

# DATA SHEET

## **BLU45/12** UHF power transistor

Product specification

August 1986

# UHF power transistor

# BLU45/12

### DESCRIPTION

N-P-N silicon planar epitaxial transistor in SOT-119 envelope primarily intended for use in mobile radio transmitters in the 470 MHz communications band.

### FEATURES

- multi-base structure and emitter-ballasting resistors for an optimum temperature profile.
- internal matching to achieve an optimum wideband capability and high power gain.
- gold metallization ensures excellent reliability.

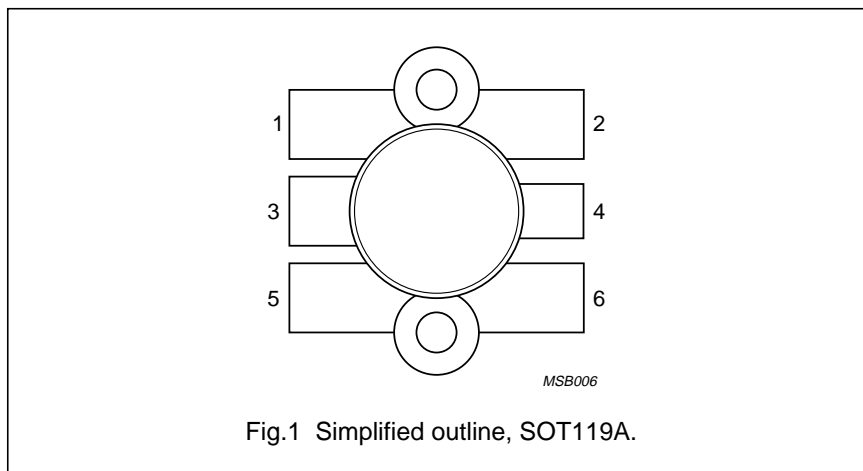
The transistor has a 6-lead flange envelope with a ceramic cap. All leads are isolated from the flange.

### QUICK REFERENCE DATA

R.F. performance up to  $T_h = 25\text{ }^\circ\text{C}$  in a common-emitter class-B circuit

MODE OF OPERATION	$V_{CE}$ V	f MHz	$P_L$ W	$G_p$ dB	$\eta_c$ %
narrow band; c.w.	12,5	470	45	> 4,8	> 55

### PIN CONFIGURATION



### PINNING

PIN	DESCRIPTION
1	emitter
2	emitter
3	base
4	collector
5	emitter
6	emitter

**PRODUCT SAFETY** This device incorporates beryllium oxide, the dust of which is toxic. The device is entirely safe provided that the BeO disc is not damaged.

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**RATINGS**

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Collector-base voltage (open emitter)

peak value

$V_{CBOM}$  max. 36 V

Collector-emitter voltage (open base)

$V_{CEO}$  max. 16,5 V

Emitter-base voltage (open collector)

