

DATA SHEET

RX1214B350Y

NPN microwave power transistor

Product specification
Superseded data of November 1994

1997 Feb 18

NPN microwave power transistor

RX1214B350Y

FEATURES

- Suitable for short and medium pulse applications up to 1 ms/10%
- Internal input prematching networks allow an easier design of circuits
- Diffused emitter ballasting resistors improve ruggedness
- Interdigitated emitter-base structure provides high emitter efficiency
- Gold metallization with barrier realizes very stable characteristics and excellent lifetime
- Multicell geometry improves power sharing and reduces thermal resistance.

APPLICATIONS

Common base, class C, broadband, pulsed power amplifiers for L-Band radar applications in the 1.2 to 1.4 GHz band. Also suitable for medium pulse, heavy duty operation within this band.

DESCRIPTION

NPN silicon planar epitaxial microwave power transistor in a SOT439A metal ceramic flange package with base connected to flange.

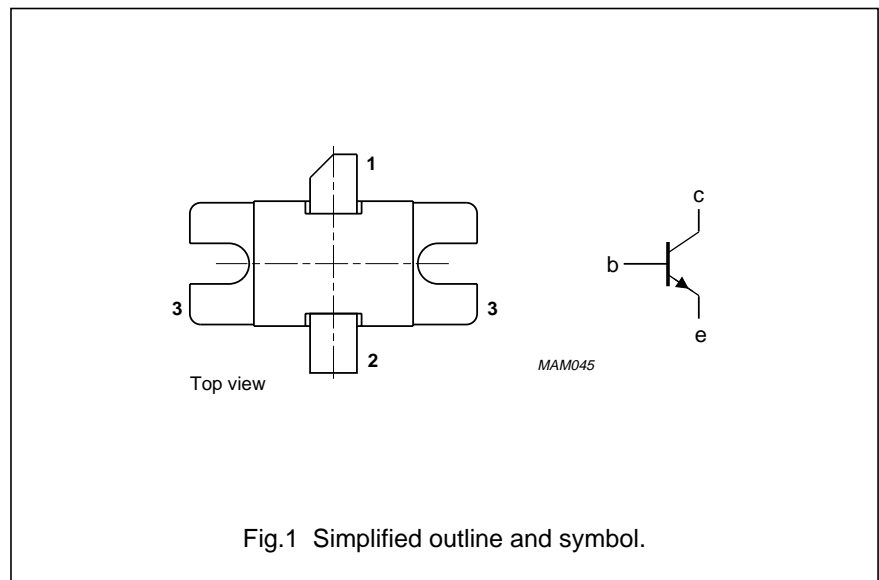
QUICK REFERENCE DATA

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

MODE OF OPERATION	CONDITIONS	f (GHz)	V _{CC} (V)	P _L (W)	G _p (dB)	η _c (%)
Class C	t _p = 130 μs; δ = 6%	1.2 to 1.4	50	280	≥7	≥40

