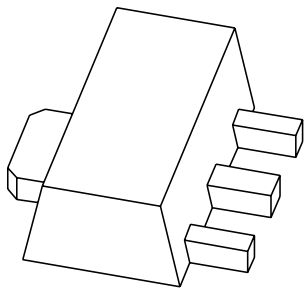


DATA SHEET



BFQ540

NPN wideband dual transistor

Product specification
Supersedes data of 1995 Sep 04
File under Discrete Semiconductors, SC14

1998 Aug 27

NPN wideband dual transistor

BFQ540

FEATURES

- High gain
- High output voltage
- Low noise
- Gold metallization ensures excellent reliability
- Low thermal resistance.

APPLICATIONS

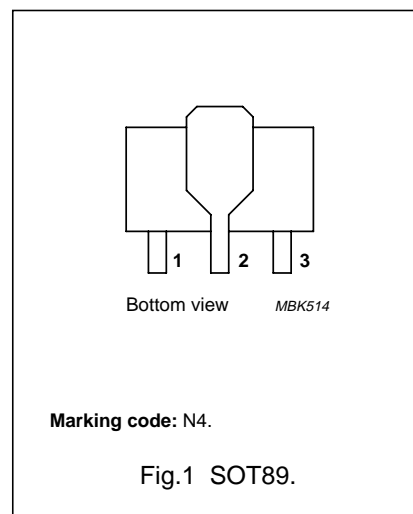
- VHF, UHF and CATV amplifiers.

DESCRIPTION

NPN wideband dual transistor in a plastic SOT89 package.

PINNING

PIN	DESCRIPTION
1	emitter
2	collector
3	base



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	–	20	V
V_{CES}	collector-emitter voltage	$R_{BE} = 0$	–	–	15	V
V_{EBO}	collector-base voltage	open collector	–	–	2	V
I_C	collector current (DC)		–	–	120	mA
P_{tot}	total power dissipation	$T_s \leq 60\text{ °C}$; note 1	–	–	1.2	W
h_{FE}	DC current gain	$I_C = 40\text{ mA}$; $V_{CE} = 8\text{ V}$; $T_j = 25\text{ °C}$	60	120	250	
f_T	transition frequency	$I_C = 40\text{ mA}$; $V_{CE} = 8\text{ V}$; $f = 1\text{ GHz}$; $T_{amb} = 25\text{ °C}$	–	9	–	GHz
$ S_{21} ^2$	insertion power gain	$I_C = 40\text{ mA}$; $V_{CE} = 8\text{ V}$; $f = 900\text{ MHz}$; $T_{amb} = 25\text{ °C}$	12	13	–	dB
F	noise figure	$I_C = 40\text{ mA}$; $V_{CE} = 8\text{ V}$; $f = 900\text{ MHz}$; $\Gamma_S = \Gamma_{opt}$	–	1.9	2.4	dB