$V_{EBO}$  max. 4 V

Collector current

d.c. or average

$I_C$  max. 9 A

(peak value);  $f > 1$  MHz

$I_{CM}$  max. 27 A

Total power dissipation

at  $T_{mb} = 25$  °C;  $f > 1$  MHz

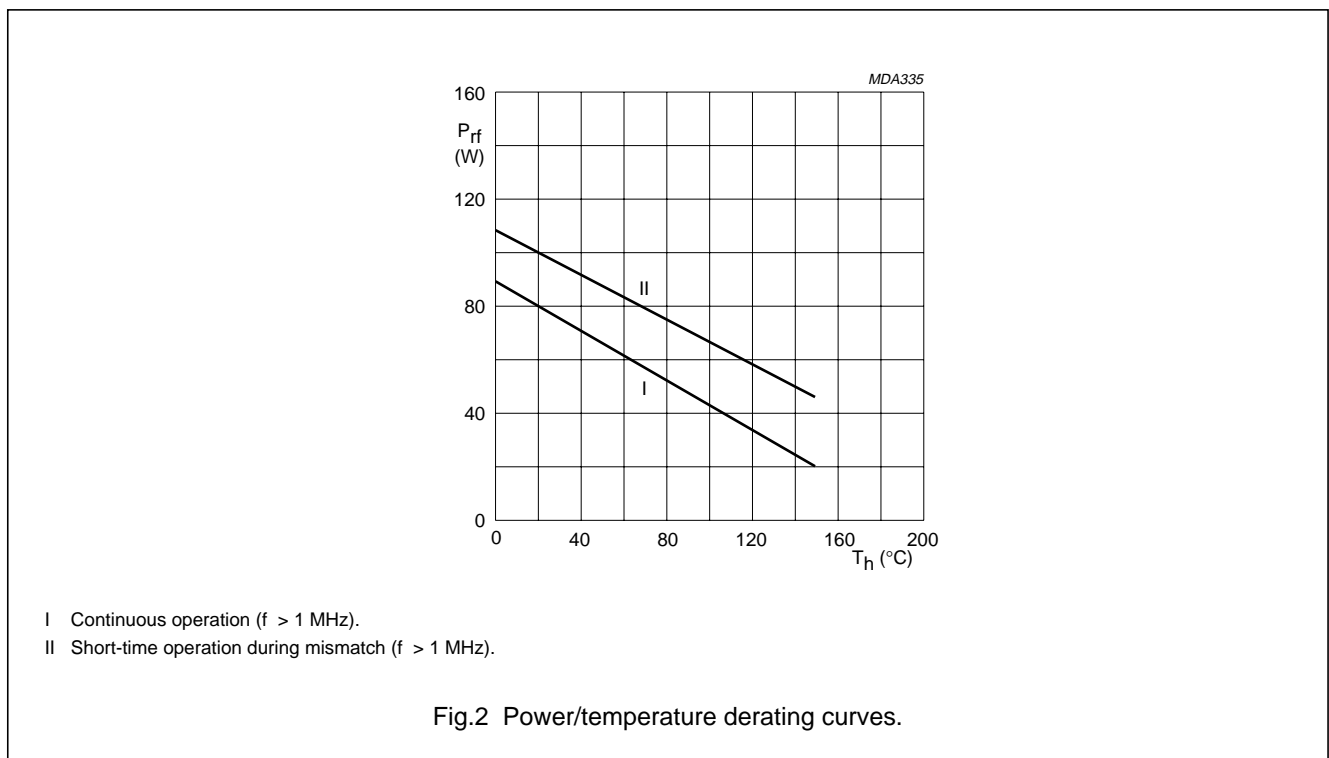
$P_{tot}$  max. 87 W

Storage temperature

$T_{stg}$  -65 to +150 °C

Operating junction temperature

$T_j$  max. 200 °C



**MAXIMUM THERMAL RESISTANCE**

Dissipation = 54 W;  $T_{amb} = 25$  °C

From junction to mounting base (r.f. operation)

