

UHF power transistor

BFG10W/X

FEATURES

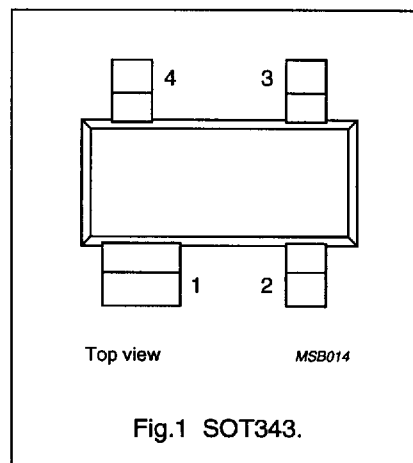
- To be supplied.

APPLICATIONS

- Common emitter class-AB operation in hand-held radio equipment up to 1.9 GHz.

PINNING

PIN	DESCRIPTION
1	collector
2	emitter
3	base
4	emitter



DESCRIPTION

NPN silicon planar epitaxial transistor encapsulated in a plastic, 4-pin dual-emitter SOT343 package.

QUICK REFERENCE DATA

RF performance at $T_{amb} = 25\text{ °C}$ in a common-emitter test circuit.

MODE OF OPERATION	f (GHz)	V_{CE} (V)	P_L (mW)	G_p (dB)	η_c (%)
Pulsed, class-AB, duty cycle: < 1 : 8	1.9	3.6	200	≥ 5	≥ 50
	0.9	6	650	≥ 10	≥ 50
	1.8	6	650	≥ 5	≥ 50

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_{CEO}	collector-emitter voltage	open base	—	10	V
V_{EBO}	emitter-base voltage	open collector	—	2.5	V
I_C	collector current (DC)		—	250	mA
$I_{C(AV)}$	average collector current		—	250	mA
P_{tot}	total power dissipation	up to $T_s = 85\text{ °C}$; note 1	—	400	mW
T_{stg}	storage temperature		-65	+150	°C
T_j	junction temperature		—	175	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to soldering point	up to $T_s = 85\text{ °C}$; note 1; $P_{tot} = 400\text{ mW}$	210	K/W

Note to the Limiting values and Thermal characteristics

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

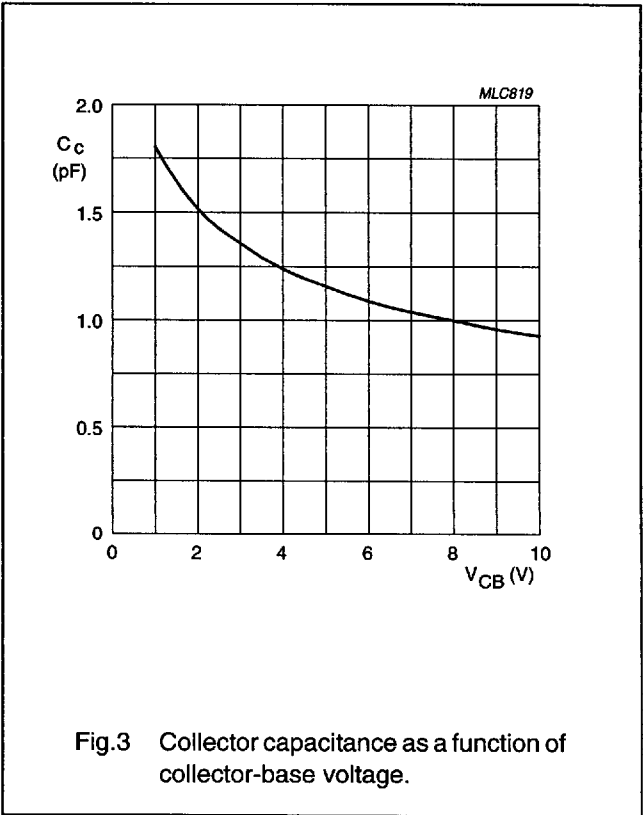
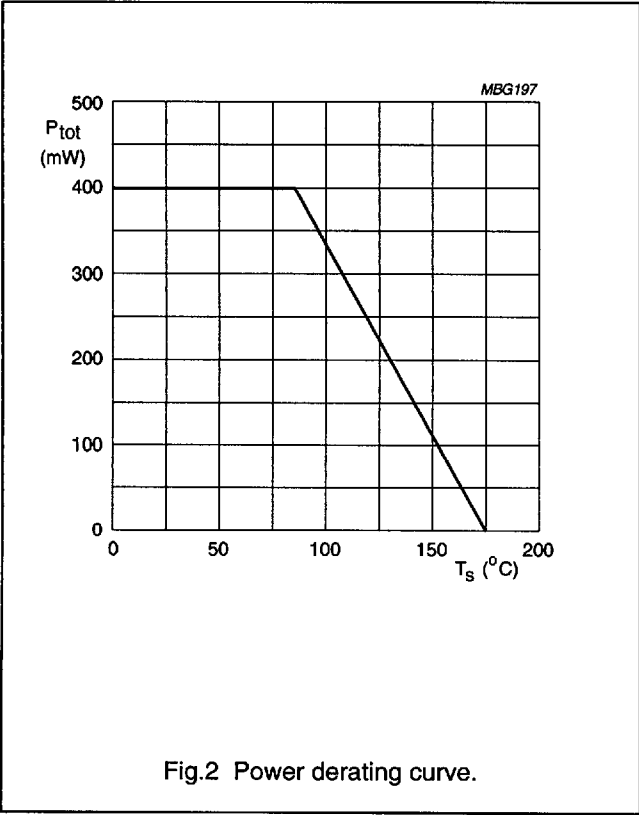
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CHARACTERISTICS

