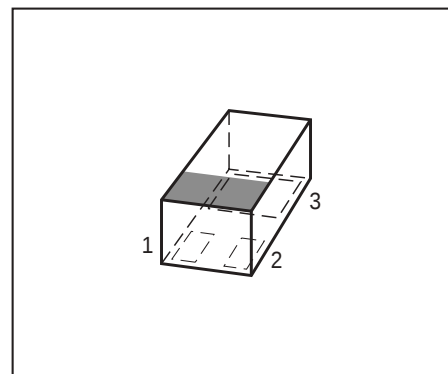


NPN Silicon Germanium RF Transistor

- High gain ultra low noise RF transistor
- Provides outstanding performance for a wide range of wireless applications up to 10 GHz and more
- Ideal for CDMA and 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 gain
 $G_{ms} = 24$ dB at 1.8 GHz
- Gold metallization for extra high reliability
- 150 GHz f_T -Silicon Germanium technology



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

Type	Marking	Pin Configuration			Package
BFR740L3	R7	1=B	2=C	3=E	TSLP-3-8

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	30	mA
Base current	I_B	3	
Total power dissipation ¹⁾ $T_S \leq 94^\circ\text{C}$	P_{tot}	160	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

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

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ¹⁾	R_{thJS}	≤ 350	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 $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	4	4.7	-	V
Collector-emitter cutoff current $V_{CE} = 13\text{ V}, V_{BE} = 0$	I_{CES}	-	-	30	μA
Collector-base cutoff current $V_{CB} = 5\text{ V}, I_E = 0$	I_{CBO}	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 0.5\text{ V}, I_C = 0$	I_{EBO}	-	-	3	μA
DC current gain $I_C = 25\text{ mA}, V_{CE} = 3\text{ V}$, pulse measured	h_{FE}	160	250	400	-

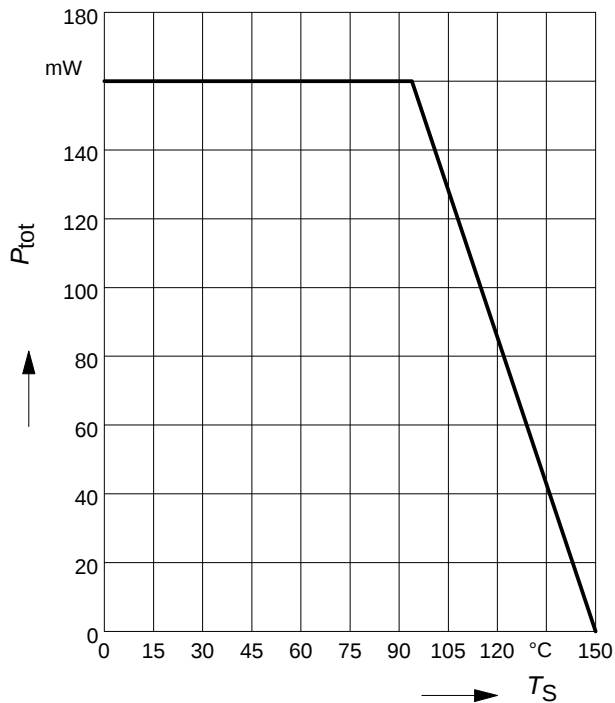
¹⁾For calculation of R_{thJA} please refer to Application Note Thermal Resistance

