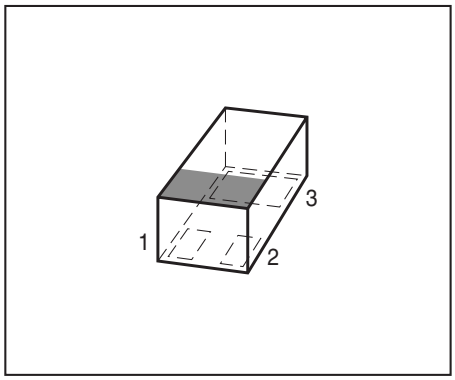
NPN Silicon RF Transistor



- High current capability and low noise figure for wide dynamic range
- Low voltage operation
- Ideal for low phase noise oscillators up to 3.5 GHz
- Low noise figure: 1.1 dB at 1.8 GHz
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101

AEC Qualified RoHS

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

Type	Marking	Pin Configuration			Package
BFR380L3	FC	1 = B	2 = E	3 = C	TSLP-3-1

Maximum Ratings at T_A = 25 °C, unless otherwise specified

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)] $T_S \leq 96$°C	P_{tot}	380	mW
Junction temperature	T_J	150	°C
Storage temperature	T_{Stg}	-55 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[2)]	R_{thJS}	≤ 140	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 AN077 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	$V_{(BR)CEO}$	6	9	-	V
Collector-emitter cutoff current	I_{CES}				nA
V_{CE} = 5 V, V_{BE} = 0		-	1	30	
V_{CE} = 15 V, V_{BE} = 0		-	-	1000	
Collector-base cutoff current V_{CB} = 5 V, I_E = 0	I_{CBO}	-	-	30	
Emitter-base cutoff current V_{EB} = 1 V, I_C = 0	I_{EBO}	-	10	500	
DC current gain I_C = 40 mA, V_{CE} = 3 V, pulse measured	h_{FE}	90	120	160	-

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	11	14	-	GHz
Collector-base capacitance V_{CB} = 5 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.45	0.8	pF
Collector emitter capacitance V_{CE} = 5 V, f = 1 MHz, V_{BE} = 0 , base grounded	C_{ce}	-	0.18	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	1	-	
Minimum Noise figure I_C = 8 mA, V_{CE} = 3 V, Z_S = Z_{Sopt} , f = 1.8 GHz	NF_{min}	0.5	1.1	2.1	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 f = 3 GHz	G_{ma}	 11.5 7.5	 14 10	 16.5 12.5	
Transducer gain I_C = 40 mA, V_{CE} = 3 V, Z_S = Z_L = 50Ω , f = 1.8 GHz f = 3 GHz	$\lvert S_{21e}\rvert^2$	 9.5 5.5	 11.5 7.5	 13.5 9.5	dB
Third order intercept point at output[2)] V_{CE} = 3 V, I_C = 40 mA, f = 1.8 GHz, Z_S = Z_L = 50Ω	IP_3	-	29.5	-	dBm
1dB compression point at output I_C = 40 mA, V_{CE} = 3V, f = 1.8 GHz Z_S = Z_L = 50Ω Z_S = Z_{Sopt}, Z_L = Z_{Lopt}	P_{-1dB}	 - -	 16 19.5	 - -	

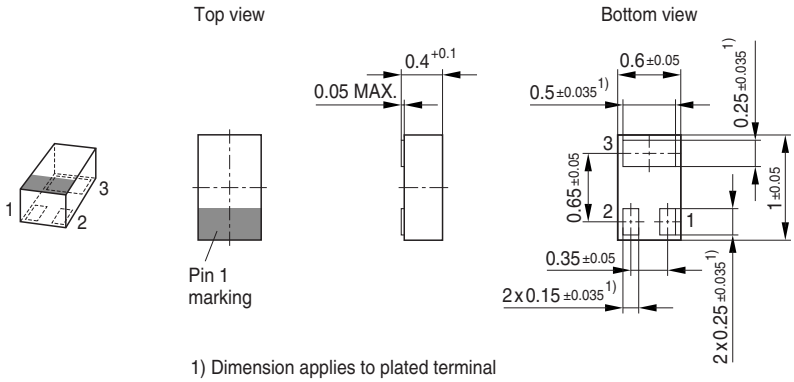
[1] $G_{ma} = |S_{21e} / S_{12e}| (k-(k^2-1)^{1/2})$

[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

For the SPICE model as well as for the S-parameters (including noise parameters) please refer to our internet website www.infineon.com/rf.models.
Please consult our website and download the latest versions before actually starting your design.
You find the BFR380L3 SPICE model in the internet in MWO- and ADS- format which you can import into these circuit simulation tools very quickly and conveniently.
The simulation data have been generated and verified using typical devices.
The BFR380L3 SPICE model reflects the typical DC- and RF-performance with high accuracy.

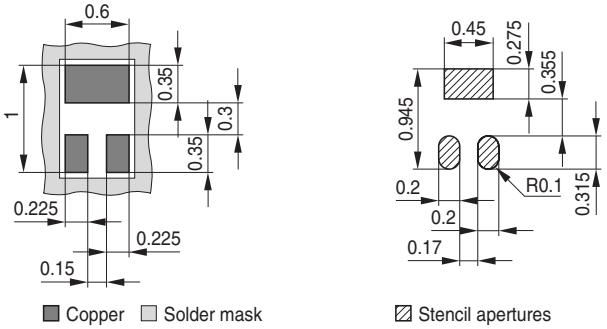
Package Outline



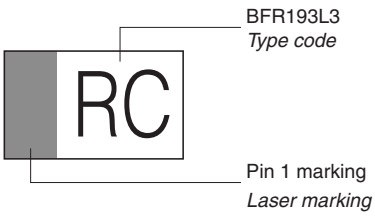
1) Dimension applies to plated terminal

Foot Print

For board assembly information please refer to Infineon website "Packages"

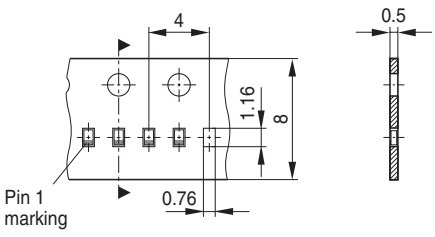


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



Datasheet Revision History: 27 May 2010

This datasheet replaces the revisions from 10 July 2008 and 30 March 2007.
The product itself has not been changed and the device characteristics remain unchanged.
Only the product description and information available in the datasheet has been expanded and updated.

Previous Revisions: 10 July 2008 and 30 March 2007	
Page	**Subject (changes since last revision)**
1	Datasheet has final status
2	Typical values for leakage currents included, values for maximum leakage currents reduced

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