SCRETE SEMICONDUCTORS

Wideband Hybrid Amplifier Modules for CATV

Data Handbook SC16
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Wideband Hybrid Amplifier Modules for CATV

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Definitions and disclaimers

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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Types added to the range since the last issue of SC16 are shown in bold print.

SELECTION GUIDES

TYPE NUMBER	POWER GAIN (dB)	SLOPE CABLE EQUIVALENT (SL) (dB)	FLATNESS (dB) MAX.	RETURN LOSS (INPUT/OUTPUT) (dB) MIN. notes: Table 2	COMPOSITE TRIPLE BEAT (dB) MAX. notes: Table 3
Reverse Amplifier: 5 to 75 MHz Range					
	@10 MHz				**4 chs**
BGY68	30 ± 0.8	−0.2 to +0.5	±0.2	20	−68(3.1)
Reverse Amplifier: 5 to 120 MHz Range					
	@10 MHz				**14 chs**
BGY66B	25 ± 0.5	−0.2 to +0.5	±0.2	20	−66(3.2)
Reverse Amplifier: 5 to 200 MHz Range					
	@10 MHz				**22 chs(3.3)**
BGY61	13.0 ± 0.5	−0.2 to +0.5	±0.2	20	−68
BGY65	18.5 ± 0.5	−0.2 to +0.5	±0.2	20	−68
BGY67	22.0 ± 0.5	−0.2 to +0.5	±0.2	20	−67
BGY67A	24.0 ± 0.5	−0.2 to +0.5	±0.2	20	−67
Forward Amplifier: 40 to 450 MHz Range					
BGY84, BGY85, BGY84A, BGY85A, BGY86, BGY87, BGY87B, BGY88, BGY89; for more information see corresponding data sheets in this handbook.					

Wideband Hybrid Amplifier Modules for CATV

TYPE NUMBER	CROSS MODUL- ATION (dB) MAX. notes: Table 4	COMPOSITE 2nd ORDER BEAT (dB) MAX. notes: Table 5	2nd ORDER BEAT (dB) MAX. notes: Table 6	OUTPUT VOLTAGE (dBmV) MIN. notes: Table 7		NOISE FIGURE (dB) MAX.	TOTAL DC CURRENT CONSUMPTION (mA) MAX.
Reverse Amplifier: 5 to 75 MHz Range							
	4 chs					**@75 MHz**	
BGY68	−60(4.1)	−	−70(6.1)	−		5.0	135
Reverse Amplifier: 5 to 120 MHz Range							
	14 chs					**@120 MHz**	
BGY66B	−54(4.2)	−	−70(6.2)	60.0(7.1)		5.0	135
Reverse Amplifier: 5 to 200 MHz Range							
	22 chs(4.3)		(6.3)	(7.2)	(7.3)	**@200 MHz**	
BGY61	−61	−	−72	67.0	64.0	7.0	230
BGY65	−61	−	−72	67.0	64.0	5.5	230
BGY67	−60	−	−67	67.0	64.0	5.5	230
BGY67A	−59	−	−67	67.0	64.0	5.5	230
Forward Amplifier: 40 to 450 MHz Range							
BGY84, BGY85, BGY84A, BGY85A, BGY86, BGY87, BGY87B, BGY88, BGY89; for more information see corresponding data sheets in this handbook.							

TYPE NUMBER	POWER GAIN (dB)		SLOPE CABLE EQUIVALENT (SL) (dB)	FLATNESS (dB) MAX.	RETURN LOSS (INPUT/OUTPUT) (dB) MIN. notes: Table 2	COMPOSITE TRIPLE BEAT (dB) MAX. notes: Table 3
Power Doublers						
BGD104, BGD108; for more information see corresponding data sheets in this handbook.						
Forward Amplifier: 40 to 550 MHz Range						
	@ 50 MHz	**@ 550 MHz**			(2.2)	**77 chs(3.4)**
BGY580	12.5 ± 0.5	12.5 to 14.5	0.5 to 2.0	±0.2	18	−52
BGY583	14.0 ± 0.5	>14.5	0.2 to 1.5	±0.2	18	−59
BGY585	17.0 ± 0.5	17.6 to 19.0	0.5 to 2.0	±0.2	18	−59
BGY585A	18.2 ± 0.5	18.8 to 20.0	0.5 to 2.0	±0.2	18	−59
BGY586	22.0 ± 0.5	22.0 to 24.0	0.2 to 1.5	±0.2	18	−53
BGY587	22.0 ± 0.5	22.0 to 24.0	0.2 to 1.5	±0.2	18	−57
BGY587B	27.0 ± 0.8	>27.5	0.5 to 2.5	±0.4	18	−57
BGY588	34.5 ± 1.0	35.0 to 37.0	0 to 2.5	±0.4	18	−57
BGY588N	34.5 ± 1.0	35.0 to 36.0	0.5 to 1.5	± 0.3	18	−57
Power Doublers						
BGD502	18.5 ± 0.5	18.8 to 20.8	0.2 to 2.2	±0.3	18	−65
BGD504	20.0 ± 0.5	20.2 to 22.2	0.2 to 2.2	±0.3	18	−64
BGD506	22.0 ± 0.5	>22.1	0 to 2.0	±0.3	18	−62
BGD508	36.0 ± 1.0	>36.5	0.2 to 2.2	±0.4	18	−62
Forward Amplifier: 40 to 600 MHz Range						
	@ 50 MHz	**@ 600 MHz**			(2.2)	**85 chs(3.5)**
BGY683	14.0 ± 0.5	>14.5	0.2 to 1.7	±0.2	18	−55
BGY685A	18.2 ± 0.5	>19.0	0.5 to 2.2	±0.2	18	−55
BGY685AD	18.5 ± 0.5	>19.0	0.2 to 2.2	±0.3	18	−62
BGY685AL	18.5 ± 0.5	>18.5	0.5 to 2.0	±0.3	18	−56
BGY687	21.5 ± 0.5	>22.0	0.8 to 2.2	±0.2	18/16	−54
BGY687B	27.0 ± 0.8	>27.8	0.8 to 2.8	±0.4	18	−53

TYPE NUMBER	CROSS MODUL-ATION (dB) MAX. notes: Table 4	COMPOSITE 2nd ORDER BEAT (dB) MAX. notes: Table 5	2nd ORDER BEAT (dB) MAX. notes: Table 6	OUTPUT VOLTAGE (dBmV) MIN. notes: Table 7	NOISE FIGURE (dB) MAX.	TOTAL DC CURRENT CONSUMPTION (mA) MAX.
Power Doublers						
BGD104, BGD108; for more information see corresponding data sheets in this handbook.						
Forward Amplifier: 40 to 550 MHz Range						
	77 chs(4.4)	77 chs(5.1)	(6.5)	(7.4)	@ 550 MHz	
BGY580	–59	–56	–70	59.0	8.5	200
BGY583	–61	–59	–72	61.5	8.5	240
BGY585	–62	–59	–70	61.0	8.0	240
BGY585A	–62	–59	–72	61.5	8.0	240
BGY586	–55	–50	–62	58.5	6.5	200
BGY587	–58	–54	–66	61.0	7.0	240
BGY587B	–60	–57	–68	61.0	6.5	340
BGY588	–59	–57	–68	61.0	6.5	340
BGY588N	-59	-62	-74	61.0	6.0	340
Power Doublers						
BGD502	–68	–62	–72	64.0	8.0	435
BGD504	–67	–60	–70	63.5	8.0	435
BGD506	–63	–55	–66	62.5	7.0	435
BGD508	–65	–60	–70	63.0	7.5	625
Forward Amplifier: 40 to 600 MHz Range						
	85 chs(4.4)	85 chs(5.2)	(6.6)	(7.5)	@ 600 MHz	
BGY683	–59	–57	–68	58.0	9.0	240
BGY685A	–60	–56	–70	60.0	8.5	240
BGY685AD	–60	–60	–70	62.0	6.0	250
BGY685AL	–55	–56	–70	60.0	5.0	250
BGY687	–54	–52	–66	58.0	6.5	240
BGY687B	–58	–54	–66	60.0	7.0	340

TYPE NUMBER	POWER GAIN (dB)		SLOPE CABLE EQUIVALENT (SL) (dB)	FLATNESS (dB) MAX.	RETURN LOSS (INPUT/OUTPUT) (dB) MIN. notes: Table 2	COMPOSITE TRIPLE BEAT (dB) MAX. notes: Table 3
Power Doublers						
BGD602	18.5 ± 0.5	>19.0	0.2 to 2.2	±0.3	18	−62
BGD602D	18.0 ± 0.5	>18.5	0.2 to 2.2	±0.3	18	−68
Forward Amplifier: 40 to 750 MHz Range						
	@ 50 MHz	**@ 750 MHz**			**(2.3)**	**110 chs(3.6)**
BGY785A	18.5 ± 0.5	>18.5	0 to 2.0	±0.3	20	−53
BGY785AD	18.5 ± 0.5	>18.5	0.2 to 2.0	±0.5	20	−58
BGY785AD/8M(1.7)	18.5 ± 0.5	−	0.2 to 2.0	±0.5	20	−58
BGY787	21.5 ± 0.5	>22.0	0 to 1.5	±0.5	20	−53
BGE788	34.0 ± 0.5	>34	0.5 to 2.5	±0.5	20	−49
Power Doublers						
BGD702/702MI(1.4)	18.5 ± 0.5	>18.5	0 to 1.5	±0.5	20(2.4)	−58
BGD702D	18.5 ± 0.5	>20.0	2.0 to 4.0	±0.5	20(2.3)	−62
BGD704	20.0 ± 0.5	>20.0	0 to 2.0	±0.5	20(2.4)	−57
Forward Amplifier: 40 to 860 MHz Range						
	@ 50 MHz	**@ 860 MHz**			**(2.3)**	**49 chs(3.7)**
BGY883	15.0 ± 0.5	>15.0	0 to 2.0	±0.3	20	−61
BGY885A	18.5 ± 0.5	−	0 to 2.0	±0.3	20	−61
BGY885B	20.0 ± 0.5	>20.0	0 to 2.0	±0.3	20	−60
BGY887	21.5 ± 0.5	>21.5	0.2 to 2.0	±0.3	20	−62
BGY887B	29.0 ± 0.5	>29.0	0.5 to 2.5	±0.5	20	−60
BGY888	34.0 ± 0.5	>34.0	0.5 to 2.5	±0.5	20	−60
CGY887A(1.1)	25.5 ± 0.5	26.25 ± 0.75 @ 870 MHz	0.2 to 1.3	±0.5	20	−62(3.9)

TYPE NUMBER	CROSS MODUL-ATION (dB) MAX. notes: Table 4	COMPOSITE 2nd ORDER BEAT (dB) MAX. notes: Table 5	2nd ORDER BEAT (dB) MAX. notes: Table 6	OUTPUT VOLTAGE (dBmV) MIN. notes: Table 7	NOISE FIGURE (dB) MAX.	TOTAL DC CURRENT CONSUMPTION (mA) MAX.
Power Doublers						
BGD602	−66	−60	−70	63.0	8.0	435
BGD602D	−61	−64	−76	66.0	7.0	440
Forward Amplifier: 40 to 750 MHz Range						
	110 chs(4.4)	**110 chs(5.3)**	**(6.7)**	**(7.6)**	**@ 750 MHz**	
BGY785A	−56	−53	−65	59.0	7.0	240
BGY785AD	−56	−58	−68	61.0	6.0	265
BGY785AD/8M(1.7)	−56	−58	−68	61.0	6.0	265
BGY787	−52	−53	−63	61.0	6.5	240
BGE788	−51	−52	−64	58.0	7.0	320
Power Doublers						
BGD702/702MI(1.4)	−62	−58	−68	61.0	8.5	435
BGD702D	−59	−62	−72	64.0	7.0	435
BGD704	−61	−56	−66	60.5	8.5	435
Forward Amplifier: 40 to 860 MHz Range						
	49 chs(4.4)	**49 chs(5.4)**	**(6.8)**	**(7.8)**	**@ 860 MHz**	
BGY883	−61	−61	−68	60.0 typ.	8.5	235
BGY885A	−61	−61	−70	59.0 typ.	8.0	240
BGY885B	−60	−60	−68	59.0 typ.	7.5	235
BGY887	−61	−61	−70	59.0	6.5	235
BGY887B	−60	−60	−70	58.5	6.5	340
BGY888	−59	−55	−65	58.0	7.0	340
CGY887A(1.1)	−55(4.6)	−57(5.6)	−	−	5.0	240

TYPE NUMBER	POWER GAIN (dB)		SLOPE CABLE EQUIVALENT (SL) (dB)	FLATNESS (dB) MAX.	RETURN LOSS (INPUT/OUTPUT) (dB) MIN. notes: Table 2	COMPOSITE TRIPLE BEAT (dB) MAX. notes: Table 3
Cascade Amplifiers						
					[2.5]	
BGE885	17.0 ± 0.5		0.2 to 1.2	±0.5	14[2.6]	–
BGX881	12.5 ± 0.5		0.2 to 1.2	±0.3	20	–
BGX885N	17.0 ± 0.5		0.2 to 1.4	±0.3	20	–
Power Doublers						
						129 chs[3.7]
BGD802/802MI[1.4]	18.5 ± 0.5	>18.5	0.2 to 2.0	±0.5	20[2.3]	–54
BGD802N	18.5 ± 0.5	>18.5	0.2 to 2.0	±0.25	20[2.3]	–54
BGD804	20.0 ± 0.5	>20.0	0.2 to 2.0	±0.5	20[2.3]	–53
BGD804N	20.0 ± 0.5	>20.0	0.2 to 2.0	±0.25	20[2.3]	–53
BGD885[1.5]	17.0 ± 0.5	–	0.2 to 1.6	±0.5	20	–
Power Doubler: 40 to 900 MHz Range						
	@ 50 MHz	**@ 900 MHz**				**129 chs[3.7]**
BGD902/902MI[1.4]	18.5 ± 0.3	19.5 ± 0.5	0.4 to 1.4	±0.3	20[2.7]	–58
BGD902L	18.5 ± 0.3	19.5 ± 0.5	0.4 to 1.4	±0.3	20	–56
BGD904/904MI[1.4]	20.0 ± 0.3	20.0 ± 0.5	0.4 to 1.4	±0.3	20[2.8]	–57.5
BGD904L	20.0 ± 0.3	21.0 ± 0.5	0.4 to 1.4	±0.3	20	–55.5
BGD906/906MI[1.1][1.4]	21.0 ± 0.5	22.5 ± 0.5	0.9 to 1.9	±0.3	20[2.3]	–56
BGD906L	21.0 ± 0.3	22.5 ± 0.5	0.5 to 1.5	±0.3	20	–54
Forward Amplifier: 40 to 1000 MHz Range						
	@ 50 MHz	**@ 1 GHz**			[2.1]	**110/150 chs[3.8]**
BGY1085A	18.5 ± 0.5	>18.5	0 to 2.0	±0.3	20	–53/–53 typ.

TYPE NUMBER	CROSS MODUL-ATION (dB) MAX. notes: Table 4	COMPOSITE 2nd ORDER BEAT (dB) MAX. notes: Table 5	2nd ORDER BEAT (dB) MAX. notes: Table 6	OUTPUT VOLTAGE (dBmV) MIN. notes: Table 7		NOISE FIGURE (dB) MAX.		TOTAL DC CURRENT CONSUMPTION (mA) MAX.
Cascade Amplifiers								
			(6.9)	(7.7)	(7.8)	@ 350 MHz	@ 860 MHz	
BGE885	–	–	–53	–	59.0	7.5	8.0	240
BGX881	–	–	–53	60.5	59.5	8.5	9.0	240
BGX885N	–	–	–53	61.0	60.0	7.5	8.0	240
Power Doublers								
	129 chs(4.4)	129 chs(5.4)						
BGD802/802MI(1.4)	–59	–56	–69(6.8)	–	61.5	–	9.0	410
BGD802N	–59	–56	–69	61.5	61.5	–	9.0	410
BGD804	–61	–54	–67(6.8)	–	60.0	–	7.5	410
BGD804N	–58	–54	–67	61.0	61.0	–	8.0	410
BGD885(1.5)	–	–	–53	64.0	63.0	–	8.0	450
Power Doubler: 40 to 900 MHz Range								
	129 chs(4.4)	129 chs(5.4)	(6.8)	(7.8)		@ 50 MHz	@ 900 MHz	
BGD902/902MI(1.4)	–62	–58	–74	64.5		5.0	8.0	435
BGD902L	–60	–59	–74	63.0		5.0	7.5	380
BGD904/904MI(1.4)	–61	–58	–75	64.0		5.0	7.5	435
BGD904L	–59	–59	–75	62.5		5.0	7.5	380
BGD906/906MI(1.1)(1.4)	–59	–55	–70	63.0		6.0	8.0	435
BGD906L	–57	–56	–70	61.5		5.5	7.5	380
Forward Amplifier: 40 to 1000 MHz Range								
	110/150 chs(4.5)	110/150 chs(5.5)	(6.10)	(7.9)	(7.10)	@ 750 MHz	@ 1 GHz	
BGY1085A	–54/–54 typ.	–56/–56 typ.	–65/–68	60.0	59.0 typ.	7.0	7.5 typ.	420

OPTICAL RECEIVERS

TYPE NUMBER	RESPONSIVITY (V/W) MIN.	f_{max} MHz	FLATNESS (dB) MAX.	OUTPUT RETURN LOSS (dB) MAX.	OPTICAL INPUT RETURN LOSSES (dB) MAX.
Optical Receiver: 5 to 300 Mhz Range					
	@ λ = 1300 nm				
BGE67BO(1.2)	800	300	±0.3	15	45
BGE67BO/4M(1.2)(1.8)	800	400	±0.3	14	45
BGE67BO/SC(1.2)(1.9)	750	300	±0.3	15	45
Optical Receiver: 40 to 860 Mhz Range					
BGE847BO(1.2)	800	860	±0.5	11	45
BGE847BO/FC(1.2)	750	860	±0.5	11	45
BGE883BO(1.1)(1.2)	400	860	±0.5	17	45
BGE887BO(1.2)	800	860	±0.5	11	45
BGE887BO/FC(1.2)(1.6)	750	860	±0.5	11	45
BGO847	800	870	1	11	45

TYPE NUMBER	EQUIVALENT NOISE INPUT ($pA/\sqrt{Hz}$) MAX.	2nd ORDER BEAT (dB) MAX. notes: Table 6	3rd ORDER BEAT (dB) MAX. notes: Table 8	LENGTH OF FIBRE MIN.		TOTAL DC CURRENT CONSUMPTION (mA) MAX.
Optical Receiver: 5 to 300 Mhz Range						
		(6.4)	(8.1)			
BGE67BO(1.2)	7	−70	−80	1000	1000	190
BGE67BO/4M(1.2)(1.8)	7	−70	−80	1000	1000	190
BGE67BO/SC(1.2)(1.9)	7	−70	−80	817	917	190
Optical Receiver: 40 to 860 Mhz Range						
		(6.4)	(8.1)			
BGE847BO(1.2)	7	−70	−80	1000	1000	205
BGE847BO/FC(1.2)	7	−70	−80	577	627	205
BGE883BO(1.1)(1.2)	13	−76	−92	1000	1000	205
BGE887BO(1.2)	7	−70	−80	1000	1000	205
BGE887BO/FC(1.2)(1.6)	7	−70	−80	577	627	205
BGO847	8	−70	−75	1000	1000	205

NOTES IN SELECTION GUIDE

Table 1 Miscellaneous notes.

NOTE IN MAIN TABLE	
1.1	provisional data/advance information
1.2	module has a monomode optical input for wavelengths from 1290 to 1600 nm; PIN diode current-monitoring terminal; 1 meter SM pigtail, 9/125 μm spectral sensitivity: >0.85 A/W at 1310 nm, >0.9 A/W at 1550 nm.
1.4	the MI type has 'mirror image' pinning for simplified board layout when put in parallel with the standard type.
1.5	cascade
1.6	as BO but with the pigtail terminated by an FC/APC optical connector.
1.7	frequency range 40 to 870 MHz
1.8	frequency range 40 to 400 MHz
1.9	as BO but with the pigtail terminated by an SC/APC optical connector.

Table 2 Return loss notes.

NOTE IN MAIN TABLE	RETURN LOSS
2.1	measured at 40 MHz, max. decrease 1.5 dB/octave
2.2	>20 dB from 40 to 80 MHz >19 dB from 80 to 160 MHz >18 dB from 160 to 450 MHz, 550 MHz or 600 MHz as appropriate
2.3	>20 dB from 40 to 80 MHz >18.5 dB from 80 to 160 MHz >17 dB from 160 to 320 MHz >15.5 dB from 320 to 640 MHz >14 dB from 640 to 750 MHz, 860 MHz or 900 MHz as appropriate
2.4	>20 dB from 40 to 80 MHz >19 dB from 80 to 160 MHz >18 dB from 160 to 320 MHz >17 dB from 320 to 640 MHz >16 dB from 640 to 750 MHz
2.5	measured at 40 MHz, max. decrease 1.5 dB/octave up to 800 MHz; from 800 to 860 MHz, return loss is >10 dB
2.6	>14 dB from 40 to 450 MHz >10 dB from 450 to 860 MHz
2.7	>20 dB from 40 to 80 MHz >21 dB from 80 to 160 MHz >21 dB from 160 to 320 MHz >18 dB from 320 to 640 MHz >17 dB from 640 to 900 MHz
2.8	>20 dB from 40 to 160 MHz >17 dB from 160 to 550 MHz >15.5 dB from 550 to 650 MHz >14 dB from 650 to 900 MHz

Table 3 Measuring conditions for composite triple beat.

NOTE IN MAIN TABLE	MEASURED AT (MHz)	V_O (dBmV)
3.1	25	50
3.2	67.25	48
3.3	175.25 (channel 7)	50
3.4	547.25 (channel 27)	44
3.5	595.25 (channel 35)	44
3.6	745.25	44
3.7	859.25	44
3.8	1st value; 745.25 MHz	44
	2nd value; 985.25 MHz	40
3.9	745.25	40

Table 4 Measuring conditions for cross modulation.

NOTE IN MAIN TABLE	MEASURED AT (MHz)	V_O (dBmV)
4.1	25	50
4.2	67.25	48
4.3	55.25 (channel 2)	50
4.4	55.25 (channel 2)	44
4.5	1st value; 55.25 (channel 2) for 110 channels; 750 MHz b/w	44
	2nd value; 55.25 (channel 2) for 150 channels; 1000 MHz b/w	40
4.6	55.25	40

Table 5 Measuring conditions for composite second-order beat.

NOTE IN MAIN TABLE	MEASURED AT (MHz)	V_O (dBmV)
5.1	548.5 (channel 27)	44
5.2	596.5 (channel 35)	44
5.3	746.5 (channel 2)	44
5.4	860.5	44
5.5	1st value; 746.5 MHz	44
	2nd value; 986.5 MHz	40
5.6	860.5	40

Table 6 Measuring conditions for 2nd order beat measured at $f_p + f_q$.

NOTE IN MAIN TABLE	f_p (MHz)	f_q (MHz)	$f_p + f_q$ (MHz)	V_O(1) (dBmV)
6.1	19	31	50	50
6.2	55.25	61.25	116.5	48
6.3	83.25	109.25	192.5	50
6.4	−70 dBc; 2 laser test (each laser: 0.5 mW; 40% modulation index)			
6.5	55.25 (channel 2)	493.25 (channel 18)	548.5 (channel 27)	44
6.6	55.25 (channel 2)	541.25	596.5	44
6.7	55.25 (channel 2)	691.25	746.5	44
6.8	55.25 (channel 2)	805.25	860.5	44
6.9	349.25	403.25	752.5	59
6.10	1st value; 55.25 (channel 2)	691.25	746.25	44
	2nd value; 55.25 (channel 2)	931.25	986.25	40

Note

1. $V_o = V_p = V_q$.

Table 7 Measuring conditions for output voltage[1].

NOTE IN MAIN TABLE	f_p (MHz)	f_q (MHz)	f_r (MHz)	$f_p + f_q - f_r$ (MHz)
7.1	111.25	118.25	120.25	109.25
7.2	35.25	42.25	44.25	33.25
7.3	187.25	194.25	196.25	185.25
7.4	540.25	547.25	549.25	538.25
7.5	590.25	597.25	599.25	588.25
7.6	740.25	747.25	749.25	738.25
7.7	341.25	348.25	350.25	339.25
7.8	851.25	858.25	860.25	849.25
7.9	740.25	747.25	749.25	738.25
7.10	980.25	987.25	989.25	978.25

Note

1. All output voltages measured at $f_p + f_q - f_r$, and for an intermodulation distortion of −60 dB (DIN 45004B, par. 6.3: 3 tone); $V_p = V_o$, $V_q = V_o - 6$ dB, $V_r = V_o - 6$ dB.

Table 8 Measuring conditions for 3rd order beat measured at $f_p + f_q - f_r$.

NOTE IN MAIN TABLE	
8.1	−80 dB, 3 laser test (each laser: 0.33 mW; 40% modulation index).

General Remarks

- All devices are cascode types except where indicated otherwise
- Source and load impedance of all devices is 75 Ω
- Characteristics specified at T_{mb} = 30 °C and measured at 24 V DC supply
- Cross modulation and beats are flat-channel measurements, that is, measured with all channel outputs at the specified V_o.

CROSS-REFERENCE GUIDE FOR WIDEBAND HYBRID AMPLIFIER MODULES

INDUSTRIAL TYPE	PHILIPS REPLACEMENT	FREQUENCY (MHz)	GAIN (dB)
CA901	BGX885N	40 to 860	17
CA901A	BGX885N	40 to 860	17
CA922	BGD885	40 to 860	17
CA922A	BGD885	40 to 860	17
D5540185	BGD502	40 to 550	18
D7540185	BGD702	40 to 750	18
D7540200	BGD704	40 to 750	20
D8640185	BGD802	40 to 860	18
MC7852	BGY885A	40 to 860	18
MC7856	BGY887	40 to 860	22
MC7862	BGD802	40 to 860	18
MHW1134	BGY61	5 to 200	13
MHW1184	BGY65	5 to 200	18
MHW1224	BGY67	5 to 200	22
MHW1244	BGY67A	5 to 200	24
MHW1304L	BGY68	5 to 75	30
MHW5182A	BGY85A	40 to 450	18
MHW5222A	BGY87	40 to 450	22
MHW5342T	BGY88	40 to 450	34
MHW5382A	BGY86	40 to 450	38

Wideband Hybrid Amplifier Modules for CATV

Selection guide

INDUSTRIAL TYPE	PHILIPS REPLACEMENT	FREQUENCY (MHz)	GAIN (dB)
MHW6142	BGY583	40 to 550	14
MHW6182	BGY585A	40 to 550	18
MHW6185B	BGD502	40 to 550	18
MHW6222	BGY587	40 to 550	22
MHW6272	BGY587B	40 to 550	27
MHW6342	BGY588	40 to 550	34
MHW6342T	BGY588	40 to 550	34
MHW7182B	BGY785A	40 to 750	18
MHW7185C	BGD702	40 to 750	18
MHW7185CR	BGD702MI	40 to 750	18
MHW7205C	BGD704	40 to 750	20
MHW7222	BGY787	40 to 750	22
MHW7222A	BGY787	40 to 750	22
MHW8142	BGY883	40 to 860	14
MHW8182B	BGY885A	40 to 860	18
MHW8185	BGD802	40 to 860	18
MHW8185R	BGD802MI	40 to 860	18
MHW8205	BGD804	40 to 860	20
MHW8222	BGY887	40 to 860	22
MHW9182B	BGY1085A	40 to 1000	18
R0605300L	BGY68	5 to 75	30
R2005240	BGY67A	5 to 200	24
S5540220	BGY587	40 to 550	22
S7540185	BGY785A	40 to 750	18
S7540215	BGY787	40 to 750	22

Wideband Hybrid Amplifier Modules for CATV

Replacement list

REPLACED/WITHDRAWN TYPES

The following type numbers were included in the previous issue of this data handbook, but are not in the current edition.

TYPE NUMBER	REASON FOR DELETION
BGD102	Replaced by BGD502
BGD601	Replaced by BGD602
BGE884	Replaced by BGX885N
BGY82	Replaced by BGY85
BGY584	Replaced by BGY585
BGY584A	Replaced by BGY585A
BGY681	Replaced by BGY683

Internet World Wide Web Home Page

WHAT IS IT?

Welcome to our place in cyberspace.

The Discretes Group now has its own home page within Philips Semiconductors. Explore our Web pages and take a look at our product offering of advance Discrete Applications and Products.

In addition we offer you the latest information on Products, News, Support, Employment and Offices.

HOW TO REACH US

For access to the Philips Semiconductors Home Page go to the World Wide Web location:

http://www.semiconductors.philips.com

You can find us in the Product category of Discretes.

GENERAL

QUALITY

Total Quality Management

Philips Semiconductors is a Quality Company, aiming towards one ultimate standard, that of Business Excellence. The tool we use in striving towards this goal is our Total Quality Management (TQM) system. The TQM is described in our Quality manuals, and is summarized in the following paragraphs. The Philips Business Excellence Programme as part of TQM follows the European Foundation for Quality Management (EFQM) model. The EFQM award is on the level of the Malcolm Baldridge award.

QUALITY ASSURANCE

Quality Assurance (QA) is based on ISO 9000 standards and customer standards such as QS-9000. Our factories are certified to ISO 9000 and QS-9000 by external inspectorates. Sales organizations and headquarters are also certified to ISO 9000. The products of Philips Semiconductors are in conformance with the requirements of international standards.

PARTNERSHIPS WITH CUSTOMERS

Partnerships with customers include Process Quality measurement co-operation (using PPM), design-in agreements, ship-to-stock, just-in-time, sharing technology roadmaps, a change notification programme, self-qualification programmes and application support.

PARTNERSHIPS WITH SUPPLIERS

Our suppliers are certified to ISO 9000 and participate in ship-to-stock programmes. Key-suppliers receive support and feedback through our Supplier Quality System (SQS) audits.

CONTINUOUS IMPROVEMENT PROGRAMME

The continuous improvement programme incorporates continuous process and system improvement, design improvement, complete use of statistical process control, and logistics improvement, driven by key performance indicators. To encourage improvement in teamwork a very popular Quality Improvement Competition is held yearly. With a large number of improvement teams participating, opportunities arise for the sharing of successful improvement ideas.

Advanced quality planning

During the design and development of new products and processes, quality is built-in by advanced quality planning. By means of failure-mode-and-effect analysis the critical parameters of a process are identified. Procedures are then laid down to ensure the highest level of performance for these parameters. The capability of process steps is also planned in this phase in preparation for production under statistical process control.

Quality network

Product quality is the responsibility of the Business Lines, with their Quality and Reliability (Q&R) departments operating in a supportive and controlling manner. The sales organization has Quality Managers who respond to any quality matters raised by customers. Customer complaints are then handled by direct contact between Sales Quality and the relevant Q&R department. General quality requirements are covered by a divisional Quality department.

Product conformance

The assurance of product conformance is an integral part of our Quality Assurance practice. This is achieved by:

- In-line Quality Assurance to monitor process reproducibility during manufacture. Equipment performance and 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. Periodic sample inspections to monitor and measure the conformance of products are increasingly being replaced by continuous in-line monitoring.
- Qualification tests.

The inspection and test requirements are detailed in the General Quality Specifications in the SNW-FQ-611 series.

Product reliability

Highly accelerated tests are implemented to evaluate and monitor product reliability. Rejects from reliability tests are subjected to failure analysis, so that improvements may be made. This analysis also extends to product related customer complaints.

Customer response

Our quality improvement depends on working together with our customer. We need our customer's input, and we therefore invite constructive comments on all aspects of our performance. For all such matters, please contact your local Philips Semiconductors sales representative.

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 $R_{th\ j\text{-}mb} > 15$ K/W and power types by $R_{th\ j\text{-}mb} \leq 15$ 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

O For optical 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 IEC in its publication number 60134.

Remark: It is common practice to use the Absolute Maximum Rating System in published semiconductor data sheets.

Definitions of terms used

ELECTRONIC DEVICE

An electronic tube or valve, transistor or other semiconductor device.

Remark: 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.

Remark: Limiting conditions may be either maxima or minima.

RATING SYSTEM

The set of principles upon which ratings are established and which determine their interpretation.

Remark: 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}.

Letter Symbols

General

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 terminal, followed by a number. In the case of multiple subscripts, hyphens may be necessary to avoid confusion.

Examples:

I_{B2} continuous (DC) current flowing into the second base terminal

$V_{B2\text{-}E}$ continuous (DC) voltage between the terminals of second base and emitter terminals.

Subscripts for multiple devices

For multiple unit devices, the subscripts are modified by a number preceding the letter subscript. In the case of multiple subscripts, hyphens may be necessary to avoid confusion.

Examples:

I_{2C} continuous (DC) current flowing into the collector terminal of the second unit

$V_{1C\text{-}2C}$ continuous (DC) voltage between the collector terminals of the first and second units.

Application of the rules

Fig.1 represents a transistor collector current as a function of time. It comprises a continuous (DC) current and a varying component.

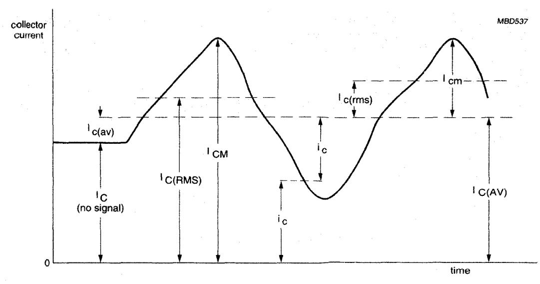


Fig.1 Collector current as a function of time.

Letter symbols for electrical parameters

DEFINITION

For the purpose of this publication, the term 'electrical parameter' applies to four-pole matrix parameters, elements of electrical equivalent circuits, electrical impedances and admittances, inductances and capacitances.

BASIC LETTERS

The following list comprises the most important basic letters used for electrical parameters of semiconductor devices.

B, b susceptance (imaginary part of an admittance)

C capacitance

G, g conductance (real part of an admittance)

H, h hybrid parameter

L inductance

R, r resistance (real part of an impedance)

X, x reactance (imaginary part of an impedance)

Y, y admittance

Z, z impedance.

Upper-case letters are used for the representation of:

- Electrical parameters of external circuits and of circuits in which the device forms only a part
- All inductances and capacitances.

Lower-case letters are used for the representation of electrical parameters inherent in the device, with the exception of inductances and capacitances.

SUBSCRIPTS

General subscripts

The following list comprises the most important general subscripts used for electrical parameters of semiconductor devices.

F, f	forward (forward transfer)
I, i (or 1)	input
L, l	load
O, o (or 2)	output
R, r	reverse (reverse transfer)
S, s	source.

Examples: Z_s, h_f, h_F.

The upper-case variant of a subscript is used for the designation of static (DC) values.

Examples:

h_{FE}	static value of forward current transfer ratio in common-emitter configuration (DC current gain)
R_E	DC value of the external emitter resistance.

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_{11}), h_o (or h_{22}), h_f (or h_{21}), h_r (or h_{12}).

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 Ω (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.1 and Fig.2). This means that an ‘ideal gain curve’ for the module is calculated and the flatness is the maximum deviation of this ‘ideal gain’ curve.

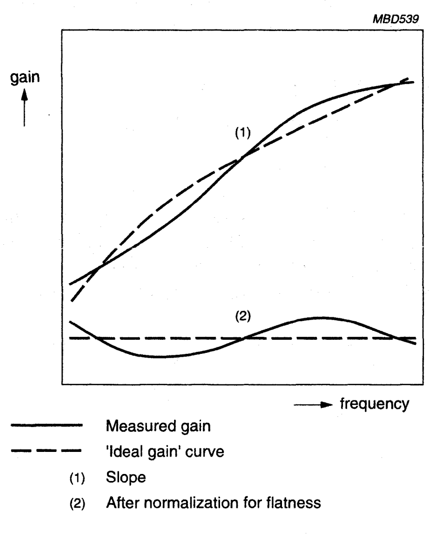


Fig.1 Gain curve before optimizing.

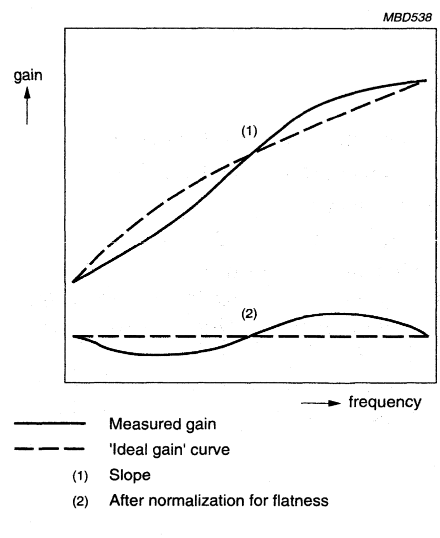


Fig.2 Gain curve after optimizing.

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:

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

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 ±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 = 3.1224×10^{-3}

b = 1.9932×10^{-6}

c = -8.934×10^{-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 45004-B 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.3).

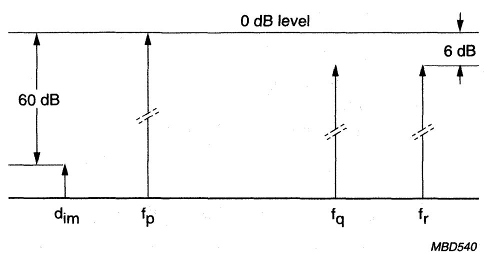


Fig.3 Intermodulation distortion.

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(1) 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 appoximates 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 4, 5 and 6).

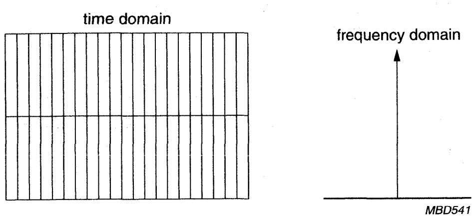


Fig.4 CW signal (sinewave), no other signals switched on.

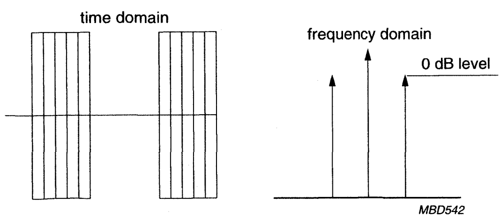


Fig.5 One signal switched on 100% modulated.

