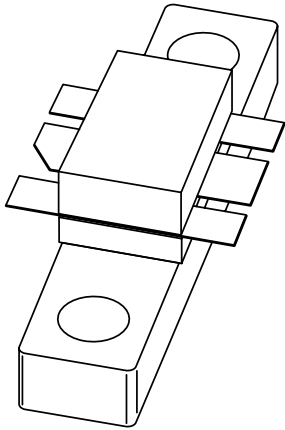


DATA SHEET



BLV59 UHF linear power transistor

Product specification
Supersedes data of March 1993

1998 Jan 09

UHF linear power transistor

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FEATURES

- Internal input matching to achieve an optimum wideband capability and high power gain
- Emitter-ballasting resistors for lower junction temperatures
- Titanium-platinum-gold metallization ensures long life and excellent reliability.

APPLICATIONS

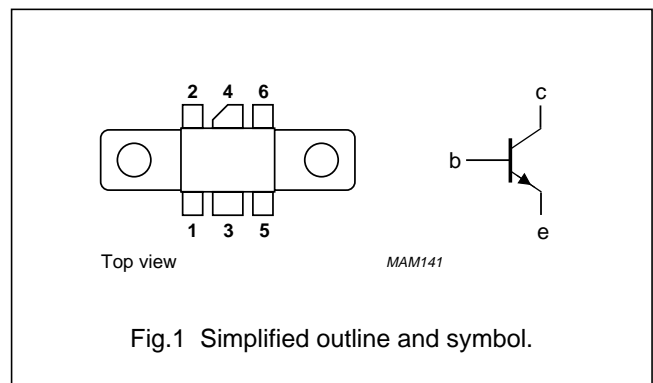
- UHF linear amplifiers in television transmitters.

DESCRIPTION

NPN silicon planar epitaxial power transistor encapsulated in a 6-lead SOT171A flange package with a ceramic cap. All leads are isolated from the flange.

PINNING - SOT171A

| PIN | SYMBOL | DESCRIPTION |
|-----|--------|-------------|
| 1 | e | emitter |
| 2 | e | emitter |
| 3 | b | base |
| 4 | c | collector |
| 5 | e | emitter |
| 6 | e | emitter |



QUICK REFERENCE DATA

RF performance at $T_h = 25\text{ }^\circ\text{C}$ in a common emitter class-AB circuit.

| MODE OF OPERATION | f (MHz) | V_{CE} (V) | P_L (W) | G_p (dB) | η_c (%) |
|-------------------|---------|--------------|-----------|------------|--------------|
| CW, class-AB | 860 | 25 | 30 | >7 | >50 |

WARNING

Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO disc is not damaged. All persons who handle, use or dispose of this product should be aware of its nature and of the necessary safety precautions. After use, dispose of as chemical or special waste according to the regulations applying at the location of the user. It must never be thrown out with the general or domestic waste.

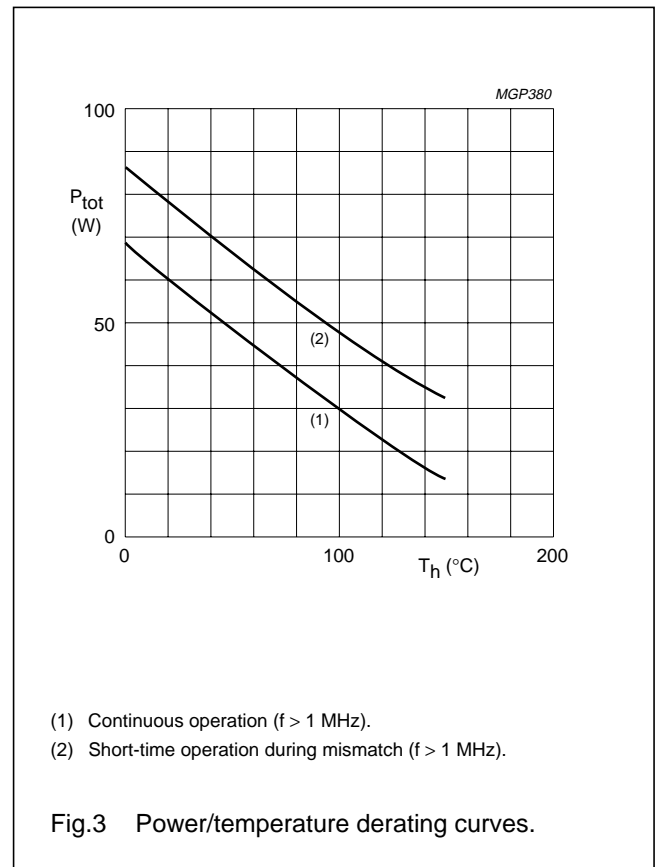
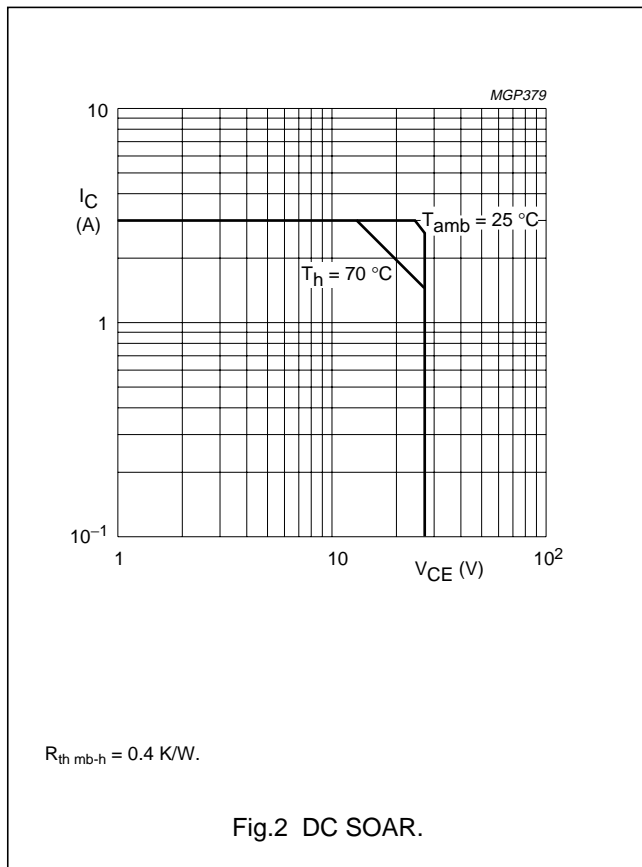
UHF linear power transistor

