

DATA SHEET

BFS17A

NPN 3 GHz wideband transistor

Product specification

September 1995



NPN 3 GHz wideband transistor

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DESCRIPTION

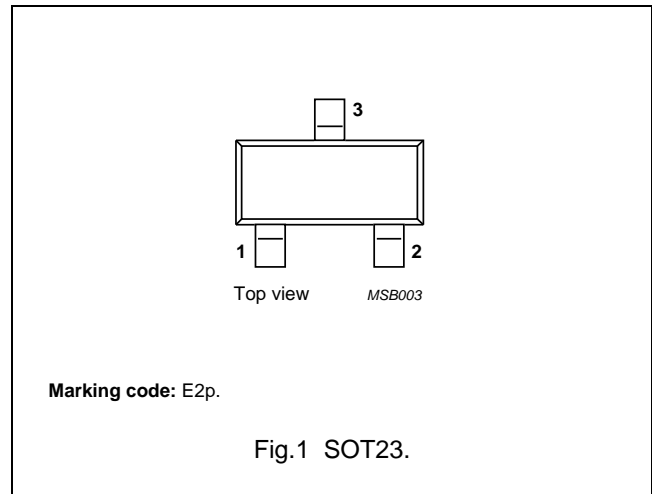
NPN transistor in a plastic SOT23 package.

APPLICATIONS

- It is intended for RF applications such as oscillators in TV tuners.

PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	25	V
V_{CEO}	collector-emitter voltage	open base	–	15	V
I_C	DC collector current		–	25	mA
P_{tot}	total power dissipation	up to $T_s = 70\text{ °C}$; note 1	–	300	mW
f_T	transition frequency	$I_C = 25\text{ mA}$; $V_{CE} = 5\text{ V}$; $f = 500\text{ MHz}$; $T_{amb} = 25\text{ °C}$	2.8	–	GHz
G_{UM}	maximum unilateral power gain	$I_C = 14\text{ mA}$; $V_{CE} = 10\text{ V}$; $f = 800\text{ MHz}$	13.5	–	dB
F	noise figure	$I_C = 2\text{ mA}$; $V_{CE} = 5\text{ V}$; $f = 800\text{ MHz}$; $T_{amb} = 25\text{ °C}$	2.5	–	dB
V_O	output voltage	$d_{im} = -60\text{ dB}$; $I_C = 14\text{ mA}$; $V_{CE} = 10\text{ V}$; $R_L = 75\text{ }\Omega$; $T_{amb} = 25\text{ °C}$; $f_{(p+q-r)} = 793.25\text{ MHz}$	150	–	mV

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	–	25	V
V_{CEO}	collector-emitter voltage	open base	–	15	V
V_{EBO}	emitter-base voltage	open collector	–	2.5	V
I_C	DC collector current		–	25	mA
I_{CM}	peak collector current		–	50	mA
P_{tot}	total power dissipation	up to $T_s = 70\text{ °C}$; note 1	–	300	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C

Note to the Quick reference data and the Limiting values

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

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THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to soldering point	up to $T_s = 70\text{ °C}$; note 1	260	K/W

