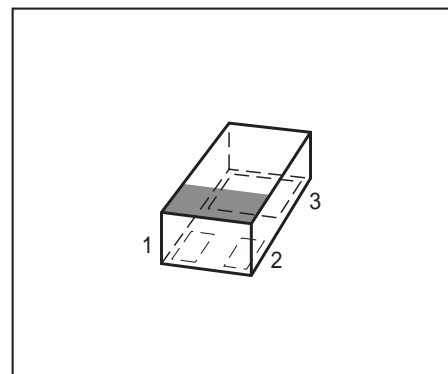


NPN Silicon Germanium RF Transistor*

- High gain ultra low noise RF transistor for low current operation
- Ideal for low power consumption LNA design
- Provides outstanding performance for a wide range of wireless applications up to 10 GHz and more
- 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 at only 7m.
 $G_{ms} = 25$ dB at 1.8 GHz, $G_{ma} = 18$ dB at 6 GHz
- 150 GHz f_T -Silicon Germanium technology
- Extremely small and flat leadless package, height 0.32 mm max.
- Pb-free (RoHS compliant) package¹⁾
- Qualified according AEC Q101

* Short term description



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

Type	Marking	Pin Configuration			Package
BFR705L3RH	R1	1=B	2=C	3=E	TSLP-3-9

¹Pb-containing package may be available upon special request

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage $T_A > 0^\circ\text{C}$ $T_A \leq 0^\circ\text{C}$	V_{CEO}	4 3.5	V
Collector-emitter voltage	V_{CES}	13	
Collector-base voltage	V_{CBO}	13	
Emitter-base voltage	V_{EBO}	1.2	
Collector current	I_{C}	10	mA
Base current	I_{B}	1	
Total power dissipation ¹⁾ , $T_S \leq 123^\circ\text{C}$	P_{tot}	40	mW
Junction temperature	T_{j}	150	$^\circ\text{C}$
Ambient temperature	T_{A}	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ²⁾	R_{thJS}	≤ 665	K/W

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 $I_{\text{C}} = 1\text{ mA}$, $I_{\text{B}} = 0$	$V_{(\text{BR})\text{CEO}}$	4	4.7	-	V
Collector-emitter cutoff current $V_{\text{CE}} = 13\text{ V}$, $V_{\text{BE}} = 0$	I_{CES}	-	-	30	μA
Collector-base cutoff current $V_{\text{CB}} = 5\text{ V}$, $I_{\text{E}} = 0$	I_{CBO}	-	-	100	nA
Emitter-base cutoff current $V_{\text{EB}} = 0.5\text{ V}$, $I_{\text{C}} = 0$	I_{EBO}	-	-	1	μA
DC current gain $I_{\text{C}} = 7\text{ mA}$, $V_{\text{CE}} = 3\text{ V}$, pulse measured	h_{FE}	160	250	400	-

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

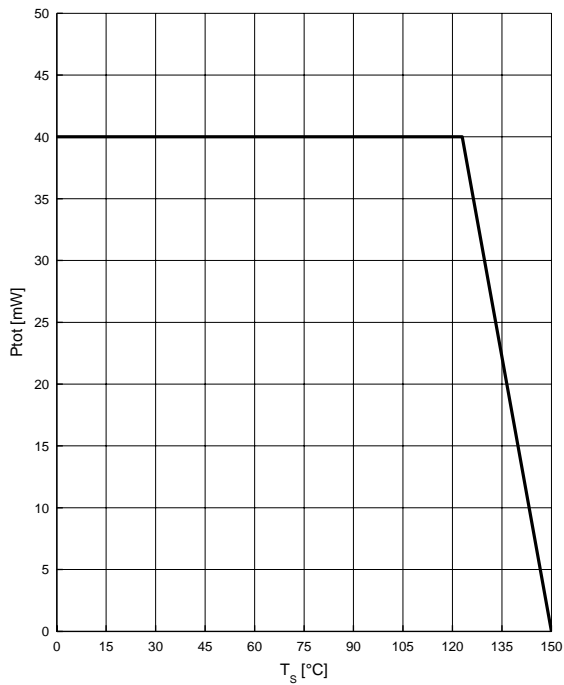
² For calculation of R_{thJA} please refer to Application Note Thermal Resistance

