DATA SHEET

LZ1418E100R
NPN microwave power transistor

Product specification
Supersedes data of June 1992

1997 Feb 18

Philips
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NPN microwave power transistor LZ1418E100R

FEATURES

- Interdigitated structure provides high emitter efficiency
- Diffused emitter ballasting resistor provides excellent current sharing and withstanding a high VSWR
- Gold metallization realizes very stable characteristics and excellent lifetime
- Multicell geometry gives good balance of dissipated power and low thermal resistance
- Internal input and output prematching ensures good stability and allows an easier design of wideband circuits.

APPLICATIONS

- Common emitter class A amplifiers in CW conditions for military and professional applications between 1.4 to 1.8 GHz.

DESCRIPTION

NPN silicon planar epitaxial microwave power transistor in a SOT443A metal ceramic flange package with the emitter connected to the flange.

PINNING - SOT443A

PIN	DESCRIPTION
1	collector
2	base
3	emitter connected to flange

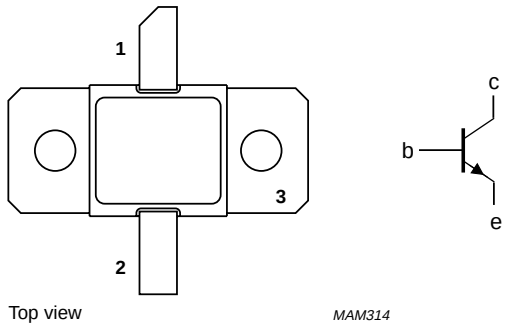


Fig.1 Simplified outline and symbol.

QUICK REFERENCE DATA

Microwave performance up to T_{mb} = 25 °C in a common emitter class A wideband amplifier.

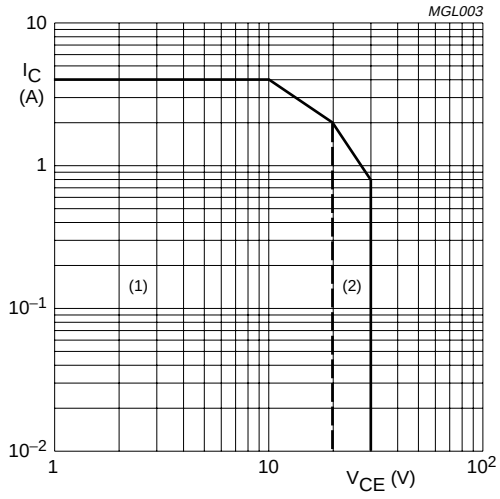
MODE OF OPERATION	f (GHz)	V_{CE} (V)	I_C (A)	P_{L1} (W)	G_{po} (dB)	Z_i; Z_L (Ω)
Class-A (CW)	1.4 to 1.8	16	2	≥9	≥10	see Fig 7

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	–	45	V
V_{CER}	collector-emitter voltage	R_{BE} = 220 Ω	–	30	V
V_{CEO}	collector-emitter voltage	open base	–	20	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	collector current (DC)		–	4	A
P_{tot}	total power dissipation	$T_{mb} \geq 75$ °C	–	45	W
T_{stg}	storage temperature		–65	+200	°C
T_j	operating junction temperature		–	200	°C
T_{sld}	soldering temperature	at 0.2 mm from flange; $t \leq 10$ s	–	235	°C



$T_{mb} \leq 75$ °C.

(1) Region of permissible DC operation.

(2) Permissible extension provided $R_{BE} \leq 220$ Ω.

Fig.2 DC SOAR.