Note

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

CHARACTERISTICS

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

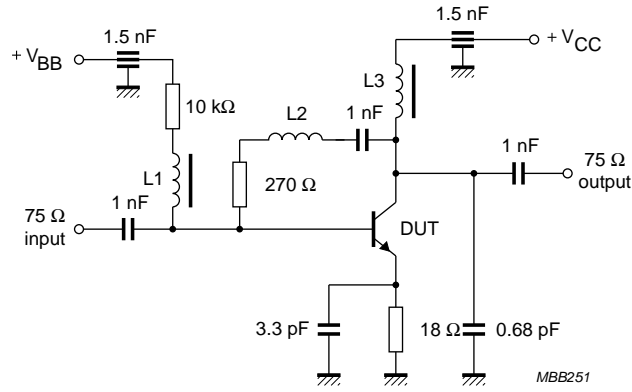
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current	$I_E = 0$; $V_{CB} = 10\text{ V}$	–	–	50	nA
h_{FE}	DC current gain	$I_C = 2\text{ mA}$; $V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ °C}$	25	90	–	
		$I_C = 25\text{ mA}$; $V_{CE} = 1\text{ V}$; $T_{amb} = 25\text{ °C}$	25	90	–	
f_T	transition frequency	$I_C = 25\text{ mA}$; $V_{CE} = 5\text{ V}$; $f = 500\text{ MHz}$; $T_{amb} = 25\text{ °C}$	–	2.8	–	GHz
C_c	collector capacitance	$I_E = 0$; $V_{CB} = 10\text{ V}$; $f = 1\text{ MHz}$; $T_{amb} = 25\text{ °C}$	–	0.7	–	pF
C_e	emitter capacitance	$I_C = 0$; $V_{EB} = 0.5\text{ V}$; $f = 1\text{ MHz}$	–	1.25	–	pF
C_{re}	feedback capacitance	$I_C = 0$; $V_{CE} = 5\text{ V}$; $f = 1\text{ MHz}$	–	0.6	–	pF
G_{UM}	maximum unilateral power gain note 1	$I_C = 14\text{ mA}$; $V_{CE} = 10\text{ V}$; $f = 800\text{ MHz}$	–	13.5	–	dB
F	noise figure	$I_C = 2\text{ mA}$; $V_{CE} = 5\text{ V}$; $Z_S = 60\text{ }\Omega$; $f = 800\text{ MHz}$; $T_{amb} = 25\text{ °C}$	–	2.5	–	dB
V_O	output voltage	note 2	–	150	–	mV

Notes

- 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.
- $d_{im} = -60\text{ dB}$ (DIN 45004B); $I_C = 14\text{ mA}$; $V_{CE} = 10\text{ V}$; $R_L = 75\text{ }\Omega$; $T_{amb} = 25\text{ °C}$;
 $V_p = V_O$; $f_p = 795.25\text{ MHz}$;
 $V_q = V_O - 6\text{ dB}$; $f_q = 803.25\text{ MHz}$;
 $V_r = V_O - 6\text{ dB}$; $f_r = 805.25\text{ MHz}$;
measured at $f_{(p+q-r)} = 793.25\text{ MHz}$.

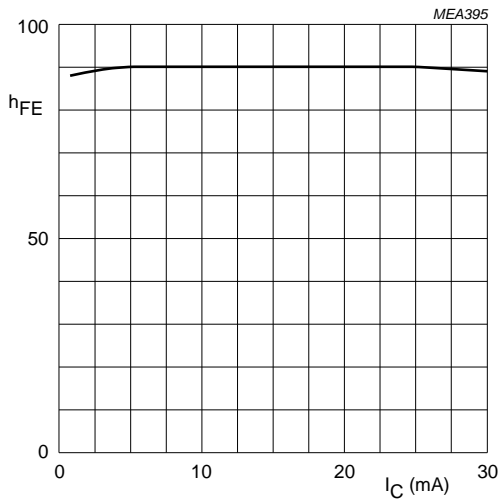
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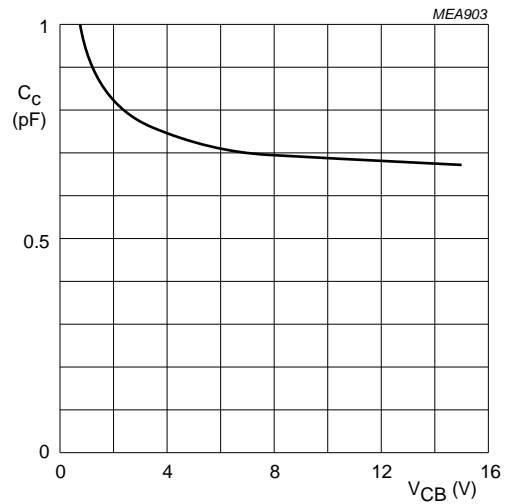
L1 = L3 = 5 μ H Ferroxcube choke.
 L2 = 3 turns 0.4 mm copper wire; winding pitch 1 mm; internal diameter 3 mm.

