240       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY681

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 12   | –    | 13        | dB   |
|           |                                   | f = 450 MHz   | 12.5 | –    | 14        | dB   |
| SL        | slope cable equivalent            | f = 40 to 450 MHz   | 0.5  | –    | 1.5       | dB   |
| FL        | flatness of frequency response    | f = 40 to 450 MHz   | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –    | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | –    | +45       | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –    | –58       | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –62       | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –    | –61       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –    | –74       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64   | –    | –         | dBmV |
| F         | noise figure                      | f = 450 MHz   | –    | –    | 8         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 220  | 240       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY683

## FEATURES

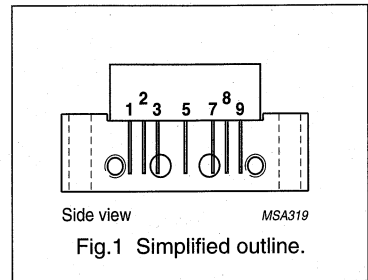
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high dynamic range amplifier module for CATV systems operating over a frequency range of 40 to 600 MHz at a voltage supply of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 13.5 | 14.5 | dB   |
|                  |                                | f = 600 MHz           | 14.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY683

**CHARACTERISTICS**Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 30$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|------------------|-----------------------------------|---|------|------|------|
| $G_p$            | power gain                        | $f = 50$ MHz  | 13.5 | 14.5 | dB   |
|                  |                                   | $f = 600$ MHz   | 14.5 | –    | dB   |
| SL               | slope cable equivalent            | $f = 40$ to 600 MHz   | 0.2  | 1.7  | dB   |
| FL               | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | ±0.2 | dB   |
| $S_{11}$         | input return losses               | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|                  |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|                  |                                   | $f = 160$ to 600 MHz  | 18   | –    | dB   |
| $S_{22}$         | output return losses              | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|                  |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|                  |                                   | $f = 160$ to 600 MHz  | 18   | –    | dB   |
| $S_{21}$         | phase response                    | $f = 50$ MHz  | –45  | +45  | deg  |
| CTB              | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –55  | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –59  | dB   |
| CSO              | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –57  | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –68  | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60$ dB; note 2                                | 58   | –    | dBmV |
| F                | noise figure                      | $f = 600$ MHz   | –    | 9    | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3  | –    | 240  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY683

**CHARACTERISTICS**Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|------------------|-----------------------------------|---|------|------|-----------|------|
| $G_p$            | power gain                        | f = 50 MHz  | 13.5 | –    | 14.5      | dB   |
|                  |                                   | f = 550 MHz   | 14.5 | –    | –         | dB   |
| SL               | slope cable equivalent            | f = 40 to 550 MHz   | 0.2  | –    | 1.5       | dB   |
| FL               | flatness of frequency response    | f = 40 to 550 MHz   | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses               | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|                  |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|                  |                                   | f = 160 to 550 MHz  | 18   | –    | –         | dB   |
| $S_{22}$         | output return losses              | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|                  |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|                  |                                   | f = 160 to 550 MHz  | 18   | –    | –         | dB   |
| $S_{21}$         | phase response                    | f = 50 MHz  | –45  | –    | +45       | deg  |
| CTB              | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –    | –59       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –61       | dB   |
| CSO              | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –    | –59       | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –    | –72       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60$ dB; note 2                                | 61.5 | –    | –         | dBmV |
| F                | noise figure                      | f = 550 MHz   | –    | –    | 8.5       | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3  | –    | 200  | 240       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY683

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 30$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|------------------|-----------------------------------|---|------|------|------|------|
| $G_p$            | power gain                        | $f = 50$ MHz  | 16.5 | –    | 17.5 | dB   |
|                  |                                   | $f = 450$ MHz   | 17.4 | –    | 18.8 | dB   |
| SL               | slope cable equivalent            | $f = 40$ to 450 MHz   | 0.5  | –    | 1.8  | dB   |
| FL               | flatness of frequency response    | $f = 40$ to 450 MHz   | –    | –    | ±0.2 | dB   |
| $S_{11}$         | input return losses               | $f = 40$ to 80 MHz  | 20   | –    | –    | dB   |
|                  |                                   | $f = 80$ to 160 MHz   | 19   | –    | –    | dB   |
|                  |                                   | $f = 160$ to 450 MHz  | 18   | –    | –    | dB   |
| $S_{22}$         | output return losses              | $f = 40$ to 80 MHz  | 20   | –    | –    | dB   |
|                  |                                   | $f = 80$ to 160 MHz   | 19   | –    | –    | dB   |
|                  |                                   | $f = 160$ to 450 MHz  | 18   | –    | –    | dB   |
| $S_{21}$         | phase response                    | $f = 50$ MHz  | –45  | –    | +45  | deg  |
| CTB              | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –    | –61  | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –60  | dB   |
| CSO              | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –    | –61  | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –    | –75  | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60$ dB; note 2                                | 64   | –    | –    | dBmV |
| F                | noise figure                      | $f = 450$ MHz   | –    | –    | 7    | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3  | –    | 200  | 240  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY685

## FEATURES

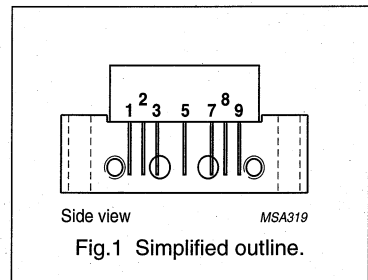
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high dynamic range amplifier module designed for applications in CATV systems operating over a frequency range of 40 to 600 MHz operating with a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 16.5 | 17.5 | dB   |
|                  |                                | f = 600 MHz           | 17.8 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY685

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 16.5 | 17.5      | dB   |
|           |                                   | f = 600 MHz   | 17.8 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 600 MHz   | 0.5  | 2.2       | dB   |
| FL        | flatness of frequency response    | f = 40 to 600 MHz   | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 600 MHz  | 18   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 600 MHz  | 18   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –55       | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –60       | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –56       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –68       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 60   | –         | dBmV |
| F         | noise figure                      | f = 600 MHz   | –    | 8.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 240       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.



## CATV amplifier module

## BGY685

**Table 2** Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 16.5 | –    | 17.5      | dB   |
|           |                                   | f = 550 MHz   | 17.6 | –    | 19        | dB   |
| SL        | slope cable equivalent            | f = 40 to 550 MHz   | 0.5  | –    | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 550 MHz   | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | f = 160 to 550 MHz  | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | f = 160 to 550 MHz  | 18   | –    | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | –    | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –    | –59       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –62       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –    | –59       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 61   | –    | –         | dBmV |
| F         | noise figure                      | f = 550 MHz   | –    | –    | 8         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 220  | 240       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY685

**Table 3** Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 16.5 | –    | 17.5      | dB   |
|           |                                   | $f = 450$ MHz   | 17.4 | –    | 18.8      | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 450 MHz   | 0.5  | –    | 1.8       | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 450 MHz   | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | $f = 160$ to 450 MHz  | 18   | –    | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –    | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –    | –         | dB   |
|           |                                   | $f = 160$ to 450 MHz  | 18   | –    | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | –    | +45       | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –    | –61       | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –    | –60       | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –    | –61       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –    | –75       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64   | –    | –         | dBmV |
| F         | noise figure                      | $f = 450$ MHz   | –    | –    | 7         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 220  | 240       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY685A

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Special super-high dynamic range amplifier module for applications in CATV systems with a bandwidth of 40 to 600 MHz at a supply voltage of +24 V (DC).

## PINNING - SOT115C

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

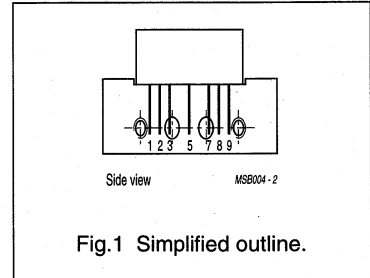


Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | TYP. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 17.7 | –    | 18.7 | dB   |
|                  |                                | f = 600 MHz           | 19   | –    | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 220  | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 60   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY685A

**CHARACTERISTICS**Bandwidth 40 to 600 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ .

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|---|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$   | 17.7 | 18.7      | dB   |
|                  |                                   | $f = 600\text{ MHz}$  | 19   | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }600\text{ MHz}$                                       | 0.5  | 2.2       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }600\text{ MHz}$                                       | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$  | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }600\text{ MHz}$                                      | 18   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$  | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }600\text{ MHz}$                                      | 18   | –         | dB   |
| $S_{21}$         | phase response                    | $f = 50\text{ MHz}$   | –45  | +45       | deg  |
| CTB              | composite triple beat             | 85 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 595.25 MHz | –    | –55       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –60       | dB   |
| CSO              | composite second order distortion | 85 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 596.5 MHz  | –    | –56       | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –70       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                                | 60   | –         | dBmV |
| F                | noise figure                      | $f = 600\text{ MHz}$  | –    | 8.5       | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3  | –    | 240       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 541.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 596.5\text{ MHz}$ .
- $f_p = 590.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 597.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 599.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 588.25\text{ MHz}$ .
- The module normally operates at  $V_B = 24\text{ V}$ , but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY685A

## CHARACTERISTICS

Bandwidth 40 to 550 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ .

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|------------------|-----------------------------------|---|------|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$   | 17.7 | –    | 18.7      | dB   |
|                  |                                   | $f = 550\text{ MHz}$  | 18.8 | –    | 20        | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }550\text{ MHz}$                                       | 0.5  | –    | 2         | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }550\text{ MHz}$                                       | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$  | 20   | –    | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –    | –         | dB   |
|                  |                                   | $f = 160\text{ to }550\text{ MHz}$                                      | 18   | –    | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$  | 20   | –    | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –    | –         | dB   |
|                  |                                   | $f = 160\text{ to }550\text{ MHz}$                                      | 18   | –    | –         | dB   |
| $S_{21}$         | phase response                    | $f = 50\text{ MHz}$   | –45  | –    | +45       | deg  |
| CTB              | composite triple beat             | 77 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 547.25 MHz | –    | –    | –59       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –62       | dB   |
| CSO              | composite second order distortion | 77 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 548.5 MHz  | –    | –    | –59       | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –    | –72       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                                | 61.5 | –    | –         | dBmV |
| F                | noise figure                      | $f = 550\text{ MHz}$  | –    | –    | 8         | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3  | –    | 220  | 240       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 493.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 548.5\text{ MHz}$ .
- $f_p = 540.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 547.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 549.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 538.25\text{ MHz}$ .
- The module normally operates at  $V_B = 24\text{ V}$ , but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY685A

## CHARACTERISTICS

Bandwidth 40 to 450 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_{\text{S}} = Z_{\text{L}} = 75\ \Omega$ .

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX.      | UNIT |
|------------------|-----------------------------------|---|------|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$   | 17.7 | –    | 18.7      | dB   |
|                  |                                   | $f = 450\text{ MHz}$  | 18.6 | –    | 19.8      | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }450\text{ MHz}$                                       | 0.5  | –    | 1.8       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }450\text{ MHz}$                                       | –    | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$  | 20   | –    | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –    | –         | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                      | 18   | –    | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$  | 20   | –    | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –    | –         | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                      | 18   | –    | –         | dB   |
| $S_{21}$         | phase response                    | $f = 50\text{ MHz}$   | –45  | –    | +45       | deg  |
| CTB              | composite triple beat             | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –    | –61       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –    | –61       | dB   |
| CSO              | composite second order distortion | 60 channels flat;<br>$V_o = 46\text{ dBmV}$<br>measured at 446.5 MHz    | –    | –    | –61       | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –    | –75       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                                | 64   | –    | –         | dBmV |
| F                | noise figure                      | $f = 450\text{ MHz}$  | –    | –    | 7         | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3  | –    | 220  | 240       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The module normally operates at  $V_B = 24\text{ V}$ , but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGY685AD

## FEATURES

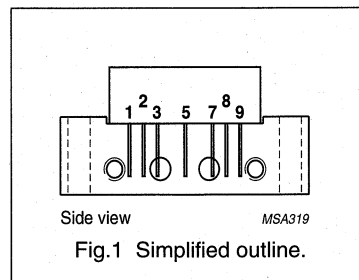
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metalization ensures excellent reliability.

## APPLICATIONS

- CATV systems operating over a frequency range of 40 to 600 MHz.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## DESCRIPTION

The BGY685AD is a hybrid high dynamic range cascode amplifier module with Darlington pre-stage dies operating at a voltage supply of +24 V in a SOT115J2 package.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN.  | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|-------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18    | 19   | dB   |
|                  |                                | f = 600 MHz           | 18.75 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –     | 250  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

## BGY685AD

**CHARACTERISTICS**Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 30$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN.  | MAX. | UNIT |
|------------------|-----------------------------------|---|-------|------|------|
| $G_p$            | power gain                        | f = 50 MHz  | 18    | 19   | dB   |
|                  |                                   | f = 600 MHz   | 18.75 | –    | dB   |
| SL               | slope cable equivalent            | f = 40 to 600 MHz   | 0.2   | 2.2  | dB   |
| FL               | flatness of frequency response    | f = 40 to 600 MHz   | –     | ±0.3 | dB   |
| $S_{11}$         | input return losses               | f = 40 to 80 MHz  | 20    | –    | dB   |
|                  |                                   | f = 80 to 160 MHz   | 19    | –    | dB   |
|                  |                                   | f = 160 to 600 MHz  | 18    | –    | dB   |
| $S_{22}$         | output return losses              | f = 40 to 80 MHz  | 20    | –    | dB   |
|                  |                                   | f = 80 to 160 MHz   | 19    | –    | dB   |
|                  |                                   | f = 160 to 600 MHz  | 18    | –    | dB   |
| $S_{21}$         | phase response                    | f = 50 MHz  | –45   | +45  | deg  |
| CTB              | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –     | –62  | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –     | –58  | dB   |
| CSO              | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –     | –60  | dB   |
| $d_2$            | second order distortion           | note 1  | –     | –70  | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60$ dB; note 2                                | 62    | –    | dBmV |
| F                | noise figure                      | f = 50 MHz  | –     | 6    | dB   |
|                  |                                   | f = 600 MHz   | –     | 8    | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | $V_B = 24$ V  | –     | 250  | mA   |

**Notes**

- $V_p = V_q = 44$  dBmV;  
 $f_p = 55.25$  MHz;  $f_q = 541.25$  MHz;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.



## CATV amplifier module

## BGY685AD

## CHARACTERISTICS

Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 550$ MHz   | 18.8 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz   | 0.2  | 2.2       | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz  | 18   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –         | dB   |
|           |                                   | $f = 160$ to 550 MHz  | 18   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –65       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –60       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –62       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 63   | –         | dBmV |
| F         | noise figure                      | $f = 50$ MHz  | –    | 6         | dB   |
|           |                                   | $f = 550$ MHz   | –    | 7.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | $V_B = 24$ V  | –    | 250       | mA   |

## Notes

- $V_p = V_q = 44$  dBmV;  
 $f_p = 55.25$  MHz;  $f_q = 493.25$  MHz;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.

## CATV amplifier module

## BGY685AD

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|-----------|-----------------------------------|---|------|------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19   | dB   |
|           |                                   | $f = 550$ MHz   | 18.6 | –    | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 450 MHz   | 0.2  | 1.8  | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 450 MHz   | –    | ±0.3 | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|           |                                   | $f = 160$ to 450 MHz  | 18   | –    | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –    | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 19   | –    | dB   |
|           |                                   | $f = 160$ to 450 MHz  | 18   | –    | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45  | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –66  | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –58  | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –67  | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –75  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 65   | –    | dBmV |
| F         | noise figure                      | $f = 50$ MHz  | –    | 6    | dB   |
|           |                                   | $f = 450$ MHz   | –    | 7    | dB   |
| $I_{tot}$ | total current consumption (DC)    | $V_B = 24$ V  | –    | 250  | mA   |

**Notes**

- $V_p = V_q = 46$  dBmV;  
 $f_p = 55.25$  MHz;  $f_q = 391.25$  MHz;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.