$R_{th\ j-mb}$  max. 1,7 K/W

From mounting base to heatsink

$R_{th\ mb-h}$  max. 0,2 K/W

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**CHARACTERISTICS**

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

Collector-base breakdown voltage

open emitter;  $I_C = 100\text{ mA}$

$V_{(BR)CBO}$  min. 36 V

Collector-emitter breakdown voltage

open base;  $I_C = 200\text{ mA}$

$V_{(BR)CEO}$  min. 16,5 V

Emitter-base breakdown voltage

open collector;  $I_E = 20\text{ mA}$

$V_{(BR)EBO}$  min. 4 V

Collector cut-off current

$V_{BE} = 0$ ;  $V_{CE} = 16\text{ V}$

$I_{CES}$  max. 44 mA

Second breakdown energy

$L = 25\text{ mH}$ ;  $f = 50\text{ Hz}$ ;  $R_{BE} = 10\text{ }\Omega$

$E_{SBR}$  min. 15 mJ

D.C. current gain

$V_{CE} = 10\text{ V}$ ;  $I_C = 8\text{ A}$

$h_{FE}$  min. 15  
typ. 60

Collector capacitance at  $f = 1\text{ MHz}$

$I_E = i_e = 0$ ;  $V_{CB} = 12,5\text{ V}$

$C_c$  typ. 170 pF

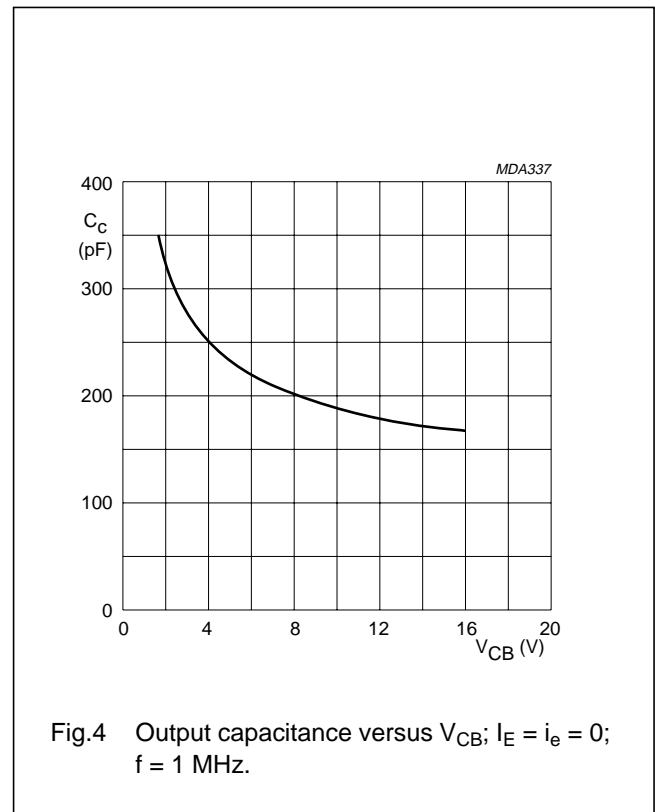
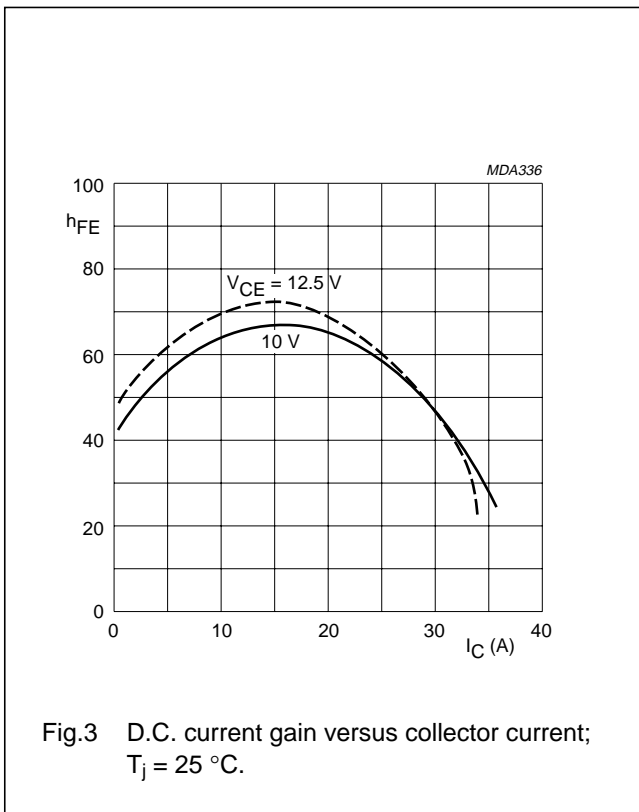
Feedback capacitance at  $f = 1\text{ MHz}$

