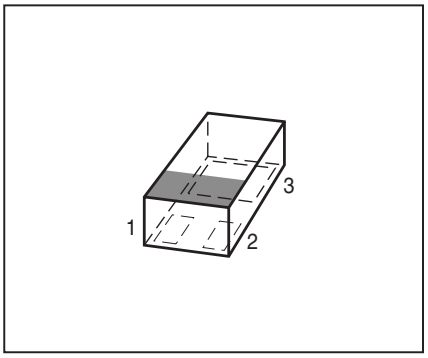
NPN Silicon Germanium RF Transistor

Target data sheet



- High gain ultra low noise RF transistor for low current operation
- Provides outstanding performance for a wide range of wireless applications up to 10 GHz and more
- Optimum gain and noise figure at low current operation
- Ideal for WLAN applications
- Outstanding noise figure F = 0.5 dB at 1.8 GHz
  Outstanding noise figure F = 0.8 dB at 6 GHz
- High maximum stable and available gain
  G_{ms} = 24 dB at 1.8 GHz, G_{ma} = 16.5 dB at 6 GHz
- 150 GHz f_T-Silicon Germanium technology
- Extremly small and flat leadless package height 0.32 mm max.
- 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
BFR720L3RH	R3	1 = B	2 = C	3 = E	TSLP-3-9

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}		V
T_A > 0 °C		4	
T_A ≤ 0 °C		3.5	
Collector-emitter voltage	V_{CES}	13	
Collector-base voltage	V_{CBO}	13	
Emitter-base voltage	V_{EBO}	1.2	
Collector current	I_C	20	mA
Base current	I_B	2	
Total power dissipation[1)] T_S ≤ tbd	P_{tot}	80	mW
Operating junction temperature range	T_{jo}	-65 ... 150	°C
Storage junction temperature range	T_{jstg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[2)]	R_{thJS}	≤ tbd	K/W

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	$V_{(BR)CEO}$	4	4.7	-	V
Collector-emitter cutoff current V_{CE} = 13 V, V_{BE} = 0	I_{CES}	-	-	30	µA
Collector-base cutoff current V_{CB} = 5 V, I_E = 0	I_{CBO}	-	-	100	nA
Emitter-base cutoff current V_{EB} = 0.5 V, I_C = 0	I_{EBO}	-	-	2	µA
DC current gain- I_C = 13 mA, V_{CE} = 3 V, pulse measured	h_{FE}	160	250	400	-

[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

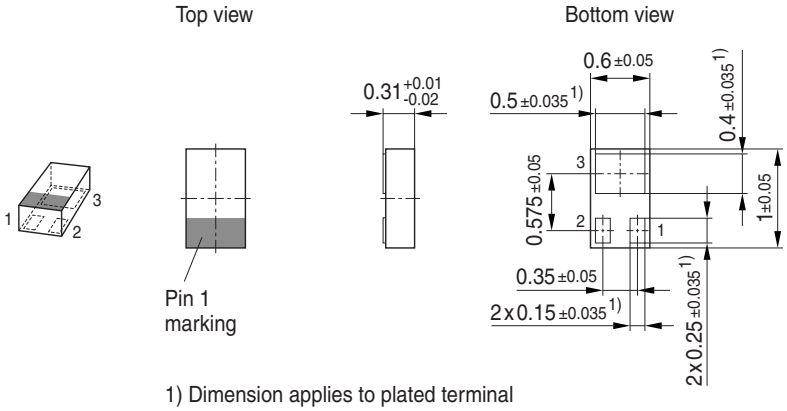
Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency I_C = 13 mA, V_{CE} = 3 V, f = 1 GHz	f_T	-	45	-	GHz
Collector-base capacitance V_{CB} = 3 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.07	-	pF
Collector emitter capacitance V_{CE} = 3 V, f = 1 MHz, V_{BE} = 0 , based grounded	C_{ce}	-	0.26	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	0.27	-	
Noise figure I_C = 5 mA, V_{CE} = 3 V, f = 1.8 GHz, Z_S = Z_{Sopt} I_C = 5 mA, V_{CE} = 3 V, f = 6 GHz, Z_S = Z_{Sopt}	NF	 - -	 0.5 0.8	 - -	dB
Power gain[1)] I_C = 13 mA, V_{CE} = 3 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt}, f = 1.8 GHz	G_{ms}	-	24	-	dB
Power gain, maximum available[1)] I_C = 13 mA, V_{CE} = 3 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt}, f = 6 GHz	G_{ma}	-	16.5	-	dB
Transducer gain I_C = 13 mA, V_{CE} = 3 V, Z_S = Z_L = 50 Ω, f = 1.8 GHz f = 6 GHz	$\lvert S_{21e}\rvert^2$	 - -	 22 13.5	 - -	dB
Third order intercept point at output[2)] V_{CE} = 3 V, I_C = 10 mA, Z_S=Z_L=50 Ω, f = 1.8 GHz	IP_3	-	20.5	-	dBm
1dB Compression point I_C = 13 mA, V_{CE} = 3 V, Z_S=Z_L=50 Ω, f = 1.8 GHz	P_{-1dB}	-	6	-	

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

[2] IP3 value depends on termination of all intermodulation frequency components.
Termination used for this measurement is 50 Ω from 0.1 MHz to 6 GHz

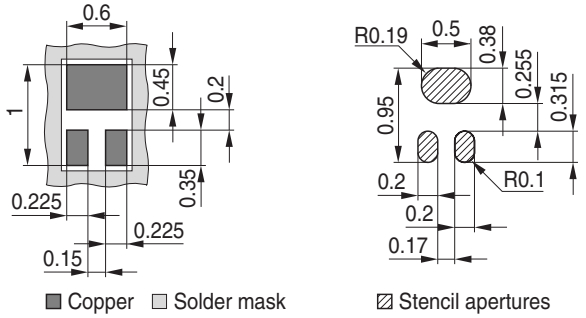
Package Outline



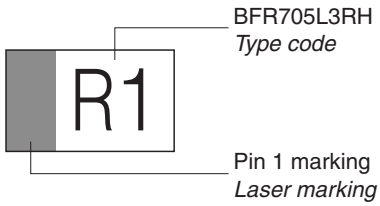
1) Dimension applies to plated terminal

Foot Print

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

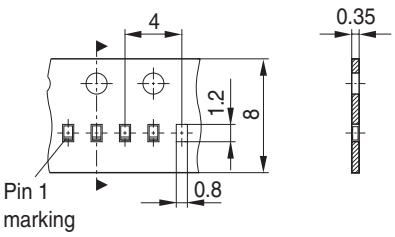


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



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