

DATA SHEET

LWE2015R

NPN microwave power transistor

Product specification
Supersedes data of November 1994
File under Discrete Semiconductors, SC15

1997 Feb 19

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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.

APPLICATIONS

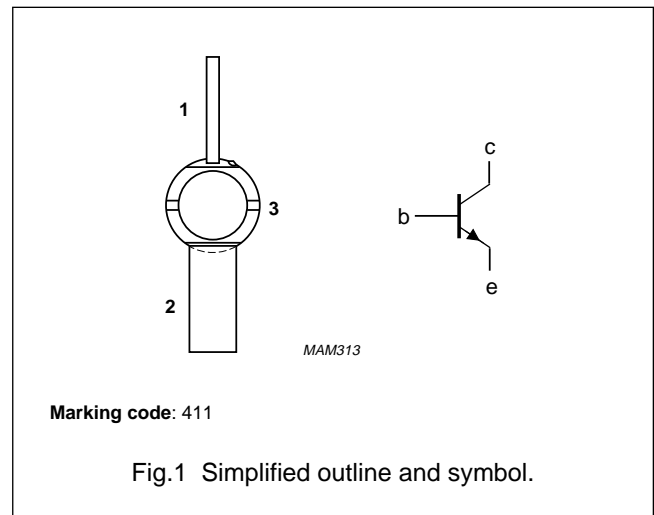
- Common emitter class-A amplifiers up to 2.3 GHz in CW conditions for military and professional applications.

DESCRIPTION

NPN silicon planar epitaxial microwave power transistor in a SOT446A metal ceramic studless package.

PINNING - SOT446A

PIN	DESCRIPTION
1	collector
2	base
3	emitter



QUICK REFERENCE DATA

Microwave performance up to $T_{mb} = 25\text{ °C}$ in a common emitter class-A selective amplifier.

MODE OF OPERATION	f (GHz)	V _{CE} (V)	I _C (mA)	P _{L1} (W)	G _{po} (dB)	Z _i (Ω)	Z _L (Ω)
Class-A (CW)	2.3	16	250	≥1.2	≥7.5	3.5 + j11	6.4 + j2

WARNING

Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO disc 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.

