

DATA SHEET

BFG25A/X

NPN 5 GHz wideband transistor

Product specification
Supersedes data of September 1995
File under Discrete Semiconductors, SC14

1997 Oct 29

NPN 5 GHz wideband transistor

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FEATURES

- Low current consumption (100 μ A to 1 mA)
- Low noise figure
- Gold metallization ensures excellent reliability.

APPLICATIONS

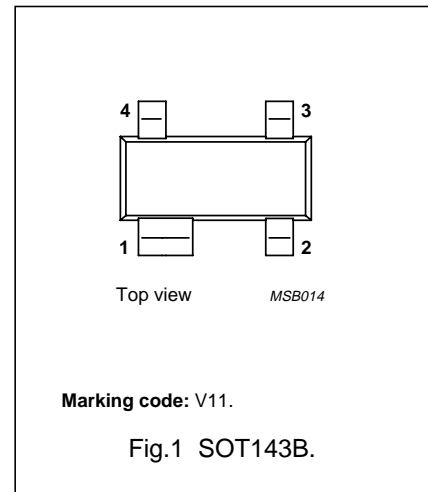
- RF low power amplifiers, such as pocket telephones, paging systems, with signal frequencies up to 2 GHz.

DESCRIPTION

NPN silicon wideband transistor in a four-lead dual emitter SOT143B plastic package (cross emitter).

PINNING

PIN	DESCRIPTION
1	collector
2	emitter
3	base
4	emitter



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage		–	–	8	V
V_{CEO}	collector-emitter voltage		–	–	5	V
I_C	collector current (DC)		–	–	6.5	mA
P_{tot}	total power dissipation	$T_s \leq 165\text{ }^\circ\text{C}$	–	–	32	mW
h_{FE}	DC current gain	$I_C = 0.5\text{ mA}; V_{CE} = 1\text{ V}$	50	80	200	
f_T	transition frequency	$I_C = 1\text{ mA}; V_{CE} = 1\text{ V}; f = 500\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$	3.5	5	–	GHz
G_{UM}	maximum unilateral power gain	$I_C = 0.5\text{ mA}; V_{CE} = 1\text{ V}; f = 1\text{ GHz}; T_{amb} = 25\text{ }^\circ\text{C}$	–	18	–	dB
F	noise figure	$I_C = 0.5\text{ mA}; V_{CE} = 1\text{ V}; f = 1\text{ GHz}; \Gamma = \Gamma_{opt}; T_{amb} = 25\text{ }^\circ\text{C}$	–	1.8	–	dB
		$I_C = 1\text{ mA}; V_{CE} = 1\text{ V}; f = 1\text{ GHz}; \Gamma = \Gamma_{opt}; T_{amb} = 25\text{ }^\circ\text{C}$	–	2	–	dB

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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	–	8	V
V _{CEO}	collector-emitter voltage	open base	–	5	V
V _{EBO}	emitter-base voltage	open collector	–	2	V
I _C	collector current (DC)		–	6.5	mA
P _{tot}	total power dissipation	T _s ≤ 165 °C; note 1	–	32	mW
T _{stg}	storage temperature		–65	150	°C
T _j	junction temperature		–	175	°C

Note

1. T_s is the temperature at the soldering point of the collector pin.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R _{th j-s}	thermal resistance from junction to soldering point	note 1	320	K/W

Note

1. T_s is the temperature at the soldering point of the collector pin.

CHARACTERISTICST_j = 25 °C unless otherwise specified.

