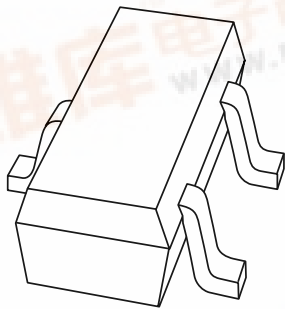


DISCRETE SEMICONDUCTORS

DATA SHEET



BFR92AT NPN 5 GHz wideband transistor

Product specification
Supersedes data of 1999 Nov 02

2000 Mar 28

NPN 5 GHz wideband transistor

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FEATURES

- High power gain
- Gold metallization ensures excellent reliability
- SOT416 (SC-75) package.

APPLICATIONS

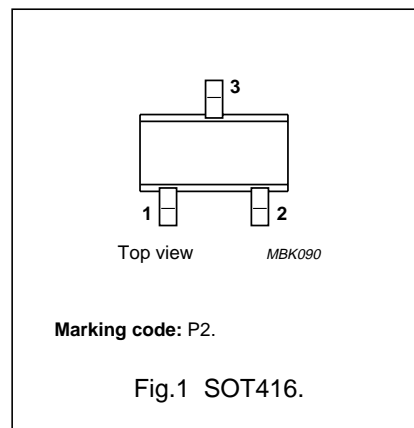
RF amplifiers, mixers and oscillators with signal frequencies up to 1 GHz.

DESCRIPTION

Silicon NPN transistor encapsulated in a plastic SOT416 (SC-75) package. The BFR92AT uses the same crystal as the SOT23 version: BFR92A.

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	–	20	V
V_{CEO}	collector-emitter voltage	open base	–	–	15	V
I_C	collector current (DC)		–	–	25	mA
P_{tot}	total power dissipation	up to $T_s = 75\text{ °C}$; note 1	–	–	150	mW
h_{FE}	current gain	$I_C = 15\text{ mA}$; $V_{CE} = 10\text{ V}$	40	90	–	
C_{re}	feedback capacitance	$I_C = 0$; $V_{CE} = 10\text{ V}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ °C}$	–	0.35	–	pF
f_T	transition frequency	$I_C = 15\text{ mA}$; $V_{CE} = 10\text{ V}$; $f = 500\text{ MHz}$	3.5	5	–	GHz
G_{UM}	maximum unilateral power gain	$I_C = 15\text{ mA}$; $V_{CE} = 10\text{ V}$; $f = 1\text{ GHz}$; $T_{amb} = 25\text{ °C}$	–	14	–	dB
		$I_C = 15\text{ mA}$; $V_{CE} = 10\text{ V}$; $f = 2\text{ GHz}$; $T_{amb} = 25\text{ °C}$	–	8	–	dB
F	noise figure	$I_C = 5\text{ mA}$; $V_{CE} = 10\text{ V}$; $f = 1\text{ GHz}$; $\Gamma_s = \Gamma_{opt}$	–	2	–	dB
T_j	junction temperature		–	–	150	°C

Note

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

NPN 5 GHz wideband transistor

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LIMITING VALUES

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

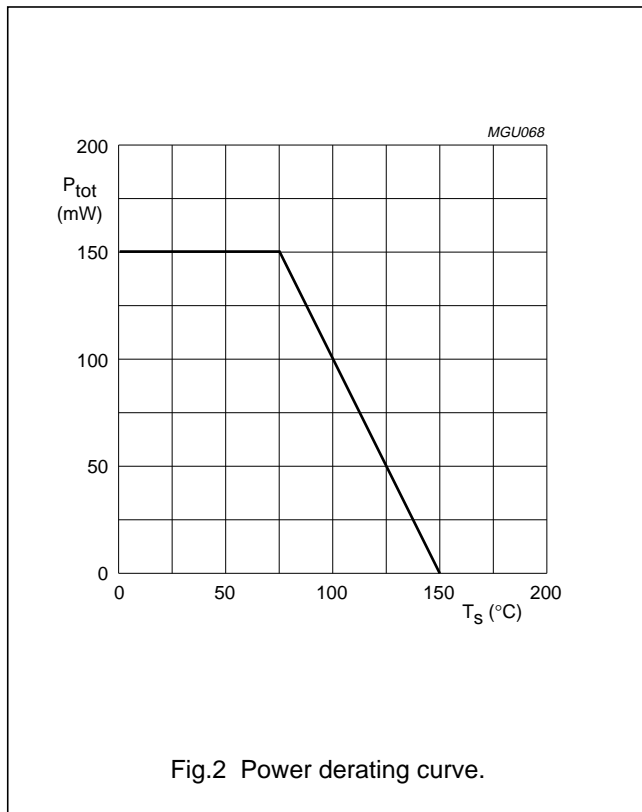
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{CB0}	collector-base voltage	open emitter	–	20	V
V _{CEO}	collector-emitter voltage	open base	–	15	V
V _{EBO}	emitter-base voltage	open collector	–	2	V
I _C	collector current (DC)		–	25	mA
P _{tot}	total power dissipation	up to T _s = 75 °C; see Fig.2; note 1	–	150	mW
T _{stg}	storage temperature		–65	+150	°C
T _j	junction temperature		–	150	°C

Note

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

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
R _{th j-s}	thermal resistance from junction to soldering point	500	K/W



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CHARACTERISTICS

$T_j = 25\text{ °C}$; unless otherwise specified.

