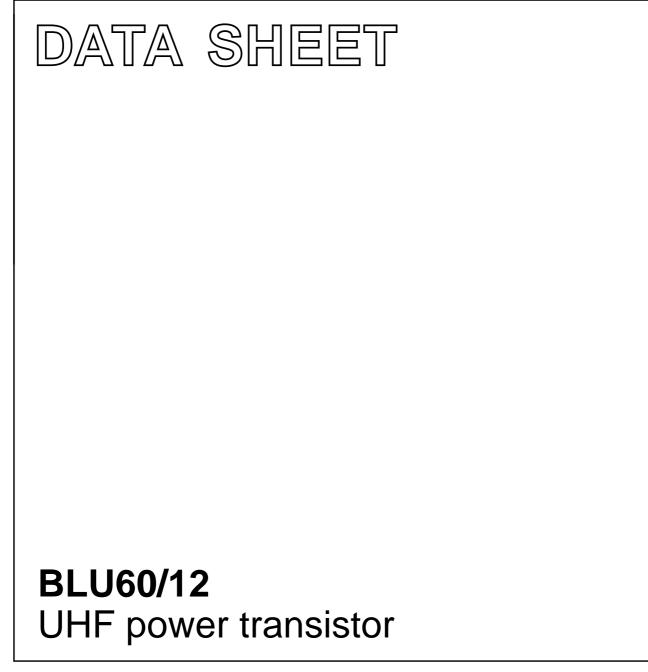
DISCRETE SEMICONDUCTORS



Product specification

March 1986



BLU60/12

UHF power transistor

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.

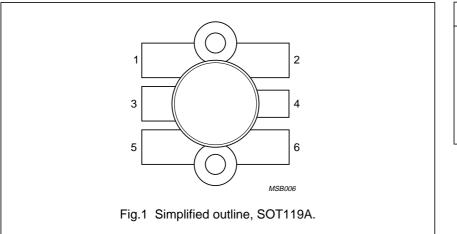
The transistor has a 6-lead flange envelope with a ceramic cap. All leads are isolated from the flange.

QUICK REFERENCE DATA

R.F. performance up to $T_h = 25$ °C in a common-emitter class-B circuit

MODE OF OPERATION	V _{CE}	f	P _L	G _p	ղ c
	V	MHz	W	dB	%
narrow band; c.w.	12,5	470	60	> 4,4	> 55

PIN CONFIGURATION



PINNING

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

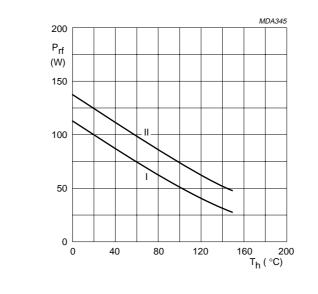
PRODUCT SAFETY This device incorporates beryllium oxide, the dust of which is toxic. The device is entirely safe provided that the BeO disc is not damaged.

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RATINGS

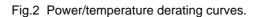
Limiting values in accordance with the Absolute Maximum System (IEC 134)

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	Ι _C	max.	12	А
(peak value); f > 1 MHz	I _{CM}	max.	36	А
Total power dissipation				
at T_{mb} = 25 °C; f > 1 MHz	P _{tot}	max.	110	W
Storage temperature	T _{stg}	–65 to	o + 150	°C
Operating junction temperature	Tj	max.	200	°C



I Continuous operation (f > 1 MHz).

II Short-time operation during mismatch (f > 1 MHz).



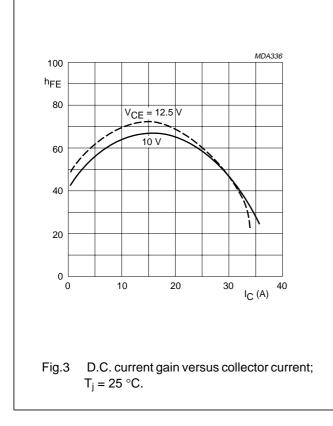
MAXIMUM THERMAL RESISTANCE

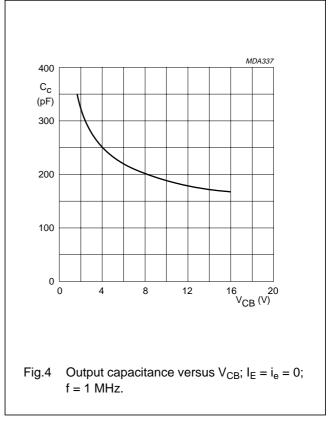
Dissipation = 72 W; T_{amb} = 25 °C

From junction to mounting base (r.f. operation)	R _{th j-mb}	max.	1,4 K/W
From mounting base to heatsink	R _{th mb-h}	max.	0,2 K/W

