

DATA SHEET

PLB16004U

Microwave power transistor

Product specification
Supersedes data of December 1994

1997 Feb 18

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FEATURES

- Diffused emitter ballasting resistors improve excellent current sharing and withstanding a high VSWR
- Interdigitated common-base structure provides high emitter efficiency
- Gold metallization with barrier realizes very stable characteristics and excellent lifetime
- Multicell geometry gives good balance of dissipated power and low thermal resistance
- Internal input and output prematching networks allow an easier design of circuits.

APPLICATIONS

Intended for use in common-base class C power amplifiers at 1.6 GHz.

DESCRIPTION

NPN silicon planar epitaxial microwave power transistor in a SOT437A glued cap metal ceramic flange package, with base connected to flange.

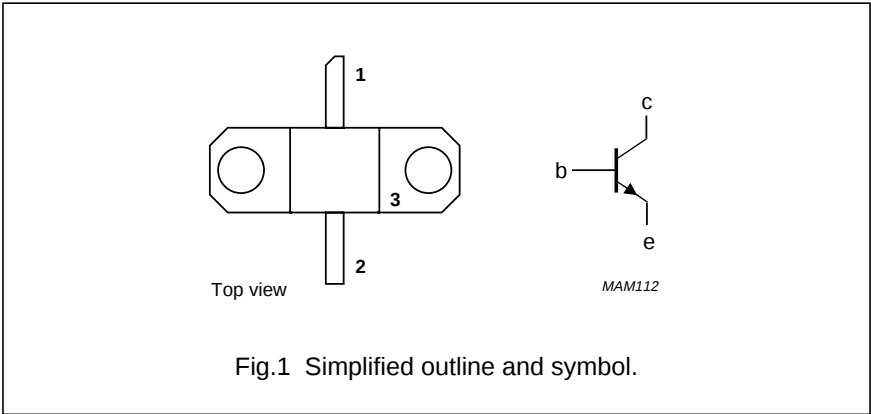
QUICK REFERENCE DATA

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

MODE OF OPERATION	f (GHz)	V _{CC} (V)	P _L (W)	G _p (dB)	η _c (%)	Z _i ; Z _L (Ω)
Class C (CW)	1.6	28	>4.5	>8.5	>40	see Figs 5 and 6

PINNING - SOT437A

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.

Microwave power transistor

PLB16004U

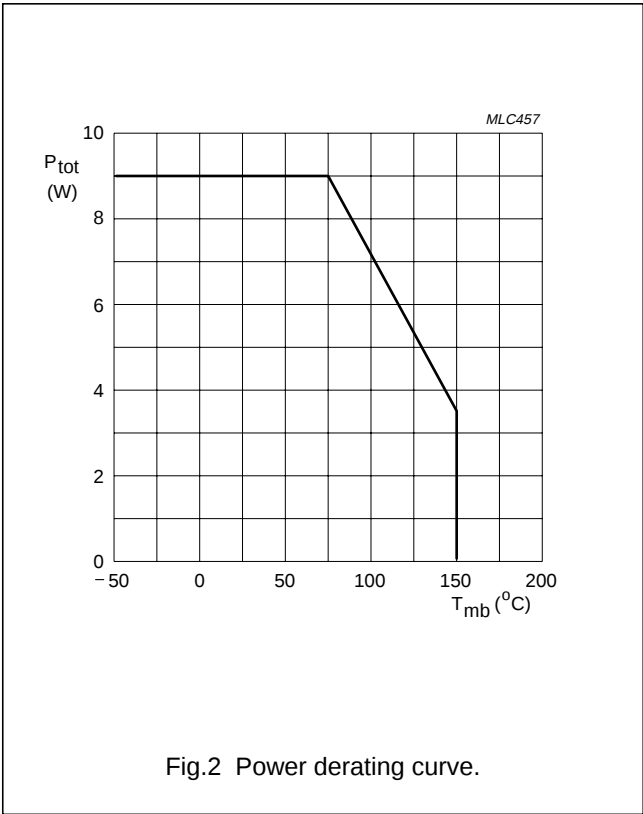
LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{CBO}	collector-base voltage	open emitter	–	40	V
V _{CES}	collector-emitter voltage	R _{BE} = 0	–	40	V
V _{CEO}	collector-emitter voltage	open base	–	15	V
V _{EBO}	emitter-base voltage	open collector	–	3	V
I _C	DC collector current		–	0.5	A
P _{tot}	total power dissipation	T _{mb} = 75 °C	–	9	W
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	200	°C
T _{sld}	soldering temperature	t ≤ 10 s; note 1	–	235	°C

Note

1. Up to 0.3 mm from ceramic.



Microwave power transistor

PLB16004U

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
$R_{th\ j-mb}$	thermal resistance from junction to mounting base	$T_j = 100\ ^\circ\text{C}$	11	K/W
$R_{th\ mb-h}$	thermal resistance from mounting base to heatsink	note 1	0.3	K/W

Note

- See "Mounting recommendations in the General part of handbook SC19a".