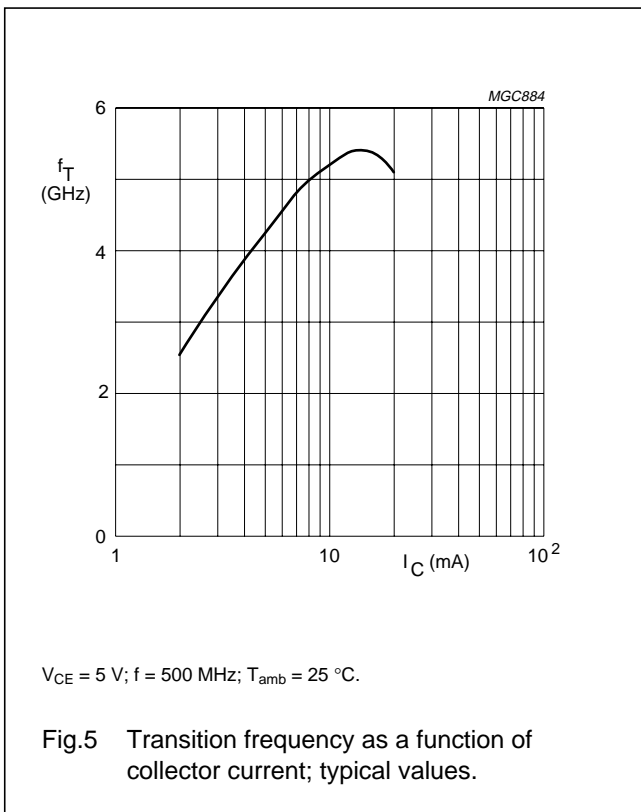
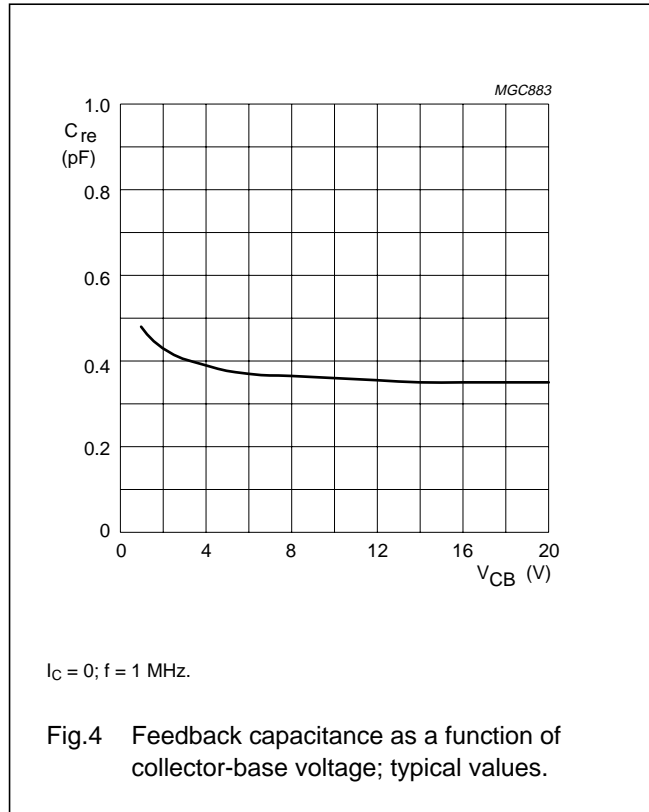
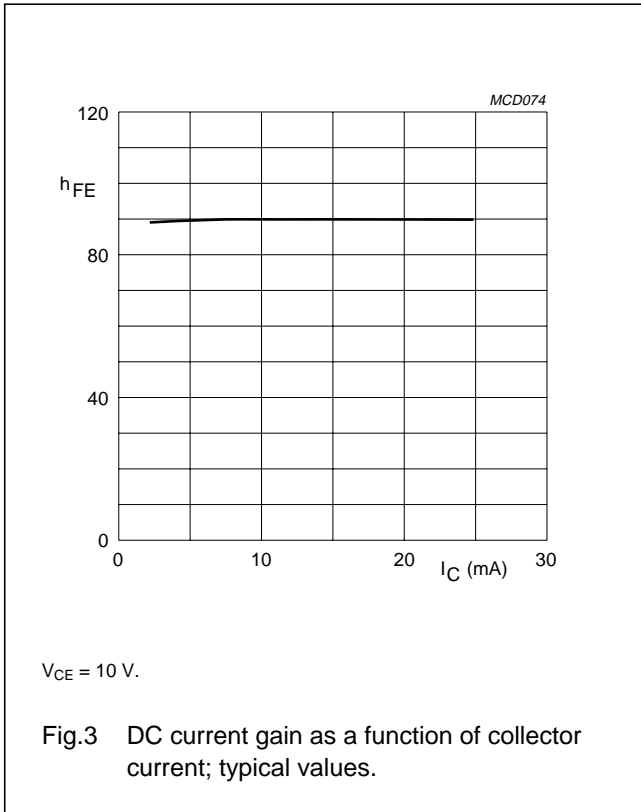
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector leakage current	$I_E = 0; V_{CB} = 10\text{ V}$	–	–	50	nA
h_{FE}	DC current gain	$I_C = 15\text{ mA}; V_{CE} = 10\text{ V}$	40	90	–	
C_c	collector capacitance	$I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	0.6	–	pF
C_e	emitter capacitance	$I_C = i_c = 0; V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$	–	0.9	–	pF
C_{re}	feedback capacitance	$I_C = 0; V_{CE} = 10\text{ V}; f = 1\text{ MHz}$	–	0.35	–	pF
f_T	transition frequency	$I_C = 15\text{ mA}; V_{CE} = 10\text{ V}; f = 500\text{ MHz}$	3.5	5	–	GHz
G_{UM}	maximum unilateral power gain; note 1	$I_C = 15\text{ mA}; V_{CE} = 10\text{ V}; f = 1\text{ GHz}; T_{amb} = 25\text{ °C}$	–	14	–	dB
		$I_C = 15\text{ mA}; V_{CE} = 10\text{ V}; f = 2\text{ GHz}; T_{amb} = 25\text{ °C}$	–	8	–	dB
F	noise figure	$I_C = 5\text{ mA}; V_{CE} = 10\text{ V}; f = 1\text{ GHz}; \Gamma_s = \Gamma_{opt}$	–	2	–	dB
		$I_C = 5\text{ mA}; V_{CE} = 10\text{ V}; f = 2\text{ GHz}; \Gamma_s = \Gamma_{opt}$	–	3	–	dB

