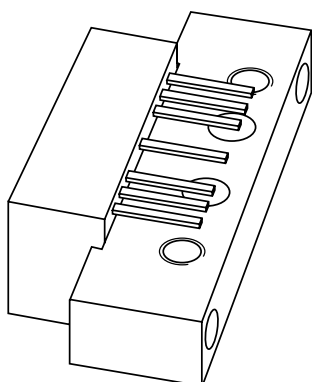


DATA SHEET



BGD904L

**860 MHz, 20 dB gain power
doubler amplifier**

Product specification
Supersedes data of 1999 Aug 17

2001 Nov 01

860 MHz, 20 dB gain power doubler amplifier

BGD904L

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 supply voltage of 24 V.

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	+V _B
7	common
8	common
9	output

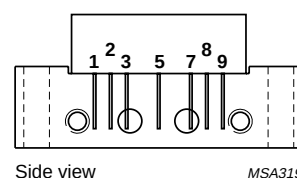


Fig.1 Simplified outline.

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 60134).

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

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CHARACTERISTICSBandwidth 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 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_{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	–	–65.5	–64	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	–55	dB
		110 channels; $f_m = 397.25$ MHz; $V_o = 49$ dBmV at 550 MHz; note 1	–	–61.5	–59.5	dB
		129 channels; $f_m = 649.25$ MHz; $V_o = 49.5$ dBmV at 860 MHz; note 2	–	–56	–54	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	–60.5	dB
		129 channels flat; $V_o = 44$ dBmV; $f_m = 55.25$ MHz	–	–61.5	–59	dB
		110 channels; $f_m = 397.25$ MHz; $V_o = 49$ dBmV at 550 MHz; note 1	–	–60	–57.5	dB
		129 channels; $f_m = 859.25$ MHz; $V_o = 49.5$ dBmV at 860 MHz; note 2	–	–56	–53.5	dB