Note

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

NPN wideband dual transistor

BFQ540

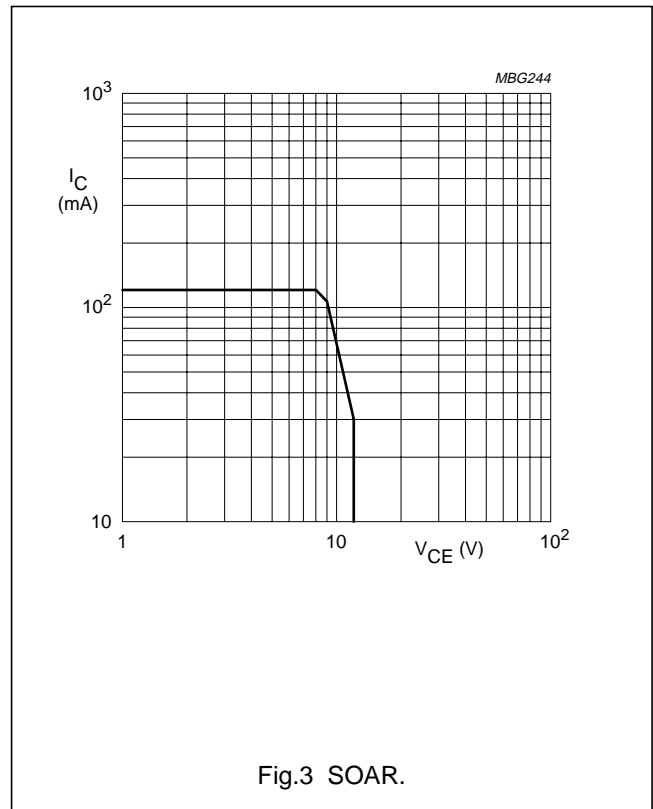
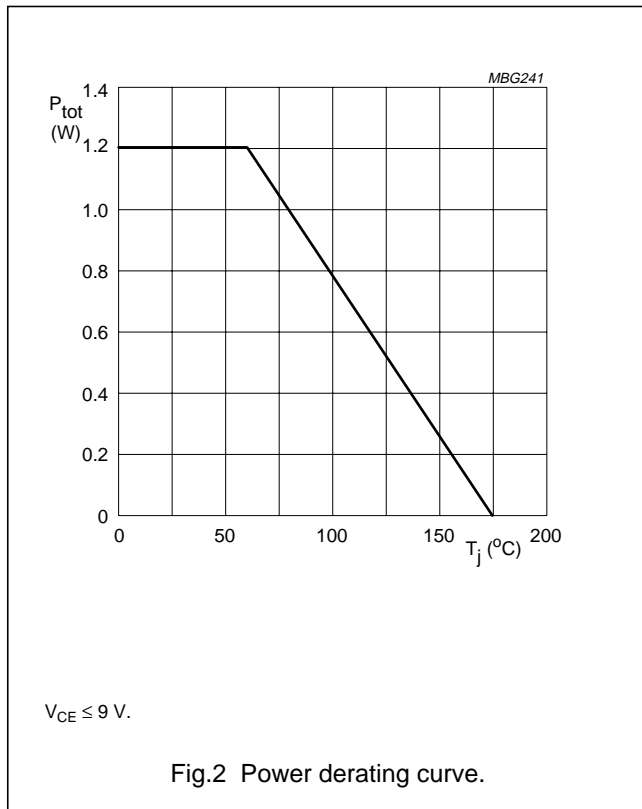
LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	20	V
V_{CES}	collector-emitter voltage	$R_{BE} = 0$	–	15	V
V_{EBO}	emitter-base voltage	open collector	–	2	V
I_C	collector current (DC)		–	120	mA
P_{tot}	total power dissipation	$T_s \leq 60\text{ }^\circ\text{C}$	–	1.2	W
T_{stg}	storage temperature		–65	+150	$^\circ\text{C}$
T_j	operating junction temperature		–	175	$^\circ\text{C}$

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to soldering point	$T_s \leq 60\text{ }^\circ\text{C}; P_{tot} = 1.2\text{ W}$	95	K/W