## CATV amplifier module

## BGY685AL

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

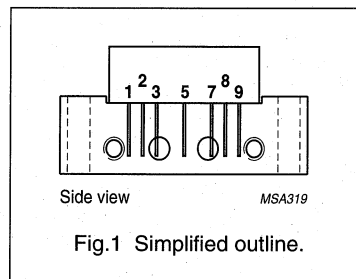
## DESCRIPTION

Hybrid high dynamic range amplifier module designed for applications in CATV systems operating over a frequency range of 40 MHz to 600 MHz operating with a voltage supply of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 18   | 19   | dB   |
|                  |                                | f = 600 MHz            | 18.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 250  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY685AL

## CHARACTERISTICS

Table 1 Bandwidth 40 to 600 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 18   | 19        | dB   |
|                  |                                   | $f = 600\text{ MHz}$   | 18.5 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }600\text{ MHz}$                                    | 0.5  | 2.0       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }600\text{ MHz}$                                    | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }600\text{ MHz}$                                   | 18   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }600\text{ MHz}$                                   | 18   | –         | dB   |
| CTB              | composite triple beat             | 85 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 595.25 MHz | –    | –56       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 85 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –55       | dB   |
| CSO              | composite second order distortion | 85 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 596.5 MHz  | –    | –56       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –70       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 60   | –         | dBmV |
| F                | noise figure                      | $f = 600\text{ MHz}$   | –    | 5         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 250       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 541.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 596.5\text{ MHz}$ .
- $f_p = 590.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 597.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 599.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 588.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

## BGY685AL

**Table 2** Bandwidth 40 to 550 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 18   | 19        | dB   |
|                  |                                   | $f = 550\text{ MHz}$   | 18.5 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }550\text{ MHz}$                                    | 0.5  | 2         | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }550\text{ MHz}$                                    | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }550\text{ MHz}$                                   | 18   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }550\text{ MHz}$                                   | 18   | –         | dB   |
| CTB              | composite triple beat             | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 547.25 MHz | –    | –58       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –56       | dB   |
| CSO              | composite second order distortion | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 548.5 MHz  | –    | –58       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –72       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 61.5 | –         | dBmV |
| F                | noise figure                      | $f = 550\text{ MHz}$   | –    | 4.5       | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 250       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 493.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 548.5\text{ MHz}$ .
- $f_p = 540.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 547.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 549.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 538.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY685AL

**Table 3** Bandwidth 40 to 450 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 18   | 19        | dB   |
|                  |                                   | $f = 450\text{ MHz}$   | 18.3 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }450\text{ MHz}$                                    | 0.3  | 1.5       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }450\text{ MHz}$                                    | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }450\text{ MHz}$                                   | 18   | –         | dB   |
| CTB              | composite triple beat             | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –58       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –54       | dB   |
| CSO              | composite second order distortion | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 446.5 MHz  | –    | –58       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –70       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 62.5 | –         | dBmV |
| F                | noise figure                      | $f = 450\text{ MHz}$   | –    | 4.5       | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 250       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY687

## FEATURES

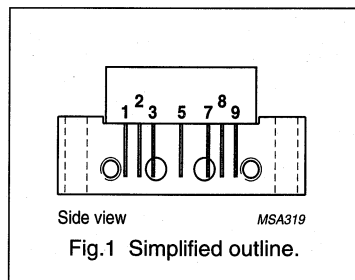
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high dynamic range amplifier module designed for CATV systems operating over a frequency range of 40 to 600 MHz at a voltage supply of 24 V (DC):

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 21   | 22   | dB   |
|                  |                                | f = 600 MHz           | 22   | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY687

**CHARACTERISTICS**Bandwidth 40 to 600 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ .

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|---|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$   | 21   | 22        | dB   |
|                  |                                   | $f = 600\text{ MHz}$  | 22   | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }600\text{ MHz}$                                       | 0.8  | 2.2       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }600\text{ MHz}$                                       | –    | $\pm 0.2$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$  | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }600\text{ MHz}$                                      | 18   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$  | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                       | 19   | –         | dB   |
|                  |                                   | $f = 160\text{ to }550\text{ MHz}$                                      | 18   | –         | dB   |
|                  |                                   | $f = 550\text{ to }600\text{ MHz}$                                      | 16   | –         | dB   |
| $S_{21}$         | phase response                    | $f = 50\text{ MHz}$   | –45  | +45       | deg  |
| CTB              | composite triple beat             | 85 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 595.25 MHz | –    | –54       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –54       | dB   |
| CSO              | composite second order distortion | 85 channels flat;<br>$V_o = 44\text{ dBmV}$ ;<br>measured at 596.5 MHz  | –    | –52       | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –66       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                                | 58   | –         | dBmV |
| F                | noise figure                      | $f = 600\text{ MHz}$  | –    | 6.5       | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3  | –    | 240       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 541.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 596.5\text{ MHz}$ .
- $f_p = 590.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 597.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 599.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 588.25\text{ MHz}$ .
- The module normally operates at  $V_B = 24\text{ V}$ , but is able to withstand supply transients up to 30 V.



## CATV amplifier module

BGY687B

## FEATURES

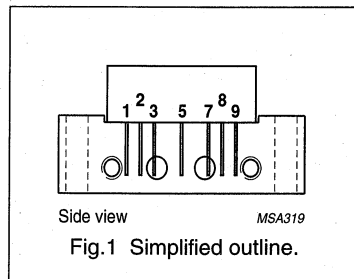
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high dynamic range amplifier module designed for CATV systems operating over a frequency range of 40 to 600 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 26.2 | 27.8 | dB   |
|                  |                                | f = 600 MHz           | 27.8 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 340  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY687B

**CHARACTERISTICS**Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|-----------|-----------------------------------|---|------|------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 26.2 | 27.8 | dB   |
|           |                                   | f = 600 MHz   | 27.8 | –    | dB   |
| SL        | slope cable equivalent            | f = 40 to 600 MHz   | 0.8  | 2.8  | dB   |
| FL        | flatness of frequency response    | f = 40 to 600 MHz   | –    | ±0.4 | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –    | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | dB   |
|           |                                   | f = 160 to 600 MHz  | 18   | –    | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –    | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | dB   |
|           |                                   | f = 160 to 600 MHz  | 18   | –    | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45  | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –53  | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –58  | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –54  | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –66  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 60   | –    | dBmV |
| F         | noise figure                      | f = 600 MHz   | –    | 7    | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 340  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY687B

**CHARACTERISTICS**Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 26.2 | 27.8      | dB   |
|           |                                   | f = 550 MHz   | 27.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 550 MHz   | 0.5  | 2.5       | dB   |
| FL        | flatness of frequency response    | f = 40 to 550 MHz   | –    | $\pm 0.4$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 550 MHz  | 18   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –         | dB   |
|           |                                   | f = 160 to 550 MHz  | 18   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –57       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –60       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –57       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –68       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 61   | –         | dBmV |
| F         | noise figure                      | f = 550 MHz   | –    | 6.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 340       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY687B

**CHARACTERISTICS**Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75$  Ω.

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|-----------|-----------------------------------|---|------|------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 26.2 | 27.8 | dB   |
|           |                                   | f = 450 MHz   | 27.5 | –    | dB   |
| SL        | slope cable equivalent            | f = 40 to 450 MHz   | 0.5  | 2.5  | dB   |
| FL        | flatness of frequency response    | f = 40 to 450 MHz   | –    | ±0.2 | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –    | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –    | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –    | dB   |
|           |                                   | f = 80 to 160 MHz   | 19   | –    | dB   |
|           |                                   | f = 160 to 450 MHz  | 18   | –    | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45  | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –58  | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –58  | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –60  | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64   | –    | dBmV |
| F         | noise figure                      | f = 450 MHz   | –    | 6    | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 340  | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGY785A

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

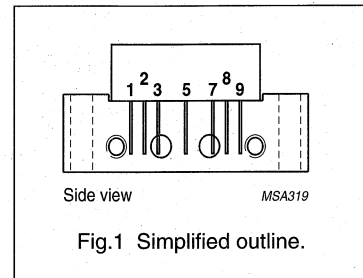
## DESCRIPTION

Hybrid high dynamic range cascode amplifier module designed for CATV systems operating over a frequency range of 40 to 750 MHz at a voltage supply of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

## PIN CONFIGURATION



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 750 MHz           | 18.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY785A

## CHARACTERISTICS

Table 1 Bandwidth 40 to 750 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|---|------|-----------|------|
| $G_p$            | power gain                        | f = 50 MHz  | 18   | 19        | dB   |
|                  |                                   | f = 750 MHz   | 18.5 | –         | dB   |
| SL               | slope cable equivalent            | f = 40 to 750 MHz   | 0    | 2.0       | dB   |
| FL               | flatness of frequency response    | f = 40 to 750 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|                  |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|                  |                                   | f = 640 to 750 MHz  | 14   | –         | dB   |
| $S_{22}$         | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|                  |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|                  |                                   | f = 640 to 750 MHz  | 14   | –         | dB   |
| CTB              | composite triple beat             | 110 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 745.25 MHz | –    | –53       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 110 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –56       | dB   |
| CSO              | composite second order distortion | 110 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 746.5 MHz  | –    | –53       | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –65       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                              | 59   | –         | dBmV |
| F                | noise figure                      | f = 50 MHz  | –    | 5.5       | dB   |
|                  |                                   | f = 450 MHz   | –    | 5.5       | dB   |
|                  |                                   | f = 550 MHz   | –    | 5.5       | dB   |
|                  |                                   | f = 600 MHz   | –    | 6         | dB   |
|                  |                                   | f = 750 MHz   | –    | 7         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                               | –    | 240       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 691.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 746.5\text{ MHz}$ .
- $f_p = 740.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 747.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 749.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 738.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY785A

**Table 2** Bandwidth 40 to 600 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 18   | 19        | dB   |
|                  |                                   | $f = 600\text{ MHz}$   | 18.5 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }600\text{ MHz}$                                    | 0    | 1.5       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }600\text{ MHz}$                                    | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 18.5 | –         | dB   |
|                  |                                   | $f = 160\text{ to }320\text{ MHz}$                                   | 17   | –         | dB   |
|                  |                                   | $f = 320\text{ to }600\text{ MHz}$                                   | 16   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 18.5 | –         | dB   |
|                  |                                   | $f = 160\text{ to }320\text{ MHz}$                                   | 17   | –         | dB   |
|                  |                                   | $f = 320\text{ to }600\text{ MHz}$                                   | 16   | –         | dB   |
| CTB              | composite triple beat             | 85 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 595.25 MHz | –    | –57       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 85 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –59       | dB   |
| CSO              | composite second order distortion | 85 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 596.5 MHz  | –    | –58       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –70       | dB   |
| $V_o$            | output voltage                    | $d_{\text{in}} = -60\text{ dB}$ ; note 2                             | 61   | –         | dBmV |
| F                | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 240       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 541.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 596.5\text{ MHz}$ .
- $f_p = 590.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 597.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 599.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 588.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

## BGY785A

**Table 3** Bandwidth 40 to 550 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | f = 50 MHz   | 18   | 19        | dB   |
|                  |                                   | f = 550 MHz  | 18.5 | –         | dB   |
| SL               | slope cable equivalent            | f = 40 to 550 MHz  | 0    | 1.5       | dB   |
| FL               | flatness of frequency response    | f = 40 to 550 MHz  | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | f = 40 to 80 MHz   | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|                  |                                   | f = 320 to 550 MHz   | 16   | –         | dB   |
| $S_{22}$         | output return losses              | f = 40 to 80 MHz   | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|                  |                                   | f = 320 to 550 MHz   | 16   | –         | dB   |
| CTB              | composite triple beat             | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 547.25 MHz | –    | –60       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –60       | dB   |
| CSO              | composite second order distortion | 77 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 548.5 MHz  | –    | –60       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –72       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 62   | –         | dBmV |
| F                | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 240       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 493.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 548.5\text{ MHz}$ .
- $f_p = 540.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 547.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 549.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 538.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .



## CATV amplifier module

## BGY785A

**Table 4** Bandwidth 40 to 450 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 18   | 19        | dB   |
|                  |                                   | $f = 450\text{ MHz}$   | 18.5 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }450\text{ MHz}$                                    | 0    | 1.5       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }450\text{ MHz}$                                    | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 18.5 | –         | dB   |
|                  |                                   | $f = 160\text{ to }320\text{ MHz}$                                   | 17   | –         | dB   |
|                  |                                   | $f = 320\text{ to }450\text{ MHz}$                                   | 16   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 18.5 | –         | dB   |
|                  |                                   | $f = 160\text{ to }320\text{ MHz}$                                   | 17   | –         | dB   |
|                  |                                   | $f = 320\text{ to }450\text{ MHz}$                                   | 16   | –         | dB   |
| CTB              | composite triple beat             | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –61       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –60       | dB   |
| CSO              | composite second order distortion | 60 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 446.5 MHz  | –    | –61       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –75       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 64   | –         | dBmV |
| F                | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 240       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY785AD

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

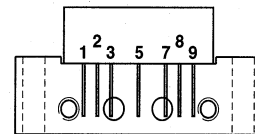
CATV systems operating in the 40 to 750 MHz frequency range.

## DESCRIPTION

Hybrid high dynamic range cascode amplifier module with darlington pre-stage dies in a SOT115J package operating at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



Side view

MSA319

Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 750 MHz           | 18.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 265  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 60   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY785AD

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 750 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | f = 50 MHz   | 18   | 19        | dB   |
|                  |                                   | f = 750 MHz  | 18.5 | –         | dB   |
| SL               | slope cable equivalent            | f = 40 to 750 MHz  | 0.2  | 2         | dB   |
| FL               | flatness of frequency response    | f = 40 to 750 MHz  | –    | $\pm 0.5$ | dB   |
| $S_{11}$         | input return losses               | f = 40 to 80 MHz   | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|                  |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|                  |                                   | f = 640 to 750 MHz   | 14   | –         | dB   |
| $S_{22}$         | output return losses              | f = 40 to 80 MHz   | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|                  |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|                  |                                   | f = 640 to 750 MHz   | 14   | –         | dB   |
| $S_{21}$         | phase response                    | f = 50 MHz   | 135  | 225       | deg  |
| CTB              | composite triple beat             | 110 channels flat; $V_o = 44$ dBmV; measured at 745.25 MHz | –    | –58       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 110 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz  | –    | –56       | dB   |
| CSO              | composite second order distortion | 110 channels flat; $V_o = 44$ dBmV; measured at 746.5 MHz  | –    | –58       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –68       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60$ dB; note 2                           | 61   | –         | dBmV |
| F                | noise figure                      | f = 50 MHz   | –    | 5.5       | dB   |
|                  |                                   | f = 450 MHz  | –    | 5         | dB   |
|                  |                                   | f = 550 MHz  | –    | 5.5       | dB   |
|                  |                                   | f = 600 MHz  | –    | 5.5       | dB   |
|                  |                                   | f = 750 MHz  | –    | 6         | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3   | –    | 265       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY785AD

**Table 2** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 600$ MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 600 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | 135  | 225       | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –64       | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –59       | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –60       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 265       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$ ;  $V_p = V_o$ ;  
 $f_q = 597.25$ ;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$ ;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGY785AD

**Table 3** Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 18   | 19        | dB   |
|           |                                   | f = 550 MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 550 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 550 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 550 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | 135  | 225       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –66       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –61       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –62       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64.5 | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 265       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGY785AD

**Table 4** Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 18   | 19        | dB   |
|           |                                   | f = 450 MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 450 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 450 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 450 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 450 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | 135  | 225       | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –66       | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –59       | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –65       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –75       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 66   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 265       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGY785AD/8M

## FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

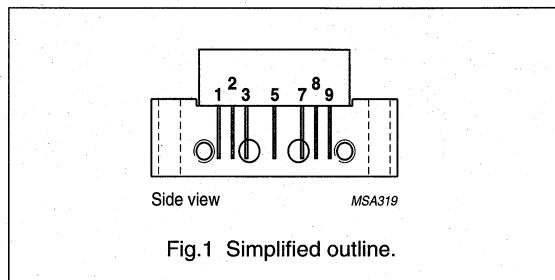
CATV systems operating in the 40 to 870 MHz frequency range.

## DESCRIPTION

Hybrid high dynamic range cascode amplifier module with Darlington pre-stage dies in a SOT115J package, operating at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 870 MHz           | 18.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 265  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 60   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

## BGY785AD/8M

## CHARACTERISTICS

Table 1 Bandwidth 40 to 870 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 870$ MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 870 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 870 MHz   | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 640 MHz  | 15.5 | –         | dB   |
|           |                                   | $f = 640$ to 870 MHz  | 14   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 640 MHz  | 15.5 | –         | dB   |
|           |                                   | $f = 640$ to 870 MHz  | 14   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | 135  | 225       | deg  |
| CTB       | composite triple beat             | 110 channels flat, note 1;<br>$V_o = 44$ dBmV; measured at 745.25 MHz | –    | –58       | dB   |
| $X_{mod}$ | cross modulation                  | 110 channels flat, note 1;<br>$V_o = 44$ dBmV; measured at 55.25 MHz  | –    | –56       | dB   |
| CSO       | composite second order distortion | 110 channels flat, note 1<br>$V_o = 44$ dBmV; measured at 746.5 MHz   | –    | –58       | dB   |
| $d_2$     | second order distortion           | notes 1 and 2   | –    | –68       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; notes 1 and 3                                      | 61   | –         | dBmV |
| F         | noise figure                      | $f = 50$ MHz  | –    | 5.5       | dB   |
|           |                                   | $f = 550$ MHz   | –    | 5.5       | dB   |
|           |                                   | $f = 650$ MHz   | –    | 5.5       | dB   |
|           |                                   | $f = 750$ MHz   | –    | 6         | dB   |
|           |                                   | $f = 870$ MHz   | –    | 6.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 4  | –    | 265       | mA   |

## Notes

- Linearity guaranteed up to 750 MHz.
- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.