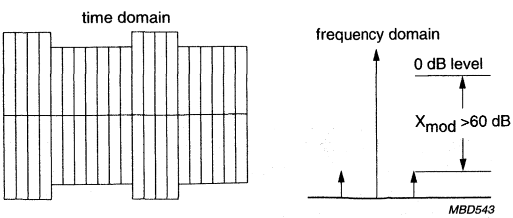


Fig.6 CW signal with X_{mod} distortion caused by other modulated signals.

MEASUREMENT

To measure X_{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(1). 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_{mod} distortion is to be measured, is not modulated. The X_{mod} distortion peak now appears as 15.75 kHz on the carrier.

The X_{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_{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

(1) The 15.75 kHz square wave modulation signal, used with X_{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) = $60 \times 525 \div 2$ = 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.

second order modulation product ($f_1 \pm f_2$) at the measuring frequency (see Fig.7).

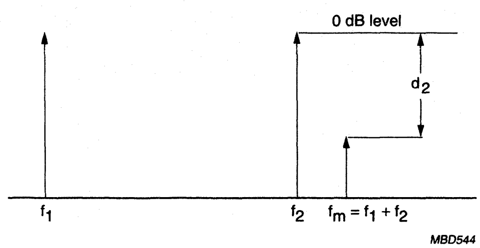


Fig.7 Second order distortion (d_2).

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
$f_m = f_1 \pm f_2$ or
$f_m = 2 \times f_1$ or
$f_m = 2 \times f_2$.

MEASUREMENT

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

During the measurement, all channels in the band are levelled to the specified V_o. 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.8).

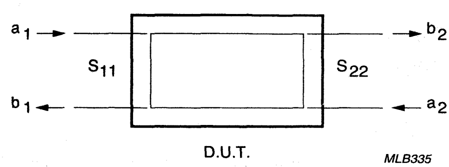


Fig.8 Two-port network with reflection coefficients S_{11} and S_{22}.

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

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

where:

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

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

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

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

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

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

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

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

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

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

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_{mod} and CSO measurements

RANGE	NAMES	FREQUENCIES (MHz)	CHANNELS
5 - 200 MHz 22 channels	T7 - T13 2 - 4 5 - 6 A - 7	7.00 - 43.00 55.25 - 67.25 77.25 - 83.25 121.25 - 175.25	7 3 2 10
40 - 300 MHz 32 channels	2 - 4 5 - 6 A2 A - F H - S W	55.25 - 67.25 77.25 - 83.25 109.25 121.25 - 151.25 163.25 - 271.25 295.25	3 2 1 6 19 1
40 - 450 MHz 52 channels	2 - 4 5 - 6 A2 A - F H - H14	55.25 - 67.25 77.25 - 83.25 109.25 121.25 - 151.25 163.25 - 397.25	3 2 1 6 40
40 - 450 MHz 60 channels	2 - 4 5 - 6 A - H22	55.25 - 67.25 77.25 - 83.25 121.25 - 445.25	3 2 55
40 - 550 MHz 77 channels	2 - 4 5 - 6 A - 27	55.25 - 67.25 77.25 - 83.25 121.25 - 547.25	3 2 72
40 - 600 MHz 85 channels	2 - 4 5 - 6 A - 35	55.25 - 67.25 77.25 - 83.25 121.25 - 595.25	3 2 80
40 - 750 MHz 110 channels	2 - 4 5 - 6 A - 60	55.25 - 67.25 77.25 - 83.25 121.25 - 745.25	3 2 105
			Continued on next page

APPENDIX E - TEST CHANNELS (CONTINUED)

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

RANGE	NAMES	FREQUENCIES (MHz)	CHANNELS
40 - 860 MHz	2	55.25	1
49 channels	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_{mod} and CSO measurements

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

APPLICATION INFORMATION

Using a Philips Optical Receiver in CATV Applications

Application note
AN98060

CONTENTS

Using a Philips Optical Receiver in CATV Applications

Application note AN98060

1 MECHANICAL OUTLINES, PINNING AND GLASSFIBER OF THE MODULE

1.1 Mechanical Outlines

Unconnectorized optical CATV receivers are encapsulated in a SOT115U outline. For a detail specification see Chapter "Package outline".

1.2 Pinning

The pinning of the BGE887BO is

PIN	DESCRIPTION
1	Voltage Monitor of the Photodiode Current (typ. 0.8 V/mW)
2	Common
3	Common
5	$+V_B$
7	Common
8	Common
9	75 Ω electrical output

1.3 Glassfiber

1.3.1 DIMENSIONS OF THE NKF GLASSFIBER

The optical input of the BGY887BO is a single mode glassfiber of NKF. This glassfiber is double coated.

The dimensions of this glassfiber are:

Nominal mode field diameter	9 – 10 µm ± 10%
Cladding diameter	125 µm ± 3 µm
Primary coating diameter	250 µm ± 15 µm
Secondary coating diameter	950 µm + 0 mm/–0.1 mm

The mechanical characteristics are:

Bending radius	min. 30 mm
Pulling force	max. 6 Newton

1.3.2 DIMENSIONS OF THE SIECOR GLASSFIBER

The optical input of the BGE887BO is a single mode glassfiber of Siecor (Corning SMF-28, type 1R41-31131-24). This glassfiber is double coated.

The dimension of this glassfiber are:

Nominal mode field diameter	9.3 µm ± 0.5 µm
Cladding diameter	125 µm ± 1 µm
Primary coating diameter	245 µm ± 10 µm
Secondary coating diameter	900 µm

The mechanical characteristics are:

Bending radius	min. 30 mm
Pulling force	max. 6 Newton

1.3.3 STRIPPING OF GLASSFIBER

The glassfibers used for optical receivers are double coated, so stripping of this glassfiber is a double activity. Stripping can be done mechanically:

1. Strip the secondary coating with a mechanical stripper. The diameter of this stripper (closed) must be 0.40 mm (Parts of ±1.5 cm length at once)
2. Strip the primary coating with a mechanical stripper. The diameter of this stripper must be 0.18 mm. The primary coating of the NKF glassfiber can also be removed by dissolving the coating with di-chlorine-methylene (CH2CL2).

Two mechanical strippers that can be used are:

1. Radikor fiber stripper, article no. 650952, type 3756, 0.40 mm red
2. Radikor fiber stripper, article no. 650956, type 3755, 0.18 mm blue.

These strippers can be ordered at:

Radikor Electronics B.V.
PO-box 50006
1305 AA Almere
The Netherlands
tel. +31 365 312 554
fax +31 365 312 465

Using a Philips Optical Receiver in CATV Applications

Application note
AN98060

2 SPECIFICATION:

In the specification of optical receivers, a table with characteristics is included where the main parameters of the device are mentioned. In this chapter, these characteristics are explained.

2.1 Responsivity

The responsivity of an optical receiver is defined as: $\text{responsivity} = \dfrac{\text{output voltage [V]}}{\text{input power of modulated light [W]}}$

The responsivity is given in voltage per Watt and can be calculated to Amperes/Watt and Watt/Watt as follows:

Responsivity [A/W] = Responsivity [V/W]/load impedance [Ω]

Responsivity [W/W] = Responsivity [V/W]^2/load impedance [Ω].

Measuring the responsivity of an optical receiver is determined with a network analyzer. First this analyzer is calibrated with a calibrated optical reference receiver, the HP83411C. This reference receiver has one optical input and two electrical outputs; a 50 Ω RF output and a DC output. The responsivity of the two outputs is given. The RF output responsivity is given in A/W and as function of frequency, the DC output has a responsivity of 2 V/W of the un-modulated light. After the calibration, the responsivity of an optical receiver is measured compared to the reference receiver.

The output impedance of an optical receiver is 75 Ω and the output of a calibrated reference receiver is 50 Ω. For calibration, an additional minimum loss pad is needed to convert the 50 Ω output impedance into 75 Ω. This minimum loss pad has an attenuation of 5.7 dB for power. When the calibration is done with a calibrated reference receiver, the calibration data has to be adapted for this minimum loss pad. The calibration data is given in A/W, so the current attenuation of the minimum loss pad has to be calculated:

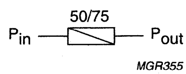


Fig.1 Minimum loss pad.

$$P_{in} = I_{in}^2 \times Z_{in}$$

$$P_{out} = I_{out}^2 \times Z_{out}$$

$$P_{out} = P_{in} - 5.7\text{ dB} = 0.269 \times P_{in} = 0.269 \times I_{in}^2 \times Z_{in}$$

$$I_{out}^2 \times Z_{out} = 0.269 \times I_{in}^2 \times Z_{in}$$

$$\frac{I_{out}}{I_{in}} = \sqrt{\left(\frac{0.269 \times Z_{in}}{Z_{out}}\right)} = \sqrt{\left(\frac{0.269 \times 50}{75}\right)} = 0.4236$$

The current attenuation of a minimum loss pad from 50 to 75 Ω is 20.Log(0.4236) = –7.46 dB.

The current attenuation of a minimum loss pad from 75 to 50 Ω is 20.Log(0.6353) = –3.94 dB.

The responsivity measurement of an optical receiver has to be corrected for the calibrated reference receiver (cal.ref.rec.) and the minimum loss pad.

Example:

Current attenuation minimum loss pad = –7.46 dB
50 MHz responsivity cal.ref.rec. = 0.44659 A/W = –7.00 dB
50 MHz measured responsivity DUT = 36 dB.

The network analyzer is calibrated as 'thru-line', with the calibrated reference receiver and minimum loss pad as thru-line. The measured 50 MHz responsivity has to corrected for this 'thru-line':

Responsitivity DUT	= measured resp	+	current att	+	responsivity cal.ref.rec.
	= 36 dB	+	–7.46 dB	+	–7.00 dB
	= 21.54 dB				
	= 11.93 A/W				
	= 895.5 V/W (in 75 Ω)				

2.2 Flatness Of The Frequency Response

The flatness of the response of an optical receiver is defined as the maximum deviation from an absolute flat response over a given frequency range, after the slope of the receiver over this frequency range has been optimized and equalized by means of a certain cable length to give the best result for flatness. This means that an 'ideal response curve' for the receiver is calculated and the flatness is the maximum deviation of this 'ideal response curve'.

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

$$\text{Responsivity} = R + C\sqrt{\left(\frac{f_x}{f_1}\right)}$$

where
R = constant
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 response curve best fits the measured response curve figures. The start value for C is calculated using the formula:

$$C_{start} = \frac{R_n - R_1}{\sqrt{\left(\frac{f_n}{f_1} - 1\right)}}$$

where
R_n = the measured response at the stop frequency
R_1 = the measured response at the start frequency
f_n = stop frequency.

The value of R is chosen so that the maximum positive deviation of the measured response from the 'ideal response curve' is the same as the maximum negative deviation. The value of C is adapted by ±0.001 dB until the 'ideal response curve' best fits the measured curve.

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

2.3 In- And Output Return Losses

The output return loss of an optical receiver is the measured S_{22} of the output of this module in dB. This S_{22} is the $-20 \log_{10}$ of the reflection coefficient, which indicates the matching between the output impedance and the characteristic impedance of 75 Ω.

The input return loss of an optical receiver is the optical back reflection of the photodiode, measured at the fiber. At a level of –45 dB input reflection, 0.56% of the total light is reflected back into the fiber.

2.4 Second Order Distortion

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. The second order distortion of an optical receiver is measured with two lasers. Both lasers are modulated with a CW carrier, which together cause a distortion product at the measurement frequency. For the second order measurement of an optical receiver, the settings are related to the optical input signal; the optical un-modulated input power and the modulation index.The measurement starts with a calibration. First one laser is modulated with a CW signal of the measurement frequency. The optical power level and modulation index are equal to the ones used for the distortion frequencies. The output power at the measurement frequency is set as 0 dB level. During measurement, the two lasers are modulated by a CW carrier. The distortion is measured by measuring the distance between the 0 dB level and the power level at the measurement frequency.

Example:

$P_{optical}$	= 0.5 mW per laser
$m_{odulation\ index}$	= 40%
f_1	= 135 MHz
f_2	= 189.25 MHz
$f_{measurement}$	= 324.25 MHz

- Two lasers are set at an (DC) optical output power level of 0.5 mW each
- One laser is modulated for 40% with 324.25 MHz
- The output power measured at 324.25 MHz is set as 0 dB level.

After this calibration:

- Two lasers are modulated for 40% with 135 and 186.25 MHz respectively
- The distortion power is measured at the frequency $f_1 + f_2 = 324.25$ MHz compared to the 0 dB level. This distance is the second order distortion.

2.5 Third Order Distortion

The third 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 three CW signals with their third order modulation product ($f_1 + f_2 - f_3$) at the measuring frequency. The third order distortion of an optical receiver is measured with three lasers. These lasers are modulated with a CW carrier, which together cause a distortion product at the measurement frequency. For the third order measurement of an optical receiver, the settings are related to the optical input signal; the optical un-modulated input power and the modulation index. The measurement starts with a calibration. First one laser is modulated with a CW signal of the measurement frequency. The optical power level and modulation index are equal to the ones used for the distortion frequencies. The output power at the measurement frequency is set as 0 dB level. During measurement, the three lasers are modulated by a CW carrier. The distortion is measured by measuring the distance between the 0 dB level and the power level at the measurement frequency.

Example:

$P_{optical}$	= 0.33 mW per laser
$m_{odulation\ index}$	= 40 %
f_1	= 326.25 MHz
f_2	= 333.25 MHz
f_3	= 335.25 MHz
$f_{measurement}$	= 324.25 MHz

- Three lasers are set at a (DC) optical output power level of 0.33 mW each respectively
- One laser is modulated for 40% with 324.25 MHz
- The output power measured at 324.25 MHz is set as 0 dB level.

After this calibration:

- Three lasers are modulated for 40% with 326.25, 333.25 and 335.25 MHz
- The distortion power is measured at the frequency $f_1 + f_2 - f_3$ = 324.25 MHz compared to the 0 dB level. This distance is the third order distortion.

2.6 Total Current Consumption

The total current consumption I_{tot} is the total DC current consumption of an optical receiver when a DC voltage supply of 24 V is applied.

2.7 Equivalent Input Noise

The schematic of the measurement set-up to measure the equivalent input noise of the optical receiver is given in Fig.2:

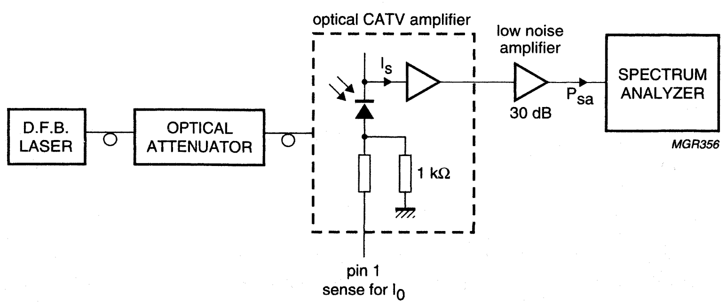


Fig.2 Equivalent input noise measurement set-up.

The total noise power measured at the spectrum analyzer (P_{sa}) consists out of three parts:

P_{sa} = Laser noise + Photodiode shot noise + Optical receiver noise (thermal).

The noise power at the spectrum analyzer is frequency dependent. This noise power can be calculated with:

$$P_{sa} = \left(RIN \cdot I_0^2 + 2 \cdot I_0 \cdot e + I_n^2 \right) \cdot B \cdot Rd \quad [W] \tag{1}$$

Where:

P_{sa}	= noise power measured at the spectrum analyzer	[W]
RIN	= relative intensity noise of the laser source	[dB/Hz]
I_0	= DC detector current (= $V_{pin\ 1}/1\ k\Omega$)	[A]
e	= 1.6E-19	[Coulomb = A/Hz]
I_n	= receiver equivalent input noise current	[A/√Hz]
B	= resolution bandwidth of spectrum analyzer	[Hz]
Rd	= responsivity of the opt. CATV ampl. = $\frac{P_{sa}}{I_s^2}$	[Ω]

Out of this noise power measurement, the receiver equivalent input noise can be calculated, which is also frequency dependent. For this calculation, a few assumptions are made:

- RIN of the used laser > 160 dB/Hz (DFB laser)
- The responsivity of the DUT is constant over the used optical input span
- No optical reflections in the used measurement equipment (< –60 dB)
- The noise floor of the used spectrum analyzer is much lower than the receiver noise (use a good pre-amplifier if necessary, as given in the schematic of the measurement equipment).

2.7.1 MEASUREMENT

1. Measure the P_{sa} with no optical input signal (I_0 = 0 mA, $V_{pin\ 1}$ = 0 V). The measured power is the receiver noise power
2. Adjust the optical power of the laser to the maximum value which will be used (e.g. 2 mW), at this level the RIN of the laser source should be better than 160 dB/Hz
3. Set the optical attenuator at 0 dB loss
4. Measure the P_{sa} for minimally four different optical input powers by adjusting the optical attenuator (e.g. 0.2, 1, 1.5 or 2 mW) and measure the corresponding I_0 by measuring the $V_{pin\ 1}/1\ k\Omega$. The RIN of the laser stays constant in this measurement because the laser current has not been changed. The measurement results in the P_{sa} as function of I_0.

2.7.2 CALCULATION

To calculate the receiver equivalent input noise, a help function has been defined:

$$Y(I_0) = \left(\frac{P_{sa}(I_0) - P_{sa}(0)}{I_0}\right) = (RIN \cdot I_0 + 2 \cdot e) \cdot B \cdot Rd \quad (2)$$

$Y(I_0)$ can be calculated for the measured P_{sa} values and plotted as function of I_0 (dotted points):

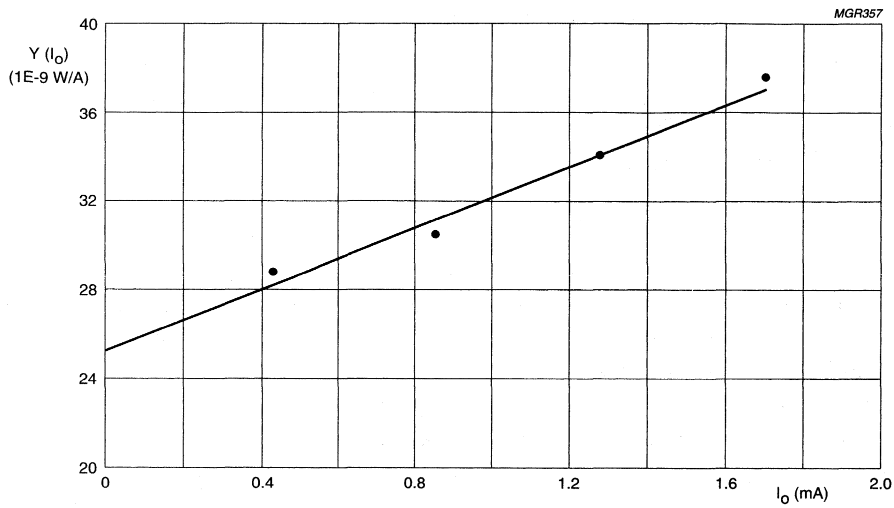


Fig.3 $Y(I_0)$ versus I_0.

With this graph, the value for Y(0) ($I_0 = 0$) can be found.

For $I_0 = 0$ (no optical input signal):

$P_{sa}(0) = I_n^2 \cdot B \cdot Rd$ (see (1)) and $Y(0) = 2 \cdot e \cdot Rd \cdot B$ (see (2)).

These two formulas combined give the formula to calculate the receiver equivalent input noise (EIN):

$$I_n = \sqrt{\left(\frac{2 \cdot e \cdot P_{sa}(0)}{Y(0)}\right)} \ [A/\sqrt{Hz}]$$

where:

P_{sa} = the measured noise power at the spectrum analyzer without an optical input signal

Y(0) = the I_0 value out of the graph $Y(I_0)$ versus I_0

I_n = the receiver equivalent noise current.

3 MONITOR CURRENT PIN

An optical signal which is applied to a reverse biased photodiode will generate electron-hole pairs, resulting in a current. The ratio between the optical input signal and the current out of the photodiode is the responsivity of a photodiode. This responsivity depends on the used wavelength, the so called spectral sensitivity. The photodiodes used in Philips optical receivers have a minimum responsivity of 0.85 A/W at 1310 nm. Pin 1 of the Philips optical receivers can be used to monitor the un-modulated optical input power (DC). The design of these receivers is such that the DC current out of the photodiode flows into a 1 kΩ transfer resistor. Via a 10 kΩ resistor the voltage drop over the transfer resistor can be measured with a high ohmic voltmeter (> 10 MΩ, low ohmic will influence the voltage drop). Because of the use of a 1 kΩ transfer resistor, the monitor current pin will have a typical output voltage of 0.85 V/mW.

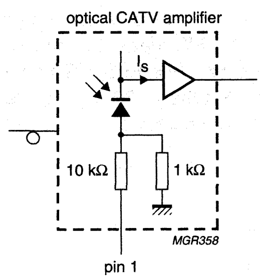


Fig.4 The monitor current pin.

The pin 1 output voltage is dependent on several items:

P_{opt} = Optical input power at the receiver
Resp = Responsivity of the used photodiode
$R_{transfer}$ = Value of the transfer resistor

The optical input power can be measured with an optical power meter at a surface where the optical link can be separated and connected to this meter. The loss after this point (connector loss), has to be subtracted of the measured optical power. The loss of a connector is maximally 0.5 dB. The responsivity of the used photodiodes is specified as > 0.85 A/W. The transfer resistor is developed for 1 kΩ. The accuracy of this substrate resistor is ±1%. After the assembly of the total receiver, this accuracy is decreased to 1000 Ω ±10% due to different temperature steps.

The pin 1 accuracy is:

$V_{pin\ 1}$ = (P_{opt} − Connector loss) × Resp × $R_{transfer}$
$V_{pin\ 1\ min}$ = $P_{opt} \times 0.891 \times 0.85 \times 900$ = 0.68 V/mW (0.77 V/mW without any connector loss)
$V_{pin1\ max}$ = $P_{opt} \times 1 \times 0.95 \times 1100$ = 1.05 V/mW (0.93 V/mW with 0.5 dB connector loss)

All Philips optical receivers are checked on pin 1 voltage between 0.75 and 1 V/mW.

4 OPTICAL CATV RECEIVER TEST SETUP

The schematic diagram of the optical CATV receiver test set-up, which is used by Philips, is given at the next page. At the left side of this diagram, three lasers are placed, biased via three laser power supplies. The three lasers can be modulated by three RF-generators which is needed to measure **d2 and d3**. The input of one laser can be switched to either the output of the RF-generator or to port one of the S-parameter test set. This allows measuring the **responsivity**. The light of the lasers is combined by two 'splitter/combiners' and applied to the input of the adjustable optical attenuator. After the optical attenuator, the light is splitted into a 5% and a 95% part. The 5% part is used to adjust and monitor the optical (DC) light, available at the 95% output of the splitter. The ratio between the 5% and 95% output of the splitter is measured and added as correction factor in the optical power meter. The 95% output of the splitter is connectorized and can be connected to the calibrated optical reference receiver (CORR) or to the device under test (DUT). The output of the CORR can be connected to a power meter to adjust the optical modulated light for the **d2 and d3** measurement. The output of the CORR can also be connected to port 2 of the S-parameter test-set to calibrate for the **responsivity** measurement. After calibration, the 95% output of the splitter is connected to the DUT. With a multimeter, the pin 1 voltage of the DUT can be measured, needed for the **EIN** measurement. The output of the DUT can be switched to port 2 of the S-parameter test-set to measure the **responsivity and S_{22}**. The output of the DUT can also be connected to the input of a spectrum analyzer to measure **d2 and d3**. When a 30 dB amplifier is connected between the output of the DUT and input of the spectrum analyzer, the **EIN** can be measured.

The equipment which is used is:

- 3 lasers CQF94/D from Philips
- 3 RF-generators HP8657A from Hewlett-Packard
- 3 laser power supplies PLPS2000 from Philips
- 3 splitter/combiners from Gould (50/50%, 30/70% and 5/95% ratio)
- An adjustable optical attenuator HP8156A from Hewlett-Packard
- An optical power meter HP8153A from Hewlett-Packard
- A calibrated optical reference receiver HP83411C from Hewlett-Packard
- A spectrum/network analyzer HP4396A from Hewlett-Packard
- A 75 Ω S-parameter test-set HP85046B from Hewlett-Packard
- A 30 dB low noise amplifier, several 50 and 75 Ω switches, 50/75 Ω minimum loss pads, multimeters, a power supply, relay actuator and a computer for automated measurement.

Using a Philips Optical Receiver in CATV Applications

Application note AN98060

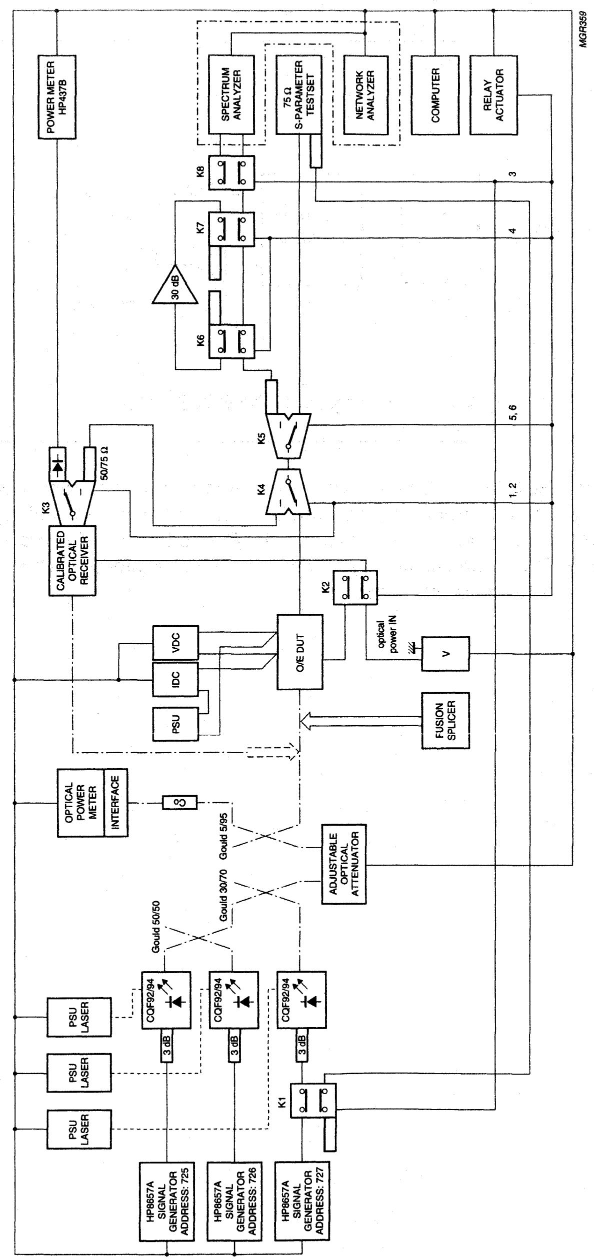


Fig.5 Optical receiver test setup.

5 BGE887BO CIRCUIT DIAGRAM

The BGE887BO circuit diagram is given in Fig.6.

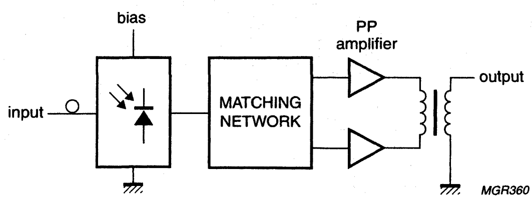


Fig.6 Circuit diagram of the BGE887BO.

The photo-diode at the input of a BGE887BO transducers the light into electrical current. The matching networks matches the photo-diode to the push-pull amplifiers. The transformers used in this matching network amplify the photo-diode current. This matching network has been patented by Philips Semiconductors, number PHN 14.489. The push-pull amplifiers are standard CATV amplifiers with a standard output transformer. The total gain of the push-pull amplifier, including the matching network, is ±21.5 dB.

Using a Philips Optical Receiver in CATV Applications

Application note AN98060

6 OUTPUT VOLTAGE CALCULATION

An optical CATV receiver converts amplitude modulated optical light into an electrical RF signal. This chapter describes how to calculate this conversion.The output voltage of an optical CATV receiver can be calculated with the formula:

Output Voltage (peak) = Responsivity × Optical Input Power × m

Where:

Output voltage	=	The electrical output voltage in 75 Ω, at the output of the optical CATV receiver module, given in (m)V
Responsivity	=	The conversion ratio of an optical CATV receiver module, given as electrical output voltage per optical input power (V/W)
Optical input power	=	The unmodulated optical power at the input of the optical CATV receiver module, given in (m)W
Modulation index	=	The amplitude modulation index of the optical input signal, given in percentage

Example:

A practical situation is:
Optical input power is 1 mW (0 dBm).
Modulation index m = 5%.
Responsivity = 900 V/W (the typical responsivity of the BGE887BO).

Output Voltage (peak) = Responsivity × Optical Input Power × m

$Vout(peak) = R \times P_{optical} \times m$

$Vout(peak) = 900 \times 1E\text{-}3 \times 0.05$

$Vout(peak) = 45\ mV$

$Vout(average) = Vout(peak)/\sqrt{2}$

$Vout(average) = 45/\sqrt{2} = 31.8\ mV$

$Vout(dBmV) = 20\log(31.8) = 30\ dBmV.$

For any other input power and/or modulation index the output voltage can be calculated similarly.

The calculation of the responsivity from V/W into A/W and W/W is given below:

Responsivity [A/W] = Responsivity [V/W]/Load impedance (75 Ω)

Responsivity [W/W] = Responsivity $[V/W]^2$/Load Impedance (75 Ω).

7 CARRIER TO NOISE RATIO CALCULATION

The carrier to noise ratio of an optical link (from laser to the output of the receiver) can be determined by the following equation: $\frac{C}{N} = \frac{0.5 \cdot m^2 \cdot I_{pd}^2}{2 \cdot e \cdot I_{pd} \cdot B + RIN \cdot I_{pd}^2 \cdot B + I_n^2 \cdot B}$

Where:

m	= modulation index optical input signal
I_{pd}	= photodiode current (= V_{pin1}/1 k)
e	= 1.6×10^{-19} (C = A/Hz)
B	= bandwidth (= 5 MHz)
RIN	= relative intensity noise of the laser (dB/Hz)
I_n	= equivalent input noise optical receiver (pA/Hz)

Example:

m	= 5%
I_{pd}	= 1 mA ($V_{pin\ 1}$ = 1 V)
e	= 1.6×10^{-19} (C)
B	= 5×10^{6} Hz
RIN	= 3.2×10^{-16} (1/Hz) (= −155 dB/Hz)
I_n	= 7 pA/√Hz

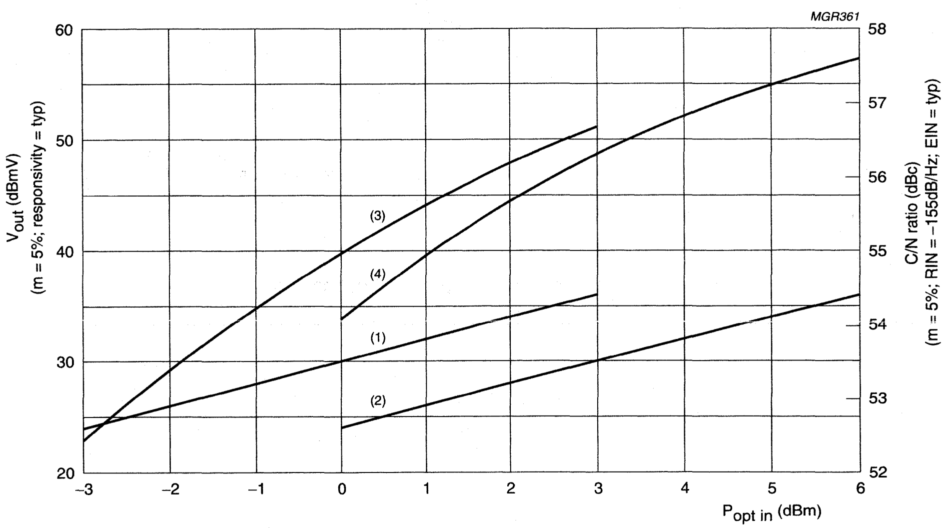
$$\frac{C}{N} = \frac{0.5 \cdot (0.05)^2 \cdot \left(1 \cdot 10^{-3}\right)^2}{2\left(1.6 \cdot 10^{-19}\right) \cdot \left(1 \cdot 10^{-3}\right) \cdot \left(5 \cdot 10^{6}\right) + \left(3.2 \cdot 10^{-16}\right) \cdot \left(1 \cdot 10^{-3}\right)^2 \cdot \left(5 \cdot 10^{6}\right) + \left(7 \cdot 10^{-12}\right)^2 \cdot \left(5 \cdot 10^{6}\right)}$$

$$\frac{C}{N} = -55.6 \text{ dBc}$$

8 BGE887BO AND BGE883BO APPLICATION CONSIDERATIONS

The BGE887BO has been designed for an optical input power of around 0 dBm. Because higher optical input powers are getting more important, Philips designed the BGE883BO. In this chapter the differences between the BGE883BO and BGE887BO are explained. The BGE887BO has been designed for the optical input power range between –3 and +3 dBm. At higher input powers, the second and third order intermodulation of the BGE887BO is limiting for normal use. The noise of the BGE887BO is not important at those levels.The BGE883BO has been designed for an optical input power range between 0 and 6 dBm (3 dB higher than the BGE887BO). The intermodulation behaviour of this module is improved. The noise of this module is higher, but at these levels not limiting. The BGE883BO has 6 dB less responsivity, >400 V/W in stead of 800 V/W. The output return-loss of this module has been improved significantly. For the optical input range between 0 and 3 dBm both modules can be used. It is dependent of the application, which one is preferred.

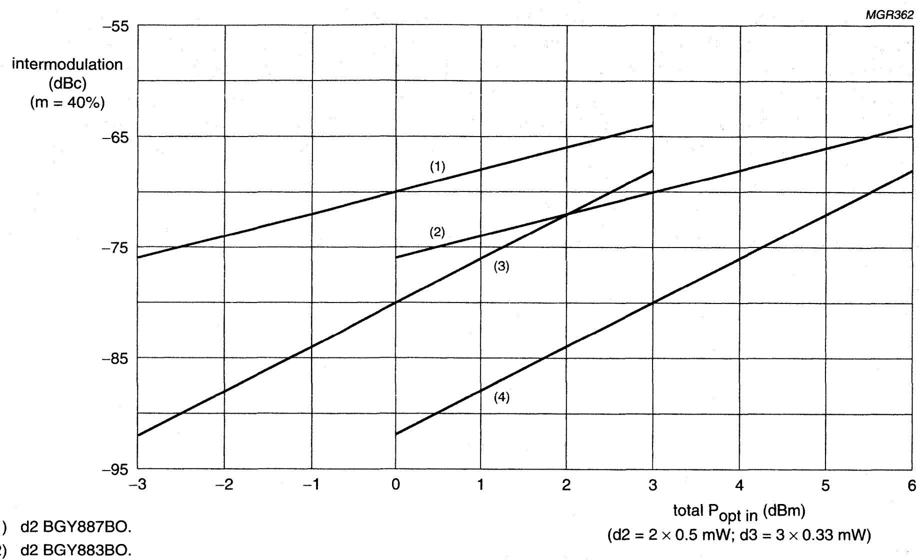
In Fig.7, a graph is given of the output voltage of the module versus the optical input power and also the carrier to noise ratio versus the optical input power. The output voltage of the two modules is just shifted with 3 dB of input power. The C/N ratio is also shifted but has also an other shape.



(1) V(out)BGE887BO.
(2) V(out)BGE883BO.
(3) C/N BGE887BO.
(4) C/N BGE883BO.

Fig.7 V(out) and C/N ratio versus P(optical in).

In Fig.8, a graph is given of the d2 and d3 intermodulation versus the optical input power. These d2 and d3 of the two modules are just shifted with 3 dB of input power.



(1) d2 BGY887BO.
(2) d2 BGY883BO.
(3) d3 BGY887BO.
(4) d3 BGY883BO.

Fig.8 d2 and d3 versus P (optical input).

9 MULTI CHANNEL MEASUREMENTS

CATV amplifiers are specified on multichannel behaviour. The number of channels used for measurements is dependent on the application. Measurements are done with multichannel equipment which has a generator for each channel. Doing multichannel measurements on optical CATV receivers requires a big number of lasers. One laser for each channel is needed to prevent that distortion of the laser is added to the measurement results. This is a very expensive way of measuring. Another option is using one linear laser and doing two multi channel measurements with one setting of the laser by using an optical attenuator. After these two measurements, the total power of the measured multichannel measurement can be divided in the distortion power of the laser and the distortion power of the optical CATV receiver. An example of this way of measurement and calculation of distortion is given in Section 9.1.

9.1 Calculation of the BGE887BO CTB Figure

The method of calculating the CTB figure of an optical CATV receiver is explained with the help of an example. The CTB, of the total measurement system, is measured twice; test 1 and test 2.