Fig.2 Intermodulation distortion and second order intermodulation distortion test circuit.



$V_{CE} = 1$ V; $T_{amb} = 25$ °C.

Fig.3 DC current gain as a function of collector current.

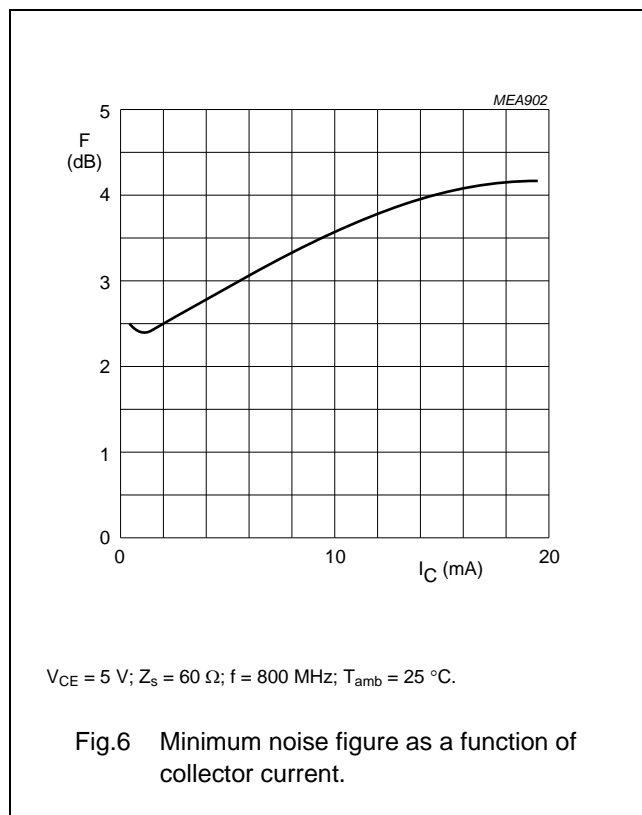
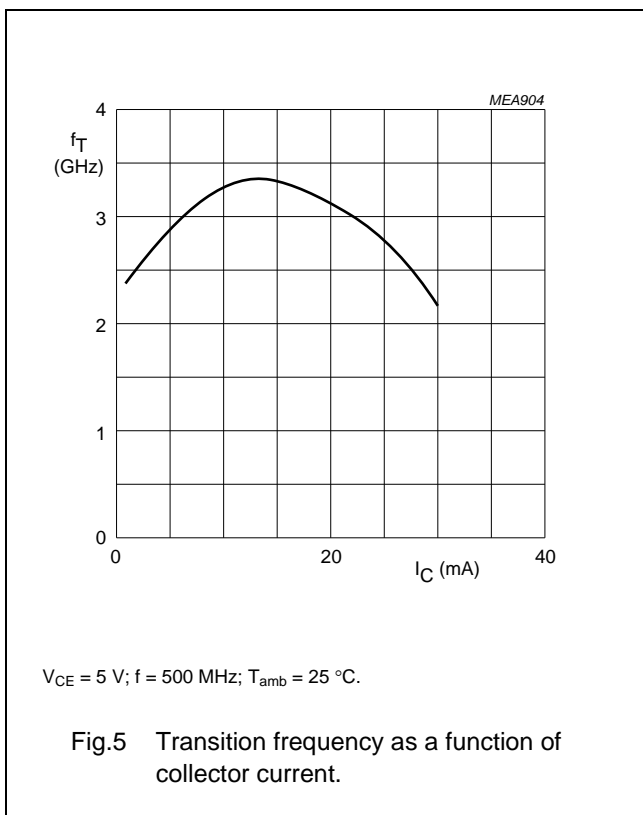


$I_E = 0$; $f = 1$ MHz; $T_{amb} = 25$ °C.

Fig.4 Collector capacitance as a function of collector-base voltage.

