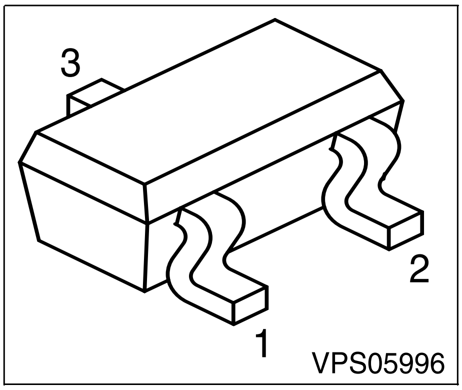
NPN Silicon RF Transistor

Preliminary data

- High current capability and low figure for wide dynamic range application
- Low voltage operation
- Ideal for low phase noise oscillators up to 3.5 GHz
- Low noise figure: 1.1 dB at 1.8 GHz



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

Type	Marking	Pin Configuration			Package
BFR380T	FCs	1 = B	2 = E	3 = C	SC75

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	6	V
Collector-emitter voltage	V_{CES}	15	
Collector-base voltage	V_{CBO}	15	
Emitter-base voltage	V_{EBO}	2	
Collector current	I_C	80	mA
Base current	I_B	14	
Total power dissipation[1)] $T_S \leq 66°C$	P_{tot}	380	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}	≤ 220	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.	
Characteristics					
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	6	9	-	V
Collector-emitter cutoff current V_{CE} = 15 V, V_{BE} = 0	I_{CES}	-	-	10	µA
Collector-base cutoff current V_{CB} = 5 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 = 40 mA, V_{CE} = 3 V	h_{FE}	60	130	200	-

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 = 40 mA, V_{CE} = 3 V, f = 1 GHz	f_T	10	14	-	GHz
Collector-base capacitance V_{CB} = 5 V, f = 1 MHz, emitter grounded	C_{cb}	-	0.5	0.7	pF
Collector emitter capacitance V_{CE} = 5 V, f = 1 MHz, base grounded	C_{ce}	-	0.18	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, collector grounded	C_{eb}	-	1	-	
Noise figure I_C = 8 mA, V_{CE} = 3 V, $Z_S = Z_{Sopt}$, f = 1.8 GHz	F_{min}	-	1.1	-	dB
Power gain, maximum available[1] I_C = 40 mA, V_{CE} = 3 V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, f = 1.8 GHz I_C = 40 mA, V_{CE} = 3 V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, f = 3 GHz	G_{ma}	 - -	 12.5 8.5	 - -	
Transducer gain I_C = 40 mA, V_{CE} = 3 V, $Z_S = Z_L = 50\Omega$, f = 1.8 GHz I_C = 40 mA, V_{CE} = 3 V, $Z_S = Z_L = 50\Omega$, f = 3 GHz	$\|S_{21e}\|^2$	 - -	 10 6	 - -	dB
Third order intercept point at output[2] V_{CE} = 3 V, I_C = 40 mA, f = 1.8 GHz, $Z_S = Z_L = 50\Omega$	IP_3	-	29.5	-	dBm
1dB Compression point at output I_C = 40 mA, V_{CE} = 3 V, $Z_S = Z_L = 50\Omega$, f = 1.8 GHz	P_{-1dB}	-	16	-	

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

[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

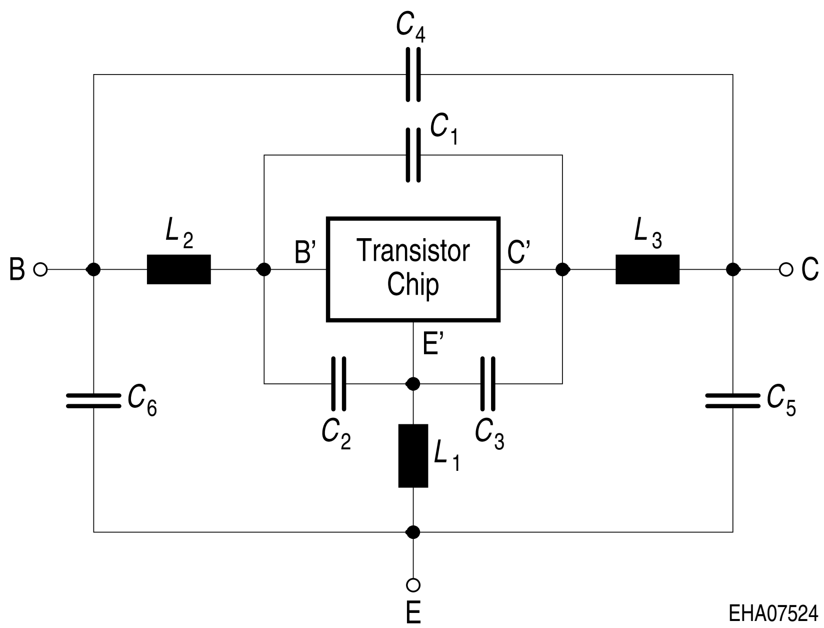
SPICE Parameter (Gummel-Poon Model, Berkley-SPICE 2G.6 Syntax):

