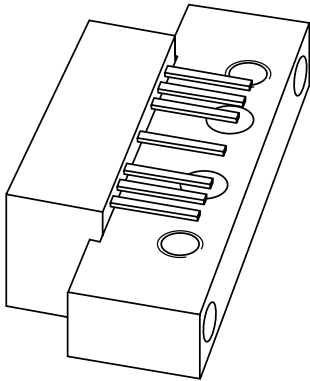


# DATA SHEET



## **BGD904; BGD904MI** CATV amplifier modules

Product specification  
Supersedes data of 1999 May 26

2000 Jan 10

# 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

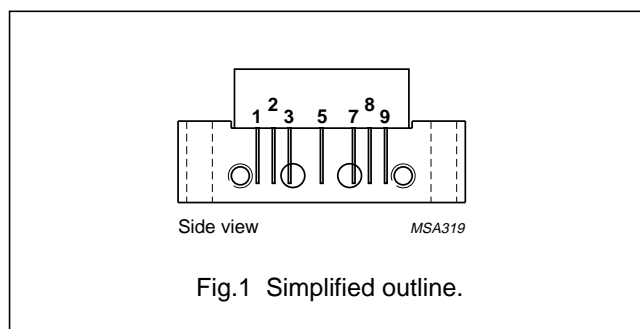
- CATV systems operating in the 40 to 900 MHz frequency range.

## 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 <sub>B</sub>	+V <sub>B</sub>
7, 8	common	common
9	output	input



## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G <sub>p</sub>	power gain	f = 50 MHz	19.7	20.3	dB
		f = 900 MHz	20.5	21.5	dB
I <sub>tot</sub>	total current consumption (DC)	V <sub>B</sub> = 24 V	405	435	mA

## LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V <sub>B</sub>	supply voltage	–	30	V
V <sub>i</sub>	RF input voltage	–	70	dBmV
T <sub>stg</sub>	storage temperature	–40	+100	°C
T <sub>mb</sub>	operating mounting base temperature	–20	+100	°C