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LIMITING VALUES

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

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
|-------------|--------------------------------|------------------------------------|------|------|------|
| V_{CBO} | collector-base voltage | open emitter | – | 50 | V |
| V_{CEO} | collector-emitter voltage | open base | – | 27 | V |
| V_{EBO} | emitter-base voltage | open collector | – | 3.5 | V |
| I_C | collector current (DC) | | – | 3 | A |
| $I_{C(AV)}$ | average collector current | | – | 3 | A |
| I_{CM} | peak collector current | $f > 1$ MHz | – | 9 | A |
| P_{tot} | total power dissipation | $T_{mb} = 25\text{ °C}; f > 1$ MHz | – | 70 | W |
| T_{stg} | storage temperature | | –65 | +150 | °C |
| T_j | operating junction temperature | | – | 200 | °C |



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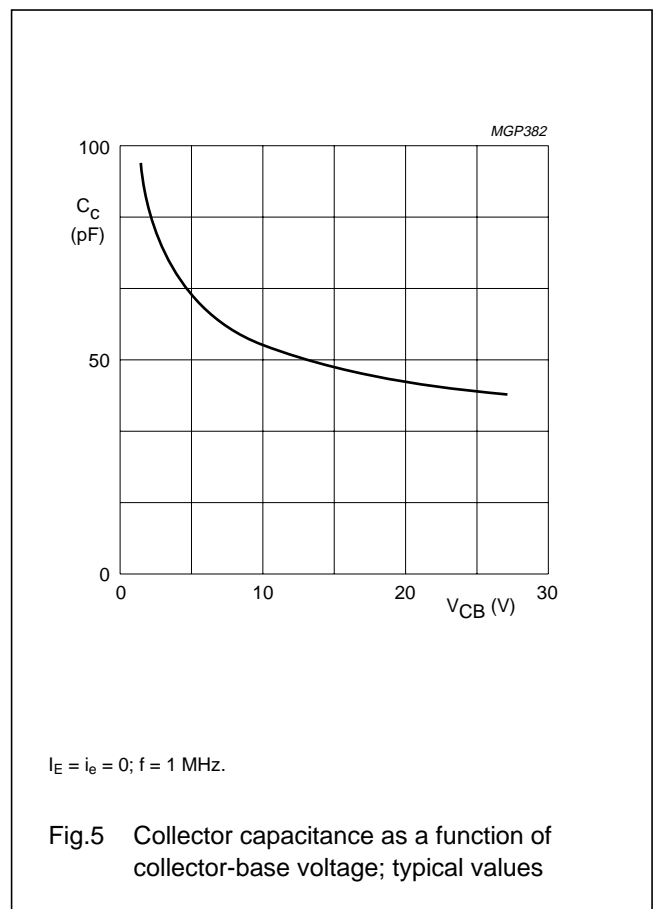
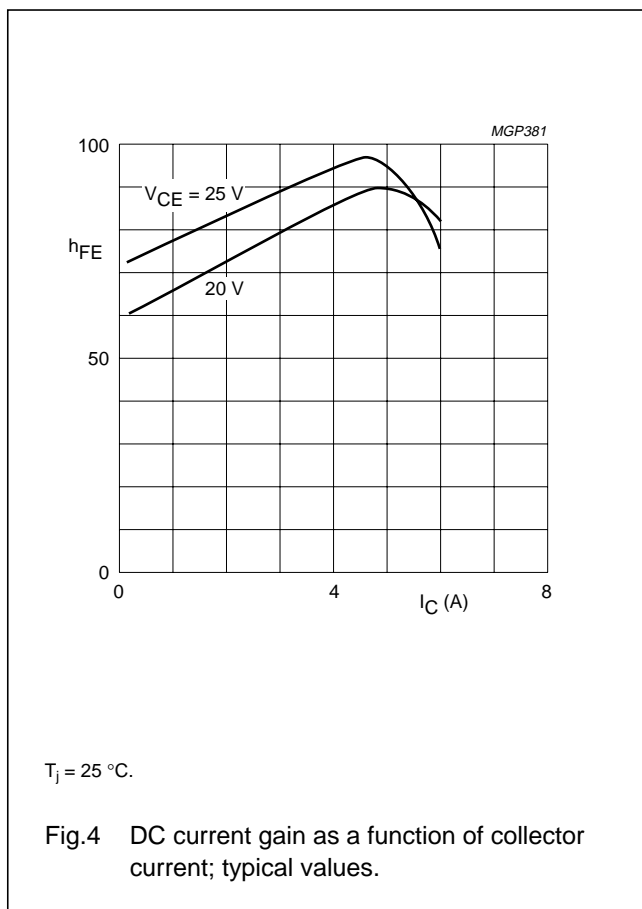
THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
|----------------|---|---|-------|------|
| $R_{th\ j-mb}$ | thermal resistance from junction to mounting base | $T_{mb} = 25\text{ }^\circ\text{C}$, $P_{tot} = 50\text{ W}$ | 2.3 | K/W |
| $R_{th\ mb-h}$ | thermal resistance from mounting base to heatsink | | 0.4 | K/W |