PINNING - SOT439A

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 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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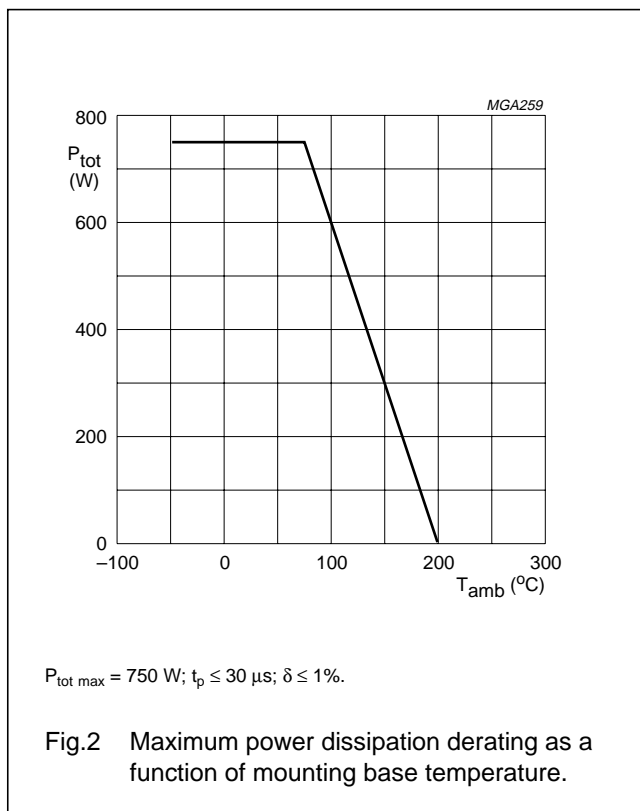
LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	65	V
V_{CEO}	collector-emitter voltage	open base	–	20	V
V_{CES}	collector-emitter voltage	$R_{BE} = 0 \Omega$	–	65	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	collector current (DC)	$t_p \leq 130 \mu\text{s}; \delta \leq 6\%$	–	25	A
P_{tot}	total power dissipation	$T_{mb} < 75 \text{ }^\circ\text{C};$ $t_p \leq 30 \mu\text{s}; \delta \leq 1\%$	–	750	W
T_{stg}	storage temperature		–65	200	$^\circ\text{C}$
T_j	operating junction temperature		–	200	$^\circ\text{C}$
T_{sld}	soldering temperature	$t \leq 10 \text{ s}; \text{ note 1}$	–	235	$^\circ\text{C}$

Note

- Up to 0.2 mm from ceramic.



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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
$R_{th\ j-mb}$	thermal resistance from junction to mounting base	$T_j = 120\text{ °C}$	1.2	K/W
$R_{th\ mb-h}$	thermal resistance from mounting base to heatsink	note 1	0.2	K/W
$Z_{th\ j-h}$	thermal impedance from junction to heatsink	$t_p = 130\ \mu\text{s}$; $\delta = 6\%$; $T_j = 110\text{ °C}$; notes 1 and 2	0.17	K/W

Notes

1. See "Mounting recommendations in the General part of handbook SC19a".
2. Equivalent thermal impedance under pulsed microwave operating conditions.

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
I_{CBO}	collector cut-off current	$V_{CB} = 50\text{ V}$; $I_E = 0$	30	mA
I_{EBO}	emitter cut-off current	$V_{EB} = 1.5\text{ V}$; $I_C = 0$	3	mA

APPLICATION INFORMATION

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

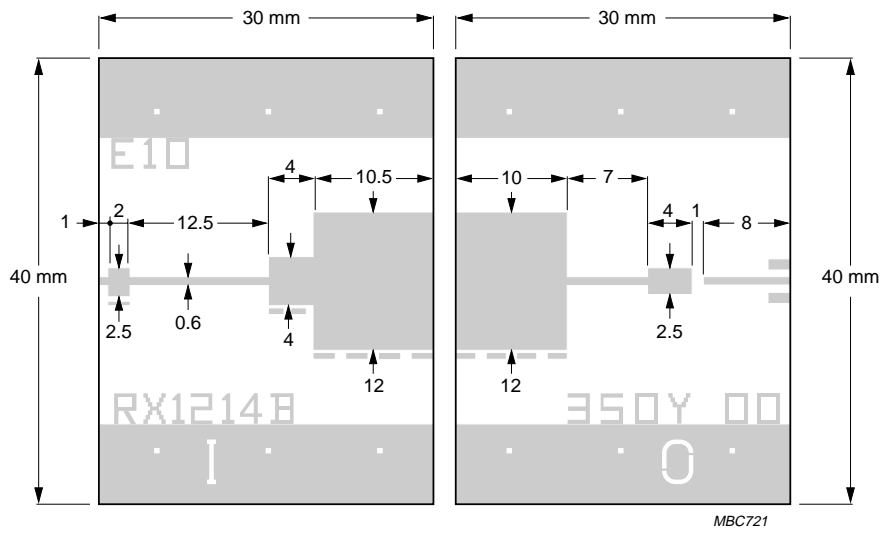
MODE OF OPERATION	CONDITIONS	f (GHz)	V_{CC} (V) note 1	P_L (W)	G_p (dB)	η_c (%)
Class C	$t_p = 130\ \mu\text{s}$; $\delta = 6\%$; note 2	1.2 to 1.4	50	280	≥ 7 ; typ. 8	≥ 40 ; typ. 44

