

# DATA SHEET

**LEE1015T**

**NPN microwave power transistor**

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

1997 Feb 18

# NPN microwave power transistor

LEE1015T

## FEATURES

- Diffused emitter ballasting resistors providing excellent current sharing and withstanding a high VSWR
- Interdigitated structure provides high emitter efficiency
- Gold metallization realizes very good stability of the characteristics and excellent lifetime
- Multicell geometry gives good balance of dissipated power and low thermal resistance.

## APPLICATIONS

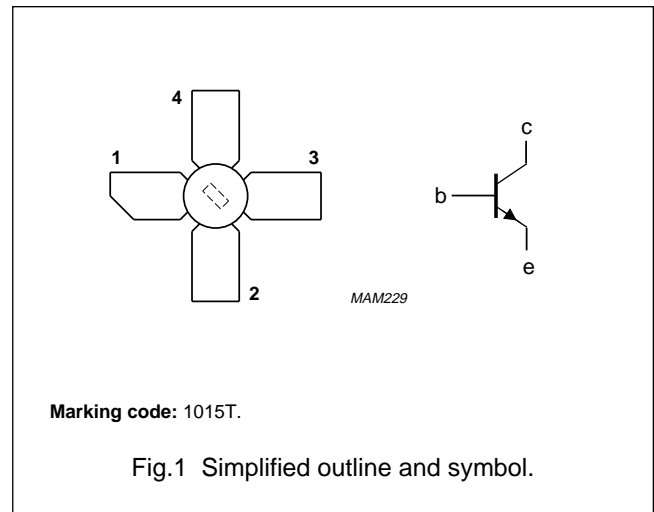
Intended for use in common emitter, class A power amplifiers for applications that require a high level of linearity.

## DESCRIPTION

NPN silicon planar epitaxial microwave power transistor in a SOT122A metal ceramic package.

## PINNING - SOT122A

PIN	DESCRIPTION
1	collector
2	emitter
3	base
4	emitter



## QUICK REFERENCE DATA

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

MODE OF OPERATION	f (MHz)	$V_{CE}$ (V)	$I_C$ (mA)	$P_{L1}$ (W)	$G_{po}$ (dB)	$d_{im}$ (dB)
Class A (CW)	860	20	140	>1	>13	<-57 note 1

### Note

1. The stated intermodulation distortion level is referred to the total output power of 18.25 dBm, which corresponds to the sum of the power carried by each of the two equal amplitude tones at  $f_1 = 859\text{ MHz}$  and  $f_2 = 861\text{ MHz}$ .

<b>WARNING</b>
<b>Product and environmental safety - toxic materials</b>
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	–	40	V
$V_{CER}$	collector-emitter voltage	$R_{BE} = 10 \Omega$	–	40	V
$V_{CEO}$	collector-emitter voltage	open base	–	22	V
$V_{EBO}$	emitter-base voltage	open collector	–	3	V
$I_C$	collector current		–	500	mA
$P_{tot}$	total power dissipation	$T_{mb} = 75 \text{ }^\circ\text{C}$	–	7.5	W
$T_{stg}$	storage temperature		–65	+150	$^\circ\text{C}$
$T_j$	junction temperature		–	200	$^\circ\text{C}$
$T_{sld}$	soldering temperature	$t \leq 10 \text{ s}$ ; note 1	–	235	$^\circ\text{C}$

### Note

- Up to 0.2 mm from ceramic.