CHARACTERISTICS

$T_j = 25\text{ }^\circ\text{C}$ unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|---------------|-------------------------------------|---|------|------|------|------|
| $V_{(BR)CBO}$ | collector-base breakdown voltage | open emitter; $I_C = 50\text{ mA}$ | 50 | – | – | V |
| $V_{(BR)CEO}$ | collector-emitter breakdown voltage | open base; $I_C = 100\text{ mA}$ | 27 | – | – | V |
| $V_{(BR)EBO}$ | emitter-base breakdown voltage | open collector; $I_E = 10\text{ mA}$ | 3.5 | – | – | V |
| I_{CES} | collector leakage current | $V_{CE} = 27\text{ V}$; $V_{BE} = 0$ | – | – | 10 | mA |
| $E_{(SBR)}$ | second breakdown energy | $L = 25\text{ mH}$; $f = 50\text{ Hz}$; $R_{BE} = 10\text{ }\Omega$ | 4 | – | – | mJ |
| h_{FE} | DC current gain | $V_{CE} = 24\text{ V}$; $I_C = 2\text{ A}$ | 15 | – | – | |
| C_c | collector capacitance | $V_{CB} = 25\text{ V}$; $I_E = i_e = 0$; $f = 1\text{ MHz}$ | – | 44 | – | pF |
| C_{re} | feedback capacitance | $V_{CE} = 25\text{ V}$; $I_C = 0$; $f = 1\text{ MHz}$ | – | 30 | – | pF |
| C_{cf} | collector-flange capacitance | | – | 2 | – | pF |



UHF linear power transistor

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APPLICATION INFORMATION

RF performance up to $T_h = 25\text{ }^\circ\text{C}$ in a common emitter class-AB circuit; $R_{th\text{ mb-h}} = 0.4\text{ K/W}$.