When the input power and the responsivity of the optical CATV receiver are known, the total CTB power at the output can be calculated:

Table 1

	TEST 1	**TEST 2**
Input Power: • Poptical • Modulation index • Poptical (average) 1 carrier	1.8 dBm 1.5 mW 3.5% $1.5E\text{-}3 \times 0.035 \times (1/\sqrt{2})$ = 37.1E-6 W = 37.1 μW	–3 dBm 0.5 mW 3.5% $0.5E\text{-}3 \times 0.035 \times (1/\sqrt{2})$ = 12.4E-6 W = 12.4 μW
Output Power: BGE887BO: responsivity = 900 V/W Vout 1 carrier:	 = 37.1E-6 × 900 = 33.4 mV = 30.5 dBmV = –18.3 dBm	 = 12.4E-6 × 900 = 11.1 mV = 20.9 dBmV = –27.8 dBm
CTB Power (319.25 MHz) CTB Pout	 = –63.5 dBc = –18.3 – 63.5 = –81.8 dBm = 6.607E-9 mW	 = –66.0 dBc = –27.8 – 66 = –93.8 dBm = 0.417E-9 mW

The CTB product at the output of the receiver is the product of the amplified input CTB and the CTB distortion of the receiver BGE887BO. At test 1, the total CTB power at the output of the BGE887BO is:

$$CTB_{total(1)} = (CTB_{transmitter} \times \text{responsivity}) + (CTB_{module}) \qquad (3)$$

When the input signal is attenuated optically, the CTB distance of the input CTB stays the same. The amplified input CTB will also be the same in distance but the absolute power of this signal is lower; –9.6 dB at test 2 compared to test 1. The added CTB of the receiver BGE887BO is 19.2 dB lower in distance and 28.8 dB lower in absolute output power (when an output signal is attenuated with x dB, the third order distortion product is 3x dB lower). At test 2 the total output CTB power is: (compared with test 1, in terms of the used powers at that formula).(1)

$$CTB_{total(2)} = ((CTB_{transmitter} \times responsivity) - 9.6\ dB) + (CTB_{module} - 28.8\ dB) \quad (4)$$

$$= ((CTB_{transmitter} \times responsivity) \times 0.11) + (CTB_{module} \times 0.0013)$$

In numbers that is:

$CTB_{total(1)} = 6.607E\text{-}9\ mW = (CTB_{transmitter} \times responsivity) + (CTB_{module})$

$CTB_{total(2)} = 0.417E\text{-}9\ mW = 0.11(CTB_{transmitter} \times responsivity) + 0.0013\ (CTB_{module})$

Or:

$$CTB_{total(1)} = 6.607E\text{-}9\ mW = (CTB_{transmitter} \times responsivity) + (CTB_{module}) \quad (5)$$

$$9.09 \times CTB_{total(2)} = 3.791E\text{-}9 = 1\ (CTB_{transmitter} \times responsivity) + 0.0118\ (CTB_{module}) \quad (6)$$

Subtracting equation (5) from (6) leads to:

$CTB_{total(1)} - \{9.09 \times CTB_{total(2)}\} = 2.816E\text{-}9\ mW = 0.9882\ (CTB_{module})$

$CTB_{module} = 2.850E\text{-}9\ mW$

Substitution in equation (5) yields:

$CTB_{transmitter} \times responsivity = 3.757E\text{-}9\ mW$ (@ test 1)

All these powers in mW, are given in Table 2 in dBm. The input signal of 1 carrier is also given in dBm, so the several CTB figures can be calculated in dBc. The different CTB products are:

(1) CTB is a third order distortion product, so CTB decreases three times faster than the input power.

Table 2

	TEST 1	TEST 2
Pout carrier	–18.3 dBm	–27.8 dBm
Pout (CTB trans. × resp.)	3.757E-9 mW –84.3 dBm	0.413E-9 mW –93.8 dBm
Pout (CTB module)	2.85OE-9 mW –85.5 dBm	3.7E-12 mW –114.3 dBm
Pout (CTB total)	6.607E-9 mW –81.8 dBm	0.417E-9 mW –93.8 dBm
Input CTB Module CTB Total CTB	–66.0 dBc –67.2 dBc –63.5 dBc	–66.0 dBc –86.5 dBc –66.0 dBc

As shown in the table above, the input CTB (CTB of the transmitter) is already high. The BGE887BO also has a contribution in the CTB. To measure the CTB of the receiver accurately, the input CTB must be more than 10 dB better than the CTB of the receiver. This can be done by:

- Decreasing the number of channels
- Using a more linear laser
- Using a laser with an optical isolator.

Remark: take care that the optical connections don't have a bad optical back reflection (reflections into the laser!).

9.2 Calculation of the BGE887BO CSO Figure

The CSO can be calculated in the same way as done with the CTB calculation. The method of calculating the CSO figure of an optical CATV receiver is also explained with the help of the same example. The CSO, of the total measurement system, is measured twice; test 1 and test 2.

When the input power and the responsivity of the optical CATV receiver are known, the total CSO power at the output can be calculated:

Table 3

	TEST 1	TEST 2
Input Power: • Poptical • Modulation index • Poptical (average) 1 carrier	1.8 dBm 1.5 mW 3.5% 1.5E-3 × 0.035 × (1/√2) = 37.1E-6 W = 37.1 μW	–3 dBm 0.5 mW 3.5% 0.5E-3 × 0.035 × (1/√2) = 12.4E-6 W = 12.4 μW
Output Power: BGE887BO: responsivity = 900 V/W Vout 1 carrier:	= 37.1E-6 × 900 = 33.4 mV = 30.5 dBmV = –18.3 dBm	= 12.4E-6 × 900 = 11.1 mV = 20.9 dBmV = –27.8 dBm
CSO Power (319.25 MHz) CSO Pout	= –64.8 dBc = –18.3 – 64.8 = –83.1 dBm = 4.898E-9 mW	= –65.5 dBc = –27.8 – 65.5 = –93.3 dBm = 0.468E-9 mW

The CSO product at the output of the receiver is the product of the amplified input CSO and the CSO distortion of the receiver BGE887BO. At test 1, the total CSO power at the output of the BGE887BO is:

$$CSO_{total(1)} = (CSO_{transmitter} \times \text{responsivity}) \times (CSO_{module}) \qquad (7)$$

When the input signal is attenuated optically, the CSO distance of the input CSO stays the same. The amplified input CSO will be the same in distance but the absolute power of this signal is lower; –9.6 dB at test 2 compared with test 1. The added CSO of the receiver BGE887BO is 9.6 dB lower in distance and 19.2 dB lower in absolute output power (when an output signal is attenuated with x dB, the second order distortion product is 2× dB lower).

At test 2 the total output CSO power is: (compared with test 1, in terms of the used powers at that formula)(1)

$$CSO_{total(2)}$$

$$= ((CSO_{transmitter} \times \text{responsivity}) - 9.6\ \text{dB}) + (CSO_{module} - 19.2\ \text{dB}) \qquad (8)$$

$$= ((CSO_{transmitter} \times \text{responsivity}) \times 0.11) + (CSO_{module} \times 0.012)$$

In numbers that is:

$CSO_{total(1)} = 4.898\text{E-}9\ \text{mW} = (CSO_{transmitter} \times \text{responsivity}) + (CSO_{module})$

$CSO_{total(2)} = 0.468\text{E-}9\ \text{mW} = 0.11\ (CTB_{transmitter} \times \text{responsivity}) + 0.012(CTB_{module})$

(1) CSO is a second order distortion product, so CSO decreases twice times faster than the input power.

Or:

$$CSO_{total(1)} = 4.898E\text{-}9\ mW = (CSO_{transmitter} \times responsivity) + (CSO_{module}) \tag{9}$$

$$9.09 \times CSO_{total(2)} = 4.255E\text{-}9\ mW = 1\,(CSO_{transmitter} \times responsivity) + 0.109\,(CSO_{module}) \tag{10}$$

$CSO_{total(1)} - \{9.09 \times CSO_{total(2)}\} = 0.643E\text{-}9\ mW = 0.891(CSO_{module})$

$CSO_{module} = 0.722E\text{-}9\ mW$

Substitution in equation (9) yields:

$CSO_{transmitter} \times responsivity = 4.179E\text{-}9\ mW$ (@ test 1)

All these powers in mW, are given below in dBm. The input signal of 1 carrier is also given in dBm, so the several CSO figures can be calculated in dBc. The different CSO products are:

Table 4

	TEST 1	TEST 2
Pout carrier	–18.3 dBm	–27.8 dBm
Pout (CSO trans. × resp.)	4.179E-9 mW –83.8 dBm	0.459E-9 mW –93.4 dBm
Pout (CSO module)	0.722E-9 mW –91.4 dBm	8.66E-12 mW –110.6 dBm
Pout (CSO total)	4.898E-9 mW –83.1 dBm	0.468E-9 mW –93.3 dBm
Input CSO Module CSO Total CSO	–65.5 dBc –73.1 dBc –64.8 dBc	65.6 dBc 82.8 dBc 65.5 dBc

As shown in Table 4, the input CSO (CSO of the transmitter) is already high. The BGE887BO also has a contribution in the CSO. To measure the CSO of the receiver accurately, the input CSO must be more than 10 dB better than the CSO of the receiver. This can be done by:

- Decreasing the number of channels
- Using a more linear laser
- Using a laser with an optical isolator.

Remark: take care that the optical connections don't have a bad optical back reflection (reflections into the laser!).

10 INPUT DYNAMIC RANGE

The photo-diodes used in the Philips optical CATV receivers can handle a maximum input power of 5 mW = 7 dBm, without any damage or degradation of the photodiode.

10.1 $V_{pin\ 1}$ versus Input Power

In Fig.9, the pin 1 monitor voltage is given as function of the optical input power.

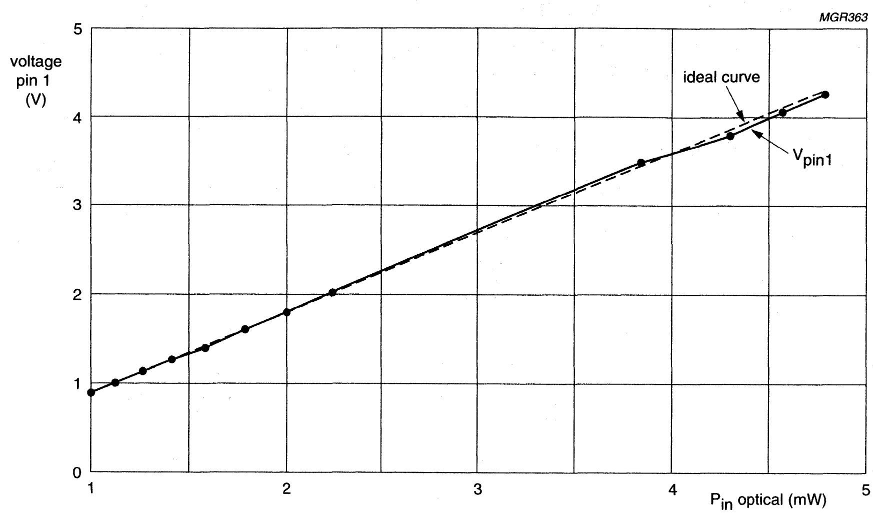


Fig.9 BGE887BO $V_{pin\ 1}$ versus Pin.

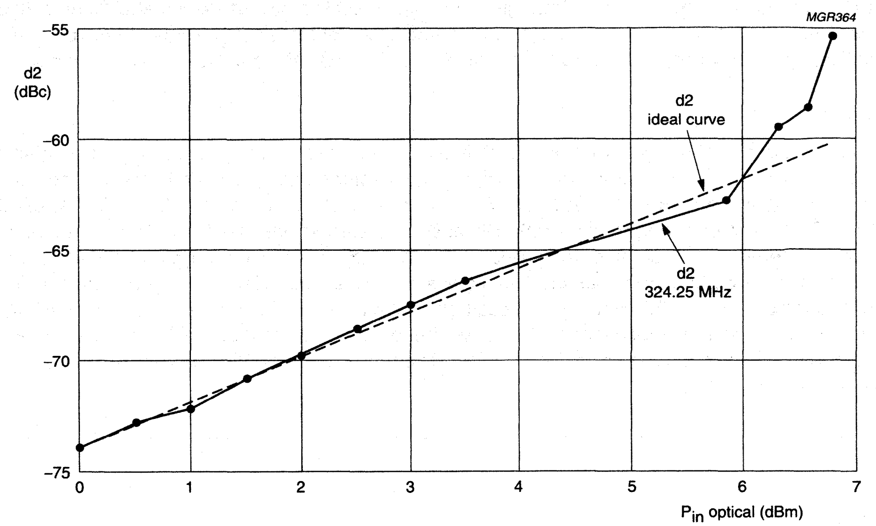
The pin 1 voltage is linear with the optical input power between 1 and 5 mW.

Using a Philips Optical Receiver in CATV Applications

Application note AN98060

10.2 D2 versus Input Power

In Fig.10, the second order distortion is given as function of optical input power.



m = 40% each laser.

Fig.10 BGE887BO d2 versus Pin.

The second order distortion is linear with the optical input power between 0 and 6 dBm. Above 6 dBm, the optical CATV receiver becomes non-linear because the reverse voltage decreases too much. The reverse biasing of the photo diode is done via two 1 kΩ resistors. 6 dBm optical input power gives a voltage decrease of 8 V (6 dBm = 4 mW ≈ 4 mA), which brings the photo-diode in the non-linear region.

11 OPTICAL CONNECTORS

Optical connectors are used to get the light out of one glassfiber into an other glassfiber. For CATV applications, single mode glassfiber is used. The nominal mode field diameter of these fibers (that part of the glassfiber which is used to transport the light) is 9 – 10 μm. Because of this small diameter, a precise mating of the two glassfiber end faces is needed to get all the light from one glassfiber into the other glassfiber. Another problem with glassfiber is reflection of light when the transport medium changes, e.g. from glass into air. Reflection means losses and there is also a chance that light gets back into the laser which influence the proper functioning of the laser. To solve these problems as much as possible, specific high quality connectors are used. Philips supplies FC/APC and SC/APC connectors.

11.1 APC-Ferrules

In an optical connector, the end of the glassfiber is placed in a ferrule, a ceramic or glass bush to fix the glassfiber within the mechanical outline. The last three characters of the optical connector names are used to specify the end face of this ferrule of the connector. The characters APC stand for Angled Physical Contact. The end of the ferrule used in the FC/APC and SC/APC connectors is angled; 8° ± 0.5°. Because of this angle, less light is reflected into the glassfiber when the glassfiber is open-ended (optical return loss is minimally 60 dB). By using a physical contact between the end of two ferrules, the light goes directly from glassfiber into glassfiber. This means less reflections and also less losses (optical insertion loss maximally 0.5 dB). When light goes from one glassfiber via air into an other glassfiber, the optical losses are 8% (an interface between glassfiber and air gives 4% loss). The end faces of APC ferrules are also polished to get a very flat plane which makes a better physical contact. The repeatability of APC connectors is 0.2 dB. Two mated APC ferrules are drawn in Fig.11.

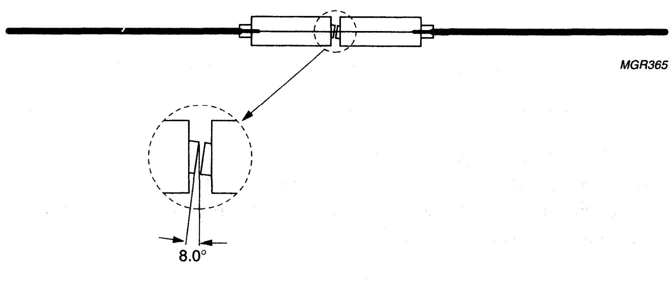
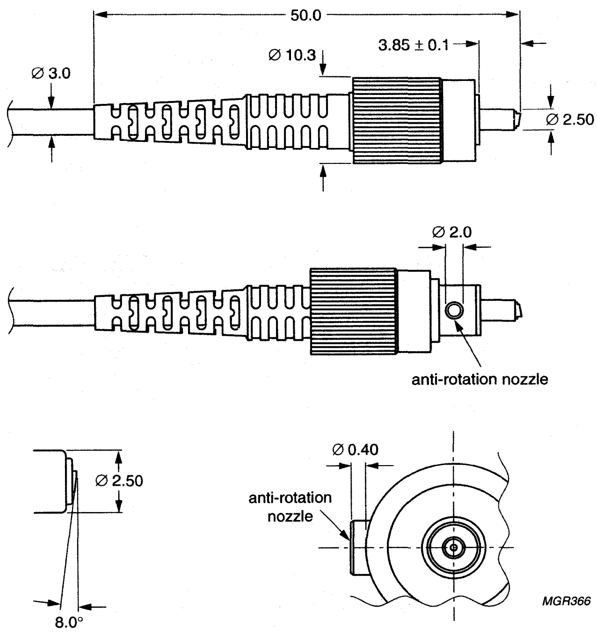


Fig.11 Two mated APC ferrules.

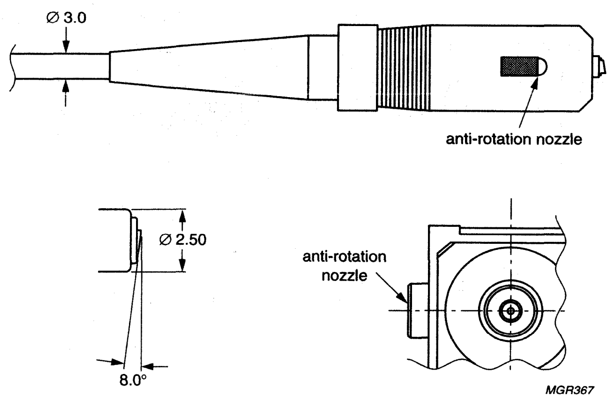
11.2 FC and SC Connectors

The first two characters of the connector names are used to specify the mechanical outline of the connector. The outlines FC and SC have a very tight mechanical specification to get the ferrules exactly in front of each other and with a specified pressure pushed to each other by a spring (0.80 to 1.20 kgf spring force).The FC/APC and SC/APC connectorized optical CATV receivers of Philips also have a buffered glassfiber. Over the glassfiber a thermoplastic yellow 3 mm tube is placed. In between this tube and the glassfiber a Kevlar aramid fiber is placed. This Kevlar fiber is connected to the connector and can be used as strain relief by fixing the kevlar at the end tube end, near by the receiver. The outlines of the FC/APC and SC/APC connectors are given in Figs 12 and 13.



Dimensions in millimetre.

Fig.12 FC/APC connector.

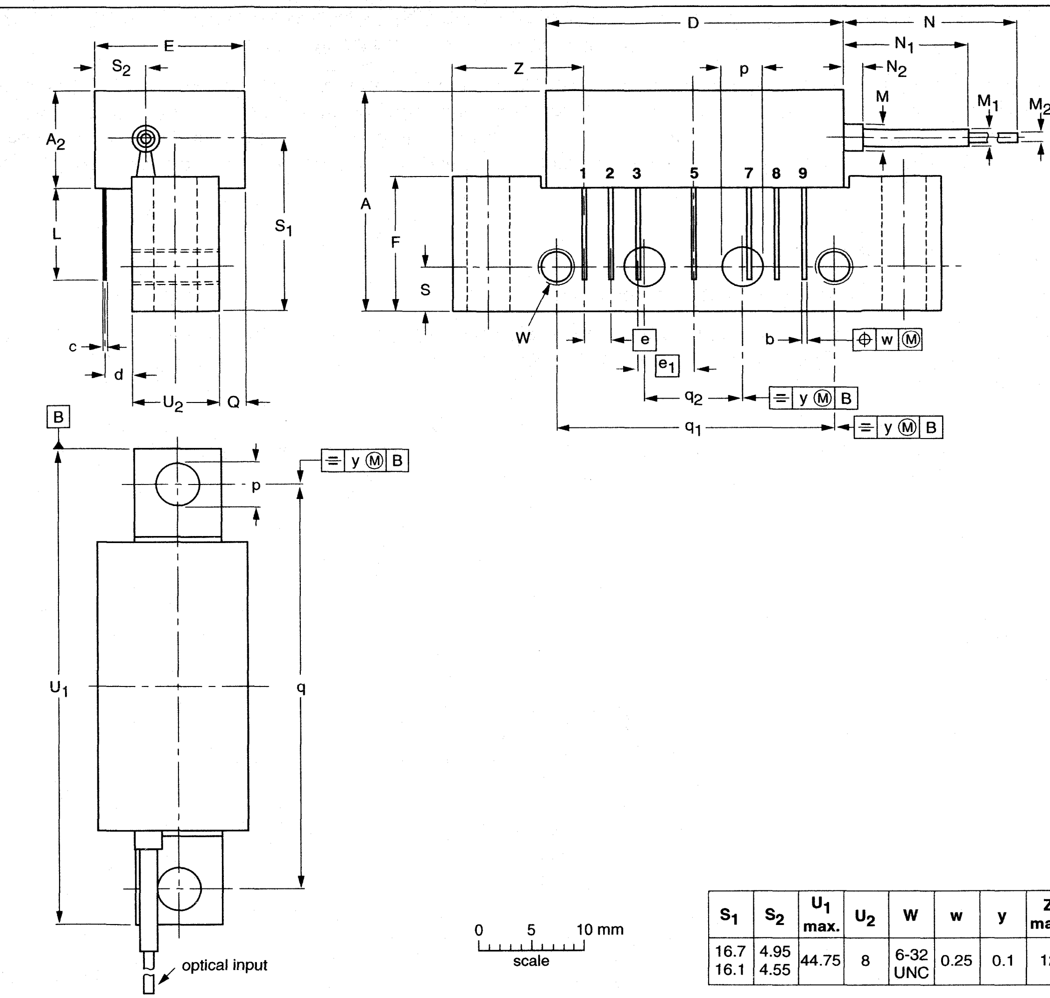


Dimensions in millimetre.

Fig.13 SC/APC connector.

12 PACKAGE OUTLINE

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 **SOT115U**



S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	M	M_1	M_2	N min.	N_1	N_2	p	Q max.	q	q_1	q_2	S
mm	20.8	9.1	0.51 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	10.7 8.7	5 1	4.15 3.85	2.4	38.1	25.4	10.2	4.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115U						99-04-13

A hybrid wideband amplifier module for digital CATV networks with the BGD902

Application Note AN98109

INTRODUCTION

Today's wideband CATV networks transform into a huge information highway system, including analog and digital TV channels, telemetric signals, telephone and multimedia services and Internet access.

The trend is to use higher frequencies and incorporating digital transfer. The trends for increasing information density and higher bandwidth for information transport demand higher performed CATV semiconductor devices.

Therefore, Philips Semiconductors developed a new CATV hybrid module - the BGD902. This BGD902 CATV module (a 900 MHz module) delivers the performance that is demanded by the future multimedia coaxial networks. It is equipped with silicon bipolar transistors, virtually always used in broadband applications such as CATV amplifiers. This technology enables excellent modules with extremely good characteristics, especially for the demands of the future digital CATV networks.

WIDEBAND HYBRID MODULES

A simplified version of a typical wideband amplifier is given in Fig.1.

The first transformer balances the input signal V_i and takes care of impedance matching for maximum power transfer to the inputs of the transistors. The output of the push-pull amplifier, yielding low second order distortion, is fed to the output via the output transformer.

A biasing circuit sets the DC current of the transistors which is normally rather high to minimize the third order distortion d3. The emitter resistors linearize the behaviour of the device by which the distortion has been improved, while some feedback via a RC network is applied to reduce distortion even further.

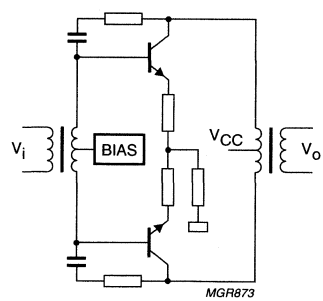


Fig.1 Simplified wideband module.

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Many improvements are applied such as applying darlingtons or transistors in a cascade configuration or using a two-stage cascade configuration to obtain higher gains.

Although the basic circuit looks relatively simple the final design in all its details is rather complex with tuned correction networks, carefully designed transformers and the very fine geometric bipolar transistors, optimized for use in CATV amplifier modules.

The most important characteristics of wideband amplifier modules are the following:

- Gain, frequency range, flatness (linearity of the frequency characteristic) and slope
- Second order distortion d2 or CSO
- Third order distortion d3 or CTB
- Cross modulation (X_{MOD}) at a given output voltage V_O
- Input and output reflections (return losses S_{11} and S_{22})
- Noise figure
- Current consumption.

Normally trade-off exist between many of these parameters. Improving one of them may effect another one negatively, so carefully designing these modules is an art in itself.

THE DEMANDS FOR FUTURE MULTIMEDIA NETWORKS

Especially for the multimedia CATV networks of tomorrow, it is very important to invest into the right solutions. For such systems, the planned lifetime is about 15 to 20 years. Therefore, it is necessary to choose high quality components that will survive the environment hazards that reduce the performance of a CATV hybrid both long-term and short-term. The most important influences are:

- Temperature (decreases CTB values at high output levels)
- Surge pulses (may damage, the transistor dies in milliseconds)
- Overvoltage (may damage, the transistor dies instantaneously)
- Quality aspects of the hybrids.

Other important parameters that have a major influence in the performance of future digital transmission in CATV networks are:

- CTB performance, especially at high temperatures, high channel loading and sloped conditions
- Flatness; very important for transmission of linear signals and to decrease failure rate of digital signals
- S_{11} and S_{22}; especially for digital signal transmission one of the parameters that could have big influence on the signal quality.

Philips Semiconductors, as a major player in the CATV hybrid market, has a long experience in designing circuits for highest technical performance and for longest lifetimes. By deciding for the right mix of quality and technical performance of a CATV module we developed the BGD902, the module for future multimedia CATV networks.

COMPARISON OF MAIN PARAMETERS FROM SEVERAL EXISTING WIDEBAND MODULES FOR CATV APPLICATION

This section compares some commercially available state-of-the-art wideband modules using different technologies. Philips Semiconductors' BGD902, the new high performance 900 MHz power doubler is compared to a US made bipolar competitor (called Si. 2) and to a GaAs using MESFETs of Japanese origin.

For reference, a specification summary with all essential characteristics is shown in the Table 1.

Table 1

PARAMETER	CONDITIONS	BGD902	Si. 2	GaAs	UNIT
Frequency range	$f_{MIN} - f_{MAX}$	40 to 900	40 to 860	50 to 860	MHz
Gain	f_{MAX}	19 to 20	19 to 20.5	18.5 to 20.0	dB
Slope	$f_{MIN} - f_{MAX}$	0.4 to 1.4	0 to 1.5	0 to 2.0	dB
Flatness		0.6	1.0	1.0	dB
CSO	110 channels; V_O = 44 dBmV	−61.0	−62.0	−59.0; note 1	dB
CTB	110 channels; V_O = 44 dBmV	−62.0	−62.0	−59.0; note 1	dB
X_{MOD}	110 channels; V_O = 44 dBmV	−63.5	−63.0	−59.0; note 1	dB
Noise	$f = f_{MAX}$	8.0	8.0	7.0	dB
I_{DC}	typical	420	400	355	mA

Note

1. Not specified, calculated back from tilted conditions.

Measurement results

Figures 2 to 8 show the test results of extensive measurements on a multitude of products, set up in our development laboratories.

A hybrid wideband amplifier module for digital CATV networks with the BGD902

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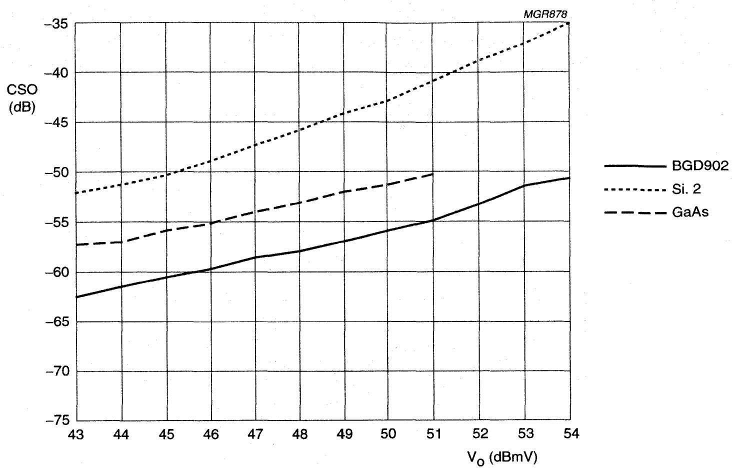
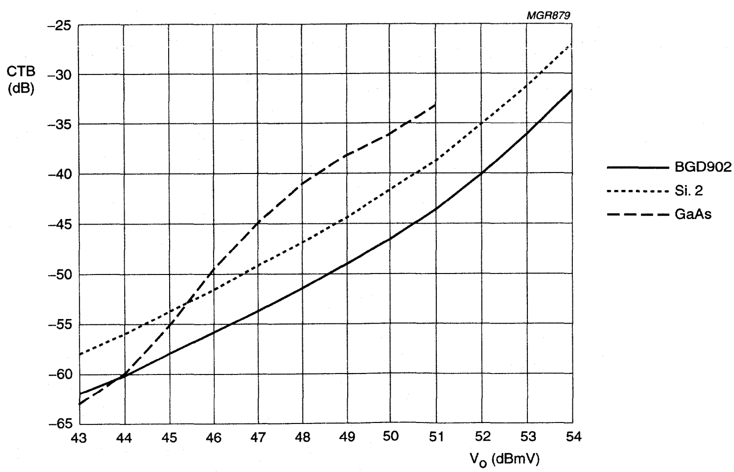
Distortion at various levels of the output voltage



Average value at 860.5 MHz.

Tested with 129 channels, it appears that at high output voltages BGD902 is unbeatable for CSO. One competitor is around 2 dB worse, the other around 4 to 5 dB.

Fig.2 CSO/129 channels (dB) as function of V_O (dBmV).



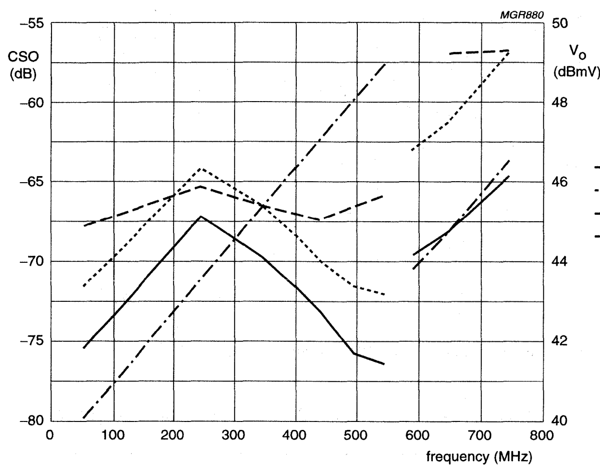
Average value at 859.25 MHz

CTB for 129 channels is best for BGD902 especially at higher output voltages.

Fig.3 CTB (dB) as function of V_O (dBmV).

CTB, XMOD and CSO as function of frequency under tilted conditions

Figure 4 shows the performance for a channel distribution which is partly analogue (f < 750 MHz), partly digital (750 to 870 MHz). Due to the built-in cable loss correction, the input voltage, given as a thin black line in Fig.4, rises as a function of the frequency ('sloped' or 'tilted' conditions). The required output voltage for digital is less as is shown in Fig.4. Clearly, the BGD902 outperforms the competition; the silicon devices are in this case better than the GaAs one.



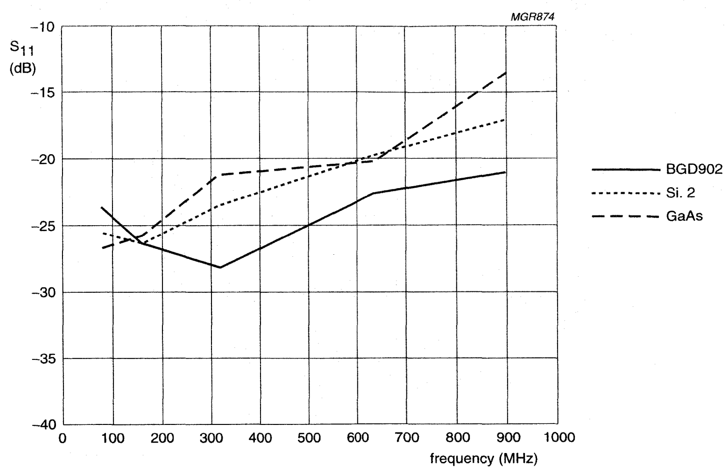
Mean values at 9 dB tilt.

Fig.4 CSO (dB) and V_O (dBmV) as a function of frequency.

A hybrid wideband amplifier module for digital CATV networks with the BGD902

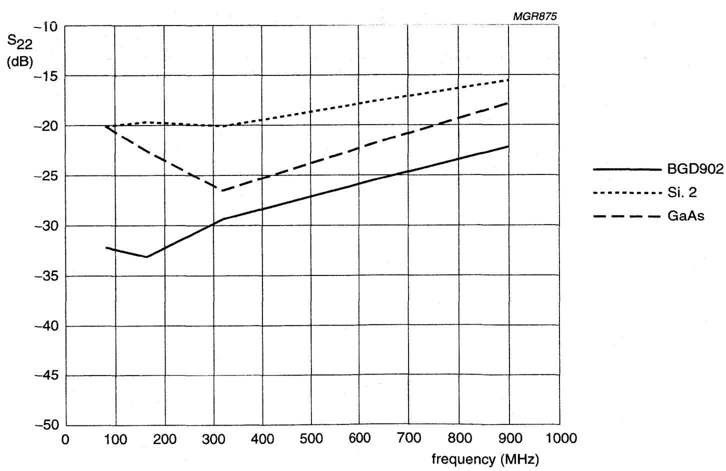
Application Note AN98109

S_{11}/S_{22} as function of frequency



The input reflection S_{11} underlines the excellent performance of BGD902.

Fig.5 S_{11} as function of frequency, mean values.

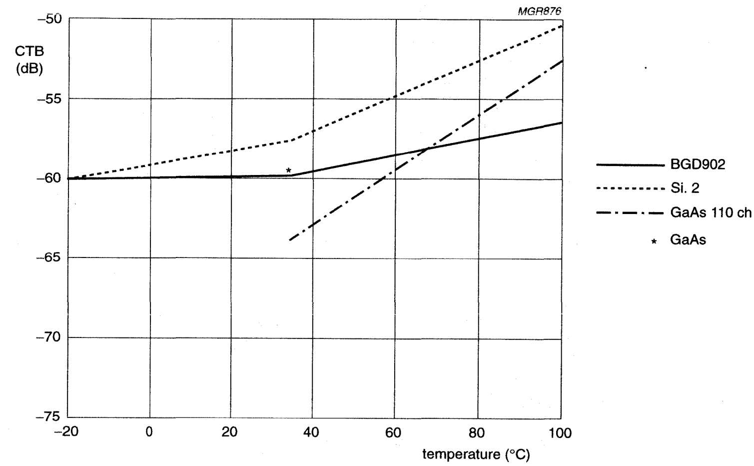


Clearly, the BGD902 is the leader in output reflection.

Fig.6 S_{22} as function of frequency, mean values.

Temperature dependency

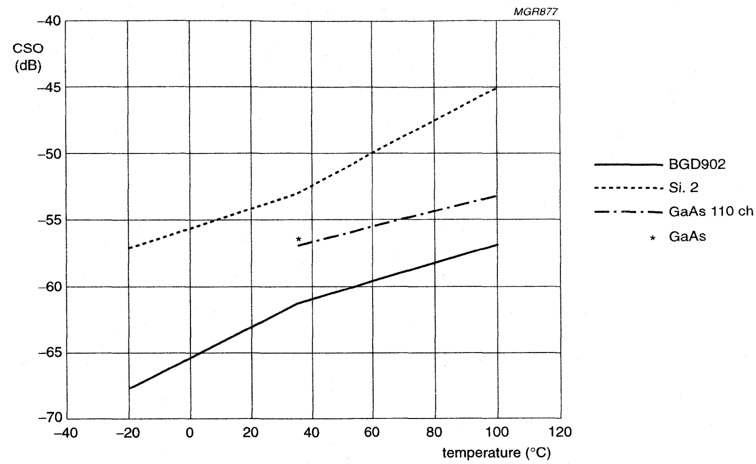
Figure 7 shows the temperature dependency of CTB. It shows a very big effect on GaAs distortion by temperature changes. Its 35 °C behaviour may be OK, at higher temperatures it degrades seriously. Both its high temperature behaviour and its temperature dependency are doubtful.



The temperature graphs show the performance of GaAs at 110 channels (only one test point is available for 129 channels). Silicon devices were all tested at 129 channels.

Mean values V_o = 44 dBmV.

Fig.7 CTB (dB) as function of temperature.



Mean values (V_O = 44dBmV).
This figure shows the excellent behaviour of the BGD902 over temperature on CSO.

Fig.8 CSO (dB) as function of temperature.

SUMMARY

The advantages of the BGD902 - achieved by the properties of state-of-the-art silicon devices - are clearly given and show the big improvements in overall performance of this new developed CATV hybrid amplifier when compared to some other state-of-the-art hybrid modules. The BGD902 is the basis for the entree into the digital millennium, a time with higher channel loading and more coaxial bandwidth that will let multimedia become a 'virtual reality'.

DEVICE DATA

in alphanumeric sequence

CATV power doubler amplifier module BGD104

FEATURES

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

DESCRIPTION

Power doubler 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	$+V_B$
7	common
8	common
9	output

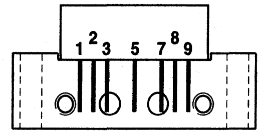


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20.5	dB
		f = 450 MHz	20.5	22.5	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

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	19.5	20.5	dB
		f = 450 MHz	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; measured at 445.25 MHz	–	−64	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	−66	dB
d_2	second order distortion	note 1	–	−73	dB
V_o	output voltage	d_{im} = −60 dB; note 2	64.5	–	dBmV
F	noise figure	f = 40 to 450 MHz	–	7	dB
I_{tot}	total current consumption (DC)	note 3	–	435	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

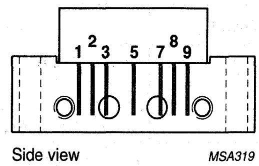


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	35	37	dB
		f = 450 MHz	36.5	–	dB
I_{tot}	total current consumption (DC)	V_B = +24 V	–	625	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz; T_{case} = 35 °C; $Z_S = Z_L$ = 75 Ω; V_B = +24 V

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
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–64	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–65	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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 value; V_B = +24 V; note 3	–	625	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 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	$+V_B$
7	common
8	common
9	output

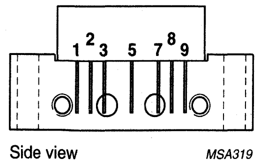


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz			
	BGD502		18	19	dB
	BGD504		19.5	20.5	dB
	power gain	f = 550 MHz			
	BGD502		18.8	20.8	dB
	BGD504		20.2	22.2	dB
I_{tot}	total current consumption (DC)	$V_B = 24$ V	–	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	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	f = 50 MHz				
	BGD502		18	–	19	dB
	BGD504		19.5	–	20.5	dB
	power gain	f = 550 MHz				
	BGD502		18.8	–	20.8	dB
	BGD504		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	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz				
	BGD502		–	–	–65	dB
	BGD504		–	–	–64	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz				
	BGD502		–	–	–68	dB
	BGD504		–	–	–67	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz				
	BGD502		–	–	–62	dB
	BGD504		–	–	–60	dB
d_2	second order distortion	note 1				
	BGD502		–	–	–72	dB
	BGD504		–	–	–70	dB
V_o	output voltage	d_{im} = –60 dB; note 2				
	BGD502		64	–	–	dBmV
	BGD504		63.5	–	–	dBmV
F	noise figure	f = 550 MHz	–	–	8	dB
I_{tot}	total current consumption (DC)	note 3	–	415	435	mA

Notes

1. 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.
2. 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.
3. The modules normally operate at V_B = 24 V, but are able to withstand supply transients up to 30 V.