Note

1. G_{UM} is the maximum unilateral power gain, assuming s_{12} is zero and $G_{UM} = 10 \log \frac{|s_{21}|^2}{(1 - |s_{11}|^2)(1 - |s_{22}|^2)}$ dB

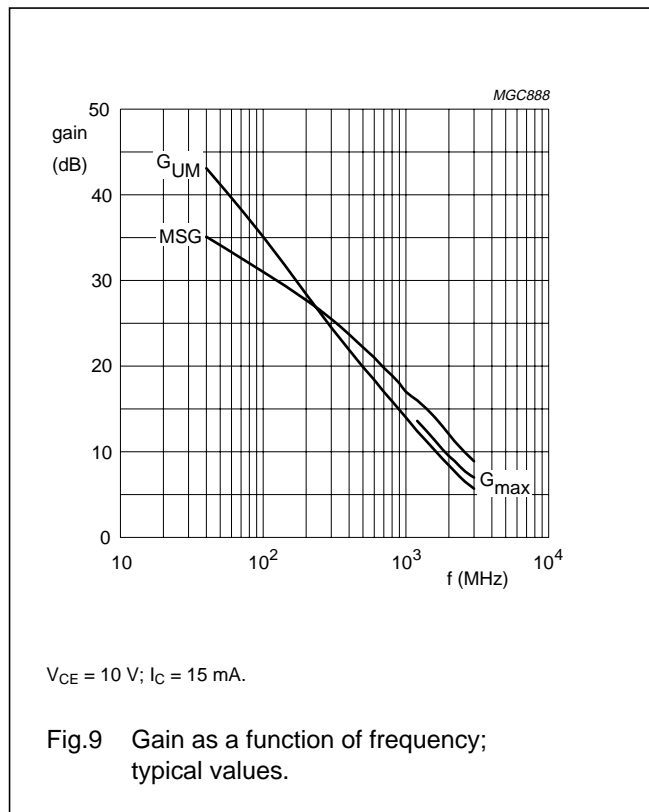