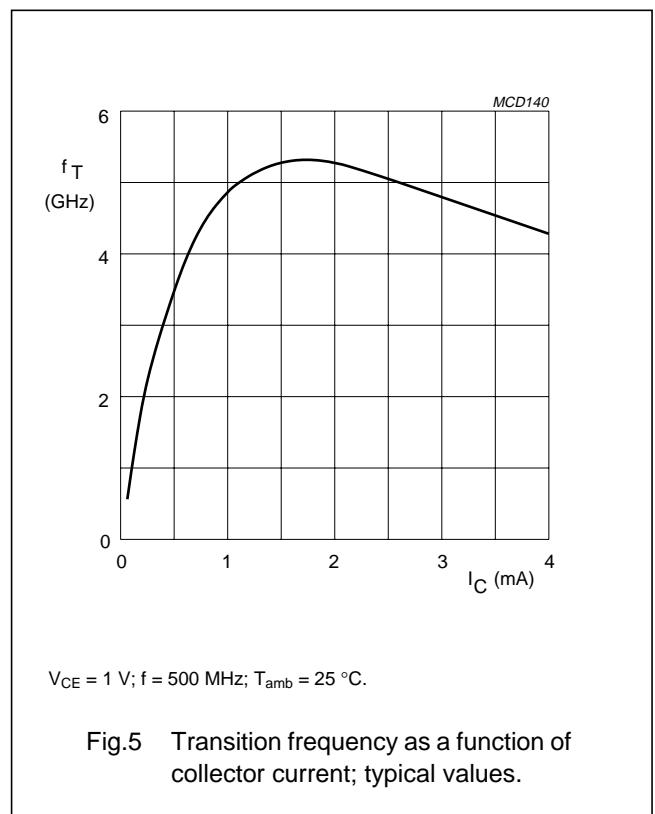
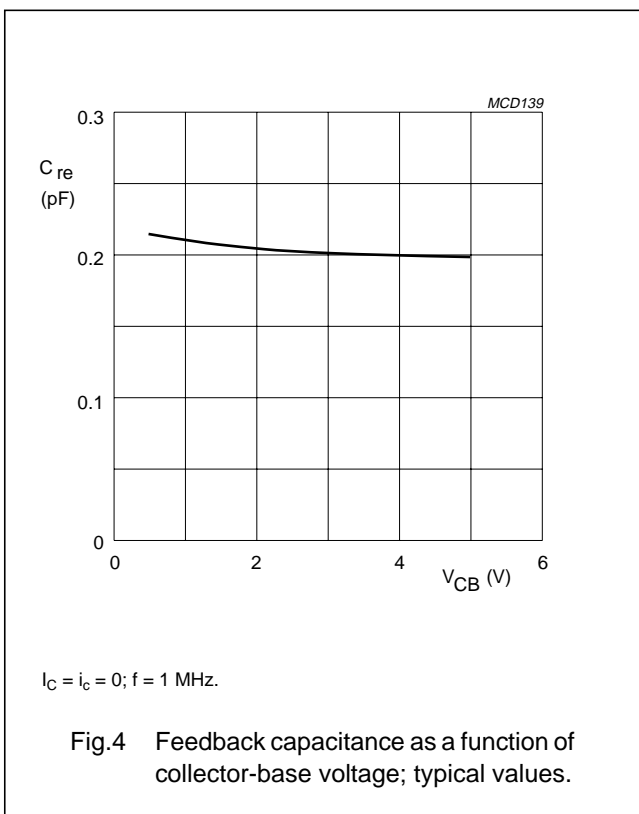
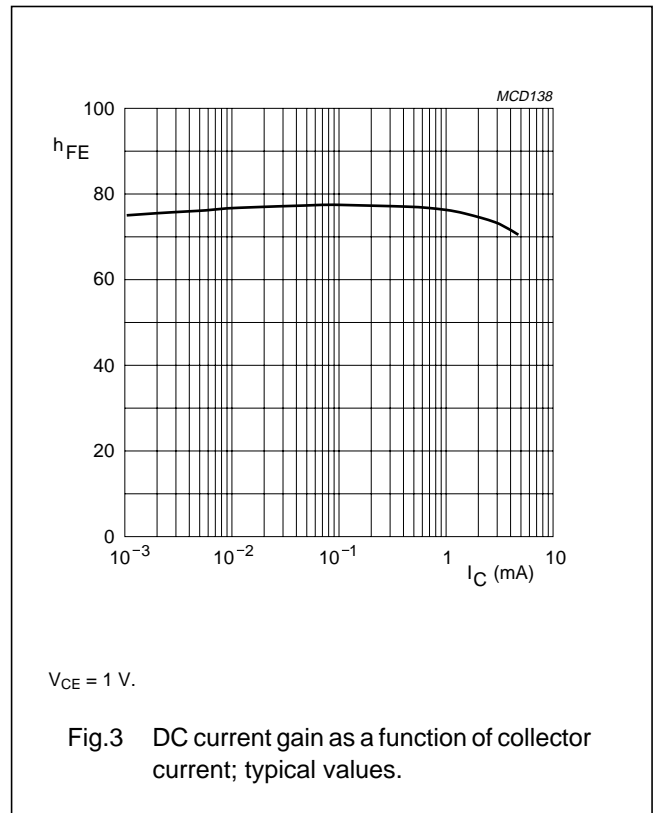
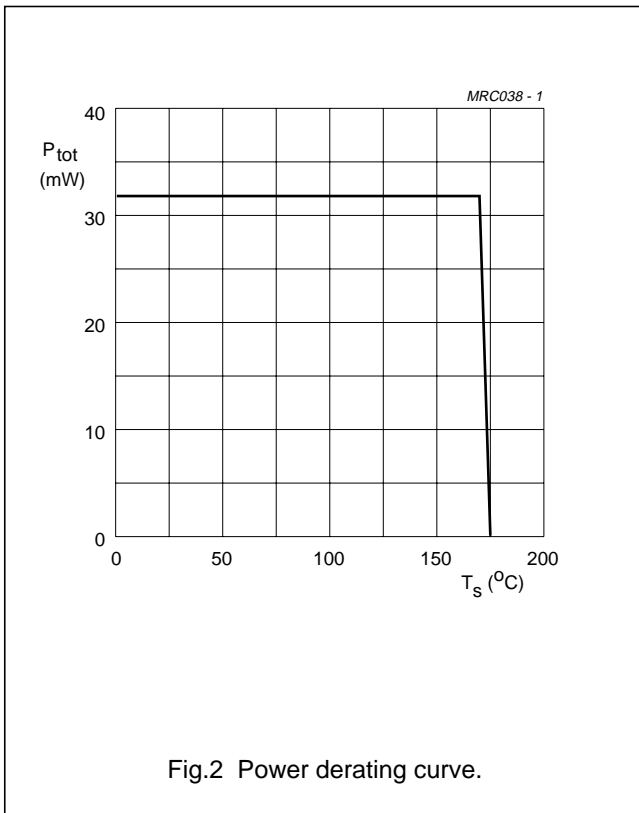
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CBO}	collector leakage current	I _E = 0; V _{CB} = 5 V	–	–	50	μA
h _{FE}	DC current gain	I _C = 0.5 mA; V _{CE} = 1 V	50	80	200	
C _{re}	feedback capacitance	I _C = i _c = 0; V _{CB} = 1 V; f = 1 MHz	–	0.21	0.3	pF
f _T	transition frequency	I _C = 1 mA; V _{CE} = 1 V; T _{amb} = 25 °C; f = 500 MHz	3.5	5	–	GHz
G _{UM}	maximum unilateral power gain (note 1)	I _C = 0.5 mA; V _{CE} = 1 V; f = 1 GHz; T _{amb} = 25 °C	–	18	–	dB
F	noise figure	I _C = 0.5 mA; V _{CE} = 1 V; f = 1 GHz; Γ = Γ _{opt} ; T _{amb} = 25 °C	–	1.8	–	dB
		I _C = 1 mA; V _{CE} = 1 V; f = 1 GHz; Γ = Γ _{opt} ; T _{amb} = 25 °C	–	2	–	dB