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

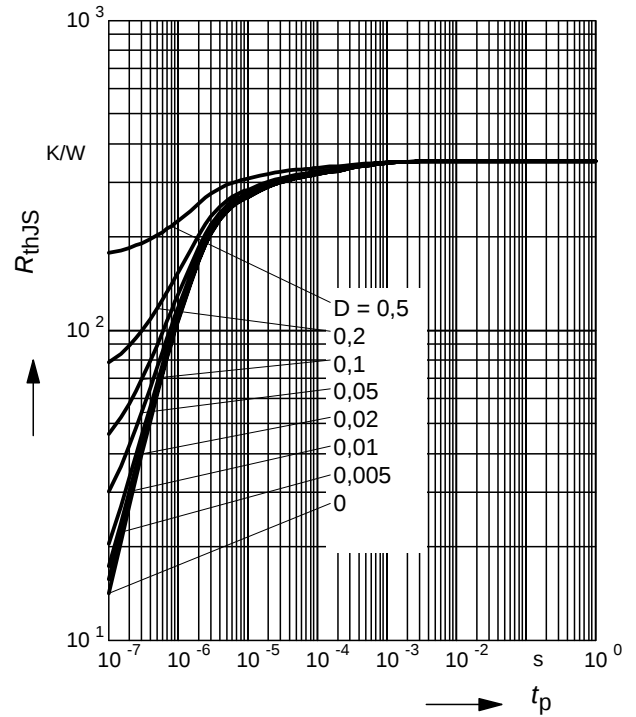
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency $I_C = 25\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 2\text{ GHz}$	f_T	-	42	-	GHz
Collector-base capacitance $V_{CB} = 3\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, emitter grounded	C_{cb}	-	0.1	0.16	pF
Collector emitter capacitance $V_{CE} = 3\text{ V}$, $f = 1\text{ MHz}$, $V_{BE} = 0$, 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}	-	0.38	-	
Noise figure $I_C = 8\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 1.8\text{ GHz}$, $Z_S = Z_{Sopt}$ $I_C = 8\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 6\text{ GHz}$, $Z_S = Z_{Sopt}$	F	- -	0.5 0.8	- -	dB
Power gain, maximum stable ¹⁾ $I_C = 25\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$	G_{ms}	-	24	-	dB
Power gain, maximum available ¹⁾ $I_C = 25\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 6\text{ GHz}$	G_{ma}	-	14.5	-	dB
Transducer gain $I_C = 25\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_L = 50\text{ }\Omega$, $f = 1.8\text{ GHz}$ $f = 6\text{ GHz}$	$ S_{21el} ^2$	- -	21.5 12	- -	dB
Third order intercept point at output ²⁾ $V_{CE} = 3\text{ V}$, $I_C = 25\text{ mA}$, $Z_S = Z_L = 50\text{ }\Omega$, $f = 1.8\text{ GHz}$	IP_3	-	25	-	dBm
1dB Compression point at output $I_C = 25\text{ mA}$, $V_{CE} = 3\text{ V}$, $Z_S = Z_L = 50\text{ }\Omega$, $f = 1.8\text{ GHz}$	P_{-1dB}	-	11	-	

¹⁾ $G_{ma} = |S_{21e} / S_{12e}| (k - (k^2 - 1)^{1/2})$, $G_{ms} = |S_{21e} / S_{12e}|$
²⁾ IP_3 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 $P_{\text{tot}} = f(T_S)$