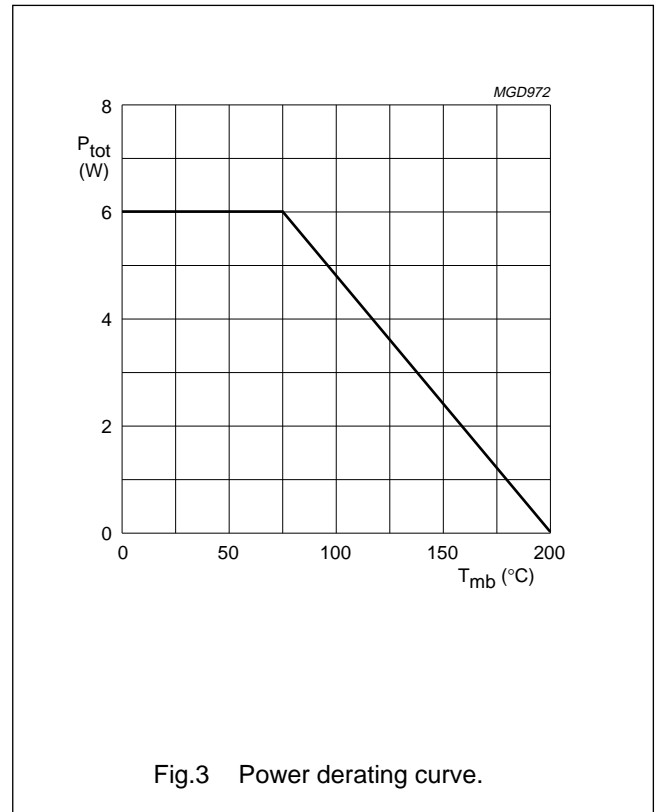
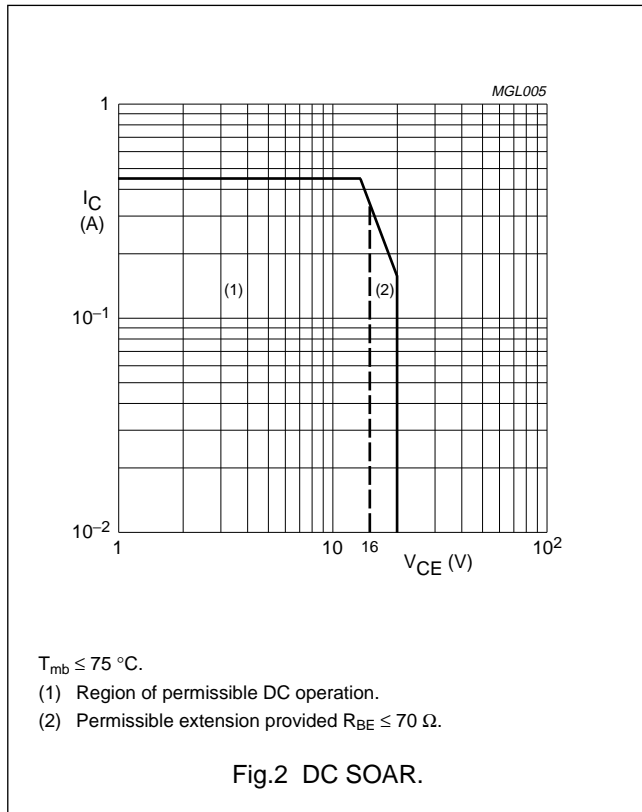
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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	35	V
V_{CER}	collector-emitter voltage	$R_{BE} = 70 \Omega$	–	20	V
V_{CEO}	collector-emitter voltage	open base	–	16	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	collector current (DC)		–	450	mA
P_{tot}	total power dissipation	$T_{mb} \leq 75 \text{ }^\circ\text{C}$	–	6	W
T_{stg}	storage temperature		–65	+200	$^\circ\text{C}$
T_j	operating junction temperature		–	200	$^\circ\text{C}$
T_{sld}	soldering temperature	at 0.1 mm from case; $t \leq 10 \text{ s}$	–	235	$^\circ\text{C}$



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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
$R_{th\ j-mb}$	thermal resistance from junction to mounting-base	$T_j = 75\text{ °C}$	12	K/W

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	$V_{CB} = 25\text{ V}; I_E = 0$	–	–	≤ 10	μA
I_{EBO}	emitter cut-off current	$V_{EB} = 1.5\text{ V}; I_C = 0$	–	–	≤ 10	μA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}; I_C = 230\text{ mA}$	–	40	–	
C_{cb}	collector-base capacitance	$V_{CB} = 16\text{ V}; V_{EB} = 1.5\text{ V}; I_E = I_C = 0; f = 1\text{ MHz}$	–	2	–	pF
C_{ce}	collector-emitter capacitance	$V_{CE} = 16\text{ V}; V_{EB} = 1.5\text{ V}; I_E = I_C = 0; f = 1\text{ MHz}$	–	2	–	pF
C_{eb}	emitter-base capacitance	$V_{CB} = 10\text{ V}; V_{EB} = 1\text{ V}; I_C = I_E = 0; f = 1\text{ MHz}$	–	15	–	pF

APPLICATION INFORMATION

Microwave performance up to $T_{mb} = 25\text{ °C}$ in a common emitter class-A selective circuit; note 1.