CHARACTERISTICS

Bandwidth 40 to 450 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	f = 50 MHz				
	BGD502		18	–	19	dB
	BGD504		19.5	–	20.5	dB
	power gain	f = 450 MHz				
	BGD502		18.6	–	20.6	dB
	BGD504		20	–	22	dB
SL	slope cable equivalent	f = 40 to 450 MHz				
	BGD502		0.2	–	1.8	dB
	BGD504		0	–	1.65	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; measured at 445.25 MHz				
	BGD502		–	–	–67	dB
	BGD504		–	–	–66	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; measured at 548.5 MHz				
	BGD502		–	–	t.b.f.	dB
	BGD504		–	–	t.b.f.	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz				
	BGD502		–	–	–67	dB
	BGD504		–	–	–66	dB
d_2	second order distortion	note 1				
	BGD502		–	–	–75	dB
	BGD504		–	–	–73	dB
V_o	output voltage	d_{im} = –60 dB; note 2				
	BGD502		67	–	–	dBmV
	BGD504		66.5	–	–	dBmV
F	noise figure	f = 450 MHz	–	–	7	dB
I_{tot}	total current consumption (DC)	note 3	–	415	435	mA

Notes

1. 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.
2. 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.
3. 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

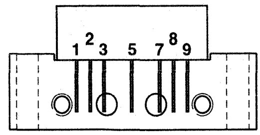


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21.5	22.5	dB
		f = 550 MHz	22.1	–	dB
I_{tot}	total current consumption (DC)	VB = +24V	–	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C
V_B	DC supply voltage	–	+28	V

CHARACTERISTICS

Table 1 Bandwidth 40 to 550 MHz; T_{case} = 35 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21.5	22.5	dB
		f = 550 MHz	22.1	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0	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
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	−62	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−63	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	−55	dB
d_2	second order distortion	V_o = 44 dBmV; note 1	–	−66	dB
V_o	output voltage	d_{im} = −60 dB; note 2	62.5	–	dBmV
F	noise figure	f = 550 MHz	–	7	dB
I_{tot}	total current consumption	DC value; V_B = +24 V; note 3	–	435	mA

Notes

1. 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.
2. Measured according to DIN45004B;
   f_p = 540.25 MHz; $V_o = V_p$;
   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.
3. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 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 in a SOT115J package 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	$+V_B$
7	common
8	common
9	output

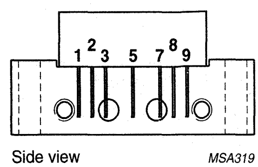


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	35	37	dB
		f = 550 MHz	36.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	625	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 550 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 = 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	–	±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; V_o = 44 dBmV; measured at 547.25 MHz	–	−62	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−65	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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; V_o = 46 dBmV; measured at 445.25 MHz	–	–64	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–65	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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 printed-circuit board 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 Ω 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 printed-circuit board 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 | 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	$+V_B$
7	common
8	common
9	output

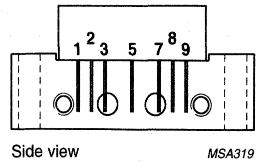


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 600 MHz	19	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

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; V_o = 44 dBmV; measured at 595.25 MHz	–	–62	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–66	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CHARACTERISTICS

Bandwidth 40 to 550 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 = 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	–	±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; V_o = 44 dBmV; measured at 547.25 MHz	–	−66	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−68	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CHARACTERISTICS

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	18.6	–	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; $V_o = 46$ dBmV; measured at 445.25 MHz	–	−67	dB
X_{mod}	cross modulation	60 channels flat; $V_o = 46$ dBmV; measured at 55.25 MHz	–	−66	dB
CSO	composite second order distortion	60 channels flat; $V_o = 46$ dBmV 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

1. $f_p = 55.25$ MHz; $V_p = 46$ dBmV;
   $f_q = 391.25$ MHz; $V_q = 46$ dBmV;
   measured at $f_p + f_q = 446.5$ MHz.
2. 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.
3. 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	$+V_B$
7	common
8	common
9	output

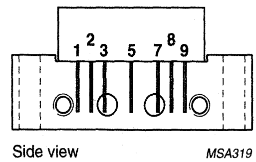


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	17.5	18.5	dB
		f = 600 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	440	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	−40	+100	°C
T_{mb}	operating mounting base temperature	−20	+100	°C

CHARACTERISTICS

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	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; $V_o = 44$ dBmV; measured at 595.25 MHz	–	–68	dB
X_{mod}	cross modulation	85 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–61	dB
CSO	composite second order distortion	85 channels flat; $V_o = 44$ dBmV; measured at 596.5 MHz	–	–64	dB
d_2	second order distortion	note 1	–	–76	dB
V_o	output voltage	$d_{im} = -60$ dB; note 2	66	–	dBmV
F	noise figure	f = 50 MHz	–	5.5	dB
		f = 600 MHz	–	7	dB
I_{tot}	total current consumption (DC)	note 3	–	440	mA

Notes

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
   $f_q = 541.25$ MHz; $V_q = 44$ dBmV;
   measured at $f_p + f_q = 596.5$ MHz.
2. $f_p = 590.25$ 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.
3. The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

CHARACTERISTICS

Bandwidth 40 to 550 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 = 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	–	±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; V_o = 44 dBmV; measured at 547.25 MHz	–	–69	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–62	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CHARACTERISTICS

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	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; $V_o = 46$ dBmV; measured at 445.25 MHz	–	−68	dB
X_{mod}	cross modulation	60 channels flat; $V_o = 46$ dBmV; measured at 55.25 MHz	–	−59	dB
CSO	composite second order distortion	60 channels flat; $V_o = 46$ dBmV 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

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
   $f_q = 391.25$ MHz; $V_q = 44$ dBmV;
   measured at $f_p + f_q = 446.5$ MHz.
2. $f_p = 440.25$ 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.
3. The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

CATV amplifier modules

BGD702; BGD702MI

FEATURES

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

DESCRIPTION

Hybrid amplifier modules designed for CATV systems operating over a frequency range of 40 to 750 MHz at a voltage supply of 24 V (DC). Both modules are electrically identical, only the pinning is different.

PINNING - SOT115J

PIN	DESCRIPTION	
	BGD702	BGD702MI
1	input	output
2	common	common
3	common	common
5	$+V_B$	$+V_B$
7	common	common
8	common	common
9	output	input

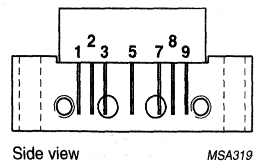


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 750 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 750 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	f = 50 MHz	18	18.5	19	dB
		f = 750 MHz	18.5	19.7	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0.2	1.3	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	±0.2	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	27	–	dB
		f = 80 to 160 MHz	19	30	–	dB
		f = 160 to 320 MHz	18	29	–	dB
		f = 320 to 640 MHz	17	22	–	dB
		f = 640 to 750 MHz	16	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	23	–	dB
		f = 80 to 160 MHz	19	24	–	dB
		f = 160 to 320 MHz	18	23	–	dB
		f = 320 to 640 MHz	17	21	–	dB
		f = 640 to 750 MHz	16	21	–	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	–	−59	−58	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−64	−62	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	−63	−58	dB
d_2	second order distortion	note 1	–	−78	−68	dB
V_o	output voltage	d_{im} = −60 dB; note 2	61	64	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5.5	dB
		f = 450 MHz	–	–	6.5	dB
		f = 550 MHz	–	–	6.5	dB
		f = 600 MHz	–	–	7	dB
		f = 750 MHz	–	6.5	8.5	dB
I_{tot}	total current consumption (DC)	note 3	–	425	435	mA

Notes

1. 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.
2. 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.
3. The modules normally operate at V_B = 24 V, but are able to withstand supply transients up to 30 V.

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.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 600 MHz	18.5	19.4	–	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	27	–	dB
		f = 80 to 160 MHz	19	30	–	dB
		f = 160 to 320 MHz	18	29	–	dB
		f = 320 to 600 MHz	17	22	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	23	–	dB
		f = 80 to 160 MHz	19	24	–	dB
		f = 160 to 320 MHz	18	23	–	dB
		f = 320 to 600 MHz	17	21	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	85 channels flat; $V_o = 44$ dBmV; measured at 595.25 MHz	–	–66	–65	dB
X_{mod}	cross modulation	85 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–66	–65	dB
CSO	composite second order distortion	85 channels flat; $V_o = 44$ dBmV; measured at 596.5 MHz	–	–68	–60	dB
d_2	second order distortion	note 1	–	–80	–70	dB
V_o	output voltage	$d_{im} = -60$ dB; note 2	64	67	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	425	435	mA

Notes

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
   $f_q = 541.25$ MHz; $V_q = 44$ dBmV;
   measured at $f_p + f_q = 596.5$ MHz.
2. 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.
3. The modules normally operate at $V_B = 24$ V, but are able to withstand supply transients up to 30 V.

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.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 550 MHz	18.5	19.3	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.2	–	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	27	–	dB
		f = 80 to 160 MHz	19	30	–	dB
		f = 160 to 320 MHz	18	29	–	dB
		f = 320 to 550 MHz	17	22	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	23	–	dB
		f = 80 to 160 MHz	19	24	–	dB
		f = 160 to 320 MHz	18	23	–	dB
		f = 320 to 550 MHz	17	21	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; $V_o = 44$ dBmV; measured at 547.25 MHz	–	–68	–67	dB
X_{mod}	cross modulation	77 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–68	–67	dB
CSO	composite second order distortion	77 channels flat; $V_o = 44$ dBmV; measured at 548.5 MHz	–	–68	–62	dB
d_2	second order distortion	note 1	–	–81	–72	dB
V_o	output voltage	$d_{im} = -60$ dB; note 2	64.5	68	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	425	435	mA

Notes

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
   $f_q = 493.25$ MHz; $V_q = 44$ dBmV;
   measured at $f_p + f_q = 548.5$ MHz.
2. 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.
3. The modules normally operate at $V_B = 24$ V, but are able to withstand supply transients up to 30 V.

Table 4 Bandwidth 40 to 450 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	f = 50 MHz	18	18.5	19	dB
		f = 450 MHz	18.5	19.2	–	dB
SL	slope cable equivalent	f = 40 to 450 MHz	0.2	–	2	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	27	–	dB
		f = 80 to 160 MHz	19	30	–	dB
		f = 160 to 320 MHz	18	29	–	dB
		f = 320 to 450 MHz	17	22	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	23	–	dB
		f = 80 to 160 MHz	19	24	–	dB
		f = 160 to 320 MHz	18	23	–	dB
		f = 320 to 450 MHz	17	21	–	dB
S_{21}	phase response	f = 50 MHz	−45	–	+45	deg
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–	−68	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	−65	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV 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	–	425	435	mA

Notes

1. 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.
2. 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.
3. The modules normally operate at V_B = 24 V, but are 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	$+V_B$
7	common
8	common
9	output

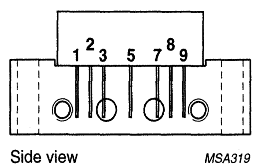


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 750 MHz	20	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	400	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	25	V
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 750 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	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	–	±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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 2 Bandwidth 40 to 600 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	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	–	±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; V_o = 44 dBmV; measured at 595.25 MHz	–	–68	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–61	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 550 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	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	–	±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_o = 44 dBmV; measured at 547.25 MHz	–	–69	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–62	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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.

DESCRIPTION

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

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

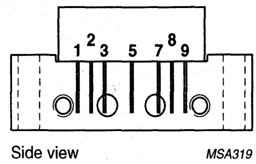


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20.5	dB
		f = 750 MHz	20	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 750 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	f = 50 MHz	19.5	20	20.5	dB
		f = 750 MHz	20	21	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0	1	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	±0.2	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	31	–	dB
		f = 80 to 160 MHz	19	29	–	dB
		f = 160 to 320 MHz	18	25	–	dB
		f = 320 to 640 MHz	17	21	–	dB
		f = 640 to 750 MHz	16	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	26	–	dB
		f = 80 to 160 MHz	19	27	–	dB
		f = 160 to 320 MHz	18	26	–	dB
		f = 320 to 640 MHz	17	24	–	dB
		f = 640 to 750 MHz	16	23	–	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	–57	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–63	–61	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	–61	–56	dB
d_2	second order distortion	note 1	–	–75	–66	dB
V_o	output voltage	d_{im} = –60 dB; note 2	60.5	63.5	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5	dB
		f = 450 MHz	–	–	6.5	dB
		f = 550 MHz	–	–	7	dB
		f = 600 MHz	–	–	7	dB
		f = 750 MHz	–	6.5	8.5	dB
I_{tot}	total current consumption (DC)	note 3	–	425	435	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 600 MHz	20	20.7	–	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_{11}	input return losses	f = 40 to 80 MHz	20	31	–	dB
		f = 80 to 160 MHz	19	29	–	dB
		f = 160 to 320 MHz	18	25	–	dB
		f = 320 to 600 MHz	17	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	26	–	dB
		f = 80 to 160 MHz	19	27	–	dB
		f = 160 to 320 MHz	18	26	–	dB
		f = 320 to 600 MHz	17	24	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	85 channels flat; $V_o = 44$ dBmV; measured at 595.25 MHz	–	–65	–64	dB
X_{mod}	cross modulation	85 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–65	–64	dB
CSO	composite second order distortion	85 channels flat; $V_o = 44$ dBmV; measured at 596.5 MHz	–	–66	–58	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	–	425	435	mA

Notes

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
   $f_q = 541.25$ MHz; $V_q = 44$ dBmV;
   measured at $f_p + f_q = 596.5$ MHz.
2. 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.
3. The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

Table 3 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	f = 50 MHz	19.5	20	20.5	dB
		f = 550 MHz	20	20.6	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0	–	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	31	–	dB
		f = 80 to 160 MHz	19	29	–	dB
		f = 160 to 320 MHz	18	25	–	dB
		f = 320 to 550 MHz	17	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	26	–	dB
		f = 80 to 160 MHz	19	27	–	dB
		f = 160 to 320 MHz	18	26	–	dB
		f = 320 to 550 MHz	17	24	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–67	–66	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–67	–66	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	–67	–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	–	425	435	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 4 Bandwidth 40 to 450 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	f = 50 MHz	19.5	20	20.5	dB
		f = 450 MHz	20	20.6	–	dB
SL	slope cable equivalent	f = 40 to 450 MHz	0	–	2	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	31	–	dB
		f = 80 to 160 MHz	19	29	–	dB
		f = 160 to 320 MHz	18	25	–	dB
		f = 320 to 450 MHz	17	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	26	–	dB
		f = 80 to 160 MHz	19	27	–	dB
		f = 160 to 320 MHz	18	26	–	dB
		f = 320 to 450 MHz	17	25	–	dB
S_{21}	phase response	f = 50 MHz	−45	–	+45	deg
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–	−67	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	−64	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV 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	–	425	435	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CATV amplifier modules BGD802; BGD802MI

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 modules in a SOT115J package operating with a voltage supply of 24 V (DC).
Both modules are electrically identical, only the pinning is different.

PINNING - SOT115J

PIN	DESCRIPTION	
	BGD802	BGD802MI
1	input	output
2	common	common
3	common	common
5	$+V_B$	$+V_B$
7	common	common
8	common	common
9	output	input

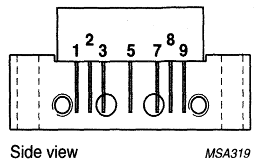


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 860 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	410	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	25	V
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 860 MHz	18.5	19.5	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	1.1	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.2	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	35	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 320 MHz	17	27	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 860 MHz	14	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	29	–	dB
		f = 160 to 320 MHz	17	25.5	–	dB
		f = 320 to 640 MHz	15.5	23	–	dB
		f = 640 to 860 MHz	14	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 channels flat; V_o = 47 dBmV; measured at 859.25 MHz	–	–66	–63	dB
X_{mod}	cross modulation	49 channels flat; V_o = 47 dBmV; measured at 55.25 MHz	–	–65	–62	dB
CSO	composite second order distortion	49 channels flat; V_o = 47 dBmV; measured at 860.5 MHz	–	–67.5	–60	dB
d_2	second order distortion	note 1	–	–75	–69	dB
V_o	output voltage	d_{im} = –60 dB; note 2	61.5	63.5	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5.5	dB
		f = 550 MHz	–	–	6	dB
		f = 650 MHz	–	–	7	dB
		f = 750 MHz	–	–	7.5	dB
		f = 860 MHz	–	6.5	9	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 860 MHz	18.5	19.5	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	1.1	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.2	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	35	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 320 MHz	17	27	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 860 MHz	14	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	29	–	dB
		f = 160 to 320 MHz	17	25.5	–	dB
		f = 320 to 640 MHz	15.5	23	–	dB
		f = 640 to 860 MHz	14	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	129 channels flat; V_o = 44 dBmV; measured at 859.25 MHz	–	–56.5	–54	dB
X_{mod}	cross modulation	129 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–61	–59	dB
CSO	composite second order distortion	129 channels flat; V_o = 44 dBmV; measured at 860.5 MHz	–	–64.5	–56	dB
d_2	second order distortion	note 1	–	–75	–69	dB
V_o	output voltage	d_{im} = –60 dB; note 2	61.5	63	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 750 MHz; V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 750 MHz	18.5	19.4	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	–	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	35	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 320 MHz	17	27	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 750 MHz	14	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	29	–	dB
		f = 160 to 320 MHz	17	25.5	–	dB
		f = 320 to 640 MHz	15.5	23	–	dB
		f = 640 to 750 MHz	14	22	–	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	–	–60.5	–58	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–62.5	–60	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	–66	–60	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	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 550 MHz	18.5	19.3	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.2	–	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	35	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 320 MHz	17	27	–	dB
		f = 320 to 550 MHz	16	22	–	dB
S_{22}	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	29	–	dB
		f = 160 to 320 MHz	17	25.5	–	dB
		f = 320 to 550 MHz	16	23	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–67	–65	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–66	–63	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	–67	–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	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CATV amplifier module

BGD802N

FEATURES

- Extremely flat gain response
- 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 at a supply voltage of 24 V (DC).

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

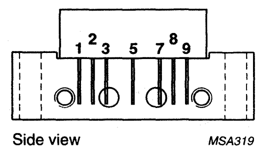


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 860 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	410	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	25	V
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 860 MHz	18.5	19.5	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	0.9	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.1	±0.25	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	32	–	dB
		f = 80 to 160 MHz	18.5	27	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 860 MHz	14	20.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	33	–	dB
		f = 80 to 160 MHz	18.5	29	–	dB
		f = 160 to 860 MHz	17	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 channels flat; V_o = 47 dBmV; measured at 859.25 MHz	–	–65	–63	dB
X_{mod}	cross modulation	49 channels flat; V_o = 47 dBmV; measured at 55.25 MHz	–	–64	–62	dB
CSO	composite second order distortion	49 channels flat; V_o = 47 dBmV; measured at 860.5 MHz	–	–68	–60	dB
d_2	second order distortion	note 1	–	–75	–69	dB
V_o	output voltage	d_{im} = –60 dB; note 2	61.5	63.5	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5.5	dB
		f = 550 MHz	–	–	6	dB
		f = 650 MHz	–	–	7	dB
		f = 750 MHz	–	–	7.5	dB
		f = 860 MHz	–	6.5	9	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 860 MHz	18.5	19.5	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	0.9	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.1	±0.25	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	32	–	dB
		f = 80 to 160 MHz	18.5	27	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 860 MHz	14	20.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	33	–	dB
		f = 80 to 160 MHz	18.5	29	–	dB
		f = 160 to 860 MHz	17	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	129 channels flat; V_o = 44 dBmV; measured at 859.25 MHz	–	–	–54	dB
X_{mod}	cross modulation	129 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	–59	dB
CSO	composite second order distortion	129 channels flat; V_o = 44 dBmV; measured at 860.5 MHz	–	–	–56	dB
d_2	second order distortion	note 1	–	–75	–69	dB
V_o	output voltage	d_{im} = –60 dB; note 2	61.5	63.5	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	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	–	–	±0.25	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	32	–	dB
		f = 80 to 160 MHz	18.5	27	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 750 MHz	14	20.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	33	–	dB
		f = 80 to 160 MHz	18.5	29	–	dB
		f = 160 to 750 MHz	17	22	–	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	–	–	−59	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	−60	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	–	−60	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	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 4 Bandwidth 40 to 650 MHz; V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	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	–	–	±0.2	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	32	–	dB
		f = 80 to 160 MHz	18.5	27	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 650 MHz	15	22	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	33	–	dB
		f = 80 to 160 MHz	18.5	29	–	dB
		f = 160 to 650 MHz	17	22	–	dB
S_{21}	phase response	f = 50 MHz	−45	–	+45	deg
CTB	composite triple beat	94 channels flat; V_o = 44 dBmV; measured at 649.25 MHz	–	–	−61	dB
X_{mod}	cross modulation	94 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	−61	dB
CSO	composite second order distortion	94 channels flat; V_o = 44 dBmV; measured at 650.5 MHz	–	–	−62	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	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 5 Bandwidth 40 to 550 MHz; V_B = 24 V; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	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	–	–	±0.2	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	32	–	dB
		f = 80 to 160 MHz	18.5	27	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 550 MHz	16	22	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	33	–	dB
		f = 80 to 160 MHz	18.5	29	–	dB
		f = 160 to 550 MHz	17	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–	–65	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	–63	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	–	–65	dB
d_2	second order distortion	note 1	–	–	–74	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	–	395	410	mA

Notes

1. 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.
2. 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.
3. 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

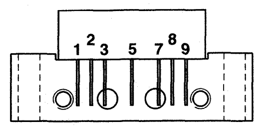


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20.5	dB
		f = 860 MHz	20	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	410	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C
V_B	supply voltage	–	25	V

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 860 MHz	20	21	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	1.1	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.2	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	28	–	dB
		f = 80 to 160 MHz	18.5	23	–	dB
		f = 160 to 320 MHz	17	20	–	dB
		f = 320 to 640 MHz	15.5	20	–	dB
		f = 640 to 860 MHz	14	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	19	–	dB
		f = 640 to 860 MHz	14	19	–	dB
S_{21}	phase response	f = 50 MHz	−45	–	+45	deg
CTB	composite triple beat	49 channels flat; V_o = 47 dBmV; measured at 859.25 MHz	–	−64	−61	dB
X_{mod}	cross modulation	49 channels flat; V_o = 47 dBmV; measured at 55.25 MHz	–	−65.5	−62	dB
CSO	composite second order distortion	49 channels flat; V_o = 47 dBmV; measured at 860.5 MHz	–	−63	−58	dB
d_2	second order distortion	note 1	–	−73	−67	dB
V_o	output voltage	d_{im} = −60 dB; note 2	+60	−61.5	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5	dB
		f = 550 MHz	–	–	6	dB
		f = 650 MHz	–	–	6	dB
		f = 750 MHz	–	–	6.5	dB
		f = 860 MHz	–	6.5	7.5	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 860 MHz	20	21	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	1.1	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.2	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	28	–	dB
		f = 80 to 160 MHz	18.5	23	–	dB
		f = 160 to 320 MHz	17	20	–	dB
		f = 320 to 640 MHz	15.5	20	–	dB
		f = 640 to 860 MHz	14	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	19	–	dB
		f = 640 to 860 MHz	14	19	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	129 channels flat; V_o = 44 dBmV; measured at 859.25 MHz	–	–54	–53	dB
X_{mod}	cross modulation	129 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–62	–61	dB
CSO	composite second order distortion	129 channels flat; V_o = 44 dBmV; measured at 860.5 MHz	–	–60.5	–54	dB
d_2	second order distortion	note 1	–	–73	–67	dB
V_o	output voltage	d_{im} = –60 dB; note 2	+60	–61.5	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 750 MHz; V_B = 24 V; T_{case} = 35 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 750 MHz	20	20.8	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	–	±0.45	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	28	–	dB
		f = 80 to 160 MHz	18.5	23	–	dB
		f = 160 to 320 MHz	17	20	–	dB
		f = 320 to 640 MHz	15.5	20	–	dB
		f = 640 to 750 MHz	14	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	19	–	dB
		f = 640 to 750 MHz	14	19	–	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	–	–59	–57	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–64	–62	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	–62	–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	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 4 Bandwidth 40 to 650 MHz; $V_B = 24$ V; $T_{case} = 35$ °C; $Z_S = Z_L = 75$ Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 650 MHz	20	20.7	–	dB
SL	slope cable equivalent	f = 40 to 650 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 650 MHz	–	–	±0.35	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	28	–	dB
		f = 80 to 160 MHz	18.5	23	–	dB
		f = 160 to 320 MHz	17	20	–	dB
		f = 320 to 650 MHz	15	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 650 MHz	15	19	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	94 channels flat; $V_o = 44$ dBmV; measured at 649.25 MHz	–	–	–60	dB
X_{mod}	cross modulation	94 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–	–62	dB
CSO	composite second order distortion	94 channels flat; $V_o = 44$ dBmV; measured at 650.5 MHz	–	–	–58	dB
d_2	second order distortion	note 1	–	–	–69	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	–	395	410	mA

Notes

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
   $f_q = 595.25$ MHz; $V_q = 44$ dBmV;
   measured at $f_p + f_q = 650.5$ MHz.
2. 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.
3. The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 550 MHz	20	20.6	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 550 MHz	–	–	±0.35	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	28	–	dB
		f = 80 to 160 MHz	18.5	23	–	dB
		f = 160 to 320 MHz	17	20	–	dB
		f = 320 to 550 MHz	16	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 550 MHz	16	19	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–66	–64	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–67	–64	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	–67	–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	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

FEATURES

- Extremely flat gain response
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Excellent return loss properties
- 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 at a voltage supply of 24 V (DC).

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

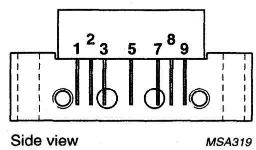


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20.5	dB
		f = 860 MHz	20	–	dB
I_{tot}	total current consumption (DC)	$V_B = 24$ V	–	410	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	25	V
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	−40	+100	°C
T_{mb}	mounting base operating temperature	−20	+100	°C

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 860 MHz	20	21	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	0.9	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.1	±0.25	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	23.5	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 640 MHz	15.5	19.5	–	dB
		f = 640 to 860 MHz	14	17.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 860 MHz	17	21	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 channels flat; V_o = 47 dBmV; measured at 859.25 MHz	–	–65	–62	dB
X_{mod}	cross modulation	49 channels flat; V_o = 47 dBmV; measured at 55.25 MHz	–	–64	–61	dB
CSO	composite second order distortion	49 channels flat; V_o = 47 dBmV; measured at 860.5 MHz	–	–66	–58	dB
d_2	second order distortion	note 1	–	–77.5	–67	dB
V_o	output voltage	d_{im} = –60 dB; note 2	61	63	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5	dB
		f = 550 MHz	–	–	5.5	dB
		f = 650 MHz	–	–	6.5	dB
		f = 750 MHz	–	–	7	dB
		f = 860 MHz	–	6.5	8	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 2 Bandwidth 40 to 860 MHz; V_B = 24 V; T_{case} = 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	20.5	dB
		f = 860 MHz	20	21	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	0.9	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.1	±0.25	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	23.5	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 640 MHz	15.5	19.5	–	dB
		f = 640 to 860 MHz	14	17.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 860 MHz	17	21	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	129 channels flat; V_o = 44 dBmV; measured at 859.25 MHz	–	–	–53	dB
X_{mod}	cross modulation	129 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	–58	dB
CSO	composite second order distortion	129 channels flat; V_o = 44 dBmV; measured at 860.5 MHz	–	–	–54	dB
d_2	second order distortion	note 1	–	–77.5	–67	dB
V_o	output voltage	d_{im} = –60 dB; note 2	61	63	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 750 MHz; V_B = 24 V; T_{case} = 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	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	–	–	±0.25	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	23.5	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 640 MHz	15.5	19.5	–	dB
		f = 640 to 750 MHz	14	17.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 750 MHz	17	21	–	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	–	–	–59	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	–	–	–70	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	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 4 Bandwidth 40 to 650 MHz; $V_B = 24$ V; $T_{case} = 30$ °C; $Z_S = Z_L = 75\ \Omega$

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20	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	–	–	±0.2	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	23.5	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 650 MHz	15	19.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 650 MHz	17	21	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	94 channels flat; V_o = 44 dBmV; measured at 649.25 MHz	–	–	–60	dB
X_{mod}	cross modulation	94 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	–60	dB
CSO	composite second order distortion	94 channels flat; V_o = 44 dBmV; measured at 650.5 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	–	395	410	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 5 Bandwidth 40 to 550 MHz; V_B = 24 V; T_{case} = 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	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	–	–	±0.2	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	23.5	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 550 MHz	16	19.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 550 MHz	17	21	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–	–64	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	–62	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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	–	395	410	mA

Notes

1. 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.
2. 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.
3. 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
2, 3, 5, 6, 7	common
4	10 V, 200 mA supply terminal
8	$+V_B$
9	output

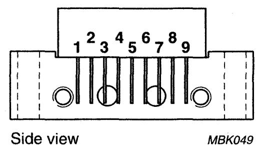


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	16.5	17.5	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	450	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	DC supply voltage	–	26	V
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 860 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	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	–	±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

1. Decrease per octave of 1.5 dB.
2. 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.
3. 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.
4. 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.
5. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

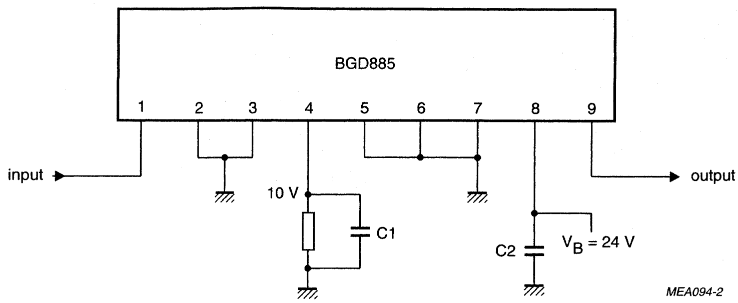


Fig.2 Test circuit.

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 modules | BGD902; BGD902MI

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 900 MHz frequency range.

DESCRIPTION

Hybrid amplifier modules in a SOT115J package operating with a voltage supply of 24 V (DC).
Both modules are electrically identical only the pinning is different.

PINNING - SOT115J

PIN	DESCRIPTION	
	BGD902	BGD902MI
1	input	output
2, 3	common	common
5	$+V_B$	$+V_B$
7, 8	common	common
9	output	input

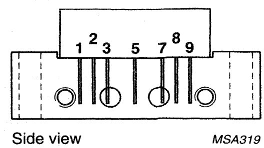


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18.2	18.8	dB
		f = 900 MHz	19	20	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	405	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	30	V
V_i	RF input voltage	–	70	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

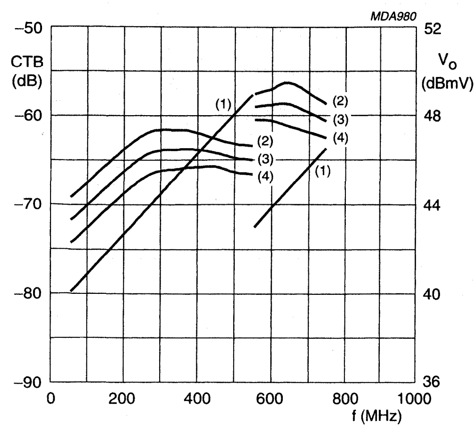
Bandwidth 40 to 900 MHz; V_B = 24 V; T_{mb} = 35 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18.2	18.5	18.8	dB
		f = 900 MHz	19	19.5	20	dB
SL	slope cable equivalent	f = 40 to 900 MHz	0.4	0.9	1.4	dB
FL	flatness of frequency response	f = 40 to 900 MHz	–	±0.15	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	21	24	–	dB
		f = 80 to 160 MHz	22	26	–	dB
		f = 160 to 320 MHz	22	28	–	dB
		f = 320 to 640 MHz	19	22	–	dB
		f = 640 to 900 MHz	18	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	25	32	–	dB
		f = 80 to 160 MHz	25	33	–	dB
		f = 160 to 320 MHz	21	29	–	dB
		f = 320 to 750 MHz	20	25	–	dB
		f = 750 to 900 MHz	19	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 chs flat; V_o = 47 dBmV; f_m = 859.25 MHz	–	–68.5	–67	dB
		77 chs flat; V_o = 44 dBmV; f_m = 547.25 MHz	–	–70	–68	dB
		110 chs flat; V_o = 44 dBmV; f_m = 745.25 MHz	–	–63.5	–62	dB
		129 chs flat; V_o = 44 dBmV; f_m = 859.25 MHz	–	–60	–58	dB
		110 chs; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–64	–62	dB
		129 chs; f_m = 650 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–58.5	–56.5	dB
X_{mod}	cross modulation	49 chs flat; V_o = 47 dBmV; f_m = 55.25 MHz	–	–66.5	–64	dB
		77 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–69.5	–67	dB
		110 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–66	–63.5	dB
		129 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–64.5	–62	dB
		110 chs; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–63	–60	dB
		129 chs; f_m = 860 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–61	–58	dB
CSO	composite second order distortion	49 chs flat; V_o = 47 dBmV; f_m = 860.5 MHz	–	–65	–62	dB
		77 chs flat; V_o = 44 dBmV; f_m = 548.5 MHz	–	–72	–67	dB
		110 chs flat; V_o = 44 dBmV; f_m = 746.5 MHz	–	–65	–60	dB
		129 chs flat; V_o = 44 dBmV; f_m = 860.5 MHz	–	–61	–58	dB
		110 chs; f_m = 250 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–67	–63	dB
		129 chs; f_m = 250 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–62	–58	dB

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
d_2	second order distortion	note 3	–	–80	–74	dB
		note 4	–	–83	–77	dB
		note 5	–	–84	–78	dB
V_o	output voltage	d_{im} = –60 dB; note 6	64.5	66	–	dBmV
		d_{im} = –60 dB; note 7	65.5	67	–	dBmV
		d_{im} = –60 dB; note 8	67.5	69	–	dBmV
		CTB compression = 1 dB; 129 chs flat; f = 859.25 MHz	48.5	49.5	–	dBmV
		CSO compression = 1 dB; 129 chs flat; f = 860.5 MHz	50	53	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5	dB
		f = 550 MHz	–	5	5.5	dB
		f = 750 MHz	–	5.5	6.5	dB
		f = 900 MHz	–	6.5	8	dB
I_{tot}	total current consumption (DC)	note 9	405	420	435	mA

Notes

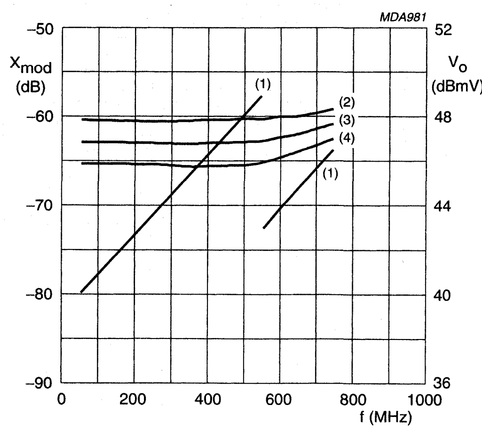
1. Tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at –6 dB offset (550 to 750 MHz).
2. Tilt = 12.5 dB (50 to 860 MHz).
3. f_p = 55.25 MHz; V_p = 44 dBmV;
   f_q = 805.25 MHz; V_q = 44 dBmV;
   measured at $f_p + f_q$ = 860.5 MHz.
4. f_p = 55.25 MHz; V_p = 44 dBmV;
   f_q = 691.25 MHz; V_q = 44 dBmV;
   measured at $f_p + f_q$ = 746.5 MHz.
5. 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.
6. 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.
7. 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.
8. 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.
9. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 35 V.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 110 chs; tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at −6 dB offset (550 to 750 MHz).

(1) V_o.
(2) Typ. +3 σ.
(3) Typ.
(4) Typ. −3 σ.

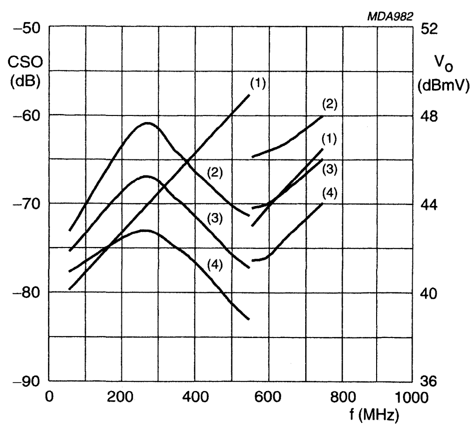
Fig.2 Composite triple beat as function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 110 chs; tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at −6 dB offset (550 to 750 MHz).

(1) V_o.
(2) Typ. +3 σ.
(3) Typ.
(4) Typ. −3 σ.

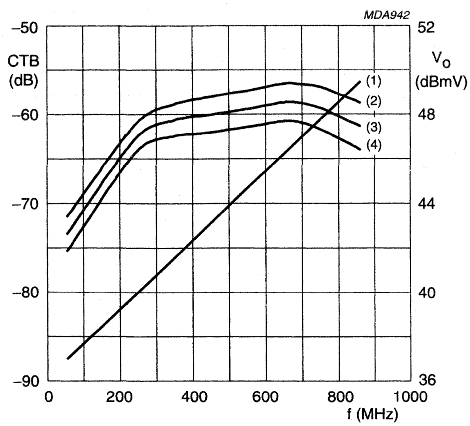
Fig.3 Cross modulation as function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 110 chs; tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at −6 dB offset (550 to 750 MHz).