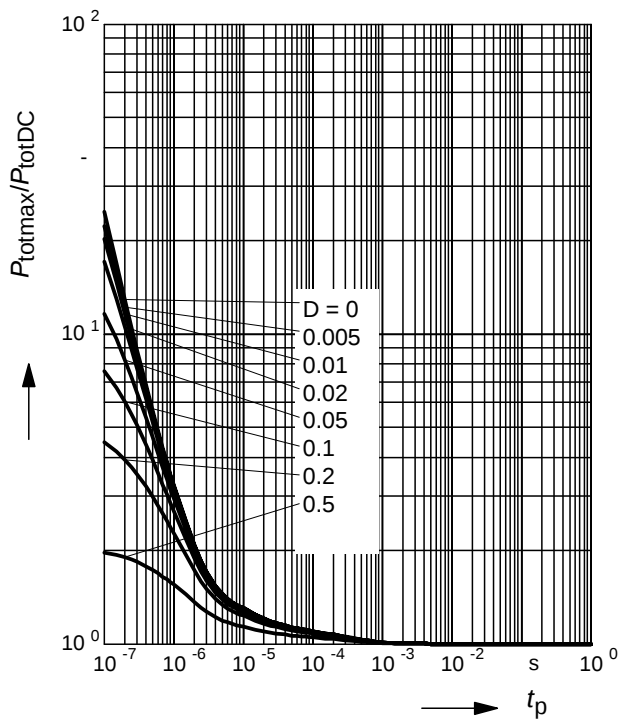


Permissible Pulse Load $R_{\text{thJS}} = f(t_p)$



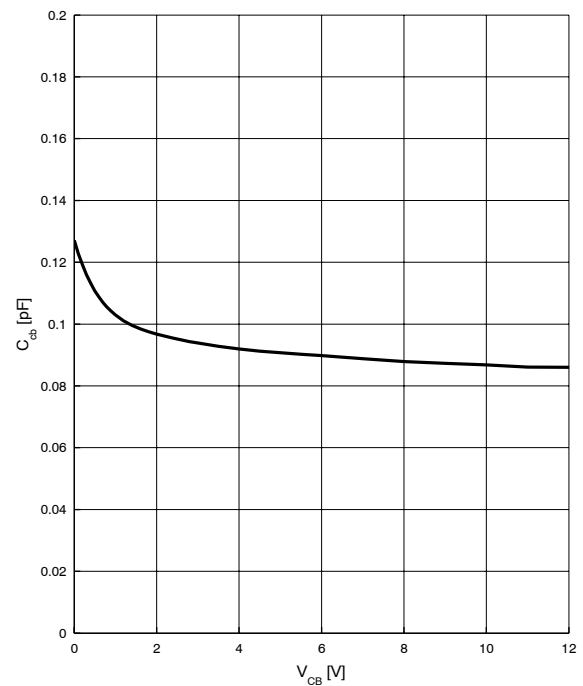
Permissible Pulse Load

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



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

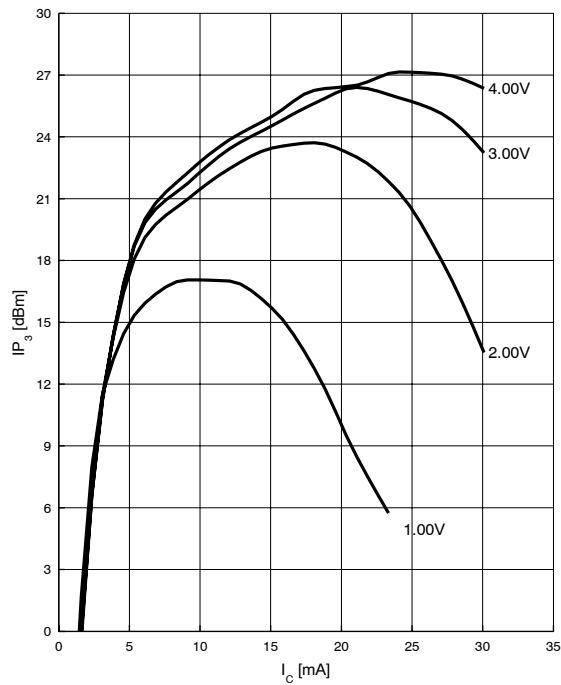
$f = 1 \text{ MHz}$



Third order Intercept Point $IP_3 = f(I_C)$