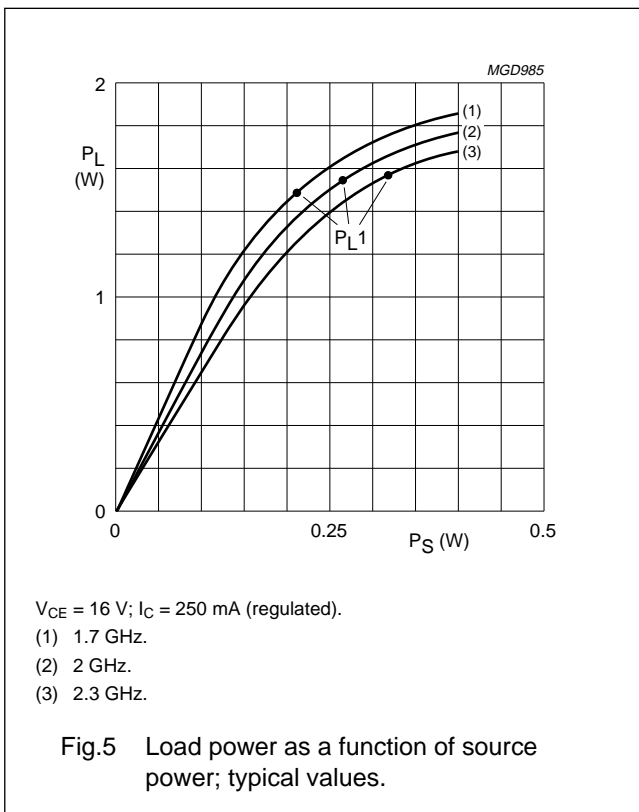
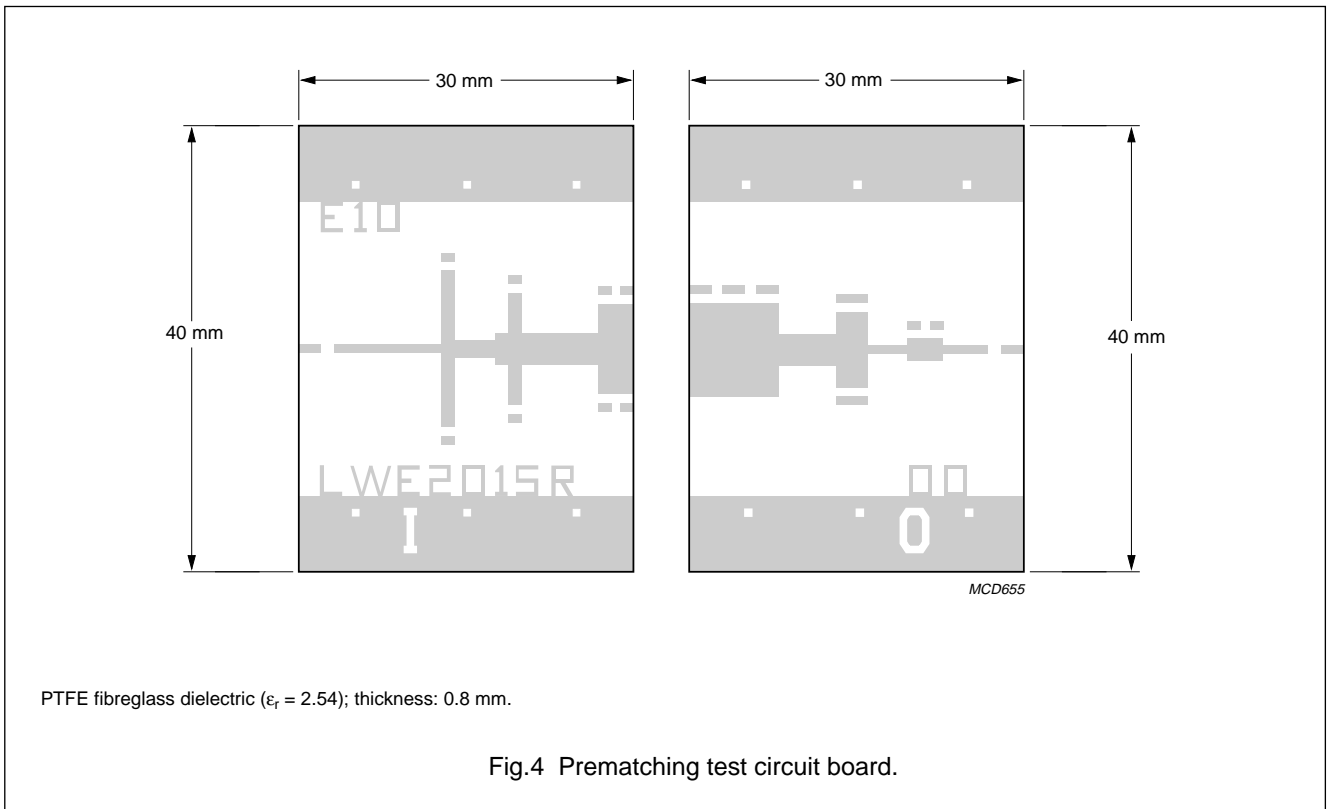
MODE OF OPERATION	f (GHz)	V_{CE} (V)	I_C (mA)	P_{L1} (W)	G_{po} (dB)	Z_i (Ω)	Z_L (Ω)
Class-A (CW)	2.3	16	250	≥ 1.2 typ. 1.6	≥ 7.5 typ. 8.1	$3.5 + j11$	$6.4 + j2$

