DATA SHEET

PLB16004U
Microwave power transistor

Product specification
Supersedes data of December 1994

1997 Feb 18

Microwave power transistor PLB16004U

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 °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

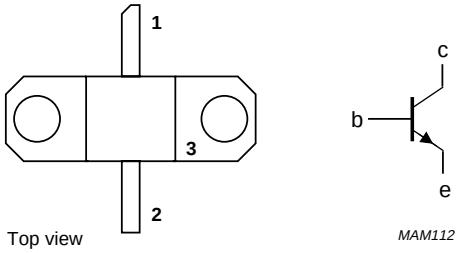


Fig.1 Simplified outline and symbol.

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.

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.

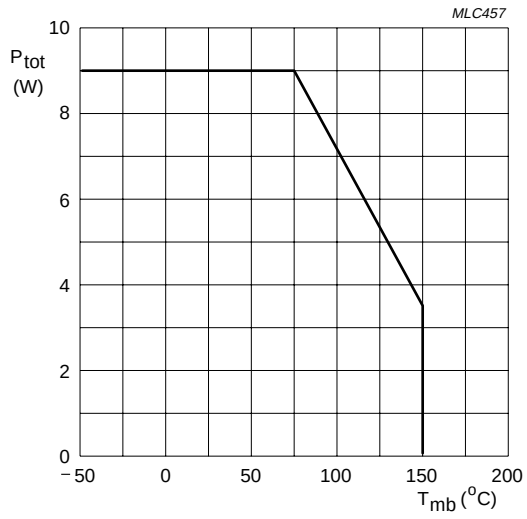


Fig.2 Power derating curve.

THERMAL CHARACTERISTICS

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

Note

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

CHARACTERISTICS

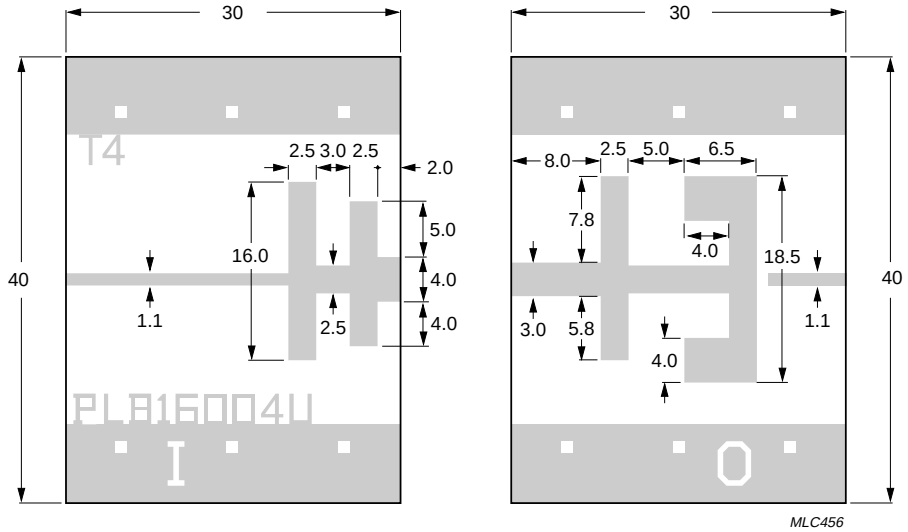
T_{mb} = 25 °C unless otherwise specified.

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

APPLICATION INFORMATION

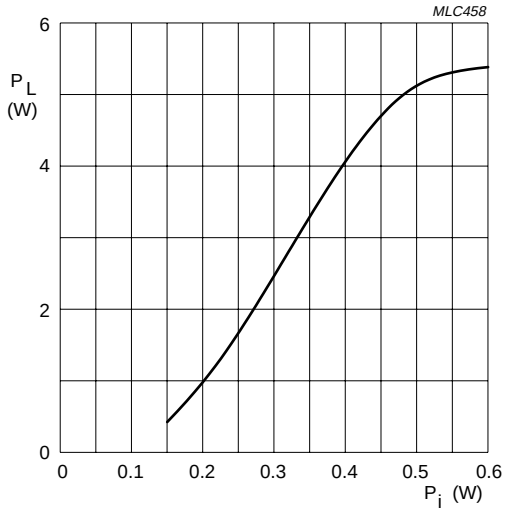
Microwave performance up to T_{mb} = 25 °C in a common-base test circuit as shown in Fig.3.

