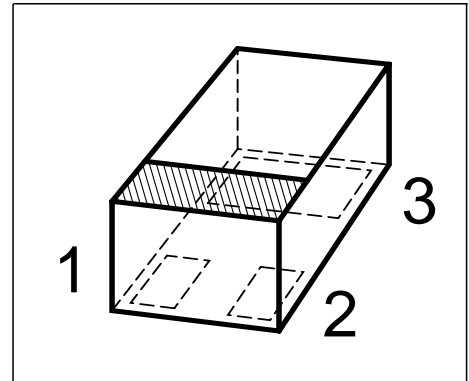


NPN Silicon RF Transistor
Preliminary data

- For low noise, high-gain broadband amplifiers at collector currents from 1 mA to 20 mA
- $f_T = 9$ GHz
 $F = 1.0$ dB at 1 GHz



ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Marking	Pin Configuration			Package
BFR949L3	RK	1 = B	2 = E	3 = C	TSLP-3-1

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	10	V
Collector-emitter voltage	V_{CES}	20	
Collector-base voltage	V_{CBO}	20	
Emitter-base voltage	V_{EBO}	1.5	
Collector current	I_C	35	mA
Base current	I_B	4	
Total power dissipation $T_S \leq 100^\circ\text{C}$ ¹⁾	P_{tot}	250	mW
Junction temperature	T_j	150	°C
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Junction - soldering point ²⁾	R_{thJS}	\leq tbd	K/W
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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 $T_A = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage $I_C = 1 \text{ mA}, I_B = 0$	$V_{(BR)CEO}$	10	-	-	V
Collector-emitter cutoff current $V_{CE} = 20 \text{ V}, V_{BE} = 0$	I_{CES}	-	-	100	μA
Collector-base cutoff current $V_{CB} = 10 \text{ V}, I_E = 0$	I_{CBO}	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 1 \text{ V}, I_C = 0$	I_{EBO}	-	-	0.1	μA
DC current gain $I_C = 5 \text{ mA}, V_{CE} = 6 \text{ V}$	h_{FE}	100	140	200	-

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC characteristics (verified by random sampling)					
Transition frequency $I_C = 15 \text{ mA}, V_{CE} = 6 \text{ V}, f = 1 \text{ GHz}$	f_T	7	9	-	GHz
Collector-base capacitance $V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$	C_{cb}	-	0.25	-	pF
Collector-emitter capacitance $V_{CE} = 10 \text{ V}, f = 1 \text{ MHz}$	C_{ce}	-	0.15	-	
Emitter-base capacitance $V_{EB} = 0.5 \text{ V}, f = 1 \text{ MHz}$	C_{eb}	-	0.7	-	
Noise figure $I_C = 5 \text{ mA}, V_{CE} = 6 \text{ V}, Z_S = Z_{Sopt}, f = 1 \text{ GHz}$ $I_C = 3 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{Sopt}, f = 1.8 \text{ GHz}$	F	-	1	2.5	dB
		-	1.5	-	
Power gain, maximum stable ¹⁾ $I_C = 10 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{Sopt}, Z_L = Z_{Lopt}, f = 900 \text{ MHz}$	G_{ms}	-	21.5	-	
Power gain, maximum available ²⁾ $I_C = 10 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{Sopt}, Z_L = Z_{Lopt}, f = 1.8 \text{ GHz}$	G_{ma}	-	15.5	-	
Transducer gain $I_C = 15 \text{ mA}, V_{CE} = 6 \text{ V}, Z_S = Z_L = 50 \Omega, f = 1 \text{ GHz}$ $I_C = 10 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_L = 50 \Omega, f = 1.8 \text{ GHz}$	$ S_{21e} ^2$	14	17	-	
		-	12	-	

$$^1G_{ms} = |S_{21} / S_{12}|$$

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