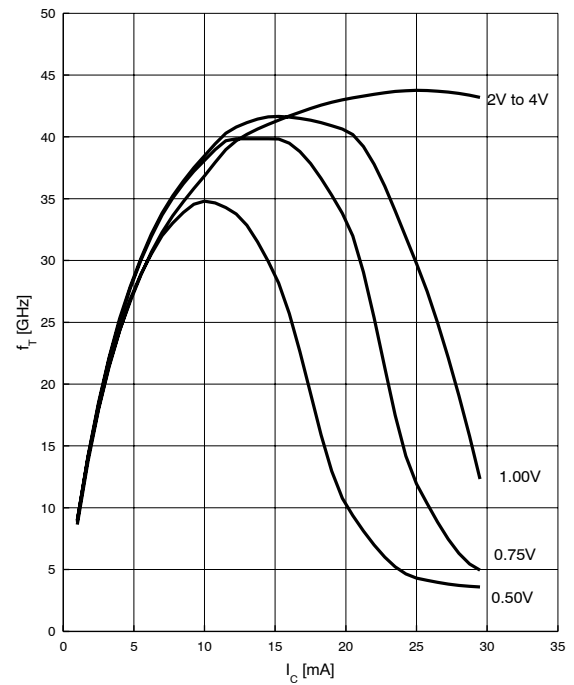
(Output, $Z_S = Z_L = 50 \Omega$)

$V_{CE} = \text{parameter}$, $f = 1.8 \text{ GHz}$



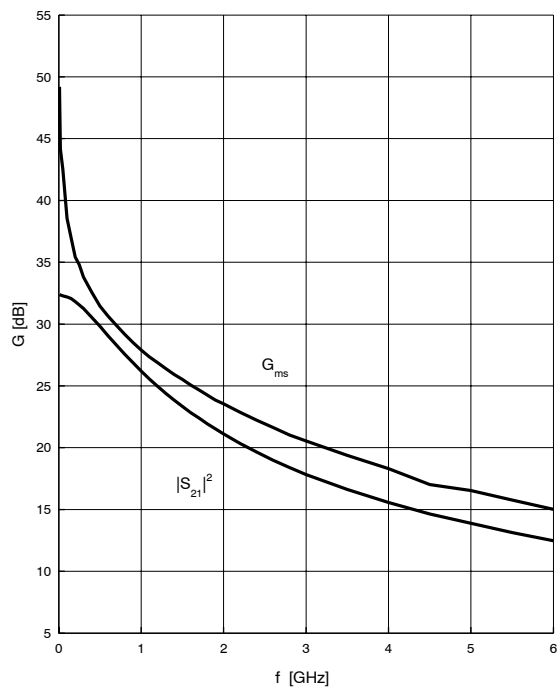
Transition frequency $f_T = f(I_C)$

$V_{CE} = \text{parameter}$, $f = 2 \text{ GHz}$



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

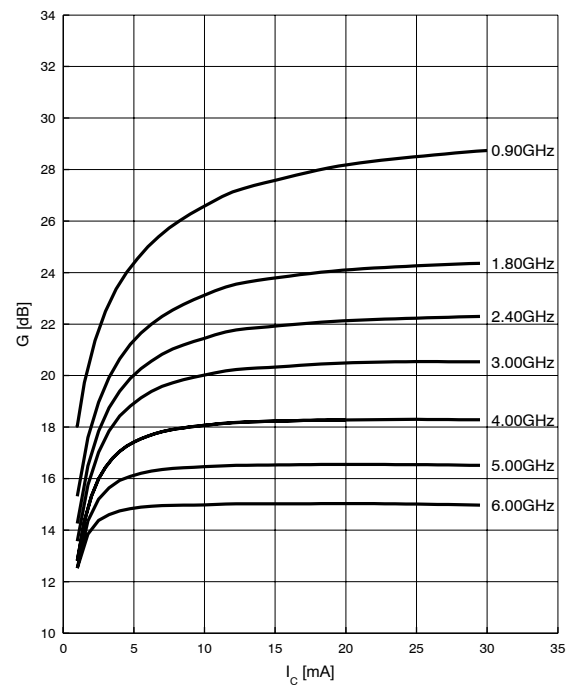
$V_{CE} = 3 \text{ V}$, $I_C = 25 \text{ mA}$