Note

1. G_{UM} is the maximum unilateral power gain, assuming S₁₂ is zero and $G_{UM} = 10 \log \frac{|S_{21}|^2}{(1 - |S_{11}|^2)(1 - |S_{22}|^2)}$ dB

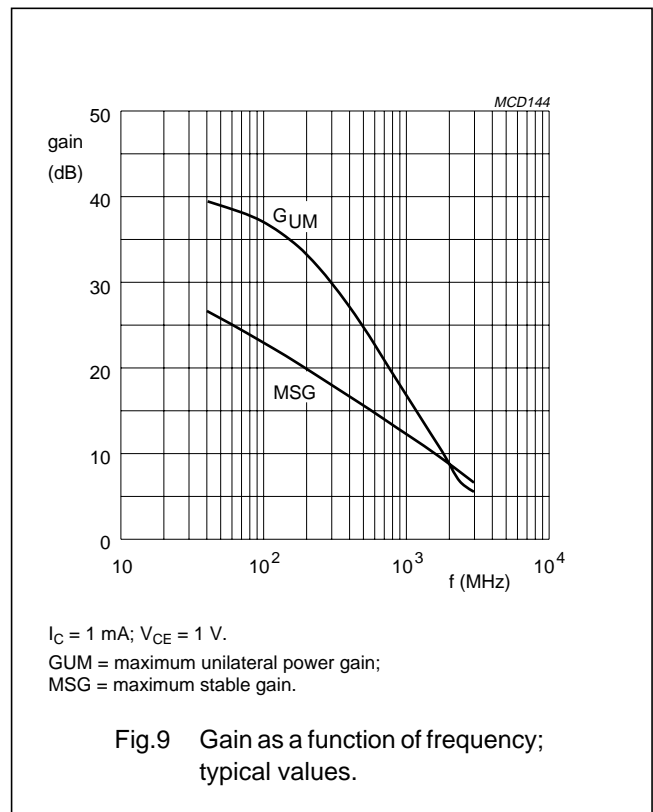
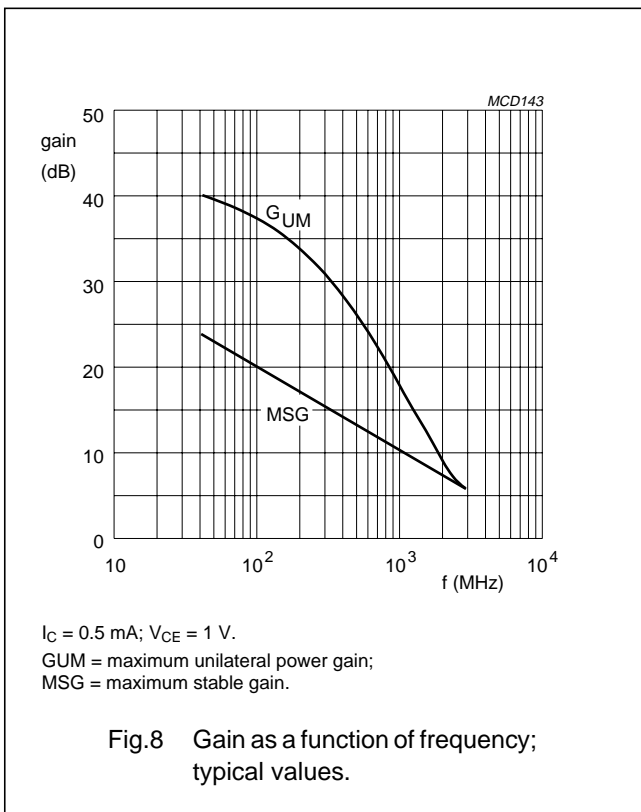
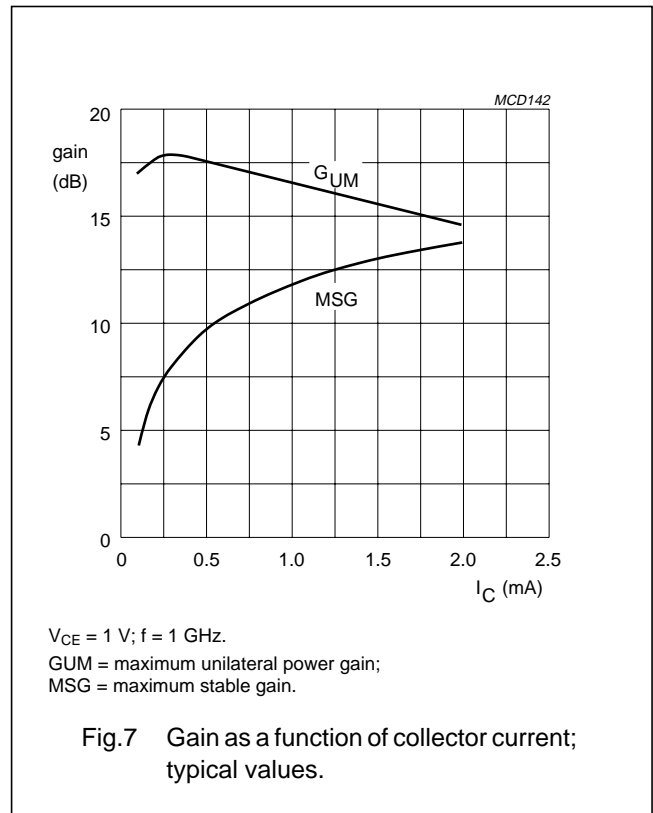
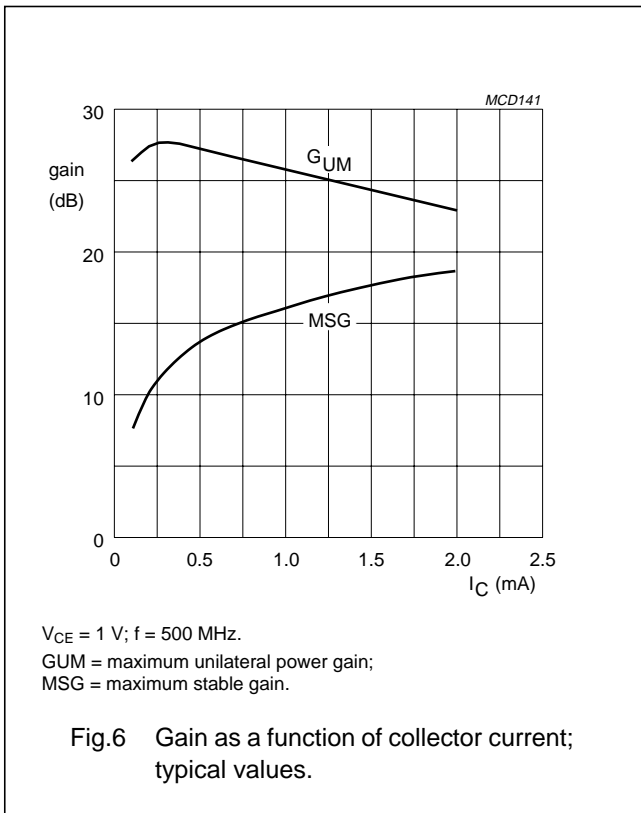