$I_C = 0$ ;  $V_{CE} = 12,5\text{ V}$

$C_{re}$  typ. 100 pF

Collector-flange capacitance

$C_{cf}$  typ. 3 pF



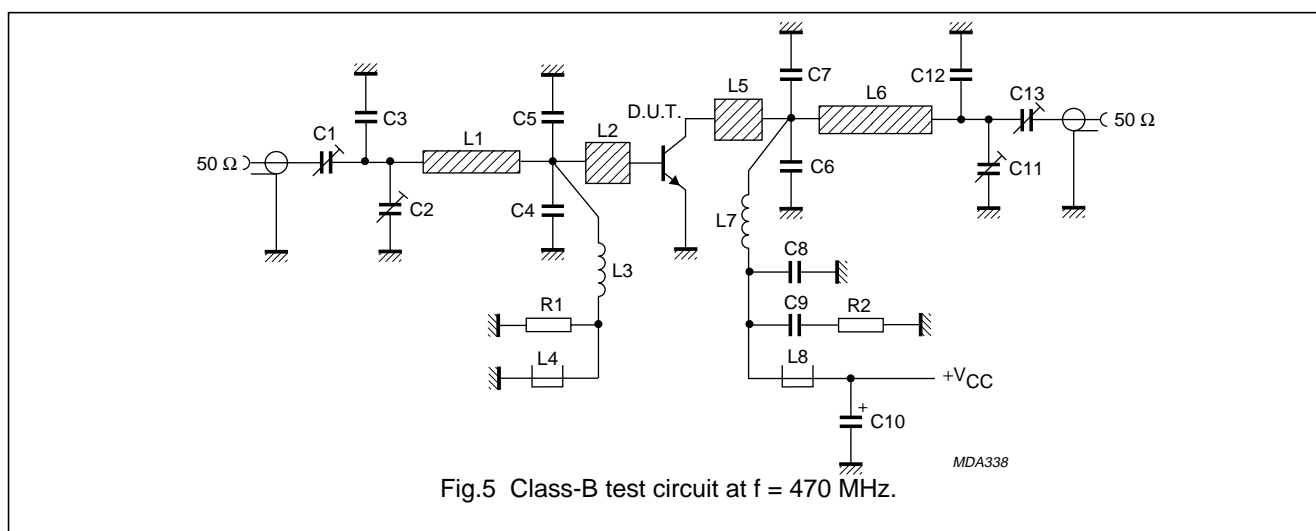
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## APPLICATION INFORMATION

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

MODE OF OPERATION	$V_{CE}$ V	f MHz	$P_L$ W	$G_p$ dB	$\eta_c$ %
narrow band; c.w.	12,5	470	45	> 4,8 typ. 5,8	> 55 typ. 61



List of components:

- C1 = C13 = 1,8 to 10 pF film dielectric trimmer (cat. no. 2222 809 05002)
- C2 = C11 = 1,4 to 5,5 pF film dielectric trimmer (cat. no. 2222 809 09001)
- C3 = 12 pF multilayer ceramic chip capacitor<sup>(1)</sup>
- C4 = C5 = 8,2 pF multilayer ceramic chip capacitor<sup>(2)</sup>
- C6 = C7 = 15 pF multilayer ceramic chip capacitor<sup>(1)</sup>
- C8 = 110 pF multilayer ceramic chip capacitor<sup>(1)</sup>
- C9 =  $3 \times 100$  nF multilayer ceramic chip capacitor in parallel
- C10 = 2,2  $\mu\text{F}$  (35 V) electrolytic capacitor
- C12 = 5,6 pF multilayer ceramic chip capacitor<sup>(1)</sup>
- L1 = 34,6  $\Omega$  stripline (17 mm  $\times$  4 mm)
- L2 = L5 = 25,3  $\Omega$  stripline (6 mm  $\times$  6 mm)
- L3 = 45 nH; 4 turns, closely wound enamelled Cu-wire (0,5 mm); int. dia. 2,5 mm; leads  $2 \times 5$  mm
- L4 = L8 = Ferroxcube wideband h.f. choke, grade 3B (cat. no. 4312 020 36642)
- L6 = 29,2  $\Omega$  stripline (25,5 mm  $\times$  5 mm)
- L7 = 10 nH; 1 turn Cu-wire (1,0 mm); int. dia. 5 mm; leads  $2 \times 5$  mm
- R1 = 1  $\Omega \pm 5\%$  (0,4 W) metal film resistor
- R2 = 10  $\Omega \pm 5\%$  (1,0 W) metal film resistor