CHARACTERISTICS

$T_{mb} = 25\ ^\circ\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CES}	collector cut-off current	$R_{BE} = 0; V_{CE} = 30\ \text{V}$	–	200	μA
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 1\ \text{mA}; I_E = 0$	40	–	V
$V_{(BR)CES}$	collector-emitter breakdown voltage	$I_C = 1\ \text{mA}; I_E = 0$	40	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_C = 1\ \text{mA}; I_E = 0$	3	–	V
h_{FE}	DC current gain	$I_C = 300\ \text{mA}; V_{CE} = 5\ \text{V}$	15	100	

APPLICATION INFORMATION

Microwave performance up to $T_{mb} = 25\ ^\circ\text{C}$ in a common-base test circuit as shown in Fig.3.

MODE OF OPERATION	f (GHz)	V_{CC} (V)	P_L (W)	G_p (dB)	η_c (%)	$Z_i; Z_L$ (Ω)
Class C (CW)	1.6	28	typ. 5	typ. 10	typ. 50	see Figs 5 and 6

Microwave power transistor

PLB16004U

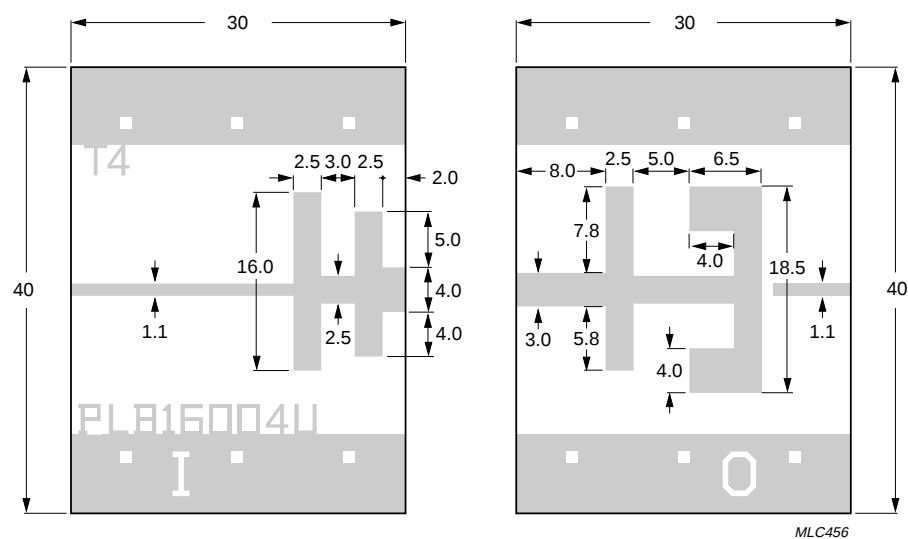


Fig.3 Narrowband test circuit.