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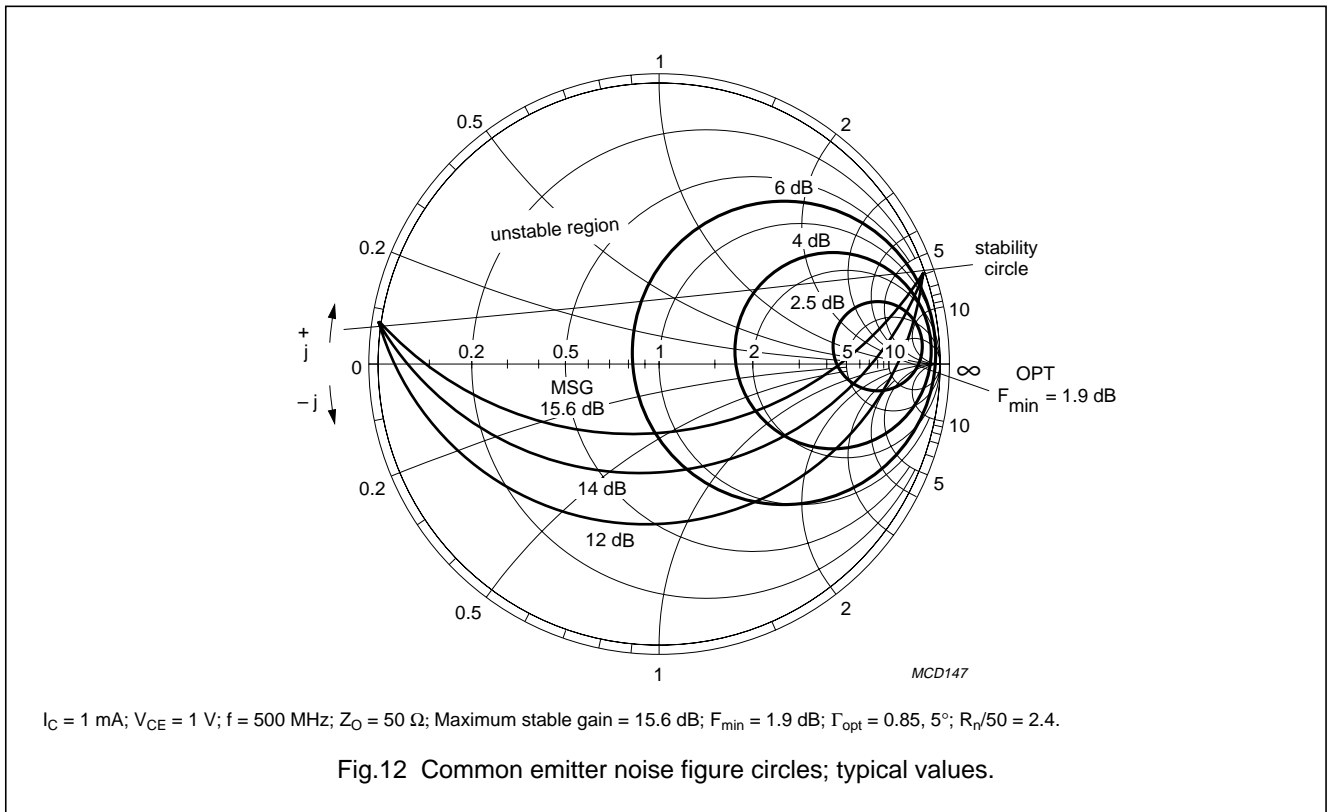
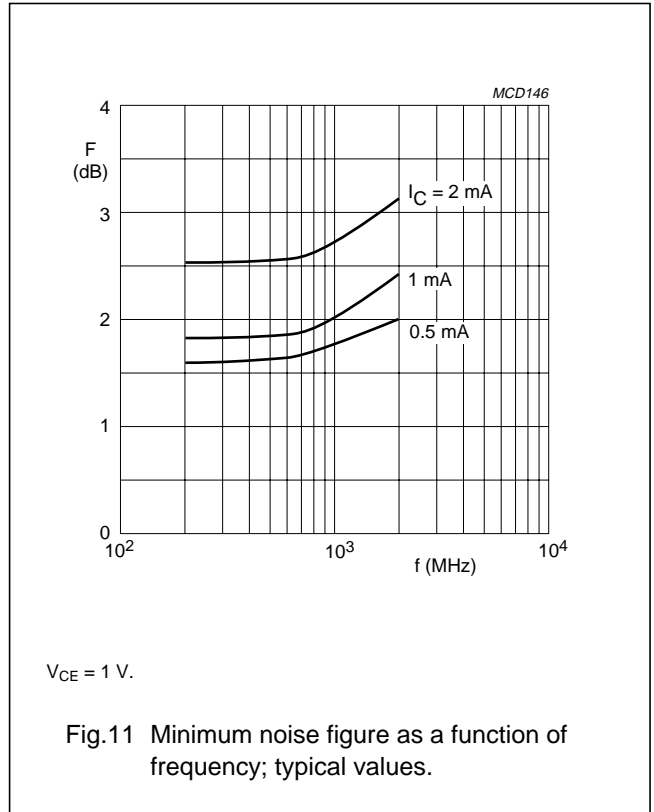
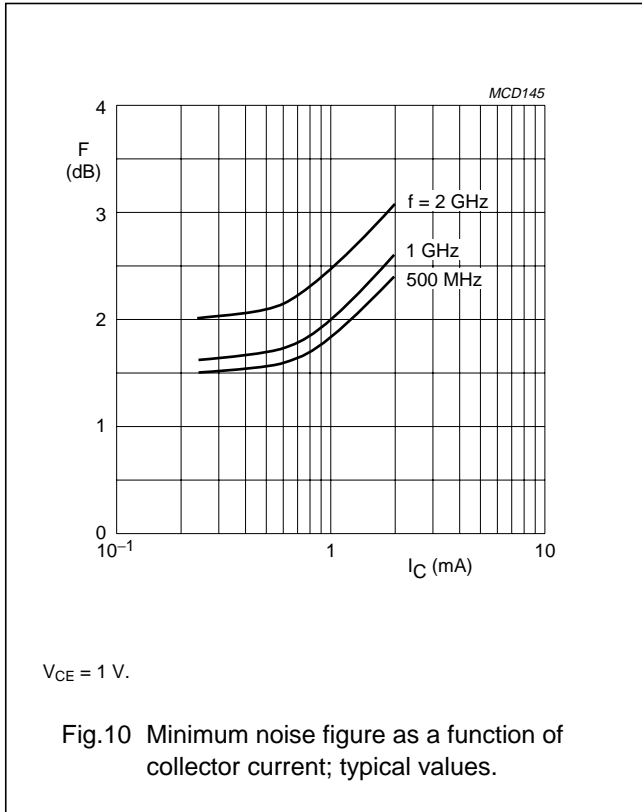
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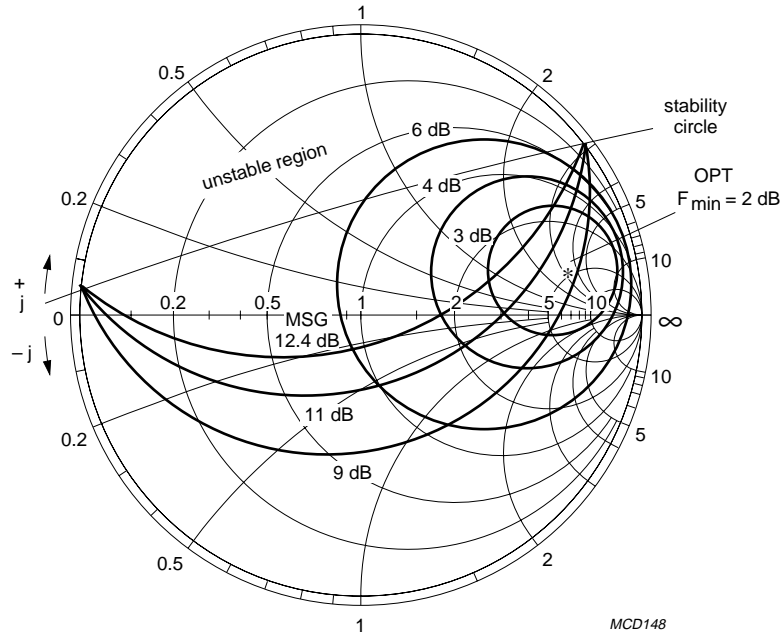