## CATV amplifier module

## BGY785AD/8M

**Table 2** Bandwidth 40 to 650 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$  Ω

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX. | UNIT |
|-----------|-----------------------------------|---|------|------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 18   | 19   | dB   |
|           |                                   | f = 650 MHz   | 18.5 | –    | dB   |
| SL        | slope cable equivalent            | f = 40 to 650 MHz   | 0.2  | 2    | dB   |
| FL        | flatness of frequency response    | f = 40 to 650 MHz   | –    | ±0.4 | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –    | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –    | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –    | dB   |
|           |                                   | f = 320 to 650 MHz  | 16   | –    | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –    | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –    | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –    | dB   |
|           |                                   | f = 320 to 650 MHz  | 16   | –    | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | 135  | 225  | deg  |
| CTB       | composite triple beat             | 94 channels flat, note 1;<br>$V_o = 44$ dBmV;<br>measured at 649.25 MHz | –    | –62  | dB   |
| $X_{mod}$ | cross modulation                  | 94 channels flat, note 1;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –57  | dB   |
| CSO       | composite second order distortion | 94 channels flat, note 1;<br>$V_o = 44$ dBmV;<br>measured at 650.5 MHz  | –    | –60  | dB   |
| $d_2$     | second order distortion           | notes 1 and 2   | –    | –70  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; notes 1 and 3  | 63   | –    | dBmV |
| F         | noise figure                      | see Table 1   | –    | –    | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 4  | –    | 265  | mA   |

**Notes**

- Linearity guaranteed up to 750 MHz.
- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  $f_q = 595.25$  MHz;  $V_q = 44$  dBmV; measured at  $f_p + f_q = 650.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 640.25$  MHz;  $V_p = V_o$ ;  $f_q = 647.25$  MHz;  $V_q = V_o - 6$  dB;  $f_r = 649.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 638.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGY785AD/8M

**Table 3** Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 550$ MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 550 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 550 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | 135  | 225       | deg  |
| CTB       | composite triple beat             | 77 channels flat, note 1;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –65       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat, note 1;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –59       | dB   |
| CSO       | composite second order distortion | 77 channels flat, note 1;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –62       | dB   |
| $d_2$     | second order distortion           | notes 1 and 2   | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; notes 1 and 3  | 64.5 | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 4  | –    | 265       | mA   |

**Notes**

- Linearity guaranteed up to 750 MHz.
- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  $f_q = 493.25$  MHz;  $V_q = 44$  dBmV; measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

# CATV amplifier module

# BGY787

### FEATURES

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

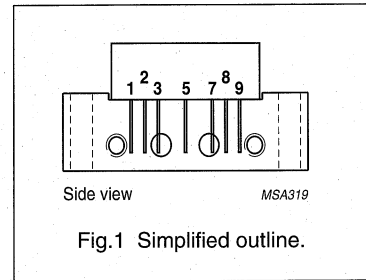
### DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 750 MHz at a voltage supply of +24 V (DC).

### PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

### PIN CONFIGURATION



### QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS             | MIN. | MAX. | UNIT |
|------------------|--------------------------------|------------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz             | 21   | 22   | dB   |
|                  |                                | f = 750 MHz            | 21.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = +24 V | –    | 240  | mA   |

### LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | mounting base operating temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY787

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 750 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|---|------|-----------|------|
| $G_p$            | power gain                        | f = 50 MHz  | 21   | 22        | dB   |
|                  |                                   | f = 750 MHz   | 21.5 | –         | dB   |
| SL               | slope cable equivalent            | f = 40 to 750 MHz   | 0    | 1.5       | dB   |
| FL               | flatness of frequency response    | f = 40 to 750 MHz   | –    | $\pm 0.5$ | dB   |
| $S_{11}$         | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|                  |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|                  |                                   | f = 640 to 750 MHz  | 14   | –         | dB   |
| $S_{22}$         | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|                  |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|                  |                                   | f = 640 to 750 MHz  | 14   | –         | dB   |
| $S_{21}$         | phase response                    | f = 50 MHz  | –45  | +45       | deg  |
| CTB              | composite triple beat             | 110 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 745.25 MHz | –    | –51       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 110 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –51       | dB   |
| CSO              | composite second order distortion | 110 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 746.5 MHz  | –    | –50       | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –63       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                              | 59   | –         | dBmV |
| F                | noise figure                      | f = 50 MHz  | –    | 5         | dB   |
|                  |                                   | f = 450 MHz   | –    | 5.5       | dB   |
|                  |                                   | f = 550 MHz   | –    | 5.5       | dB   |
|                  |                                   | f = 600 MHz   | –    | 6         | dB   |
|                  |                                   | f = 750 MHz   | –    | 6.5       | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                               | –    | 240       | mA   |

## Notes

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 691.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 746.5\text{ MHz}$ .
- $f_p = 740.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 747.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 749.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 738.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY787

**Table 2** Bandwidth 40 to 600 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50\text{ MHz}$  | 21   | 22        | dB   |
|                  |                                   | $f = 600\text{ MHz}$   | 21.5 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40\text{ to }600\text{ MHz}$                                    | 0    | 1.5       | dB   |
| FL               | flatness of frequency response    | $f = 40\text{ to }600\text{ MHz}$                                    | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | $f = 40\text{ to }80\text{ MHz}$                                     | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 18.5 | –         | dB   |
|                  |                                   | $f = 160\text{ to }320\text{ MHz}$                                   | 17   | –         | dB   |
|                  |                                   | $f = 320\text{ to }600\text{ MHz}$                                   | 16   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40\text{ to }80\text{ MHz};$                                    | 20   | –         | dB   |
|                  |                                   | $f = 80\text{ to }160\text{ MHz}$                                    | 18.5 | –         | dB   |
|                  |                                   | $f = 160\text{ to }320\text{ MHz}$                                   | 17   | –         | dB   |
|                  |                                   | $f = 320\text{ to }600\text{ MHz}$                                   | 16   | –         | dB   |
| $S_{21}$         | phase response                    | $f = 50\text{ MHz}$  | –45  | +45       | deg  |
| CTB              | composite triple beat             | 85 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 595.25 MHz | –    | –56       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 85 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –53       | dB   |
| CSO              | composite second order distortion | 85 channels flat; $V_o = 44\text{ dBmV}$ ;<br>measured at 596.5 MHz  | –    | –53       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –66       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 59.5 | –         | dBmV |
| F                | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 240       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 44\text{ dBmV}$ ;  
 $f_q = 541.25\text{ MHz}$ ;  $V_q = 44\text{ dBmV}$ ;  
measured at  $f_p + f_q = 596.5\text{ MHz}$ .
- $f_p = 590.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 597.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 599.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 588.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY787

**Table 3** Bandwidth 40 to 550 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_{\text{S}} = Z_{\text{L}} = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|---|------|-----------|------|
| $G_{\text{p}}$   | power gain                        | f = 50 MHz  | 21   | 22        | dB   |
|                  |                                   | f = 550 MHz   | 21.5 | –         | dB   |
| SL               | slope cable equivalent            | f = 40 to 550 MHz   | 0    | 1.5       | dB   |
| FL               | flatness of frequency response    | f = 40 to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|                  |                                   | f = 320 to 550 MHz  | 16   | –         | dB   |
| $S_{22}$         | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|                  |                                   | f = 320 to 550 MHz  | 16   | –         | dB   |
| $S_{21}$         | phase response                    | f = 50 MHz  | –45  | +45       | deg  |
| CTB              | composite triple beat             | 77 channels flat; $V_{\text{o}} = 44\text{ dBmV}$ ;<br>measured at 547.25 MHz | –    | –59       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 77 channels flat; $V_{\text{o}} = 44\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –54       | dB   |
| CSO              | composite second order distortion | 77 channels flat; $V_{\text{o}} = 44\text{ dBmV}$ ;<br>measured at 548.5 MHz  | –    | –55       | dB   |
| $d_2$            | second order distortion           | note 1  | –    | –66       | dB   |
| $V_{\text{o}}$   | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                                      | 61.5 | –         | dBmV |
| F                | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_{\text{B}} = +24\text{ V}$ ; note 3                              | –    | 240       | mA   |

**Notes**

- $f_{\text{p}} = 55.25\text{ MHz}$ ;  $V_{\text{p}} = 44\text{ dBmV}$ ;  
 $f_{\text{q}} = 493.25\text{ MHz}$ ;  $V_{\text{q}} = 44\text{ dBmV}$ ;  
measured at  $f_{\text{p}} + f_{\text{q}} = 548.5\text{ MHz}$ .
- $f_{\text{p}} = 540.25\text{ MHz}$ ;  $V_{\text{p}} = V_{\text{o}}$ ;  
 $f_{\text{q}} = 547.25\text{ MHz}$ ;  $V_{\text{q}} = V_{\text{o}} - 6\text{ dB}$ ;  
 $f_{\text{r}} = 549.25\text{ MHz}$ ;  $V_{\text{r}} = V_{\text{o}} - 6\text{ dB}$ ;  
measured at  $f_{\text{p}} + f_{\text{q}} - f_{\text{r}} = 538.25\text{ MHz}$ .
- The module normally operates at  $V_{\text{B}} = +24\text{ V}$ , but is able to withstand supply transients up to +30 V.

## CATV amplifier module

BGY787

**Table 4** Bandwidth 40 to 450 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | f = 50 MHz   | 21   | 22        | dB   |
|                  |                                   | f = 450 MHz  | 21.5 | –         | dB   |
| SL               | slope cable equivalent            | f = 40 to 450 MHz  | 0    | 1.5       | dB   |
| FL               | flatness of frequency response    | f = 40 to 450 MHz  | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | f = 40 to 80 MHz   | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|                  |                                   | f = 320 to 450 MHz   | 16   | –         | dB   |
| $S_{22}$         | output return losses              | f = 40 to 80 MHz   | 20   | –         | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|                  |                                   | f = 320 to 450 MHz   | 16   | –         | dB   |
| $S_{21}$         | phase response                    | f = 50 MHz   | –45  | +45       | deg  |
| CTB              | composite triple beat             | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 445.25 MHz | –    | –59       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 55.25 MHz  | –    | –53       | dB   |
| CSO              | composite second order distortion | 60 channels flat; $V_o = 46\text{ dBmV}$ ;<br>measured at 446.5 MHz  | –    | –60       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –72       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60\text{ dB}$ ; note 2                             | 64   | –         | dBmV |
| F                | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{\text{tot}}$ | total current consumption         | DC value; $V_B = +24\text{ V}$ ; note 3                              | –    | 240       | mA   |

**Notes**

- $f_p = 55.25\text{ MHz}$ ;  $V_p = 46\text{ dBmV}$ ;  
 $f_q = 391.25\text{ MHz}$ ;  $V_q = 46\text{ dBmV}$ ;  
measured at  $f_p + f_q = 446.5\text{ MHz}$ .
- $f_p = 440.25\text{ MHz}$ ;  $V_p = V_o$ ;  
 $f_q = 447.25\text{ MHz}$ ;  $V_q = V_o - 6\text{ dB}$ ;  
 $f_r = 449.25\text{ MHz}$ ;  $V_r = V_o - 6\text{ dB}$ ;  
measured at  $f_p + f_q - f_r = 438.25\text{ MHz}$ .
- The module normally operates at  $V_B = +24\text{ V}$ , but is able to withstand supply transients up to  $+30\text{ V}$ .

## CATV amplifier module

BGY883

## FEATURES

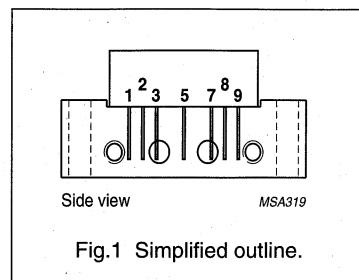
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid amplifier module designed for CATV systems operating over a frequency range of 40 to 860 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 14.5 | 15.5 | dB   |
|                  |                                | f = 860 MHz           | 15   | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 235  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |



## CATV amplifier module

BGY883

## CHARACTERISTICS

Table 1 Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ .

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|------------------|-----------------------------------|---|------|------|------|------|
| G <sub>p</sub>   | power gain                        | f = 50 MHz  | 14.5 | –    | 15.5 | dB   |
|                  |                                   | f = 860 MHz   | 15   | –    | –    | dB   |
| SL               | slope cable equivalent            | f = 40 to 860 MHz   | 0    | –    | 2    | dB   |
| FL               | flatness of frequency response    | f = 40 to 860 MHz   | –    | –    | ±0.3 | dB   |
| S <sub>11</sub>  | input return losses               | f = 40 to 80 MHz  | 20   | –    | –    | dB   |
|                  |                                   | f = 80 to 160 MHz   | 18.5 | –    | –    | dB   |
|                  |                                   | f = 160 to 320 MHz  | 17   | –    | –    | dB   |
|                  |                                   | f = 320 to 640 MHz  | 15.5 | –    | –    | dB   |
|                  |                                   | f = 640 to 860 MHz  | 14   | –    | –    | dB   |
| S <sub>22</sub>  | output return losses              | f = 40 to 80 MHz  | 20   | –    | –    | dB   |
|                  |                                   | f = 80 to 160 MHz   | 18.5 | –    | –    | dB   |
|                  |                                   | f = 160 to 320 MHz  | 17   | –    | –    | dB   |
|                  |                                   | f = 320 to 640 MHz  | 15.5 | –    | –    | dB   |
|                  |                                   | f = 640 to 860 MHz  | 14   | –    | –    | dB   |
| S <sub>21</sub>  | phase response                    | f = 50 MHz  | –45  | –    | +45  | deg  |
| CTB              | composite triple beat             | 49 channels flat; V <sub>o</sub> = 44 dBmV;<br>measured at 859.25 MHz | –    | –    | –61  | dB   |
| X <sub>mod</sub> | cross modulation                  | 49 channels flat; V <sub>o</sub> = 44 dBmV;<br>measured at 55.25 MHz  | –    | –    | –61  | dB   |
| CSO              | composite second order distortion | 49 channels flat; V <sub>o</sub> = 44 dBmV;<br>measured at 860.5 MHz  | –    | –    | –61  | dB   |
| d <sub>2</sub>   | second order distortion           | note 1  | –    | –    | –68  | dB   |
| V <sub>o</sub>   | output voltage                    | d <sub>im</sub> = –60 dB; note 2                                      | 58.5 | 60   | –    | dBmV |
| F                | noise figure                      | f = 50 MHz  | –    | –    | 6    | dB   |
|                  |                                   | f = 550 MHz   | –    | –    | 7    | dB   |
|                  |                                   | f = 650 MHz   | –    | –    | 7.5  | dB   |
|                  |                                   | f = 750 MHz   | –    | –    | 8    | dB   |
|                  |                                   | f = 860 MHz   | –    | –    | 8.5  | dB   |
| I <sub>tot</sub> | total current consumption (DC)    | note 3  | –    | –    | 235  | mA   |

## Notes

- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV;  
f<sub>q</sub> = 805.25 MHz; V<sub>q</sub> = 44 dBmV;  
measured at f<sub>p</sub> + f<sub>q</sub> = 860.5 MHz.
- Measured according to DIN45004B:  
f<sub>p</sub> = 851.25 MHz; V<sub>p</sub> = V<sub>o</sub>;  
f<sub>q</sub> = 858.25 MHz; V<sub>q</sub> = V<sub>o</sub> – 6 dB;  
f<sub>r</sub> = 860.25 MHz; V<sub>r</sub> = V<sub>o</sub> – 6 dB;  
measured at f<sub>p</sub> + f<sub>q</sub> – f<sub>r</sub> = 849.25 MHz.
- The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY885A

## FEATURES

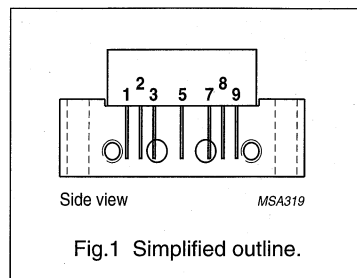
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid amplifier module for CATV systems operating over a frequency range of 40 to 860 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 860 MHz           | 18.5 | —    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | —    | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | —    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | -40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | -20  | +100 | °C   |

## CATV amplifier module

BGY885A

## CHARACTERISTICS

Table 1 Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | TYP. | MAX. | UNIT |
|------------------|-----------------------------------|--|------|------|------|------|
| G <sub>p</sub>   | power gain                        | f = 50 MHz   | 18   | –    | 19   | dB   |
|                  |                                   | f = 860 MHz  | 18.5 | –    | –    | dB   |
| SL               | slope cable equivalent            | f = 40 to 860 MHz  | 0    | –    | 2    | dB   |
| FL               | flatness of frequency response    | f = 40 to 860 MHz  | –    | –    | ±0.3 | dB   |
| S <sub>11</sub>  | input return losses               | f = 40 to 80 MHz   | 20   | –    | –    | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –    | –    | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –    | –    | dB   |
|                  |                                   | f = 320 to 640 MHz   | 15.5 | –    | –    | dB   |
|                  |                                   | f = 640 to 860 MHz   | 14   | –    | –    | dB   |
| S <sub>22</sub>  | output return losses              | f = 40 to 80 MHz   | 20   | –    | –    | dB   |
|                  |                                   | f = 80 to 160 MHz  | 18.5 | –    | –    | dB   |
|                  |                                   | f = 160 to 320 MHz   | 17   | –    | –    | dB   |
|                  |                                   | f = 320 to 640 MHz   | 15.5 | –    | –    | dB   |
|                  |                                   | f = 640 to 860 MHz   | 14   | –    | –    | dB   |
| S <sub>21</sub>  | phase response                    | f = 50 MHz   | –45  | –    | +45  | deg  |
| CTB              | composite triple beat             | 49 channels flat; V <sub>o</sub> = 44 dBmV; measured at 859.25 MHz | –    | –    | –61  | dB   |
| X <sub>mod</sub> | cross modulation                  | 49 channels flat; V <sub>o</sub> = 44 dBmV; measured at 55.25 MHz  | –    | –    | –61  | dB   |
| CSO              | composite second order distortion | 49 channels flat; V <sub>o</sub> = 44 dBmV; measured at 860.5 MHz  | –    | –    | –61  | dB   |
| d <sub>2</sub>   | second order distortion           | note 1   | –    | –    | –70  | dB   |
| V <sub>o</sub>   | output voltage                    | d <sub>im</sub> = –60 dB; note 2                                   | 58   | 60   | –    | dBmV |
| F                | noise figure                      | f = 50 MHz   | –    | –    | 5    | dB   |
|                  |                                   | f = 450 MHz  | –    | –    | 5.5  | dB   |
|                  |                                   | f = 550 MHz  | –    | –    | 5.5  | dB   |
|                  |                                   | f = 600 MHz  | –    | –    | 6    | dB   |
|                  |                                   | f = 650 MHz  | –    | –    | 6    | dB   |
|                  |                                   | f = 750 MHz  | –    | –    | 7    | dB   |
|                  |                                   | f = 860 MHz  | –    | –    | 8    | dB   |
| I <sub>tot</sub> | total current consumption (DC)    | note 3   | –    | –    | 240  | mA   |

