

T-33-15

RXB06150W

NPN silicon planar epitaxial microwave power transistor

PHILIPS INTERNATIONAL 56E D ■ 7110826 0046542 92T ■ PHIN

FEATURES

- Suitable for short and medium pulse applications up to 1 ms/15%
- Internal input prematching networks allow an easier design of circuits
- Diffused emitter ballasting resistors improve ruggedness
- Interdigitated emitter-base structure provides high emitter efficiency
- Gold metallization with barrier realizes very good stability of the characteristics and excellent lifetime
- Multicell geometry improves power sharing and reduces thermal resistance.

DESCRIPTION

NPN silicon planar epitaxial microwave power transistor in a FO-91B metal ceramic flange package with base connected to flange.

APPLICATIONS

Intended for use in common base, class C, broadband, pulsed power amplifiers for radar applications in the 540 to 610 MHz band. Also suitable for medium pulse, heavy duty operation within this band.

QUICK REFERENCE DATA

Microwave performance up to $T_{mb} = 25^\circ\text{C}$ in a common base class C broadband amplifier.

MODE OF OPERATION	CONDITIONS	f (MHz)	V _{CC} (V)	P _L (W)	G _p (dB)	η _c (%)
class C	t _p = 500 μs; δ = 15%	540 - 610	40	≥ 150	≥ 7.5	≥ 50

PIN CONFIGURATION

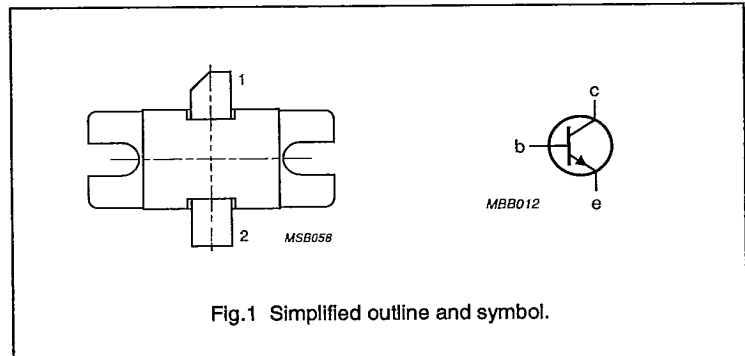


Fig.1 Simplified outline and symbol.

PINNING - FO-91B

PIN	DESCRIPTION
1	collector
2	emitter
3	base connected to flange

WARNING

Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO slab is not damaged. All persons who handle, use or dispose of this product should be aware of its nature and of the necessary safety precautions. After use, dispose of as chemical or special waste according to the regulations applying at the location of the user. It must never be thrown out with the general or domestic waste.

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	-	65	V
V_{CEO}	collector-emitter voltage	open base	-	15	V
V_{CES}	collector-emitter voltage	$R_{BE} = 0 \Omega$	-	60	V
V_{EBO}	emitter-base voltage	open collector	-	3	V
T_{stg}	storage temperature range		-65	200	°C
T_j	junction temperature		-	200	°C
T_{skt}	soldering temperature	$t \leq 10$ s note 1	-	235	°C

Note

- Up to 0.2 mm from ceramic.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	MAX.
$R_{th\ mb-h}$	thermal resistance from mounting base to heatsink	0.2 K/W