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

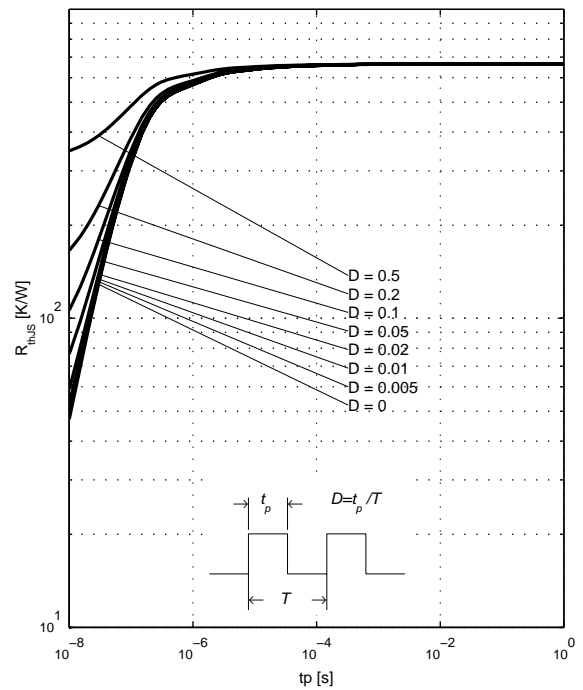
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency $I_C = 7\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 1\text{ GHz}$	f_T	-	39	-	GHz
Collector-base capacitance $V_{CB} = 3\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, emitter grounded	C_{cb}	-	0.04	0.08	pF
Collector emitter capacitance $V_{CE} = 3\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, base grounded	C_{ce}	-	0.15	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$, $V_{CB} = 0$, collector grounded	C_{eb}	-	0.18	-	
Noise figure $I_C = 3\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 1.8\text{ GHz}$, $Z_S = Z_{Sopt}$ $I_C = 3\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 6\text{ GHz}$, $Z_S = Z_{Sopt}$	F	- -	0.5 0.8	- -	dB
Power gain, maximum stable ¹⁾ $I_C = 7\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$	G_{ms}	-	25	-	dB
Power gain, maximum available ¹⁾ $I_C = 7\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 6\text{ GHz}$	G_{ma}	-	18	-	dB
Transducer gain $I_C = 7\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_L = 50\text{ }\Omega$, $f = 1.8\text{ GHz}$ $f = 6\text{ GHz}$	$ S_{21e} ^2$	- -	21 14	- -	dB