## Notes

- f<sub>p</sub> = 55.25 MHz; V<sub>p</sub> = 44 dBmV; f<sub>q</sub> = 805.25 MHz; V<sub>q</sub> = 44 dBmV; measured at f<sub>p</sub> + f<sub>q</sub> = 860.5 MHz.
- Measured according to DIN45004B:  
f<sub>p</sub> = 851.25 MHz; V<sub>p</sub> = V<sub>o</sub>; f<sub>q</sub> = 858.25 MHz; V<sub>q</sub> = V<sub>o</sub> – 6 dB;  
f<sub>r</sub> = 860.25 MHz; V<sub>r</sub> = V<sub>o</sub> – 6 dB; measured at f<sub>p</sub> + f<sub>q</sub> – f<sub>r</sub> = 849.25 MHz.
- The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY885A

**Table 2** Bandwidth 40 to 750 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75 \Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz   | 18   | 19        | dB   |
|           |                                   | f = 750 MHz  | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 750 MHz  | 0    | 1.5       | dB   |
| FL        | flatness of frequency response    | f = 40 to 750 MHz  | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | f = 640 to 750 MHz   | 14   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | f = 640 to 750 MHz   | 14   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz   | –45  | +45       | deg  |
| CTB       | composite triple beat             | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 745.25 MHz | –    | –53       | dB   |
| $X_{mod}$ | cross modulation                  | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –57       | dB   |
| CSO       | composite second order distortion | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 746.5 MHz  | –    | –53       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –65       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2  | 59   | –         | dBmV |
| F         | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 240       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGY885A

**Table 3** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 600$ MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 600 MHz   | 0    | 1.5       | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –57       | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –59       | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –58       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 61   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 240       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY885A

**Table 4** Bandwidth 40 to 550 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 550$ MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 550 MHz   | 0    | 1.5       | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 550 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 550 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 550 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 547.25 MHz | –    | –60       | dB   |
| $X_{mod}$ | cross modulation                  | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –60       | dB   |
| CSO       | composite second order distortion | 77 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 548.5 MHz  | –    | –60       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –72       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 62   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 240       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 493.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGY885A

**Table 5** Bandwidth 40 to 450 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 18   | 19        | dB   |
|           |                                   | $f = 450$ MHz   | 18.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 450 MHz   | 0    | 1.5       | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 450 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 450 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 450 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 445.25 MHz | –    | –61       | dB   |
| $X_{mod}$ | cross modulation                  | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 55.25 MHz  | –    | –60       | dB   |
| CSO       | composite second order distortion | 60 channels flat;<br>$V_o = 46$ dBmV;<br>measured at 446.5 MHz  | –    | –61       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –75       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 64   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 240       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 46$  dBmV;  
 $f_q = 391.25$  MHz;  $V_q = 46$  dBmV;  
measured at  $f_p + f_q = 446.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 440.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 447.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 449.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 438.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY885B

## FEATURES

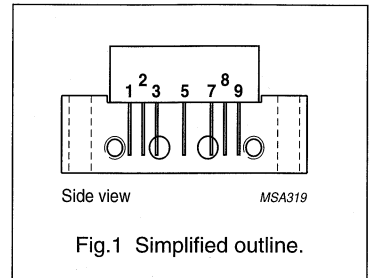
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

The BGY885B is a hybrid amplifier module designed for CATV systems operating over a frequency range of 40 to 860 MHz at a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 19.5 | 20.5 | dB   |
|                  |                                | f = 860 MHz           | 20   | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 235  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |



## CATV amplifier module

BGY885B

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$  Ω

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|-----------|-----------------------------------|---|------|------|------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 19.5 | –    | 20.5 | dB   |
|           |                                   | $f = 860$ MHz   | 20   | –    | –    | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 860 MHz   | 0    | –    | 2    | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 860 MHz   | –    | –    | ±0.3 | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –    | –    | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –    | –    | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –    | –    | dB   |
|           |                                   | $f = 320$ to 640 MHz  | 15.5 | –    | –    | dB   |
|           |                                   | $f = 640$ to 860 MHz  | 14   | –    | –    | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –    | –    | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –    | –    | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –    | –    | dB   |
|           |                                   | $f = 320$ to 640 MHz  | 15.5 | –    | –    | dB   |
|           |                                   | $f = 640$ to 860 MHz  | 14   | –    | –    | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | –    | +45  | deg  |
| CTB       | composite triple beat             | 49 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 859.25 MHz | –    | –    | –60  | dB   |
| CSO       | composite second order distortion | 49 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 860.5 MHz  | –    | –    | –60  | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –    | –68  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 57.5 | 59   | –    | dBmV |
| F         | noise figure                      | $f = 50$ MHz  | –    | –    | 5    | dB   |
|           |                                   | $f = 550$ MHz   | –    | –    | 5.5  | dB   |
|           |                                   | $f = 650$ MHz   | –    | –    | 6.5  | dB   |
|           |                                   | $f = 750$ MHz   | –    | –    | 6.5  | dB   |
|           |                                   | $f = 860$ MHz   | –    | –    | 7.5  | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | –    | 235  | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY887

## FEATURES

- Excellent linearity
- Extremely low noise
- Excellent return loss properties
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

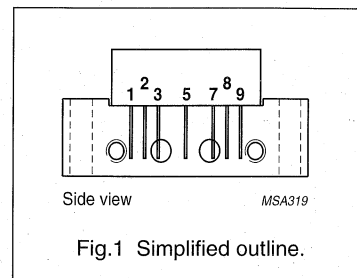
- CATV systems operating in the 40 to 860 MHz frequency range.

## DESCRIPTION

Hybrid dynamic range amplifier module in a SOT115J package operating with a voltage supply of 24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 21   | 22   | dB   |
|                  |                                | f = 860 MHz           | 21.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 235  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY887

## CHARACTERISTICS

Table 1 Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 21   | 22        | dB   |
|           |                                   | f = 860 MHz   | 21.5 | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 860 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | f = 40 to 860 MHz   | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz  | 14   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz  | 14   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 49 channels flat; $V_o = 44$ dBmV; measured at 859.25 MHz | –    | –62       | dB   |
| $X_{mod}$ | cross modulation                  | 49 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz  | –    | –61       | dB   |
| CSO       | composite second order distortion | 49 channels flat; $V_o = 44$ dBmV; measured at 860.5 MHz  | –    | –61       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                 | 59   | –         | dBmV |
| F         | noise figure                      | f = 50 MHz  | –    | 4.5       | dB   |
|           |                                   | f = 550 MHz   | –    | 5         | dB   |
|           |                                   | f = 600 MHz   | –    | 5         | dB   |
|           |                                   | f = 650 MHz   | –    | 5         | dB   |
|           |                                   | f = 750 MHz   | –    | 5.5       | dB   |
|           |                                   | f = 860 MHz   | –    | 6.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 235       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY887

**Table 2** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50$ MHz   | 21   | 22        | dB   |
|                  |                                   | $f = 860$ MHz  | 21.5 | –         | dB   |
| SL               | slope cable equivalent            | $f = 40$ to 860 MHz  | 0.2  | 2         | dB   |
| FL               | flatness of frequency response    | $f = 40$ to 860 MHz  | –    | $\pm 0.3$ | dB   |
| $S_{11}$         | input return losses               | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|                  |                                   | $f = 80$ to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | $f = 160$ to 320 MHz   | 17   | –         | dB   |
|                  |                                   | $f = 320$ to 640 MHz   | 15.5 | –         | dB   |
|                  |                                   | $f = 640$ to 860 MHz   | 14   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|                  |                                   | $f = 80$ to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | $f = 160$ to 320 MHz   | 17   | –         | dB   |
|                  |                                   | $f = 320$ to 640 MHz   | 15.5 | –         | dB   |
|                  |                                   | $f = 640$ to 860 MHz   | 14   | –         | dB   |
| $S_{21}$         | phase response                    | $f = 50$ MHz   | –45  | +45       | deg  |
| CTB              | composite triple beat             | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 859.25 MHz | –    | –51       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –57       | dB   |
| CSO              | composite second order distortion | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 860.5 MHz  | –    | –55       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –70       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60$ dB; note 2                                 | 59   | –         | dBmV |
| F                | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3   | –    | 235       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

## BGY887

**Table 3** Bandwidth 40 to 750 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz   | 21   | 22        | dB   |
|           |                                   | $f = 750$ MHz  | 21.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 750 MHz  | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 750 MHz  | –    | $\pm 0.3$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz   | 17   | –         | dB   |
|           |                                   | $f = 320$ to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | $f = 640$ to 750 MHz   | 14   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz   | 17   | –         | dB   |
|           |                                   | $f = 320$ to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | $f = 640$ to 750 MHz   | 14   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz   | –45  | +45       | deg  |
| CTB       | composite triple beat             | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 745.25 MHz | –    | –51       | dB   |
| $X_{mod}$ | cross modulation                  | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –54       | dB   |
| CSO       | composite second order distortion | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 746.5 MHz  | –    | –56       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2  | 60   | –         | dBmV |
| F         | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 235       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY887

**Table 4** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 21   | 22        | dB   |
|           |                                   | $f = 600$ MHz   | 21.5 | –         | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 600 MHz   | 0.2  | 2         | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | $\pm 0.2$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 16   | –         | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –         | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –         | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 16   | –         | dB   |
| $S_{21}$  | phase response                    | $f = 50$ MHz  | –45  | +45       | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –56       | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –57       | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –58       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 61   | –         | dBmV |
| F         | noise figure                      | see Table 1   | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 235       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY887B

## FEATURES

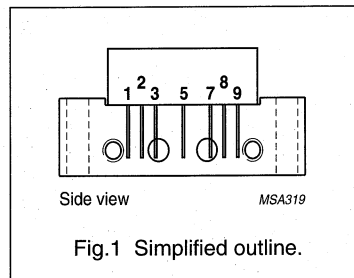
- Excellent linearity
- Extremely low noise
- High gain
- Excellent return loss properties.

## APPLICATIONS

- Single-module line extender in CATV systems operating in the 40 to 860 MHz frequency range.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## DESCRIPTION

Hybrid amplifier module in a SOT115J package operating with a voltage supply of 24 V (DC). This high gain module consists of two cascaded stages, both in cascode configuration.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 28.5 | 29.5 | dB   |
|                  |                                | f = 860 MHz           | 29   | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 340  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY887B

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 28.5 | 29.5      | dB   |
|           |                                   | f = 860 MHz   | 29   | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 860 MHz   | 0.5  | 2.5       | dB   |
| FL        | flatness of frequency response    | f = 40 to 860 MHz   | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz  | 14   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz  | 14   | –         | dB   |
| CTB       | composite triple beat             | 49 channels flat; $V_o = 44$ dBmV; measured at 859.25 MHz | –    | –60       | dB   |
| $X_{mod}$ | cross modulation                  | 49 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz  | –    | –60       | dB   |
| CSO       | composite second order distortion | 49 channels flat; $V_o = 44$ dBmV; measured at 860.5 MHz  | –    | –60       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                 | 58.5 | –         | dBmV |
| F         | noise figure                      | f = 50 MHz  | –    | 5         | dB   |
|           |                                   | f = 550 MHz   | –    | 5.5       | dB   |
|           |                                   | f = 600 MHz   | –    | 5.5       | dB   |
|           |                                   | f = 650 MHz   | –    | 5.5       | dB   |
|           |                                   | f = 750 MHz   | –    | 6         | dB   |
|           |                                   | f = 860 MHz   | –    | 6.5       | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 340       | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.



## CATV amplifier module

BGY887B

**Table 2** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|--|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz   | 28.5 | 29.5      | dB   |
|           |                                   | f = 860 MHz  | 29   | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 860 MHz  | 0.5  | 2.5       | dB   |
| FL        | flatness of frequency response    | f = 40 to 860 MHz  | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz   | 14   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz   | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz   | 14   | –         | dB   |
| CTB       | composite triple beat             | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 859.25 MHz | –    | –46       | dB   |
| $X_{mod}$ | cross modulation                  | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –52       | dB   |
| CSO       | composite second order distortion | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 860.5 MHz  | –    | –53       | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –70       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2  | 58.5 | –         | dBmV |
| F         | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 340       | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 805.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY887B

**Table 3** Bandwidth 40 to 750 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.       | UNIT |
|-----------|-----------------------------------|--|------|------------|------|
| $G_p$     | power gain                        | $f = 50$ MHz   | 28.5 | 29.5       | dB   |
|           |                                   | $f = 750$ MHz  | 29   | –          | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 750 MHz  | 0.2  | 2.2        | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 750 MHz  | –    | $\pm 0.45$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz   | 20   | –          | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 18.5 | –          | dB   |
|           |                                   | $f = 160$ to 320 MHz   | 17   | –          | dB   |
|           |                                   | $f = 320$ to 640 MHz   | 15.5 | –          | dB   |
|           |                                   | $f = 640$ to 750 MHz   | 14   | –          | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz   | 20   | –          | dB   |
|           |                                   | $f = 80$ to 160 MHz  | 18.5 | –          | dB   |
|           |                                   | $f = 160$ to 320 MHz   | 17   | –          | dB   |
|           |                                   | $f = 320$ to 640 MHz   | 15.5 | –          | dB   |
|           |                                   | $f = 640$ to 750 MHz   | 14   | –          | dB   |
| CTB       | composite triple beat             | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 745.25 MHz | –    | –50        | dB   |
| $X_{mod}$ | cross modulation                  | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –54        | dB   |
| CSO       | composite second order distortion | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 746.5 MHz  | –    | –56        | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –70        | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2  | 59   | –          | dBmV |
| F         | noise figure                      | see Table 1  | –    | –          | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 340        | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY887B

**Table 4** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{mb} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.       | UNIT |
|-----------|-----------------------------------|---|------|------------|------|
| $G_p$     | power gain                        | $f = 50$ MHz  | 28.5 | 29.5       | dB   |
|           |                                   | $f = 600$ MHz   | 29   | –          | dB   |
| SL        | slope cable equivalent            | $f = 40$ to 600 MHz   | –    | 2          | dB   |
| FL        | flatness of frequency response    | $f = 40$ to 600 MHz   | –    | $\pm 0.35$ | dB   |
| $S_{11}$  | input return losses               | $f = 40$ to 80 MHz  | 20   | –          | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –          | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –          | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 16   | –          | dB   |
| $S_{22}$  | output return losses              | $f = 40$ to 80 MHz  | 20   | –          | dB   |
|           |                                   | $f = 80$ to 160 MHz   | 18.5 | –          | dB   |
|           |                                   | $f = 160$ to 320 MHz  | 17   | –          | dB   |
|           |                                   | $f = 320$ to 600 MHz  | 16   | –          | dB   |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –55        | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –56        | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –60        | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –72        | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 61   | –          | dBmV |
| F         | noise figure                      | see Table 1   | –    | –          | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 340        | mA   |

**Notes**

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## Optical receiver module

BGY887BO

## FEATURES

- Excellent linearity
- Extremely low noise
- Excellent flatness
- Standard CATV outline
- Rugged construction
- Gold metallization ensures excellent reliability.

## APPLICATIONS

- CATV systems operating in the 40 to 860 MHz frequency range.

## DESCRIPTION

Hybrid high dynamic range optical receiver module in a SOT115M package operating at a voltage supply of +24 V (DC). The module contains a monomode optical input suitable for wavelengths from 1290 to 1600 nm, a terminal to monitor the pin diode current and an electrical output with an impedance of 75  $\Omega$ .

## PINNING - SOT115M

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | monitor current |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

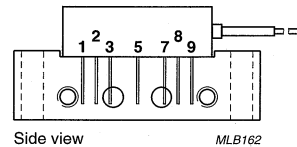


Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT                   |
|------------------|--------------------------------|-----------------------|------|------|------------------------|
| f                | frequency range                |                       | 40   | 860  | MHz                    |
| S <sub>22</sub>  | output return losses           | f = 40 to 860 MHz     | 11   | –    | dB                     |
|                  | optical input return losses    |                       | 40   | –    | dB                     |
| d <sub>2</sub>   | second order distortion        | f = 324.25 MHz        | –    | –70  | dBc                    |
| F                | equivalent noise input         | f = 40 MHz            | –    | 7    | pA/ $\sqrt{\text{Hz}}$ |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 250  | mA                     |

## HANDLING

Fibreglass optical coupling: maximum tensile strength = 5 N; minimum bending radius = 35 mm.

## CAUTION

The device is supplied in an antistatic package and must be protected against static discharge during transport or handling.