## CATV amplifier modules

## BGD904; BGD904MI

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

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

## CATV amplifier modules

## BGD904; BGD904MI

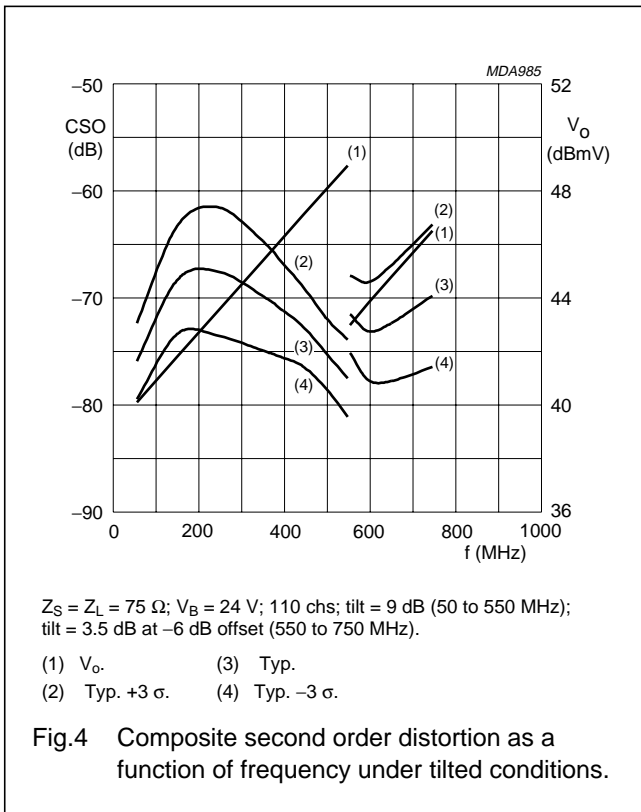
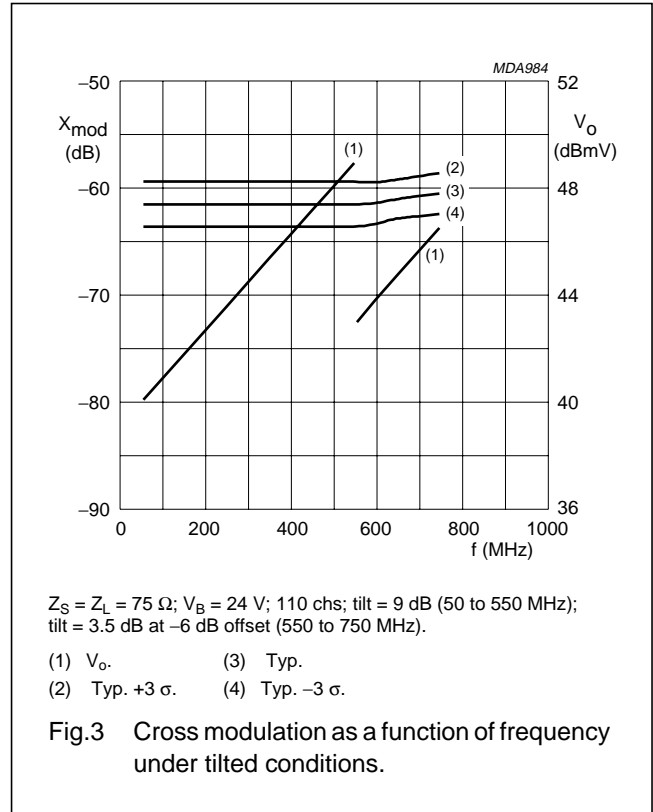
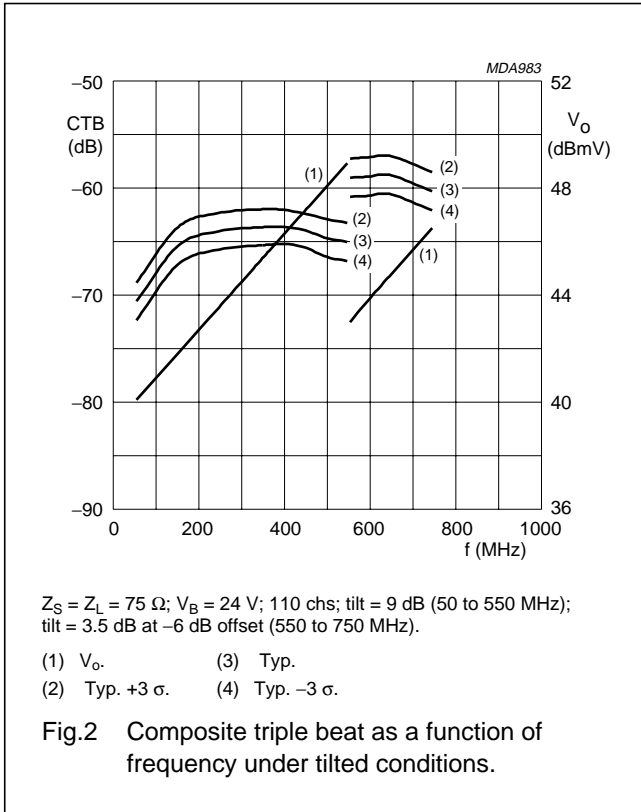
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO	composite second order distortion	49 chs flat; $V_o = 47$ dBmV; $f_m = 860.5$ MHz	–	–68	–62	dB
		77 chs flat; $V_o = 44$ dBmV; $f_m = 548.5$ MHz	–	–72	–67	dB
		110 chs flat; $V_o = 44$ dBmV; $f_m = 746.5$ MHz	–	–68	–62	dB
		129 chs flat; $V_o = 44$ 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**

- Tilt = 9 dB (50 to 550 MHz); tilt = 3.5 dB at –6 dB offset (550 to 750 MHz).
- Tilt = 12.5 dB (50 to 860 MHz).
- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  $f_q = 805.25$  MHz;  $V_q = 44$  dBmV; measured at  $f_p + f_q = 860.5$  MHz.
- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  $f_q = 691.25$  MHz;  $V_q = 44$  dBmV; measured at  $f_p + f_q = 746.5$  MHz.
- $f_p = 55.25$  MHz;  $V_p = 44$  dBmV;  $f_q = 493.25$  MHz;  $V_q = 44$  dBmV; measured at  $f_p + f_q = 548.5$  MHz.
- Measured according to DIN45004B:  
 $f_p = 851.25$  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.
- 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.
- Measured according to DIN45004B:  
 $f_p = 540.25$  MHz;  $V_p = V_o$ ;  $f_q = 547.25$  MHz;  $V_q = V_o - 6$  dB;  $f_r = 549.25$  MHz;  $V_r = V_o - 6$  dB;  
measured at  $f_p + f_q - f_r = 538.25$  MHz.
- The module normally operates at  $V_B = 24$  V, but is able to withstand supply transients up to 35 V.

