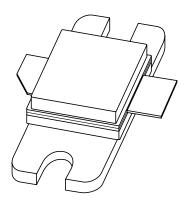
# DISCRETE SEMICONDUCTORS

# DATA SHEET



# **BLS3135-50**Microwave power transistor

Product specification Supersedes data of 1999 Aug 16 2003 Apr 15





BLS3135-50

#### **FEATURES**

- · Suitable for short and medium pulse applications
- Internal input and output matching networks for an easy circuit design
- Emitter ballasting resistors improve ruggedness
- · Gold metallization ensures excellent reliability
- Interdigitated emitter-base structure provides high emitter efficiency
- Multicell geometry improves power sharing and reduces thermal resistance.

#### **APPLICATIONS**

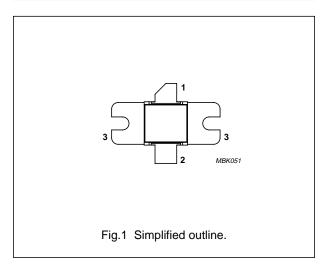
 Common base class-C pulsed power amplifiers for radar applications in the 3.1 to 3.5 GHz band.

#### **DESCRIPTION**

NPN silicon planar epitaxial microwave power transistor in a 2-lead rectangular flange package with a ceramic cap (SOT422A) with the common base connected to the flange.

#### **PINNING - SOT422A**

PIN	DESCRIPTION
1	collector
2	emitter
3	base; connected to flange



#### **QUICK REFERENCE DATA**

RF performance at T<sub>h</sub> = 25 °C in a common base class-C test circuit.

MODE OF OPERATION	f	V <sub>CB</sub>	P <sub>L</sub>	G <sub>p</sub>	ης
	(GHz)	(V)	(W)	(dB)	<b>(%)</b>
Pulsed, class-C	3.1 to 3.5	40	50	typ. 8	typ. 40

#### **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.

# Microwave power transistor

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#### **LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	METER CONDITIONS			
V <sub>CBO</sub>	collector-base voltage	open emitter	_	75	V
V <sub>CES</sub>	collector-emitter voltage	$R_{BE} = 0$	_	75	V
V <sub>EBO</sub>	emitter-base voltage	open collector	_	2	V
I <sub>CM</sub>	peak collector current	$t_p \le 100 \ \mu s; \ \delta \le 10\%$	_	6	Α
P <sub>tot</sub>	total power dissipation	$t_p = 100 \ \mu s; \ \delta = 10\%; \ T_{mb} = 25 \ ^{\circ}C$	_	80	W
T <sub>stg</sub>	storage temperature		-65	+200	°C
Tj	operating junction temperature		_	200	°C
T <sub>sld</sub>	soldering temperature	up to 0.2 mm from ceramic cap; t $\leq$ 10 s	_	235	°C

#### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
7	thermal impedance from junction to heatsink	$t_p = 100 \ \mu s; \ \delta = 10\%; \ note \ 1$	0.71	K/W
∠th j-h		$t_p = 300 \ \mu s; \ \delta = 10\%; \ note \ 1$	0.99	K/W

#### Note

1. Equivalent thermal impedance under pulsed microwave operating conditions. Measured with IR-scan with 20  $\mu$ m spot size at hotspot.

#### **CHARACTERISTICS**

 $T_j$  = 25  $^{\circ}C$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>(BR)CBO</sub>	collector-base breakdown voltage	I <sub>C</sub> = 15 mA; open emitter	75	_	V
V <sub>(BR)CES</sub>	collector-emitter breakdown voltage	$I_C = 15 \text{ mA}; V_{BE} = 0$	75	_	V
I <sub>CBO</sub>	collector leakage current	$V_{CB} = 40 \text{ V}; I_{E} = 0$	_	1.5	mA
I <sub>CES</sub>	collector leakage current	$V_{CE} = 40 \text{ V}; V_{BE} = 0$	_	3	mA
I <sub>EBO</sub>	emitter leakage current	$V_{EB} = 1.5 \text{ V}; I_C = 0$	_	0.3	mA
h <sub>FE</sub>	DC current gain	V <sub>CB</sub> = 5 V; I <sub>C</sub> = 1.5 A	40	_	

#### **APPLICATION INFORMATION**

RF performance at  $T_h$  = 25 °C in a common-base test circuit.

MODE OF OPERATION	f (GHz)	V <sub>CE</sub> (V)	P <sub>L</sub> (W)	G <sub>p</sub> (dB)	η <sub>C</sub> (%)
Class-C; $t_p = 100 \mu s$ ; $\delta = 10\%$	3.1 to 3.5	40	≥50	≥7	≥35
			typ. 55	typ. 8	typ. 40

# Microwave power transistor

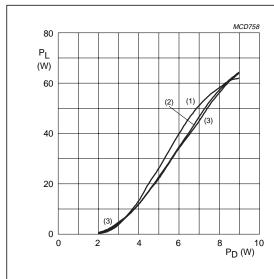
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#### Typical impedance

FREQUENCY (GHZ)	Z <sub>S</sub> (Ω)	Z <sub>L</sub> (Ω)
3.1	23.5 – j 5.6	7.8 – j 3.7
3.2	23.6 – j 4.3	7.3 – j 4.1
3.3	23.8 – j 2.9	6.6 – j 4.3
3.4	24.3 – j 1.6	5.8 – j 4.2
3.5	24.9 – j 0.3	5.1 – j 4.1

# Microwave power transistor

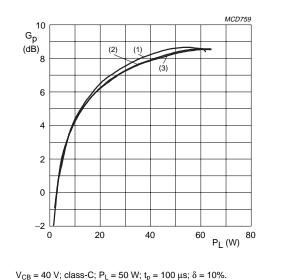
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 $V_{CB}$  = 40 V; class-C;  $t_p$  = 100  $\mu$ s;  $\delta$  = 10%.