Notes

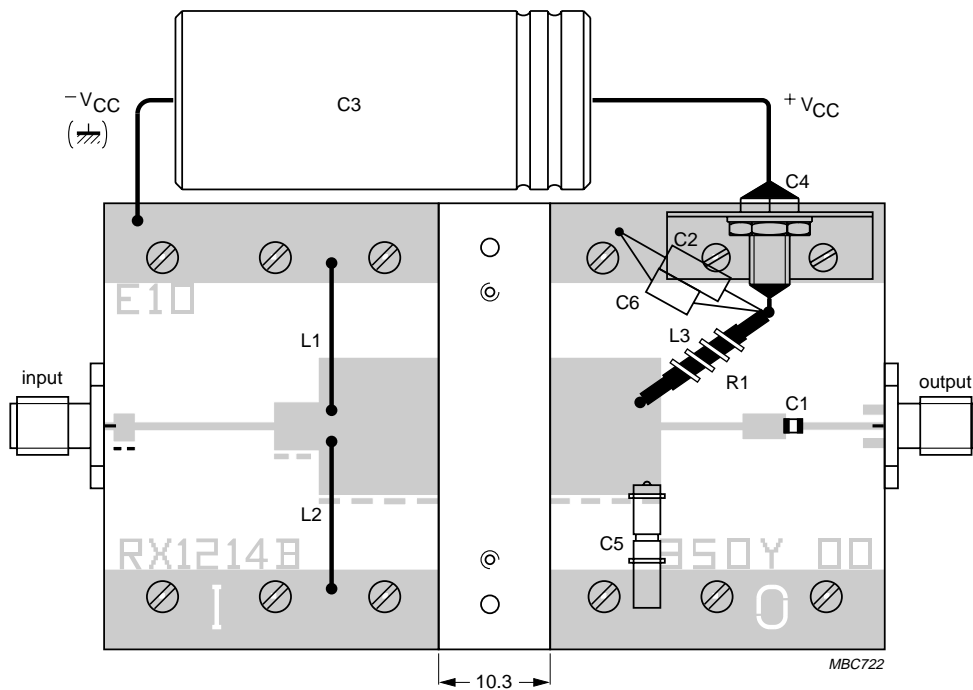
1. V_{CC} during pulse.
2. Operating conditions and performances for other pulse formats can be made available on request.

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MBC721



MBC722

Fig.3 Broadband test circuit.