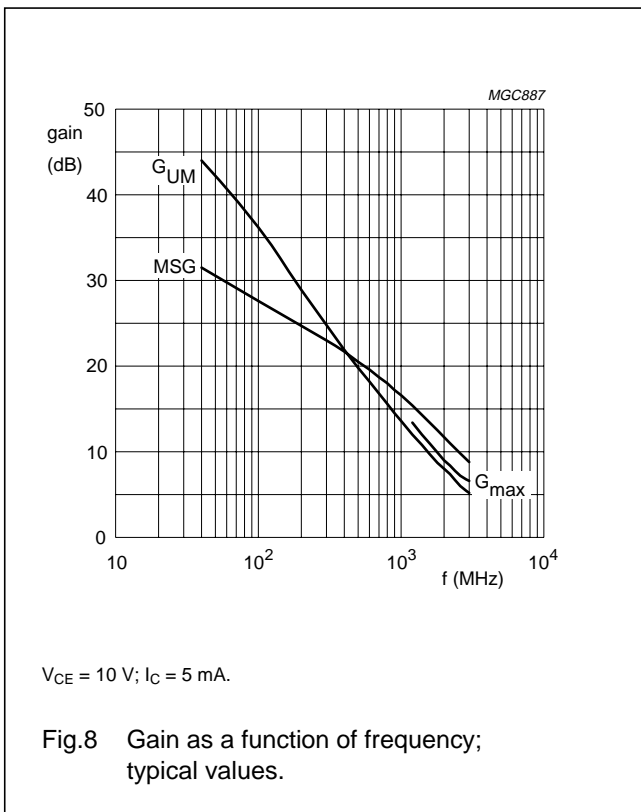
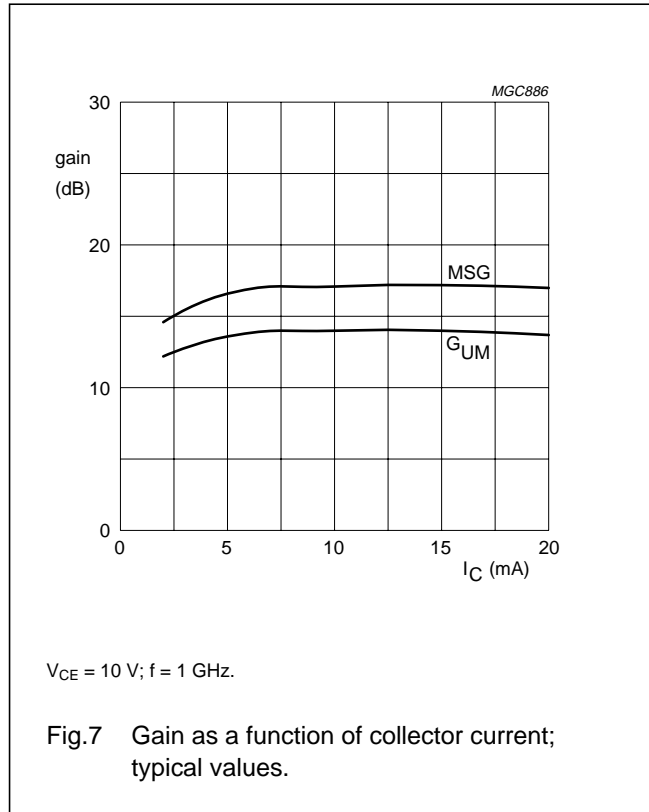
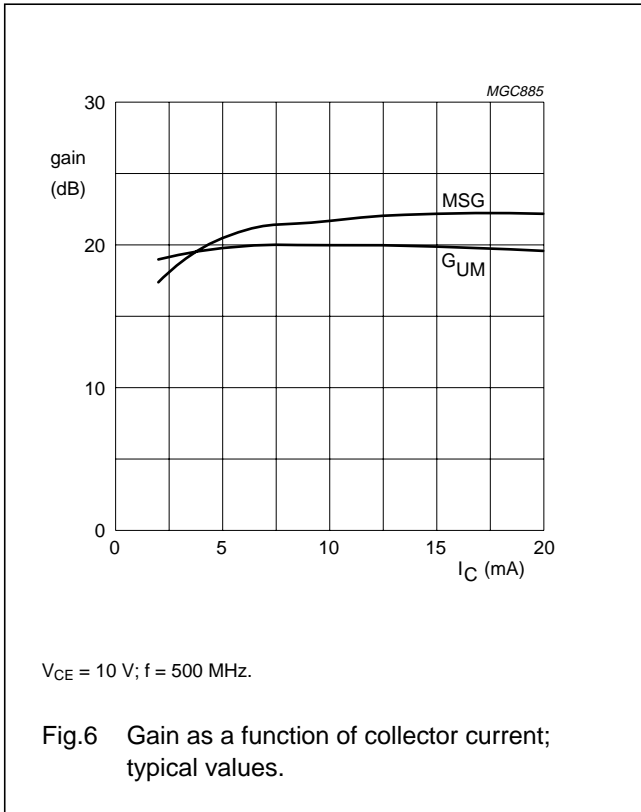
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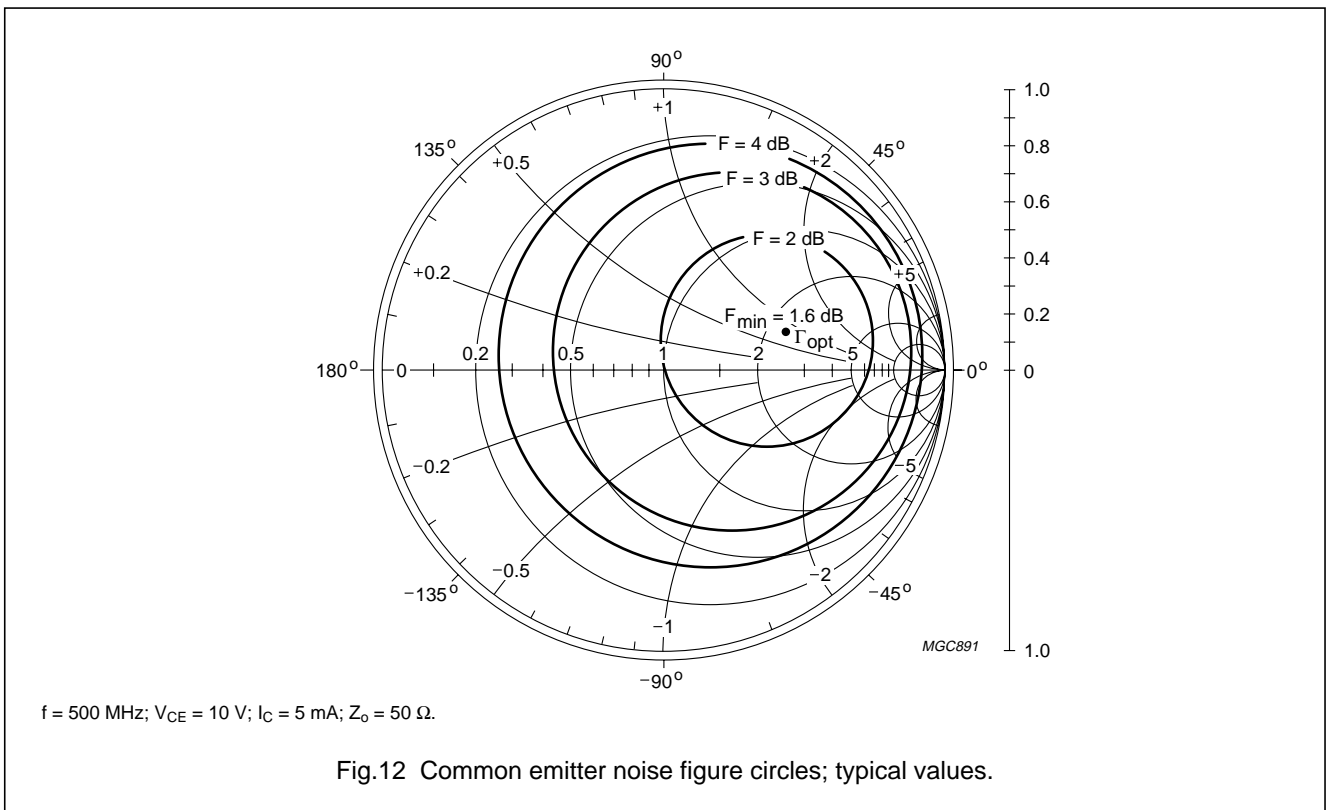