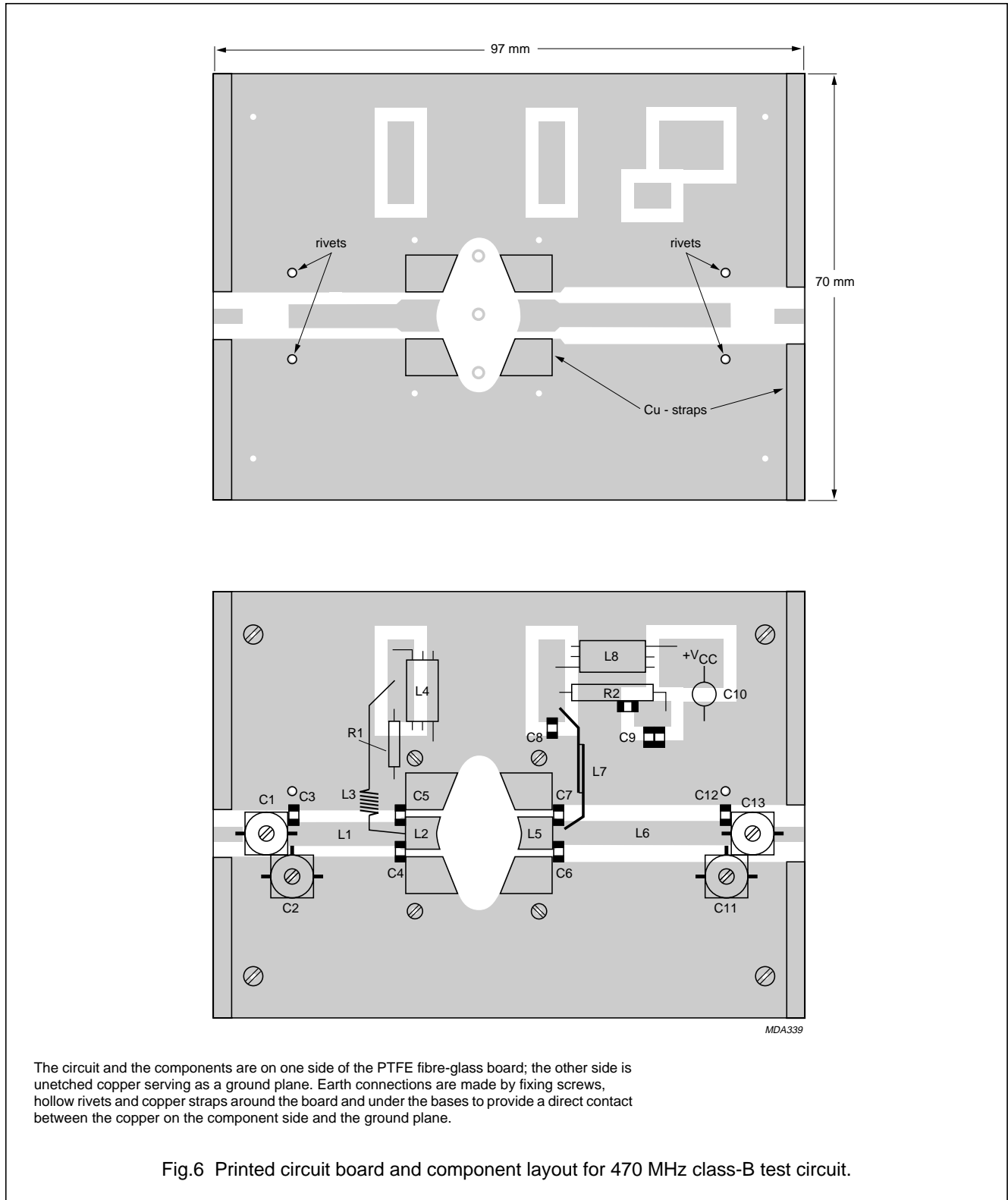
## Notes

1. American Technical Ceramics capacitor type B or capacitor of the same quality.
2. Idem type A.

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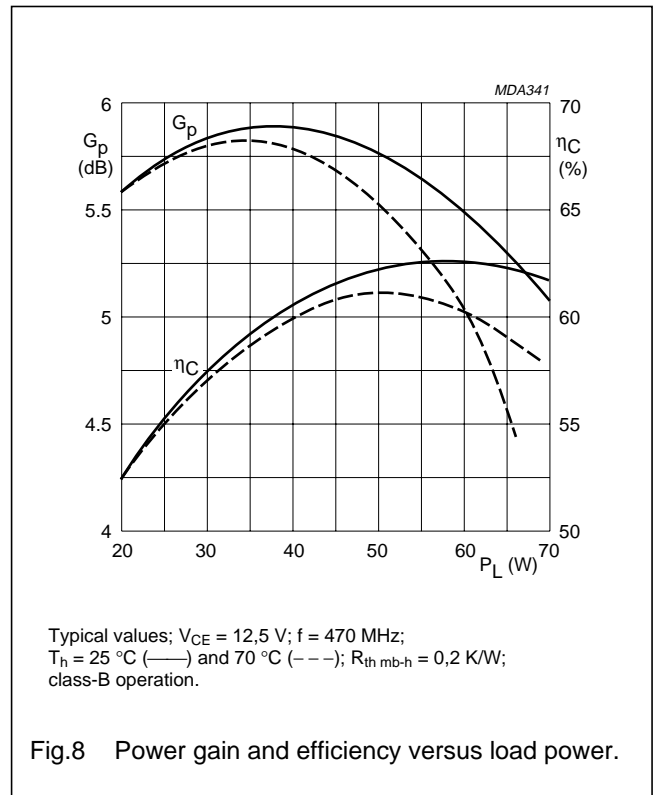