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CHARACTERISTICS				
$T_j = 25 \text{ °C}$ unless otherwise specified				
Collector-base breakdown voltage				
open emitter; I _C = 100 mA	V _{(BR)CBO}	min.	36	V
Collector-emitter breakdown voltage				
open base; I _C = 200 mA	V _{(BR)CEO}	min.	16,5	V
Emitter-base breakdown voltage				
open collector; I _E = 20 mA	V _{(BR)EBO}	min.	4	V
Collector cut-off current				
V _{BE} = 0; V _{CE} = 16 V	I _{CES}	max.	44	mA
Second breakdown energy				
L = 25 mH; f = 50 Hz; R_{BE} = 10 Ω	E_{SBR}	min.	15	mJ
D.C. current gain				
$V_{CE} = 10 \text{ V}; I_{C} = 8 \text{ A}$	h _{FE}	min.	15	
	''FE	typ.	60	
Collector capacitance at f = 1 MHz				
$I_E = i_e = 0; V_{CB} = 12,5 V$	Cc	typ.	170	pF
Feedback capacitance at f = 1 MHz				
$I_{C} = 0; V_{CE} = 12,5$	C _{re}	typ.	100	pF
Collector-flange capacitance	C _{cf}	typ.	3	pF



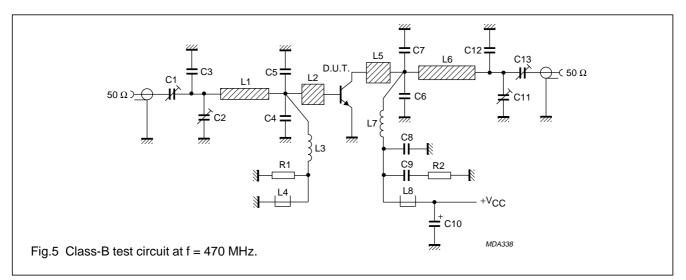


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APPLICATION INFORMATION

R.F. performance at T_h = 25 °C in a common-emitter class-B circuit

MODE OF OPERATION	V _{CE}	f	P _L	G _p	າc
	V	MHz	W	dB	%
narrow band; c.w.	12,5	470	60	> 4,4 typ. 5,5	> 55 typ. 62



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⁽¹⁾

C4 = C5 = 8, 2 pF multilayer ceramic chip capacitor⁽²⁾

C6 = C7 = 15 pF multilayer ceramic chip capacitor⁽¹⁾

C8 = 110 pF multilayer ceramic chip capacitor⁽¹⁾

C9 = 3×100 nF multilayer ceramic chip capacitor in parallel

 $C10 = 2,2 \ \mu F$ (35 V) electrolytic capacitor

C12 = 5,6 pF multilayer ceramic chip capacitor⁽¹⁾

L1 = 34,6 Ω stripline (17 mm × 4 mm)

L2 = L5 = 25,3 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 × 5 mm

L4 = L8 = Ferroxcube wideband h.f. choke, grade 3B (cat. no. 4312 020 36642)

L6 = 29,2 Ω stripline (25,5 mm \times 5 mm)

L7 = 10 nH; 1 turn Cu-wire (1,0 mm); int. dia. 5 mm; leads 2×5 mm

R1 = 1 $\Omega \pm 5\%$ (0,4 W) metal film resistor

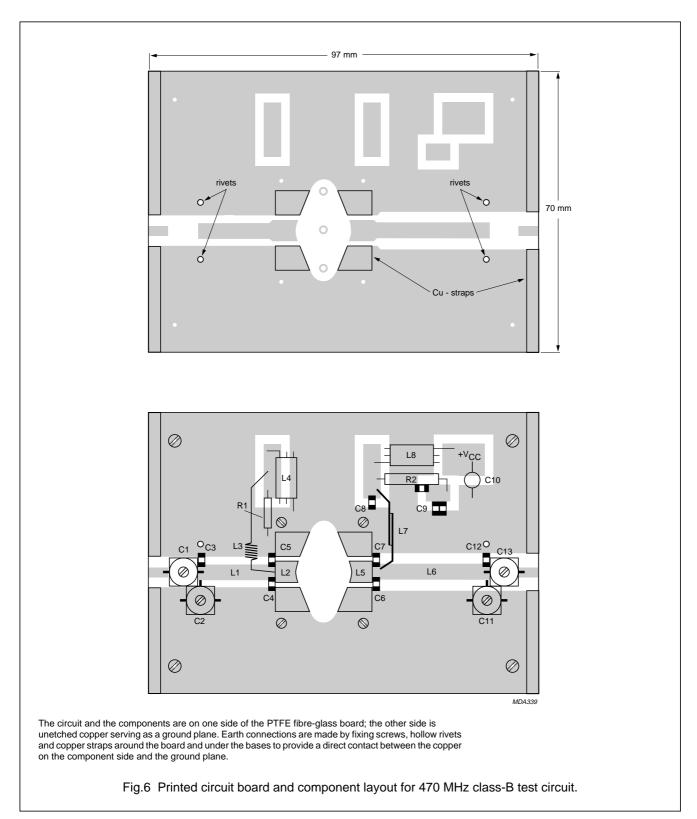
R2 = 10 $\Omega \pm 5\%$ (1,0 W) metal film resistor

Notes

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

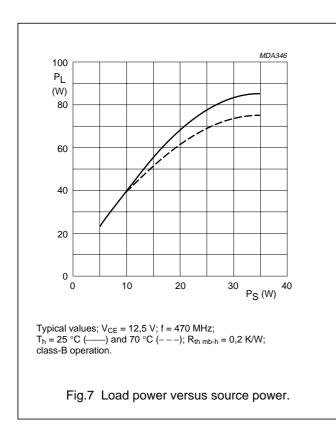
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Striplines are on a double Cu-clad printed circuit board with P.T.F.E. fibre-glass dielectric (ϵ_r = 2,2); thickness 1/32 inch.