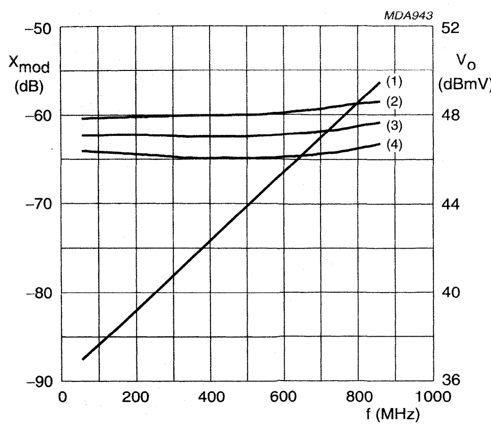
(1) V_o.
(2) Typ. +3 σ.
(3) Typ.
(4) Typ. −3 σ.

Fig.4 Composite second order distortion as function of frequency under tilted conditions.



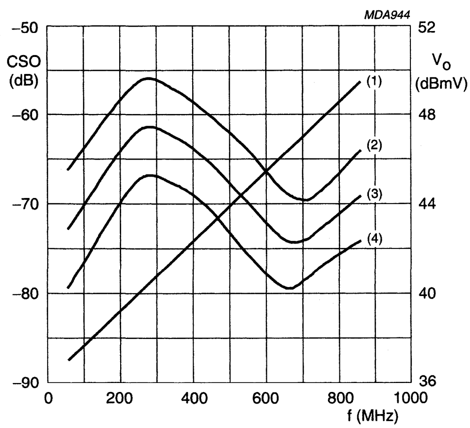
$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).
(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. −3 σ.

Fig.5 Composite triple beat as function of frequency under tilted conditions.



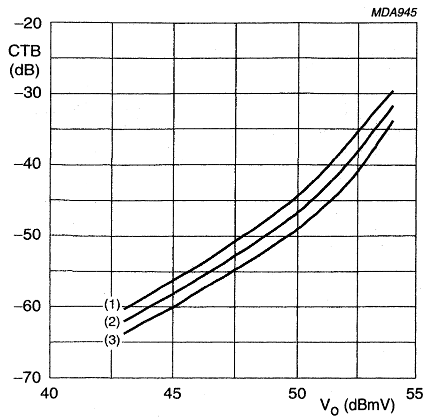
$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).
(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. −3 σ.

Fig.6 Cross modulation as function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).
(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. −3 σ.

Fig.7 Composite second order distortion as function of frequency under tilted conditions.



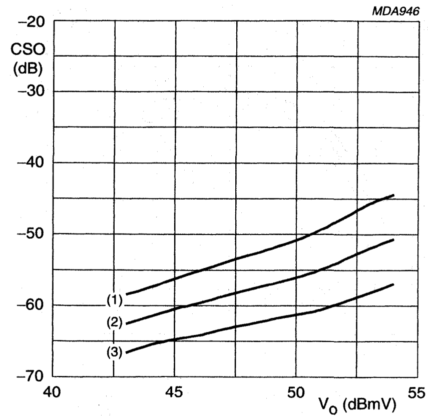
$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs; $f_m = 859.25$ MHz.

(1) Typ. +3 σ.

(2) Typ.

(3) Typ. −3 σ.

Fig.8 Composite triple beat as function of output voltage.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs; $f_m = 860.5$ MHz.

(1) Typ. +3 σ.

(2) Typ.

(3) Typ. −3 σ.

Fig.9 Composite second order distortion as function of output voltage.

CATV amplifier module | BGD902L

FEATURES

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

APPLICATIONS

- CATV systems operating in the 40 to 900 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	$+V_B$
7	common
8	common
9	output

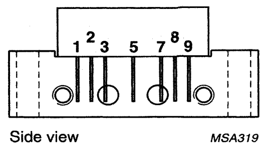


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18.2	18.8	dB
		f = 900 MHz	19	20	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	350	380	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	30	V
V_i	RF input voltage	–	70	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 900 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	f = 50 MHz	18.2	18.5	18.8	dB
		f = 900 MHz	19	19.5	20	dB
SL	slope cable equivalent	f = 40 to 900 MHz	0.4	0.9	1.4	dB
FL	flatness of frequency response	f = 40 to 900 MHz	–	±0.15	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	21	24	–	dB
		f = 80 to 160 MHz	22	26	–	dB
		f = 160 to 320 MHz	22	28	–	dB
		f = 320 to 640 MHz	19	22	–	dB
		f = 640 to 900 MHz	18	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	25	32	–	dB
		f = 80 to 160 MHz	25	33	–	dB
		f = 160 to 320 MHz	21	29	–	dB
		f = 320 to 750 MHz	20	22	–	dB
		f = 750 to 900 MHz	19	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 channels flat; V_o = 47 dBmV; f_m = 859.25 MHz	–	–66.5	–65	dB
		77 channels flat; V_o = 44 dBmV; f_m = 547.25 MHz	–	–68	–66	dB
		110 channels flat; V_o = 44 dBmV; f_m = 745.25 MHz	–	–61.5	–60	dB
		129 channels flat; V_o = 44 dBmV; f_m = 859.25 MHz	–	–58	–56	dB
		110 channels; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	tbd	tbd	dB
		129 channels; f_m = 650 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	tbd	tbd	dB
X_{mod}	cross modulation	49 channels flat; V_o = 47 dBmV; f_m = 55.25 MHz	–	–64.5	–62	dB
		77 channels flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–67.5	–65	dB
		110 channels flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–64	–61.5	dB
		129 channels flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–62.5	–60	dB
		110 channels; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	tbd	tbd	dB
		129 channels; f_m = 860 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	tbd	tbd	dB

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO	composite second order distortion	49 channels flat; V_o = 47 dBmV; f_m = 860.5 MHz	–	−66	−63	dB
		77 channels flat; V_o = 44 dBmV; f_m = 548.5 MHz	–	−71	−66	dB
		110 channels flat; V_o = 44 dBmV; f_m = 746.5 MHz	–	−65	−60	dB
		129 channels flat; V_o = 44 dBmV; f_m = 860.5 MHz	–	−62	−59	dB
		110 channels; f_m = 250 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	tbd	tbd	dB
		129 channels; f_m = 250 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	tbd	tbd	dB
d_2	second order distortion	note 3	–	−80	−74	dB
		note 4	–	−83	−77	dB
		note 5	–	−84	−78	dB
V_o	output voltage	d_{im} = −60 dB; note 6	63	64.5	–	dBmV
		d_{im} = −60 dB; note 7	64	65.5	–	dBmV
		d_{im} = −60 dB; note 8	66	67.5	–	dBmV
		CTB compression = 1 dB; 129 channels flat; f = 859.25 MHz	tbd	tbd	–	dBmV
		CSO compression = 1 dB; 129 channels flat; f = 860.5 MHz	tbd	tbd	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5	dB
		f = 550 MHz	–	5	5.5	dB
		f = 750 MHz	–	5.5	6.5	dB
		f = 900 MHz	–	6	7.5	dB
I_{tot}	total current consumption (DC)	note 9	350	365	380	mA

Notes

1. Tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at −6 dB offset (550 to 750 MHz).
2. Tilt = 12.5 dB (50 to 860 MHz).
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 35 V.

CATV amplifier modules BGD904; BGD904MI

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 900 MHz frequency range.

DESCRIPTION

Hybrid amplifier modules in a SOT115J package operating with a voltage supply of 24 V (DC).
Both modules are electrically identical only the pinning is different.

PINNING - SOT115J

PIN	DESCRIPTION	
	BGD904	BGD904MI
1	input	output
2, 3	common	common
5	$+V_B$	$+V_B$
7, 8	common	common
9	output	input

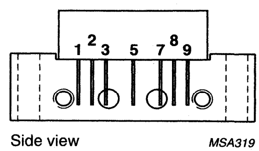


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.7	20.3	dB
		f = 900 MHz	20.5	21.5	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	405	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	30	V
V_i	RF input voltage	–	70	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

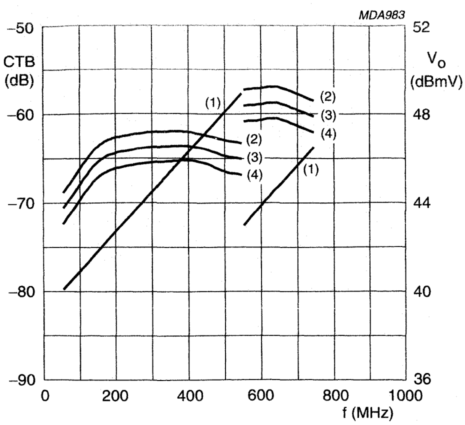
Bandwidth 40 to 900 MHz; V_B = 24 V; T_{mb} = 35 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.7	20	20.3	dB
		f = 900 MHz	20.5	21	21.5	dB
SL	slope cable equivalent	f = 40 to 900 MHz	0.4	0.9	1.4	dB
FL	flatness of frequency response	f = 40 to 900 MHz	–	±0.15	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	21	25	–	dB
		f = 80 to 160 MHz	22	30	–	dB
		f = 160 to 320 MHz	21	29	–	dB
		f = 320 to 550 MHz	18	24	–	dB
		f = 550 to 650 MHz	17	22	–	dB
		f = 650 to 750 MHz	16	21	–	dB
		f = 750 to 750 MHz	15	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	25	29	–	dB
		f = 80 to 160 MHz	23	28	–	dB
		f = 160 to 320 MHz	19	25	–	dB
		f = 320 to 550 MHz	18	24	–	dB
		f = 550 to 650 MHz	18	24	–	dB
		f = 650 to 750 MHz	18	24	–	dB
		f = 750 to 900 MHz	17	23	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 chs flat; V_o = 47 dBmV; f_m = 859.25 MHz	–	–68	–66.5	dB
		77 chs flat; V_o = 44 dBmV; f_m = 547.25 MHz	–	–69.5	–67.5	dB
		110 chs flat; V_o = 44 dBmV; f_m = 745.25 MHz	–	–63	–61.5	dB
		129 chs flat; V_o = 44 dBmV; f_m = 859.25 MHz	–	–59.5	–57.5	dB
		110 chs; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–63.5	–61.5	dB
		129 chs; f_m = 650 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–58.5	–56	dB
X_{mod}	cross modulation	49 chs flat; V_o = 47 dBmV; f_m = 55.25 MHz	–	–66	–63	dB
		77 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–68.5	–66	dB
		110 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–65.5	–62.5	dB
		129 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–64	–61	dB
		110 chs; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–61.5	–59	dB
		129 chs; f_m = 860 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–60	–57	dB

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO	composite second order distortion	49 chs flat; V_o = 47 dBmV; $_m$ = 860.5 MHz	–	−68	−62	dB
		77 chs flat; V_o = 44 dBmV; f_m = 548.5 MHz	–	−72	−67	dB
		110 chs flat; V_o = 44 dBmV; f_m = 746.5 MHz	–	−68	−62	dB
		129 chs flat; V_o = 44 dBmV; f_m = 860.5 MHz	–	−64	−58	dB
		110 chs; f_m = 250 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	−67	−62	dB
		129 chs; f_m = 250 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	−62	−58	dB
d_2	second order distortion	note 3	–	−82	−75	dB
		note 4	–	−82	−76	dB
		note 5	–	−83	−77	dB
V_o	output voltage	d_{im} = −60 dB; note 6	64	65.5	–	dBmV
		d_{im} = −60 dB; note 7	65	67	–	dBmV
		d_{im} = −60 dB; note 8	67	69	–	dBmV
		CTB compression = 1 dB; 129 chs flat; f = 859.25 MHz	48.5	49	–	dBmV
		CSO compression = 1 dB; 129 chs flat; f = 860.5 MHz	50	52	–	dBmV
F	noise figure	f = 50 MHz	–	4	5	dB
		f = 550 MHz	–	4.5	5.5	dB
		f = 750 MHz	–	5.1	6.5	dB
		f = 900 MHz	–	6.2	7.5	dB
I_{tot}	total current consumption (DC)	note 9	405	420	435	mA

Notes

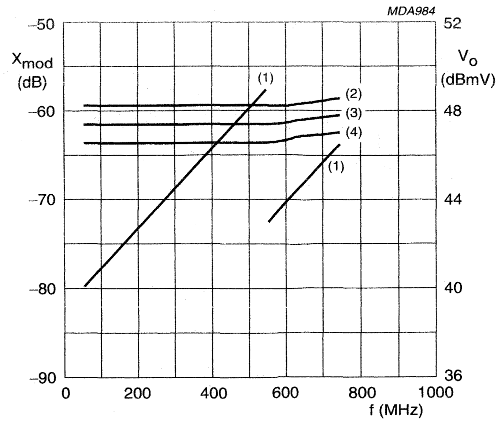
1. Tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at −6 dB offset (550 to 750 MHz).
2. Tilt = 12.5 dB (50 to 860 MHz).
3. f_p = 55.25 MHz; V_p = 44 dBmV; f_q = 805.25 MHz; V_q = 44 dBmV; measured at $f_p + f_q$ = 860.5 MHz.
4. f_p = 55.25 MHz; V_p = 44 dBmV; f_q = 691.25 MHz; V_q = 44 dBmV; measured at $f_p + f_q$ = 746.5 MHz.
5. 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.
6. 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.
7. 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.
8. 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.
9. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 35 V.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 110 chs; tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at −6 dB offset (550 to 750 MHz).

(1) V_o.
(2) Typ. +3 σ.
(3) Typ.
(4) Typ. −3 σ.

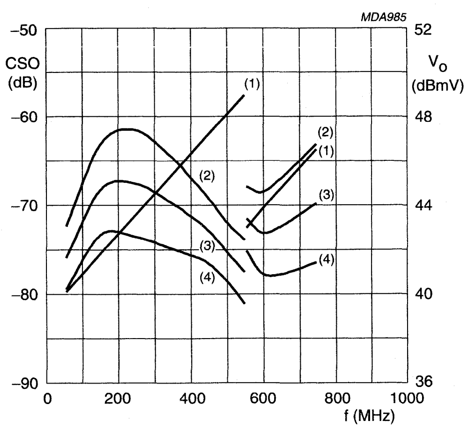
Fig.2 Composite triple beat as function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 110 chs; tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at −6 dB offset (550 to 750 MHz).

(1) V_o.
(2) Typ. +3 σ.
(3) Typ.
(4) Typ. −3 σ.

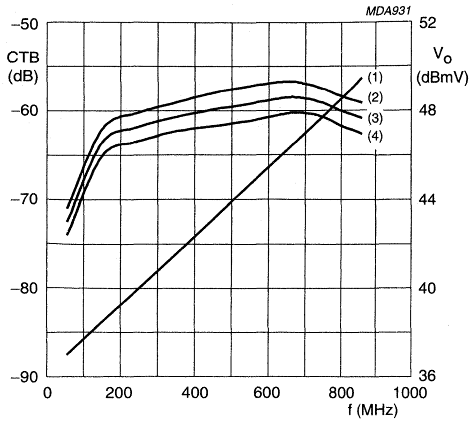
Fig.3 Cross modulation as function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 110 chs; tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at −6 dB offset (550 to 750 MHz).

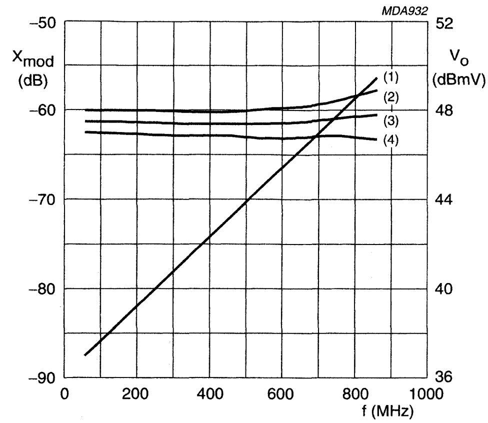
(1) V_o.
(2) Typ. +3 σ.
(3) Typ.
(4) Typ. −3 σ.

Fig.4 Composite second order distortion as function of frequency under tilted conditions.



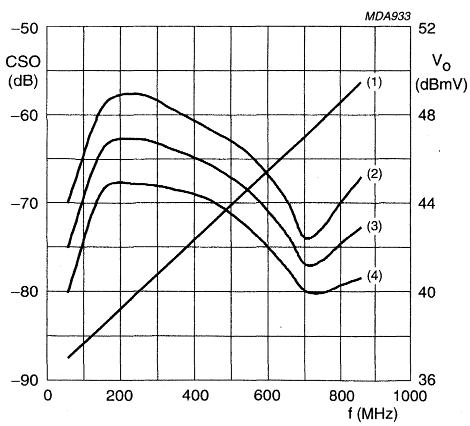
$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).
(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. −3 σ.

Fig.5 Composite triple beat as function of frequency under tilted conditions.



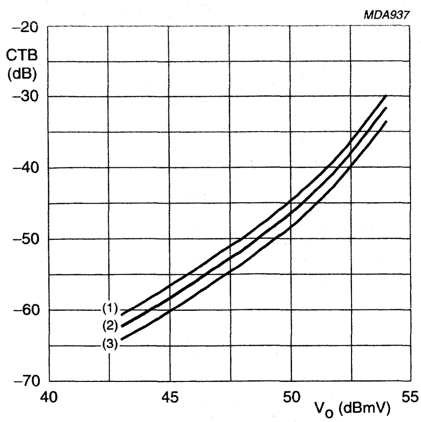
$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).
(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. −3 σ.

Fig.6 Cross modulation as function of frequency under tilted conditions.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).
(1) V_o. (3) Typ.
(2) Typ. +3 σ. (4) Typ. −3 σ.

Fig.7 Composite second order distortion as function of frequency under tilted conditions.



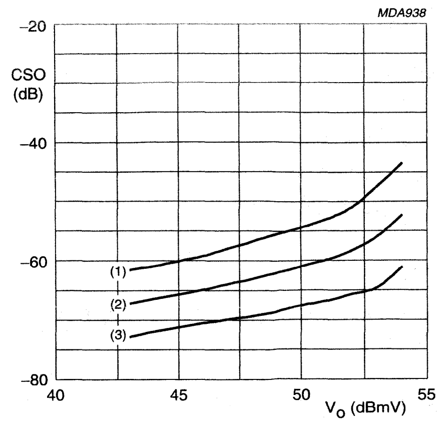
$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs; $f_m = 859.25$ MHz.

(1) Typ. +3 σ.

(2) Typ.

(3) Typ. −3 σ.

Fig.8 Composite triple beat as function of output voltage.



$Z_S = Z_L = 75\ \Omega$; $V_B = 24$ V; 129 chs; $f_m = 860.5$ MHz.

(1) Typ. +3 σ.

(2) Typ.

(3) Typ. −3 σ.

Fig.9 Composite second order distortion as function of output voltage.

FEATURES

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

APPLICATIONS

- CATV systems operating in the 40 to 900 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	$+V_B$
7	common
8	common
9	output

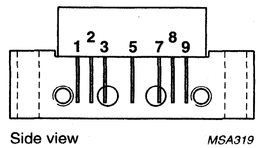


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.7	20.3	dB
		f = 900 MHz	20.5	21.5	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	350	380	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	30	V
V_i	RF input voltage	–	70	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 900 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	f = 50 MHz	19.7	20	20.3	dB
		f = 900 MHz	20.5	21	21.5	dB
SL	slope cable equivalent	f = 40 to 900 MHz	0.4	0.9	1.4	dB
FL	flatness of frequency response	f = 40 to 900 MHz	–	±0.15	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	21	25	–	dB
		f = 80 to 160 MHz	22	30	–	dB
		f = 160 to 320 MHz	21	29	–	dB
		f = 320 to 550 MHz	18	24	–	dB
		f = 550 to 650 MHz	17	22	–	dB
		f = 650 to 900 MHz	16	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	25	29	–	dB
		f = 80 to 160 MHz	23	28	–	dB
		f = 160 to 320 MHz	19	25	–	dB
		f = 320 to 750 MHz	18	24	–	dB
		f = 750 to 900 MHz	17	23	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 channels flat; V_o = 47 dBmV; f_m = 859.25 MHz	–	–66	–64.5	dB
		77 channels flat; V_o = 44 dBmV; f_m = 547.25 MHz	–	–67.5	–65.5	dB
		110 channels flat; V_o = 44 dBmV; f_m = 745.25 MHz	–	–61	–59.5	dB
		129 channels flat; V_o = 44 dBmV; f_m = 859.25 MHz	–	–57.5	–55.5	dB
		110 channels; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	tbd	tbd	dB
		129 channels; f_m = 650 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	tbd	tbd	dB
X_{mod}	cross modulation	49 channels flat; V_o = 47 dBmV; f_m = 55.25 MHz	–	–64	–61	dB
		77 channels flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–66.5	–64	dB
		110 channels flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–63.5	–60.5	dB
		129 channels flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–62	–59	dB
		110 channels; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	tbd	tbd	dB
		129 channels; f_m = 860 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	tbd	tbd	dB

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO	composite second order distortion	49 channels flat; V_o = 47 dBmV; f_m = 860.5 MHz	–	−69	−63	dB
		77 channels flat; V_o = 44 dBmV; f_m = 548.5 MHz	–	−71	−66	dB
		110 channels flat; V_o = 44 dBmV; f_m = 746.5 MHz	–	−68	−62	dB
		129 channels flat; V_o = 44 dBmV; f_m = 860.5 MHz	–	−65	−59	dB
		110 channels; f_m = 250 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	tbd	tbd	dB
		129 channels; f_m = 250 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	tbd	tbd	dB
d_2	second order distortion	note 3	–	−82	−75	dB
		note 4	–	−82	−76	dB
		note 5	–	−83	−77	dB
V_o	output voltage	d_{im} = −60 dB; note 6	62.5	64	–	dBmV
		d_{im} = −60 dB; note 7	63.5	65.5	–	dBmV
		d_{im} = −60 dB; note 8	65.5	67.5	–	dBmV
		CTB compression = 1 dB; 129 channels flat; f = 859.25 MHz	tbd	tbd	–	dBmV
		CSO compression = 1 dB; 129 channels flat; f = 860.5 MHz	tbd	tbd	–	dBmV
F	noise figure	f = 50 MHz	–	4	5	dB
		f = 550 MHz	–	4.5	5.5	dB
		f = 750 MHz	–	5.1	6.5	dB
		f = 900 MHz	–	6.2	7.5	dB
I_{tot}	total current consumption (DC)	note 9	350	365	380	mA

Notes

1. Tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at −6 dB offset (550 to 750 MHz).
2. Tilt = 12.5 dB (50 to 860 MHz).
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 35 V.

CATV amplifier modules BGD906; BGD906MI

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 900 MHz frequency range.

DESCRIPTION

Hybrid amplifier modules in a SOT115J package operating with a voltage supply of 24 V (DC).
Both modules are electrically identical only the pinning is different.

PINNING - SOTT115J

PIN	DESCRIPTION	
	BGD906	BGD906MI
1	input	output
2	common	common
3	common	common
5	$+V_B$	$+V_B$
7	common	common
8	common	common
9	output	input

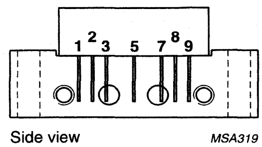


Fig.1 Simplified outline SOT115J.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21.2	21.8	dB
		f = 900 MHz	22	23	dB
I_{tot}	total current consumption (DC)	V_B = 24 V; T_{mb} = 35 °C	405	435	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	30	V
V_i	RF input voltage	–	70	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 900 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	f = 50 MHz	21.2	21.5	21.8	dB
		f = 900 MHz	22	22.5	23	dB
SL	slope cable equivalent	f = 40 to 900 MHz	0.5	1.0	1.5	dB
FL	flatness of frequency response	f = 40 to 900 MHz	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	21	–	–	dB
		f = 80 to 160 MHz	20	–	–	dB
		f = 160 to 320 MHz	17	–	–	dB
		f = 320 to 650 MHz	16	–	–	dB
		f = 650 to 900 MHz	15	–	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	25	–	–	dB
		f = 80 to 160 MHz	22	–	–	dB
		f = 160 to 320 MHz	20	–	–	dB
		f = 320 to 550 MHz	19	–	–	dB
		f = 550 to 650 MHz	18	–	–	dB
		f = 650 to 750 MHz	17	–	–	dB
		f = 750 to 900 MHz	16	–	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 chs flat; V_o = 47 dBmV; f_m = 859.25 MHz	–	–	–65	dB
		77 chs flat; V_o = 44 dBmV; f_m = 547.25 MHz	–	–	–66	dB
		110 chs flat; V_o = 44 dBmV; f_m = 745.25 MHz	–	–	–60	dB
		129 chs flat; V_o = 44 dBmV; f_m = 859.25 MHz	–	–	–56	dB
		110 chs; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–	–60	dB
		129 chs; f_m = 650 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–	–54.5	dB
X_{mod}	cross modulation	49 chs flat; V_o = 47 dBmV; f_m = 55.25 MHz	–	–	–61	dB
		77 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–	–64	dB
		110 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–	–61	dB
		129 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–	–59	dB
		110 chs; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–	–57	dB
		129 chs; f_m = 860 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–	–55	dB

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO	composite second order distortion	49 chs flat; V_o = 47 dBmV; f_m = 860.5 MHz	–	–	–60	dB
		77 chs flat; V_o = 44 dBmV; f_m = 548.5 MHz	–	–	–65	dB
		110 chs flat; V_o = 44 dBmV; f_m = 746.5 MHz	–	–	–58	dB
		129 chs flat; V_o = 44 dBmV; f_m = 860.5 MHz	–	–	–55	dB
		110 chs; f_m = 250 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–	–60	dB
		129 chs; f_m = 250 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–	–55	dB
d_2	second order distortion	note 3	–	–	–70	dB
		note 4	–	–	–72	dB
		note 5	–	–	–76	dB
V_o	output voltage	d_{im} = –60 dB; note 6	63	–	–	dBmV
		d_{im} = –60 dB; note 7	64	–	–	dBmV
		d_{im} = –60 dB; note 8	66	–	–	dBmV
		CTB compression = 1 dB; 129 chs flat; f = 859.25 MHz	48	48.5	–	dBmV
		CSO compression = 1 dB; 129 chs flat; f = 860.5 MHz	49	51	–	dBmV
F	noise figure	f = 50 MHz	–	–	5.5	dB
		f = 550 MHz	–	–	5	dB
		f = 750 MHz	–	–	6	dB
		f = 900 MHz	–	–	7.5	dB
I_{tot}	total current consumption (DC)	note 9	405	420	435	mA

Notes

1. Tilt = 9 dB (50 to 550 MHz)
   tilt = 3.5 dB at –6 dB offset (550 to 750 MHz).
2. Tilt = 12.5 dB (50 to 860 MHz).
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 35 V.

CATV amplifier module | BGD906L

FEATURES

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

APPLICATIONS

- CATV systems operating in the 40 to 900 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	$+V_B$
7	common
8	common
9	output

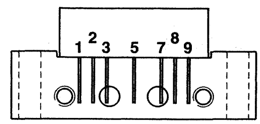


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21.2	21.8	dB
		f = 900 MHz	22	23	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	350	380	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	30	V
V_i	RF input voltage	–	70	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 900 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	f = 50 MHz	21.2	21.5	21.8	dB
		f = 900 MHz	22	22.5	23	dB
SL	slope cable equivalent	f = 40 to 900 MHz	0.5	1.0	1.5	dB
FL	flatness of frequency response	f = 40 to 900 MHz	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	21	–	–	dB
		f = 80 to 160 MHz	20	–	–	dB
		f = 160 to 320 MHz	17	–	–	dB
		f = 320 to 650 MHz	16	–	–	dB
		f = 650 to 900 MHz	15	–	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	25	–	–	dB
		f = 80 to 160 MHz	22	–	–	dB
		f = 160 to 320 MHz	20	–	–	dB
		f = 320 to 550 MHz	19	–	–	dB
		f = 550 to 650 MHz	18	–	–	dB
		f = 650 to 750 MHz	17	–	–	dB
		f = 750 to 900 MHz	16	–	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	49 chs flat; V_o = 47 dBmV; f_m = 859.25 MHz	–	–	–63	dB
		77 chs flat; V_o = 44 dBmV; f_m = 547.25 MHz	–	–	–64	dB
		110 chs flat; V_o = 44 dBmV; f_m = 745.25 MHz	–	–	–58	dB
		129 chs flat; V_o = 44 dBmV; f_m = 859.25 MHz	–	–	–54	dB
		110 chs; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–	tbd	dB
		129 chs; f_m = 650 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–	tbd	dB
X_{mod}	cross modulation	49 chs flat; V_o = 47 dBmV; f_m = 55.25 MHz	–	–	–59	dB
		77 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–	–62	dB
		110 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–	–59	dB
		129 chs flat; V_o = 44 dBmV; f_m = 55.25 MHz	–	–	–57	dB
		110 chs; f_m = 400 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–	tbd	dB
		129 chs; f_m = 860 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–	tbd	dB

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO	composite second order distortion	49 chs flat; V_o = 47 dBmV; f_m = 860.5 MHz	–	–	–61	dB
		77 chs flat; V_o = 44 dBmV; f_m = 548.5 MHz	–	–	–64	dB
		110 chs flat; V_o = 44 dBmV; f_m = 746.5 MHz	–	–	–58	dB
		129 chs flat; V_o = 44 dBmV; f_m = 860.5 MHz	–	–	–56	dB
		110 chs; f_m = 250 MHz; V_o = 49 dBmV at 550 MHz; note 1	–	–	tbd	dB
		129 chs; f_m = 250 MHz; V_o = 49.5 dBmV at 860 MHz; note 2	–	–	tbd	dB
d_2	second order distortion	note 3	–	–	–70	dB
		note 4	–	–	–72	dB
		note 5	–	–	–76	dB
V_o	output voltage	d_{im} = –60 dB; note 6	61.5	–	–	dBmV
		d_{im} = –60 dB; note 7	62.5	–	–	dBmV
		d_{im} = –60 dB; note 8	64.5	–	–	dBmV
		CTB compression = 1 dB; 129 chs flat; f = 859.25 MHz	tbd	tbd	–	dBmV
		CSO compression = 1 dB; 129 chs flat; f = 860.5 MHz	tbd	tbd	–	dBmV
F	noise figure	f = 50 MHz	–	–	5.5	dB
		f = 550 MHz	–	–	5	dB
		f = 750 MHz	–	–	6	dB
		f = 900 MHz	–	–	7.5	dB
I_{tot}	total current consumption (DC)	note 9	350	365	380	mA

Notes

1. Tilt = 9 dB (50 to 550 MHz) tilt = 3.5 dB at –6 dB offset (550 to 750 MHz).
2. Tilt = 12.5 dB (50 to 860 MHz).
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 35 V.

Optical receiver module BGE67BO

FEATURES

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

APPLICATIONS

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

DESCRIPTION

Hybrid high dynamic range optical receiver amplifier module in a SOT115U 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 Ω.

PINNING - SOT115U

PIN	DESCRIPTION
1	monitor current
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

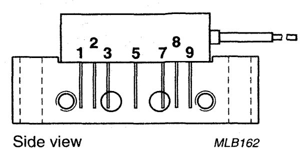


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		5	300	MHz
S_{22}	output return losses	f = 5 to 300 MHz	15	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion		–	−70	dBc
F	equivalent noise input	f = 10 to 300 MHz	–	7	pA/√Hz
I_{tot}	total current consumption (DC)	V_B = 24 V	160	190	mA

HANDLING

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

CAUTION
This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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_{stg}	storage temperature		−40	+85	°C
T_{mb}	operating mounting base temperature		−20	+85	°C
P_{in}	optical input power	continuous	−	5	mW
ESD	ESD sensitivity	human body model; R = 1.5 kΩ; C = 100 pF	500	−	V

CHARACTERISTICS

Table 1 Bandwidth 5 to 300 MHz; V_B = 24 V; T_{mb} = 30 °C; Z_L = 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_{22}	output return losses	f = 5 to 300 MHz	15	−	dB
	optical input return losses		45	−	dB
d_2	second order distortion	note 1	−	−70	dB
d_3	third order distortion	note 2	−	−80	dB
F	equivalent noise input	f = 10 to 300 MHz	−	7	pA/√Hz
s_λ	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_{tot}	total current consumption (DC)	note 3	160	190	mA

Notes

1. Two laser test; each laser with 40% modulation index;
   f_p = 20.25 MHz; P_p = 0.5 mW;
   f_q = 34 MHz; P_q = 0.5 mW;
   measured at $f_p + f_q$ = 54.25 MHz.
2. Three laser test; each laser with 40% modulation index;
   f_p = 125.25 MHz; P_p = 0.33 mW;
   f_q = 110.25 MHz; P_q = 0.33 mW;
   f_r = 135.25 MHz; P_r = 0.33 mW;
   measured at $f_p + f_q - f_r$ = 100.25 MHz.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

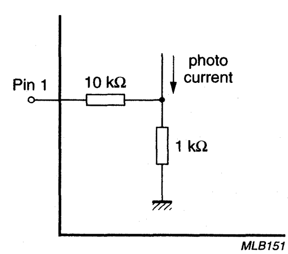


Fig.2 Monitor current pin.

Optical receiver module BGE67BO/4M

FEATURES

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

APPLICATIONS

- Reverse receiver amplifiers in two-way CATV systems in the 5 to 400 MHz frequency range.

DESCRIPTION

Hybrid high dynamic range optical receiver amplifier module in a SOT115U 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 Ω.

PINNING - SOT115U

PIN	DESCRIPTION
1	monitor current
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

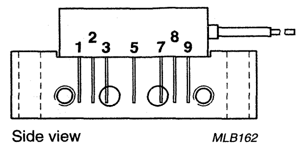


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		5	400	MHz
S_{22}	output return losses	f = 5 to 400 MHz	14	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion		–	–70	dBc
F	equivalent noise input	f = 5 to 400 MHz	–	7	pA/√Hz
I_{tot}	total current consumption (DC)	V_B = 24 V	150	180	mA

HANDLING

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

CAUTION
This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A, and SNW-FQ-302B.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		5	400	MHz
T_{stg}	storage temperature		−40	+85	°C
T_{mb}	operating mounting base temperature		−20	+85	°C
P_{in}	optical input power	continuous	−	5	mW
ESD	ESD sensitivity	human body model; R = 1.5 kΩ; C = 100 pF	500	−	V

CHARACTERISTICS

Table 1 Bandwidth 5 to 400 MHz; V_B = 24 V; T_{mb} = 30 °C; Z_L = 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_{22}	output return losses	f = 5 to 400 MHz	14	−	dB
	optical input return losses		45	−	dB
d_2	second order distortion	note 1	−	−70	dB
		note 2	−	−70	dB
d_3	third order distortion	note 3	−	−80	dB
F	equivalent noise input	f = 5 to 400 MHz	−	7	pA/√Hz
s_λ	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_{tot}	total current consumption (DC)	note 4	150	180	mA

Notes

1. Two laser test; each laser with 40% modulation index;
   f_p = 30.25 MHz; P_p = 0.5 mW;
   f_q = 70 MHz; P_q = 0.5 mW;
   measured at $f_p + f_q$ = 100.25 MHz.
2. Two laser test; each laser with 40% modulation index;
   f_p = 200.25 MHz; P_p = 0.5 mW;
   f_q = 100 MHz; P_q = 0.5 mW;
   measured at $f_p + f_q$ = 300.25 MHz.
3. Three laser test; each laser with 40% modulation index;
   f_p = 325.25 MHz; P_p = 0.33 mW;
   f_q = 210.25 MHz; P_q = 0.33 mW;
   f_r = 135.25 MHz; P_r = 0.33 mW;
   measured at $f_p + f_q - f_r$ = 400.25 MHz.
4. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

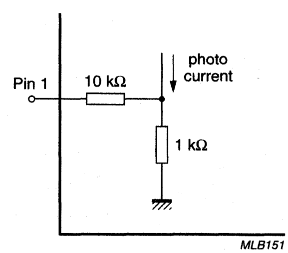


Fig.2 Monitor current pin.

Optical receiver module BGE67BO/SC

FEATURES

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

APPLICATIONS

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

DESCRIPTION

Hybrid high dynamic range optical receiver amplifier 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 1 290 to 1 600 nm, a terminal to monitor the pin diode current and an electrical output with an impedance of 75 Ω. 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, 3, 7, 8	common
5	$+V_B$
9	output

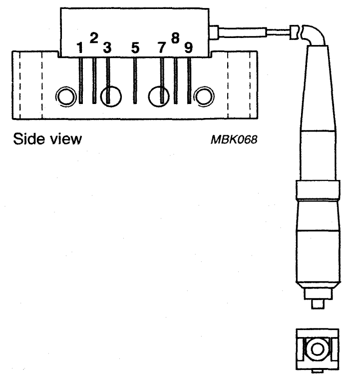


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		5	300	MHz
S_{22}	output return losses	f = 5 to 300 MHz	15	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion		–	−70	dBc
F	equivalent noise input	f = 10 to 300 MHz	–	7	pA/√Hz
I_{tot}	total current consumption (DC)	V_B = 24 V	160	190	mA

HANDLING

Fibreglass optical coupling: maximum tensile strength = 5 N; minimum bending radius = 35 mm.
To prevent damage to the optical fibre, a clamp should be fixed at a distance of not less than 26 mm from the module cap.