T_j = 25 °C (unless otherwise specified).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{(BR)CBO}	collector-base breakdown voltage	open emitter; I _C = 0.1 mA	20	–	V
V _{(BR)CEO}	collector-emitter breakdown voltage	open base; I _C = 5 mA	10	–	V
V _{(BR)EBO}	emitter-base breakdown voltage	open collector; I _E = 0.1 mA	2.5	–	V
I _{CES}	collector cut-off current	V _{CE} = 6 V; V _{BE} = 0	–	100	μA
h _{FE}	DC current gain	I _C = 50 mA; V _{CE} = 5 V	25	–	
C _c	collector capacitance	I _E = i _e = 0; V _{CB} = 6 V; f = 1 MHz	–	3	pF
C _{re}	feedback capacitance	I _C = 0; V _{CE} = 6 V; f = 1 MHz	–	2	pF



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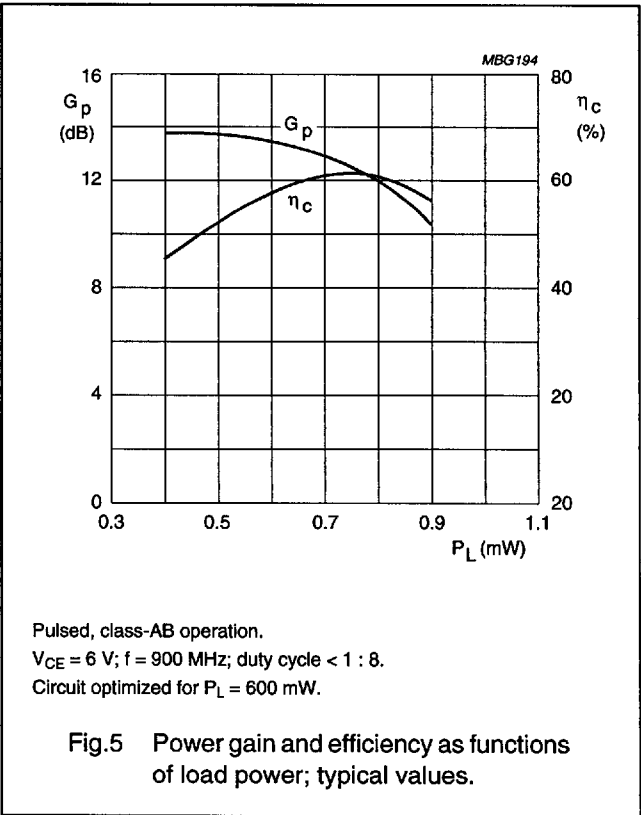
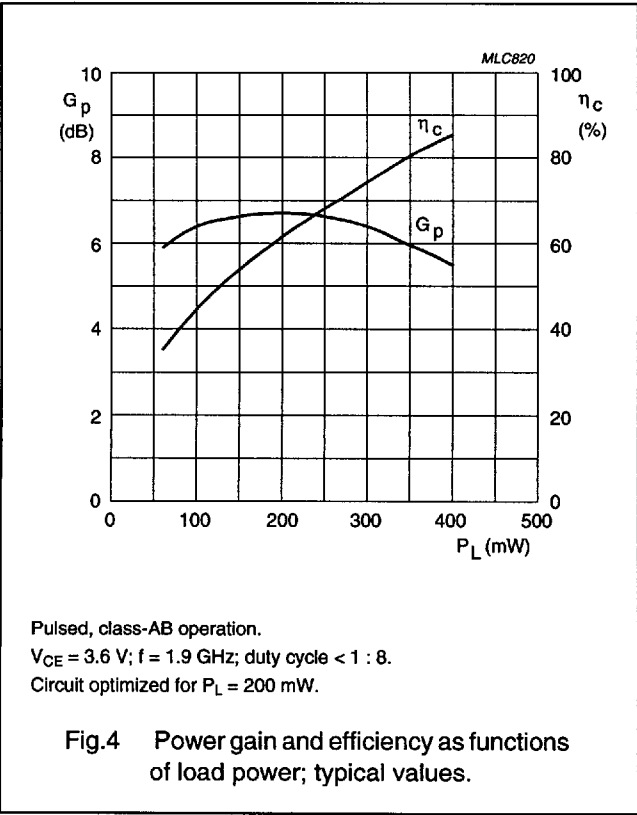
APPLICATION INFORMATION

RF performance at $T_{amb} = 25\text{ }^{\circ}\text{C}$ in a common-emitter test circuit.

MODE OF OPERATION	f (GHz)	V _{CE} (V)	P _L (mW)	G _p (dB)	η _c (%)
Pulsed, class-AB, duty cycle: < 1 : 8	1.9	3.6	200	≥5; typ. 7	≥50; typ. 60
	0.9	6	650	≥10	≥50