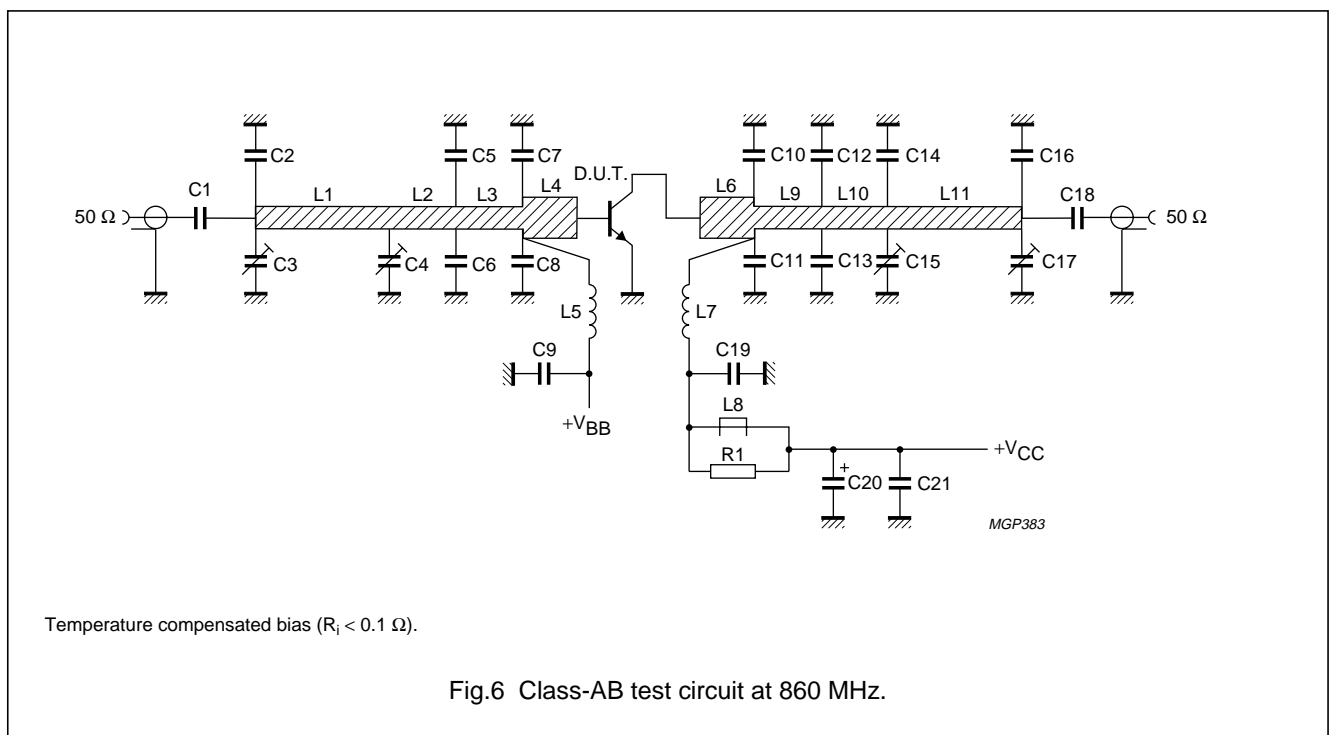
| MODE OF OPERATION | f (MHz) | V _{CE} (V) | I _{C(zs)} (mA) | G _p (dB) | P _L (W) | η _c (%) | ΔG _p (dB) ⁽¹⁾ |
|-------------------|---------|---------------------|-------------------------|---------------------|--------------------|--------------------|-------------------------------------|
| CW, class-AB | 860 | 25 | 60 | >7 typ. 8.5 | 30 | >50 typ. 55 | <1 typ. 0.2 |

Note

1. Assuming a 3rd order amplitude transfer characteristic, 1 dB gain compression corresponds with 30% sync input/25% sync output compression in television service (negative modulation, C.C.I.R. system).

Ruggedness in class-AB operation

The BLV59 is capable of withstanding a load mismatch corresponding to VSWR = 10 through all phases at rated load power under the following conditions: V_{CE} = 25 V; f = 860 MHz; T_h = 25 °C; R_{th mb-h} = 0.4 K/W; I_{C(zs)} = 60 mA.



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List of components (see Figs 6 and 7).