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

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_{stg}	storage temperature		−40	+85	°C
T_{mb}	operating mounting base temperature		−20	+85	°C
P_{in}	optical input power	continuous	−	5	mW
ESD	ESD sensitivity	human body model; R = 1.5 kΩ; C = 100 pF	500	−	V

CHARACTERISTICS

Bandwidth 5 to 300 MHz; V_B = 24 V; T_{mb} = 30 °C; Z_L = 75 Ω.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
S	responsivity	λ = 1300 nm	750	−	V/W
$V_{pin\ 1}$	pin 1 monitor voltage	λ = 1300 nm	0.75	1	V/mW
FL	flatness of frequency response		−	±0.3	dB
S_{22}	output return losses	f = 5 to 300 MHz	15	−	dB
	optical input return losses		45	−	dB
OBR_C	connector optical return losses		60	−	dB
IL_C	connector optical insertion losses		−	0.5	dB
d_2	second order distortion	note 1	−	−70	dB
d_3	third order distortion	note 2	−	−80	dB
F	equivalent noise input	f = 10 to 300 MHz	−	7	pA/√Hz
s_λ	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	buffered fibre; SM type; 9/125 μm; kevlar buffer: 3 mm	817	917	mm
I_{tot}	total current consumption (DC)	note 3	160	190	mA

Notes

1. Two laser test; each laser with 40% modulation index; f_p = 20.25 MHz; P_p = 0.5 mW; f_q = 34 MHz; P_q = 0.5 mW; measured at $f_p + f_q$ = 54.25 MHz.
2. Three laser test; each laser with 40% modulation index; f_p = 125.25 MHz; P_p = 0.33 mW; f_q = 110.25 MHz; P_q = 0.33 mW; f_r = 135.25 MHz; P_r = 0.33 mW; measured at $f_p + f_q - f_r$ = 100.25 MHz.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

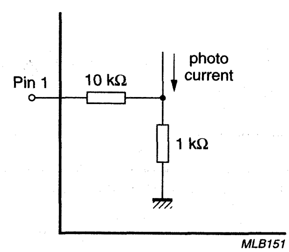


Fig.2 Monitor current pin.

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 750 MHz frequency range.

DESCRIPTION

Hybrid high dynamic range amplifier module operating at a supply voltage of 24 V (DC) in a SOT115J package. The module consists of two cascaded stages both in cascode configuration.

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

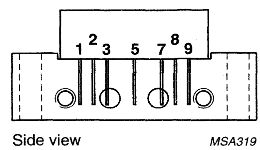


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	34.5	dB
		f = 750 MHz	34	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	290	320	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	supply voltage	–	25	V
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 750 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	33.5	34.5	dB
		f = 750 MHz	34	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0.5	2.5	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	±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	–	−49	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−51	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	−52	dB
d_2	second order distortion	note 1	–	−64	dB
V_o	output voltage	d_{im} = −60 dB; note 2	58	–	dBmV
F	noise figure	f = 750 MHz	–	7	dB
PM	positive match	f = 40 MHz to 2 GHz	–	3	dB
I_{tot}	total current consumption (DC)	note 3	290	320	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Optical receiver module BGE847BO

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 amplifier module in a SOT115T package. Two of the module pins are for connection to 24 V (DC). One for amplifier supply voltage and the other for the pin diode bias.
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 Ω.

PINNING - SOT115T

PIN	DESCRIPTION
1	monitor current
2	common
3	common
4	$+V_B$ of the pin diode
5	$+V_B$ of the amplifier
7	common
8	common
9	output

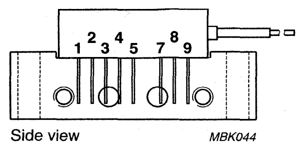


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		40	860	MHz
S_{22}	output return losses	f = 40 to 860 MHz	11	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion	f = 324.25 MHz	–	−70	dBc
F	equivalent noise input	f = 40 MHz	–	7	pA/√Hz
I_{tot}	total current consumption (DC)	V_B = 24 V	175	205	mA

HANDLING

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

CAUTION
This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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_{stg}	storage temperature		−40	+85	°C
T_{mb}	operating mounting base temperature		−20	+85	°C
P_{in}	optical input power	continuous	−	5	mW
ESD	ESD sensitivity	human body model; R = 1.5 kΩ; C = 100 pF	500	−	V

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
S	responsivity	λ = 1300 nm	800	−	V/W
FL	flatness of frequency response		−	±0.5	dB
S_{22}	output return losses	f = 40 to 860 MHz	11	−	dB
	optical input return losses		45	−	dB
d_2	second order distortion	note 1	−	−70	dB
d_3	third order distortion	note 2	−	−80	dB
F	equivalent noise input	f = 40 MHz	−	7	pA/√Hz
s_λ	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_{tot}	total current consumption (DC)		175	205	mA
$I_{pin\ 4}$	pin diode bias current (DC)		−	25	mA

Notes

1. Two laser test; each laser with 40% modulation index; f_p = 135 MHz; P_p = 0.5 mW; f_q = 189.25 MHz; P_q = 0.5 mW; measured at $f_p + f_q$ = 324.25 MHz.
2. Three laser test; each laser with 40% modulation index; f_p = 326.25 MHz; P_p = 0.33 mW; f_q = 333.25 MHz; P_q = 0.33 mW; f_r = 335.25 MHz; P_r = 0.33 mW; measured at $f_p + f_q - f_r$ = 324.25 MHz.

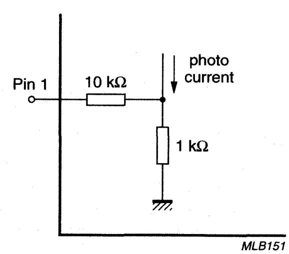


Fig.2 Monitor current pin.

Optical receiver module | BGE847BO/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 SOT115W package. Two of the module pins are for connection to 24 V (DC); one for amplifier supply voltage and the other for the pin diode bias.

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 Ω. The optical fibre is terminated by an FC/APC connector (JDS version) and partly reinforced by a 3 mm diameter Kevlar buffer.

PINNING - SOT115W

PIN	DESCRIPTION
1	monitor current
2	common
3	common
4	$+V_B$ of the pin diode
5	$+V_B$ of the amplifier
7	common
8	common
9	output

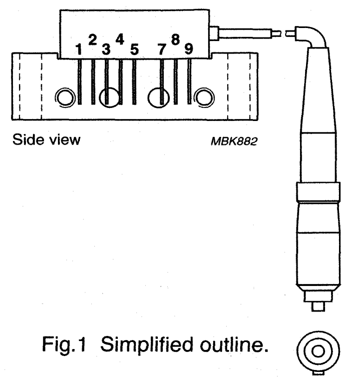


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		40	860	MHz
S_{22}	output return losses	f = 40 to 860 MHz	11	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion	f = 324.25 MHz	–	−70	dBc
F	equivalent noise input	f = 40 MHz	–	7	pA/√Hz
I_{tot}	total current consumption (DC)	V_B = 24 V	175	205	mA

HANDLING

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

CAUTION
This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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_{stg}	storage temperature		−40	+85	°C
T_{mb}	operating mounting base temperature		−20	+85	°C
P_{in}	optical input power	continuous	−	5	mW
ESD	ESD sensitivity	human body model; R = 1.5 kΩ; C = 100 pF	500	−	V

CHARACTERISTICS

Table 1 Bandwidth 40 to 860 MHz; V_B = 24 V; T_{mb} = 30 °C; Z_L = 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_{22}	output return losses	f_1 = 40 to 860 MHz	11	−	dB
	optical input return losses		45	−	dB
OBR_C	connector optical return losses		60	−	dB
IL_C	connector optical insertion losses		−	0.5	dB
d_2	second order distortion	note 1	−	−70	dB
d_3	third order distortion	note 2	−	−80	dB
F	equivalent noise input	f_1 = 40 MHz	−	7	pA/√Hz
s_λ	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	buffered fibre; SM type; 9/125 μm; Kevlar buffer: 3 mm	577	627	mm
I_{tot}	total current consumption (DC)	note 3	175	205	mA
$I_{pin\ 4}$	pin diode bias current (DC)		−	25	mA

Notes

1. Two laser test; each laser with 40 % modulation index:
   f_p = 135 MHz; P_p = 0.5 mW;
   f_q = 189.25 MHz; P_q = 0.5 mW;
   measured at $f_p + f_q$ = 324.25 MHz.
2. Three laser test; each laser with 40 % modulation index:
   f_p = 326.25 MHz; P_p = 0.33 mW;
   f_q = 333.25 MHz; P_q = 0.33 mW;
   f_r = 335.25 MHz; P_r = 0.33 mW;
   measured at $f_p + f_q - f_r$ = 324.25 MHz.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

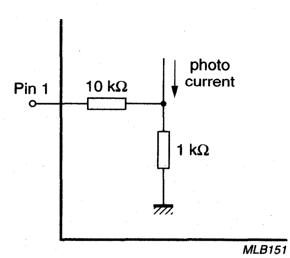


Fig.2 Monitor current pin.

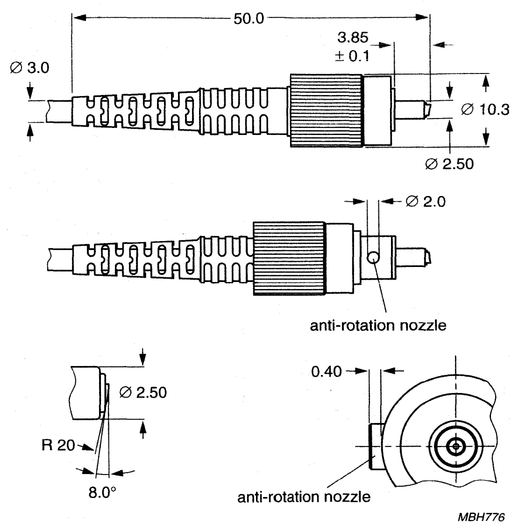


Fig.3 FC/APC connector.

Optical receiver module BGE883BO

FEATURES

- Excellent linearity
- 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 SOT115U package operating at a voltage supply of 24 V (DC). The module contains a monomode optical input suitable for wavelengths from 1 290 to 1 600 nm, a terminal to monitor the pin diode current and an electrical output with an impedance of 75 Ω.

PINNING - SOT115U

PIN	DESCRIPTION
1	monitor current
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

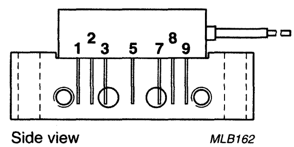


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		40	860	MHz
S_{22}	output return losses	f = 40 to 860 MHz	17	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion	f = 324.25 MHz	–	−76	dBc
F	equivalent noise input	f = 40 to 860 MHz	–	13	pA/√Hz
I_{tot}	total current consumption (DC)	V_B = 24 V	175	205	mA

HANDLING

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

CAUTION
This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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_{stg}	storage temperature		−40	+85	°C
T_{mb}	operating mounting base temperature		−20	+85	°C
P_{in}	optical input power	continuous	–	5	mW
ESD	ESD sensitivity	human body model; R = 1.5 kΩ; C = 100 pF	500	–	V

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
S	responsivity	λ = 1300 nm	400	–	V/W
FL	flatness of frequency response		–	±0.5	dB
S_{22}	output return losses	f = 40 to 860 MHz	17	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion	note 1	–	−76	dB
d_3	third order distortion	note 2	–	−92	dB
		note 3	–	−80	dB
F	equivalent noise input	f = 40 MHz to 860 MHz	–	13	pA/√Hz
s_λ	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_{tot}	total current consumption (DC)	V_B = 24 V	175	205	mA

Notes

1. Two laser test; each laser with 40% modulation index;
   f_p = 135 MHz; P_p = 0.5 mW;
   f_q = 189.25 MHz; P_q = 0.5 mW;
   measured at $f_p + f_q$ = 324.25 MHz.
2. Three laser test; each laser with 40% modulation index;
   f_p = 326.25 MHz; P_p = 0.33 mW;
   f_q = 333.25 MHz; P_q = 0.33 mW;
   f_r = 335.25 MHz; P_r = 0.33 mW;
   measured at $f_p + f_q - f_r$ = 324.25 MHz.
3. Three laser test; each laser with 50% modulation index;
   f_p = 326.25 MHz; P_p = 0.53 mW;
   f_q = 333.25 MHz; P_q = 0.53 mW;
   f_r = 335.25 MHz; P_r = 0.53 mW;
   measured at $f_p + f_q - f_r$ = 324.25 MHz.

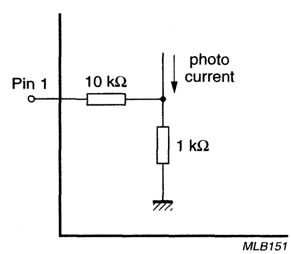


Fig.2 Monitor current pin.

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 with 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	$+V_B$
9	output; note 1

Note

1. Pins 1 and 9 carry DC voltages.

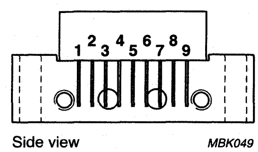


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	16.5	17.5	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	DC supply voltage	–	28	V
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

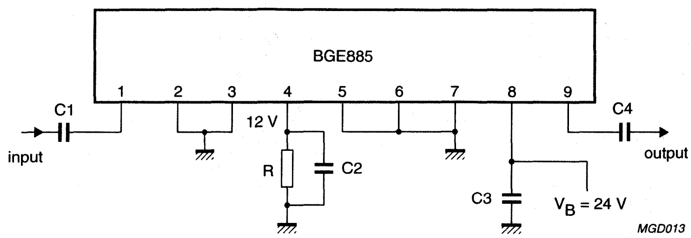
CHARACTERISTICS

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	16.5	17.5	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	–	±0.5	dB
S_{11}	input return losses	f = 40 to 450 MHz	14	–	dB
		f = 450 to 860 MHz	10	–	dB
S_{22}	output return losses	f = 40 to 450 MHz	14	–	dB
		f = 450 to 860 MHz	10	–	dB
d_2	second order distortion	note 1	–	−53	dB
V_o	output voltage	d_{im} = −60 dB; note 2	59	–	dBmV
F	noise figure	f = 350 MHz	–	7.5	dB
		f = 860 MHz	–	8	dB
I_{tot}	total current consumption (DC)	note 3	–	240	mA

Notes

1. 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.
2. Measured according to DIN45004B:
   f_p = 851.25 MHz; $V_p = V_o$ = 59 dBmV;
   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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.



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 Ω,1 W

Optical receiver module | BGE887BO

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 SOT115U 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 Ω.

PINNING - SOT115U

PIN	DESCRIPTION
1	monitor current
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

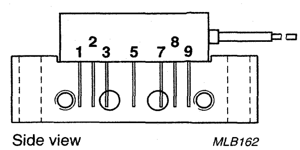


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		40	860	MHz
S_{22}	output return losses	f = 40 to 860 MHz	11	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion	f = 324.25 MHz	–	−70	dBc
F	equivalent noise input	f = 40 MHz	–	7	pA/√Hz
I_{tot}	total current consumption (DC)	V_B = 24 V	175	205	mA

HANDLING

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

CAUTION
This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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_{stg}	storage temperature		−40	+85	°C
T_{mb}	operating mounting base temperature		−20	+85	°C
P_{in}	optical input power	continuous	−	5	mW
ESD	ESD sensitivity	human body model; $R = 1.5\ k\Omega$; $C = 100\ pF$	500	−	V

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
S	responsivity	$\lambda = 1300$ nm	800	−	V/W
$V_{pin\ 1}$	pin 1 monitor voltage	$\lambda = 1300$ nm	0.75	1	V/mW
FL	flatness of frequency response		−	±0.5	dB
S_{22}	output return losses	f = 40 to 860 MHz	11	−	dB
	optical input return losses		45	−	dB
d_2	second order distortion	note 1	−	−70	dB
d_3	third order distortion	note 2	−	−80	dB
F	equivalent noise input	f = 40 MHz	−	7	pA/√Hz
s_λ	spectral sensitivity	$\lambda = 1310 \pm 20$ nm	0.85	−	A/W
		$\lambda = 1550 \pm 20$ 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_{tot}	total current consumption (DC)	note 3	175	205	mA

Notes

1. Two laser test; each laser with 40% modulation index; $f_p = 135$ MHz; $P_p = 0.5$ mW; $f_q = 189.25$ MHz; $P_q = 0.5$ mW; measured at $f_p + f_q = 324.25$ MHz.
2. Three laser test; each laser with 40% modulation index; $f_p = 326.25$ MHz; $P_p = 0.33$ mW; $f_q = 333.25$ MHz; $P_q = 0.33$ mW; $f_r = 335.25$ MHz; $P_r = 0.33$ mW; measured at $f_p + f_q - f_r = 324.25$ MHz.
3. The module normally operates at $V_B = 24$ V but is able to withstand supply transients up to 30 V.

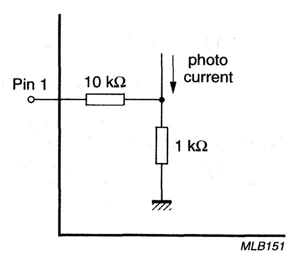


Fig.2 Monitor current pin.

Optical receiver module | BGE887BO/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 Ω. 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	$+V_B$
7	common
8	common
9	output

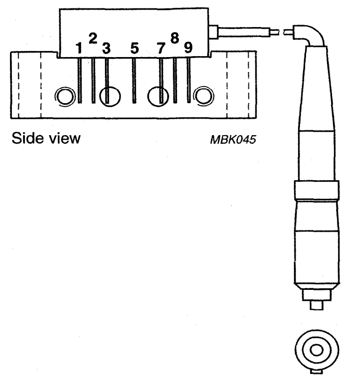


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		40	860	MHz
S_{22}	output return losses	f = 40 to 860 MHz	11	–	dB
	optical input return losses		40	–	dB
d_2	second order distortion	f = 324.25 MHz	–	–70	dBc
F	equivalent noise input	f = 40 MHz	–	7	pA/√Hz
I_{tot}	total current consumption (DC)	V_B = 24 V	175	205	mA

HANDLING

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

CAUTION
This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

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_{stg}	storage temperature		−40	+85	°C
T_{mb}	operating mounting base temperature		−20	+85	°C
P_{in}	optical input power	continuous	−	5	mW
ESD	ESD sensitivity	human body model; R = 1.5 kΩ; C = 100 pF	500	−	V

CHARACTERISTICS

Bandwidth 40 to 860 MHz; V_B = 24 V; T_{mb} = 30 °C; Z_L = 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_{22}	output return losses	f_1 = 40 to 860 MHz	11	−	dB
	optical input return losses		45	−	dB
OBR_C	connector optical return losses		70	−	dB
IL_C	connector optical insertion losses		−	0.5	dB
d_2	second order distortion	note 1	−	−70	dB
d_3	third order distortion	note 2	−	−80	dB
F	equivalent noise input	f_1 = 40 MHz	−	7	pA/√Hz
s_λ	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	buffered fibre; SM type; 9/125 μm; Kevlar buffer: 3 mm	577	627	mm
I_{tot}	total current consumption (DC)	note 3	175	205	mA

Notes

1. Two laser test; each laser with 40% modulation index:
   f_p = 135 MHz; P_p = 0.5 mW;
   f_q = 189.25 MHz; P_q = 0.5 mW;
   measured at $f_p + f_q$ = 324.25 MHz.
2. Three laser test; each laser with 40% modulation index:
   f_p = 326.25 MHz; P_p = 0.33 mW;
   f_q = 333.25 MHz; P_q = 0.33 mW;
   f_r = 335.25 MHz; P_r = 0.33 mW;
   measured at $f_p + f_q - f_r$ = 324.25 MHz.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

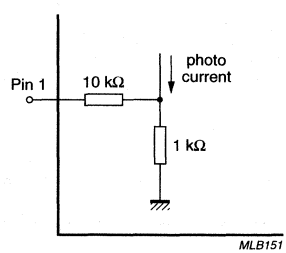


Fig.2 Monitor current pin.

Optical receiver module

BGE887BO/FC

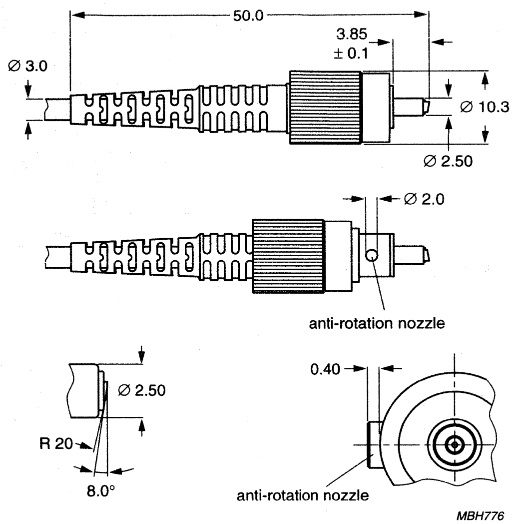


Fig.3 FC/APC connector.

FEATURES

- Improved BGY847BO
- Excellent linearity
- Extremely low noise up to 870 MHz
- Excellent flatness (straight line)
- Standard CATV outline
- Rugged construction
- Gold metallization ensures excellent reliability.

APPLICATIONS

- CATV systems operating in the 40 to 870 MHz frequency range.

DESCRIPTION

Hybrid high dynamic range optical receiver amplifier module in a SOT115T package. Two of the module pins are for connection to 24 V (DC), one for amplifier supply voltage and the other for the pin diode bias.
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 Ω.

PINNING - SOT115T

PIN	DESCRIPTION
1	monitor current
2	common
3	common
4	$+V_B$ of the pin diode
5	$+V_B$ of the amplifier
7	common
8	common
9	output

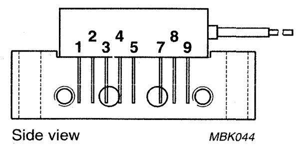


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		40	870	MHz
S_{22}	output return losses	f = 40 to 870 MHz	11	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion	f = 40 to 550 MHz	–	−70	dBc
F	equivalent input noise	f = 40 to 750 MHz	–	7	pA/√Hz
I_{tot}	total current consumption (DC)	V_B = 24 V	175	205	mA

HANDLING

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

CAUTION
This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
f	frequency range		40	870	MHz
T_{stg}	storage temperature		−40	+85	°C
T_{mb}	operating mounting base temperature		−20	+85	°C
P_{in}	optical input power	continuous	–	5	mW
ESD	ESD sensitivity	human body model; $R = 1.5\ k\Omega$; $C = 100\ pF$	500	–	V

CHARACTERISTICS

Table 1 Bandwidth 40 to 870 MHz; $V_B = 24\ V$; $T_{mb} = 30\ °C$; $Z_L = 75\ \Omega$

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
S	responsivity	$\lambda = 1300\ nm$	800	–	V/W
FL	flatness of frequency response	peak to valley; with respect to a straight line	–	1	dB
SL	slope of frequency response	f = 40 to 870 MHz	0	2	dB
S_{22}	output return losses	f = 40 to 870 MHz	11	–	dB
	optical input return losses		45	–	dB
d_2	second order distortion	f = 40 to 550 MHz; note 1	–	−70	dB
		f = 550 to 750 MHz; note 1	–	−65	dB
		f = 750 to 870 MHz; note 1	–	−63	dB
d_3	third order distortion	f = 40 to 750 MHz; note 2	–	−75	dB
		f = 750 to 870 MHz; note 2	–	−73	dB
F	equivalent input noise	f = 40 to 750 MHz	–	7	$pA/\sqrt{Hz}$
		f = 750 to 870 MHz	–	8	$pA/\sqrt{Hz}$
s_λ	spectral sensitivity	$\lambda = 1310\ \pm20\ nm$	0.85	–	A/W
		$\lambda = 1550\ \pm20\ nm$	0.9	–	A/W
λ	optical wavelength		1290	1600	nm
L	length of optical fibre	fibre; SM type; 9/125 µm	1	–	m
I_{tot}	total current consumption (DC)		175	205	mA
$I_{pin\ 4}$	pin diode bias current (DC)		–	25	mA

Notes

1. Two laser test; each laser with 40% modulation index; $P_{opt} = 1\ mW$ (total).
2. Three laser test; each laser with 60% modulation index; $P_{opt} = 1\ mW$ (total).

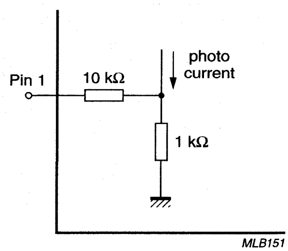


Fig.2 Monitor current pin.

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	$+V_B$
9	output; note1

Note

1. Pins 1 and 9 carry DC voltages.

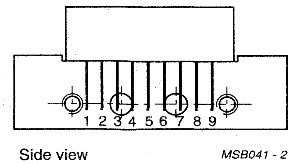


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	12	13	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	DC supply voltage	–	26	V
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

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

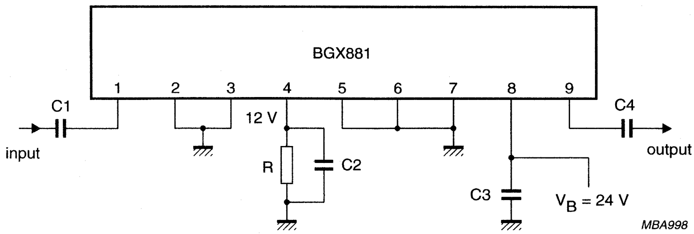
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	12	13	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	1.2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.3	dB
S_{11}	input return losses	f = 40 MHz; note 1	20	–	dB
		f = 800 to 860 MHz	10	–	dB
S_{22}	output return losses	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

1. Decreases 1.5 dB per octave.
2. 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.
3. 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.
4. 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.
5. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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 Ω, 1 W



Pins 1 and 9 carry DC voltages.

Fig.2 Test circuit.

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	$+V_B$
9	output (note 1)

Note

1. Pins 1 and 9 carry DC voltages.

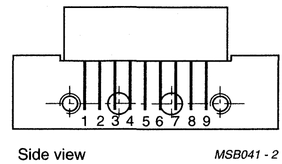


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	16.5	17.5	dB
		f = 750 MHz	17.3	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_B	DC supply voltage	–	26	V
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

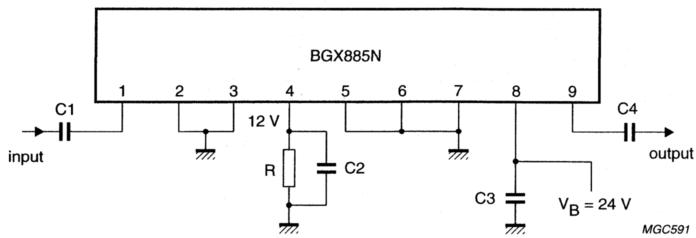
CHARACTERISTICS

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
		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

1. Decrease per octave of 1.5 dB.
2. 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.
3. 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.
4. 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.
5. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.



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 Ω, 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

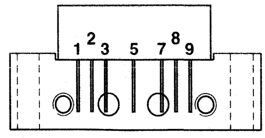


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 10 MHz	12.5	–	13.5	dB
I_{tot}	total current consumption (DC)	V_B = +24 V	–	215	230	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+90	°C

CHARACTERISTICS

Table 1 Bandwidth 5 to 200 MHz; T_{mb} = 30 °C; $Z_S = Z_L$ = 75 Ω

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

Notes

1. f_p = 83.25 MHz; V_p = 50 dBmV;
   f_q = 109.25 MHz; V_q = 50 dBmV;
   measured at $f_p + f_q$ = 192.5 MHz.
2. Measured according to DIN45004B;
   f_p = 35.25 MHz; $V_o = V_p$;
   f_q = 42.25 MHz; $V_q = V_o$ −6 dB;
   f_r = 44.25 MHz; $V_r = V_o$ −6 dB;
   measured at $f_p + f_q - f_r$ = 33.25 MHz.
3. Measured according to DIN45004B;
   f_p = 187.25 MHz; $V_o = V_p$;
   f_q = 194.25 MHz; $V_q = V_o$ −6 dB;
   f_r = 196.25 MHz; $V_r = V_o$ −6 dB;
   measured at $f_p + f_q - f_r$ = 185.25 MHz.
4. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

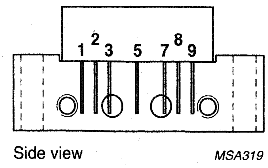


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 10 MHz	18	–	19	dB
I_{tot}	total current consumption (DC)	V_B = +24 V	–	215	230	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+90	°C

CHARACTERISTICS

Table 1 Bandwidth 5 to 200 MHz; T_{mb} = 30 °C; $Z_S = Z_L$ = 75 Ω

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

Notes

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

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).

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

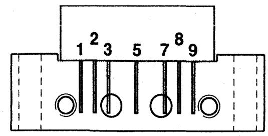


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 10 MHz	24.5	25.5	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	115	135	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 5 to 120 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 = 10 MHz	24.5	25.5	dB
SL	slope cable equivalent		−0.2	+0.5	dB
FL	flatness of frequency response		−	±0.2	dB
S_{11}	input return losses		20	−	dB
S_{22}	output return losses		20	−	dB
CTB	composite triple beat	14 channels flat; V_o = 48 dBmV; measured at 67.25 MHz	−	−66	dB
X_{mod}	cross modulation	14 channels flat; V_o = 48 dBmV; 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

1. 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.
2. 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.
3. 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

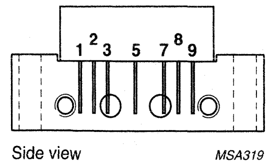


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 10 MHz	21.5	–	22.5	dB
I_{tot}	total current consumption (DC)	V_B = +24 V	–	215	230	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+90	°C

CHARACTERISTICS

Table 1 Bandwidth 5 to 200 MHz; T_{mb} = 30 °C; $Z_S = Z_L$ = 75 Ω

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

Notes

1. f_p = 83.25 MHz; V_p = 50 dBmV;
   f_q = 109.25 MHz; V_q = 50 dBmV;
   measured at $f_p + f_q$ = 192.5 MHz.
2. Measured according to DIN45004B;
   f_p = 35.25 MHz; $V_o = V_p$;
   f_q = 42.25 MHz; $V_q = V_o$ –6 dB;
   f_r = 44.25 MHz; $V_r = V_o$ –6 dB;
   measured at $f_p + f_q - f_r$ = 33.25 MHz.
3. Measured according to DIN45004B;
   f_p = 187.25 MHz; $V_o = V_p$;
   f_q = 194.25 MHz; $V_q = V_o$ –6 dB;
   f_r = 196.25 MHz; $V_r = V_o$ –6 dB;
   measured at $f_p + f_q - f_r$ = 185.25 MHz.
4. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

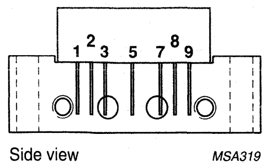


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 10 MHz	23.5	–	24.5	dB
I_{tot}	total current consumption (DC)	V_B = +24 V	–	215	230	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	−40	+100	°C
T_{mb}	mounting base operating temperature	−20	+90	°C

CHARACTERISTICS

Table 1 Bandwidth 5 to 200 MHz; T_{mb} = 30 °C; Z_S = Z_L = 75 Ω

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

Notes

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

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	$+V_B$
7	common
8	common
9	output

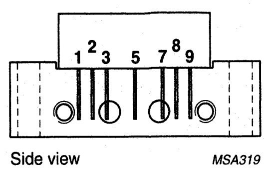


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 10 MHz	29.2	30.8	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	135	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 5 to 75 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 = 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	−	±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; measured at 25 MHz	−	−68	dB
X_{mod}	cross modulation	4 channels flat; V_o = 50 dBmV; 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

1. f_p = 19 MHz; V_p = 50 dBmV;
   f_q = 31 MHz; V_q = 50 dBmV;
   measured at $f_p + f_q$ = 50 MHz.
2. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 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). The BGY84 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

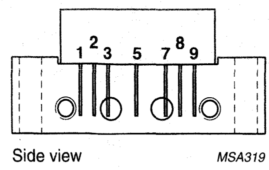


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	16.5	–	17.5	dB
		f = 450 MHz	17.3	–	18.8	dB
I_{tot}	total current consumption (DC)	V_B = 24 V				
	BGY84		–	180	200	mA
	BGY85		–	220	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz; 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	17.3	–	18.8	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	–	–	±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	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz				
	BGY84		–	–	−55	dB
	BGY85		–	–	−58	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz				
	BGY84		–	–	−57	dB
	BGY85		–	–	−60	dB
d_2	second order distortion	note 1	–	–	−70	dB
V_o	output voltage	d_{im} = −60 dB; note 2				
	BGY84		60	–	–	dBmV
	BGY85		62.5	–	–	dBmV
F	noise figure	f = 450 MHz				
	BGY84		–	–	6.5	dB
	BGY85		–	–	7	dB
I_{tot}	total current consumption (DC)	V_B = 24 V; note 3				
	BGY84		–	180	200	mA
	BGY85		–	220	240	mA

Notes

1. 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.
2. 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.
3. The modules normally operate at V_B = 24 V, but are able to withstand supply transients up to 30 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

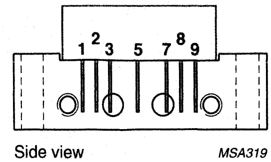


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	–	18.8	dB
		f = 450 MHz	18.7	–	20.2	dB
I_{tot}	total current consumption (DC)	V_B = +24 V				
	BGY84A		–	180	200	mA
	BGY85A		–	220	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz; T_{mb} = 30 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	–	18.8	dB
		f = 450 MHz	18.7	–	20.2	dB
SL	slope cable equivalent	f = 40 to 450 MHz	0.3	–	1.5	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
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz				
	BGY84A		–	–	–55	dB
	BGY85A		–	–	–59	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz				
	BGY84A		–	–	–58	dB
	BGY85A		–	–	–61	dB
d_2	second order distortion	note 1	–	–	–72	dB
V_o	output voltage	d_{im} = –60 dB; note 2				
	BGY84A		60	–	–	dBmV
	BGY85A		62.5	–	–	dBmV
F	noise figure	f = 40 to 450 MHz				
	BGY84A		–	–	6.5	dB
	BGY85A		–	–	7	dB
I_{tot}	total current consumption	DC value; V_B = +24 V; note 3				
	BGY84A		–	180	200	mA
	BGY85A		–	220	240	mA

Notes

1. 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.
2. 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.
3. The modules normally operate at V_B = +24 V, but are able to withstand supply transients up to +30 V.

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 the BGY87 as a final amplifier.

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

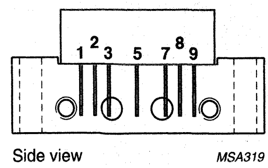


Fig.1 Simplified outline.

QUICK REFERENCE DATA

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
I_{tot}	total current consumption (DC)	V_B = 24 V				
	BGY86		–	180	200	mA
	BGY87		–	220	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

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	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	–	–	±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	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz				
	BGY86		–	–	–54	dB
	BGY87		–	–	–58	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz				
	BGY86		–	–	–51	dB
	BGY87		–	–	–55	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; measured at 446.5 MHz	–	–	–	–
	BGY86		–	–	–53	dB
	BGY87		–	–	–57	dB
d_2	second order distortion	note 1				
	BGY86		–	–	–68	dB
	BGY87		–	–	–72	dB
V_o	output voltage	d_{im} = –60 dB; note 2				
	BGY86		61.5	–	–	dBmV
	BGY87		64	–	–	dBmV
F	noise figure	f = 450 MHz				
	BGY86		–	–	6	dB
	BGY87		–	–	6.5	dB
I_{tot}	total current consumption (DC)	note 3				
	BGY86		–	180	200	mA
	BGY87		–	220	240	mA

Notes

1. 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.
2. 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.
3. 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

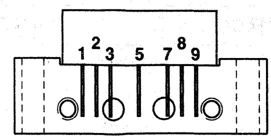


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	26.2	27.8	dB
I_{tot}	total current consumption (DC)	V_B = +24 V; note 1	–	340	mA

Note

1. The module normally operates at V_B = +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_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz; T_{case} = 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
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–58	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–58	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; measured at 446.5 MHz	–	–60	dB
d_2	second order beat	V_o = 46 dBmV; 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 value; V_B = +24 V	–	340	mA

Notes

1. 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.
2. 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 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

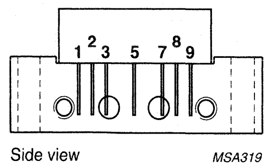


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	–	35.5	dB
		f = 450 MHz	35	–	37	dB
I_{tot}	total current consumption (DC)	$V_B = +24$ V	–	320	340	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 450 MHz; T_{mb} = 35 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	–	35.5	dB
		f = 450 MHz	35	–	37	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
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–	–58	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	–59	dB
d_2	second order distortion	note 1	–	–	–70	dB
V_o	output voltage	d_{im} = –60 dB note 2	62	–	–	dBmV
F	noise figure	f = 450 MHz	–	–	6	dB
I_{tot}	total current consumption	DC value; V_B = +24 V; note 3	–	320	340	mA

Notes

1. 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.
2. Measured according to DIN45004B;
   f_p = 440.25 MHz; $V_p = V_o$ = 62 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.
3. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 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	$+V_B$
7	common
8	common
9	output

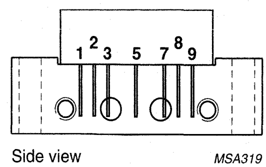


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	37	–	39	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	320	340	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 450 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	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	–	–	±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; V_o = 46 dBmV; measured at 445.25 MHz	–	–	–58	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	–58	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CATV amplifier module | BGY580

FEATURES

- Excellent linearity
- Extreme 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 550 MHz at a voltage supply of 24 V (DC). The BGY580 is intended for use as a pre-amplifier.

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

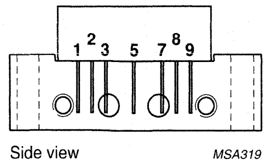


Fig.1 Simplified outline.

QUICK REFERENCE DATA

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
I_{tot}	total current consumption (DC)	V_B = 24 V	–	180	200	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 550 MHz; T_{mb} = 30 °C; Z_S = Z_L = 75 Ω

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	–	–	±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; measured at 547.25 MHz	–	–	−52	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	−59	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 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	f = 550 MHz	–	–	8.5	dB
I_{tot}	total current consumption (DC)	V_B = 24 V; note 3	–	180	200	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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 550 MHz at a voltage supply of 24 V (DC).

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

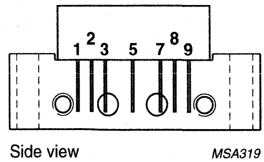


Fig.1 Simplified outline.

QUICK REFERENCE DATA

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
I_{tot}	total current consumption (DC)	V_B = 24 V	–	220	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 550 MHz; T_{mb} = 30 °C; $Z_S = Z_L$ = 75 Ω

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	–	–	±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; measured at 547.25 MHz	–	–	−59	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	−61	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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	–	–	8.5	dB
I_{tot}	total current consumption (DC)	V_B = 24 V; note 3	–	220	240	mA

Notes

1. 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.
2. Measured according to DIN45004B; f_p = 440.25 MHz; $V_p = V_o$; f_q = 447.25 MHz; $V_q = V_p$ −6 dB; f_r = 449.25 MHz; $V_r = V_p$ −6 dB; measured at $f_p + f_q - f_r$ = 438.25 MHz.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CATV amplifier module BGY585

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). Intended for use as a final amplifier.