	1.8	6	650	≥5	≥50

Ruggedness in class-AB operation

The BFG10W/X is capable of withstanding a load mismatch corresponding to VSWR = 6 : 1 through all phases, at rated output power under pulsed conditions up to a supply voltage of 8.6 V, $t_p = 4.6\text{ ms}$ and a duty cycle of 1 : 8.



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SPICE parameters for the BFG10 crystal

SEQUENCE No.	PARAMETER	VALUE	UNIT
1	IS	2.714	fA
2	BF	102.8	–
3	NF	0.998	–
4	VAF	28.12	V
5	IKF	60.09	A
6	ISE	403.2	pA
7	NE	2.937	–
8	BR	31.01	–
9	NR	0.999	–
10	VAR	2.889	V
11	IKR	0.284	A
12	ISC	1.487	fA
13	NC	1.100	–
14	RB	3.500	Ω
15	IRB	1.000	μA
16	RBM	3.500	Ω
17	RE	0.217	Ω
18	RC	0.196	Ω
19 ⁽¹⁾	XTB	0.000	–
20 ⁽¹⁾	EG	1.110	eV
21 ⁽¹⁾	XTI	3.000	–
22	CJE	5.125	pF
23	VJE	0.600	V
24	MJE	0.367	–
25	TF	12.07	ps
26	XTF	99.40	–
27	VTF	7.220	V
28	ITF	3.950	A
29	PTF	0.000	deg
30	CJC	2.327	pF
31	VJC	0.668	V
32	MJC	0.398	–
33	XCJC	0.160	–
34 ⁽¹⁾	TR	0.000	ns
35 ⁽¹⁾	CJS	0.000	F
36 ⁽¹⁾	VJS	750.0	mV
37 ⁽¹⁾	MJS	0.000	–
38	FC	0.652	–