Note

1. Circuit consists of prematching circuit boards in combination with complementary input and output slug tuners.

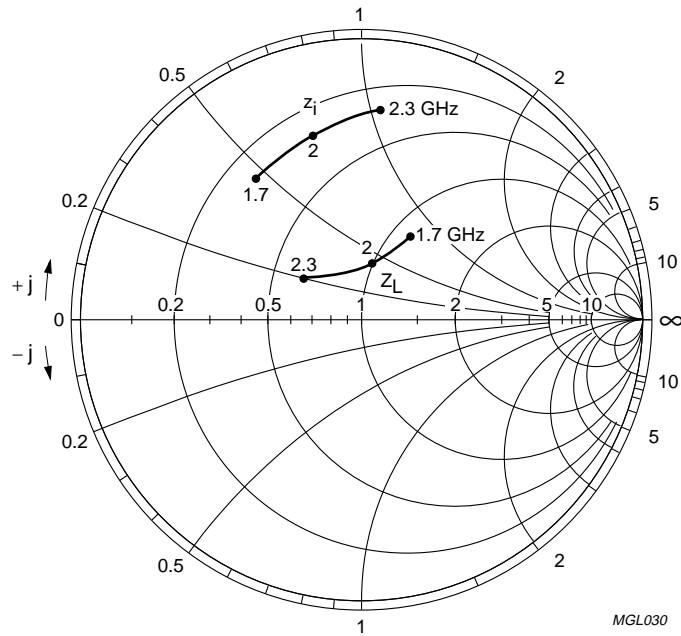
NPN microwave power transistor

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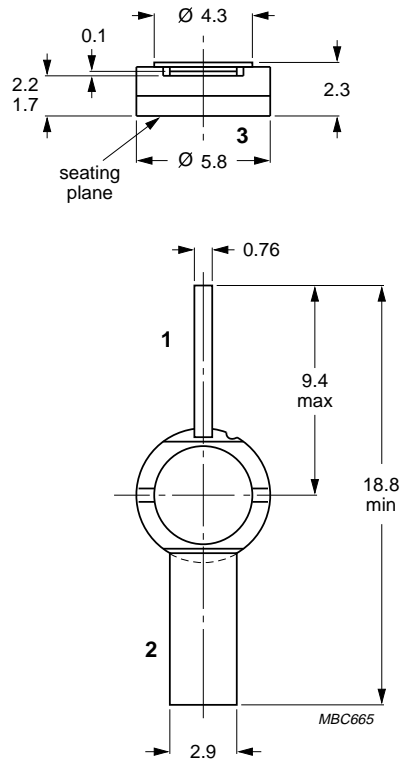
$Z_o = 10 \Omega; P_{L1} = 1.6 \text{ W}; T_{mb} = 25 \text{ }^\circ\text{C}.$

Fig.6 Input and optimum load impedances as functions of frequency; typical values.

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PACKAGE OUTLINE



Dimensions in mm.

Fig.7 SOT446A.

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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	
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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