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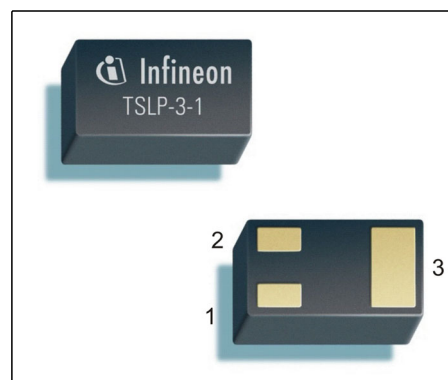
sales@integrated-circuit.com



BFR380L3

Linear Low Noise Silicon Bipolar RF Transistor

- High current capability and low noise figure for wide dynamic range
- Collector design supports supply voltage up to 5V
- 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) and halogen-free thin small leadless package
- Qualification report according to AEC-Q101 available



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 ¹⁾ $T_S \leq 96\text{ }^\circ\text{C}$	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 ²⁾	R_{thJS}	140	K/W

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

²⁾ For the definition of R_{thJS} please refer to Application Note AN077 (Thermal Resistance Calculation)



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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
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
Collector-base cutoff current $V_{CB} = 5\text{ V}, I_E = 0$	I_{CBO}	-	-	1000	
Emitter-base cutoff current $V_{EB} = 1\text{ V}, I_C = 0$	I_{EBO}	-	10	500	
DC current gain $I_C = 40\text{ mA}, V_{CE} = 3\text{ V}, \text{ pulse measured}$	h_{FE}	90	120	160	-



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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
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 ¹⁾ $I_C = 40\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$ $f = 3\text{ GHz}$	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 ²⁾ $V_{CE} = 3\text{ V}$, $I_C = 40\text{ mA}$, $f = 1.8\text{ GHz}$, $Z_S = Z_L = 50\Omega$	$IP3$	-	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	- -	

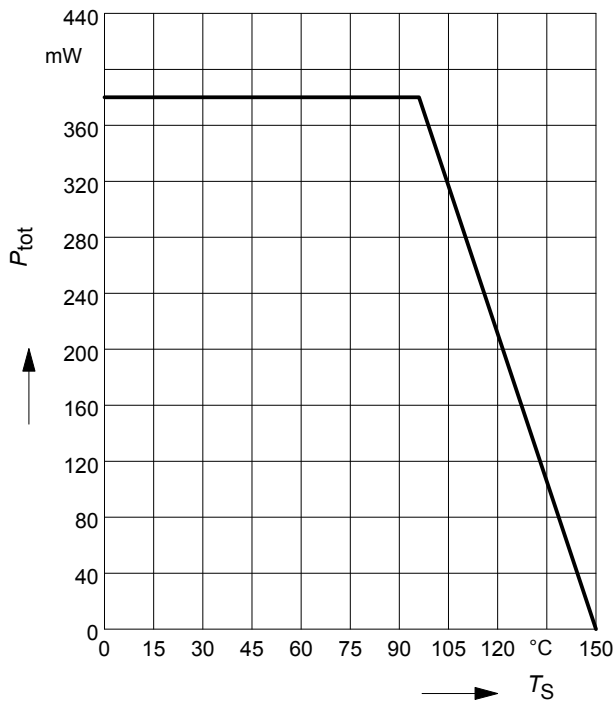
¹⁾ $G_{ma} = |S_{21e} / S_{12e}| (k - (k^2 - 1)^{1/2})$

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



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Total power dissipation $P_{tot} = f(T_S)$

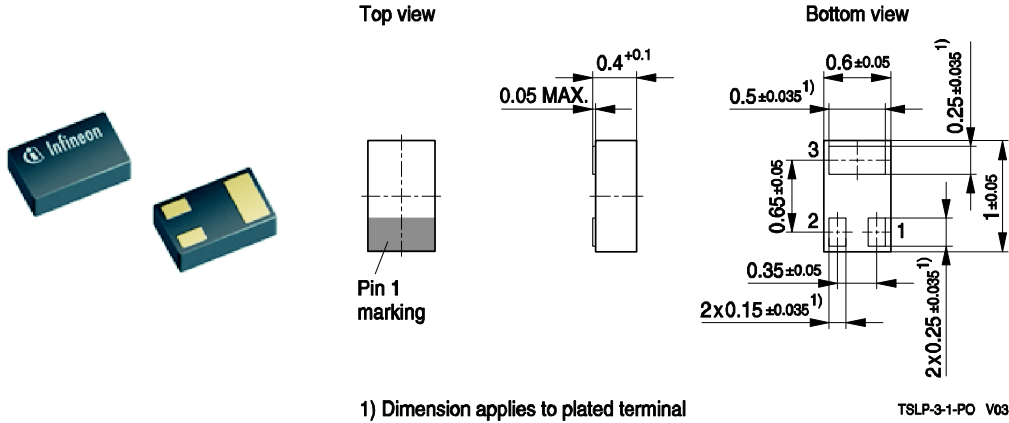




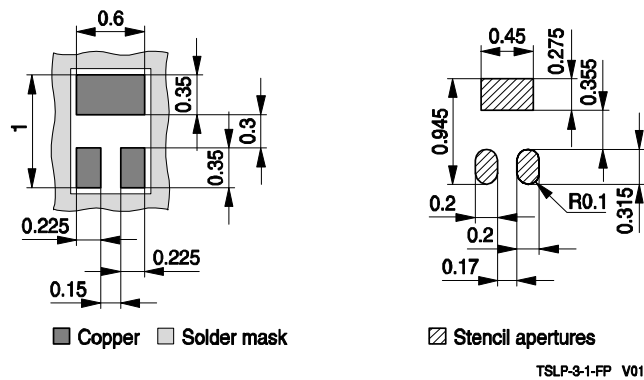
Package TSLP-3-1

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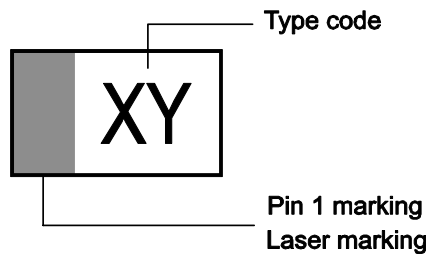
Package Outline



Foot Print

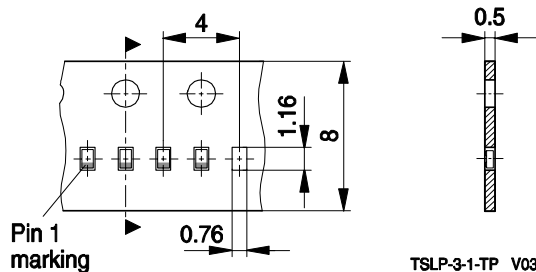


Marking Layout (Example)



Standard Packing

Reel Ø 330 mm: 15.000 Pieces/ Reel





BFR380L3

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