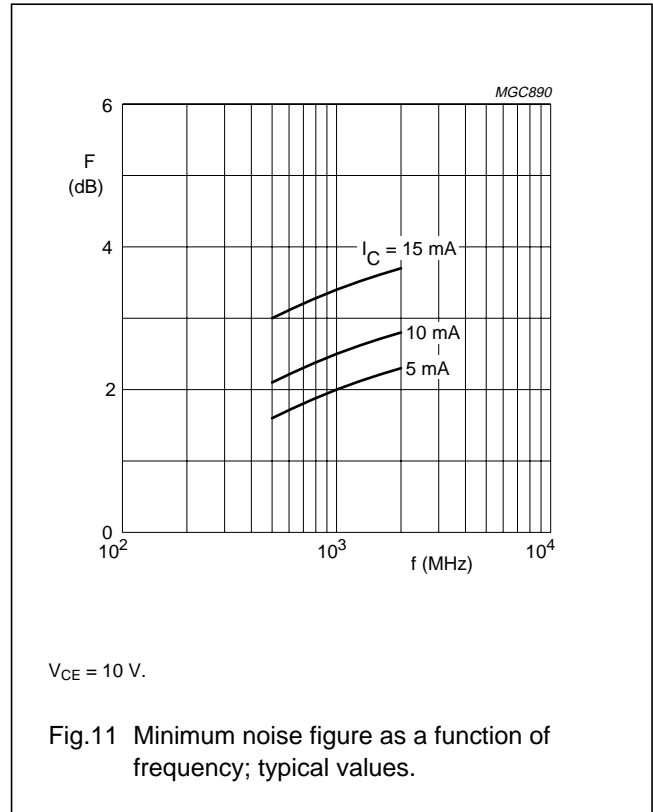
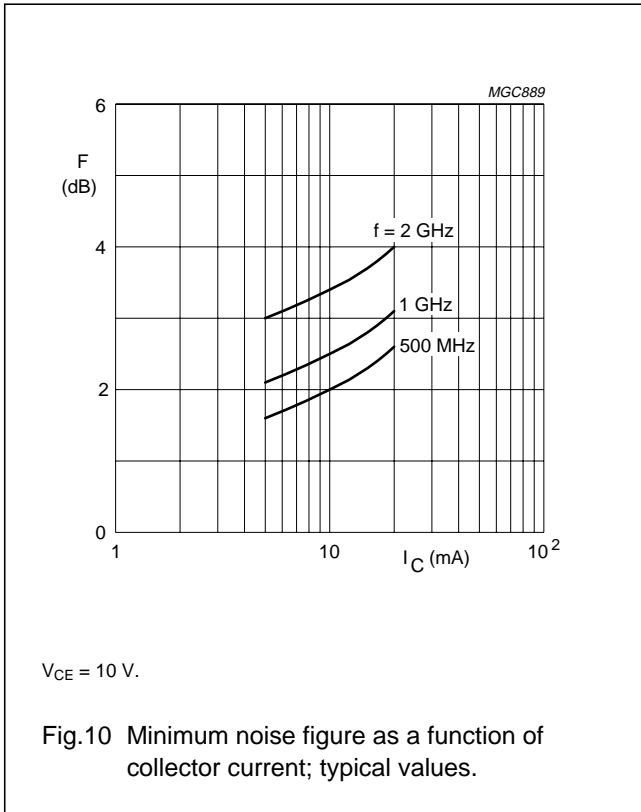
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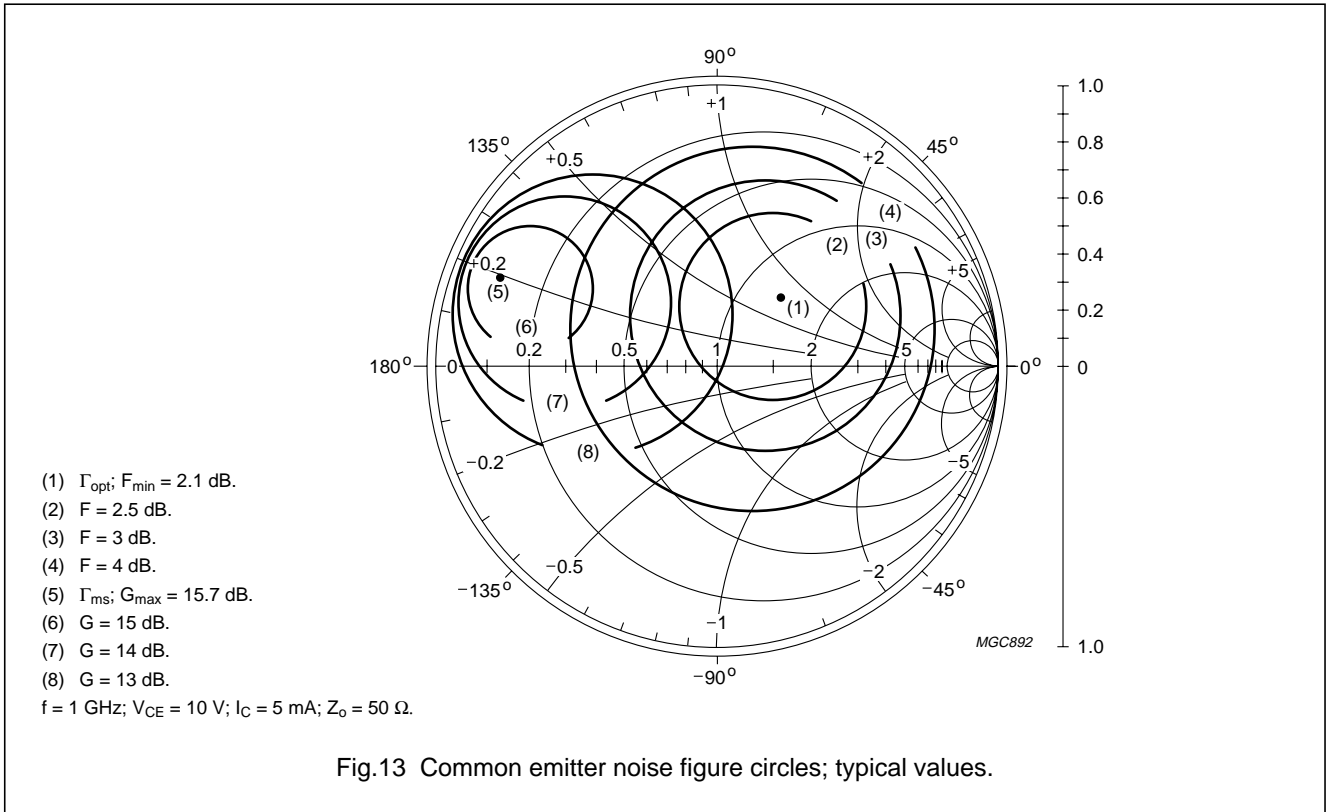