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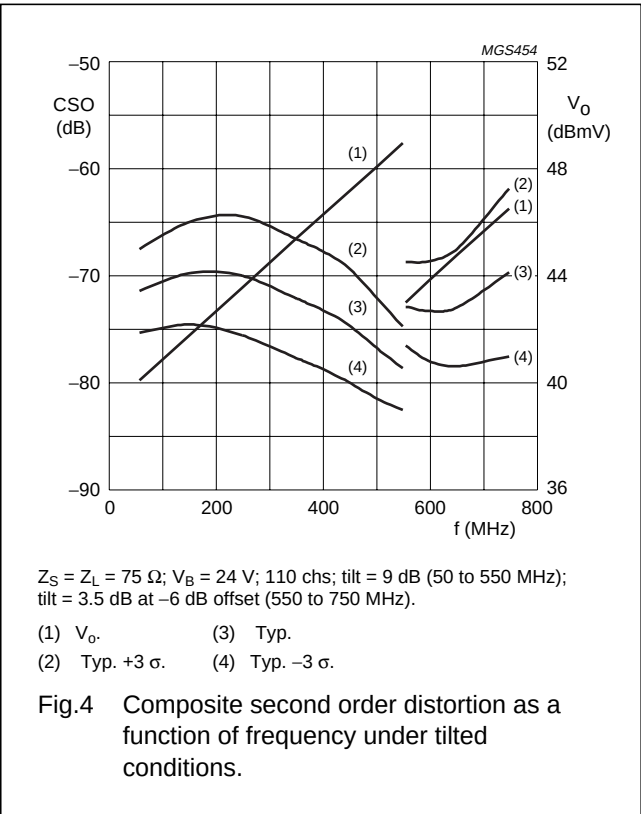
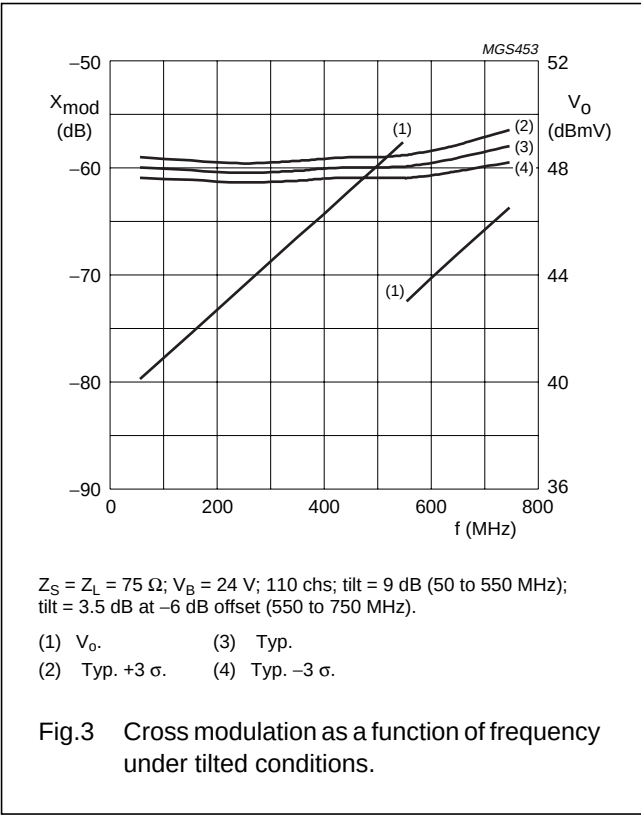
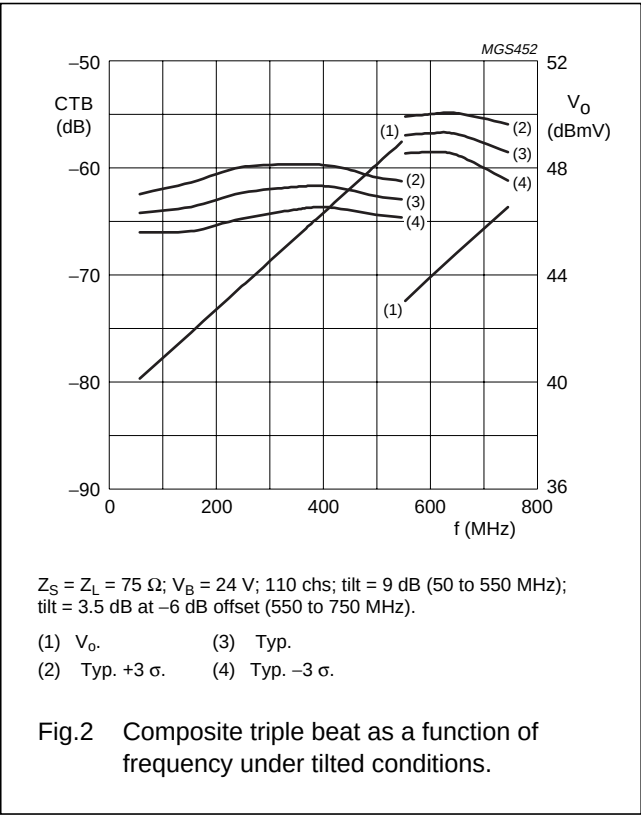
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
CSO	composite second order distortion	49 channels flat; $V_o = 47$ dBmV; $f_m = 860.5$ MHz	–	–69	–63	dB
		77 channels flat; $V_o = 44$ dBmV; $f_m = 548.5$ MHz	–	–73	–68	dB
		110 channels flat; $V_o = 44$ dBmV; $f_m = 746.5$ MHz	–	–69	–63	dB
		129 channels flat; $V_o = 44$ dBmV; $f_m = 860.5$ MHz	–	–65	–59	dB
		110 channels; $f_m = 150$ MHz; $V_o = 49$ dBmV at 550 MHz; note 1	–	–68	–63	dB
		129 channels; $f_m = 150$ MHz; $V_o = 49.5$ dBmV at 860 MHz; note 2	–	–63	–58	dB
d_2	second order distortion	note 3	–	–82	–75	dB
		note 4	–	–83	–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	47.5	48.5	–	dBmV
		CSO compression = 1 dB; 129 channels flat; $f = 860.5$ MHz	50	52	–	dBmV
NF	noise figure	$f = 50$ MHz	–	3.8	5	dB
		$f = 550$ MHz	–	4.1	5.5	dB
		$f = 750$ MHz	–	4.8	6.5	dB
		$f = 900$ MHz	–	5.9	7.5	dB
I_{tot}	total current consumption (DC)	note 9	350	365	380	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.