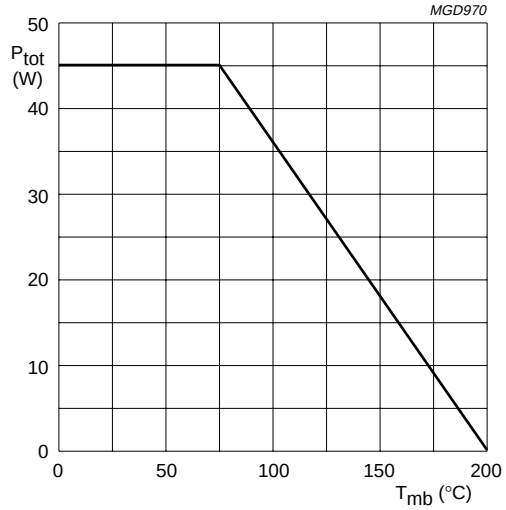


Fig.3 Power derating curve.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
$R_{th\ j\text{-}mb}$	thermal resistance from junction to mounting-base	T_j = 75 °C	2.2	K/W
$R_{th\ mb\text{-}h}$	thermal resistance from mounting-base to heatsink	T_j = 75 °C; note 1	0.2	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_{CBO}	collector cut-off current	V_{CB} = 20 V; I_E = 0	–	2	mA
		V_{CB} = 40 V; I_E = 0	–	20	mA
I_{CER}	collector cut-off current	V_{CE} = 30 V; R_{BE} = 220 Ω	–	20	mA
I_{CEO}	collector cut-off current	V_{CE} = 20 V; I_B = 0	–	20	mA
I_{EBO}	emitter cut-off current	V_{EB} = 1.5 V; I_C = 0	–	200	μA
h_{FE}	DC current gain	V_{CE} = 3 V; I_C = 2 A	15	–	100

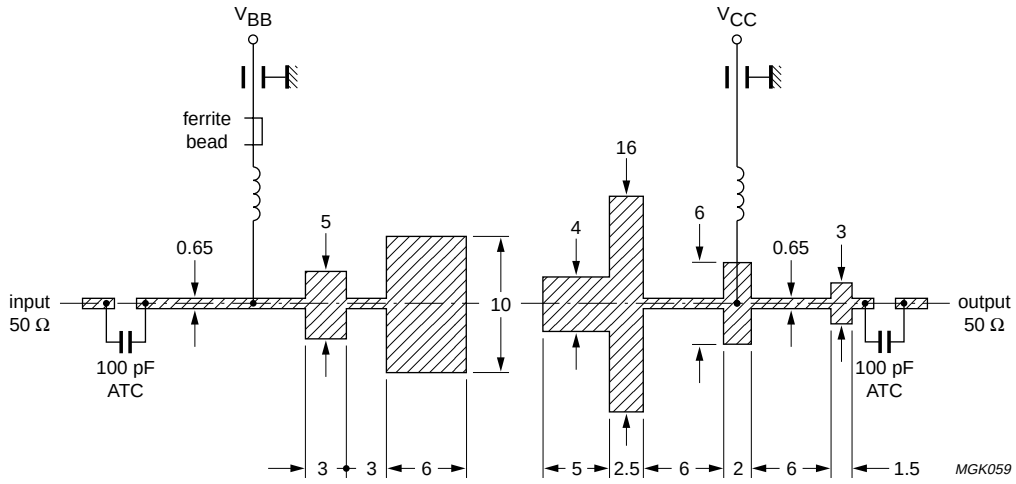
APPLICATION INFORMATION

Microwave performance up to T_{mb} = 25 °C in a common emitter class-A wideband amplifier; note 1.

MODE OF OPERATION	f (GHz)	V_{CE} (V)	I_C (A)	P_{L1} (W)	G_{po} (dB)	Z_i; Z_L (Ω)
Class-A (CW)	1.4 to 1.8	16	2	≥9 typ. 10	≥10 typ. 11	see Fig 7

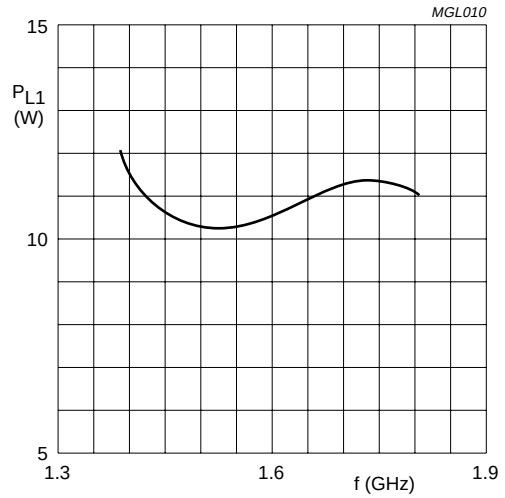
Note

1. Amplifier consists of test circuit board without any additional tuning.



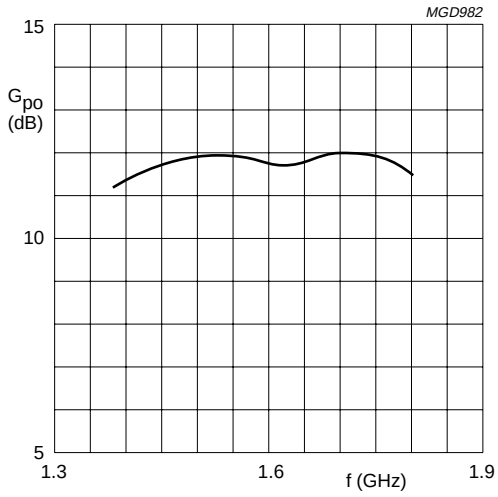
Dimensions in mm.
Substrate: Epsilam printed-circuit board.
Thickness: 0.635 mm.
Permittivity: $\varepsilon_r = 10$.