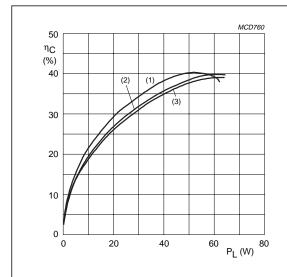
- (1) f = 3.5 GHz.
- (2) f = 3.3 GHz.
- (3) f = 3.1 GHz.

Fig.2 load power as a function of drive power; typical values.



- (1) f = 3.5 GHz.
- (2) f = 3.3 GHz.
- (3) f = 3.1 GHz.

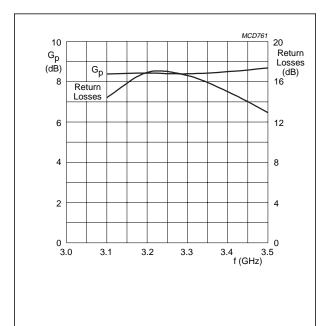
Power gain as a function of load power; typical values.



 $V_{CB}$  = 40 V; class-C;  $t_p$  = 100  $\mu$ s;  $\delta$  = 10%.

- (1) f = 3.5 GHz.
- (2) f = 3.3 GHz.
- (3) f = 3.1 GHz.

Collector efficiency as a function of load power; typical values.



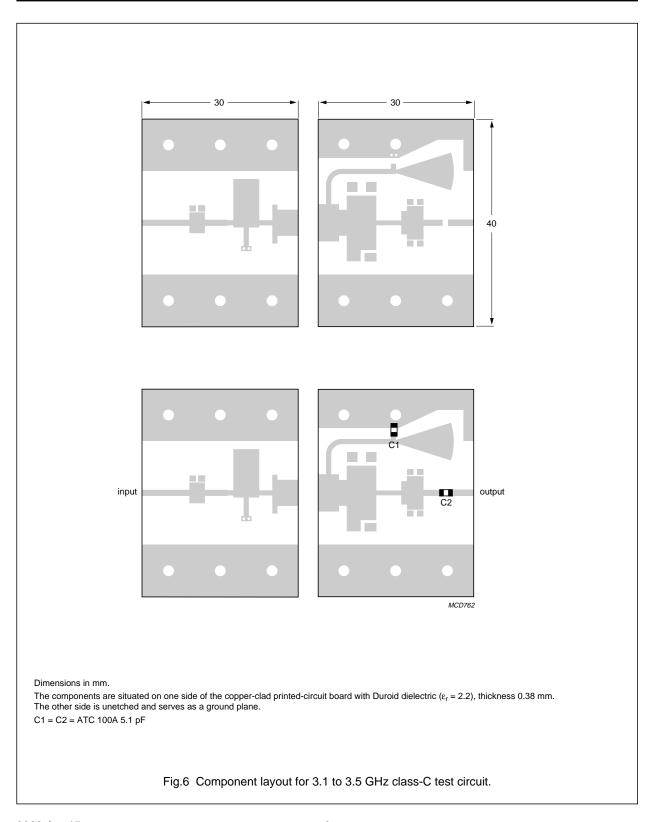
 $V_{CB}$  = 40 V; class-C;  $P_L$  = 50 W;  $t_p$  = 100  $\mu$ s;  $\delta$  = 10%.

Fig.5 Power gain and input return losses as functions of frequency; typical values.

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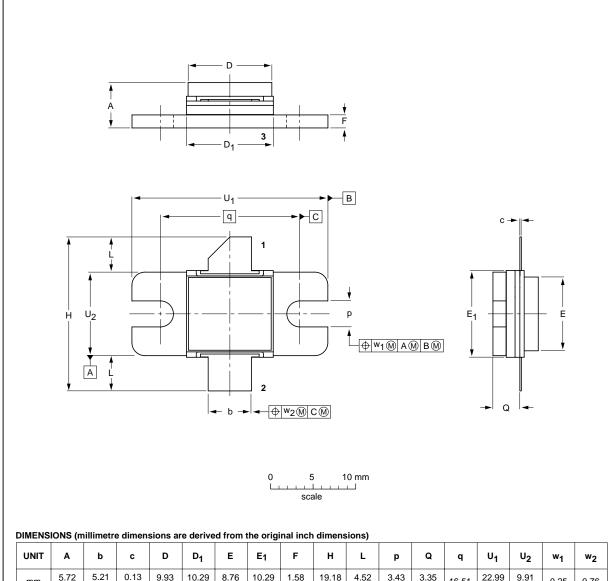


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#### **PACKAGE OUTLINE**

#### Flanged hermetic ceramic package; 2 mounting holes; 2 leads

SOT422A



mm	5.72 4.83	5.21 4.95	0.13 0.08	9.93 9.68	10.29 10.03	8.76 8.51	10.29 10.03	1.58 1.47	19.18 17.65	4.52 3.74	3.43 3.18	3.35 2.92	16.51	22.99 22.73	9.91 9.65	0.25	0.76
inches	0.225 0.190	0.205 0.195	0.005 0.003	0.391 0.381	0.405 0.395	0.345 0.335	0.405 0.395	0.062 0.058	0.755 0.695	0.178 0.147	0.135 0.125		0.65	0.905 0.895	0.390 0.380	0.01	0.03

OUTLINE		REFER	EUROPEAN	ISSUE DATE		
VERSION	IEC	JEDEC	EIAJ		PROJECTION	ISSUE DATE
SOT422A						99-03-29

### Microwave power transistor

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#### **DATA SHEET STATUS**

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). 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.

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**NOTES** 

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