Fig.13 Common emitter noise figure circles; typical values.

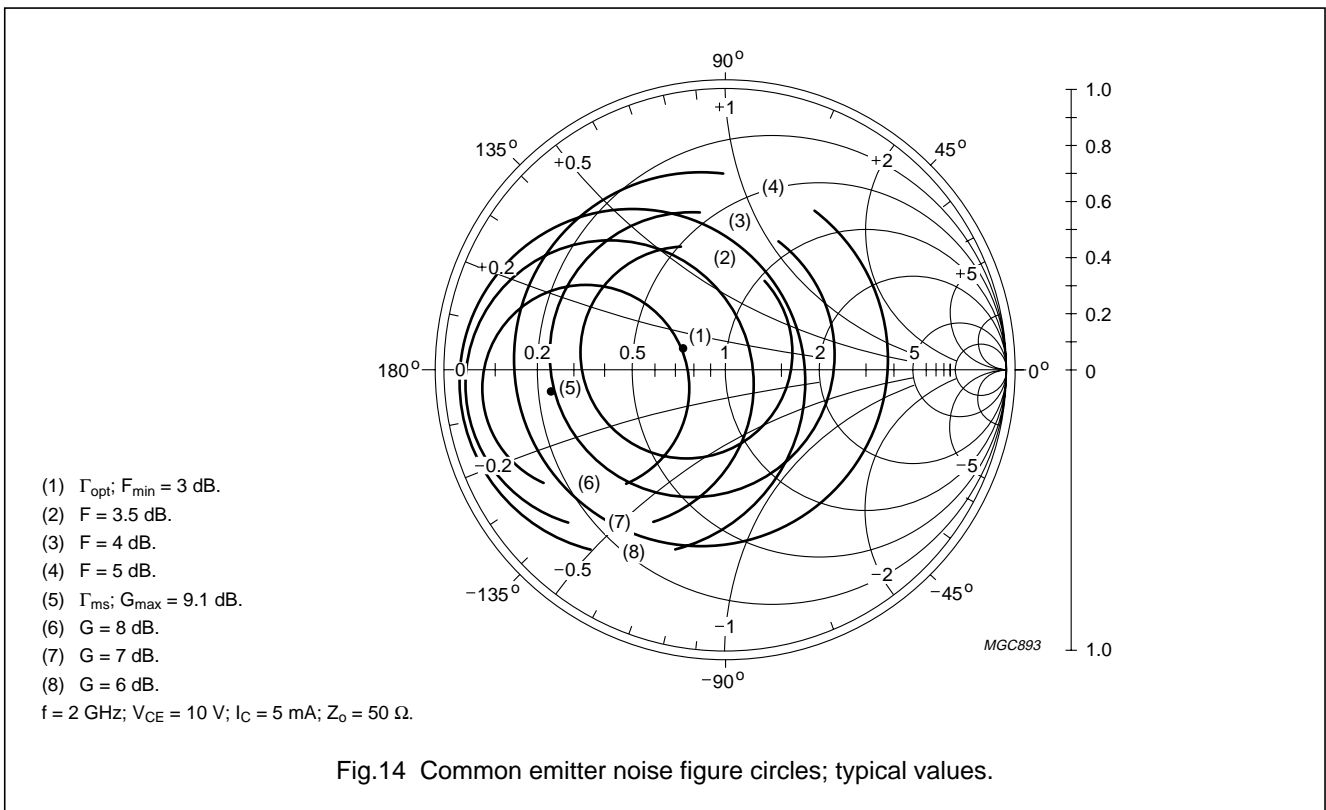
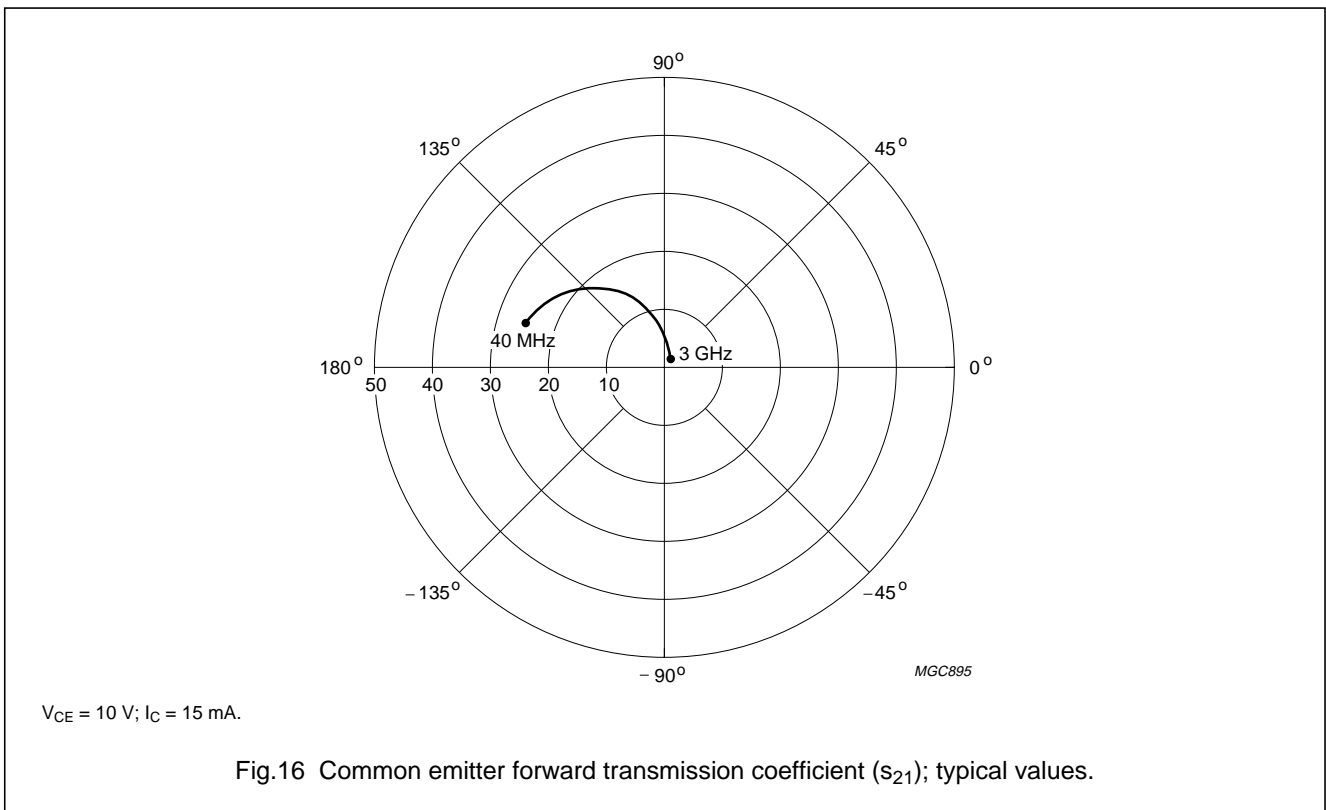
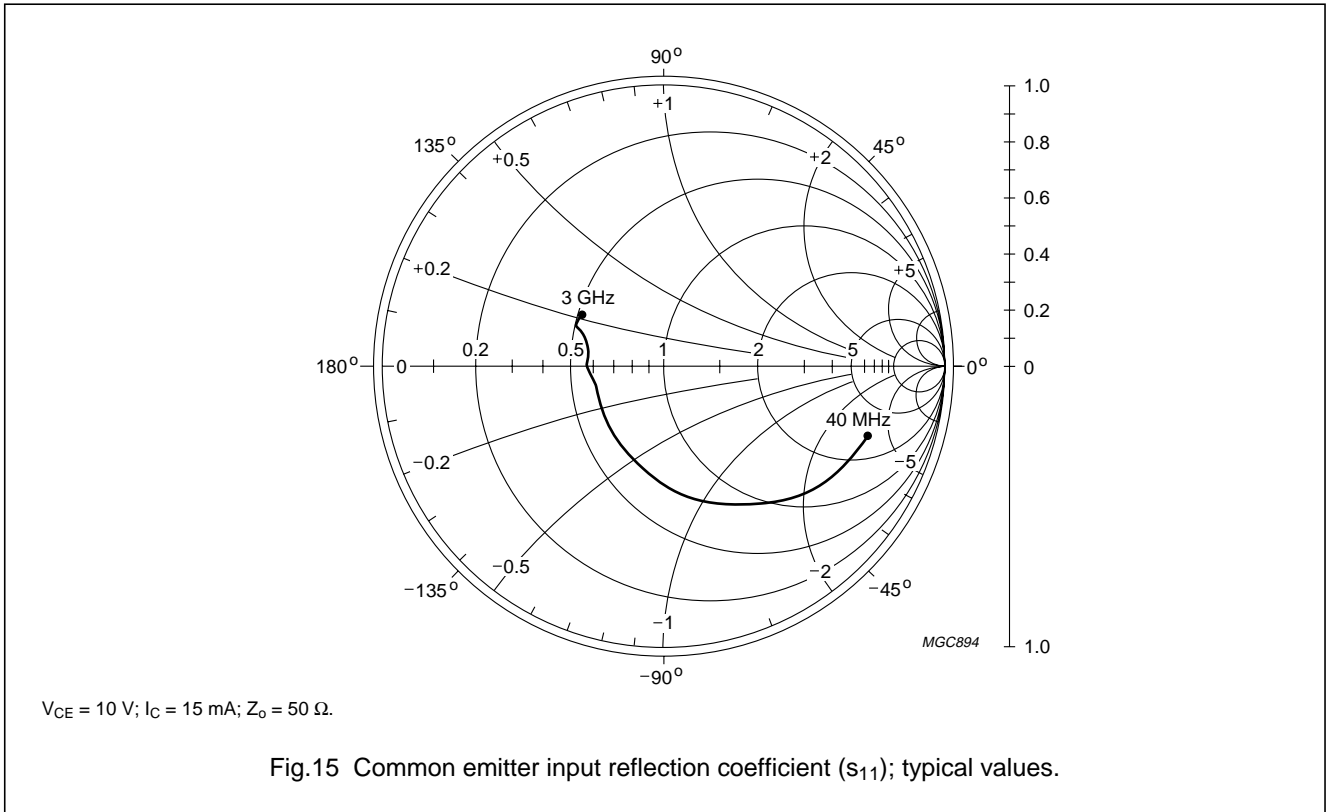