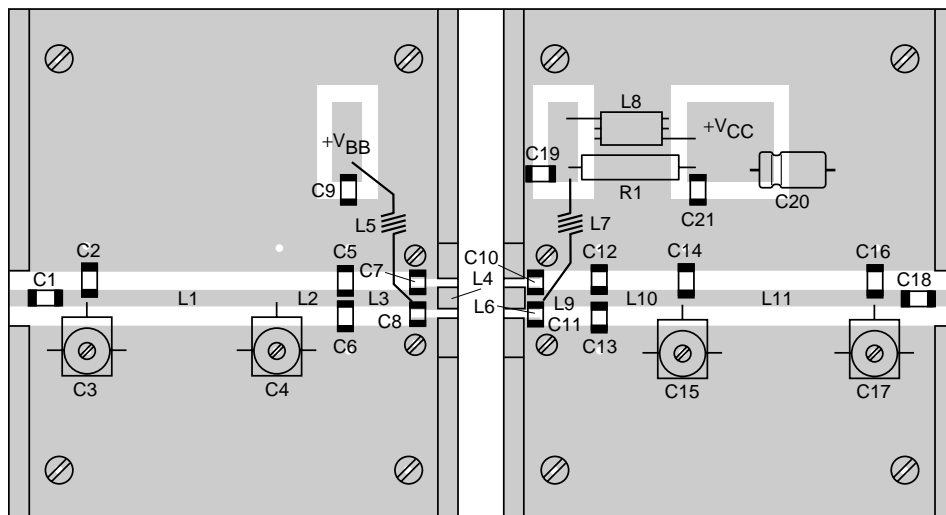
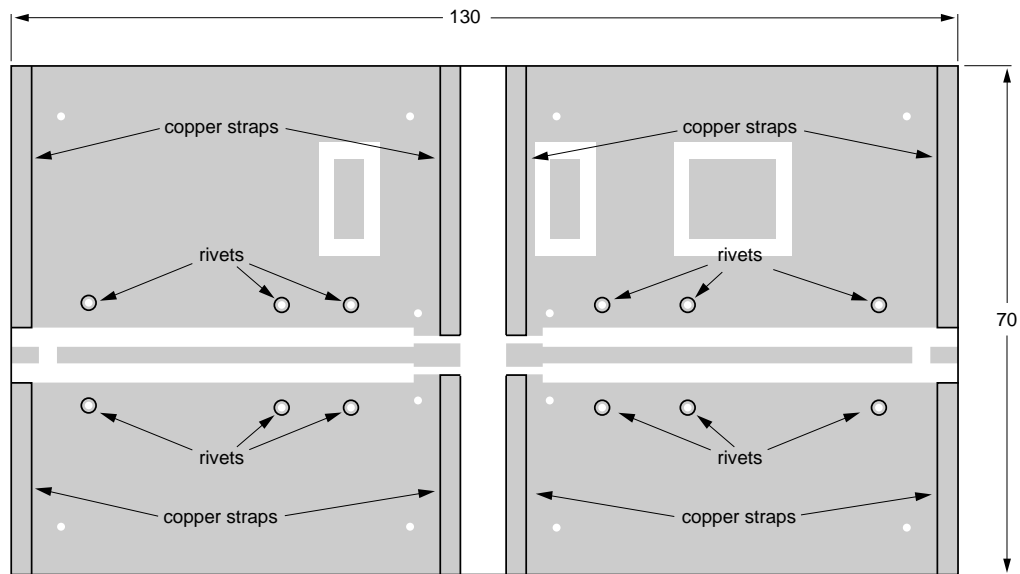
| COMPONENT | DESCRIPTION | VALUE | DIMENSIONS | CATALOGUE No. |
|------------------|---|---------------------------|---|----------------|
| C1, C18 | multilayer ceramic chip capacitor; note 1 | 33 pF | | |
| C2, C14, C16 | multilayer ceramic chip capacitor; note 1 | 3.6 pF | | |
| C3, C4, C15, C17 | film dielectric trimmer | 1.4 to 5.5 pF | | 2222 809 09001 |
| C5, C6 | multilayer ceramic chip capacitor; note 1 | 1.8 pF | | |
| C7, C8 | multilayer ceramic chip capacitor | 6.2 pF | | |
| C9, C21 | multilayer ceramic chip capacitor; note 1 | 330 pF | | |
| C10, C11 | multilayer ceramic chip capacitor; note 2 | 5.6 pF | | |
| C12 | multilayer ceramic chip capacitor; note 1 | 5.6 pF | | |
| C13 | multilayer ceramic chip capacitor; note 1 | 6.2 pF | | |
| C19 | multilayer ceramic chip capacitor; note 1 | 10 pF | | |
| C20 | electrolytic capacitor | 6.8 μ F; 63 V | | |
| L1, L11 | stripline; note 3 | 50 Ω | 26 mm \times 2.4 mm | |
| L2, L3 | stripline; note 3 | 50 Ω | 9.5 mm \times 2.4 mm | |
| L4 | stripline; note 3 | 42.6 Ω | 6 mm \times 3 mm | |
| L5 | 4 turns of closely wound 0.4 mm enamelled copper wire | 60 nH | int. diameter 3 mm leads 2 \times 5 mm | |
| L6 | stripline; note 3 | 42.6 Ω | 4 mm \times 3 mm | |
| L7 | 4 turns of closely wound 1 mm enamelled Cu wire | 45 nH | int. diameter 4 mm leads 2 \times 5 mm | |
| L8 | Ferroxcube HF choke | grade 3B | | 4312 020 36642 |
| L9 | stripline; note 3 | 50 Ω | 9 mm \times 2.4 mm | |
| L10 | stripline; note 3 | 50 Ω | 13.5 mm \times 2.4 mm | |
| R1 | metal film resistor | 10 Ω \pm 5%; 1 W | | |

Notes

- American Technical Ceramics (ATC) capacitor, type 100B or other capacitor of the same quality.
- American Technical Ceramics (ATC) capacitor, type 100A or other capacitor of the same quality.
- The striplines are on a double copper-clad printed-circuit board with PTFE fibre-glass dielectric ($\epsilon_r = 2.2$); thickness $\frac{1}{32}$ ".

