NPN Silicon RF Transistor*

- For low noise, high-gain broadband amplifiers at collector currents from 2 mA to 30 mA
- f_T = 8 GHz, F = 0.9 dB at 900 MHz

* Short term description

ESD (**E**lectro**s**tatic **d**ischarge) sensitive device, observe handling precaution!

Type	Marking	Pin Configuration			Package
BFR183F	RHs	1=B	2=E	3=C	TSFP-3

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	12	V
Collector-emitter voltage	V_{CES}	20	
Collector-base voltage	V_{CBO}	20	
Emitter-base voltage	V_{EBO}	2	
Collector current	I_C	65	mA
Base current	I_B	5	
Total power dissipation[1)] $T_S \leq 62$ °C	P_{tot}	450	mW
Junction temperature	T_j	150	°C
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[2)]	R_{thJS}	≤ 195	K/W

[1] T_S is measured on the collector lead at the soldering point to the pcb

[2] For calculation of R_{thJA} please refer to Application Note Thermal Resistance

Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	12	-	-	V
Collector-emitter cutoff current V_{CE} = 20 V, V_{BE} = 0	I_{CES}	-	-	100	µA
Collector-base cutoff current V_{CB} = 10 V, I_E = 0	I_{CBO}	-	-	100	nA
Emitter-base cutoff current V_{EB} = 1 V, I_C = 0	I_{EBO}	-	-	1	µA
DC current gain- I_C = 15 mA, V_{CE} = 8 V, pulse measured	h_{FE}	70	100	140	-

Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency I_C = 25 mA, V_{CE} = 8 V, f = 500 MHz	f_T	6	8	-	GHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.34	0.54	pF
Collector emitter capacitance V_{CE} = 10 V, f = 1 MHz, V_{BE} = 0, base grounded	C_{ce}	-	0.2	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	1.1	-	
Noise figure I_C = 5 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, f = 900 MHz f = 1.8 GHz	F	 - -	 0.9 1.4	 - -	dB
Power gain, maximum stableI_C = 15 mA I_C = 15 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt} , f = 900 MHz	G_{ms}	-	21	-	dB
Power gain, maximum available[1)] I_C = 15 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt} , f = 1.8 GHz	G_{ma}	-	14.5	-	dB
Transducer gain I_C = 15 mA, V_{CE} = 8 V, Z_S = Z_L = 50 Ω, f = 900 MHz f = 1.8 MHz	$\lvert S_{21e}\rvert^2$	 - -	 17 11	 - -	dB
Third order intercept point at output[2)] V_{CE} = 8 V, I_C = 15 mA, f = 900MHz, Z_S=Z_L=50 Ω	IP_3	-	26	-	dBm
1dB Compression point[3)] I_C = 15 mA, V_{CE} = 8 V, f = 900MHz, Z_S=Z_L=50 Ω	P_{-1dB}	-	10.5	-	

[1] $G_{ma} = |S_{21e} / S_{12e}| (k-(k^2-1)^{1/2})$, $G_{ms} = |S_{21} / S_{12}|$

[2] IP3 value depends on termination of all intermodulation frequency components. Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz

[3] DC current at no input power

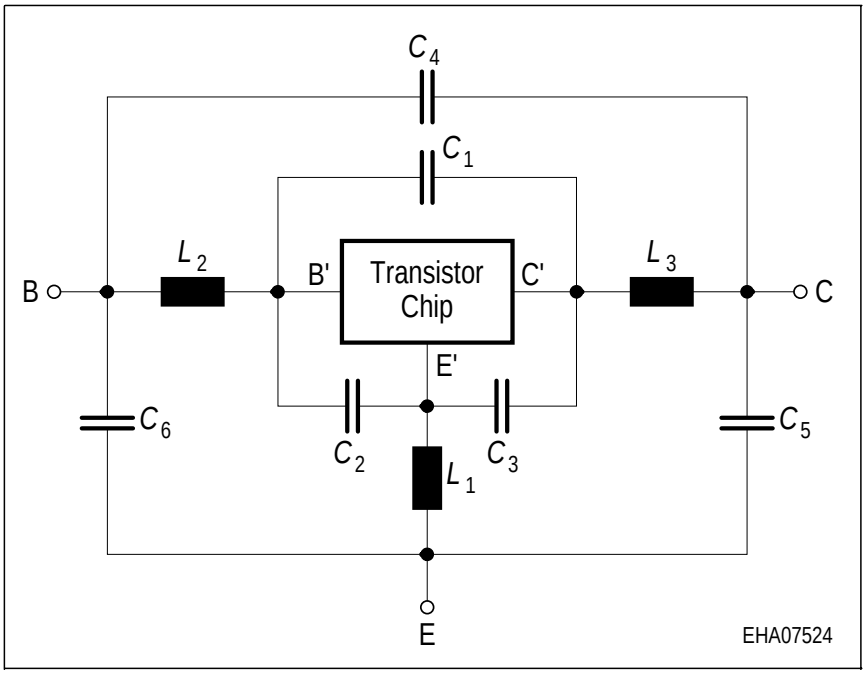
SPICE Parameter (Gummel-Poon Model, Berkley-SPICE 2G.6 Syntax):