Fig.14 Common emitter noise figure circles; typical values.

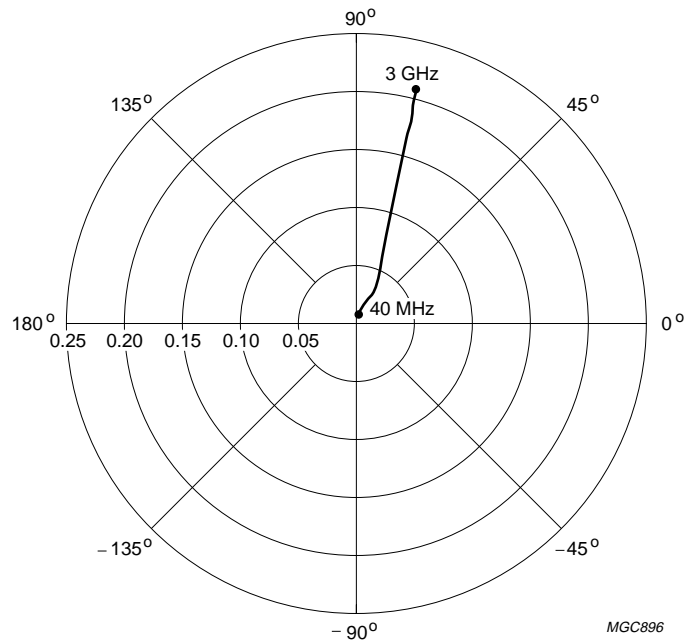
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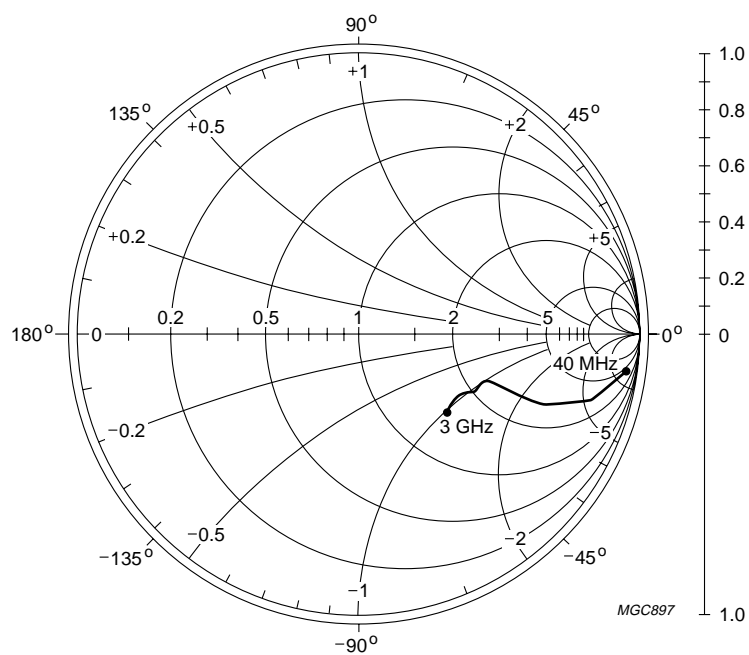
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$V_{CE} = 10\text{ V}; I_C = 15\text{ mA}$.