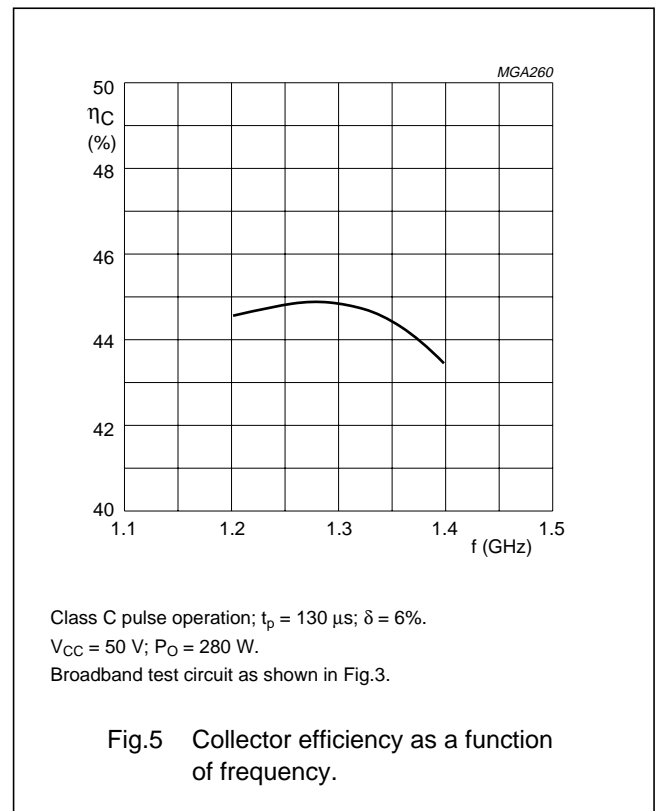
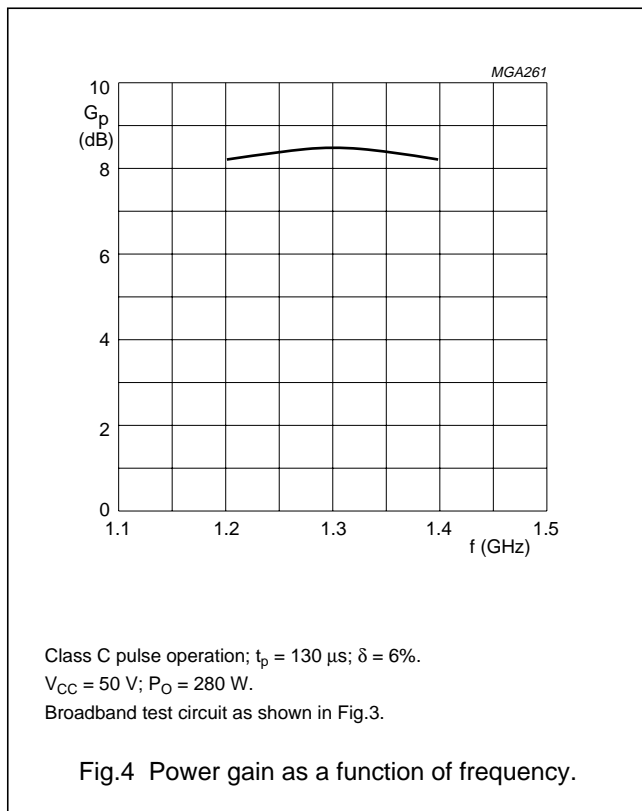
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List of components (see Fig.3)