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

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

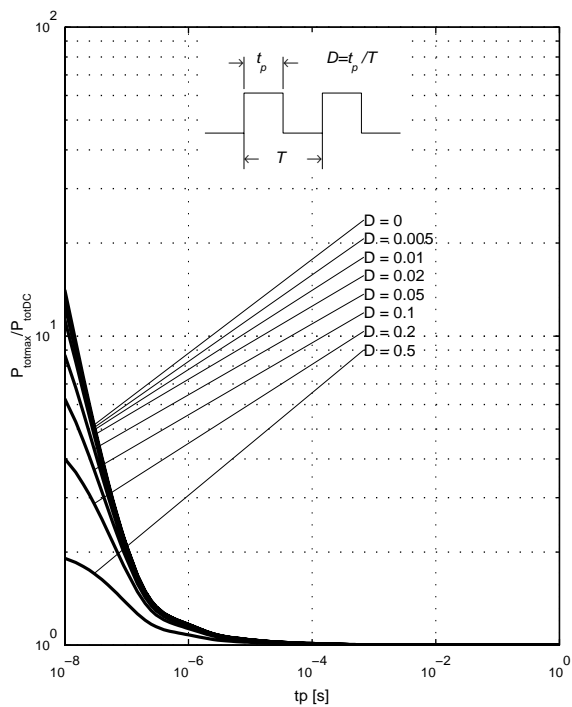


Permissible Puls Load $R_{\text{thJS}} = f(t_p)$



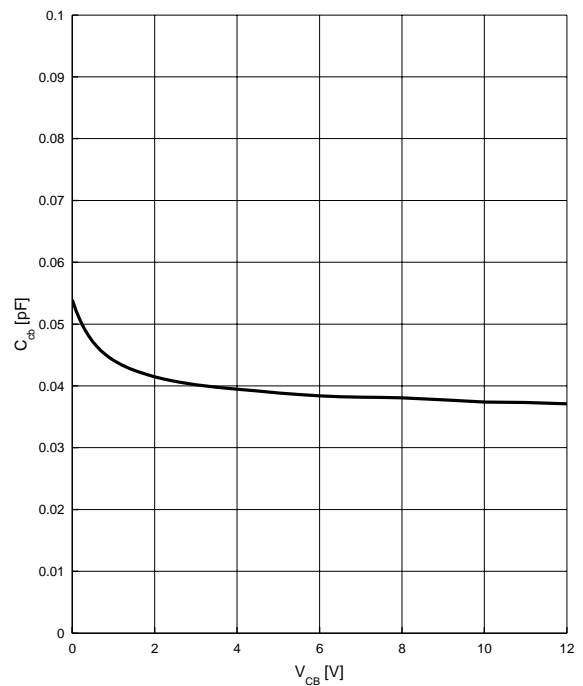
Permissible Pulse Load

$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$



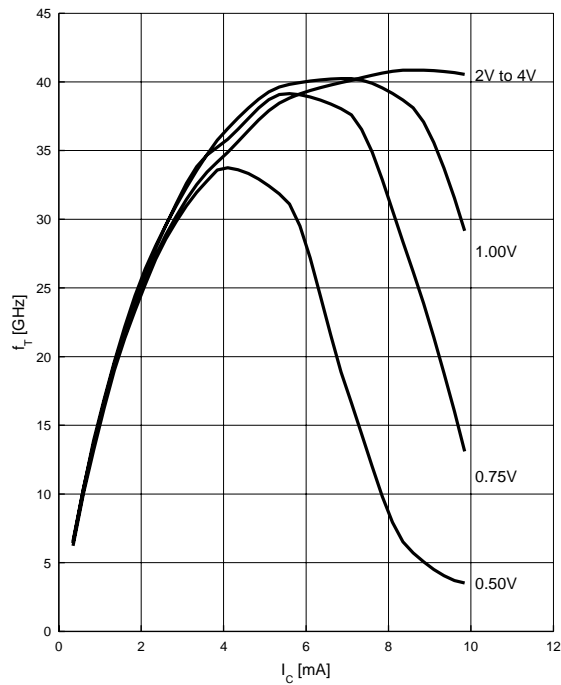
Collector-base capacitance $C_{\text{cb}} = f(V_{\text{CB}})$

$f = 1 \text{ MHz}$



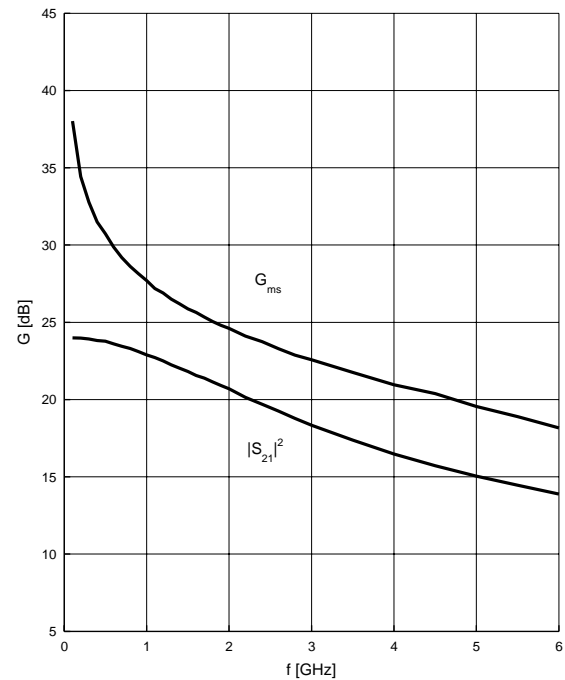
Transition frequency $f_T = f(I_C)$

$V_{CE} = \text{parameter}, f = 1 \text{ GHz}$



Power gain $G_{ma}, G_{ms} = f(f)$

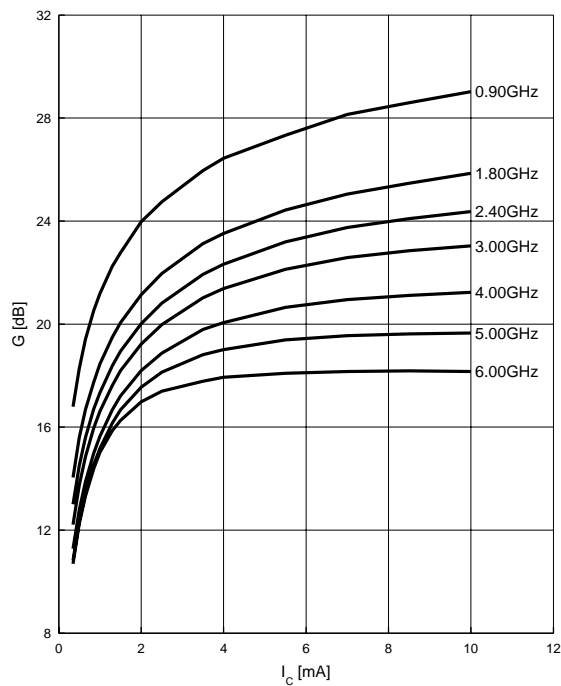
$V_{CE} = 2 \text{ V}, I_C = 7 \text{ mA}$