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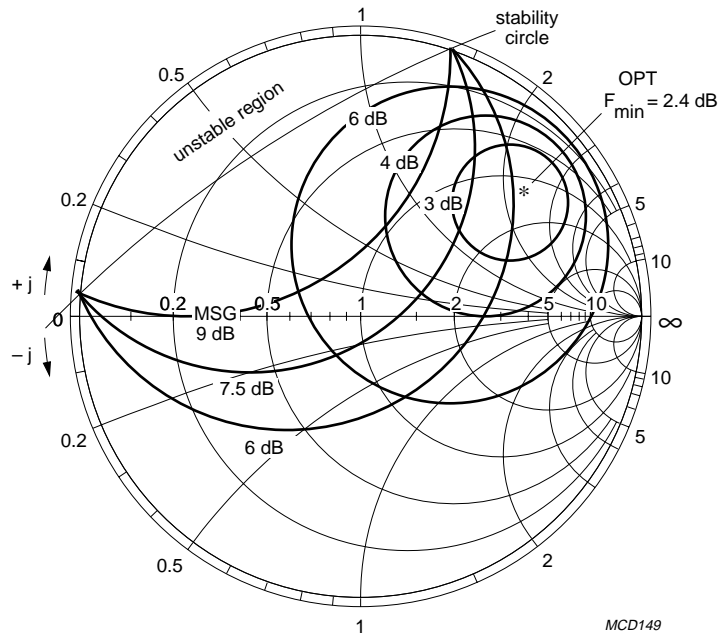
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$I_C = 1 \text{ mA}$; $V_{CE} = 1 \text{ V}$; $f = 1000 \text{ MHz}$; $Z_O = 50 \Omega$; Maximum stable gain = 12.4 dB; $F_{min} = 2 \text{ dB}$; $\Gamma_{opt} = 0.78, 14^\circ$; $R_n/50 = 2.6$.