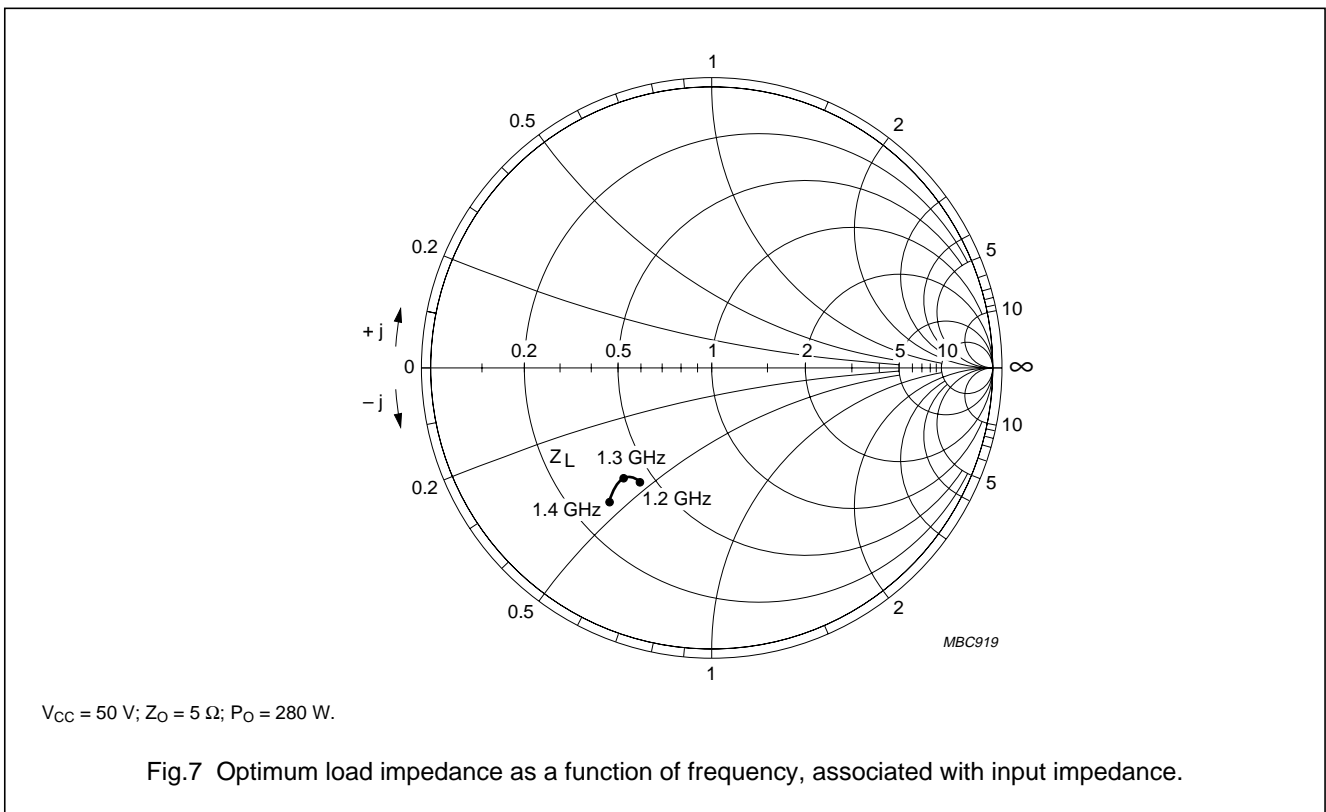
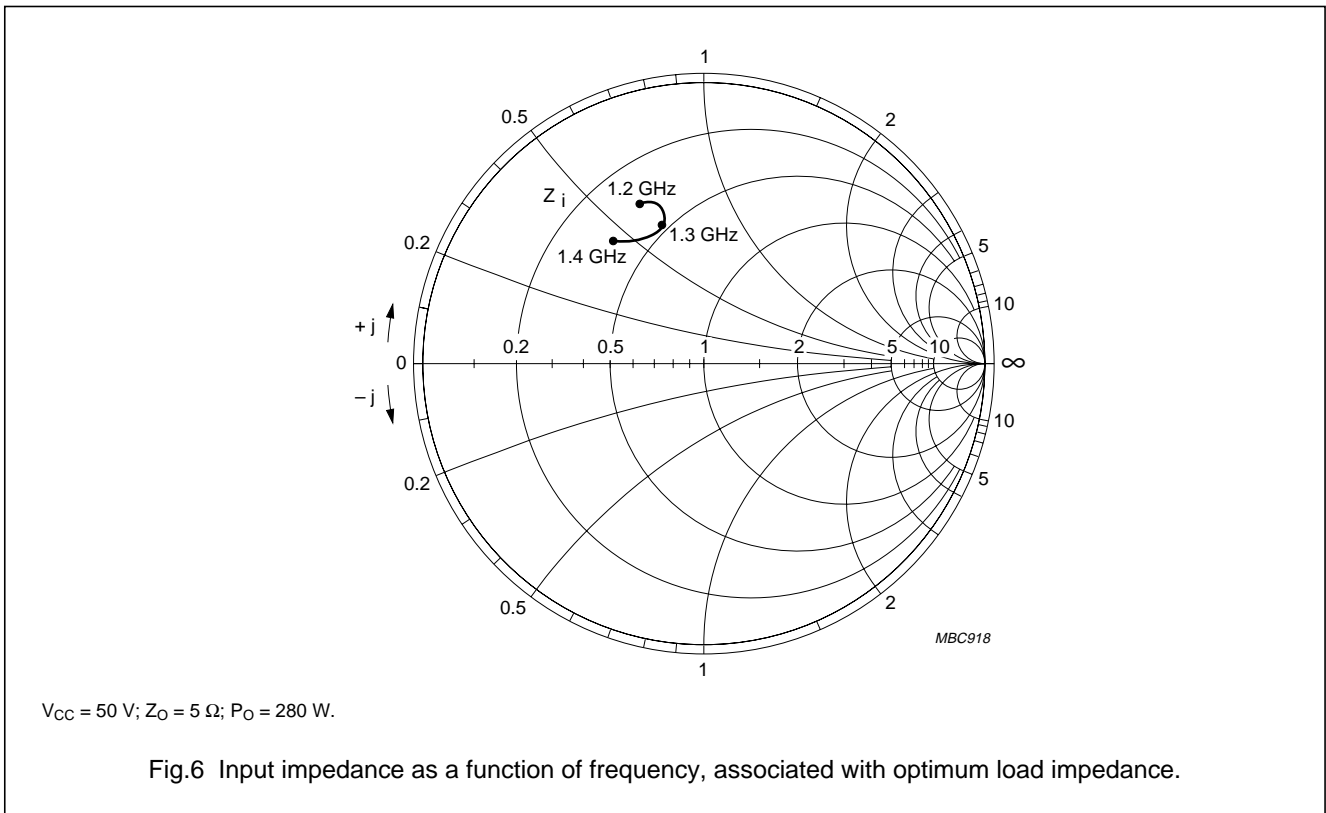
COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE NO.
L1, L2, L3	3 turns 0.65 mm diameter copper wire		int dia. = 4 mm; length of turn = 3 mm	
C1	capacitor	100 pF		ATC, ref. 100B101KP50X
C2	tantalum capacitor	10 μ F, 50 V		
C3	electrolytic capacitor	470 μ F, 63 V		
C4	feedthrough bypass capacitor			Erie, ref.1250-003
C5	variable gigatrim capacitor	0.8 - 8 pF		Tekelec, ref.729.1
C6	capacitor	4.7 nF		
R1	resistor	4.7 Ω		