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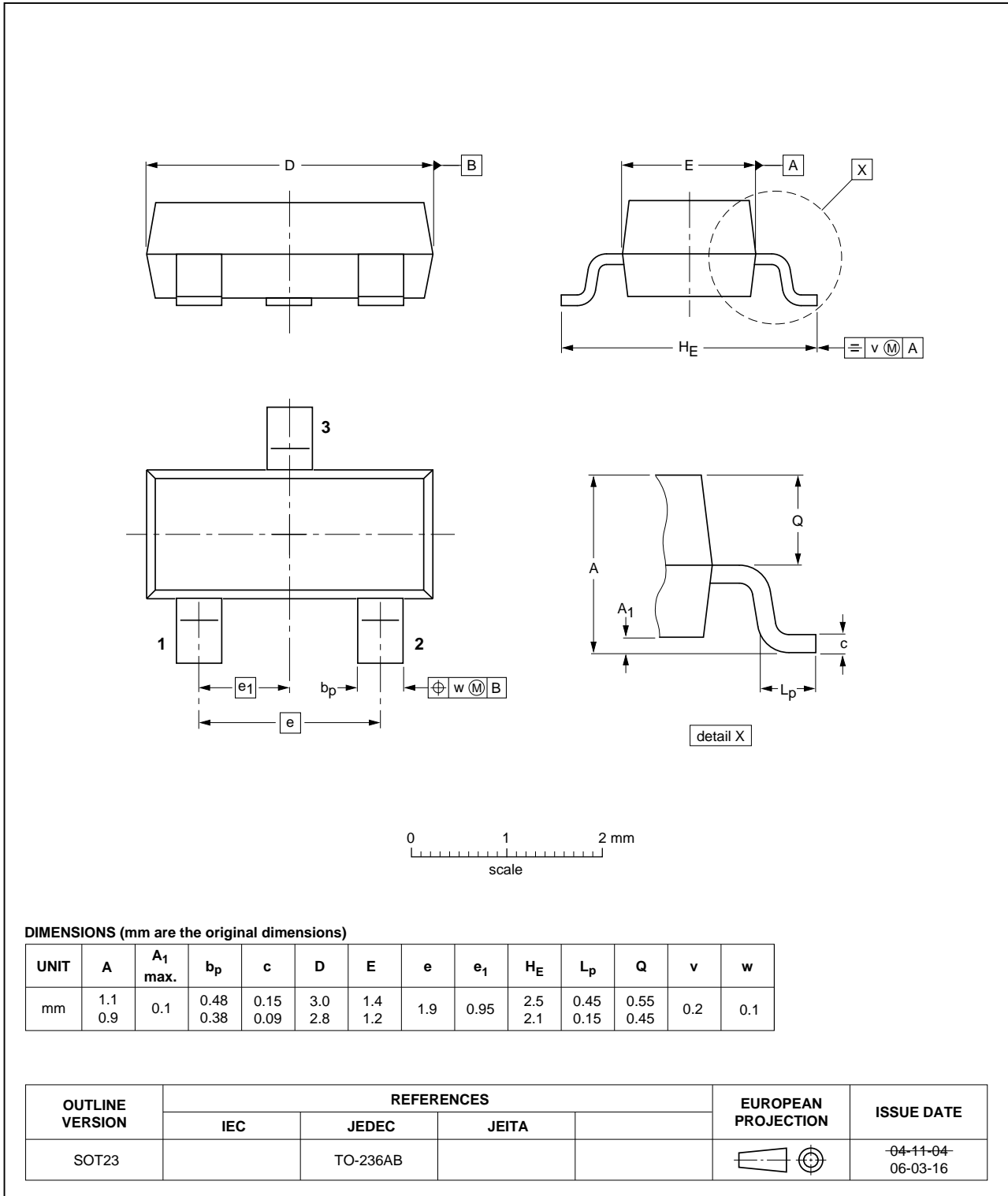
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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



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DATA SHEET STATUS

DOCUMENT STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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