Transitor Chip Data:

IS =	9.965	fA	BF =	116.376	-	NF =	1.107	-
VAF =	27.69	V	IKF =	736	mA	ISE =	0.2676	fA
NE =	1.64	-	BR =	22.802	-	NR =	1.056	-
VAR =	30	V	IKR =	0.011	A	ISC =	6.9739	pA
NC =	1.678	-	RB =	9.71	Ω	IRB =	0.2564	mA
RBM =	1.322	Ω	RE =	221	mΩ	RC =	0.101	Ω
CJE =	116.7	fF	VJE =	0.782	V	MJE =	0.5	-
TF =	8.789	ps	XTF =	0.496	-	VTF =	0.338	V
ITF =	1.529	mA	PTF =	0	deg	CJC =	840	fF
VJC =	6.949	V	MJC =	0.472	-	XCJC =	0.202	-
TR =	6.949	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	NK =	0.5	-	EG =	1.11	eV
XTI =	0	-	FC =	0.975		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:

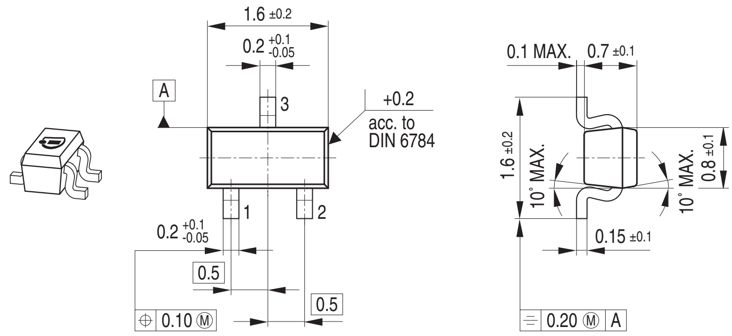


L_1 =	0.762	nH
L_2 =	0.706	nH
L_3 =	0.382	nH
C_1 =	62	fF
C_2 =	84	fF
C_3 =	180	fF
C_4 =	7	fF
C_5 =	40	fF
C_6 =	48	fF

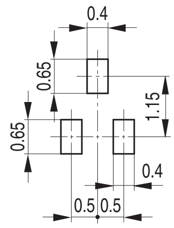
Valid up to 6GHz

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

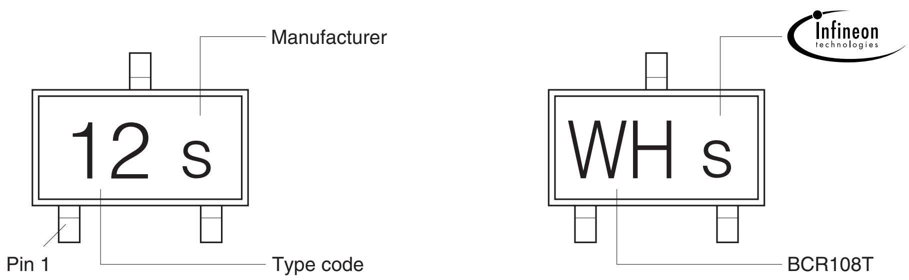
Package Outline



Foot Print



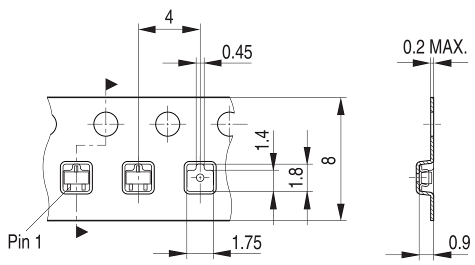
Marking Layout



Example

Packing

Code E6327: Reel ø180 mm = 3.000 Pieces/Reel
Code E6433: Reel ø330 mm = 10.000 Pieces/Reel



Published by Infineon Technologies AG,
St.-Martin-Strasse 53,
81669 München

Attention please!

The information herein is given to describe certain components and shall not be considered as a guarantee of characteristics.
Terms of delivery and rights to technical change reserved.
We hereby disclaim any and all warranties, including but not limited to warranties of non-infringement, regarding circuits, descriptions and charts stated herein.

Information

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office (www.Infineon.com).

Warnings

Due to technical requirements components may contain dangerous substances.
For information on the types in question please contact your nearest Infineon Technologies Office.
Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system.
Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.