Fig.4 Wideband test circuit board for 1.4 to1.8 GHz, CW class A application.



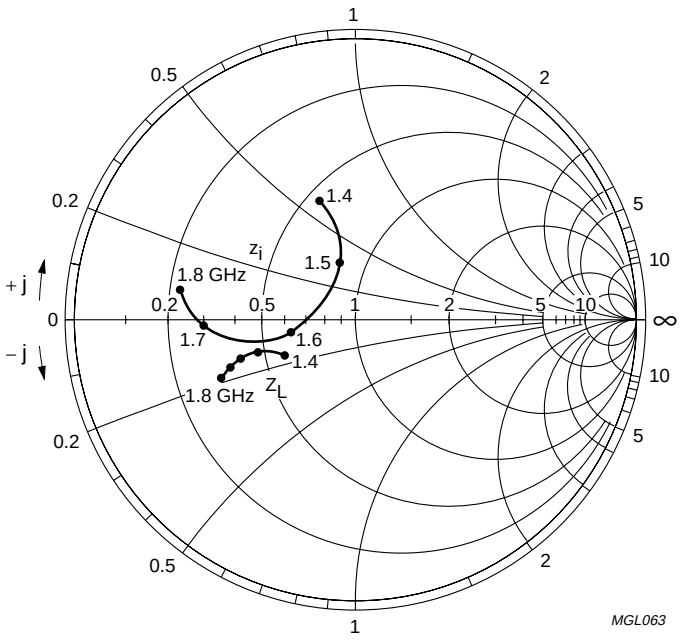
V_{CE} = 16 V; I_C = 2 A (regulated); T_{mb} = 25 °C.

Fig.5 Load power as a function of frequency; typical values.



V_{CE} = 16 V; I_C = 2 A (regulated); T_{mb} = 25 °C.

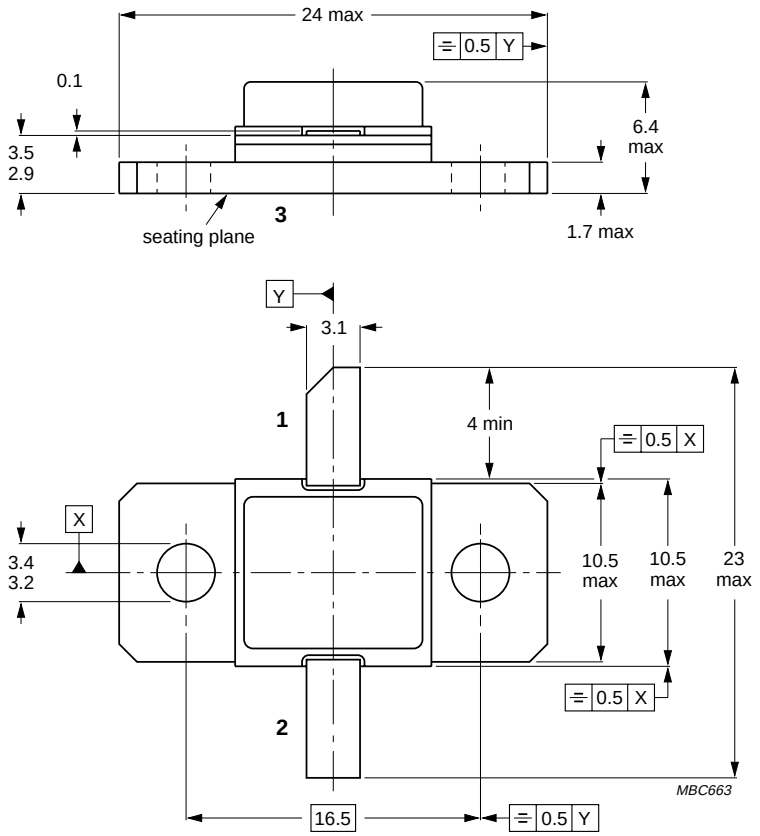
Fig.6 Linear power gain as a function of frequency; typical values.



Z_o = 10 Ω; V_{CE} = 16 V; I_C = 2 A (regulated); T_{mb} = 25 °C.

Fig.7 Input and load impedances as functions of frequency; typical values.

PACKAGE OUTLINE



Dimensions in mm.
Torque on nut: Max. 0.5 Nm.
Recommended screw: M3.

Fig.8 SOT443A.

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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Printed in The Netherlands 127147/00/02/pp12 Date of release: 1997 Feb 18 Document order number: 9397 750 01728

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