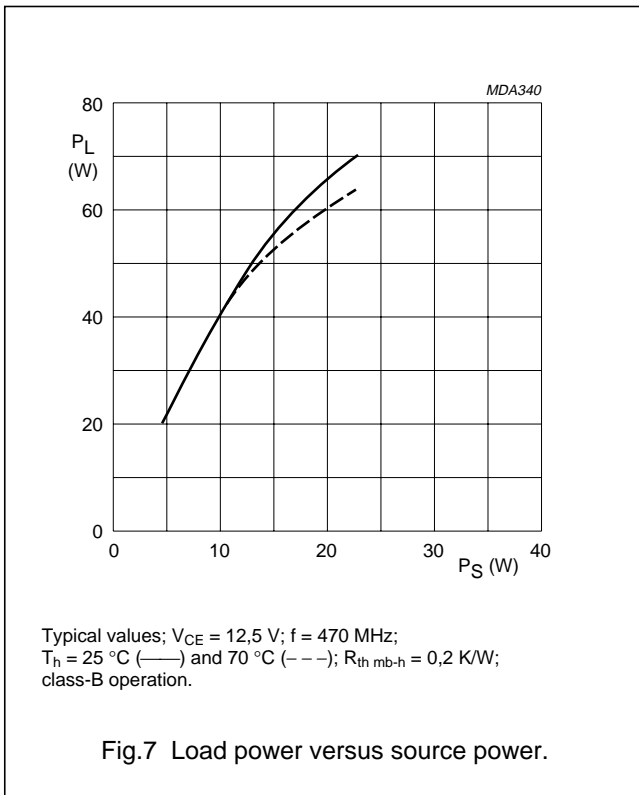
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Striplines are on a double Cu-clad printed circuit board with P.T.F.E. fibre-glass dielectric ( $\epsilon_r = 2,2$ ); thickness  $\frac{1}{32}$  inch.