## Optical receiver module

BGY887BO

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | CONDITIONS                                  | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|---|------|------|------|
| f                | frequency range                     |   | 40   | 860  | MHz  |
| T <sub>stg</sub> | storage temperature                 |   | -40  | +85  | °C   |
| T <sub>mb</sub>  | operating mounting base temperature |   | -20  | +85  | °C   |
| P <sub>in</sub>  | optical input power                 | continuous                                  | -    | 2    | mW   |
| ESD              | ESD sensitivity                     | human body model;<br>R = 1.5 kΩ; C = 100 pF | 500  | -    | V    |

## CHARACTERISTICS

Table 1 Bandwidth 40 to 860 MHz; V<sub>B</sub> = 24 V; T<sub>mb</sub> = 30 °C; Z<sub>L</sub> = 75 Ω

| SYMBOL           | PARAMETER                      | CONDITIONS               | MIN. | MAX. | UNIT   |
|------------------|--------------------------------|--------------------------|------|------|--------|
| S                | responsivity                   | λ = 1300 nm              | 800  | -    | V/W    |
| FL               | flatness of frequency response |                          | -    | ±0.5 | dB     |
| S <sub>22</sub>  | output return losses           | f = 40 to 860 MHz        | 11   | -    | dB     |
|                  | optical input return losses    |                          | 40   | -    | dB     |
| d <sub>2</sub>   | second order distortion        | note 1                   | -    | -70  | dB     |
| d <sub>3</sub>   | third order distortion         | note 2                   | -    | -80  | dB     |
| F                | equivalent noise input         | f = 40 MHz               | -    | 7    | pA/√Hz |
| s <sub>λ</sub>   | spectral sensitivity           | λ = 1310 ±20 nm          | 0.85 | -    | A/W    |
|                  |                                | λ = 1550 ±20 nm          | 0.9  | -    | A/W    |
| λ                | optical wavelength             |                          | 1290 | 1600 | nm     |
| L                | length of optical fibre        | fibre; SM type; 9/125 μm | 1    | -    | m      |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V    | -    | 250  | mA     |

## Notes

- Two laser test; each laser with 40% modulation index;  
f<sub>p</sub> = 135 MHz; P<sub>p</sub> = 0.5 mW;  
f<sub>q</sub> = 189.25 MHz; P<sub>q</sub> = 0.5 mW;  
measured at f<sub>p</sub> + f<sub>q</sub> = 324.25 MHz.
- Three laser test; each laser with 40% modulation index;  
f<sub>p</sub> = 326.25 MHz; P<sub>p</sub> = 0.33 mW;  
f<sub>q</sub> = 333.25 MHz; P<sub>q</sub> = 0.33 mW;  
f<sub>r</sub> = 335.25 MHz; P<sub>q</sub> = 0.33 mW;  
measured at f<sub>p</sub> + f<sub>q</sub> = 324.25 MHz.

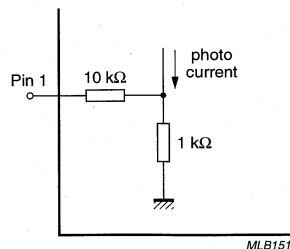


Fig.2 Monitor current pin.

## Optical receiver module

## BGY887BO/FC

## FEATURES

- Excellent linearity
- Extremely low noise
- Excellent flatness
- Standard CATV outline
- Rugged construction
- Gold metallization ensures excellent reliability
- FC/APC connector (JDS version).

## APPLICATIONS

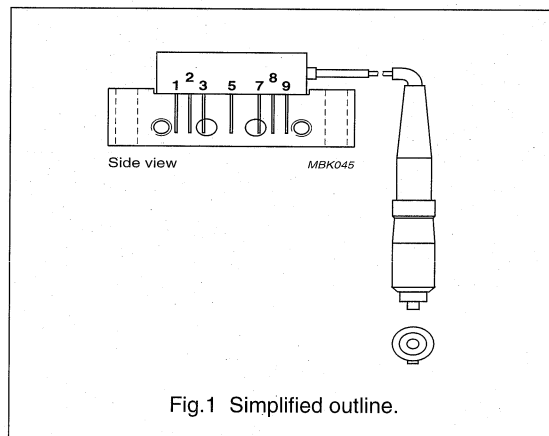
- CATV systems operating in the 40 to 860 MHz frequency range.

## DESCRIPTION

Hybrid high dynamic range optical receiver module in a SOT115N package operating at a voltage supply of +24 V (DC). The module contains a monomode optical input suitable for wavelengths from 1290 to 1600 nm, a terminal to monitor the pin diode current and an electrical output with an impedance of 75  $\Omega$ . The optical fibre is terminated by an FC/APC connector (JDS version) and partly reinforced by a 3 mm diameter Kevlar buffer.

## PINNING - SOT115N

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | monitor current |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT                   |
|------------------|--------------------------------|-----------------------|------|------|------------------------|
| f                | frequency range                |                       | 40   | 860  | MHz                    |
| S <sub>22</sub>  | output return losses           | f = 40 to 860 MHz     | 11   | –    | dB                     |
|                  | optical input return losses    |                       | 40   | –    | dB                     |
| d <sub>2</sub>   | second order distortion        | f = 324.25 MHz        | –    | –70  | dBc                    |
| F                | equivalent noise input         | f = 40 MHz            | –    | 7    | pA/ $\sqrt{\text{Hz}}$ |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 250  | mA                     |

## HANDLING

Fibreglass optical coupling; maximum tensile strength = 5 N; minimum bending radius = 35 mm.

## CAUTION

The device is supplied in an antistatic package and must be protected against static discharge during transport or handling.

## Optical receiver module

BGY887BO/FC

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | CONDITIONS                                  | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|---|------|------|------|
| f                | frequency range                     |   | 40   | 860  | MHz  |
| T <sub>stg</sub> | storage temperature                 |   | -40  | +85  | °C   |
| T <sub>mb</sub>  | operating mounting base temperature |   | -20  | +85  | °C   |
| P <sub>in</sub>  | optical input power                 | continuous                                  | -    | 2    | mW   |
| ESD              | ESD sensitivity                     | human body model;<br>R = 1.5 kΩ; C = 100 pF | 500  | -    | V    |

## CHARACTERISTICS

Table 1 Bandwidth 40 to 860 MHz; V<sub>B</sub> = 24 V; T<sub>mb</sub> = 30 °C; Z<sub>L</sub> = 75 Ω

| SYMBOL           | PARAMETER                          | CONDITIONS  | MIN. | MAX. | UNIT   |
|------------------|------------------------------------|---|------|------|--------|
| S                | responsivity                       | λ = 1300 nm   | 750  | -    | V/W    |
| FL               | flatness of frequency response     |   | -    | ±0.5 | dB     |
| S <sub>22</sub>  | output return losses               | f <sub>1</sub> = 40 to 860 MHz                            | 11   | -    | dB     |
|                  | optical input return losses        |   | 40   | -    | dB     |
| OBR <sub>C</sub> | connector optical return losses    |   | 70   | -    | dB     |
| IL <sub>C</sub>  | connector optical insertion losses |   | -    | 0.5  | dB     |
| d <sub>2</sub>   | second order distortion            | note 1  | -    | -70  | dB     |
| d <sub>3</sub>   | third order distortion             | note 2  | -    | -80  | dB     |
| F                | equivalent noise input             | f <sub>1</sub> = 40 MHz                                   | -    | 7    | pA/√Hz |
| s <sub>λ</sub>   | spectral sensitivity               | λ = 1310 ±20 nm   | 0.85 | -    | A/W    |
|                  |                                    | λ = 1350 ±20 nm   | 0.9  | -    | A/W    |
| λ                | optical wavelength                 |   | 1290 | 1600 | nm     |
| L                | length of optical fibre            | buffered fibre; SM type; 9/125 μm;<br>Kevlar buffer: 3 mm | 577  | 627  | mm     |
| I <sub>tot</sub> | total current consumption (DC)     | note 3  | -    | 250  | mA     |

## Notes

- Two laser test; each laser with 40 % modulation index:  
f<sub>p</sub> = 135 MHz; P<sub>p</sub> = 0.5 mW;  
f<sub>q</sub> = 189.25 MHz; P<sub>q</sub> = 0.5 mW;  
measured at f<sub>p</sub> + f<sub>q</sub> = 324.25 MHz.
- Three laser test; each laser with 40 % modulation index:  
f<sub>p</sub> = 326.25 MHz; P<sub>p</sub> = 0.33 mW;  
f<sub>q</sub> = 333.25 MHz; P<sub>q</sub> = 0.33 mW;  
f<sub>r</sub> = 335.25 MHz; P<sub>q</sub> = 0.33 mW;  
measured at f<sub>p</sub> + f<sub>q</sub> = 324.25 MHz.
- The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

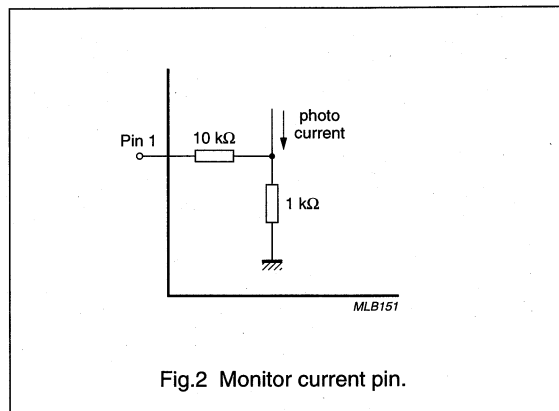


Fig.2 Monitor current pin.

Optical receiver module

BGY887BO/FC

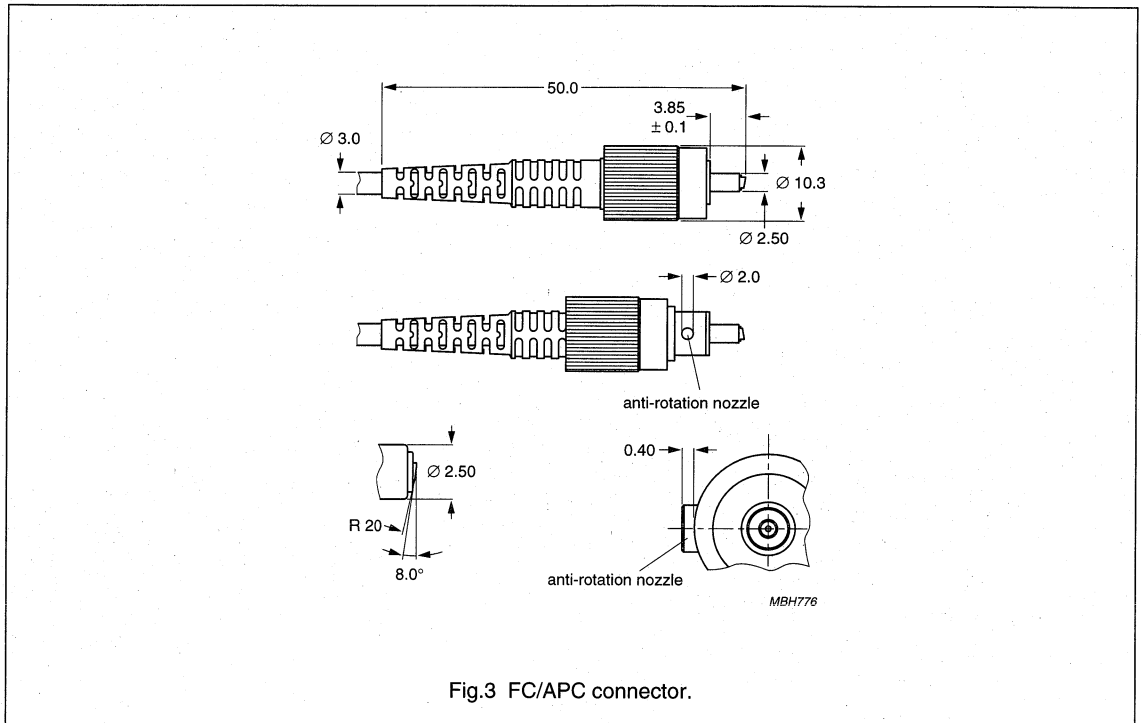


Fig.3 FC/APC connector.



## Optical receiver module

## BGY887BO/SC

## FEATURES

- Excellent linearity
- Extremely low noise
- Excellent flatness
- Standard CATV outline
- Rugged construction
- Gold metallization ensures excellent reliability
- SC/APC connector.

## APPLICATIONS

- CATV systems operating in the 40 to 860 MHz frequency range.

## DESCRIPTION

Hybrid high dynamic range optical receiver module in a SOT115P package operating at a voltage supply of +24 V (DC). The module contains a monomode optical input suitable for wavelengths from 1290 to 1600 nm, a terminal to monitor the pin diode current and an electrical output with an impedance of 75  $\Omega$ . The optical fibre is terminated by an SC/APC connector and partly reinforced by a 3 mm diameter Kevlar buffer.

## PINNING - SOT115P

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | monitor current |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |

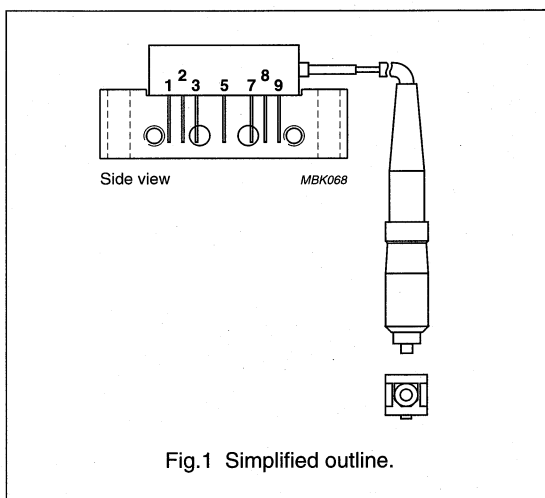


Fig.1 Simplified outline.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT                   |
|------------------|--------------------------------|-----------------------|------|------|------------------------|
| f                | frequency range                |                       | 40   | 860  | MHz                    |
| S <sub>22</sub>  | output return losses           | f = 40 to 860 MHz     | 11   | –    | dB                     |
|                  | optical input return losses    |                       | 40   | –    | dB                     |
| d <sub>2</sub>   | second order distortion        | f = 324.25 MHz        | –    | –70  | dBc                    |
| F                | equivalent noise input         | f = 40 MHz            | –    | 7    | pA/ $\sqrt{\text{Hz}}$ |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 250  | mA                     |

## HANDLING

Fibreglass optical coupling: maximum tensile strength = 5 N; minimum bending radius = 35 mm.

## CAUTION

The device is supplied in an antistatic package and must be protected against static discharge during transport or handling.

## Optical receiver module

## BGY887BO/SC

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | CONDITIONS                                  | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|---|------|------|------|
| f                | frequency range                     |   | 40   | 860  | MHz  |
| T <sub>stg</sub> | storage temperature                 |   | -40  | +85  | °C   |
| T <sub>mb</sub>  | operating mounting base temperature |   | -20  | +85  | °C   |
| P <sub>in</sub>  | optical input power                 | continuous                                  | -    | 2    | mW   |
| ESD              | ESD sensitivity                     | human body model;<br>R = 1.5 kΩ; C = 100 pF | 500  | -    | V    |

## CHARACTERISTICS

**Table 1** Bandwidth 40 to 860 MHz; V<sub>B</sub> = 24 V; T<sub>mb</sub> = 30 °C; Z<sub>L</sub> = 75 Ω

| SYMBOL           | PARAMETER                          | CONDITIONS  | MIN. | MAX. | UNIT   |
|------------------|------------------------------------|---|------|------|--------|
| S                | responsivity                       | λ = 1300 nm   | 750  | -    | V/W    |
| FL               | flatness of frequency response     |   | -    | ±0.5 | dB     |
| S <sub>22</sub>  | output return losses               | f <sub>1</sub> = 40 to 860 MHz                            | 11   | -    | dB     |
|                  | optical input return losses        |   | 40   | -    | dB     |
| OBR <sub>C</sub> | connector optical return losses    |   | 70   | -    | dB     |
| IL <sub>C</sub>  | connector optical insertion losses |   | -    | 0.5  | dB     |
| d <sub>2</sub>   | second order distortion            | note 1  | -    | -70  | dB     |
| d <sub>3</sub>   | third order distortion             | note 2  | -    | -80  | dB     |
| F                | equivalent input noise             | f = 40 MHz  | -    | 7    | pA/√Hz |
| S <sub>λ</sub>   | spectral sensitivity               | λ = 1310 ±20 nm   | 0.85 | -    | A/W    |
|                  |                                    | λ = 1350 ±20 nm   | 0.9  | -    | A/W    |
| λ                | optical wavelength                 |   | 1290 | 1600 | nm     |
| L                | length of optical fibre            | buffered fibre; SM type;<br>9/125 μm; Kevlar buffer: 3 mm | 817  | 917  | mm     |
| I <sub>tot</sub> | total current consumption (DC)     | note 3  | -    | 250  | mA     |

## Notes

- Two laser test; each laser with 40 % modulation index:  
f<sub>p</sub> = 135 MHz; P<sub>p</sub> = 0.5 mW;  
f<sub>q</sub> = 189.25 MHz; P<sub>q</sub> = 0.5 mW;  
measured at f<sub>p</sub> + f<sub>q</sub> = 324.25 MHz.
- Three laser test; each laser with 40 % modulation index:  
f<sub>p</sub> = 326.25 MHz; P<sub>p</sub> = 0.33 mW;  
f<sub>q</sub> = 333.25 MHz; P<sub>q</sub> = 0.33 mW;  
f<sub>r</sub> = 335.25 MHz; P<sub>r</sub> = 0.33 mW;  
measured at f<sub>p</sub> + f<sub>q</sub> + f<sub>r</sub> = 324.25 MHz.
- The module normally operates at V<sub>B</sub> = 24 V, but is able to withstand supply transients up to 30 V.

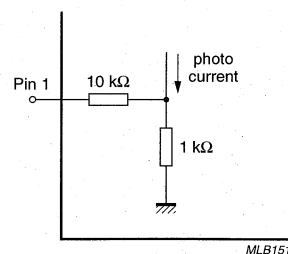


Fig.2 Monitor current pin.

## CATV amplifier module

BGY888

## FEATURES

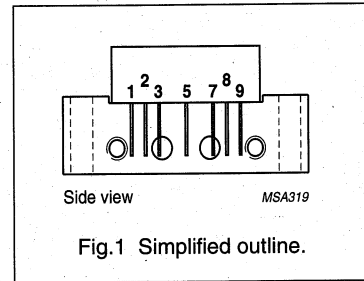
- Excellent linearity
- Extremely low noise
- High gain
- Excellent return loss properties.