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

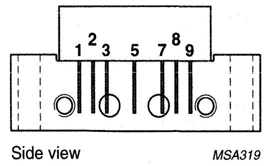


Fig.1 Simplified outline.

QUICK REFERENCE DATA

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
I_{tot}	total current consumption (DC)	V_B = 24 V	–	220	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

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	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	–	–	±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; V_o = 44 dBmV; measured at 547.25 MHz	–	–	−59	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	−62	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–	−61	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	−60	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CATV amplifier module — BGY585A

FEATURES

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

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

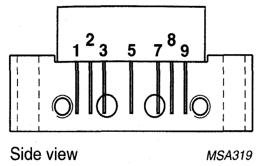


Fig.1 Simplified outline.

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). Intended for use as a final amplifier.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	17.7	–	18.7	dB
		f = 550 MHz	18.8	–	20	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	220	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	−40	+100	°C
T_{case}	case operating temperature	−20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 550 MHz; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	17.7	–	18.7	dB
		f = 550 MHz	18.8	–	20	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.5	–	2	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
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–	−59	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	−62	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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	–	–	8	dB
I_{tot}	total current consumption (DC)	V_B = 24 V; note 3	–	220	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 2 Bandwidth 40 to 450 MHz; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

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	–	–	±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	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–	−61	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	−61	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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)	V_B = 24 V; note 3	–	220	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 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	$+V_B$
7	common
8	common
9	output

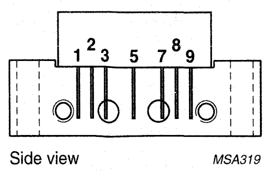


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21.5	–	22.5	dB
		f = 550 MHz	22	–	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V				
	BGY586		–	180	200	mA
	BGY587		–	220	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

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	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz				
	BGY586		–	–	–53	dB
	BGY587		–	–	–57	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz				
	BGY586		–	–	–55	dB
	BGY587		–	–	–58	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz				
	BGY586		–	–	–50	dB
	BGY587		–	–	–54	dB
d_2	second order distortion	note 1				
	BGY586		–	–	–62	dB
	BGY587		–	–	–66	dB
V_o	output voltage	d_{im} = –60 dB; note 2				
	BGY586		58.5	–	–	dBmV
	BGY587		61	–	–	dBmV
F	noise figure	f = 550 MHz				
	BGY586		–	–	6.5	dB
	BGY587		–	–	7	dB
I_{tot}	total current consumption (DC)	note 3				
	BGY586		–	180	200	mA
	BGY587		–	220	240	mA

Notes

1. 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.
2. 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.
3. 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

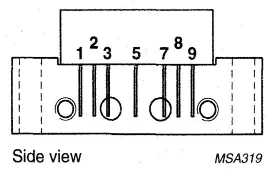


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	26.2	27.8	dB
		f = 550 MHz	27.5	–	dB
I_{tot}	total current consumption (DC)	V_B = +24 V	–	340	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C
V_B	DC supply voltage	–	+28	V

CHARACTERISTICS

Table 1 Bandwidth 40 to 550 MHz; T_{case} = 30 °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 = 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	–	±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
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–57	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–60	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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 value; V_B = +24 V; note 3	–	340	mA

Notes

1. 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.
2. Measured according to DIN45004B;
   f_p = 540.25 MHz; $V_p = V_o$ = 66.5 dBmV;
   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.
3. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

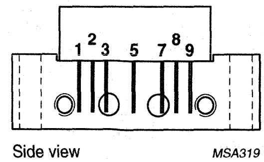


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	–	35.5	dB
		f = 550 MHz	35	–	37	dB
I_{tot}	total current consumption (DC)	$V_B = +24$ V	–	320	340	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 550 MHz; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	–	35.5	dB
		f = 550 MHz	35	–	37	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0	–	2.5	dB
FL	flatness of frequency response	f = 40 to 550 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 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; measured at 547.25 MHz	–	–	–57	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	–59	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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 value; V_B = +24 V; note 3	–	320	340	mA

Notes

1. 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.
2. Measured according to DIN45004B;
   f_p = 540.25 MHz; $V_p = V_o$ = 66.5 dBmV;
   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.
3. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 V.

Table 2 Bandwidth 40 to 450 MHz; T_{case} = 35 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	–	35.5	dB
		f = 450 MHz	35	–	37	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
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–	–61	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	–59	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; measured at 446.5 MHz	–	–	–59	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 = 450 MHz	–	–	6	B
I_{tot}	total current consumption	DC value; V_B = +24 V; note 3	–	320	340	mA

Notes

1. 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.
2. Measured according to DIN45004B;
   f_p = 440.25 MHz; $V_p = V_o$ = 66.5 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.
3. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 V.

CATV amplifier module BGY588N

FEATURES

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

APPLICATIONS

CATV systems in the 40 to 550 MHz frequency range and intended for use as a line-extender.

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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

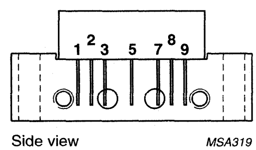


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	34	34.5	35	dB
		f = 550 MHz	35	35.5	36	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	310	325	340	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	34	34.5	35	dB
		f = 550 MHz	35	35.5	36	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.5	1	1.5	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
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–	−57	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	−59	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	–	−62	dB
d_2	second order distortion	note 1	–	–	−74	dB
V_o	output voltage	d_{im} = −60 dB; note 2	61	–	–	dBmV
F	noise figure	f = 50 MHz	–	–	5	dB
		f = 550 MHz	–	–	6	dB
I_{tot}	total current consumption (DC)	value; V_B = 24 V; note 3	310	325	340	mA

Notes

1. 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.
2. Measured according to DIN45004B;
   f_p = 540.25 MHz; $V_p = V_o$ = 66.5 dBmV;
   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.
3. 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	$+V_B$
7	common
8	common
9	output

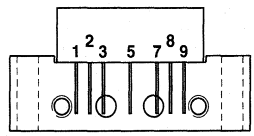


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	13.5	14.5	dB
		f = 600 MHz	14.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 600 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	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; V_o = 44 dBmV; measured at 595.25 MHz	–	–55	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–59	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; measured at 596.5 MHz	–	–57	dB
d_2	second order distortion	note 1	–	–68	dB
V_o	output voltage	d_{im} = –60 dB; note 2	58	–	dBmV
F	noise figure	f = 600 MHz	–	9	dB
I_{tot}	total current consumption (DC)	note 3	–	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CHARACTERISTICS

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

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	–	–	±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; V_o = 44 dBmV; measured at 547.25 MHz	–	–	–59	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	–61	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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	–	–	8.5	dB
I_{tot}	total current consumption (DC)	note 3	–	200	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CHARACTERISTICS

Bandwidth 40 to 450 MHz; V_B = 24 V; T_{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; V_o = 46 dBmV; measured at 445.25 MHz	–	–	−61	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	−60	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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	–	200	240	mA

Notes

1. 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.
2. 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.
3. 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 designed for applications in CATV systems with a bandwidth of 40 to 600 MHz operating at a voltage supply of 24 V (DC).

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

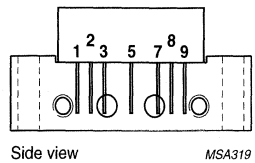


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	17.7	–	18.7	dB
		f = 600 MHz	19	–	–	dB
I_{tot}	total current consumption (DC)	$V_B = 24$ V	–	220	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 600 MHz; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	17.7	18.7	dB
		f = 600 MHz	19	–	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	–	±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; V_o = 44 dBmV; measured at 595.25 MHz	–	−55	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−60	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; measured at 596.5 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	f = 600 MHz	–	8.5	dB
I_{tot}	total current consumption (DC)	note 3	–	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 2 Bandwidth 40 to 550 MHz; T_{case} = 30 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	17.7	–	18.7	dB
		f = 550 MHz	18.8	–	20	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.5	–	2	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	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–	–59	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	–62	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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	–	–	8	dB
I_{tot}	total current consumption (DC)	note 3	–	220	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 450 MHz; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

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	–	–	±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; V_o = 46 dBmV; measured at 445.25 MHz	–	–	–61	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	–61	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Hybrid CATV amplifier module BGY685AD

FEATURES

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

APPLICATIONS

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

DESCRIPTION

Hybrid high dynamic range cascode amplifier module with Darlington pre-stage dies operating at a voltage supply of +24 V in a SOT115J package.

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

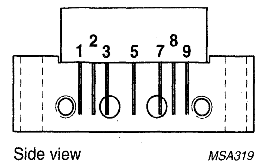


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 600 MHz	18.75	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	250	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	60	dBmV
T_{stg}	storage temperature	−40	+100	°C
T_{mb}	operating mounting base temperature	−20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 600 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 = 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; V_o = 44 dBmV; measured at 595.25 MHz	–	–62	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–58	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; 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	62	–	dBmV
F	noise figure	f = 50 MHz	–	6	dB
		f = 600 MHz	–	8	dB
I_{tot}	total current consumption (DC)	note 3	–	250	mA

Notes

1. $V_p = V_q$ = 44 dBmV;
   f_p = 55.25 MHz; f_q = 541.25 MHz;
   measured at $f_p + f_q$ = 596.5 MHz.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 2 Bandwidth 40 to 550 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	18.8	–	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	–	±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; $V_o = 44$ dBmV; measured at 547.25 MHz	–	–65	dB
X_{mod}	cross modulation	77 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–60	dB
CSO	composite second order distortion	77 channels flat; $V_o = 44$ dBmV; 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)	note 3	–	250	mA

Notes

1. $V_p = V_q = 44$ dBmV;
   $f_p = 55.25$ MHz; $f_q = 493.25$ MHz;
   measured at $f_p + f_q = 548.5$ MHz.
2. 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.
3. The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

Table 3 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 = 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; V_o = 46 dBmV; measured at 445.25 MHz	–	–66	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–58	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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)	note 3	–	250	mA

Notes

1. $V_p = V_q$ = 46 dBmV;
   f_p = 55.25 MHz; f_q = 391.25 MHz;
   measured at $f_p + f_q$ = 446.5 MHz.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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	$+V_B$
7	common
8	common
9	output

PIN CONFIGURATION

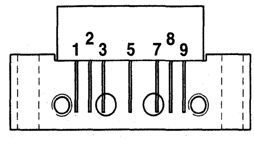


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 600 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = +24 V	–	250	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 600 MHz; 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 = 600 MHz	18.5	–	dB
SL	slope cable equivalent	f = 40 to 600 MHz	0.5	2.0	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
CTB	composite triple beat	85 channels flat; V_o = 44 dBmV; measured at 595.25 MHz	–	−56	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−55	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; measured at 596.5 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	f = 600 MHz	–	5	dB
I_{tot}	total current consumption	DC value; V_B = +24 V; note 3	–	250	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 V.

Table 2 Bandwidth 40 to 550 MHz; 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	18.5	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.5	2	dB
FL	flatness of frequency response	f = 40 to 550 MHz	–	±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; V_o = 44 dBmV; measured at 547.25 MHz	–	−58	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−56	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	−58	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	–	4.5	dB
I_{tot}	total current consumption	DC value; V_B = +24 V; note 3	–	250	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 V.

Table 3 Bandwidth 40 to 450 MHz; 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 = 450 MHz	18.3	–	dB
SL	slope cable equivalent	f = 40 to 450 MHz	0.3	1.5	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
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	−58	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	−54	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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	62.5	–	dBmV
F	noise figure	f = 450 MHz	–	4.5	dB
I_{tot}	total current consumption	DC value; V_B = +24 V; note 3	–	250	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = +24 V, but is able to withstand supply transients up to +30 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	$+V_B$
7	common
8	common
9	output

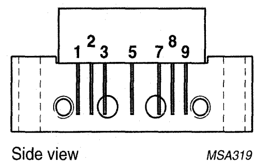


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	22	dB
		f = 600 MHz	22	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	−40	+100	°C
T_{mb}	operating mounting base temperature	−20	+100	°C

CHARACTERISTICS

Bandwidth 40 to 600 MHz; T_{case} = 30 °C; Z_S = Z_L = 75 Ω.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f =50 MHz	21	22	dB
		f = 600 MHz	22	–	dB
SL	slope cable equivalent	f = 40 to 600 MHz	0.8	2.2	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 550 MHz	18	–	dB
		f = 550 to 600 MHz	16	–	dB
S_{21}	phase response	f = 50 MHz	−45	+45	deg
CTB	composite triple beat	85 channels flat; V_o = 44 dBmV; measured at 595.25 MHz	–	−54	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−54	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; measured at 596.5 MHz	–	−52	dB
d_2	second order distortion	note 1	–	−66	dB
V_o	output voltage	d_{im} = −60 dB; note 2	58	–	dBmV
F	noise figure	f = 600 MHz	–	6.5	dB
I_{tot}	total current consumption (DC)	note 3	–	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 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	$+V_B$
7	common
8	common
9	output

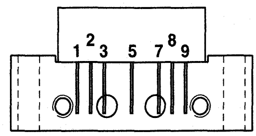


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	26.2	27.8	dB
		f = 600 MHz	27.8	–	dB
I_{tot}	total current consumption (DC)	$V_B = 24$ V	–	340	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

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; V_o = 44 dBmV; measured at 595.25 MHz	–	–53	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–58	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CHARACTERISTICS

Bandwidth 40 to 550 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 = 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	–	±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; V_o = 44 dBmV; measured at 547.25 MHz	–	–57	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–60	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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; V_o = 46 dBmV; measured at 445.25 MHz	–	–58	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–58	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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

1. 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.
2. 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.
3. 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.

APPLICATIONS

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

DESCRIPTION

Hybrid high dynamic range cascode 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	$+V_B$
7	common
8	common
9	output

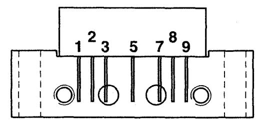


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 750 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 750 MHz; V_B = 24 V; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 750 MHz	18.5	19.5	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0	0.9	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	±0.1	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	29.5	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 640 MHz	15.5	26	–	dB
		f = 640 to 750 MHz	14	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	26	–	dB
		f = 160 to 320 MHz	17	23.5	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 750 MHz	14	24	–	dB
CTB	composite triple beat	110 channels flat; V_o = 44 dBmV; measured at 745.25 MHz	–	−54.5	−53	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−57.5	−56	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	−62	−53	dB
d_2	second order distortion	note 1	–	−77	−65	dB
V_o	output voltage	d_{im} = −60 dB; note 2	59	62	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	5.5	dB
		f = 450 MHz	–	–	5.5	dB
		f = 550 MHz	–	–	5.5	dB
		f = 600 MHz	–	–	6	dB
		f = 750 MHz	–	6	7	dB
I_{tot}	total current consumption (DC)	note 3	–	225	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 2 Bandwidth 40 to 600 MHz; V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	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	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	29.5	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 600 MHz	16	26	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	26	–	dB
		f = 160 to 320 MHz	17	23.5	–	dB
		f = 320 to 600 MHz	16	22	–	dB
CTB	composite triple beat	85 channels flat; V_o = 44 dBmV; measured at 595.25 MHz	–	–	−57	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	−59	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; 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	–	225	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 550 MHz; V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	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	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	29.5	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 550 MHz	16	26	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	26	–	dB
		f = 160 to 320 MHz	17	23.5	–	dB
		f = 320 to 550 MHz	16	22	–	dB
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–61	–60	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–61	–60	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	–67.5	–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	–	225	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 4 Bandwidth 40 to 450 MHz; V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	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	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	29.5	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 450 MHz	16	26	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	26	–	dB
		f = 160 to 320 MHz	17	23.5	–	dB
		f = 320 to 450 MHz	16	22	–	dB
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–	−61	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	−60	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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	–	225	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 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	$+V_B$
7	common
8	common
9	output

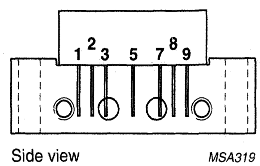


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 750 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	265	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	60	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 750 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 = 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	–	±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_{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_{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_{tot}	total current consumption (DC)	note 3	–	265	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 2 Bandwidth 40 to 600 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 = 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	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; V_o = 44 dBmV; measured at 595.25 MHz	–	−64	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−59	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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	–	±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; $V_o = 44$ dBmV; measured at 547.25 MHz	–	–66	dB
X_{mod}	cross modulation	77 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–61	dB
CSO	composite second order distortion	77 channels flat; $V_o = 44$ dBmV; 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

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
   $f_q = 493.25$ MHz; $V_q = 44$ dBmV;
   measured at $f_p + f_q = 548.5$ MHz.
2. 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.
3. The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

Table 4 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 = 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	–	±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; V_o = 46 dBmV; measured at 445.25 MHz	–	−66	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	−59	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; 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

1. 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.
2. 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.
3. 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	$+V_B$
7	common
8	common
9	output

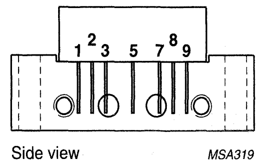


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 870 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	265	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	60	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 870 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 = 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	–	±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; V_o = 44 dBmV; measured at 745.25 MHz	–	–58	dB
X_{mod}	cross modulation	110 channels flat, note 1; V_o = 44 dBmV; measured at 55.25 MHz	–	–56	dB
CSO	composite second order distortion	110 channels flat, note 1 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

1. Linearity guaranteed up to 750 MHz.
2. 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.
3. 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.
4. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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; V_o = 44 dBmV; measured at 649.25 MHz	–	−62	dB
X_{mod}	cross modulation	94 channels flat, note 1; V_o = 44 dBmV; measured at 55.25 MHz	–	−57	dB
CSO	composite second order distortion	94 channels flat, note 1; V_o = 44 dBmV; 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

1. Linearity guaranteed up to 750 MHz.
2. 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.
3. 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.
4. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 550 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	18.5	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.2	2	dB
FL	flatness of frequency response	f = 40 to 550 MHz	–	±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; V_o = 44 dBmV; measured at 547.25 MHz	–	–65	dB
X_{mod}	cross modulation	77 channels flat, note 1; V_o = 44 dBmV; measured at 55.25 MHz	–	–59	dB
CSO	composite second order distortion	77 channels flat, note 1; V_o = 44 dBmV; 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

1. Linearity guaranteed up to 750 MHz.
2. 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.
3. 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.
4. 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.

APPLICATIONS

CATV systems operating over a 40 to 750 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	$+V_B$
7	common
8	common
9	output

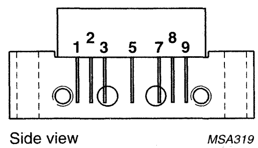


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	22	dB
		f = 750 MHz	21.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	60	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base operating temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 750 MHz; V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	21.5	22	dB
		f = 750 MHz	21.5	22.5	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0	1	1.5	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	±0.2	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	33	–	dB
		f = 80 to 160 MHz	18.5	30	–	dB
		f = 160 to 320 MHz	17	25	–	dB
		f = 320 to 640 MHz	15.5	22.5	–	dB
		f = 640 to 750 MHz	14	20.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	25	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 750 MHz	14	20	–	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	–	–54.5	–53	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–54	–52	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	–57.5	–53	dB
d_2	second order distortion	note 1	–	–75	–63	dB
V_o	output voltage	d_{im} = –60 dB; note 2	61	63	–	dBmV
F	noise figure	f = 50 MHz	–	4	5	dB
		f = 450 MHz	–	–	5.5	dB
		f = 550 MHz	–	–	5.5	dB
		f = 600 MHz	–	–	6	dB
		f = 750 MHz	–	5	6.5	dB
I_{tot}	total current consumption (DC)	note 3	–	220	240	mA

Notes

1. 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.
2. Measure 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 2 Bandwidth 40 to 600 MHz; V_B = 24 V; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	21.5	22	dB
		f = 600 MHz	21.5	–	–	dB
SL	slope cable equivalent	f = 40 to 600 MHz	0	–	1.5	dB
FL	flatness of frequency response	f = 40 to 600 MHz	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	33	–	dB
		f = 80 to 160 MHz	18.5	30	–	dB
		f = 160 to 320 MHz	17	25	–	dB
		f = 320 to 600 MHz	16	22.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz;	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	25	–	dB
		f = 320 to 600 MHz	16	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	85 channels flat; V_o = 44 dBmV; measured at 595.25 MHz	–	–59.5	–58	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–55.5	–53	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; measured at 596.5 MHz	–	–64	–56	dB
d_2	second order distortion	note 1	–	–	–68	dB
V_o	output voltage	d_{im} = –60 dB; note 2	62.5	–	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	220	240	mA

Notes

1. 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.
2. Measure 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 550 MHz; V_B = 24 V; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	21.5	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	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	33	–	dB
		f = 80 to 160 MHz	18.5	30	–	dB
		f = 160 to 320 MHz	17	25	–	dB
		f = 320 to 550 MHz	16	22.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	25	–	dB
		f = 320 to 550 MHz	16	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–61	–60	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–56.5	–55	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	–65.5	–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	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	220	240	mA

Notes

1. 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.
2. Measure 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 4 Bandwidth 40 to 450 MHz; V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	21.5	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	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	33	–	dB
		f = 80 to 160 MHz	18.5	30	–	dB
		f = 160 to 320 MHz	17	25	–	dB
		f = 320 to 450 MHz	16	22.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	28.5	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	25	–	dB
		f = 320 to 450 MHz	16	22	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	60 channels flat; V_o = 46 dBmV; measured at 445.25 MHz	–	–	–59	dB
X_{mod}	cross modulation	60 channels flat; V_o = 46 dBmV; measured at 55.25 MHz	–	–	–54	dB
CSO	composite second order distortion	60 channels flat; V_o = 46 dBmV; measured at 446.5 MHz	–	–	–60	dB
d_2	second order distortion	note 1	–	–	–73	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	–	220	240	mA

Notes

1. 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.
2. Measure 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 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	$+V_B$
7	common
8	common
9	output

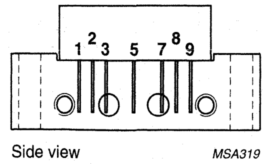


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	14.5	15.5	dB
		f = 860 MHz	15	–	dB
I_{tot}	total current consumption (DC)	$V_B = 24$ V	–	235	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	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_{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	–	–	–61	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	–	–	–68	dB
V_o	output voltage	d_{im} = –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_{tot}	total current consumption (DC)	note 3	–	–	235	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 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 with a voltage supply of 24 V (DC).

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2, 3	common
5	$+V_B$
7, 8	common
9	output

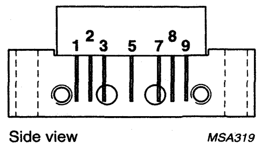


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 860 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

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	18	18.5	19	dB
		f = 860 MHz	18.5	19.5	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0	0.8	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.2	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	31	–	dB
		f = 80 to 160 MHz	18.5	30	–	dB
		f = 160 to 320 MHz	17	27.5	–	dB
		f = 320 to 640 MHz	15.5	25	–	dB
		f = 640 to 860 MHz	14	20.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	21	–	dB
		f = 640 to 860 MHz	14	21	–	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	–	–65	–61	dB
X_{mod}	cross modulation	49 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–65	–61	dB
CSO	composite second order distortion	49 channels flat; V_o = 44 dBmV; measured at 860.5 MHz	–	–67	–61	dB
d_2	second order distortion	note 1	–	–78	–70	dB
V_o	output voltage	d_{im} = –60 dB; note 2	58	60	–	dBmV
F	noise figure	f = 50 MHz	–	4.5	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	–	6	8	dB
I_{tot}	total current consumption (DC)	note 3	–	225	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 2 Bandwidth 40 to 750 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	18	18.5	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	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	31	–	dB
		f = 80 to 160 MHz	18.5	30	–	dB
		f = 160 to 320 MHz	17	27.5	–	dB
		f = 320 to 640 MHz	15.5	25	–	dB
		f = 640 to 750 MHz	14	20.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 640 MHz	15.5	21	–	dB
		f = 640 to 750 MHz	14	21	–	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	–	−55	−53	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−58	−57	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	−65	−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	–	225	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 600 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	18	18.5	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	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	31	–	dB
		f = 80 to 160 MHz	18.5	30	–	dB
		f = 160 to 320 MHz	17	27.5	–	dB
		f = 320 to 600 MHz	16	25	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 600 MHz	16	21	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	85 channels flat; V_o = 44 dBmV; measured at 595.25 MHz	–	–60	–57	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–60.5	–59	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; measured at 596.5 MHz	–	–64.5	–58	dB
d_2	second order distortion	note 1	–	–79	–70	dB
V_o	output voltage	d_{im} = –60 dB; note 2	61	64.5	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	225	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 4 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	18	18.5	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	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	31	–	dB
		f = 80 to 160 MHz	18.5	30	–	dB
		f = 160 to 320 MHz	17	27.5	–	dB
		f = 320 to 550 MHz	16	25	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 550 MHz	16	21	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; V_o = 44 dBmV; measured at 547.25 MHz	–	–61	–60	dB
X_{mod}	cross modulation	77 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–61	–60	dB
CSO	composite second order distortion	77 channels flat; V_o = 44 dBmV; measured at 548.5 MHz	–	–69	–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	–	225	240	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	18.5	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	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	31	–	dB
		f = 80 to 160 MHz	18.5	30	–	dB
		f = 160 to 320 MHz	17	27.5	–	dB
		f = 320 to 450 MHz	16	25	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	29	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	24	–	dB
		f = 320 to 450 MHz	16	21	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	60 channels flat; $V_o = 46$ dBmV; measured at 445.25 MHz	–	–	–61	dB
X_{mod}	cross modulation	60 channels flat; $V_o = 46$ dBmV; measured at 55.25 MHz	–	–	–60	dB
CSO	composite second order distortion	60 channels flat; $V_o = 46$ dBmV; 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	–	225	240	mA

Notes

1. $f_p = 55.25$ MHz; $V_p = 46$ dBmV;
   $f_q = 391.25$ MHz; $V_q = 46$ dBmV;
   measured at $f_p + f_q = 446.5$ MHz.
2. 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.
3. 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	$+V_B$
7	common
8	common
9	output

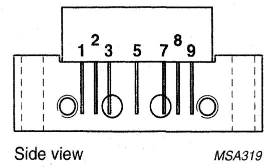


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	19.5	20.5	dB
		f = 860 MHz	20	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	235	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

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; V_o = 44 dBmV; measured at 859.25 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	–	–	–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

1. 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.
2. 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.
3. 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	$+V_B$
7	common
8	common
9	output

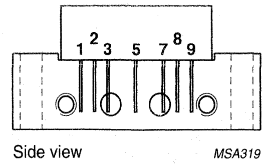


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	22	dB
		f = 860 MHz	21.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	235	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	21.5	22	dB
		f = 860 MHz	21.5	22.5	–	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	–	±0.2	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	23	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 860 MHz	14	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	27	–	dB
		f = 80 to 160 MHz	18.5	25	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 640 MHz	15.5	19	–	dB
		f = 640 to 860 MHz	14	19	–	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	–	–64.5	–62	dB
X_{mod}	cross modulation	49 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–64.5	–61	dB
CSO	composite second order distortion	49 channels flat; V_o = 44 dBmV; measured at 860.5 MHz	–	–67.5	–61	dB
d_2	second order distortion	note 1	–	–77	–70	dB
V_o	output voltage	d_{im} = –60 dB; note 2	59	60.5	–	dBmV
F	noise figure	f = 50 MHz	–	4	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	–	5	6.5	dB
I_{tot}	total current consumption (DC)	note 3	–	220	235	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	21.5	22	dB
		f = 860 MHz	21.5	22.5	–	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	–	±0.2	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	23	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 860 MHz	14	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	27	–	dB
		f = 80 to 160 MHz	18.5	25	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 640 MHz	15.5	19	–	dB
		f = 640 to 860 MHz	14	19	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	129 channels flat; V_o = 42 dBmV; measured at 859.25 MHz	–	–54	–51	dB
X_{mod}	cross modulation	129 channels flat; V_o = 42 dBmV; measured at 55.25 MHz	–	–60	–57	dB
CSO	composite second order distortion	129 channels flat; V_o = 42 dBmV; measured at 860.5 MHz	–	–605	–55	dB
d_2	second order distortion	note 1	–	–77	–70	dB
V_o	output voltage	d_{im} = –60 dB; note 2	59	60.5	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	220	235	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 750 MHz; V_B = 24 V; T_{case} = 30 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	21.5	22	dB
		f = 750 MHz	21.5	22.3	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	–	±0.3	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	23	–	dB
		f = 320 to 640 MHz	15.5	22	–	dB
		f = 640 to 750 MHz	14	20	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	27	–	dB
		f = 80 to 160 MHz	18.5	25	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 640 MHz	15.5	19	–	dB
		f = 640 to 750 MHz	14	19	–	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	–	−53	−51	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−57	−54	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	−62	−56	dB
d_2	second order distortion	note 1	–	−78	−70	dB
V_o	output voltage	d_{im} = −60 dB; note 2	60	62	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	220	235	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 4 Bandwidth 40 to 600 MHz; V_B = 24 V; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	21	21.5	22	dB
		f = 600 MHz	21.5	22.1	–	dB
SL	slope cable equivalent	f = 40 to 600 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 600 MHz	–	–	±0.2	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	27.5	–	dB
		f = 160 to 320 MHz	17	23	–	dB
		f = 320 to 600 MHz	16	22	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	27	–	dB
		f = 80 to 160 MHz	18.5	25	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 600 MHz	16	19	–	dB
S_{21}	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	85 channels flat; V_o = 44 dBmV; measured at 595.25 MHz	–	–	–56	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	–57	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; 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	–	220	235	mA

Notes

1. 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.
2. 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.
3. 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.

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.

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

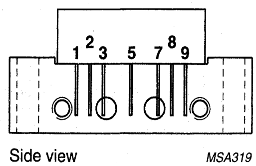


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	28.5	29.5	dB
		f = 860 MHz	29	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	340	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

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	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	–	±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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 2 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	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	–	±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; V_o = 44 dBmV; measured at 859.25 MHz	–	–46	dB
X_{mod}	cross modulation	129 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–52	dB
CSO	composite second order distortion	129 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 3 Bandwidth 40 to 750 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	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	–	±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; V_o = 44 dBmV; measured at 745.25 MHz	–	−50	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−54	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 4 Bandwidth 40 to 600 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	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	–	±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; V_o = 44 dBmV; measured at 595.25 MHz	–	–55	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–56	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; 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

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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.

DESCRIPTION

Hybrid high dynamic range amplifier module operating with a voltage supply of 24 V in a SOT115J package. The high gain module consists of two cascaded stages both in cascode configuration.

PINNING SOT115J

PIN	DESCRIPTION
1	input
2, 3	common
5	$+V_B$
7, 8	common
9	output

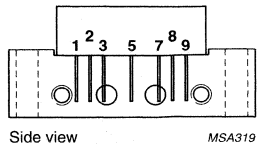


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	34.5	dB
		f = 860 MHz	34	–	dB
I_{tot}	total current consumption (DC)	$V_B = 24$ V	–	340	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	55	dBmV
T_{mb}	operating mounting base temperature	–20	+100	°C
T_{stg}	storage temperature	–40	+100	°C

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	34	34.5	dB
		f = 860 MHz	34	35	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.5	1.1	2.5	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.2	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	25	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 640 MHz	15.5	21	–	dB
		f = 640 to 860 MHz	14	18.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	25.5	–	dB
		f = 80 to 160 MHz	18.5	28.5	–	dB
		f = 160 to 320 MHz	17	26.5	–	dB
		f = 320 to 640 MHz	15.5	20.5	–	dB
		f = 640 to 860 MHz	14	21	–	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	–	−63.5	−60	dB
X_{mod}	cross modulation	49 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−63	−59	dB
CSO	composite second order distortion	49 channels flat; V_o = 44 dBmV; measured at 860.5 MHz	–	−64	−55	dB
d_2	second order distortion	note 1	–	−74	−65	dB
V_o	output voltage	d_{im} = −60 dB; note 2	58	60	–	dBmV
F	noise figure	f = 50 MHz	–	4	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	–	5.5	7	dB
I_{tot}	total current consumption (DC)	note 3	–	325	340	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	34	34.5	dB
		f = 860 MHz	34	35	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.5	1.1	2.5	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.2	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	25	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 640 MHz	15.5	21	–	dB
		f = 640 to 860 MHz	14	18.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	25.5	–	dB
		f = 80 to 160 MHz	18.5	28.5	–	dB
		f = 160 to 320 MHz	17	26.5	–	dB
		f = 320 to 640 MHz	15.5	20.5	–	dB
		f = 640 to 860 MHz	14	21	–	dB
S_{21}	phase response	f = 50 MHz	135	–	225	deg
CTB	composite triple beat	129 channels flat; $V_o = 44$ dBmV; measured at 859.25 MHz	–	−47.5	−46	dB
X_{mod}	cross modulation	129 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	−53.5	−50	dB
CSO	composite second order distortion	129 channels flat; $V_o = 44$ dBmV; measured at 860.5 MHz	–	−56	−48	dB
d_2	second order distortion	note 1	–	−74	−65	dB
V_o	output voltage	$d_{im} = -60$ dB; note 2	58	60	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	325	340	mA

Notes

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
   $f_q = 805.25$ MHz; $V_q = 44$ dBmV;
   measured at $f_p + f_q = 860.5$ MHz.
2. 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.
3. The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	34	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	–	–	±0.45	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	25	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 640 MHz	15.5	21	–	dB
		f = 640 to 750 MHz	14	18.5	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	25.5	–	dB
		f = 80 to 160 MHz	18.5	28.5	–	dB
		f = 160 to 320 MHz	17	26.5	–	dB
		f = 320 to 640 MHz	15.5	20.5	–	dB
		f = 640 to 750 MHz	14	21	–	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	–	–52.5	–50	dB
X_{mod}	cross modulation	110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–55.5	–51	dB
CSO	composite second order distortion	110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	–61.5	–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	–	325	340	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 4 Bandwidth 40 to 600 MHz; V_B = 24 V; T_{case} = 30 °C; $Z_S = Z_L$ = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	f = 50 MHz	33.5	34	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	–	–	±0.35	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	25	–	dB
		f = 80 to 160 MHz	18.5	28	–	dB
		f = 160 to 320 MHz	17	28	–	dB
		f = 320 to 600 MHz	16	21	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	20	25.5	–	dB
		f = 80 to 160 MHz	18.5	28.5	–	dB
		f = 160 to 320 MHz	17	26.5	–	dB
		f = 320 to 600 MHz	16	20.5	–	dB
S_{21}	phase response	f = 50MHz	135	–	225	deg
CTB	composite triple beat	85 channels flat; V_o = 44 dBmV; measured at 595.25 MHz	–	−56.5	−55	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	−58	−54	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; measured at 596.5 MHz	–	−69.5	−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 (DC)	see Table 1	–	–	–	dB
I_{tot}	total current consumption	note 3	–	325	340	mA

Notes

1. 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.
2. 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

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 1 000 MHz at a supply voltage of +24 V (DC).

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

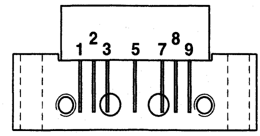


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	18	19	dB
		f = 1 000 MHz	18.5	–	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	65	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 1000 MHz; T_{case} = 30 °C; Z_S = Z_L = 75 Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	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_{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 1000 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 1000 MHz	14	–	–	dB
CTB	composite triple beat	85 channels flat; V_o = 44 dBmV; measured at 595.25 MHz	–	–	−58	dB
		110 channels flat; V_o = 44 dBmV; measured at 745.25 MHz	–	–	−53	dB
		150 channels flat; V_o = 40 dBmV; measured at 985.25 MHz	–	−53	–	dB
X_{mod}	cross modulation	85 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	−58	dB
		110 channels flat; V_o = 44 dBmV; measured at 55.25 MHz	–	–	−54	dB
		150 channels flat; V_o = 40 dBmV; measured at 55.25 MHz	–	−54	–	dB
CSO	composite second order distortion	85 channels flat; V_o = 44 dBmV; measured at 596.5 MHz	–	–	−60	dB
		110 channels flat; V_o = 44 dBmV; measured at 746.5 MHz	–	–	−56	dB
		150 channels flat; V_o = 40 dBmV; measured at 986.5 MHz	–	−56	–	dB

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

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

CATV amplifier module — CGY887A

FEATURES

- High gain
- Superior linearity
- Extremely low noise
- Rugged construction
- Gold metallization ensures excellent reliability.

APPLICATIONS

- CATV systems operating in the 40 to 870 MHz frequency range.

DESCRIPTION

Hybrid dynamic range amplifier module in a SOT115J package operating with a voltage supply of 24 V (DC), employing both GaAs and Si dies.

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	$+V_B$
7	common
8	common
9	output

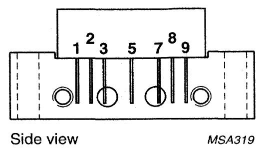


Fig.1 Simplified outline.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G_p	power gain	f = 50 MHz	25.2	25.8	dB
		f = 870 MHz	25.6	26.6	dB
I_{tot}	total current consumption (DC)	V_B = 24 V	–	240	mA

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_i	RF input voltage	–	75	dBmV
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–20	+100	°C

CHARACTERISTICS

Table 1 Bandwidth 40 to 870 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	25.2	25.8	dB
		f = 870 MHz	25.6	26.6	dB
SL	straight line	f = 40 to 870 MHz	0.2	1	dB
FL	flatness of frequency response	f = 40 to 870 MHz	–	±0.5	dB
S_{11}	input return losses	f = 40 to 80 MHz	20	–	dB
		f = 80 to 160 MHz	20	–	dB
		f = 160 to 320 MHz	20	–	dB
		f = 320 to 550 MHz	20	–	dB
		f = 550 to 640 MHz	19	–	dB
		f = 640 to 750 MHz	17	–	dB
		f = 750 to 870 MHz	17	–	dB
S_{22}	output return losses	f = 40 to 80 MHz	21	–	dB
		f = 80 to 160 MHz	19	–	dB
		f = 160 to 320 MHz	17	–	dB
		f = 320 to 550 MHz	16	–	dB
		f = 550 to 640 MHz	16	–	dB
		f = 640 to 750 MHz	16	–	dB
		f = 750 to 870 MHz	16	–	dB
S_{21}	phase response	f = 50 MHz	–45	+45	deg
CTB	composite triple beat	129 channels flat; V_o = 40 dBmV; measured at 745.25 MHz	–	–62	dB
X_{mod}	cross modulation	129 channels flat; V_o = 40 dBmV; measured at 55.25 MHz	–	–55	dB
CSO	composite second order distortion	129 channels flat; V_o = 40 dBmV; measured at 860.5 MHz	–	–57	dB
d_2	second order distortion	note 1	–	–67	dB
V_o	output voltage	d_{im} = –60 dB; note 2	62	–	dBmV
F	noise figure	f = 50 MHz	–	5.5	dB
		f = 100 to 870MHz	–	5	dB
I_{tot}	total current consumption (DC)	note 3	–	240	mA

Notes

1. f_p = 55.25 MHz; V_p = 50 dBmV;
   f_q = 805.25 MHz; V_q = 50 dBmV;
   measured at $f_p + f_q$ = 860.5 MHz.
2. Measured according 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.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

PACKAGE INFORMATION

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.