UHF linear power transistor

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MGP384

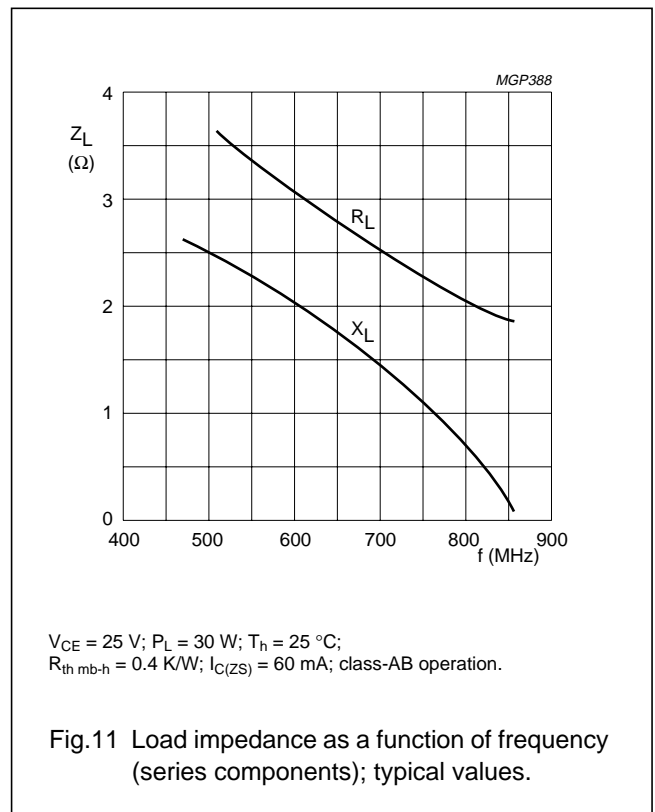
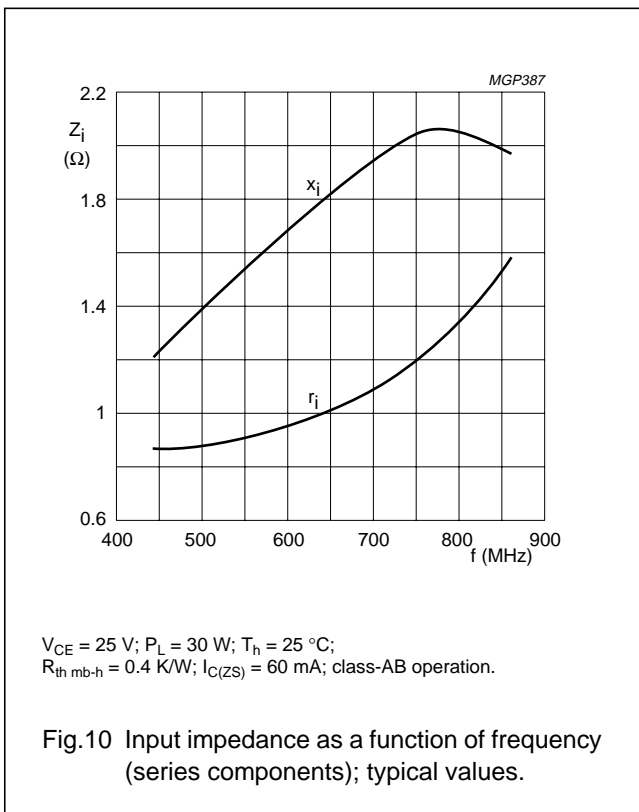
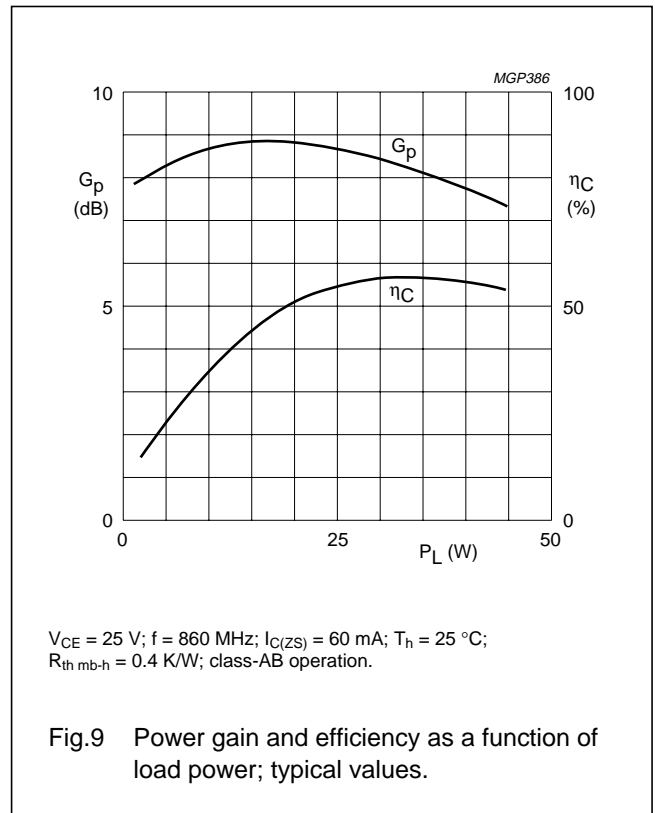
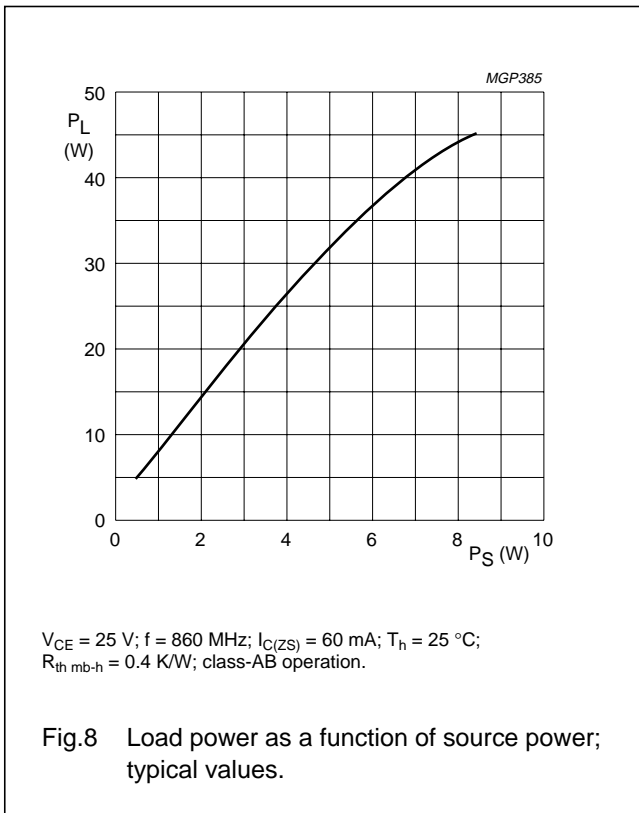
Dimensions in mm.