## APPLICATIONS

- Single module line extender in CATV systems operating over a frequency range of 40 to 860 MHz.

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## DESCRIPTION

The BGY888 is a hybrid high dynamic range amplifier module operating at a voltage supply of +24 V in a SOT115J package. The high gain module consists of two cascaded stages both in cascode configuration.

## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 33.5 | 34.5 | dB   |
|                  |                                | f = 860 MHz           | 34   | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 340  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 55   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

BGY888

## CHARACTERISTICS

Table 1 Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.      | UNIT |
|-----------|-----------------------------------|---|------|-----------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 33.5 | 34.5      | dB   |
|           |                                   | f = 860 MHz   | 34   | –         | dB   |
| SL        | slope cable equivalent            | f = 40 to 860 MHz   | 0.5  | 2.5       | dB   |
| FL        | flatness of frequency response    | f = 40 to 860 MHz   | –    | $\pm 0.5$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz  | 14   | –         | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –         | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –         | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –         | dB   |
|           |                                   | f = 320 to 640 MHz  | 15.5 | –         | dB   |
|           |                                   | f = 640 to 860 MHz  | 14   | –         | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | 135  | 225       | deg  |
| CTB       | composite triple beat             | 49 channels flat; $V_o = 44$ dBmV; measured at 859.25 MHz | –    | –60       | dB   |
| $X_{mod}$ | cross modulation                  | 49 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz  | –    | –59       | dB   |
| CSO       | composite second order distortion | 49 channels flat; $V_o = 44$ dBmV; measured at 860.5 MHz  | –    | –55       | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –65       | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                 | 58   | –         | dBmV |
| F         | noise figure                      | f = 50 MHz  | –    | 4.5       | dB   |
|           |                                   | f = 550 MHz   | –    | 5         | dB   |
|           |                                   | f = 600 MHz   | –    | 5         | dB   |
|           |                                   | f = 650 MHz   | –    | 5.5       | dB   |
|           |                                   | f = 750 MHz   | –    | 6         | dB   |
|           |                                   | f = 860 MHz   | –    | 7         | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 340       | mA   |

## Notes

- $V_p = V_q = 44$  dBmV;  
 $f_p = 55.25$  MHz;  $f_q = 805.25$  MHz;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY888

**Table 2** Bandwidth 40 to 860 MHz;  $V_B = 24$  V;  $T_{\text{case}} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS   | MIN. | MAX.      | UNIT |
|------------------|-----------------------------------|--|------|-----------|------|
| $G_p$            | power gain                        | $f = 50$ MHz   | 33.5 | 34.5      | dB   |
|                  |                                   | $f = 860$ MHz  | 34   | –         | dB   |
| SL               | slope cable equivalent            | $f = 40$ to 860 MHz  | 0.5  | 2.5       | dB   |
| FL               | flatness of frequency response    | $f = 40$ to 860 MHz  | –    | $\pm 0.5$ | dB   |
| $S_{11}$         | input return losses               | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|                  |                                   | $f = 80$ to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | $f = 160$ to 320 MHz   | 17   | –         | dB   |
|                  |                                   | $f = 320$ to 640 MHz   | 15.5 | –         | dB   |
|                  |                                   | $f = 640$ to 860 MHz   | 14   | –         | dB   |
| $S_{22}$         | output return losses              | $f = 40$ to 80 MHz   | 20   | –         | dB   |
|                  |                                   | $f = 80$ to 160 MHz  | 18.5 | –         | dB   |
|                  |                                   | $f = 160$ to 320 MHz   | 17   | –         | dB   |
|                  |                                   | $f = 320$ to 640 MHz   | 15.5 | –         | dB   |
|                  |                                   | $f = 640$ to 860 MHz   | 14   | –         | dB   |
| $S_{21}$         | phase response                    | $f = 50$ MHz   | 135  | 225       | deg  |
| CTB              | composite triple beat             | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 859.25 MHz | –    | –46       | dB   |
| $X_{\text{mod}}$ | cross modulation                  | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –50       | dB   |
| CSO              | composite second order distortion | 129 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 860.5 MHz  | –    | –48       | dB   |
| $d_2$            | second order distortion           | note 1   | –    | –65       | dB   |
| $V_o$            | output voltage                    | $d_{\text{im}} = -60$ dB; note 2                                 | 58   | –         | dBmV |
| F                | noise figure                      | see Table 1  | –    | –         | dB   |
| $I_{\text{tot}}$ | total current consumption (DC)    | note 3   | –    | 340       | mA   |

**Notes**

- $V_p = V_q = 44$  dBmV;  
 $f_p = 55.25$  MHz;  $f_q = 805.25$  MHz;  
measured at  $f_p + f_q = 860.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 858.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 860.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 849.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY888

**Table 3** Bandwidth 40 to 750 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | MAX.       | UNIT |
|-----------|-----------------------------------|--|------|------------|------|
| $G_p$     | power gain                        | f = 50 MHz   | 33.5 | 34.5       | dB   |
|           |                                   | f = 750 MHz  | 34   | –          | dB   |
| SL        | slope cable equivalent            | f = 40 to 750 MHz  | 0.2  | 2.2        | dB   |
| FL        | flatness of frequency response    | f = 40 to 750 MHz  | –    | $\pm 0.45$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz   | 20   | –          | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –          | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –          | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –          | dB   |
|           |                                   | f = 640 to 750 MHz   | 14   | –          | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz   | 20   | –          | dB   |
|           |                                   | f = 80 to 160 MHz  | 18.5 | –          | dB   |
|           |                                   | f = 160 to 320 MHz   | 17   | –          | dB   |
|           |                                   | f = 320 to 640 MHz   | 15.5 | –          | dB   |
|           |                                   | f = 640 to 750 MHz   | 14   | –          | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz   | 135  | 225        | deg  |
| CTB       | composite triple beat             | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 745.25 MHz | –    | –50        | dB   |
| $X_{mod}$ | cross modulation                  | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –51        | dB   |
| CSO       | composite second order distortion | 110 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 746.5 MHz  | –    | –53        | dB   |
| $d_2$     | second order distortion           | note 1   | –    | –65        | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2  | 59   | –          | dBmV |
| F         | noise figure                      | see Table 1  | –    | –          | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3   | –    | 340        | mA   |

**Notes**

- $V_p = V_q = 44$  dBmV;  
 $f_p = 55.25$  MHz;  $f_q = 691.25$  MHz;  
measured at  $f_p + f_q = 746.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY888

**Table 4** Bandwidth 40 to 600 MHz;  $V_B = 24$  V;  $T_{case} = 30$  °C;  $Z_S = Z_L = 75$   $\Omega$ 

| SYMBOL    | PARAMETER                         | CONDITIONS  | MIN. | MAX.       | UNIT |
|-----------|-----------------------------------|---|------|------------|------|
| $G_p$     | power gain                        | f = 50 MHz  | 33.5 | 34.5       | dB   |
|           |                                   | f = 600 MHz   | 34   | –          | dB   |
| SL        | slope cable equivalent            | f = 40 to 600 MHz   | 0    | 2          | dB   |
| FL        | flatness of frequency response    | f = 40 to 600 MHz   | –    | $\pm 0.35$ | dB   |
| $S_{11}$  | input return losses               | f = 40 to 80 MHz  | 20   | –          | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –          | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –          | dB   |
|           |                                   | f = 320 to 600 MHz  | 16   | –          | dB   |
| $S_{22}$  | output return losses              | f = 40 to 80 MHz  | 20   | –          | dB   |
|           |                                   | f = 80 to 160 MHz   | 18.5 | –          | dB   |
|           |                                   | f = 160 to 320 MHz  | 17   | –          | dB   |
|           |                                   | f = 320 to 600 MHz  | 16   | –          | dB   |
| $S_{21}$  | phase response                    | f = 50 MHz  | 135  | 225        | deg  |
| CTB       | composite triple beat             | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 595.25 MHz | –    | –55        | dB   |
| $X_{mod}$ | cross modulation                  | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 55.25 MHz  | –    | –54        | dB   |
| CSO       | composite second order distortion | 85 channels flat;<br>$V_o = 44$ dBmV;<br>measured at 596.5 MHz  | –    | –56        | dB   |
| $d_2$     | second order distortion           | note 1  | –    | –68        | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 2                                       | 61   | –          | dBmV |
| F         | noise figure                      | see Table 1   | –    | –          | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 3  | –    | 340        | mA   |

**Notes**

- $V_p = V_q = 44$  dBmV;  
 $f_p = 55.25$  MHz;  $f_q = 541.25$  MHz;  
measured at  $f_p + f_q = 596.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o$ ;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## CATV amplifier module

BGY1085A

## FEATURES

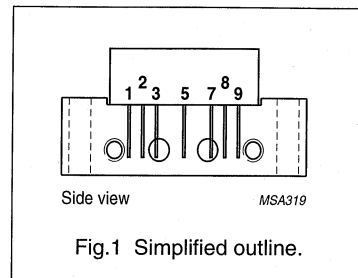
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability.

## DESCRIPTION

Hybrid high amplifier module for CATV systems operating over a frequency range of 40 to 1000 MHz at a supply voltage of +24 V (DC).

## PINNING - SOT115J

| PIN | DESCRIPTION     |
|-----|-----------------|
| 1   | input           |
| 2   | common          |
| 3   | common          |
| 5   | +V <sub>B</sub> |
| 7   | common          |
| 8   | common          |
| 9   | output          |



## QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 50 MHz            | 18   | 19   | dB   |
|                  |                                | f = 1000 MHz          | 18.5 | –    | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | –    | 240  | mA   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>i</sub>   | RF input voltage                    | –    | 65   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |



## CATV amplifier module

BGY1085A

## CHARACTERISTICS

Table 1 Bandwidth 40 to 1000 MHz;  $T_{\text{case}} = 30\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 75\ \Omega$ 

| SYMBOL           | PARAMETER                         | CONDITIONS  | MIN. | TYP. | MAX. | UNIT |
|------------------|-----------------------------------|---|------|------|------|------|
| G <sub>p</sub>   | power gain                        | f = 50 MHz  | 18   | –    | 19   | dB   |
|                  |                                   | f = 1000 MHz  | 18.5 | –    | –    | dB   |
| SL               | slope cable equivalent            | f = 40 to 1000 MHz  | 0    | –    | 2    | dB   |
| FL               | flatness of frequency response    | f = 40 to 1000 MHz  | –    | –    | ±0.3 | dB   |
| S <sub>11</sub>  | input return losses               | f = 40 to 80 MHz  | 20   | –    | –    | dB   |
|                  |                                   | f = 80 to 160 MHz   | 18.5 | –    | –    | dB   |
|                  |                                   | f = 160 to 320 MHz  | 17   | –    | –    | dB   |
|                  |                                   | f = 320 to 640 MHz  | 15.5 | –    | –    | dB   |
|                  |                                   | f = 640 to 1000 MHz   | 14   | –    | –    | dB   |
| S <sub>22</sub>  | output return losses              | f = 40 to 80 MHz  | 20   | –    | –    | dB   |
|                  |                                   | f = 80 to 160 MHz   | 18.5 | –    | –    | dB   |
|                  |                                   | f = 160 to 320 MHz  | 17   | –    | –    | dB   |
|                  |                                   | f = 320 to 640 MHz  | 15.5 | –    | –    | dB   |
|                  |                                   | f = 640 to 1000 MHz   | 14   | –    | –    | dB   |
| CTB              | composite triple beat             | 85 channels flat;<br>V <sub>o</sub> = 44 dBmV;<br>measured at 595.25 MHz  | –    | –    | –58  | dB   |
|                  |                                   | 110 channels flat;<br>V <sub>o</sub> = 44 dBmV;<br>measured at 745.25 MHz | –    | –    | –53  | dB   |
|                  |                                   | 150 channels flat;<br>V <sub>o</sub> = 40 dBmV;<br>measured at 985.25 MHz | –    | –53  | –    | dB   |
| X <sub>mod</sub> | cross modulation                  | 85 channels flat;<br>V <sub>o</sub> = 44 dBmV;<br>measured at 55.25 MHz   | –    | –    | –58  | dB   |
|                  |                                   | 110 channels flat;<br>V <sub>o</sub> = 44 dBmV;<br>measured at 55.25 MHz  | –    | –    | –54  | dB   |
|                  |                                   | 150 channels flat;<br>V <sub>o</sub> = 40 dBmV;<br>measured at 55.25 MHz  | –    | –54  | –    | dB   |
| CSO              | composite second order distortion | 85 channels flat;<br>V <sub>o</sub> = 44 dBmV;<br>measured at 596.5 MHz   | –    | –    | –60  | dB   |
|                  |                                   | 110 channels flat;<br>V <sub>o</sub> = 44 dBmV;<br>measured at 746.5 MHz  | –    | –    | –56  | dB   |
|                  |                                   | 150 channels flat;<br>V <sub>o</sub> = 40 dBmV;<br>measured at 986.5 MHz  | –    | –56  | –    | dB   |

## CATV amplifier module

## BGY1085A

| SYMBOL    | PARAMETER                      | CONDITIONS        | MIN. | TYP. | MAX. | UNIT |
|-----------|--------------------------------|-------------------|------|------|------|------|
| $d_2$     | second order distortion        | note 1            | –    | –    | –72  | dB   |
|           |                                | note 2            | –    | –    | –65  | dB   |
|           |                                | note 3            | –    | –68  | –    | dB   |
| $V_o$     | output voltage                 | $d_{im} = -60$ dB |      |      |      |      |
|           |                                | note 4            | 61   | –    | –    | dBmV |
|           |                                | note 5            | 60   | –    | –    | dBmV |
|           |                                | note 6            | 57   | –    | –    | dBmV |
| F         | noise figure                   | f = 50 MHz        | –    | –    | 5.5  | dB   |
|           |                                | f = 550 MHz       | –    | –    | 6    | dB   |
|           |                                | f = 600 MHz       | –    | –    | 6    | dB   |
|           |                                | f = 650 MHz       | –    | –    | 6.5  | dB   |
|           |                                | f = 750 MHz       | –    | –    | 7    | dB   |
|           |                                | f = 860 MHz       | –    | –    | 7.5  | dB   |
|           |                                | f = 1000 MHz      | –    | –    | 7.5  | dB   |
| $I_{tot}$ | total current consumption (DC) | note 7            | –    | –    | 240  | mA   |

## Notes

- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 541.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 596.5$  MHz.
- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  
 $f_q = 691.25$  MHz;  $V_q = 44$  dBmV;  
measured at  $f_p + f_q = 746.5$  MHz.
- $f_p = 55.25$  MHz;  $V_p = 40$  dBmV;  
 $f_q = 931.25$  MHz;  $V_q = 40$  dBmV;  
measured at  $f_p + f_q = 986.5$  MHz.
- $f_p = 590.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 597.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 599.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 588.25$  MHz.
- $f_p = 740.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 747.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 749.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 738.25$  MHz.
- $f_p = 980.25$  MHz;  $V_p = V_o$ ;  
 $f_q = 987.25$  MHz;  $V_q = V_o - 6$  dB;  
 $f_r = 989.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 978.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 30 V.

## PACKAGE OUTLINES

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**MOUNTING AND SOLDERING RECOMMENDATIONS****Mounting**

The heatsink surface must be flat, free of burrs and oxidation and be parallel to the mounting surface.

The heatsink, mounting base and ground leads should be properly RF-grounded.

Heatsink compound should be applied sparingly and evenly on the mounting base. Suitable heatsink compounds are Dow Corning 340, Eccotherm TC-5 (E&C) and Wakefield 120.

When mounting CATV hybrid modules, the UNC screws must first be turned finger-tight. The screws should then be tightened to within the tolerance 0.5 Nm minimum and 0.7 Nm maximum.

**Soldering**

Modules may be soldered directly into a circuit using a soldering iron with a maximum temperature of 260 °C for not more than 3 seconds when the soldered joints are a minimum of 3 mm from the module.