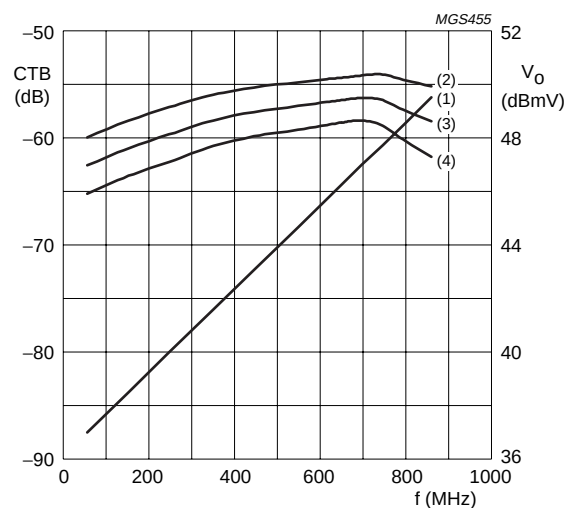
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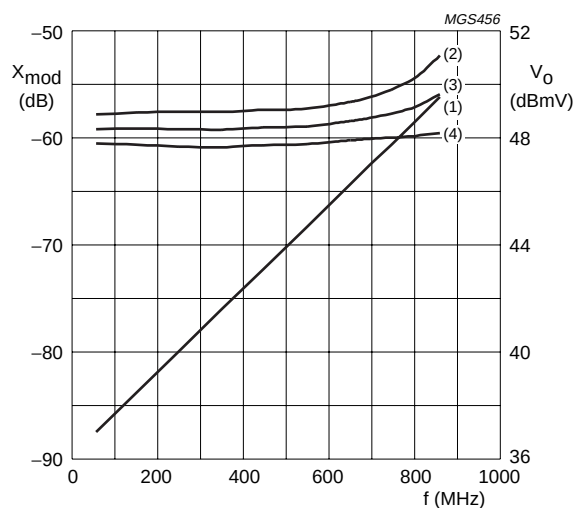
BGD904L



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).

(1) V_O . (3) Typ.
(2) Typ. +3 σ . (4) Typ. -3 σ .

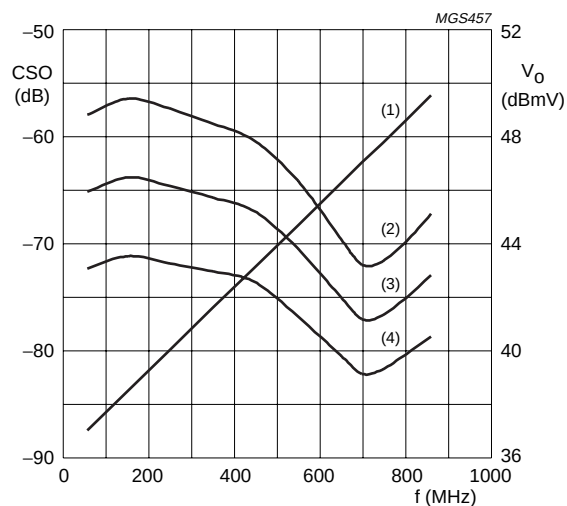
Fig.5 Composite triple beat as a function of frequency under tilted conditions.