Fig.13 Common emitter noise figure circles; typical values.

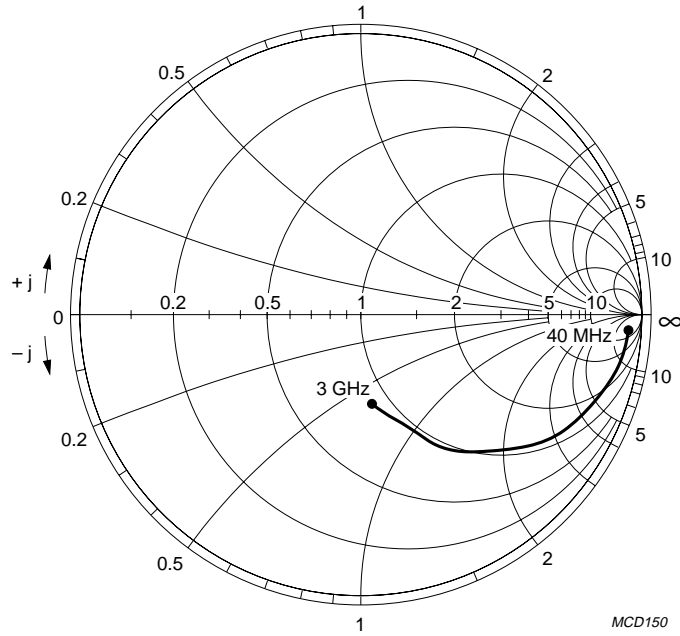


$I_C = 1 \text{ mA}$; $V_{CE} = 1 \text{ V}$; $f = 2000 \text{ MHz}$; $Z_O = 50 \Omega$; Maximum stable gain = 8.9 dB; $F_{min} = 2.4 \text{ dB}$; $\Gamma_{opt} = 0.72, 38^\circ$; $R_n/50 = 1.9$.

Fig.14 Common emitter noise figure circles; typical values.

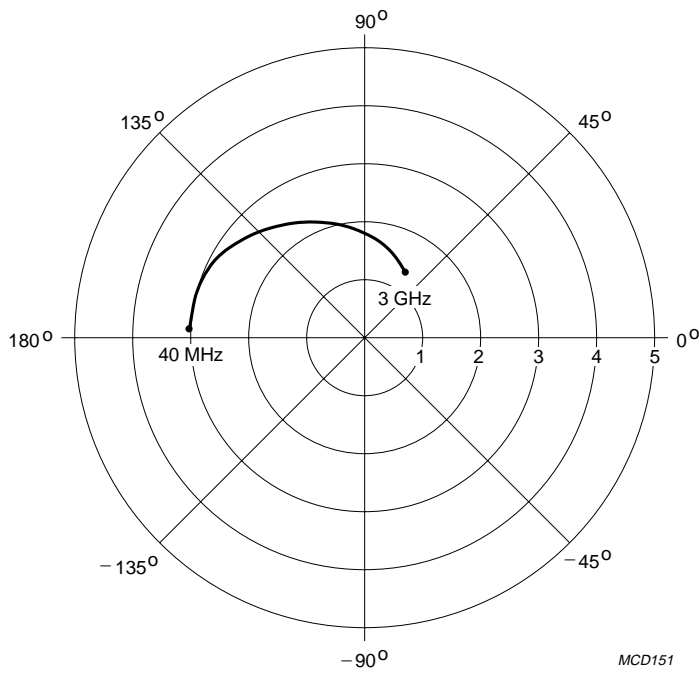
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$I_C = 1 \text{ mA}; V_{CE} = 1 \text{ V}; Z_0 = 50 \Omega.$

Fig.15 Common emitter input reflection coefficient (S_{11}); typical values.