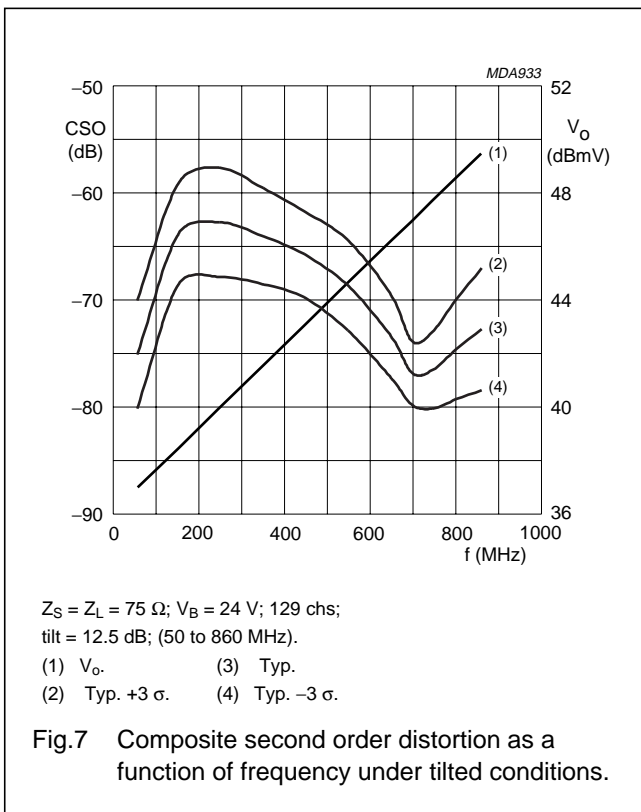
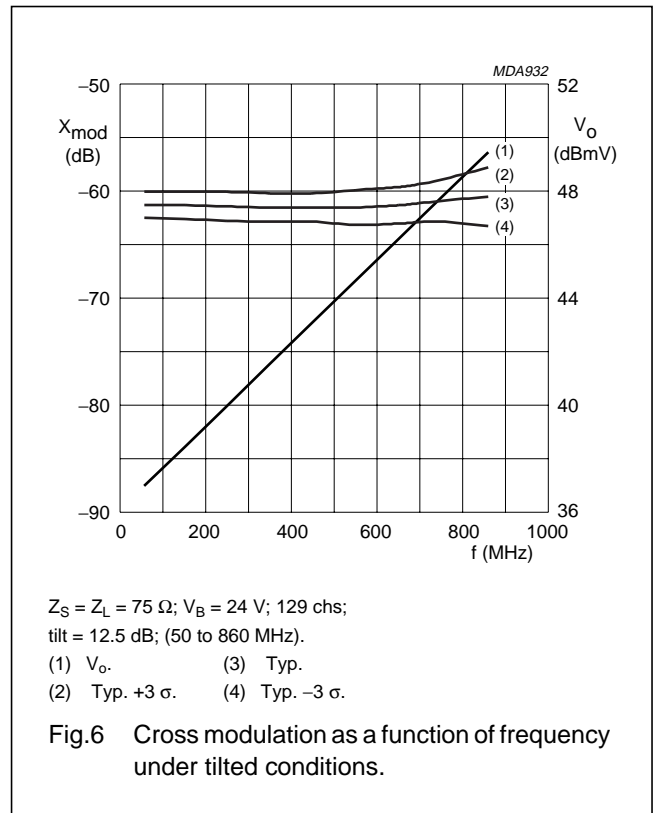
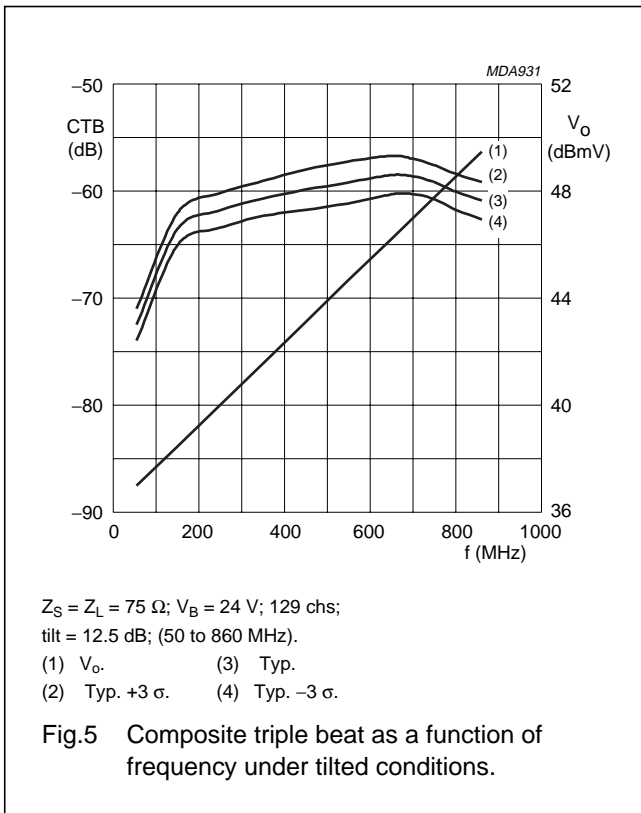
CATV amplifier modules