MGC896

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



$V_{CE} = 10\text{ V}; I_C = 15\text{ mA}; Z_0 = 50\ \Omega$.

MGC897

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

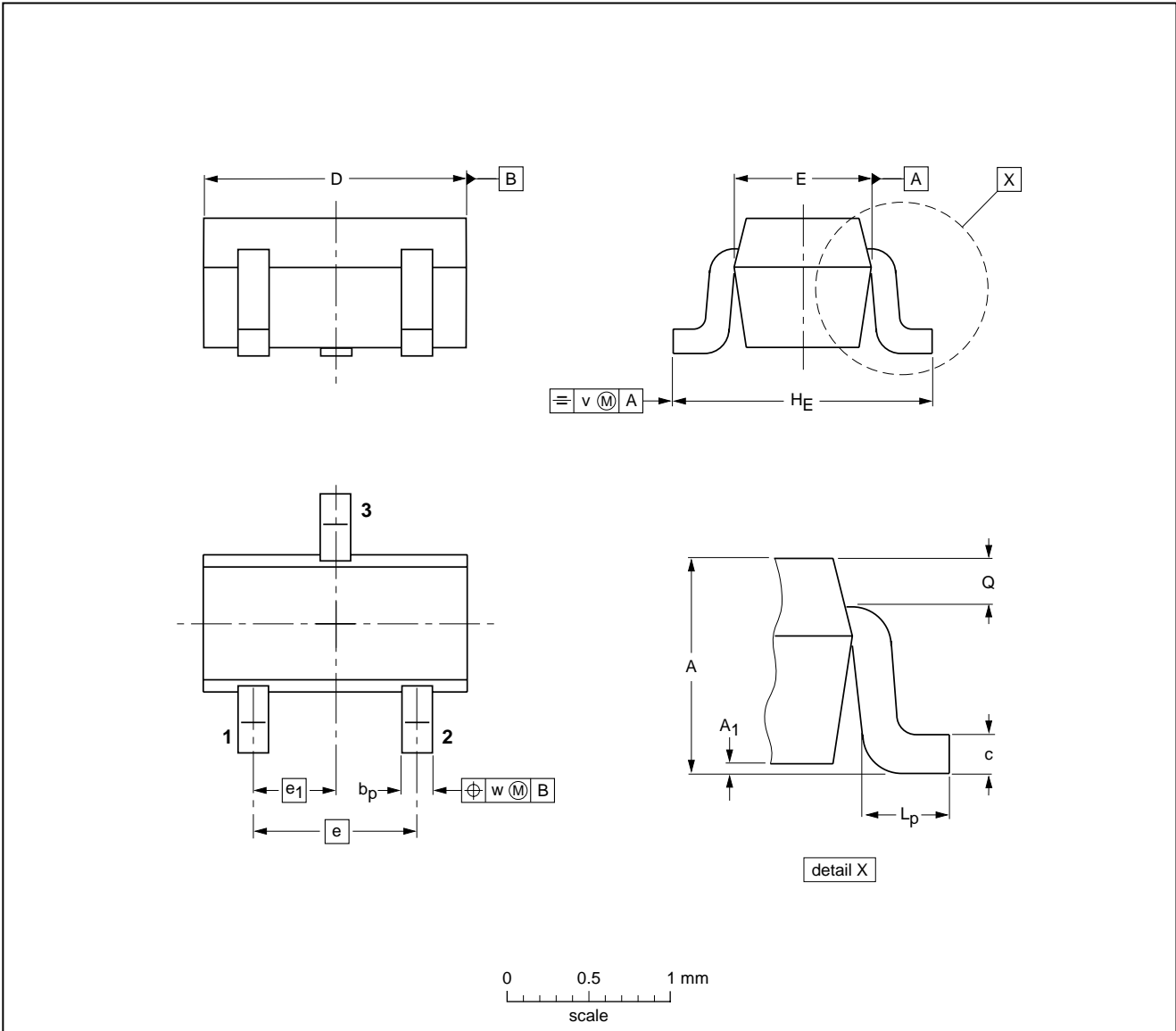
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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT416



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁ max	b _p	c	D	E	e	e ₁	H _E	L _p	Q	v	w
mm	0.95 0.60	0.1	0.30 0.15	0.25 0.10	1.8 1.4	0.9 0.7	1	0.5	1.75 1.45	0.45 0.15	0.23 0.13	0.2	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT416			SC-75			97-02-28

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DATA SHEET STATUS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS ⁽¹⁾
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

Note

1. Please consult the most recently issued data sheet before initiating or completing a design.

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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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Printed in The Netherlands

603508/02/pp16

Date of release: 2000 Mar 28

Document order number: 9397 750 06717

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