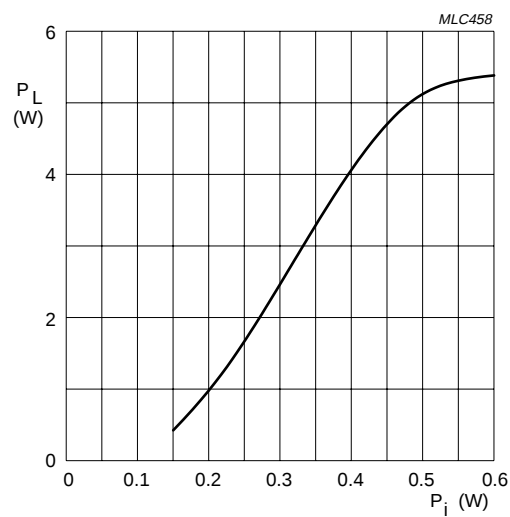
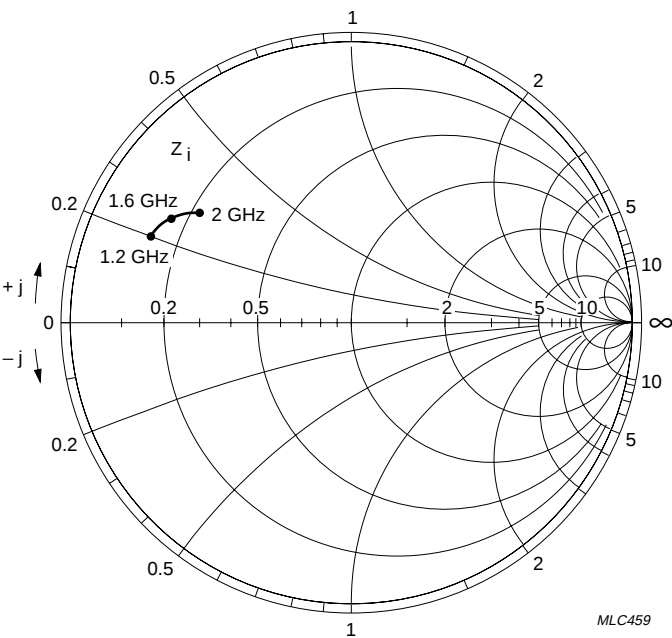


Fig.4 Load power as a function of input power.

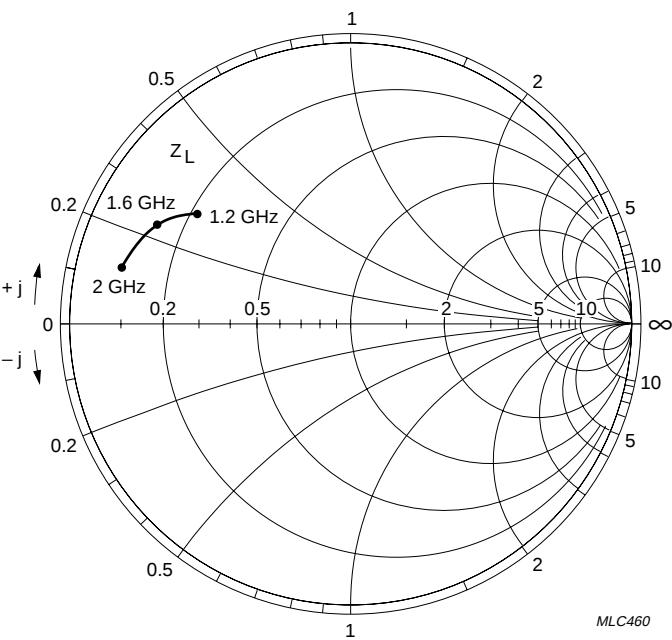
Microwave power transistor

PLB16004U



$V_{CC} = 28\text{ V}; Z_0 = 50\ \Omega$.

Fig.5 Input impedance as a function of frequency; typical values.



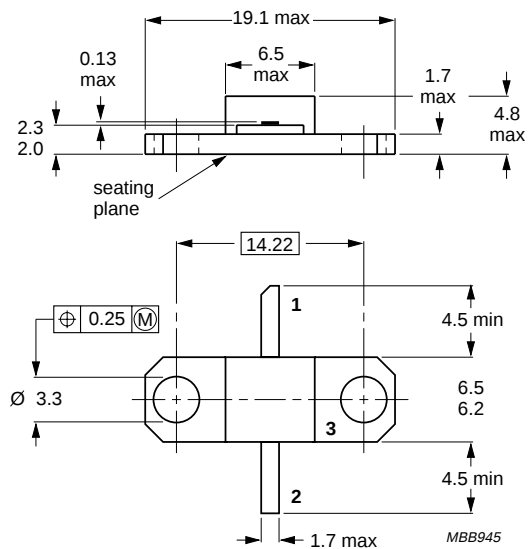
$V_{CC} = 28\text{ V}; Z_0 = 50\ \Omega$.

Fig.6 Optimum load impedance as a function of frequency; typical values.

Microwave power transistor

PLB16004U

PACKAGE OUTLINE



Dimensions in mm.

Torque on screws: max. 0.5 Nm.

Recommended screw: M3.

Recommended pitch for mounting screws: 19 mm.

Fig.7 SOT437A.

Microwave power transistor

PLB16004U

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	
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.	
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.

Microwave power transistor

PLB16004U

NOTES

Microwave power transistor

PLB16004U

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Microwave power transistor

PLB16004U

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