BGD904; BGD904MI



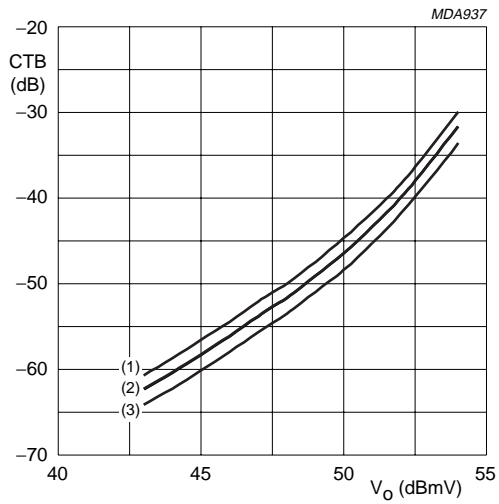
CATV amplifier modules

BGD904; BGD904MI



CATV amplifier modules

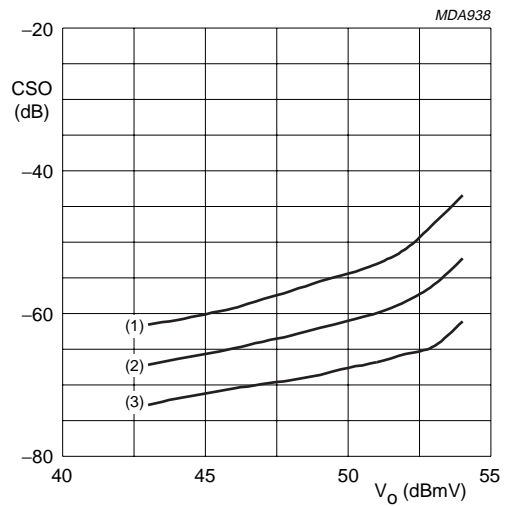
BGD904; BGD904MI



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

- (1) Typ. +3  $\sigma$ .
- (2) Typ.
- (3) Typ. -3  $\sigma$ .

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



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

- (1) Typ. +3  $\sigma$ .
- (2) Typ.
- (3) Typ. -3  $\sigma$ .