Note

1. These parameters have not been extracted, the default values are shown.

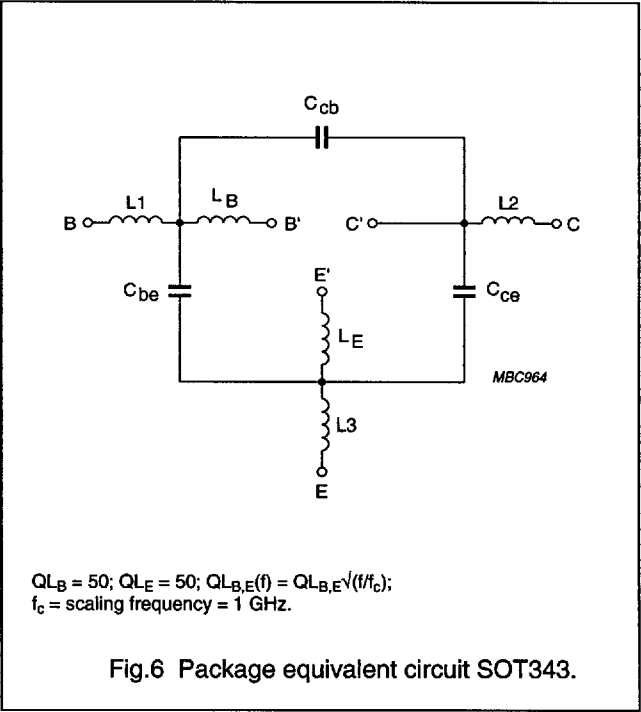


Fig.6 Package equivalent circuit SOT343.

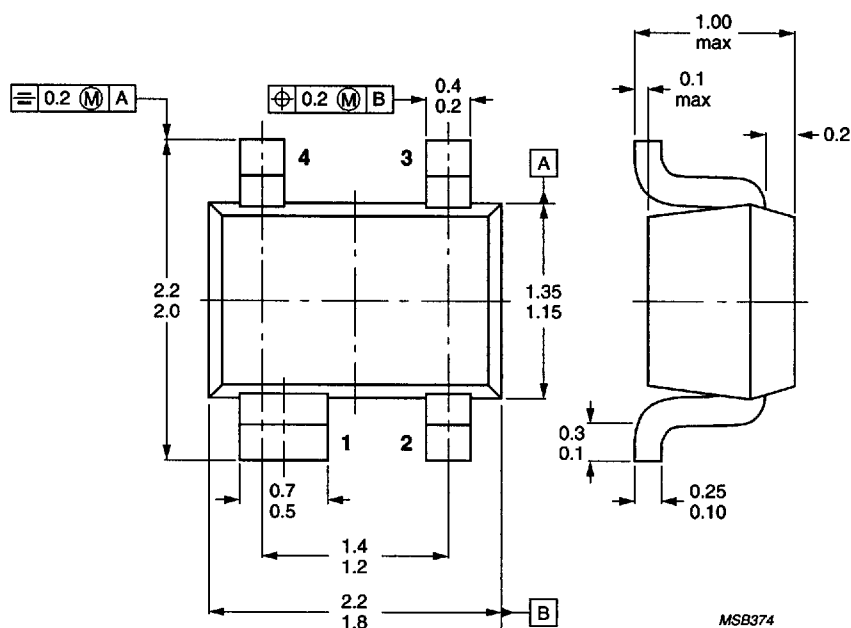
List of components (see Fig.6)

DESIGNATION	VALUE	UNIT
C _{be}	70	fF
C _{cb}	50	fF
C _{ce}	115	fF
L1	0.34	nH
L2	0.10	nH
L3	0.25	nH
L _B	0.40	nH
L _E	0.40	nH

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PACKAGE OUTLINE



Dimensions in mm.

Fig.7 SOT343.