The test jig consists of two circuits (input and output), each being 30 mm x 40 mm in size. The two circuits are mounted on a 10 mm thick hard aluminium alloy block. A recess should be machined in the aluminium block in which the transistor can be mounted. The mounting surface must be lapped to a surface roughness of Ra <0.5 μ m and the sum of the depth of the recess and the thickness of the circuits should not exceed the specified minimum dimension between mounting face and the leads of the transistor. Tolerances on this dimension may be absorbed by placing a gold plated metal shim under the leads, close to the body of the transistor.



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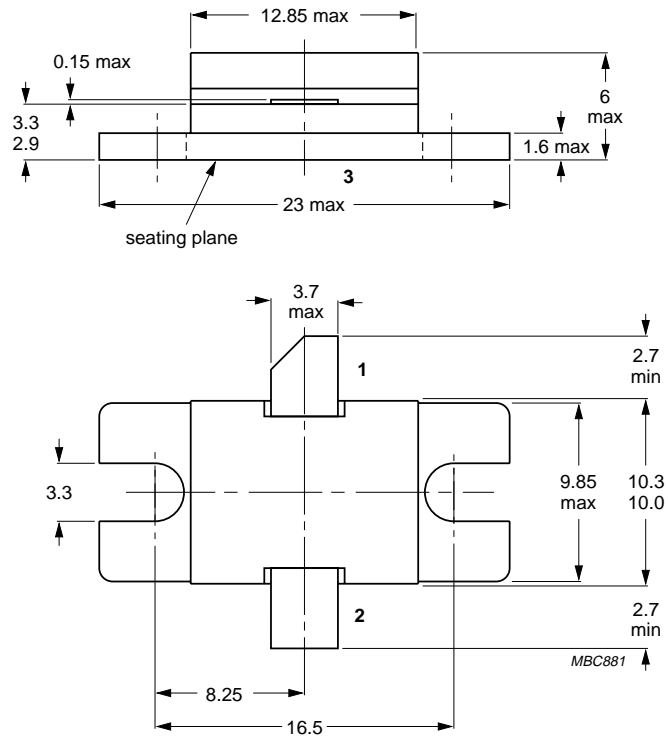
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PACKAGE OUTLINE