$I_C = 1 \text{ mA}; V_{CE} = 1 \text{ V}.$

Fig.16 Common emitter forward transmission coefficient (S_{21}); typical values.

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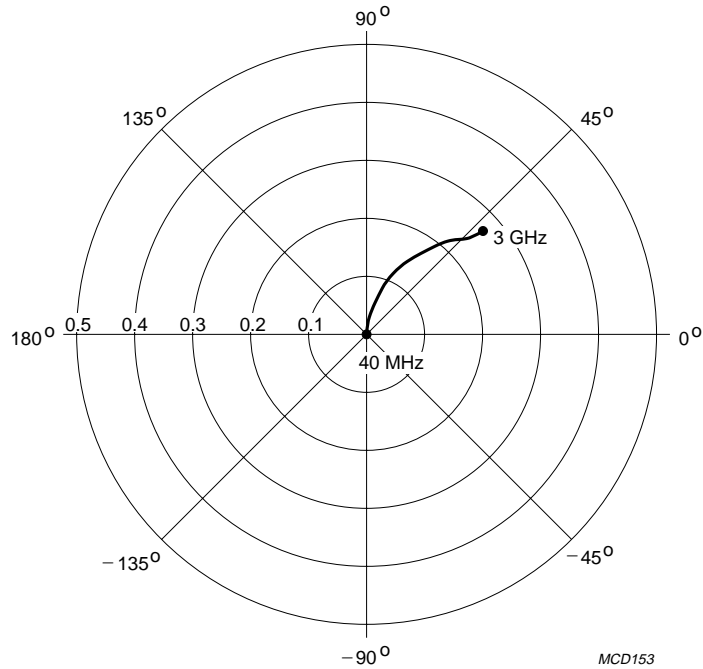


Fig.17 Common emitter reverse transmission coefficient (S_{12}); typical values.

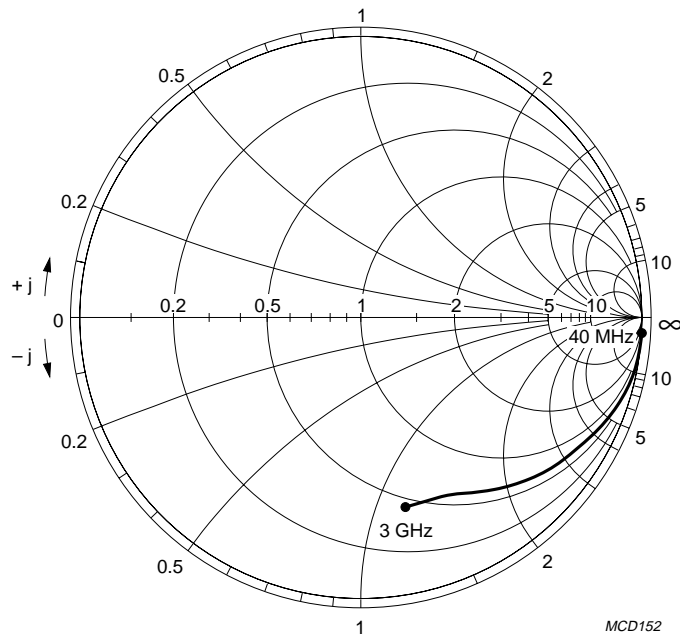


Fig.18 Common emitter output reflection coefficient (S_{22}); typical values.

