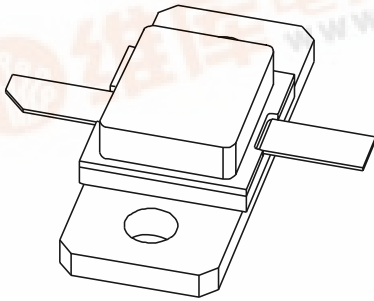


**DISCRETE SEMICONDUCTORS**

# DATA SHEET



## **RZ1214B65Y** NPN microwave power transistor

Product specification  
Supersedes data of 1997 Feb 18

1999 Dec 24

# NPN microwave power transistor

# RZ1214B65Y

### FEATURES

- Interdigitated structure provides high emitter efficiency
- Diffused emitter ballasting resistor providing 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 matching ensures good stability and allows an easier design of wideband circuits.

### APPLICATIONS

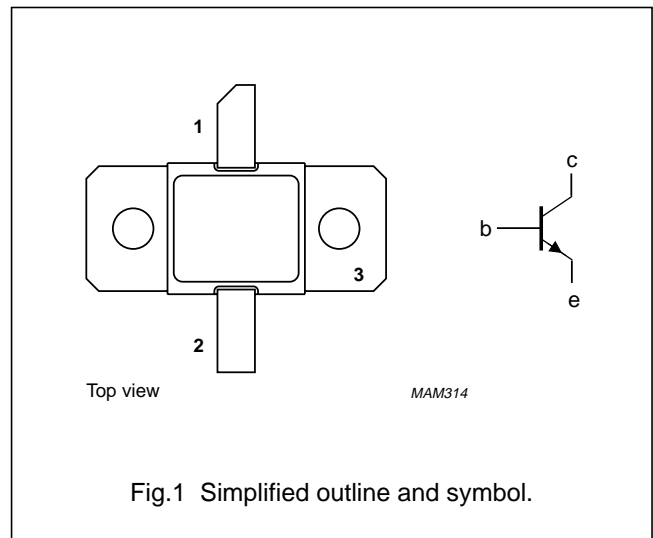
- Intended for use in common base class C wideband pulsed power amplifiers for L-band radar applications in the 1.2 to 1.4 GHz band.

### DESCRIPTION

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

### PINNING - SOT443A

PIN	DESCRIPTION
1	collector
2	emitter
3	base connected to flange



### QUICK REFERENCE DATA

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

MODE OF OPERATION	f (GHz)	V <sub>CC</sub> (V)	P <sub>L</sub> (W)	G <sub>p</sub> (dB)	η <sub>c</sub> (%)	Z <sub>i</sub> ; Z <sub>L</sub> (Ω)
Class-C; t <sub>p</sub> = 150 μs; δ = 5%	1.2 to 1.4	50	≥70	≥7	≥35	see Fig 4

<b>WARNING</b>
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.

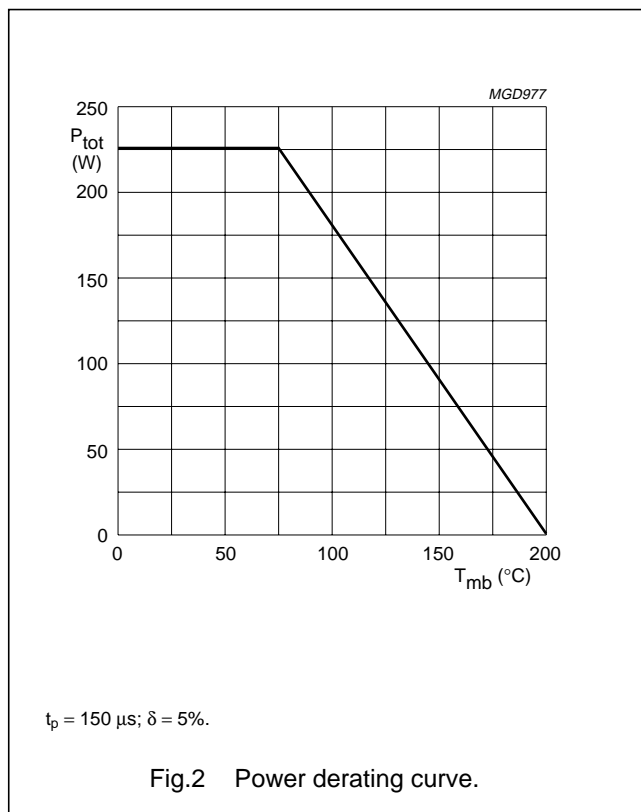
## NPN microwave power transistor

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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	–	65	V
$V_{CEO}$	collector-emitter voltage	open base	–	15	V
$V_{CES}$	collector-emitter voltage	$R_{BE} = 0 \Omega$	–	60	V
$V_{EBO}$	emitter-base voltage	open collector	–	3	V
$I_C$	collector current (DC)	$t_p \leq 150 \mu\text{s}; \delta \leq 5\%$	–	6	A
$P_{tot}$	total power dissipation	$T_{mb} \leq 75 \text{ }^\circ\text{C};$ $t_p \leq 150 \mu\text{s}; \delta \leq 5\%$	–	225	W
$T_{stg}$	storage temperature		–65	+200	$^\circ\text{C}$
$T_j$	operating junction temperature		–	200	$^\circ\text{C}$
$T_{sld}$	soldering temperature	at 0.2 mm from the case; $t \leq 10 \text{ s}$	–	235	$^\circ\text{C}$



