

# DATA SHEET

**BFS17A**

**NPN 3 GHz wideband transistor**

Product specification

September 1995



# NPN 3 GHz wideband transistor

# BFS17A

## DESCRIPTION

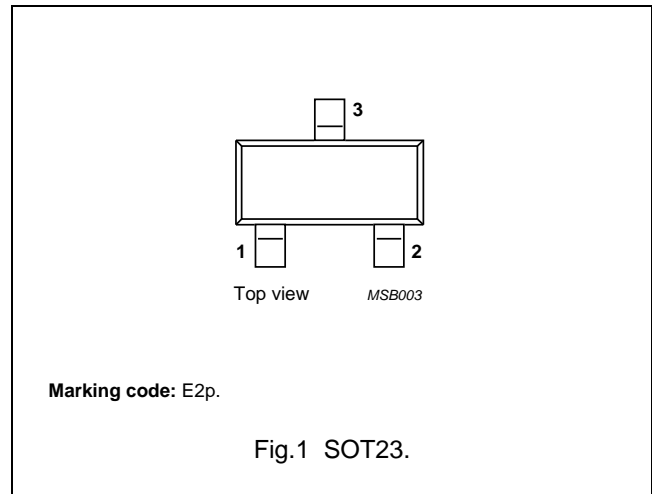
NPN transistor in a plastic SOT23 package.

## 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.

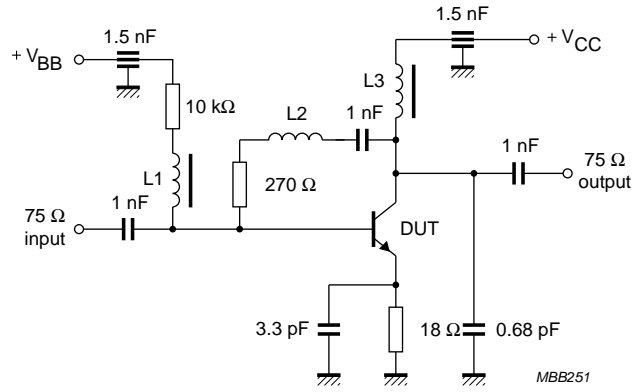
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector cut-off current	$I_E = 0$ ; $V_{CB} = 10\text{ V}$	–	–	50	nA
$h_{FE}$	DC current gain	$I_C = 2\text{ mA}$ ; $V_{CE} = 1\text{ V}$ ; $T_{amb} = 25\text{ °C}$	25	90	–	
		$I_C = 25\text{ mA}$ ; $V_{CE} = 1\text{ V}$ ; $T_{amb} = 25\text{ °C}$	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  $f_{(p+q-r)} = 793.25\text{ MHz}$ .

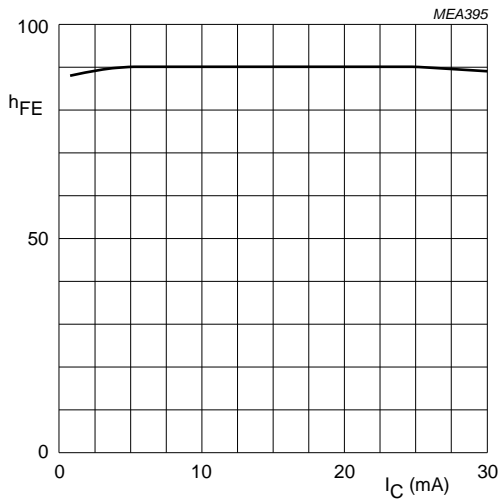
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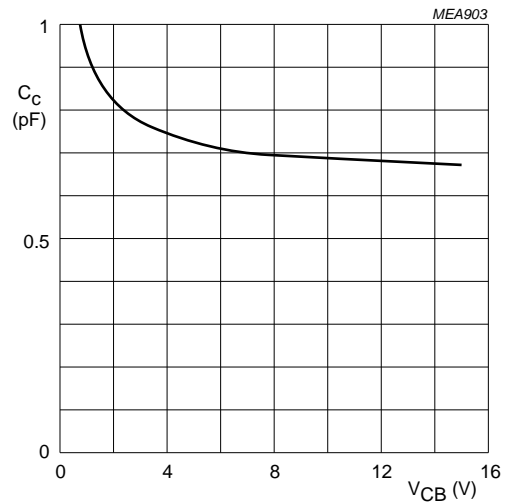
L1 = L3 = 5  $\mu$ H Ferroxcube choke.  
 L2 = 3 turns 0.4 mm copper wire; winding pitch 1 mm; internal diameter 3 mm.

