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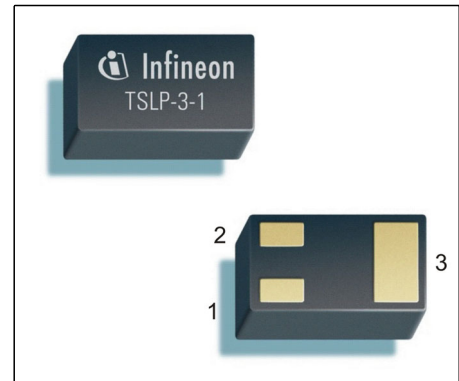
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**Linear Low Noise Silicon Bipolar RF Transistor**

- 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 <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>	$R_{thJS}$	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 the definition of  $R_{thJS}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

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

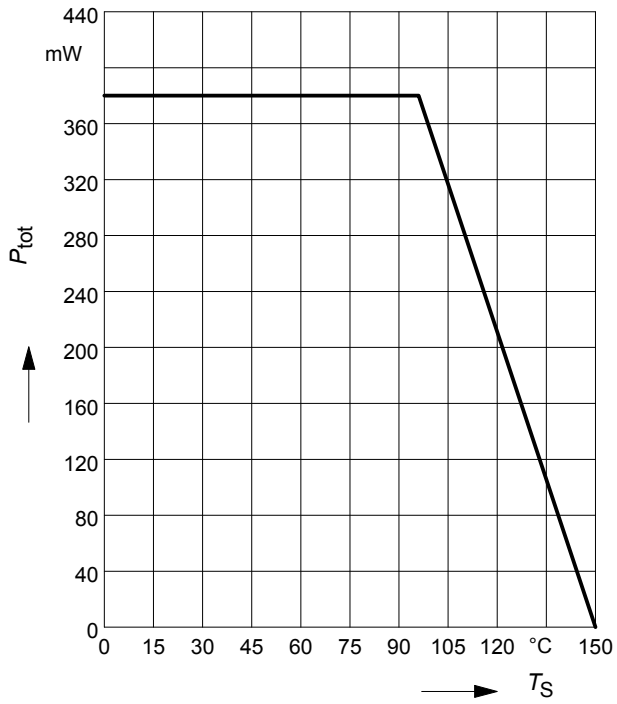
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	6	9	-	V
Collector-emitter cutoff current $V_{CE} = 5\text{ V}, V_{BE} = 0$ $V_{CE} = 15\text{ V}, V_{BE} = 0$	$I_{CES}$	-	1	30	nA
		-	-	1000	
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  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

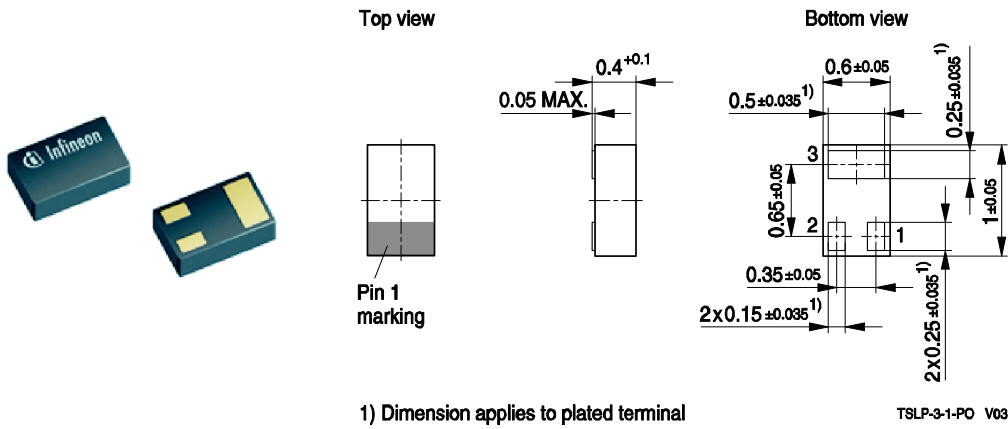
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Transition frequency $I_C = 40\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1\text{ GHz}$	$f_T$	11	14	-	GHz
Collector-base capacitance $V_{CB} = 5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , 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> $V_{CE} = 3\text{ V}$ , $I_C = 40\text{ mA}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_L = 50\Omega$	$IP3$	-	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	- -	

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

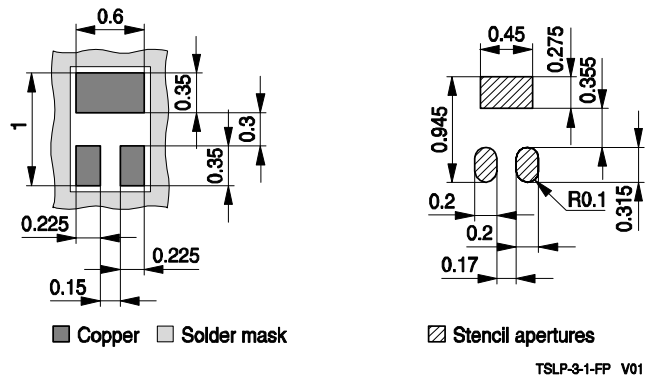
Total power dissipation  $P_{\text{tot}} = f(T_S)$



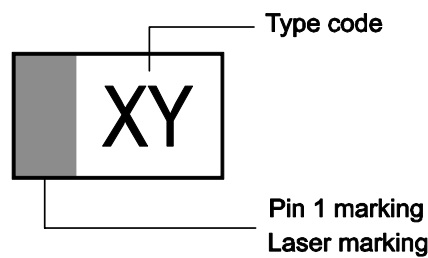
### Package Outline



### Foot Print

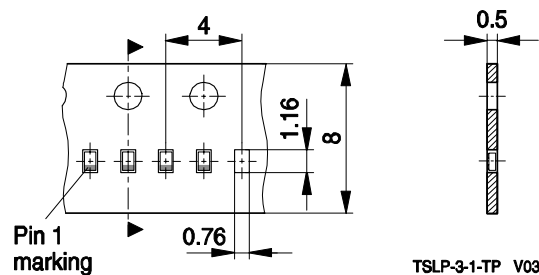


### Marking Layout (Example)



### Standard Packing

Reel Ø 330 mm: 15.000 Pieces/ Reel



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