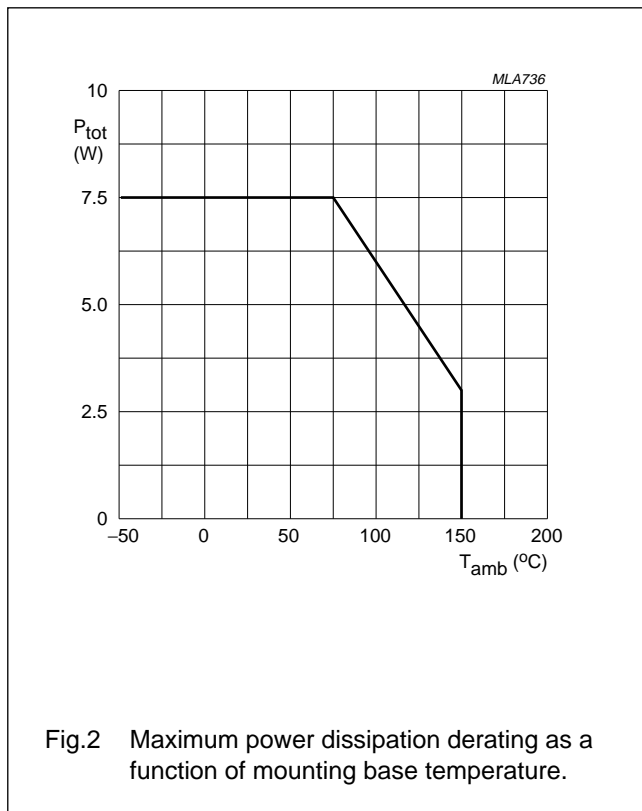
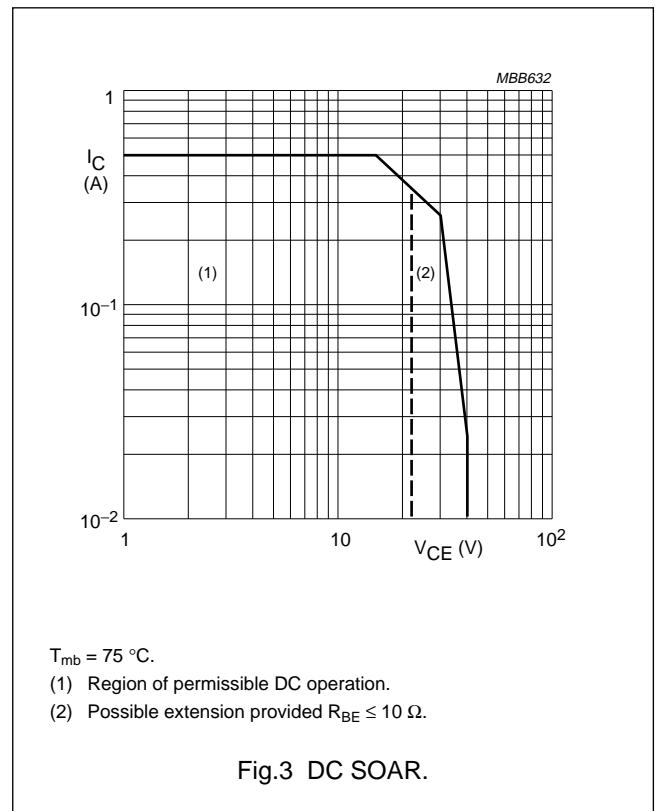


Fig.2 Maximum power dissipation derating as a function of mounting base temperature.



$T_{mb} = 75 \text{ }^\circ\text{C}$ .  
 (1) Region of permissible DC operation.  
 (2) Possible extension provided  $R_{BE} \leq 10 \Omega$ .

Fig.3 DC SOAR.

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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
$R_{th\ mb-h}$	thermal resistance from mounting base to heatsink	note 1	0.6	K/W

## Note

1. See "Mounting recommendations in the General part of handbook SC15".

## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$V_{CB} = 40\text{ V}; I_E = 0$	400	$\mu\text{A}$
$I_{CER}$	collector cut-off current	$V_{CE} = 40\text{ V}; R_{BE} = 10\ \Omega$	20	mA
$I_{EBO}$	emitter cut-off current	$V_{EB} = 1.5\text{ V}; I_C = 0$	400	$\mu\text{A}$

## APPLICATION INFORMATION

Microwave performance up to  $T_{mb} = 25\text{ °C}$  in the test circuit.

MODE OF OPERATION	f (MHz)	$V_{CE}$ (V)	$I_C$ (mA)	$P_{L1}$ (W)	$G_{po}$ (dB)
Class A	860	20	140	>1; typ. 1.3	>13; typ. 14.5

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**DEFINITIONS**

<b>Data sheet status</b>	
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.
<b>Limiting values</b>	
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 this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
<b>Application information</b>	
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.

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**NOTES**

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