$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 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 a function of frequency under tilted conditions.



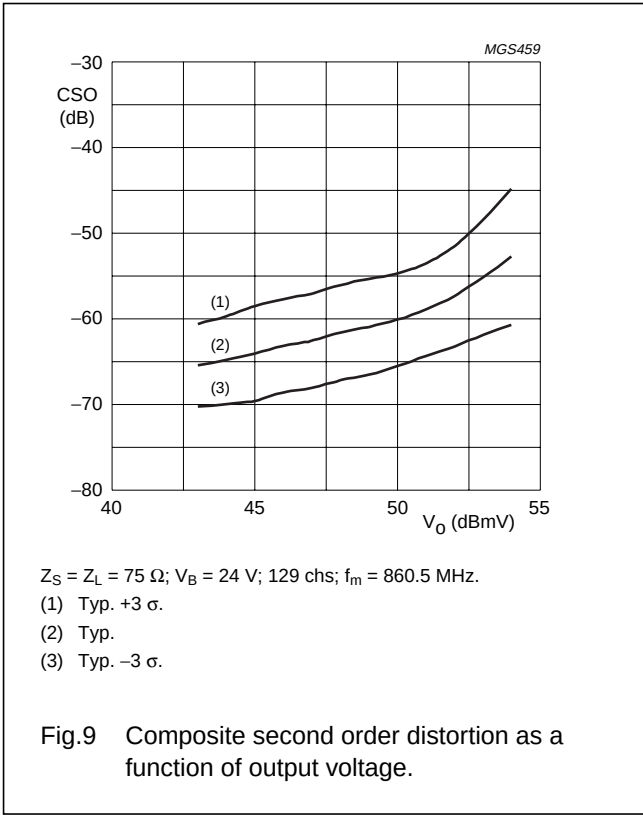
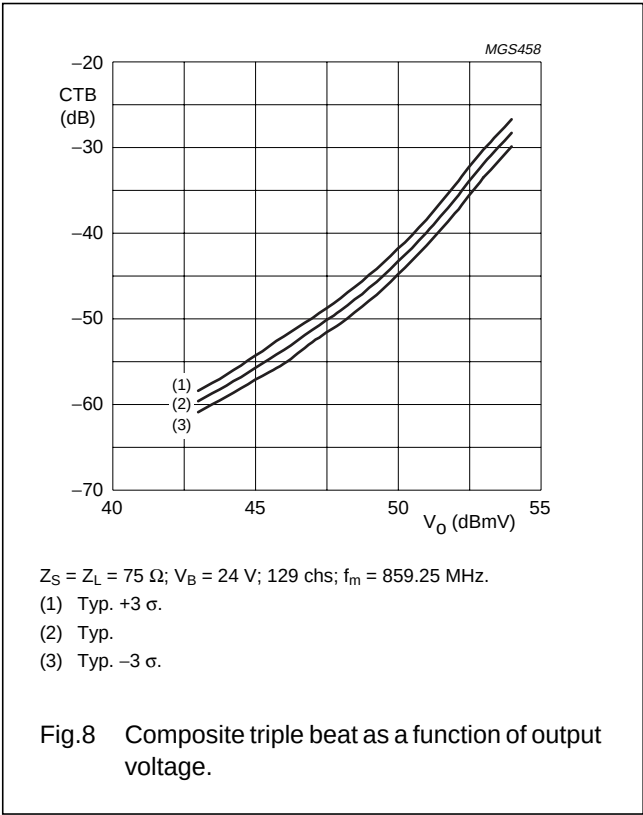
$Z_S = Z_L = 75 \Omega$; $V_B = 24 \text{ V}$; 129 chs;
tilt = 12.5 dB; (50 to 860 MHz).

(1) V_O . (3) Typ.
(2) Typ. +3 σ . (4) Typ. -3 σ .

