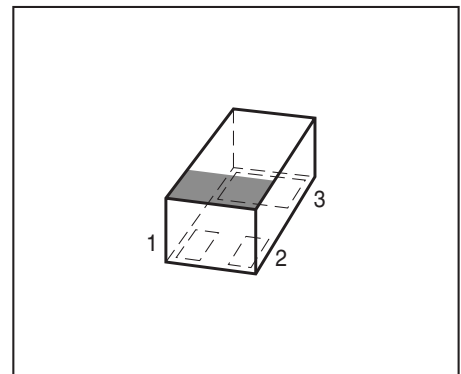


**NPN Silicon RF Transistor**

- 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



**ESD (Electrostatic discharge) sensitive device, observe handling precaution!**

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

**Maximum Ratings** at  $T_A = 25\text{ }^\circ\text{C}$ , 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 <sup>1)</sup> $T_S \leq 96\text{ }^\circ\text{C}$	$P_{tot}$	380	mW
Junction temperature	$T_J$	150	$^\circ\text{C}$
Storage temperature	$T_{Stg}$	-55 ... 150	

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>2)</sup>	$R_{thJS}$	$\leq 140$	K/W

<sup>1)</sup>  $T_S$  is measured on the collector lead at the soldering point to the pcb

<sup>2)</sup> For calculation of  $R_{thJA}$  please refer to Application Note AN077 Thermal Resistance

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	6	9	-	V
Collector-emitter cutoff current $V_{CE} = 5\text{ V}, V_{BE} = 0$ $V_{CE} = 15\text{ V}, V_{BE} = 0$	$I_{CES}$	-	1	30	nA
		-	-	1000	
Collector-base cutoff current $V_{CB} = 5\text{ V}, I_E = 0$	$I_{CBO}$	-	-	30	
Emitter-base cutoff current $V_{EB} = 1\text{ V}, I_C = 0$	$I_{EBO}$	-	10	500	
DC current gain $I_C = 40\text{ mA}, V_{CE} = 3\text{ V}$ , pulse measured	$h_{FE}$	90	120	160	-

**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Transition frequency $I_C = 40\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1\text{ GHz}$	$f_T$	11	14	-	GHz
Collector-base capacitance $V_{CB} = 5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , emitter grounded	$C_{cb}$	-	0.45	0.8	pF
Collector emitter capacitance $V_{CE} = 5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , base grounded	$C_{ce}$	-	0.18	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{CB} = 0$ , collector grounded	$C_{eb}$	-	1	-	
Minimum Noise figure $I_C = 8\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_{Sopt}$ , $f = 1.8\text{ GHz}$	$NF_{min}$	0.5	1.1	2.1	dB
Power gain, maximum available <sup>1)</sup> $I_C = 40\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8\text{ GHz}$ $f = 3\text{ GHz}$	$G_{ma}$	11.5 7.5	14 10	16.5 12.5	
Transducer gain $I_C = 40\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 1.8\text{ GHz}$ $f = 3\text{ GHz}$	$ S_{21e} ^2$	9.5 5.5	11.5 7.5	13.5 9.5	dB
Third order intercept point at output <sup>2)</sup> $V_{CE} = 3\text{ V}$ , $I_C = 40\text{ mA}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_L = 50\Omega$	$IP_3$	-	29.5	-	dBm
1dB compression point at output $I_C = 40\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1.8\text{ GHz}$ $Z_S = Z_L = 50\Omega$ $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$	$P_{-1dB}$	- -	16 19.5	- -	

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

<sup>2</sup>IP3 value depends on termination of all intermodulation frequency components.

Termination used for this measurement is  $50\Omega$  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](http://www.infineon.com/rf.models).

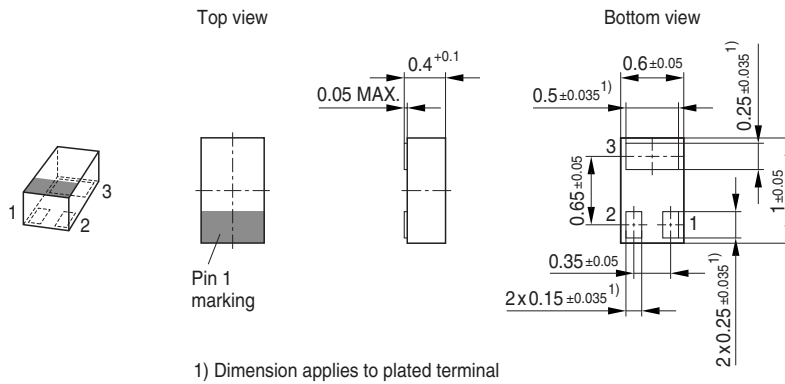
Please consult our website and download the latest versions before actually starting your design.

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.

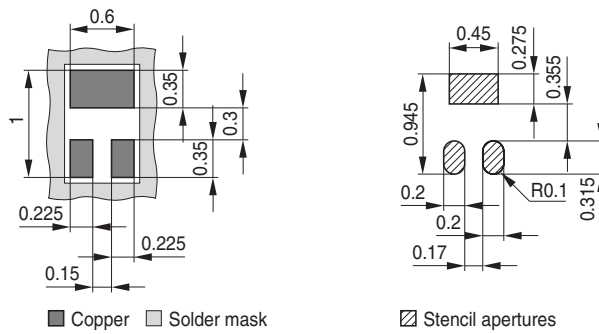
The BFR380L3 SPICE model reflects the typical DC- and RF-performance with high accuracy.

### Package Outline

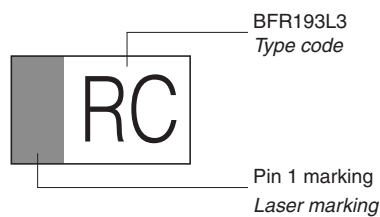


### Foot Print

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

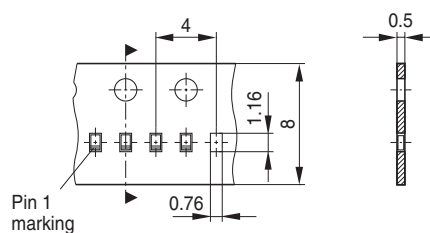


### Marking Layout (Example)



### 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.

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

**Edition 2009-11-16**

**Published by  
Infineon Technologies AG  
81726 Munich, Germany**

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