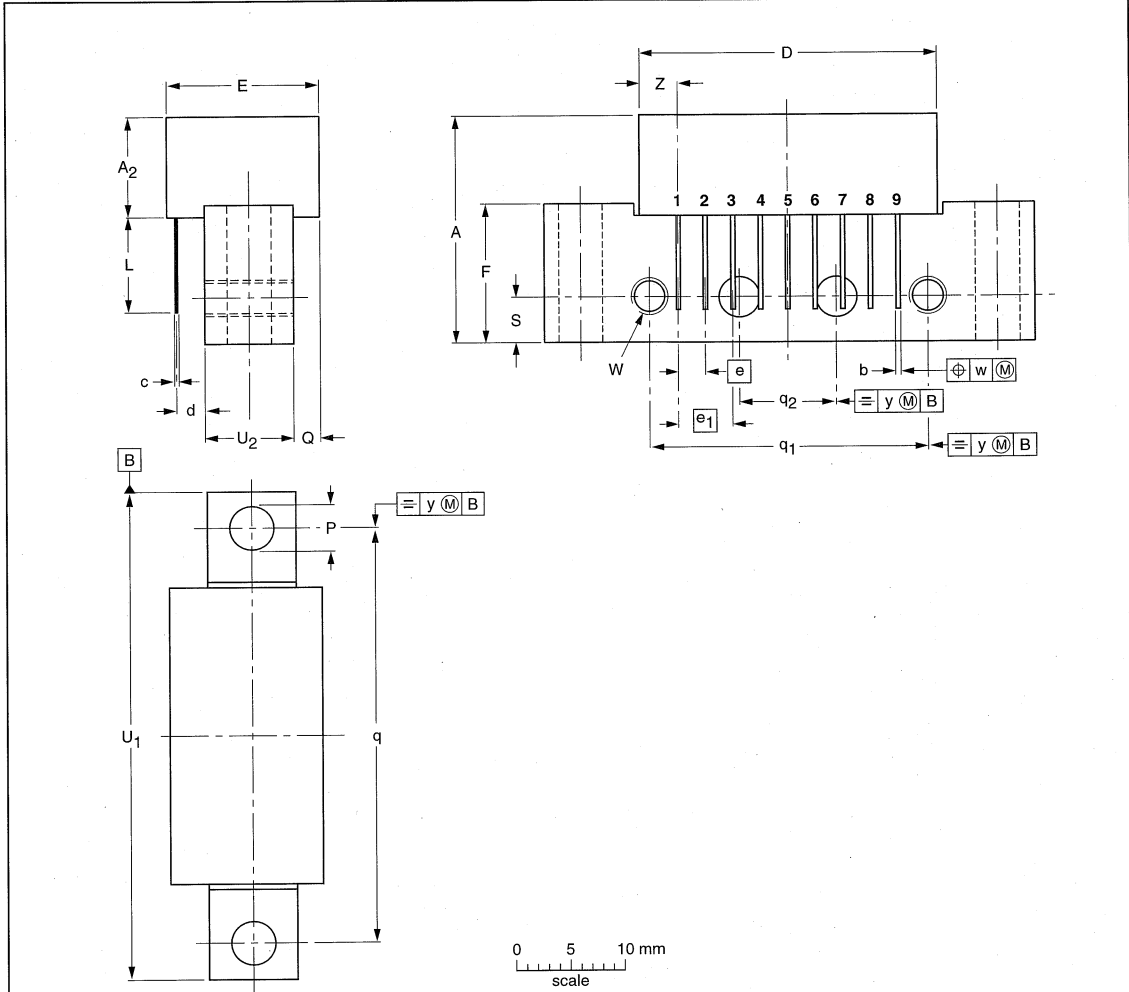
Wideband hybrid IC modules

Package information

PACKAGE OUTLINES

Rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes; 9 gold-plated in-line leads

SOT115D



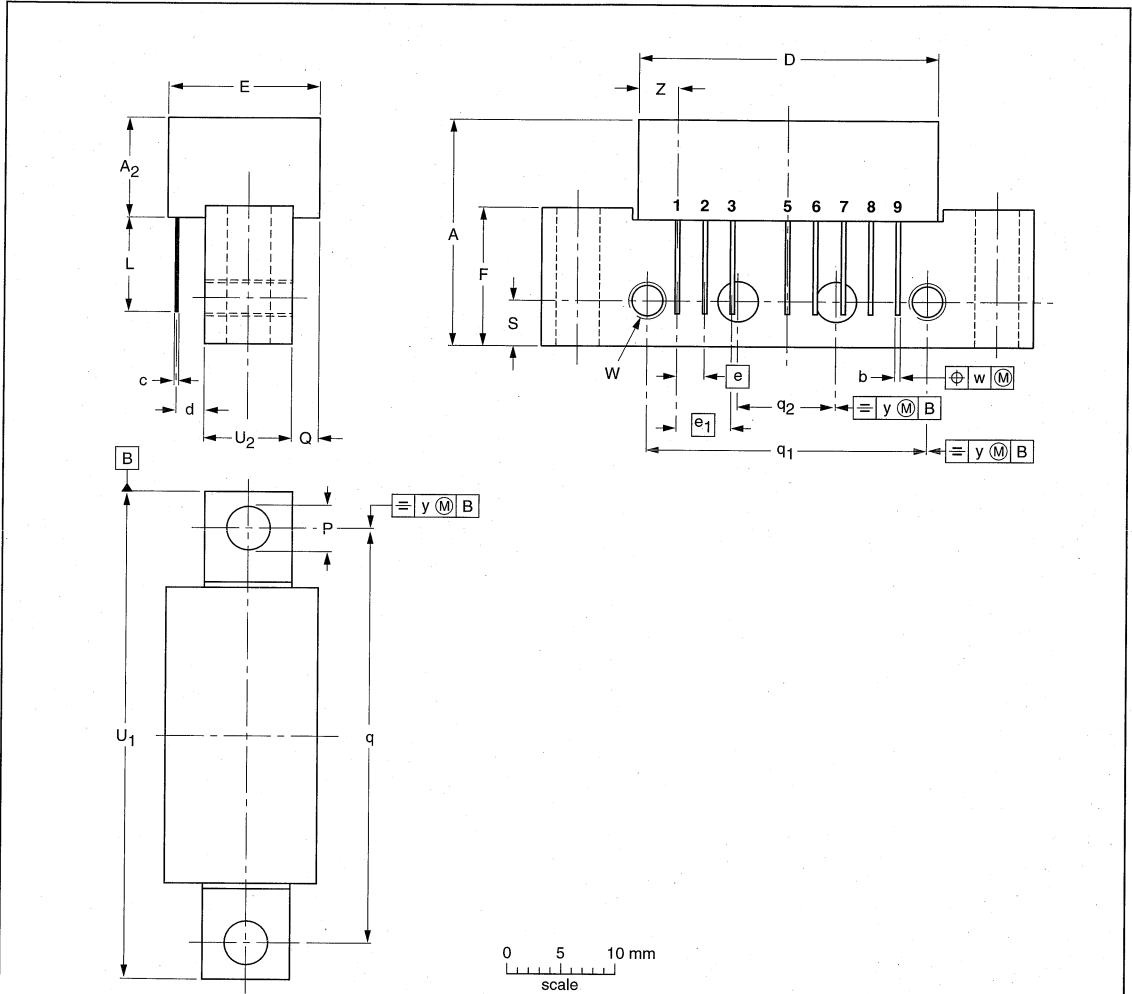
DIMENSIONS (mm are the original dimensions)

| UNIT | A max. | A <sub>2</sub> max. | b            | c    | D max. | d max. | E max. | e    | e <sub>1</sub> | F    | L min. | ∅ P          | Q max. | q    | q <sub>1</sub> | q <sub>2</sub> | s   | U <sub>1</sub> max. | U <sub>2</sub> | W           | w    | y   | Z max. |
|------|--------|---------------------|--------------|------|--------|--------|--------|------|----------------|------|--------|--------------|--------|------|----------------|----------------|-----|---------------------|----------------|-------------|------|-----|--------|
| mm   | 20.8   | 9.1                 | 0.51<br>0.38 | 0.25 | 27.2   | 2.54   | 13.75  | 2.54 | 5.08           | 12.7 | 8.8    | 4.15<br>3.85 | 2.4    | 38.1 | 25.4           | 10.2           | 4.2 | 44.75               | 8              | 6-32<br>UNC | 0.25 | 0.1 | 3.8    |

| OUTLINE VERSION | REFERENCES |       |      |  | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|--|---------------------|------------|
|                 | IEC        | JEDEC | EIAJ |  |                     |            |
| SOT115D         |            |       |      |  |                     | 97-04-10   |

Rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes; 8 gold-plated in-line leads

SOT115G



DIMENSIONS (mm are the original dimensions)

| UNIT | A max. | A <sub>2</sub> max. | b            | c    | D max. | d max. | E max. | e    | e <sub>1</sub> | F    | L min. | ∅P           | Q max. | q    | q <sub>1</sub> | q <sub>2</sub> | S   | U <sub>1</sub> max. | U <sub>2</sub> | W           | w    | y   | Z max. |
|------|--------|---------------------|--------------|------|--------|--------|--------|------|----------------|------|--------|--------------|--------|------|----------------|----------------|-----|---------------------|----------------|-------------|------|-----|--------|
| mm   | 20.8   | 9.1                 | 0.51<br>0.38 | 0.25 | 27.2   | 2.54   | 13.75  | 2.54 | 5.08           | 12.7 | 8.8    | 4.15<br>3.85 | 2.4    | 38.1 | 25.4           | 10.2           | 4.2 | 44.75               | 8              | 6-32<br>UNC | 0.25 | 0.1 | 3.8    |

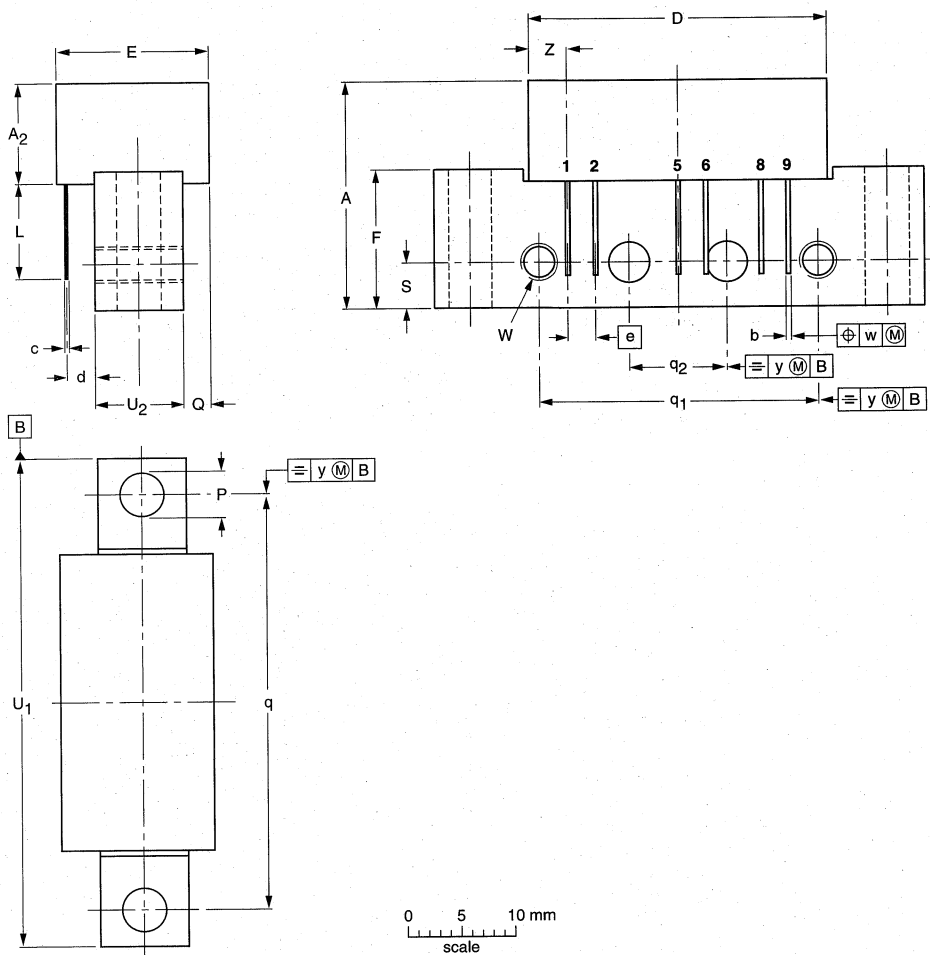
| OUTLINE VERSION | REFERENCES |       |      | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|---------------------|------------|
|                 | IEC        | JEDEC | EIAJ |                     |            |
| SOT115G         |            |       |      |                     | 97-04-10   |

Wideband hybrid IC modules

Package information

Rectangular single-ended package; aluminium flange; 2 vertical mounting holes;  
2 x 6-32 UNC and 2 extra horizontal mounting holes; 6 gold-plated in-line leads

SOT115H



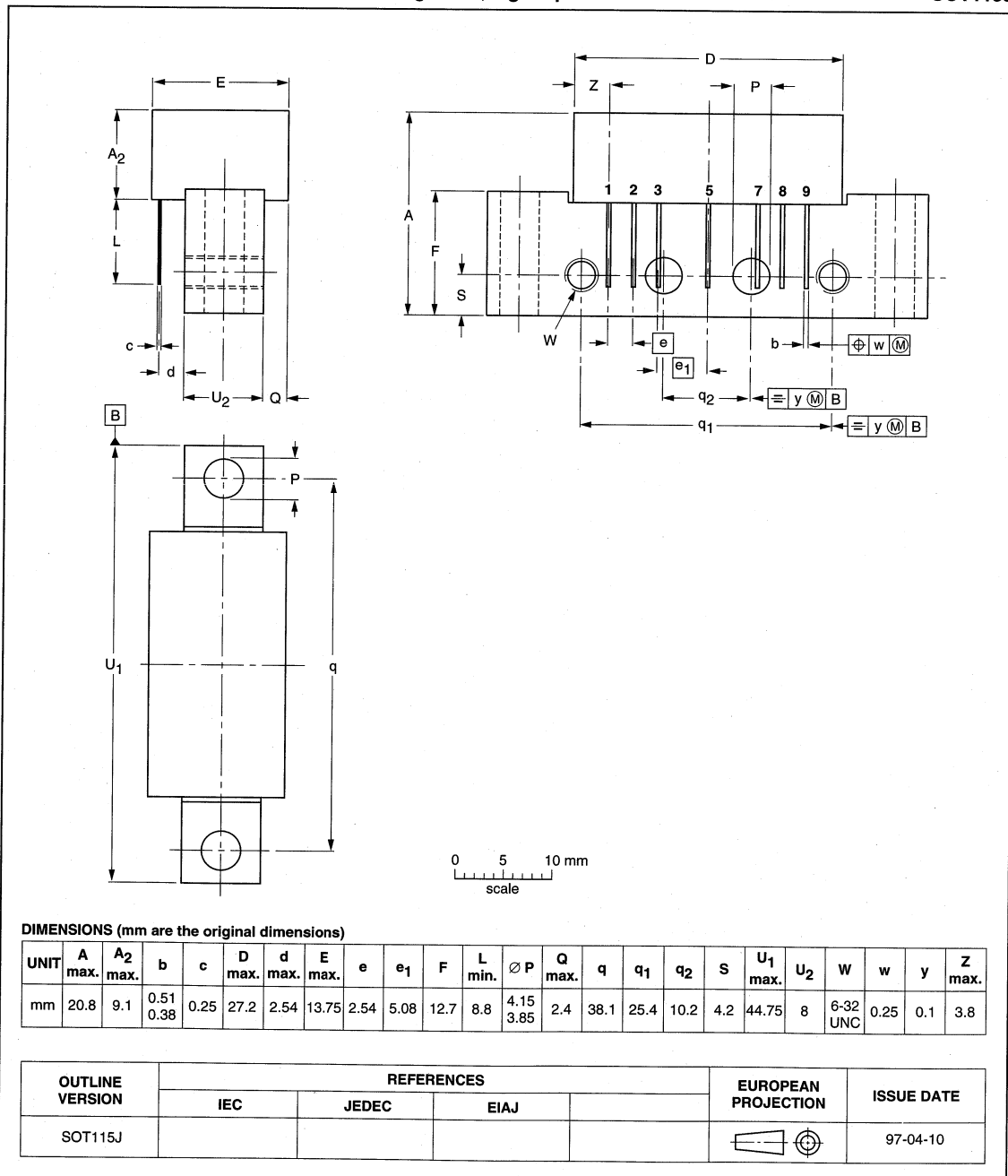
DIMENSIONS (mm are the original dimensions)

| UNIT | A max. | A <sub>2</sub> max. | b            | c    | D max. | d max. | E max. | e    | F    | L min. | ∅ P          | Q max. | q    | q <sub>1</sub> | q <sub>2</sub> | S   | U <sub>1</sub> max. | U <sub>2</sub> | W           | w    | y   | Z max. |
|------|--------|---------------------|--------------|------|--------|--------|--------|------|------|--------|--------------|--------|------|----------------|----------------|-----|---------------------|----------------|-------------|------|-----|--------|
| mm   | 20.8   | 9.1                 | 0.51<br>0.38 | 0.25 | 27.2   | 2.54   | 13.75  | 2.54 | 12.7 | 8.8    | 4.15<br>3.85 | 2.4    | 38.1 | 25.4           | 10.2           | 4.2 | 44.75               | 8              | 6-32<br>UNC | 0.25 | 0.1 | 3.8    |

| OUTLINE VERSION | REFERENCES |       |      | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|---------------------|------------|
|                 | IEC        | JEDEC | EIAJ |                     |            |
| SOT115H         |            |       |      |                     | 97-04-10   |

Rectangular single-ended package; aluminium flange; 2 vertical mounting holes;  
2 x 6-32 UNC and 2 extra horizontal mounting holes; 7 gold-plated in-line leads