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

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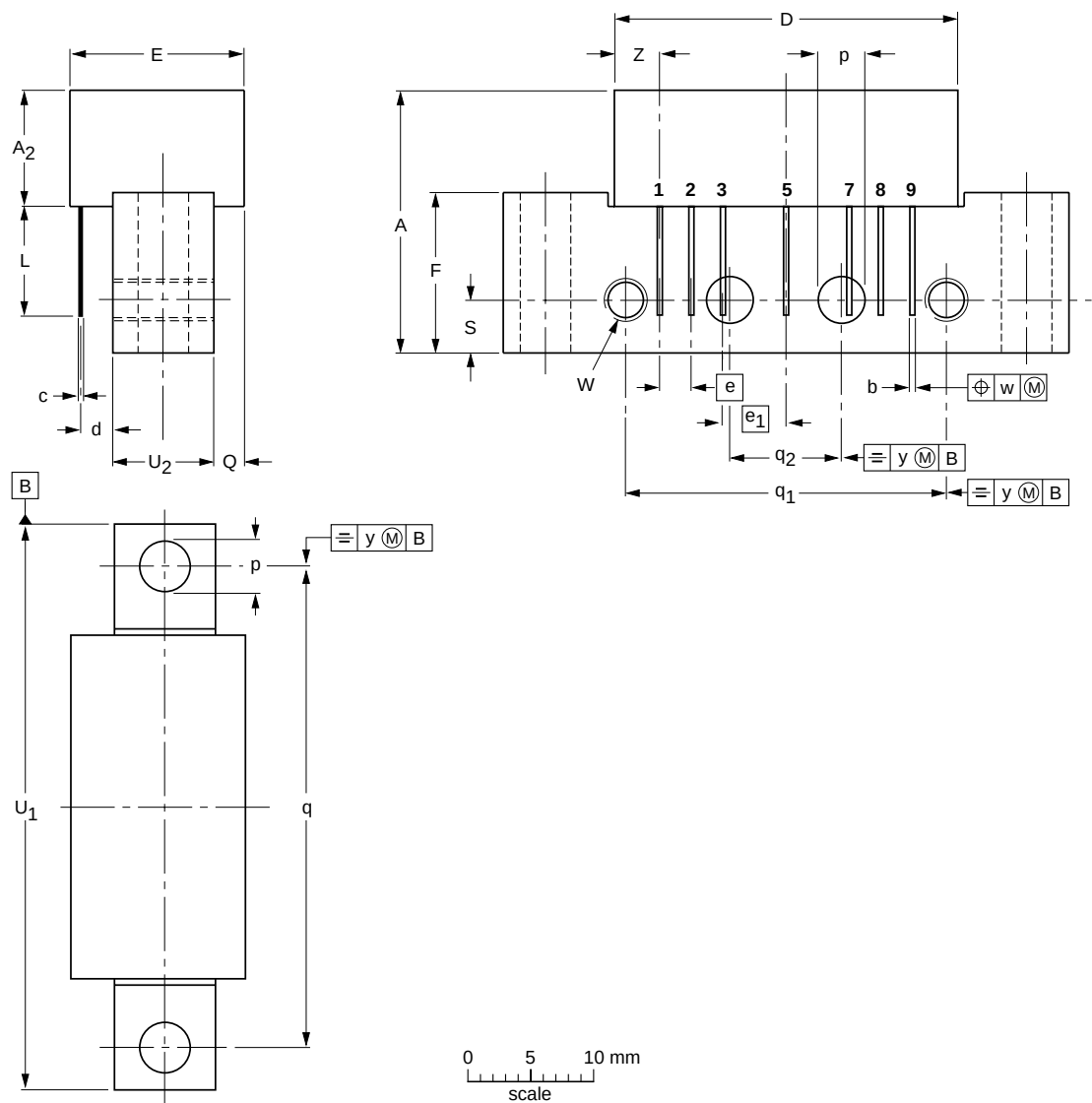
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PACKAGE OUTLINE

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

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NOTES

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NOTES

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