## NPN microwave power transistor

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**THERMAL CHARACTERISTICS** $T_j = 75\text{ °C}$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
$R_{th\ j-mb}$	thermal resistance from junction to mounting-base		2.5	K/W
$R_{th\ mb-h}$	thermal resistance from mounting-base to heatsink	note 1	0.2	K/W
$Z_{th\ j-h}$	thermal resistance from junction to heatsink	$t_p = 100\ \mu\text{s}$ ; $\delta = 10\%$ ; notes 1 and 2	0.55	K/W

**Notes**

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

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 40\text{ mA}$ ; $I_E = 0$	65	–	V
$V_{(BR)CES}$	collector-emitter breakdown voltage	$I_C = 40\text{ mA}$ ; $R_{BE} = 0$	60	–	V
$I_{CBO}$	collector cut-off current	$V_{CB} = 50\text{ V}$ ; $I_E = 0$	–	4	mA
$I_{EBO}$	emitter cut-off current	$V_{EB} = 1.5\text{ V}$ ; $I_C = 0$	–	0.4	mA

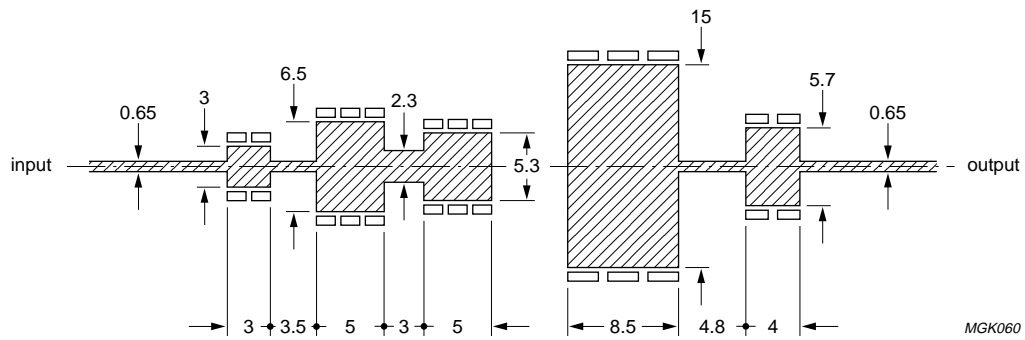
**APPLICATION INFORMATION**

The transistors are 100% tested under the following conditions.

MODE OF OPERATION	CONDITIONS	f (GHz)	$V_{CC}$ (V)	$P_L$ (W)	$G_p$ (dB)	$\eta_c$ (%)	$Z_i$ ; $Z_L$ ( $\Omega$ )
Class-C	$t_p = 150\ \mu\text{s}$ ; $\delta = 5\%$	1.2 to 1,4	50	typ.80; >70	typ.7.8; >7	typ.40; >35	see Fig 4
	$t_p = 300\ \mu\text{s}$ ; $\delta = 10\%$	1.2 to 1,4	50	typ.80;	typ.7	typ.30	see Fig 4

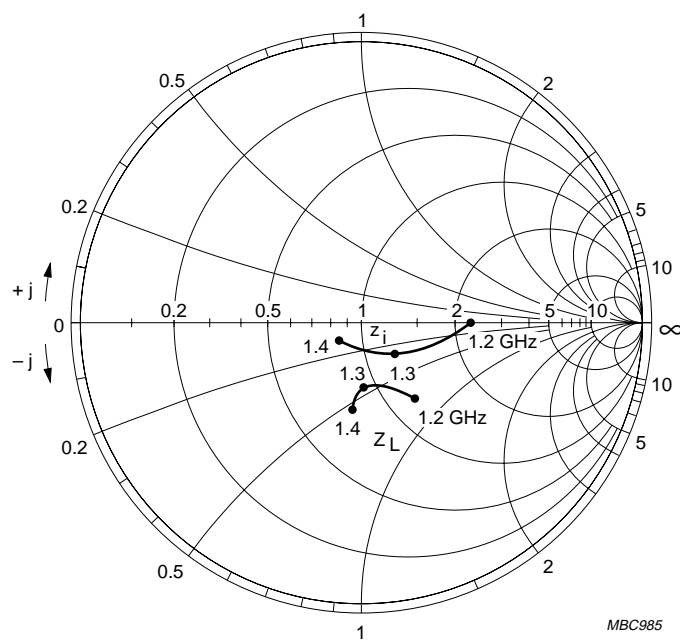
NPN microwave power transistor

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Dimensions in mm.  
 Substrate: Epsilam.  
 Thickness: 0.635 mm.  
 Permittivity:  $\epsilon_r = 10$ .