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

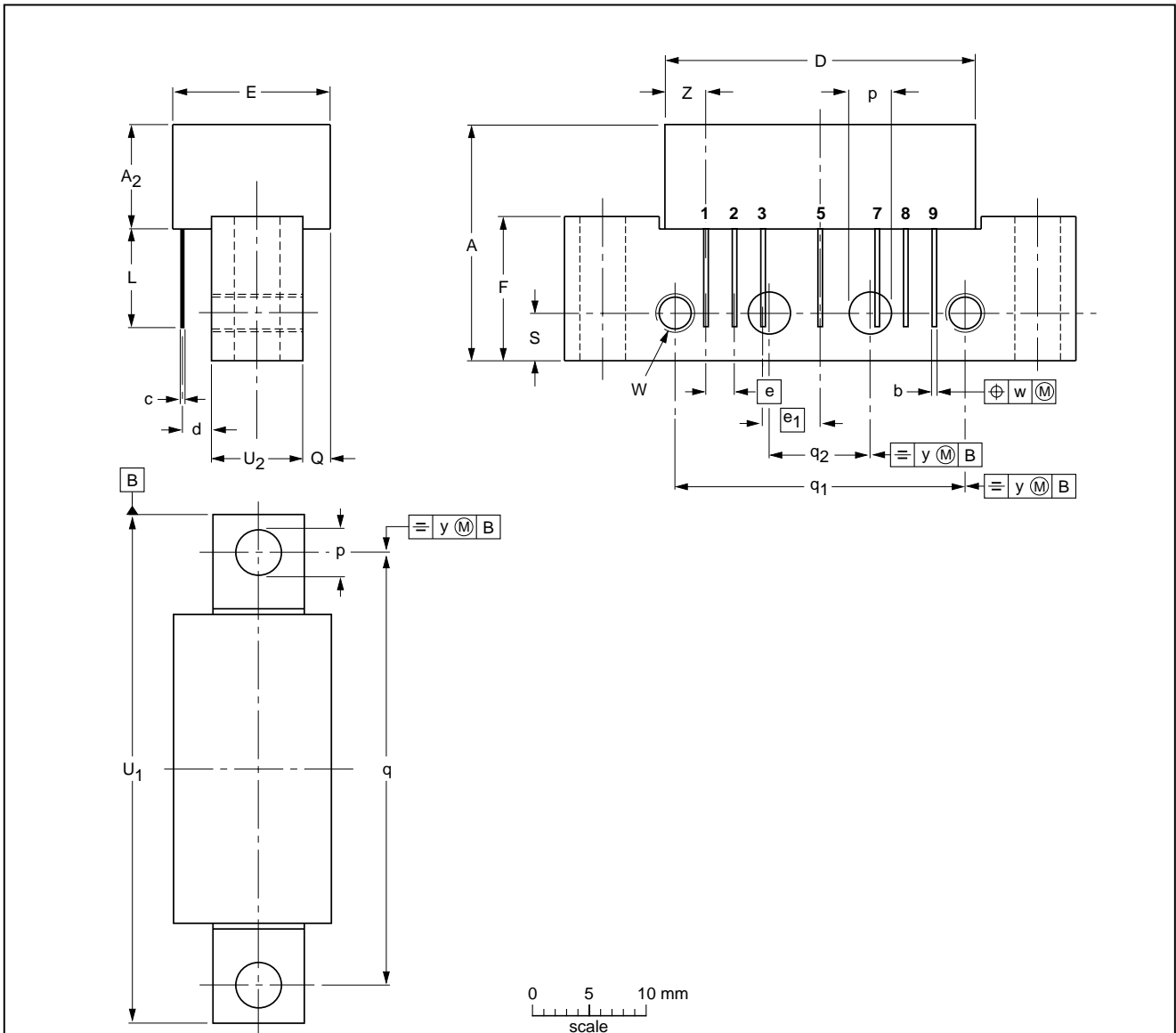
CATV amplifier modules

BGD904; BGD904MI

PACKAGE OUTLINE

Rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes

SOT115J



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A <sub>2</sub> max.	b	c	D max.	d max.	E max.	e	e <sub>1</sub>	F	L min.	p	Q max.	q	q <sub>1</sub>	q <sub>2</sub>	S	U <sub>1</sub> max.	U <sub>2</sub>	W	w	y	Z max.
mm	20.8	9.1	0.51 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



## CATV amplifier modules

## BGD904; BGD904MI

**DEFINITIONS**

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

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CATV amplifier modules

BGD904; BGD904MI

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**NOTES**

CATV amplifier modules

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**NOTES**

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