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



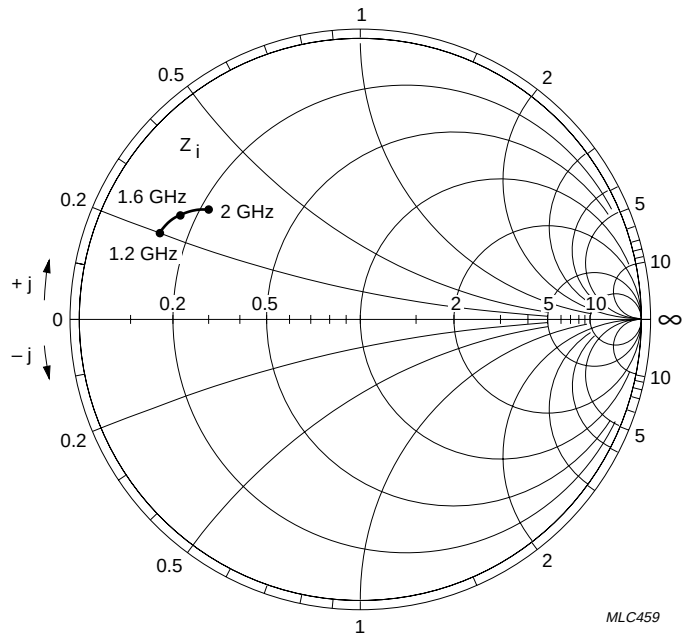
Dimensions in mm.
Substrate: Teflon fibre glass.
Thickness: 0.4 mm.
Permittivity: ε_r = 2.55.

Fig.3 Narrowband test circuit.



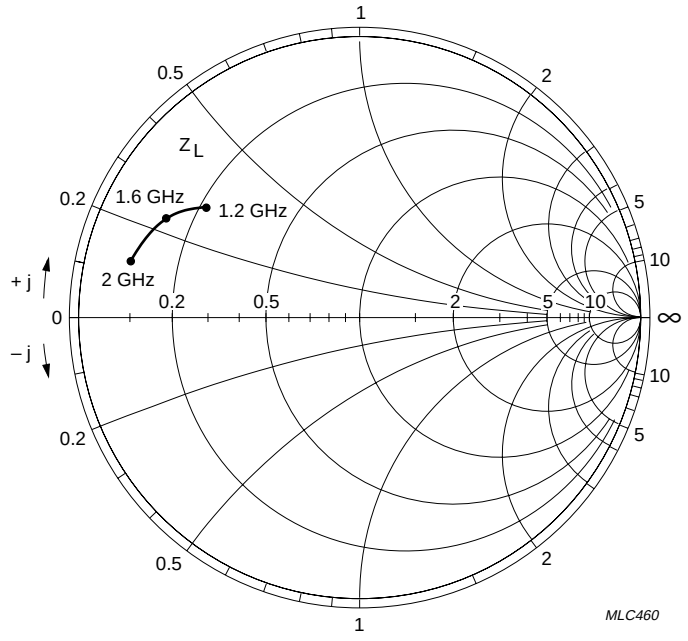
V_{CC} = 28 V; f = 1.6 GHz.

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



V_{CC} = 28 V; Z_o = 50 Ω.

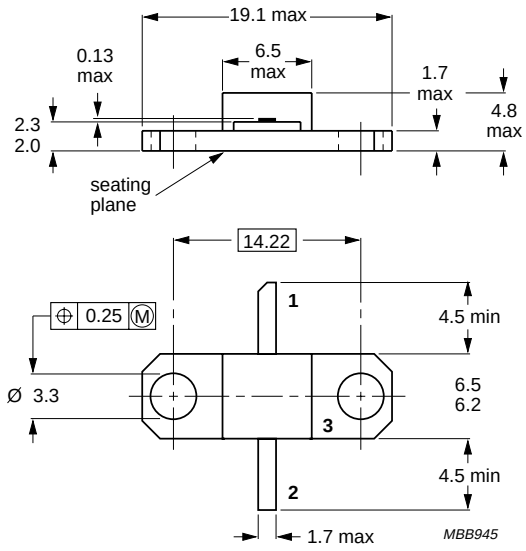
Fig.5 Input impedance as a function of frequency; typical values.



V_{CC} = 28 V; Z_o = 50 Ω.

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

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.

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

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