SOT115J



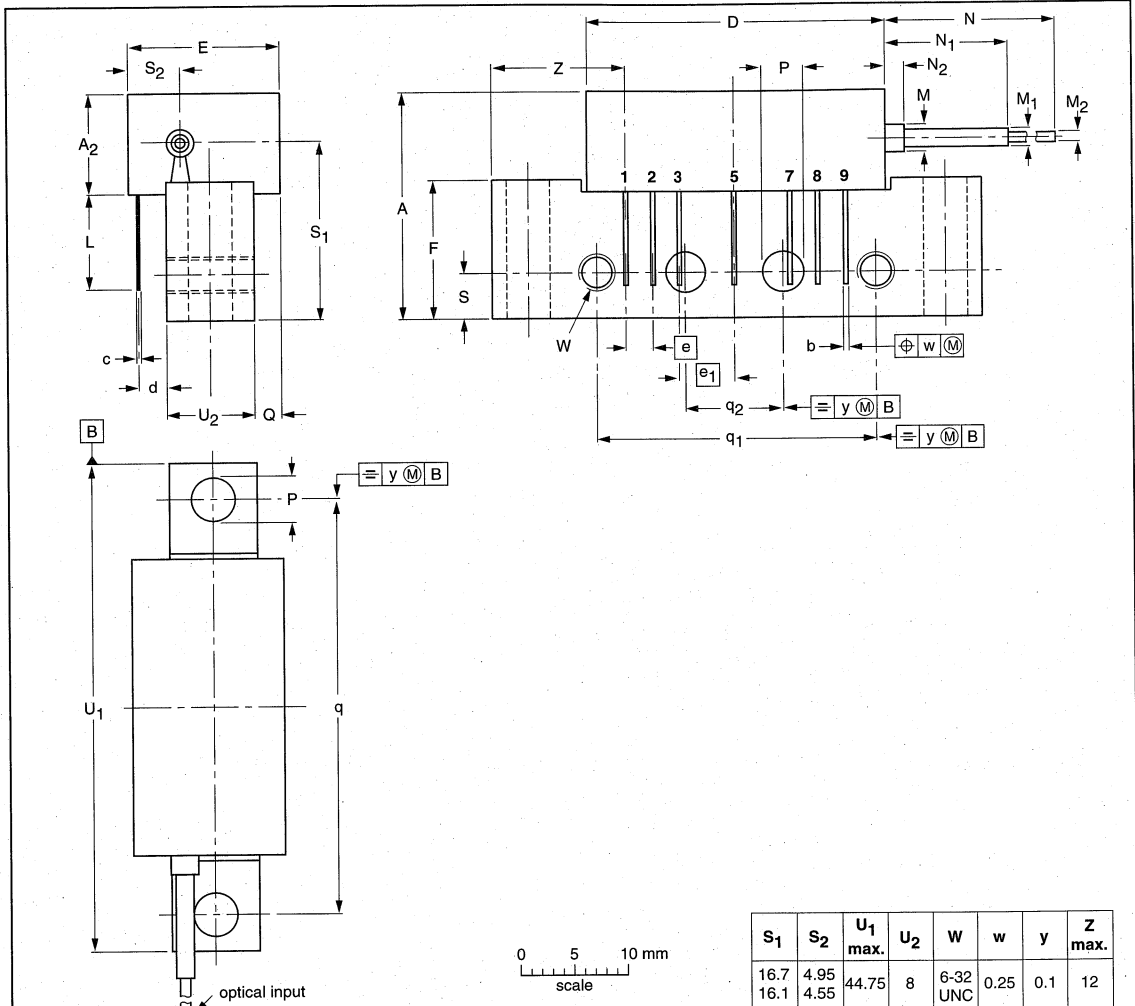


Wideband hybrid IC modules

Package information

Rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes; optical input; 7 gold-plated in-line leads

SOT115M



| S <sub>1</sub> | S <sub>2</sub> | U <sub>1</sub> max. | U <sub>2</sub> | W        | w    | y   | Z max. |
|----------------|----------------|---------------------|----------------|----------|------|-----|--------|
| 16.7           | 4.95           | 44.75               | 8              | 6-32 UNC | 0.25 | 0.1 | 12     |
| 16.1           | 4.55           |                     |                |          |      |     |        |

DIMENSIONS (mm are the original dimensions)

| UNIT | A max. | A <sub>2</sub> max. | b            | c    | D max. | d max. | E max. | e    | e <sub>1</sub> | F    | L min. | M   | M <sub>1</sub> | M <sub>2</sub> | N min. | N <sub>1</sub> | N <sub>2</sub> | ∅ P          | Q max. | q    | q <sub>1</sub> | q <sub>2</sub> | S   |
|------|--------|---------------------|--------------|------|--------|--------|--------|------|----------------|------|--------|-----|----------------|----------------|--------|----------------|----------------|--------------|--------|------|----------------|----------------|-----|
| mm   | 20.8   | 9.1                 | 0.51<br>0.38 | 0.25 | 27.2   | 2.54   | 13.75  | 2.54 | 5.08           | 12.7 | 8.8    | 2.5 | 1.6            | 0.9            | 1000   | 16<br>12       | 5<br>1         | 4.15<br>3.85 | 2.4    | 38.1 | 25.4           | 10.2           | 4.2 |

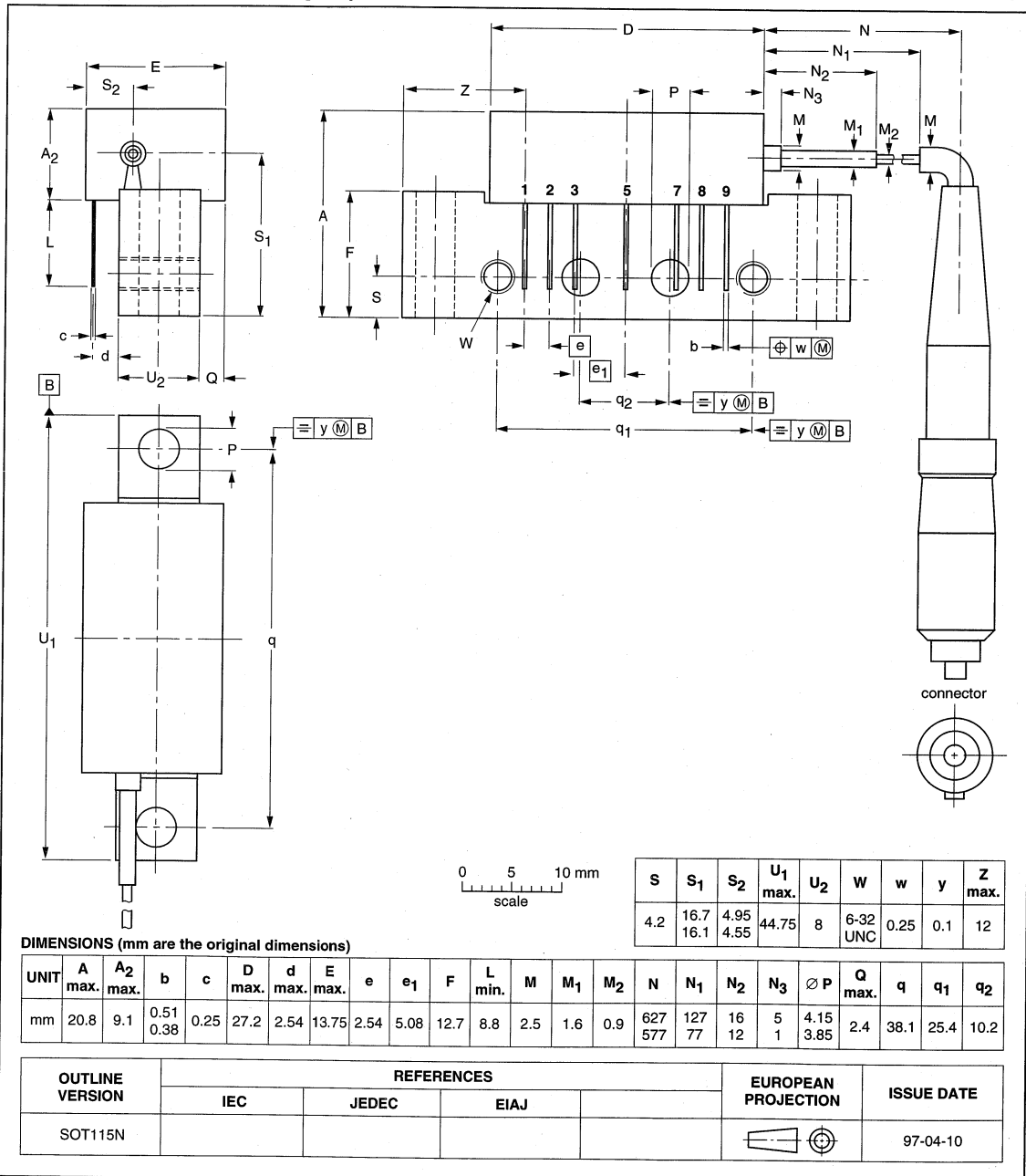
| OUTLINE VERSION | REFERENCES |       |      |  | EUROPEAN PROJECTION | ISSUE DATE |
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| SOT115M         |            |       |      |  |                     | 97-04-10   |

Wideband hybrid IC modules

Package information

Rectangular single-ended flat package; aluminium flange;  
 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes;  
 optical input with connector; 7 gold-plated in-line leads

SOT115N

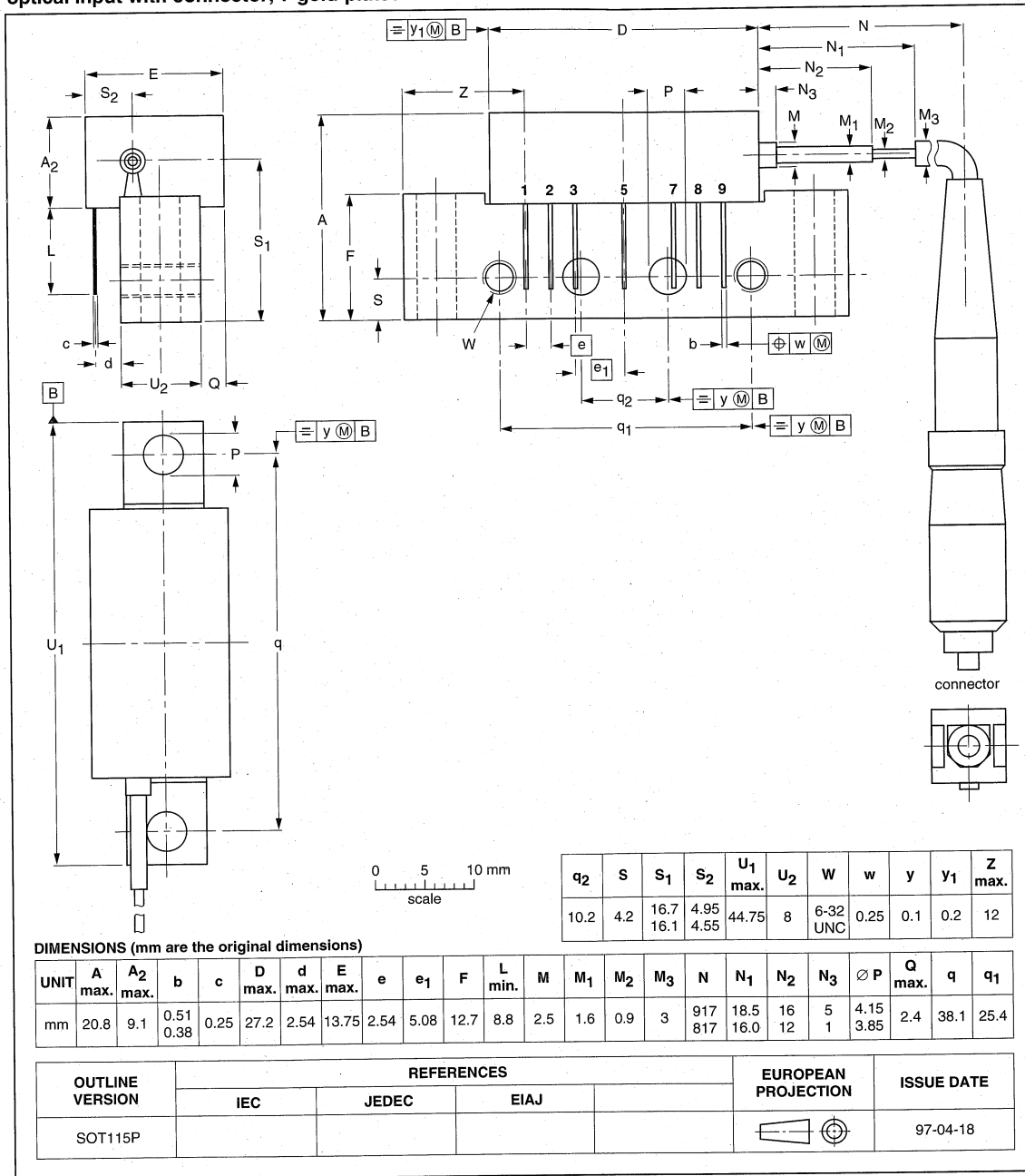


Wideband hybrid IC modules

Package information

Rectangular single-ended flat package; aluminium flange;  
 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes;  
 optical input with connector; 7 gold-plated in-line leads

SOT115P





**CATV TEST JIGS**

## STANDARD CATV TEST JIG

| PARAMETER             | CONDITIONS   | VALUE   |
|-----------------------|--|---|
| Frequency             |  | 5 to 1000 MHz                                   |
| Suitability           | suitable for devices with switchable   | positive and negative power supplies            |
| Impedance             |  | 75 $\Omega$                                     |
| Return loss           | measured with thru-line system;<br>other port terminated with 75 $\Omega$  |   |
| <600 MHz              |  | <-40 dB   |
| <860 MHz              |  | <-32 dB   |
| <1000 MHz             |  | <-28 dB   |
| Cross talk            |  | <-80 dB   |
| Insertion loss        | measured with thru-line system   | <0.1 dB   |
| DC current            |  | <1 A  |
| DC voltage            | automatically switched to the<br>device by means of a microswitch<br>after closing the pressing system   | <50 V   |
| Operating temperature |  | -25 to +75 $^{\circ}\text{C}$                   |
| RF connectors         |  | N-type female; 75 $\Omega$                      |
| DC connectors         |  | banana type                                     |
| Dimensions            | length $\times$ breadth $\times$ height; note 1  | 110 $\times$ 60 $\times$ 55 mm                  |
| Cooling               |  | water cooling connections available on test jig |
| Ordering              | order the STANDARD CATV TEST JIG via your regional sales office.<br>Internal Philips: Jos van Gennip, Building BY-3.073, Philips Semiconductors, Nijmegen.<br>E-mail: Jos.vanGennip@nym.sc.philips.com |   |

**Note**

1. Dimensions without pressing system, RF connectors and cooling connections. Distance between the centre contact of the RF connectors is 35.2 mm.

**SPECIAL CATV TEST JIG for BGX885N, BGD885, BGE885 and BGX881**

| PARAMETER             | CONDITIONS   | VALUE   |
|-----------------------|--|---|
| Frequency             |  | 40 to 860 MHz   |
| Impedance             |  | 75 $\Omega$   |
| Return loss           | measured with thru-line system;<br>other port terminated with 75 $\Omega$ .  | <-40 dB decreasing 1.5 dB per octave up to 860 MHz<br><-32 dB |
| 40 MHz<br>860 MHz     |  |   |
| Cross talk            |  | <-80 dB   |
| Insertion loss        | measured with thru-line system   | <0.1 dB   |
| DC current            |  | <1 A  |
| DC voltage            | automatically switched to the<br>device by means of a microswitch<br>after closing the pressing system   | <50 V   |
| Operating temperature |  | -25 to +75 °C   |
| RF connectors         |  | N-type female; 75 $\Omega$                                    |
| DC connectors         |  | banana type   |
| Dimensions            | length $\times$ breadth $\times$ height; note 1  | 110 $\times$ 60 $\times$ 55 mm                                |
| Cooling               |  | water cooling connections available on test jig               |
| Ordering              | order the STANDARD CATV TEST JIG via your regional sales office.<br>Internal Philips: Jos van Gennip, Building BY-3.073, Philips Semiconductors, Nijmegen.<br>E-mail: Jos.vanGennip@nym.sc.philips.com |   |

**Note**

1. Dimensions without pressing system, RF connectors and cooling connections. Distance between the centre contact of the RF connectors is 35.2 mm.

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**DATA HANDBOOK SYSTEM**

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| <i>Book</i> | <i>Title</i>  |
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| IC02        | Semiconductors for Television and Video Systems         |
| IC03        | Semiconductors for Wired Telecom Systems                |
| IC04        | HE4000B Logic Family CMOS                               |
| IC05        | Advanced Low-power Schottky (ALS) Logic                 |
| IC06        | High-speed CMOS Logic Family                            |
| IC11        | General-purpose/Linear ICs                              |
| IC12        | I <sup>2</sup> C Peripherals                            |
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| IC14        | 8048-based 8-bit Microcontrollers                       |
| IC15        | FAST TTL Logic Series                                   |
| IC16        | CMOS ICs for Clocks and Watches                         |
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| IC18        | Semiconductors for In-Car Electronics                   |
| IC19        | ICs for Data Communications                             |
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| IC24        | Low Voltage CMOS & BiCMOS Logic                         |
| IC25        | 16-bit 80C51XA Microcontrollers (eXtended Architecture) |
| IC26        | IC Package Databook                                     |
| IC27        | Complex Programmable Logic Devices                      |

**Discrete semiconductors**

| <i>Book</i> | <i>Title</i>                                       |
|-------------|--|
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| SC05        | Video Transistors and Modules for Monitors         |
| SC06        | High-voltage and Switching NPN Power Transistors   |
| SC07        | Small-signal Field-effect Transistors              |
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| SC08b       | RF Power Transistors for UHF                       |
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| SC13b       | Small-signal and Medium-power MOS Transistors      |
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| SC17        | Semiconductor Sensors                              |

**Professional components**

|      |                           |
|------|---------------------------|
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| DC02 | Monochrome Monitor Tubes and Deflection Units                               |
| DC03 | Television Tuners, Coaxial Aerial Input Assemblies                          |
| DC04 | Colour Monitor Tubes  |
| DC05 | Flyback Transformers, Mains Transformers and General-purpose FXC Assemblies |

### Magnetic products

|      |  |
|------|--|
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| MA03 | Piezoelectric Ceramics<br>Specialty Ferrites |
| MA04 | Dry-reed Switches                            |

### Passive components

|      |                                    |
|------|------------------------------------|
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| PA03 | Potentiometers                     |
| PA04 | Variable Capacitors                |
| PA05 | Film Capacitors                    |
| PA06 | Ceramic Capacitors                 |
| PA08 | Fixed Resistors                    |
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