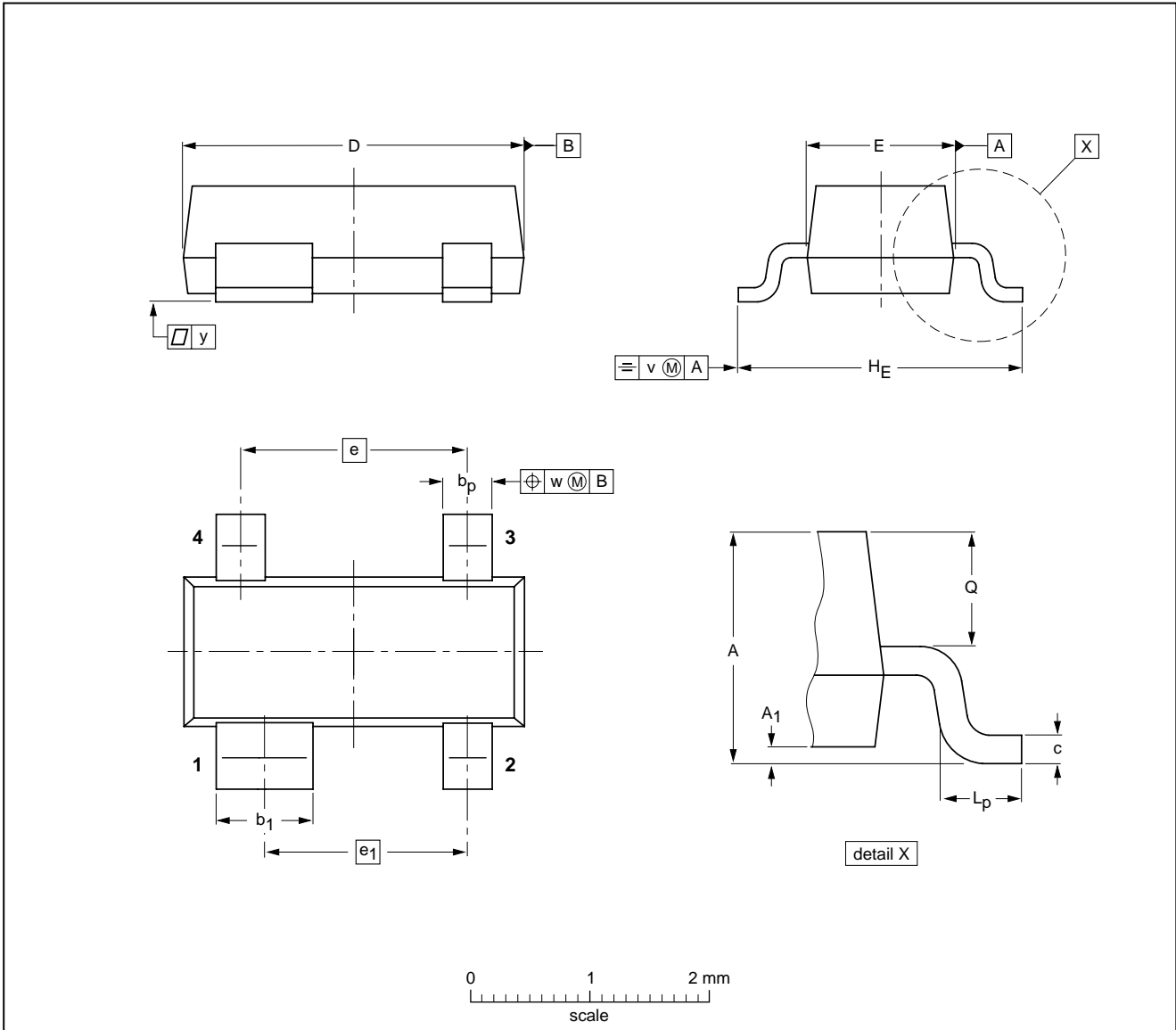
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PACKAGE OUTLINE

Plastic surface mounted package; 4 leads

SOT143B



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max	b _p	b ₁	c	D	E	e	e ₁	H _E	L _p	Q	v	w	y
mm	1.1 0.9	0.1	0.48 0.38	0.88 0.78	0.15 0.09	3.0 2.8	1.4 1.2	1.9	1.7	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT143B						97-02-28

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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.	

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Argentina: see South America

Australia: 34 Waterloo Road, NORTH RYDE, NSW 2113,
Tel. +61 2 9805 4455, Fax. +61 2 9805 4466

Austria: Computerstr. 6, A-1101 WIEN, P.O. Box 213, Tel. +43 160 1010,
Fax. +43 160 101 1210

Belarus: Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,
220050 MINSK, Tel. +375 172 200 733, Fax. +375 172 200 773

Belgium: see The Netherlands

Brazil: see South America

Bulgaria: Philips Bulgaria Ltd., Energoproject, 15th floor,
51 James Bourchier Blvd., 1407 SOFIA,
Tel. +359 2 689 211, Fax. +359 2 689 102

Canada: PHILIPS SEMICONDUCTORS/COMPONENTS,
Tel. +1 800 234 7381

China/Hong Kong: 501 Hong Kong Industrial Technology Centre,
72 Tat Chee Avenue, Kowloon Tong, HONG KONG,
Tel. +852 2319 7888, Fax. +852 2319 7700

Colombia: see South America

Czech Republic: see Austria

Denmark: Prags Boulevard 80, PB 1919, DK-2300 COPENHAGEN S,
Tel. +45 32 88 2636, Fax. +45 31 57 0044

Finland: Sinikalliontie 3, FIN-02630 ESPOO,
Tel. +358 9 615800, Fax. +358 9 61580920

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

Hungary: see Austria

India: Philips INDIA Ltd, Band Box Building, 2nd floor,
254-D, Dr. Annie Besant Road, Worli, MUMBAI 400 025,
Tel. +91 22 493 8541, Fax. +91 22 493 0966

Indonesia: see Singapore

Ireland: Newstead, Clonskeagh, DUBLIN 14,
Tel. +353 1 7640 000, Fax. +353 1 7640 200

Israel: RAPAC Electronics, 7 Kehilat Saloniki St, PO Box 18053,
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,
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Korea: Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,
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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,
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Middle East: see Italy

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

New Zealand: 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,
Tel. +64 9 849 4160, Fax. +64 9 849 7811

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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Singapore: Lorong 1, Toa Payoh, SINGAPORE 1231,
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South America: Rua do Rocio 220, 5th floor, Suite 51,
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Tel. +55 11 821 2333, Fax. +55 11 829 1849

Spain: Balmes 22, 08007 BARCELONA,
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Sweden: Kottbygatan 7, Akalla, S-16485 STOCKHOLM,
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Switzerland: Allmendstrasse 140, CH-8027 ZÜRICH,
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Taiwan: Philips Semiconductors, 6F, No. 96, Chien Kuo N. Rd., Sec. 1,
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United Kingdom: Philips Semiconductors Ltd., 276 Bath Road, Hayes,
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United States: 811 East Arques Avenue, SUNNYVALE, CA 94088-3409,
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