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.

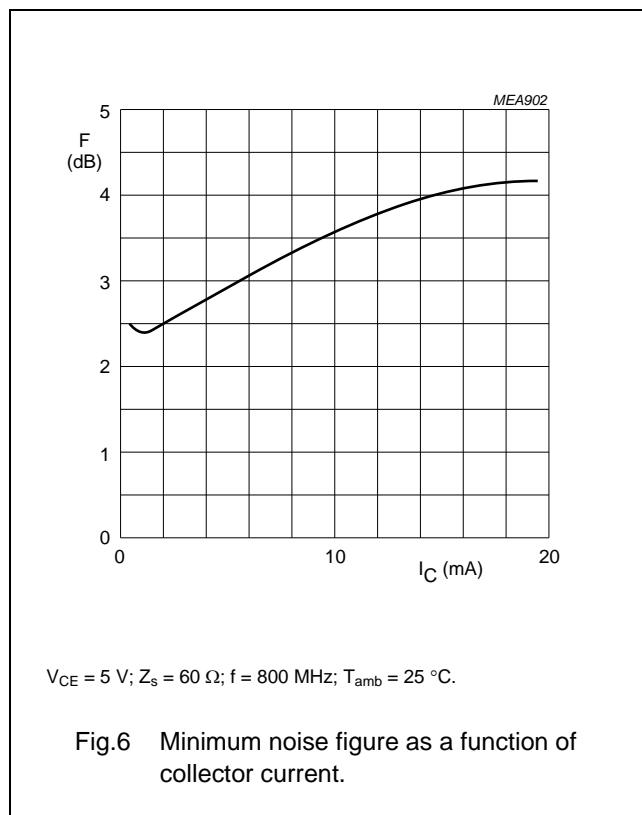
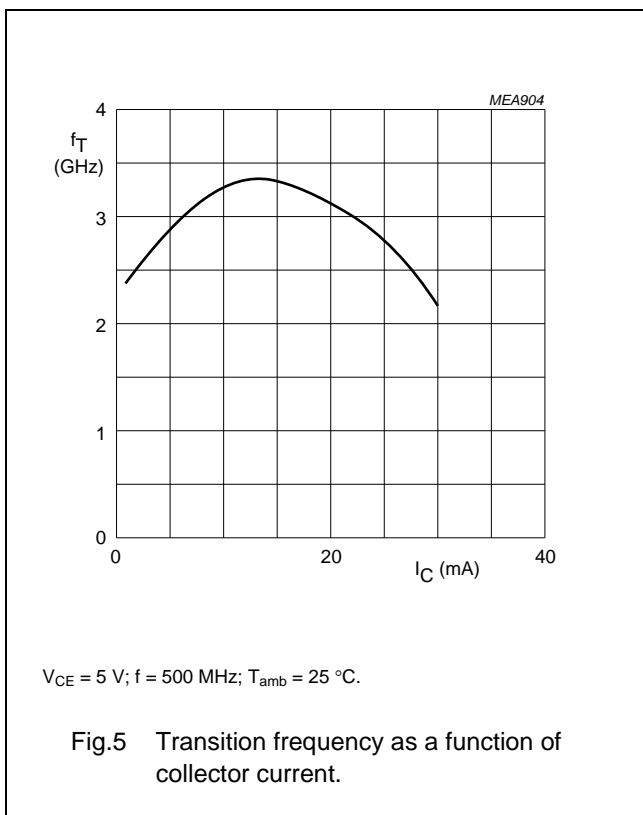


$I_E = 0$ ;  $f = 1$  MHz;  $T_{amb} = 25$  °C.

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

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PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23