Power gain $G_{ma}, G_{ms} = f(I_C)$

$V_{CE} = 3 \text{ V}$

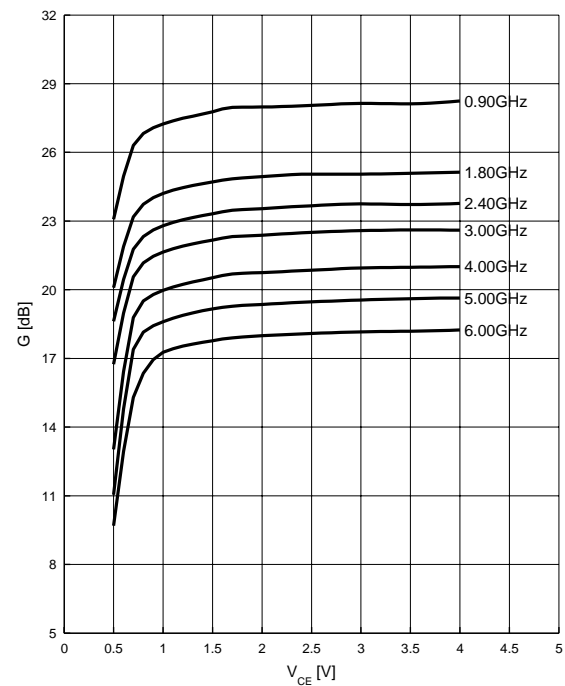
$f = \text{parameter}$



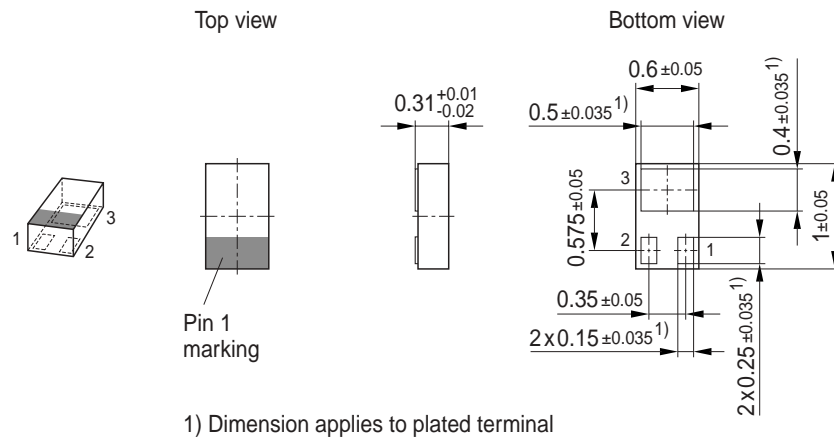
Power gain $G_{ma}, G_{ms} = f(V_{CE})$

$I_C = 7 \text{ mA}$

$f = \text{parameter}$

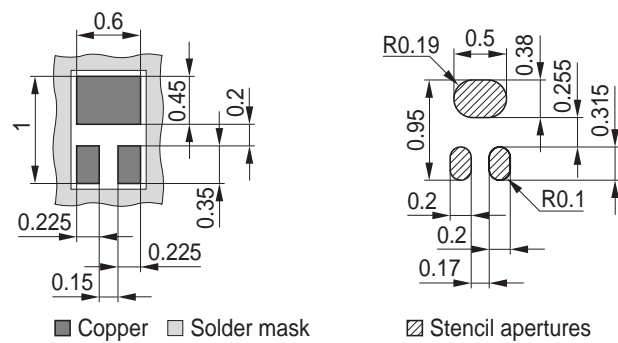


Package Outline

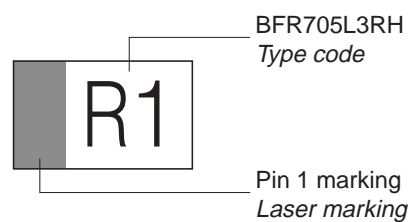


Foot Print

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

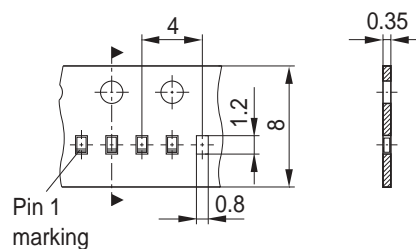


Marking Layout (Example)



Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



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