CHARACTERISTICS

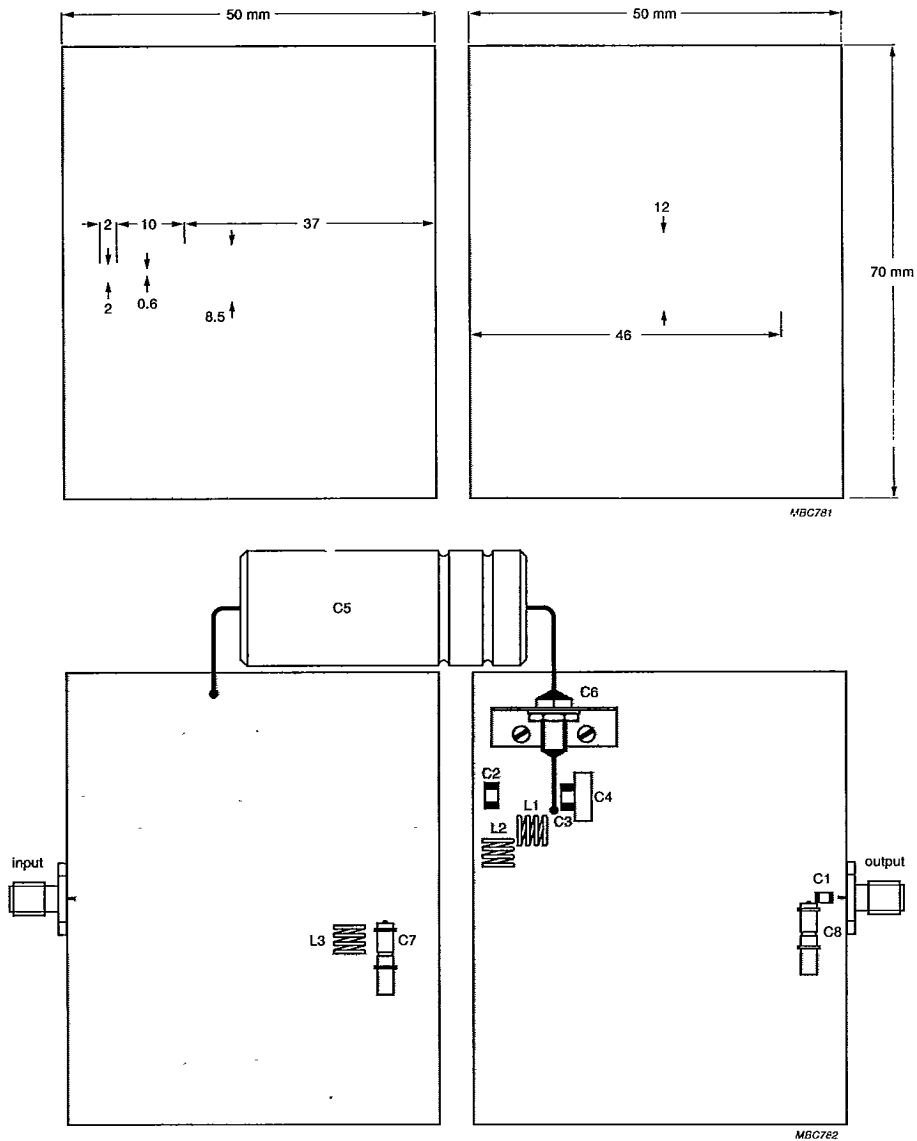
 $T_{mb} = 25$ °C unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
I_{CBO}	collector cut-off current	$V_{CB} = 50$ V; $I_E = 0$	8	mA
I_{EBO}	emitter cut-off current	$V_{EB} = 1.5$ V; $I_C = 0$	800	μ A

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Dimensions in mm

Fig.2 Broadband test circuit.

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APPLICATION INFORMATION

Microwave performance up to $T_{mb} = 25\text{ }^{\circ}\text{C}$ in a common base test circuit as shown in Fig.2.

MODE OF OPERATION	CONDITIONS	f (MHz)	V _{CC} (V) note 1	P _L (W)	G _p (dB)	η_c (%)
class C	$t_p = 500\text{ }\mu\text{s}$; $\delta = 15\text{ }%$; note 2	540 - 610	40	≥ 150	≥ 7.5 ; typ. 9	≥ 50 ; typ. 57

Notes

1. V_{CC} during pulse.
2. Operating conditions and performances for other pulse formats can be made available on request.

List of components (see test circuit)

COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE NO.
L1, L2, L3	3 turns 0.65 mm copper wire		int dia. = 4 mm; length of turn = 3 mm	
C1	capacitor	1000 pF		ATC, ref. 100B102KP50X
C2	capacitor	56 pF		ATC, ref. 100B560KP50X
C3	capacitor	100 pF		ATC, ref. 100B101KP50X
C4	tantalum capacitor	10 μF , 50 V		
C5	electrolytic capacitor	470 μF , 63 V		
C6	feedthrough bypass capacitor			Erie, ref. 1250-003
C7	variable gigatrim capacitor	0.8 - 8 pF		Tekelec, ref.729.1

The test jig consists of two circuits (input and output), each being 55 mm x 70 mm in size. The two circuits are mounted on a 10 mm thick hard aluminium alloy block. A recess should be machined in the aluminium block in which the

transistor can be mounted. The mounting surface must be lapped to a surface roughness of $R_a < 0.5\text{ }\mu\text{m}$ and the sum of the depth of the recess and the thickness of the circuits should not exceed the specified minimum dimension

between mounting face and the leads of the transistor. Tolerances on this dimension may be absorbed by placing a gold plated metal shim under the leads, close to the body of the transistor.