NPN wideband dual transistor

BFQ540

CHARACTERISTICS

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

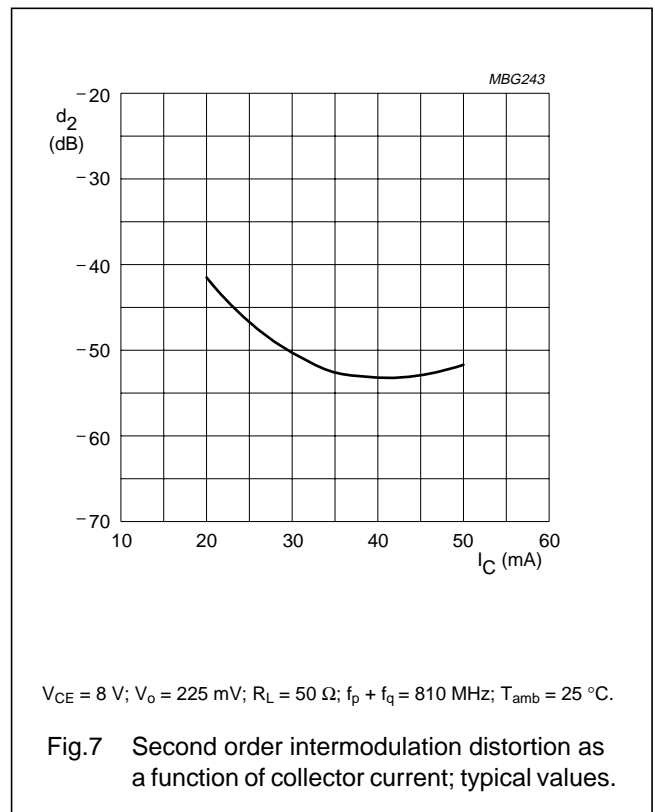
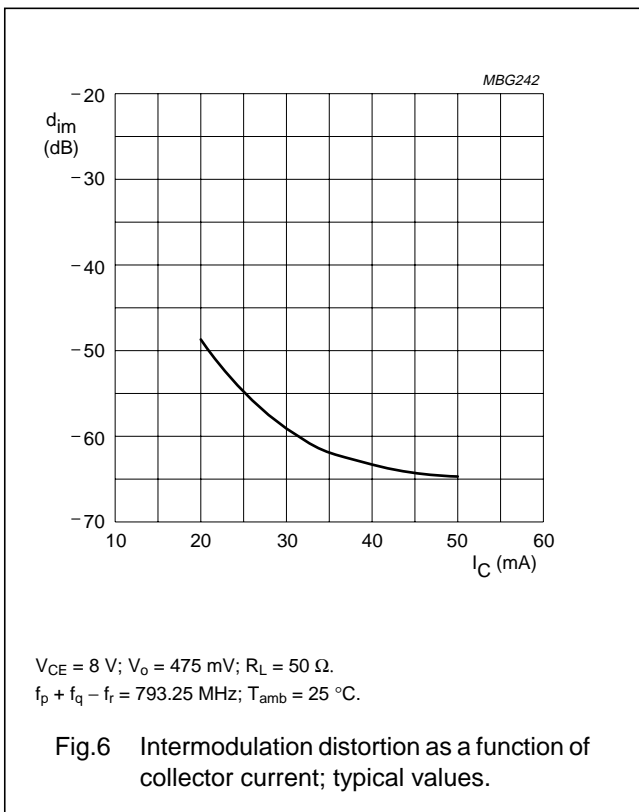
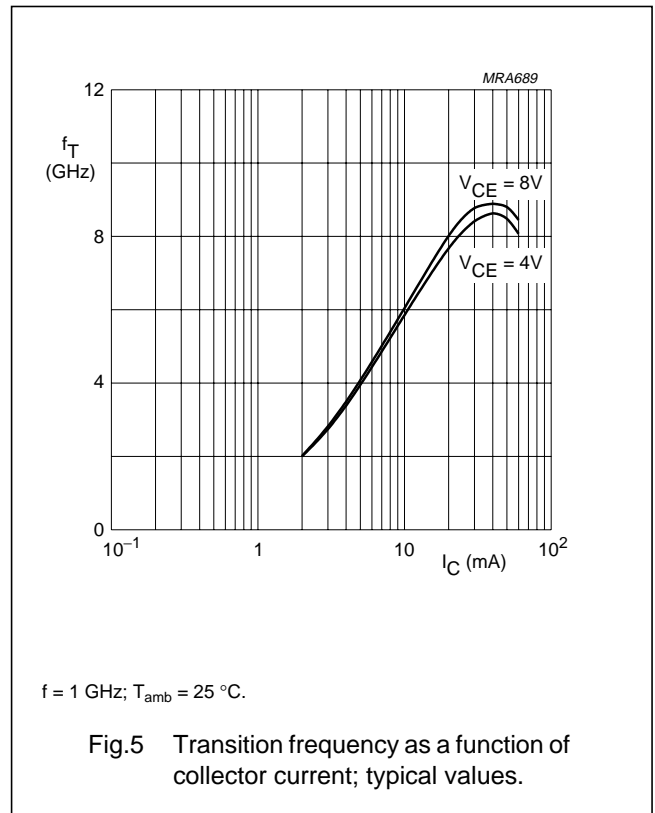
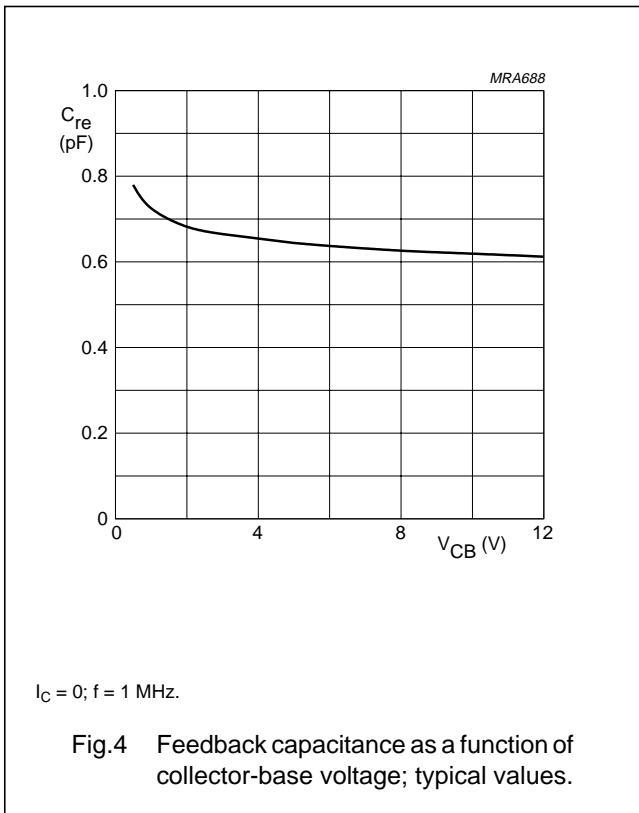
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; $I_C = 10\text{ }\mu\text{A}$; $I_E = 0$	20	–	–	V
$V_{(BR)CES}$	collector-emitter breakdown voltage	$R_{BE} = 0$; $I_C = 40\text{ }\mu\text{A}$	15	–	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	$I_E = 100\text{ }\mu\text{A}$; $I_C = 0$	2	–	–	V
I_{CBO}	collector-base leakage current	$V_{CB} = 8\text{ V}$; $I_E = 0$	–	–	50	nA
I_{EBO}	emitter-base leakage current	$V_{CB} = 1\text{ V}$; $I_C = 0$	–	–	200	nA