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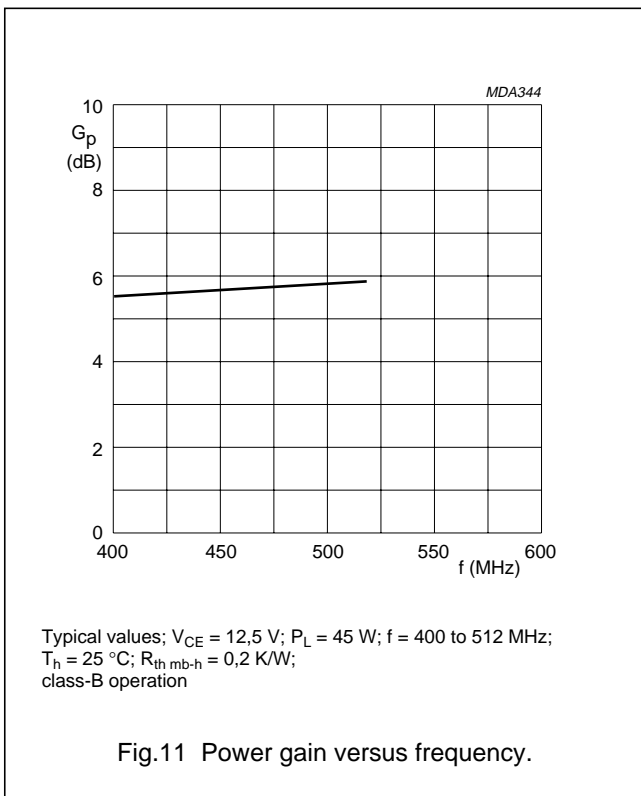
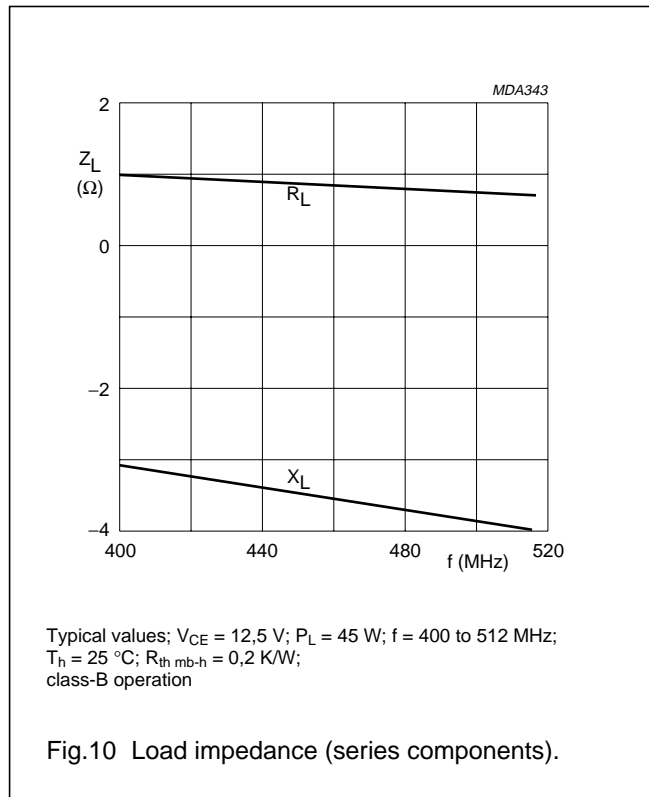
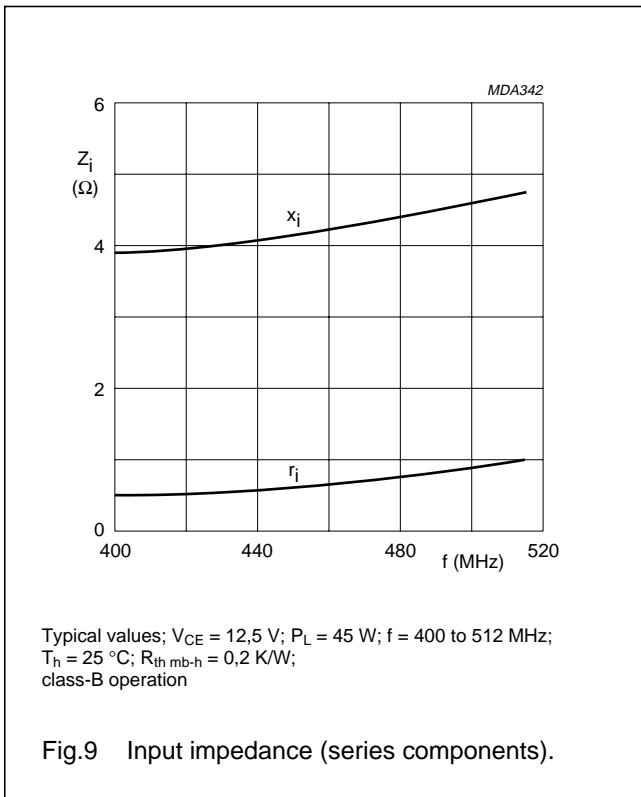


**RUGGEDNESS**

The BLU45/12 is capable of withstanding a full load mismatch ( $V_{SWR} = 50$  through all phases) up to 55 W under the following conditions:  $V_{CE} = 15,5 \text{ V}$ ;  $f = 470 \text{ MHz}$ ;  $T_h = 25 \text{ }^\circ\text{C}$ ;  $R_{th \text{ mb-h}} = 0,2 \text{ K/W}$ .