Transitor Chip Data:

IS =	1.0345	fA	BF =	115.98	-	NF =	0.80799	-
VAF =	14.772	V	IKF =	0.14562	A	ISE =	16.818	fA
NE =	1.2149	-	BR =	10.016	-	NR =	0.99543	-
VAR =	3.4276	V	IKR =	0.013483	A	ISC =	1.3559	fA
NC =	0.85331	-	RB =	2.5426	Ω	IRB =	0.43801	mA
RBM =	1.0112	Ω	RE =	1.3435	-	RC =	0.20486	Ω
CJE =	23.077	fF	VJE =	1.0792	V	MJE =	0.45354	-
TF =	22.746	ps	XTF =	0.36823	-	VTF =	0.50905	V
ITF =	1.8773	mA	PTF =	0	deg	CJC =	460.11	fF
VJC =	1.1967	V	MJC =	0.3	-	XCJC =	0.053823	-
TR =	1.0553	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	XTB =	0	-	EG =	1.11	eV
XTI =	3	-	FC =	0.54852		TNOM	300	K

All parameters are ready to use, no scalling is necessary. Extracted on behalf of Infineon Technologies AG by: Institut für Mobil- und Satellitentechnik (IMST)

Package Equivalent Circuit:

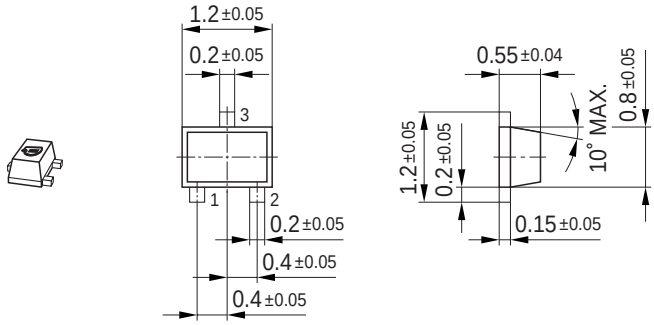


L_1 =	0.556	nH
L_2 =	0.675	nH
L_3 =	0.381	nH
C_1 =	43	fF
C_2 =	123	fF
C_3 =	66	fF
C_4 =	10	fF
C_5 =	36	fF
C_6 =	47	fF

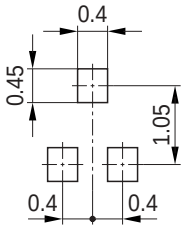
Valid up to 6GHz

For examples and ready to use parameters please contact your local Infineon Technologies distributor or sales office to obtain a Infineon Technologies CD-ROM or see Internet: http//www.infineon.com/silicondiscretes

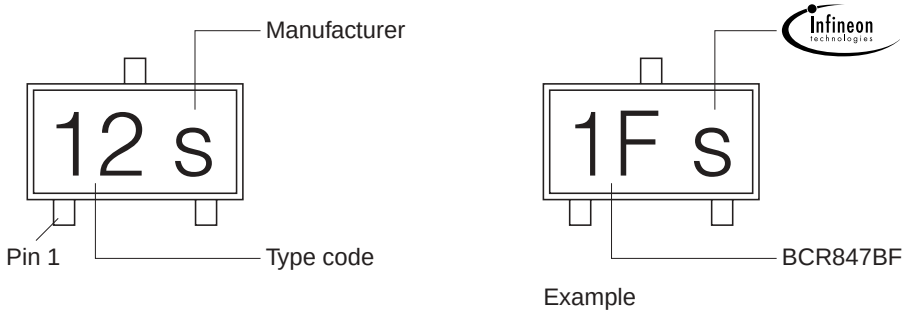
Package Outline



Foot Print

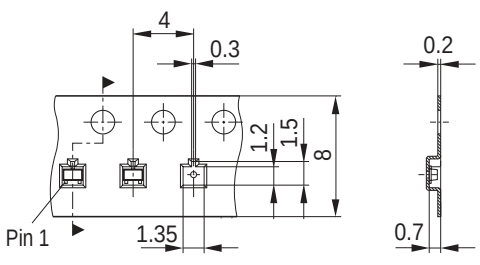


Marking Layout



Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



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