Dimensions in mm.
 Torque on nut: max 0.4 Nm.
 Recommended screw: M3.
 Recommended pitch for mounting screw: 19 mm.

Fig.8 SOT439A.

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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 this 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.	

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NOTES

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France: 4 Rue du Port-aux-Vins, BP317, 92156 SURESNES Cedex, Tel. +33 1 40 99 6161, Fax. +33 1 40 99 6427

Germany: Hammerbrookstraße 69, D-20097 HAMBURG, Tel. +49 40 23 53 60, Fax. +49 40 23 536 300

Greece: No. 15, 25th March Street, GR 17778 TAVROS/ATHENS, Tel. +30 1 4894 339/239, Fax. +30 1 4814 240

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Israel: RAPAC Electronics, 7 Kehilat Saloniki St, TEL AVIV 61180, Tel. +972 3 645 0444, Fax. +972 3 649 1007

Italy: PHILIPS SEMICONDUCTORS, Piazza IV Novembre 3, 20124 MILANO, Tel. +39 2 6752 2531, Fax. +39 2 6752 2557

Japan: Philips Bldg 13-37, Kohnan 2-chome, Minato-ku, TOKYO 108, Tel. +81 3 3740 5130, Fax. +81 3 3740 5077

Korea: Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL, Tel. +82 2 709 1412, Fax. +82 2 709 1415

Malaysia: No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR, Tel. +60 3 750 5214, Fax. +60 3 757 4880

Mexico: 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905, Tel. +9-5 800 234 7381

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Netherlands: Postbus 90050, 5600 PB EINDHOVEN, Bldg. VB, Tel. +31 40 27 82785, Fax. +31 40 27 88399

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Norway: Box 1, Manglerud 0612, OSLO, Tel. +47 22 74 8000, Fax. +47 22 74 8341

Philippines: Philips Semiconductors Philippines Inc., 106 Valero St. Salcedo Village, P.O. Box 2108 MCC, MAKATI, Metro MANILA, Tel. +63 2 816 6380, Fax. +63 2 817 3474

Poland: Ul. Lukiska 10, PL 04-123 WARSZAWA, Tel. +48 22 612 2831, Fax. +48 22 612 2327

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Russia: Philips Russia, Ul. Usatcheva 35A, 119048 MOSCOW, Tel. +7 095 755 6918, Fax. +7 095 755 6919

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South Africa: S.A. PHILIPS Pty Ltd., 195-215 Main Road Martindale, 2092 JOHANNESBURG, P.O. Box 7430 Johannesburg 2000, Tel. +27 11 470 5911, Fax. +27 11 470 5494

South America: Rua do Rocio 220, 5th floor, Suite 51, 04552-903 São Paulo, SÃO PAULO - SP, Brazil, Tel. +55 11 821 2333, Fax. +55 11 829 1849

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Taiwan: Philips Semiconductors, 6F, No. 96, Chien Kuo N. Rd., Sec. 1, TAIPEI, Taiwan Tel. +886 2 2134 2870, Fax. +886 2 2134 2874

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United Kingdom: Philips Semiconductors Ltd., 276 Bath Road, Hayes, MIDDLESEX UB3 5BX, Tel. +44 181 730 5000, Fax. +44 181 754 8421

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Description

NPN silicon planar epitaxial microwave power transistor in a SOT439A metal ceramic flange package with base connected to flange.

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Packages

Application notes

Selection guides

Other technical documentation

End of Life information

Datahandbook system

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Applications

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