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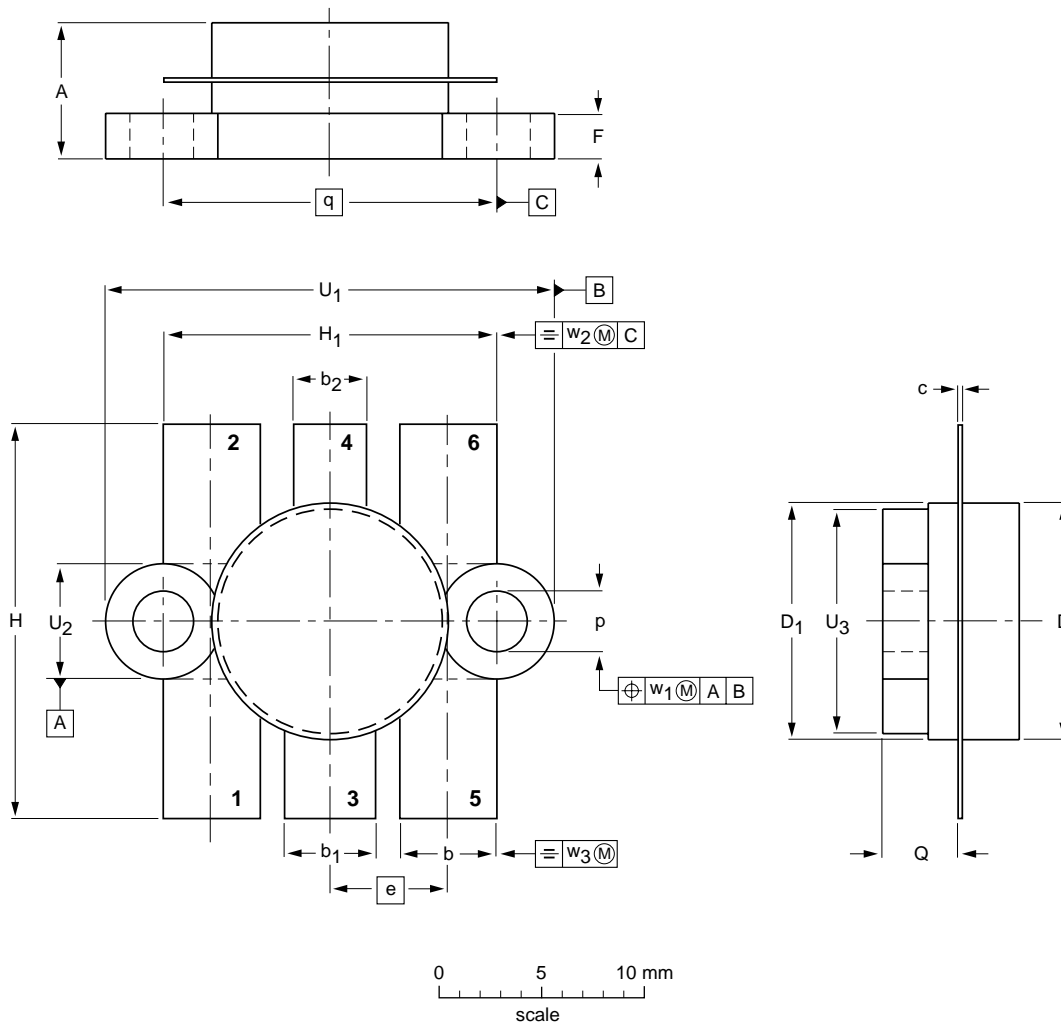
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## PACKAGE OUTLINE

Flanged ceramic package; 2 mounting holes; 6 leads

SOT119A



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

UNIT	A	b	b <sub>1</sub>	b <sub>2</sub>	c	D	D <sub>1</sub>	e	F	H	H <sub>1</sub>	p	Q	q	U <sub>1</sub>	U <sub>2</sub>	U <sub>3</sub>	w <sub>1</sub>	w <sub>2</sub>	w <sub>3</sub>
mm	7.39 6.32	5.59 5.33	5.34 5.08	4.07 3.81	0.18 0.07	12.86 12.59	12.83 12.57	6.48	2.54 2.28	22.10 21.08	18.55 18.28	3.31 2.97	4.58 3.98	18.42	25.23 23.95	6.48 6.07	12.76 12.06	0.51	1.02	0.26
inches	0.291 0.249	0.220 0.210	0.210 0.200	0.160 0.150	0.007 0.003	0.505 0.496	0.505 0.495	0.255	0.100 0.090	0.870 0.830	0.730 0.720	0.130 0.117	0.180 0.157	0.725	0.993 0.943	0.255 0.239	0.502 0.475	0.02	0.04	0.01

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT119A						97-06-28

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**DEFINITIONS**

<b>Data Sheet Status</b>	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
<b>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.	

**LIFE SUPPORT APPLICATIONS**

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