h_{FE}	DC current gain	$I_C = 40\text{ mA}$; $V_{CE} = 8\text{ V}$	60	120	250	
f_T	transition frequency	$I_C = 40\text{ mA}$; $V_{CE} = 8\text{ V}$; $f_m = 1\text{ GHz}$	–	9	–	GHz
C_e	emitter capacitance	$I_C = I_e = 0$; $V_{EB} = 0.5\text{ V}$; $f = 1\text{ MHz}$	–	2	–	pF
C_{re}	feedback capacitance	$I_C = 0$; $V_{CE} = 8\text{ V}$; $f = 1\text{ MHz}$	–	0.9	–	pF
$ S_{21} ^2$	insertion power gain	$I_C = 40\text{ mA}$; $V_{CE} = 8\text{ V}$; $f = 900\text{ MHz}$; $T_{amb} = 25\text{ }^\circ\text{C}$	12	13	–	dB
V_o	output voltage	note 1	–	500	–	mV
		note 2	–	350	–	mV
d_2	second order intermodulation distortion	note 3	–	–	–53	dB
F	noise figure	$I_C = 40\text{ mA}$; $V_{CE} = 8\text{ V}$; $f = 900\text{ MHz}$; $\Gamma_S = \Gamma_{opt}$	–	1.9	2.4	dB