The components are situated on one side of the copper-clad PTFE-glass board, the other side is unetched and serves as a ground plane. Earth connections are made by fixing screws, hollow rivets and copper straps around the board and under the bases to provide a direct contact between the copper on the component side and the ground plane.

Fig.7 Printed-circuit board and component layout for 860 MHz class-AB test circuit.

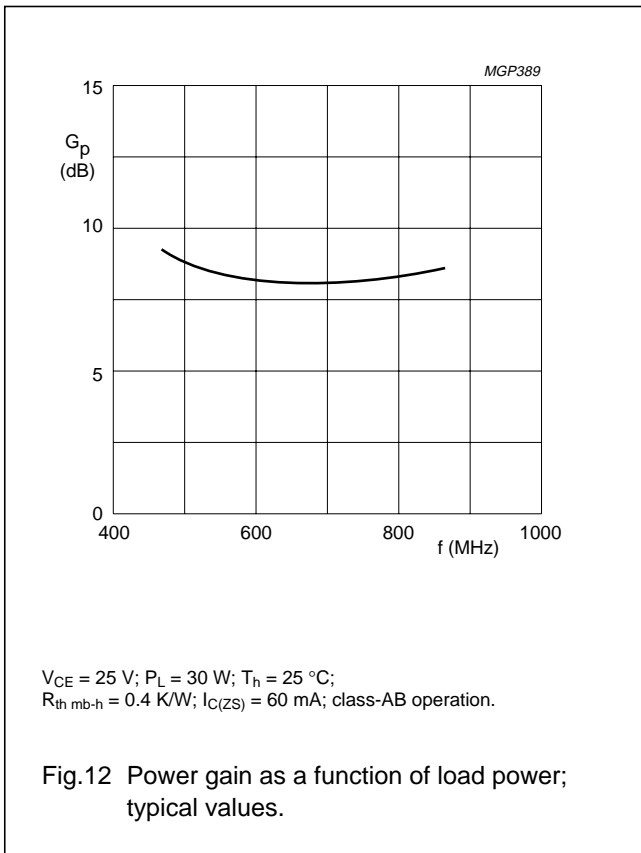
UHF linear power transistor

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UHF linear power transistor

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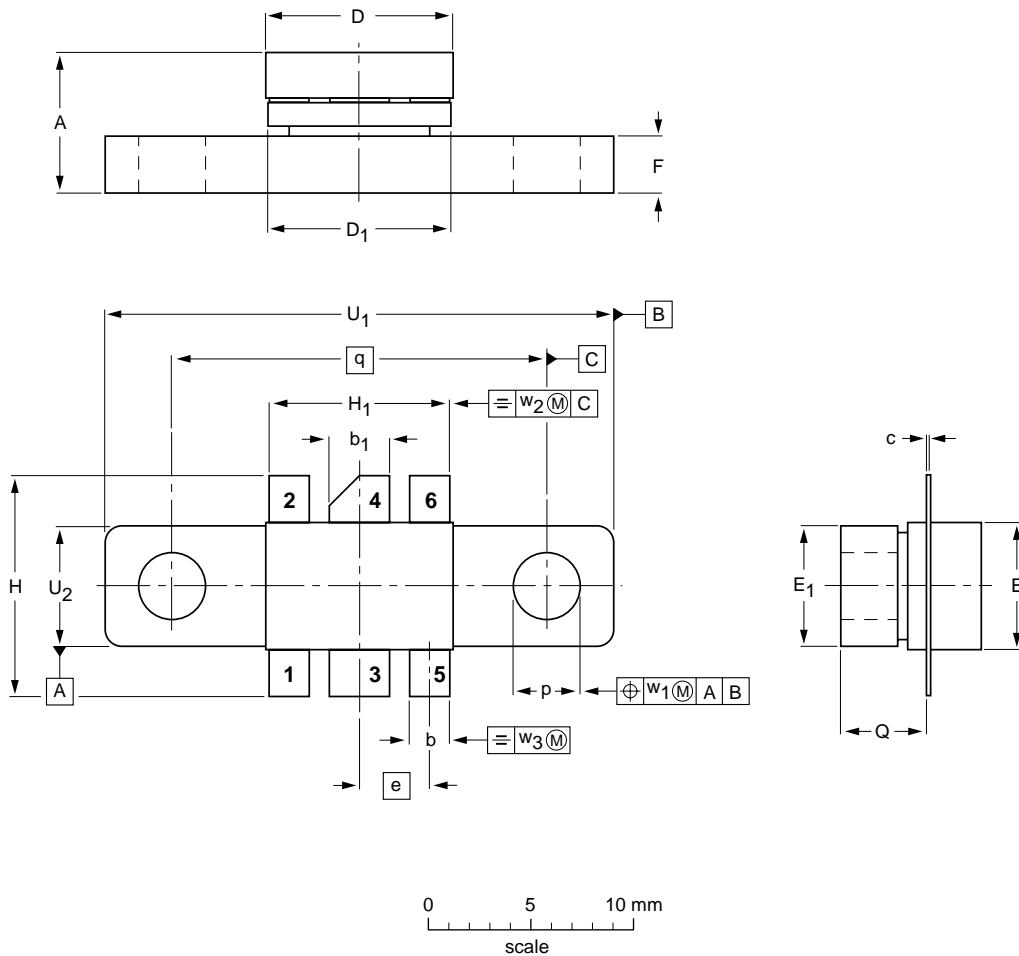
UHF linear power transistor

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PACKAGE OUTLINE

Flanged ceramic package; 2 mounting holes; 6 leads

SOT171A



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

| UNIT | A | b | b ₁ | c | D | D ₁ | E | E ₁ | e | F | H | H ₁ | p | Q | q | U ₁ | U ₂ | w ₁ | w ₂ | w ₃ |
|--------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------|----------------|----------------|----------------|----------------|----------------|-------|----------------|----------------|----------------|----------------|----------------|
| mm | 6.81 6.07 | 2.15 1.85 | 3.20 2.89 | 0.16 0.07 | 9.25 9.04 | 9.30 8.99 | 5.95 5.74 | 6.00 5.70 | 3.58 | 3.05 2.54 | 11.31 10.54 | 9.27 9.01 | 3.43 3.17 | 4.32 4.11 | 18.42 | 24.90 24.63 | 6.00 5.70 | 0.51 | 1.02 | 0.26 |
| inches | 0.268 0.239 | 0.085 0.073 | 0.126 0.114 | 0.006 0.003 | 0.364 0.356 | 0.366 0.354 | 0.234 0.226 | 0.236 0.224 | 0.140 | 0.120 0.100 | 0.445 0.415 | 0.365 0.355 | 0.135 0.125 | 0.170 0.162 | 0.725 | 0.980 0.970 | 0.236 0.224 | 0.02 | 0.04 | 0.01 |

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|-----------------|------------|-------|------|--|---------------------|------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT171A | | | | | | 97-06-28 |

UHF linear power transistor

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DEFINITIONS

| Data Sheet Status | |
|---|---|
| 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. |
| Limiting values | |
| Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. | |
| Application information | |
| Where application information is given, it is advisory and does not form part of the specification. | |

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