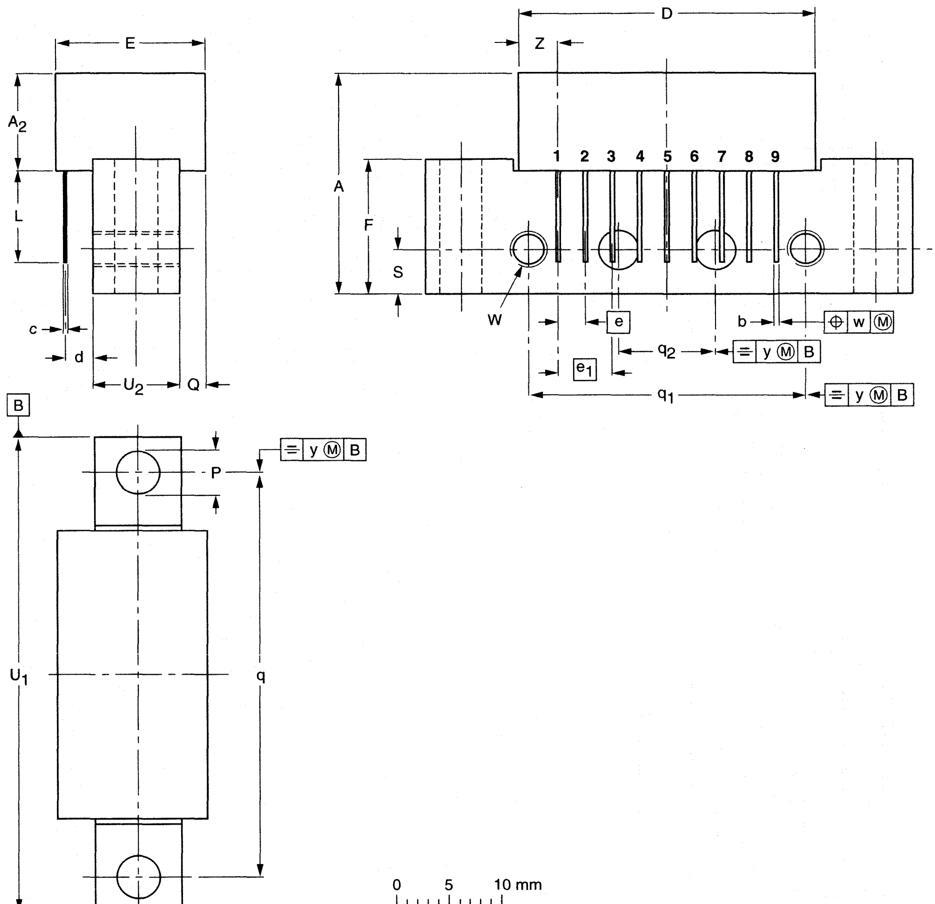
When mounting CATV hybrid modules, the UNC screws must first be turned finger-tight. The screws should then be tightened to within the tolerance 0.5 Nm minimum and 0.7 Nm maximum.

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.

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**

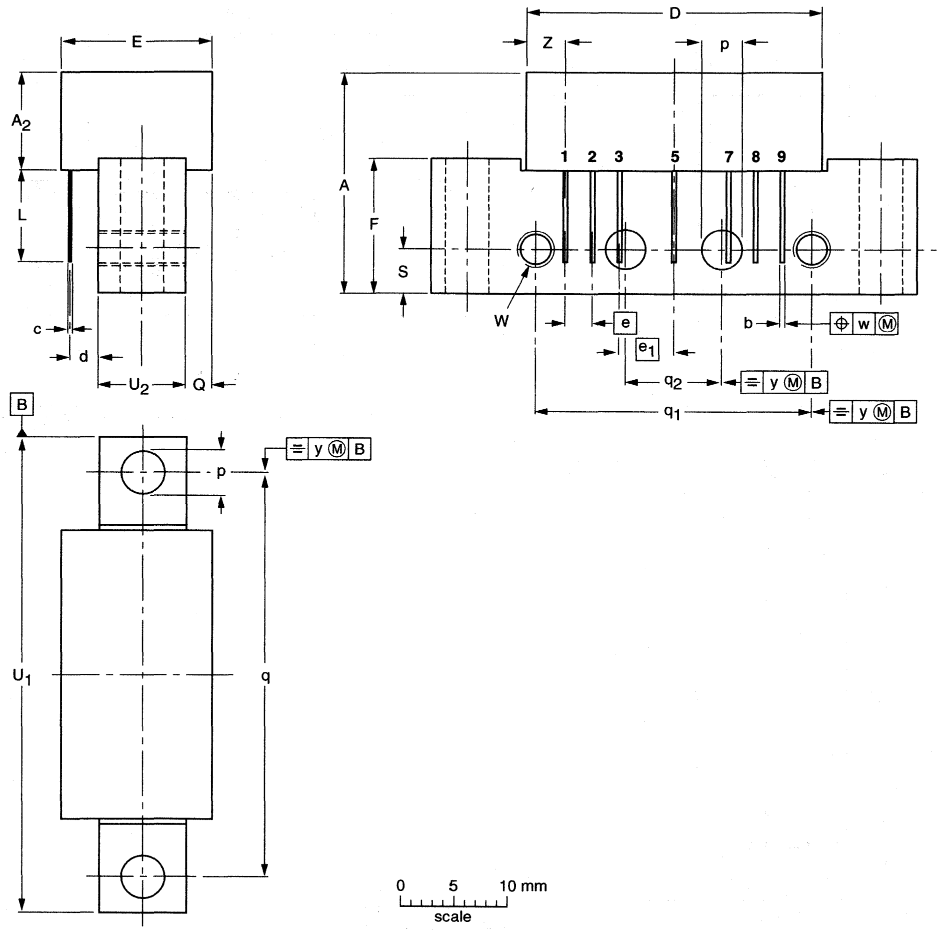


DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	∅P	Q max.	q	q_1	q_2	S	U_1 max.	U_2	W	w	y	Z max.
mm	20.8	9.1	0.51 0.38	0.25	27.2	2.54	13.75	2.54	5.08	12.7	8.8	4.15 3.85	2.4	38.1	25.4	10.2	4.2	44.75	8	6-32 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; 7 gold-plated in-line leads **SOT115J**

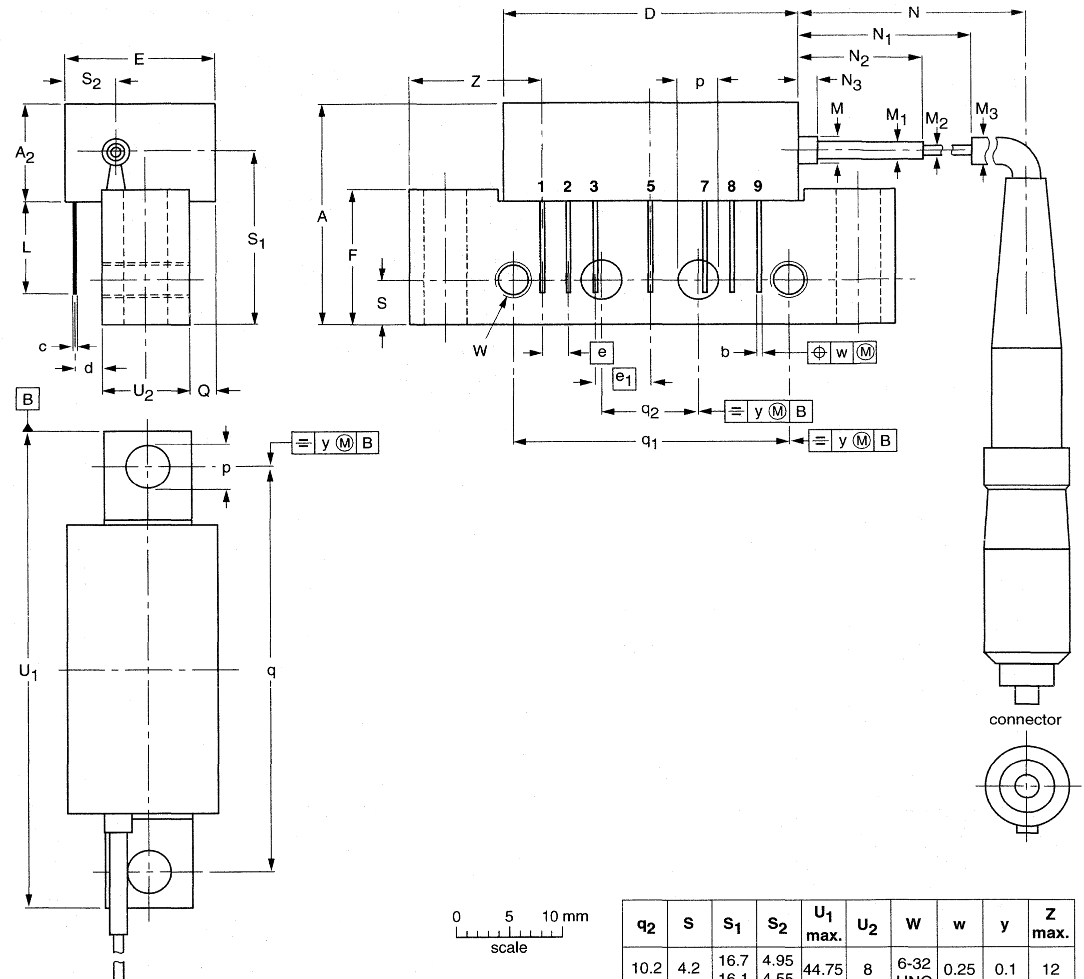


DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	p	Q max.	q	q_1	q_2	S	U_1 max.	U_2	W	w	y	Z max.
mm	20.8	9.1	0.51 0.38	0.25	27.2	2.54	13.75	2.54	5.08	12.7	8.8	4.15 3.85	2.4	38.1	25.4	10.2	4.2	44.75	8	6-32 UNC	0.25	0.1	3.8

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115J						99-02-06

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**



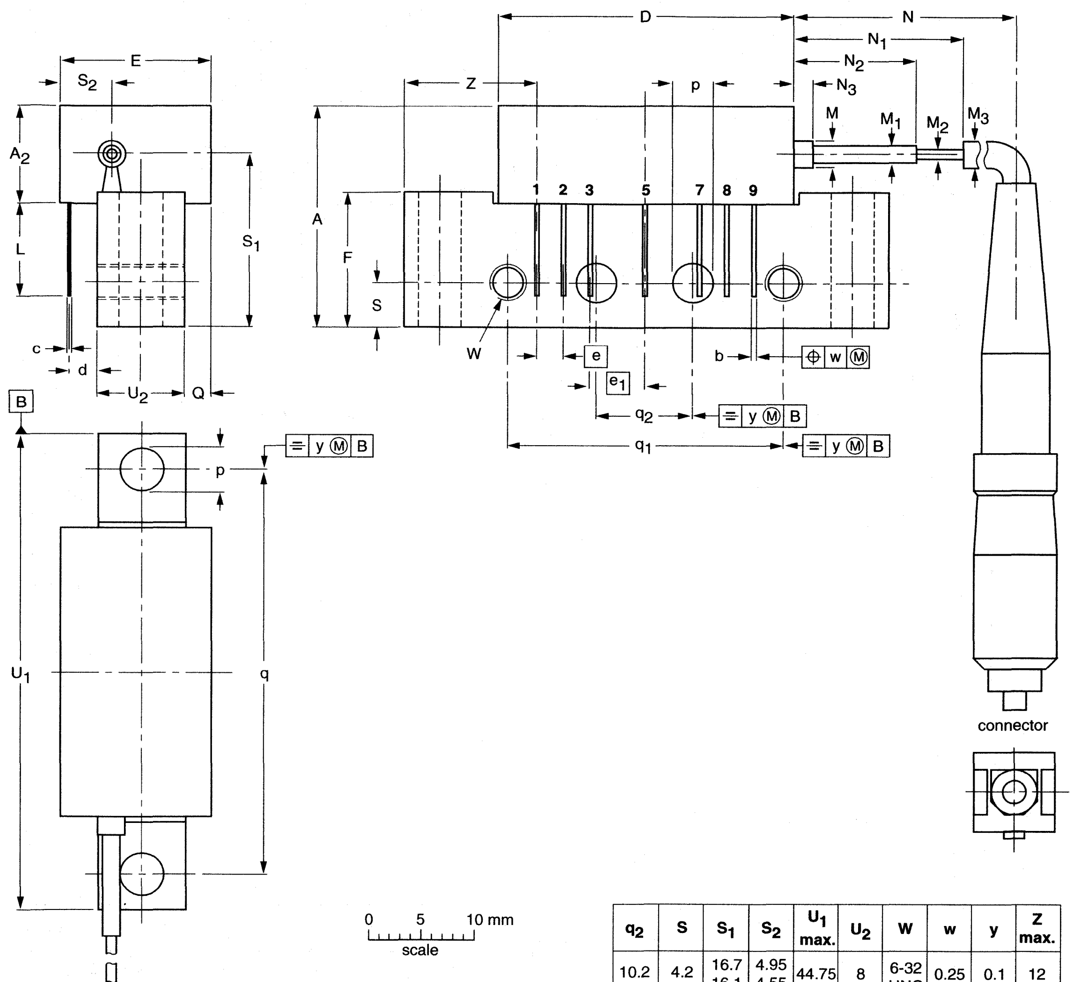
q_2	S	S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
10.2	4.2	16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	M	M_1	M_2	M_3	N	N_1	N_2	N_3	p	Q max.	q	q_1
mm	20.8	9.1	0.51 0.38	0.25	27.2	2.54	13.75	2.54	5.08	12.7	8.8	2.5	1.6	0.9	3	627 577	127 77	10.7 8.7	5 1	4.15 3.85	2.4	38.1	25.4

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115N						99-04-13

Rectangular single-ended 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**



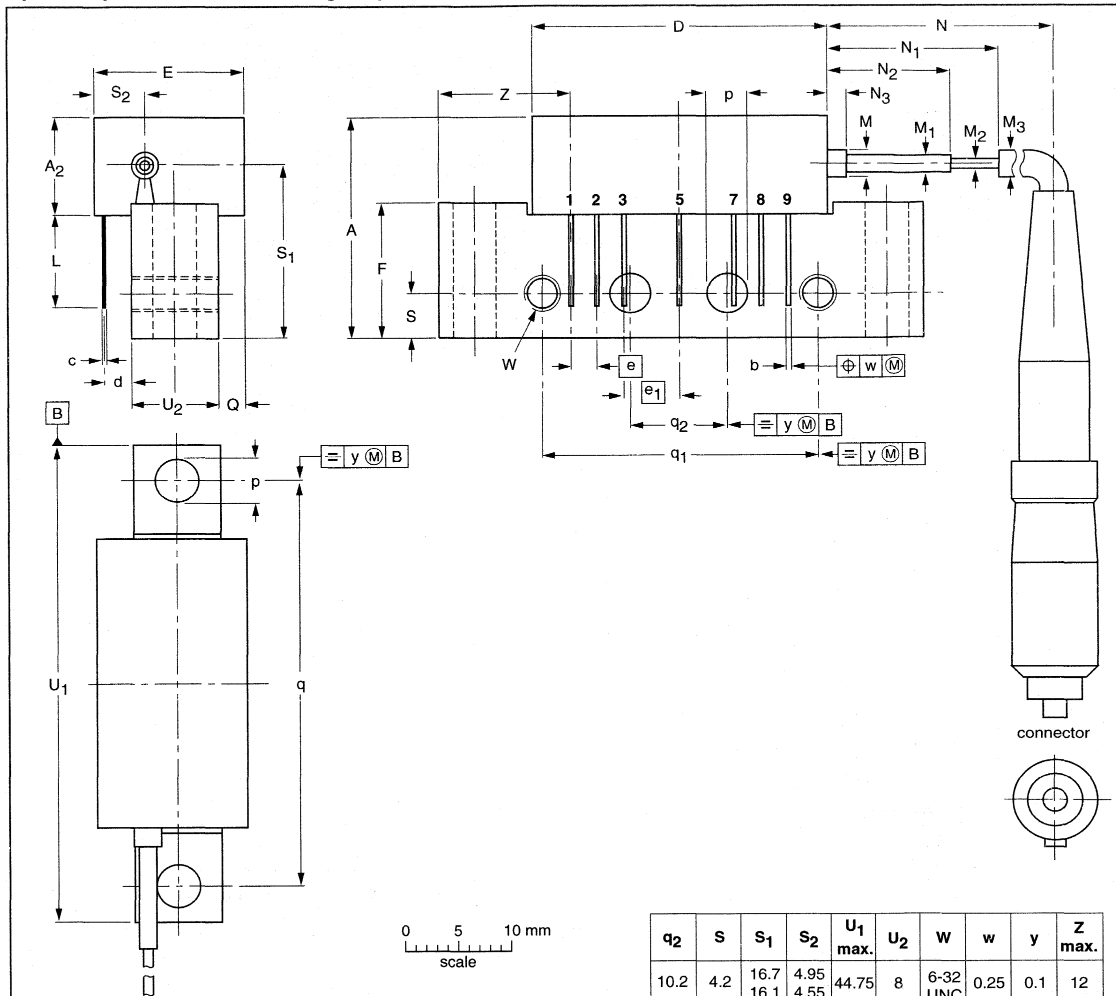
DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	M	M_1	M_2	M_3	N	N_1	N_2	N_3	p	Q max.	q	q_1
mm	20.8	9.1	0.51 0.38	0.25	27.2	2.54	13.75	2.54	5.08	12.7	8.8	2.5	1.6	0.9	3	917 817	15.3 8.7	10.7 8.7	5 1	4.15 3.85	2.4	38.1	25.4

q_2	S	S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
10.2	4.2	16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

OUTLINE VERSION	REFERENCES IEC	REFERENCES JEDEC	REFERENCES EIAJ		EUROPEAN PROJECTION	ISSUE DATE
SOT115P						99-02-06

Rectangular single-ended 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 **SOT115R**



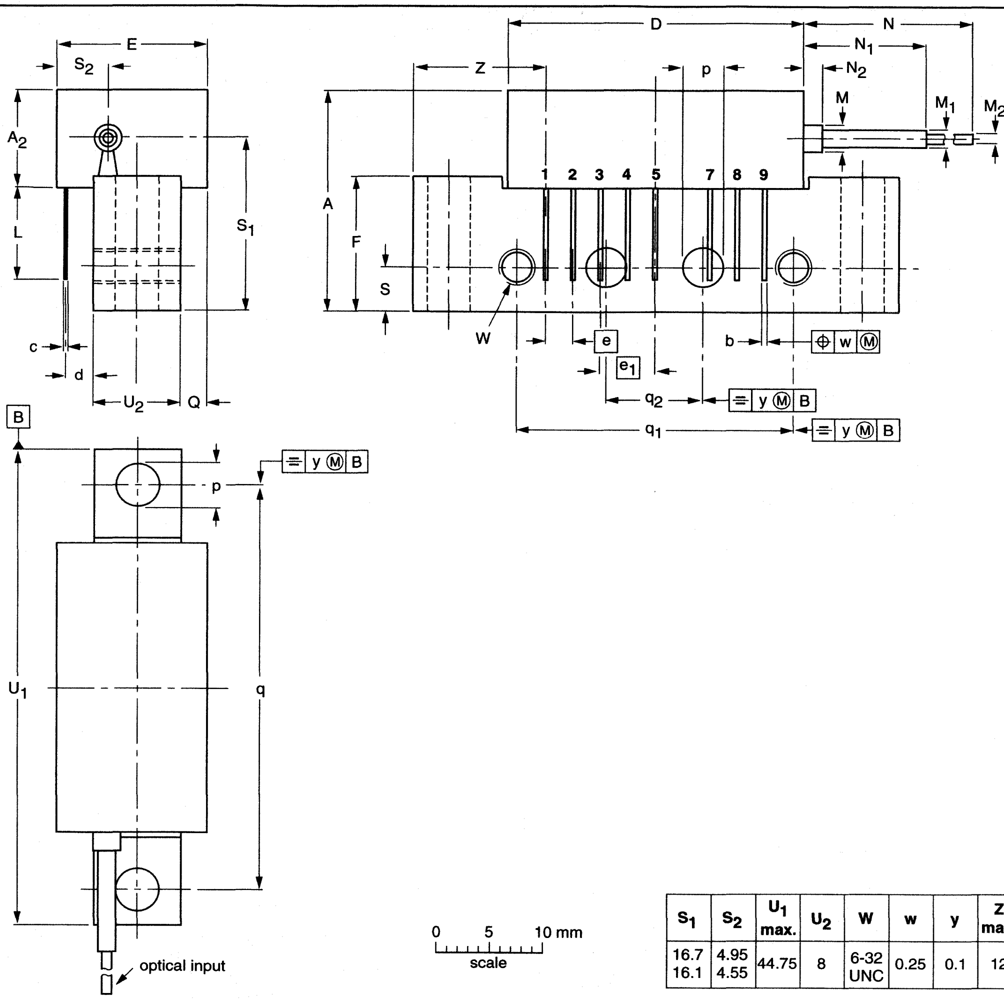
q_2	S	S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
10.2	4.2	16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	M	M_1	M_2	M_3	N	N_1	N_2	N_3	p	Q max.	q	q_1
mm	20.8	9.1	0.51 0.38	0.25	27.2	2.54	13.75	2.54	5.08	12.7	8.8	2.5	1.6	0.9	3	917 817	15.3 8.7	10.7 8.7	5 1	4.15 3.85	2.4	38.1	25.4

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115R						99-02-06

Rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes; optical input; 8 gold-plated in-line leads **SOT115T**



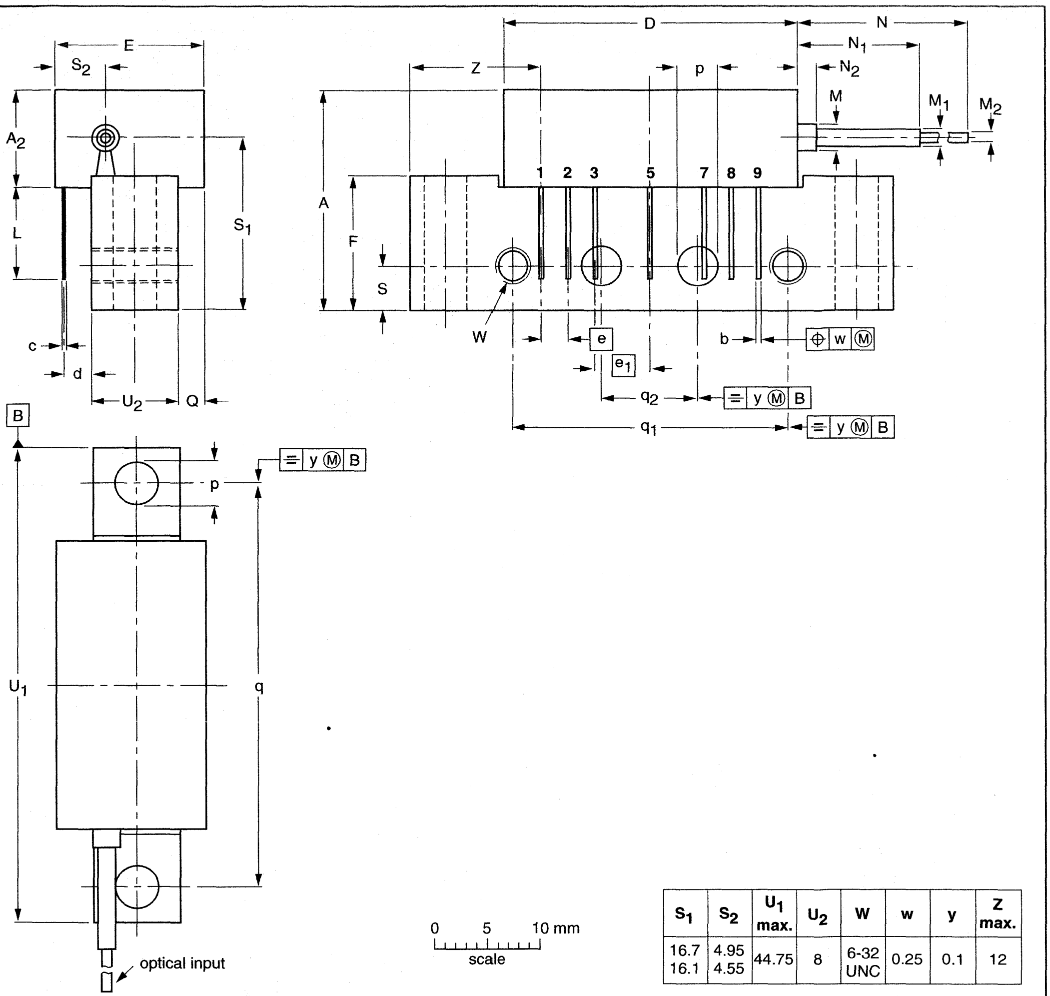
S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	M	M_1	M_2	N min.	N_1	N_2	p	Q max.	q	q_1	q_2	S
mm	20.8	9.1	0.51 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	10.7 8.7	5 1	4.15 3.85	2.4	38.1	25.4	10.2	4.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115T						99-04-13

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 **SOT115U**



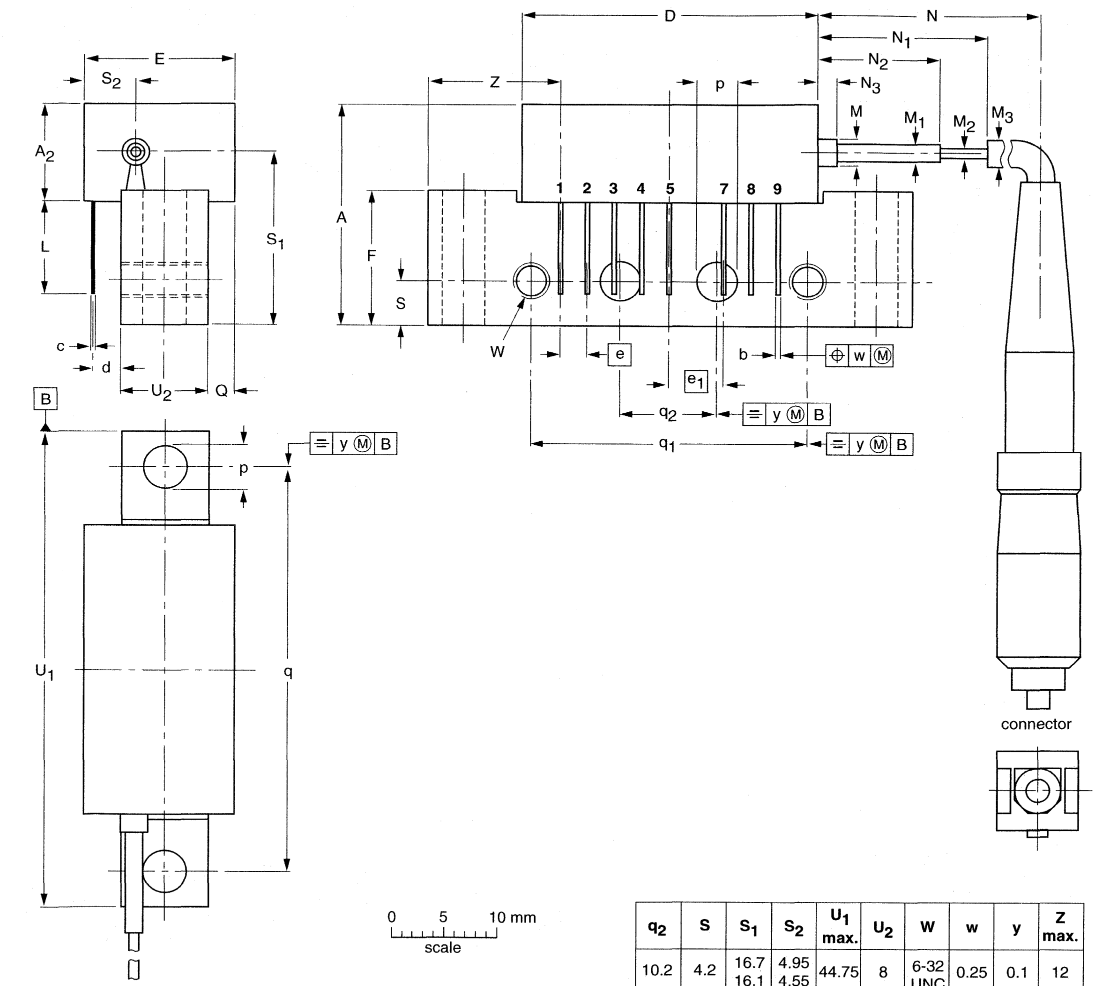
S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	M	M_1	M_2	N min.	N_1	N_2	p	Q max.	q	q_1	q_2	S
mm	20.8	9.1	0.51 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	10.7 8.7	5 1	4.15 3.85	2.4	38.1	25.4	10.2	4.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115U						99-04-13

Rectangular single-ended 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 **SOT115V**



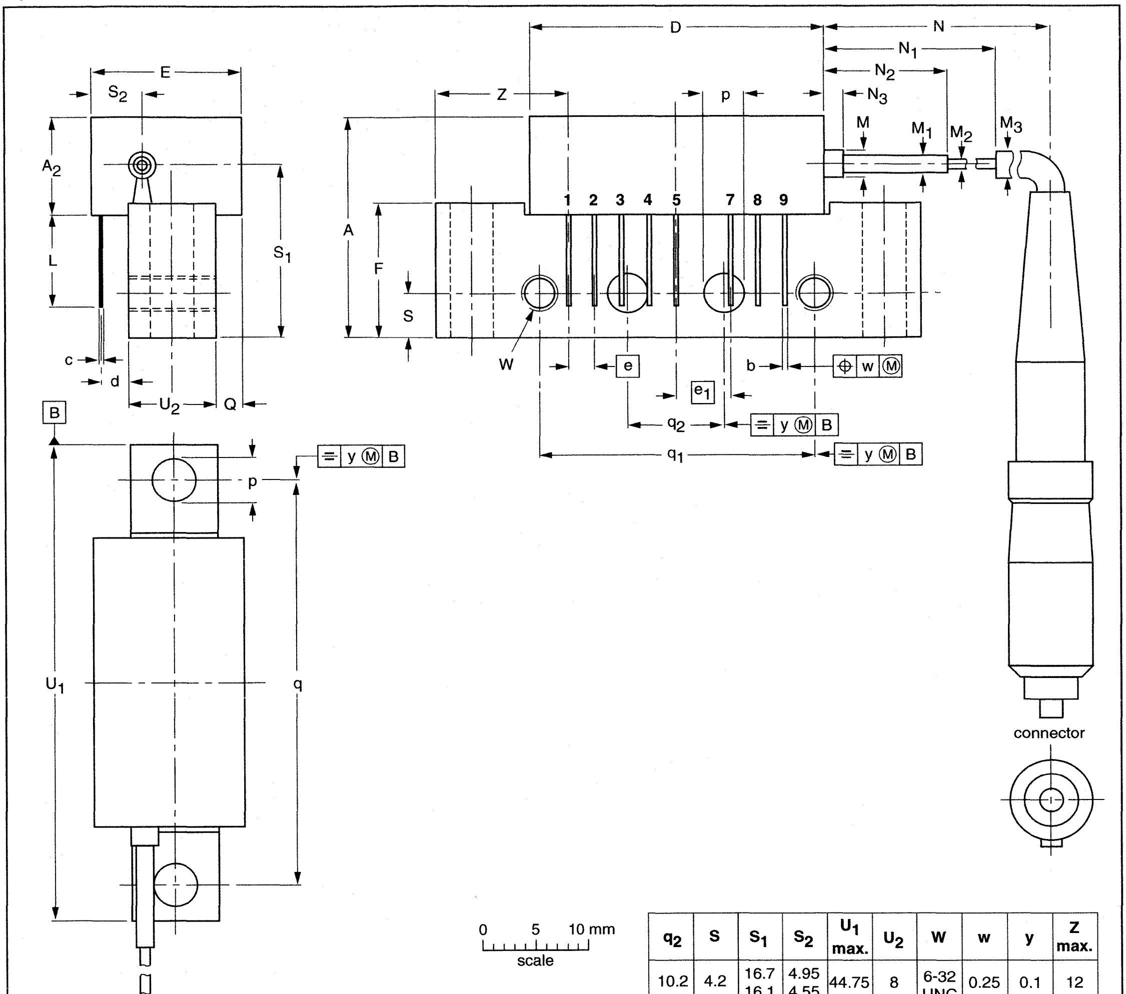
q_2	S	S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
10.2	4.2	16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	M	M_1	M_2	M_3	N	N_1	N_2	N_3	p	Q max.	q	q_1
mm	20.8	9.1	0.51 0.38	0.25	27.2	2.54	13.75	2.54	5.08	12.7	8.8	2.5	1.6	0.9	3	917 817	15.3 8.7	10.7 8.7	5 1	4.15 3.85	2.4	38.1	25.4

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115V						99-02-06

Rectangular single-ended package; aluminium flange;
2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes;
optical input with connector; 8 gold-plated in-line leads **SOT115W**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_2 max.	b	c	D max.	d max.	E max.	e	e_1	F	L min.	M	M_1	M_2	M_3	N	N_1	N_2	N_3	p	Q max.	q	q_1
mm	20.8	9.1	0.51 0.38	0.25	27.2	2.54	13.75	2.54	5.08	12.7	8.8	2.5	1.6	0.9	3	627 577	127 77	10.7 8.7	5 1	4.15 3.85	2.4	38.1	25.4

q_2	S	S_1	S_2	U_1 max.	U_2	W	w	y	Z max.
10.2	4.2	16.7 16.1	4.95 4.55	44.75	8	6-32 UNC	0.25	0.1	12

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT115W						99-04-13

CATV TESTFIXTURE

STANDARD CATV TESTFIXTURE

PARAMETER	CONDITIONS	VALUE
Frequency		5 to 1000 MHz
Suitability	suitable for devices with switchable positive and negative power supplies	
Impedance		75 Ω
Return loss	measured with thru-line system; other port terminated with 75 Ω	
<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 device by means of a microswitch after closing the pressing system	<50 V
Operating temperature		−25 to +75 °C
RF connectors		N-type female; 75 Ω
DC connectors		banana type
Dimensions	length × breadth × height; note 1	110 × 60 × 55 mm
Cooling		water cooling connections available on testfixture
Ordering	order the CATV testfixture via your regional sales office. Type number: ON5045/test jig 12 NC: 9340 554 04114	

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 testfixture for BGX885N, BGD885, BGE885 and BGX881

PARAMETER	CONDITIONS	VALUE
Frequency		40 to 860 MHz
Impedance		75 Ω
Return loss	measured with thru-line system; other port terminated with 75 Ω.	
40 MHz		<–40 dB decreasing 1.5 dB per octave up to 860 MHz
860 MHz		<–32 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 device by means of a microswitch after closing the pressing system	<50 V
Operating temperature		–25 to +75 °C
RF connectors		N-type female; 75 Ω
DC connectors		banana type
Dimensions	length × breadth × height; note 1	110 × 60 × 55 mm
Cooling		water cooling connections available on testfixture
Ordering	order the CATV testfixture via your regional sales office.	

Note

1. Dimensions without pressing system, RF connectors and cooling connections. Distance between the centre contact of the RF connectors is 35.2 mm.

DATA HANDBOOK SYSTEM

Data handbook system

DATA HANDBOOK SYSTEM

Philips Semiconductors data handbooks contain all pertinent data available at the time of publication and each is revised and reissued regularly.

Loose data sheets are sent to subscribers to keep them up-to-date on additions or alterations made during the lifetime of a data handbook.

Catalogues are available for selected product ranges (some catalogues are also on floppy discs).

Our data handbook titles are listed here.

Integrated circuits

Book	*Title*
IC01	Semiconductors for Radio, Audio and CD/DVD Systems
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^2C Peripherals
IC13	Programmable Logic Devices (PLD)
IC14	8048-based 8-bit Microcontrollers
IC15	FAST TTL Logic Series
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Discrete semiconductors

Book	*Title*
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SC06	Power Bipolar Transistors
SC07	Small-signal Field-effect Transistors
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SC13	PowerMOS Transistors
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SC16	Wideband Hybrid Amplifier Modules for CATV
SC17	Semiconductor Sensors
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SC19	RF & Microwave Power Transistors, RF Power Modules and Circulators/Isolators

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Data handbook system

OVERVIEW OF PHILIPS COMPONENTS DATA HANDBOOKS

Our sister product division, Philips Components, also has a comprehensive data handbook system to support their products. Their data handbook titles are listed here.

Display Components

Book	*Title*
DC01	Colour Television and Multimedia Tubes
DC02	Monochrome Monitor Tubes and Deflection Units
DC03	Television Tuners, Coaxial Aerial Input Assemblies
DC04	Colour Monitor and Multimedia Tubes
DC05	Wire Wound Components

Advanced Ceramics & Modules

ACM1 (MA01)	Soft Ferrites
ACM2	Discrete Ceramics
ACM3 (MA03)	Piezoelectric Ceramics and Specialty Ferrites

BC Components

PA01	Electrolytic Capacitors
PA02	Varistors, Thermistors and Sensors
PA03	Potentiometers
PA04	Variable Capacitors
PA05	Film Capacitors
PA06	Ceramic Capacitors
PA06a	Surface Mounted Ceramic Multilayer Capacitors
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