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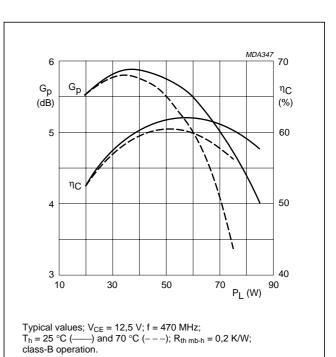
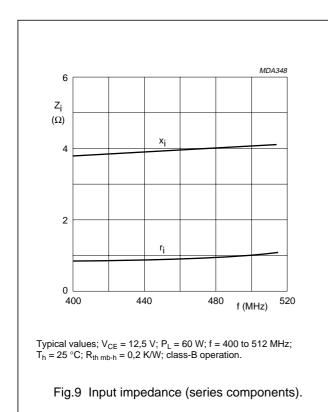


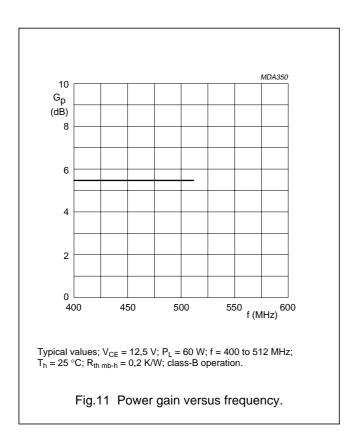
Fig.8 Power gain and efficiency versus load power.

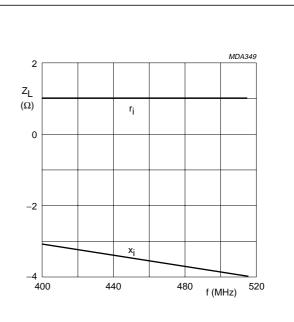
RUGGEDNESS

The BLU60/12 is capable of withstanding a full load mismatch (VSWR = 50 through all phases) up to 70 W under the following conditions; $V_{CE} = 15,5$ V; f = 470 MHz; T_h = 25 °C; R_{th mb-h} = 0,2 K/W.

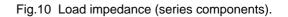
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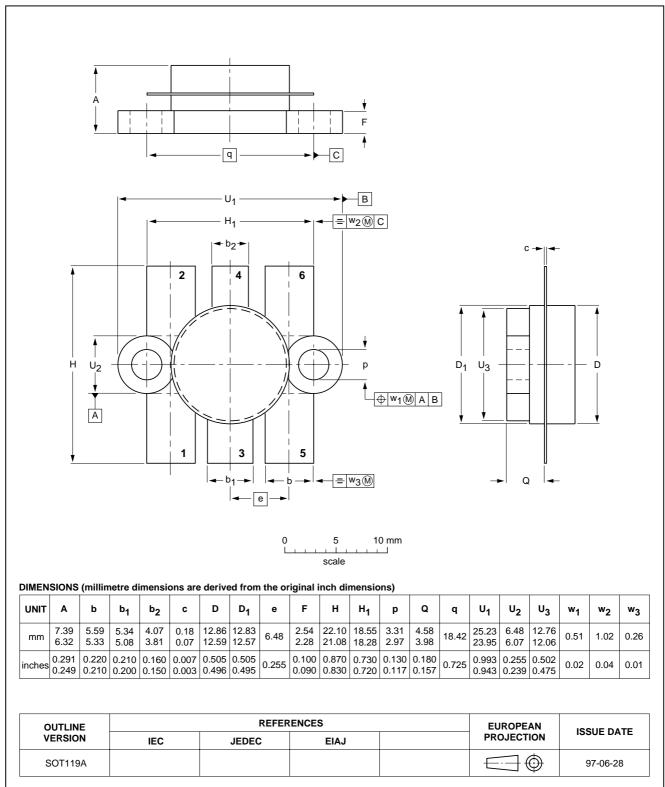


Typical values; V_{CE} = 12,5 V; P_L = 60 W; f = 400 to 512 MHz; T_h = 25 °C; R_{th mb-h} = 0,2 K/W; class-B operation.



PACKAGE OUTLINE

Flanged ceramic package; 2 mounting holes; 6 leads



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SOT119A

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DEFINITIONS

Data Sheet Status			
Objective specification	This data sheet contains target or goal specifications for product development.		
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.		
Product specification	This data sheet contains final product specifications.		
Limiting values			
more of the limiting values m of the device at these or at a	accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or ay cause permanent damage to the device. These are stress ratings only and operation ny other conditions above those given in the Characteristics sections of the specification miting 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.

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

Product specification