Fig.3 Wideband test circuit for class-C operation at 1.2 to 1.4 GHz.



Class-C operation;  $V_{CE} = 50 \text{ V}$ ;  $P_L = 65 \text{ W}$ ;  $Z_0 = 5 \Omega$ ;  $t_p = 150 \mu\text{s}$ ;  $\delta = 5\%$ .

Fig.4 Input and optimum load impedances as functions of frequency; typical values.

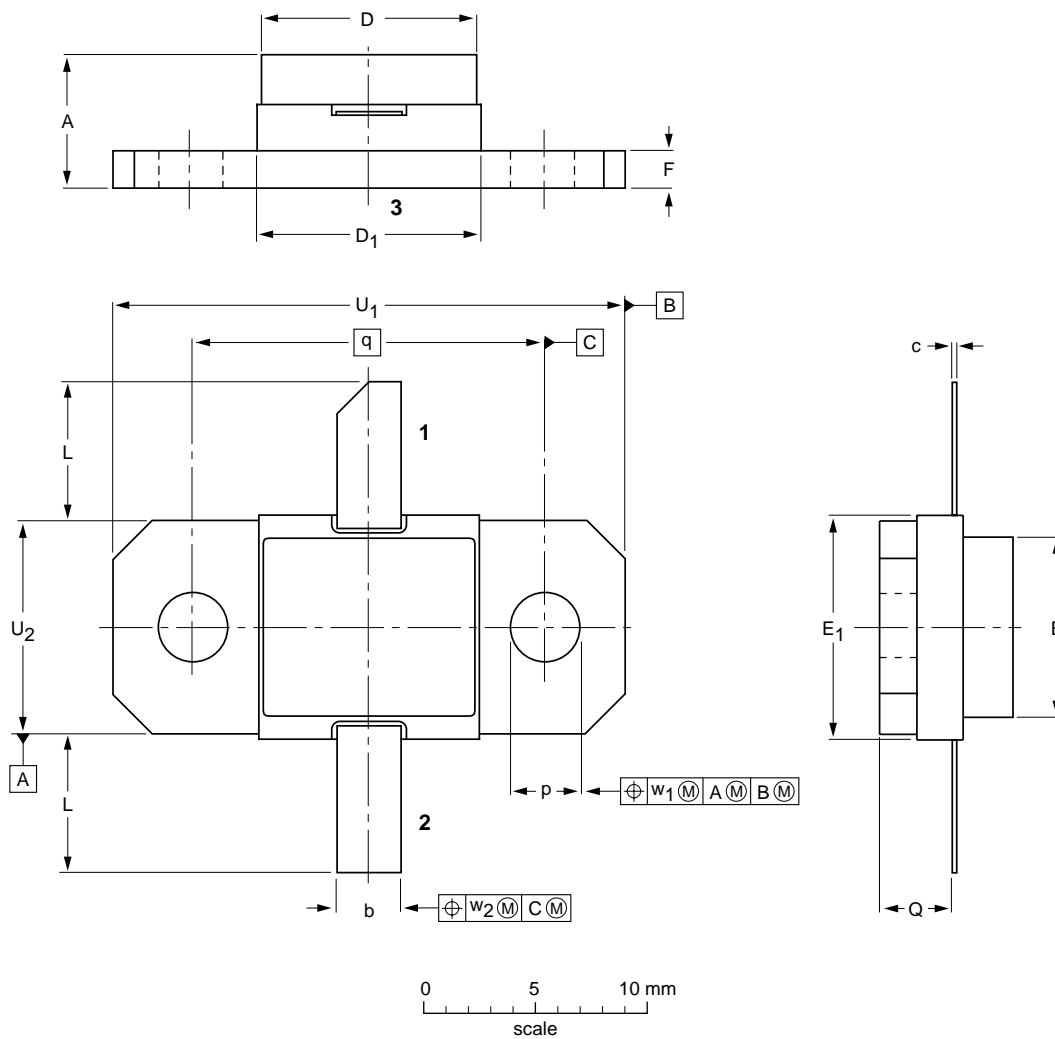
NPN microwave power transistor

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PACKAGE OUTLINE

Flanged hermetic ceramic package; 2 mounting holes; 2 leads

SOT443A



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	D <sub>1</sub>	E	E <sub>1</sub>	F	L	p	Q	q	U <sub>1</sub>	U <sub>2</sub>	w <sub>1</sub>	w <sub>2</sub>
mm	6.32 4.90	3.20 2.90	0.15 0.09	10.00 9.70	10.21 9.91	8.15 7.85	10.21 9.91	1.60 1.40	6.25 5.75	3.40 3.20	3.66 2.84	16.50	23.10 22.70	9.90 9.70	0.41	0.94
inches	0.249 0.193	0.126 0.114	0.006 0.004	0.394 0.382	0.402 0.390	0.321 0.309	0.402 0.390	0.063 0.055	0.246 0.226	0.134 0.126	0.144 0.112	0.650	0.909 0.894	0.390 0.382	0.016	0.037

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT443A						99-03-29

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**NPN microwave power transistor****RZ1214B65Y**

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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 the 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.	

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