Notes

- $d_{im} = -60\text{ dB}$ (DIN45004B); $V_{CE} = 8\text{ V}$; $I_C = 40\text{ mA}$; $R_L = 50\text{ }\Omega$;
 $V_p = V_o$; $V_q = V_o - 6\text{ dB}$; $V_r = V_o - 6\text{ dB}$;
 $f_p = 795.25\text{ MHz}$; $f_q = 803.25\text{ MHz}$; $f_r = 805.5\text{ MHz}$;
measured at $f_p + f_q - f_r = 793.25\text{ MHz}$.
- $d_{im} = -60\text{ dB}$ (DIN 45004B); $I_C = 40\text{ mA}$; $V_{CE} = 8\text{ V}$; $R_L = 50\text{ }\Omega$;
 $V_p = V_q = V_o$; $f_p = 806\text{ MHz}$; $f_q = 810\text{ MHz}$;
measured at $2f_p - f_q = 802\text{ MHz}$.
- $I_C = 40\text{ mA}$; $V_{CE} = 8\text{ V}$; $R_L = 50\text{ }\Omega$;
 $V_p = V_q = 225\text{ mV}$; $f_p = 250\text{ MHz}$; $f_q = 560\text{ MHz}$;
measured at $f_p + f_q = 810\text{ MHz}$.

NPN wideband dual transistor

BFQ540



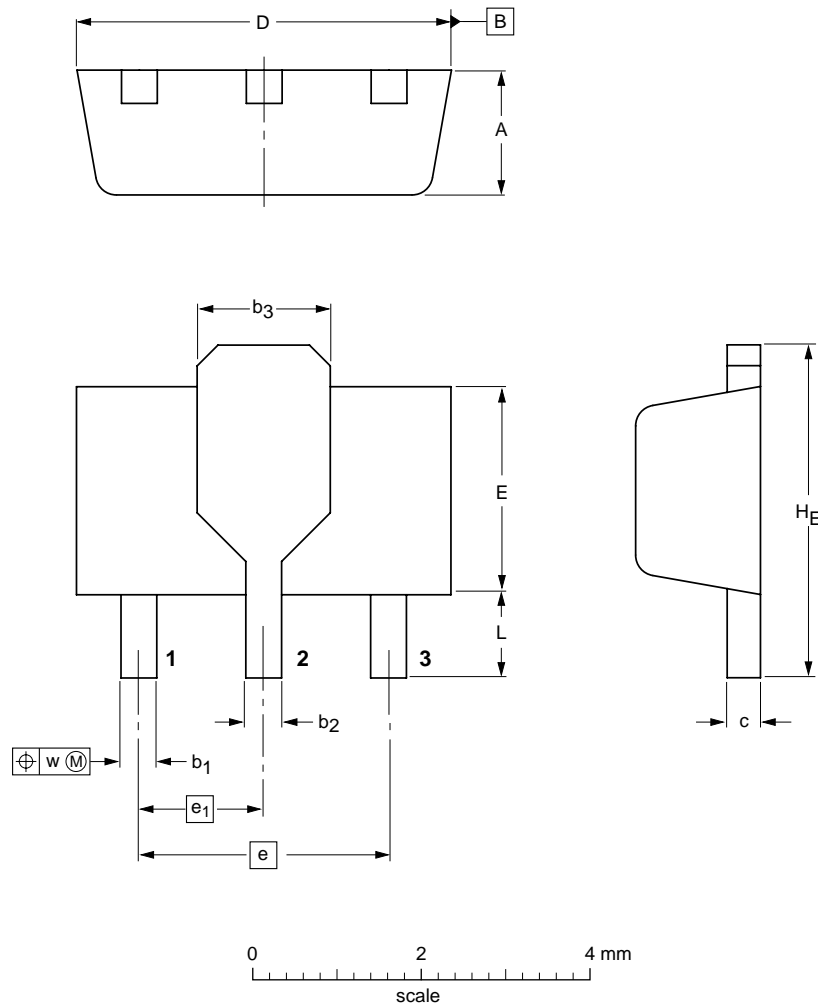
NPN wideband dual transistor

BFQ540

PACKAGE OUTLINE

Plastic surface mounted package; collector pad for good heat transfer; 3 leads

SOT89



DIMENSIONS (mm are the original dimensions)

UNIT	A	b ₁	b ₂	b ₃	c	D	E	e	e ₁	H _E	L min.	w
mm	1.6 1.4	0.48 0.35	0.53 0.40	1.8 1.4	0.44 0.37	4.6 4.4	2.6 2.4	3.0	1.5	4.25 3.75	0.8	0.13

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT89						97-02-28

NPN wideband dual transistor

BFQ540

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.
Short-form specification	The data in this specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.
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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