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

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

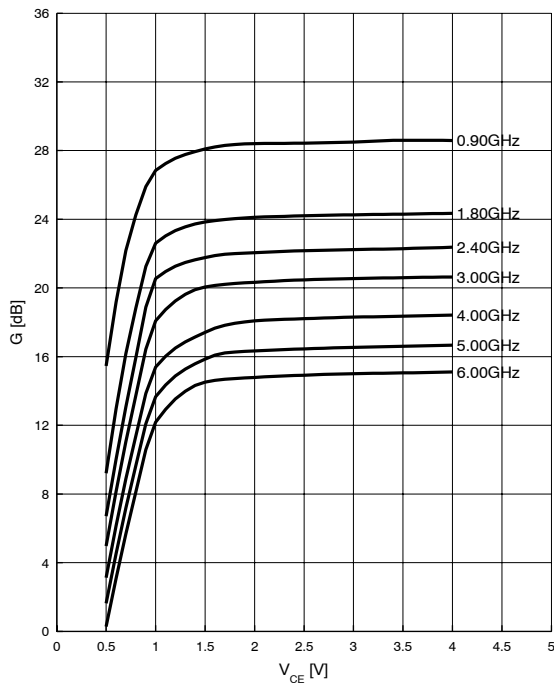
$f = \text{parameter}$



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

$I_C = 25 \text{ mA}$

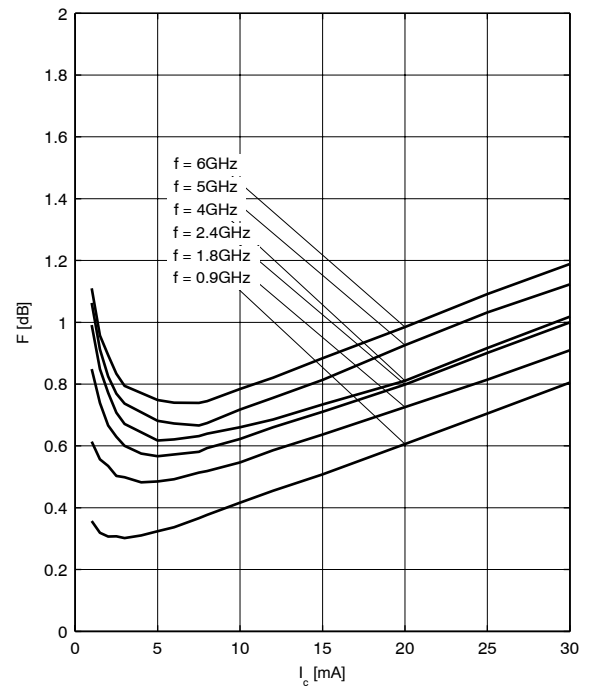
$f = \text{parameter}$



Noise figure $F = f(I_C)$

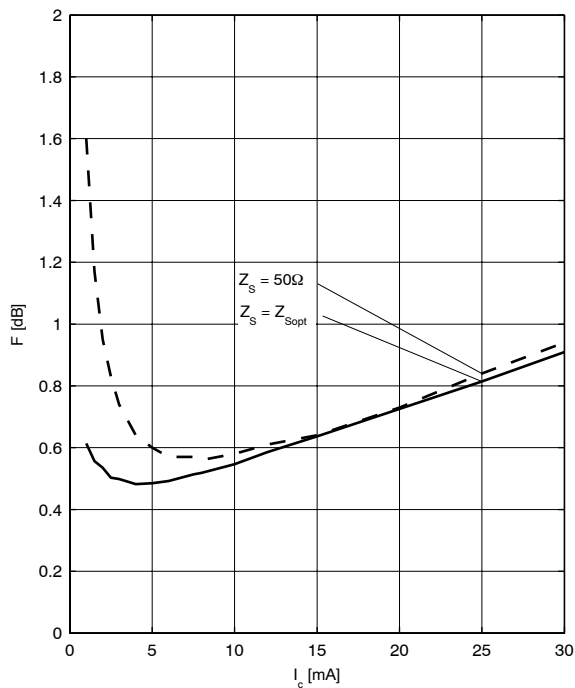
$V_{CE} = 3 \text{ V}$, $f = \text{parameter}$

$Z_S = Z_{Sopt}$



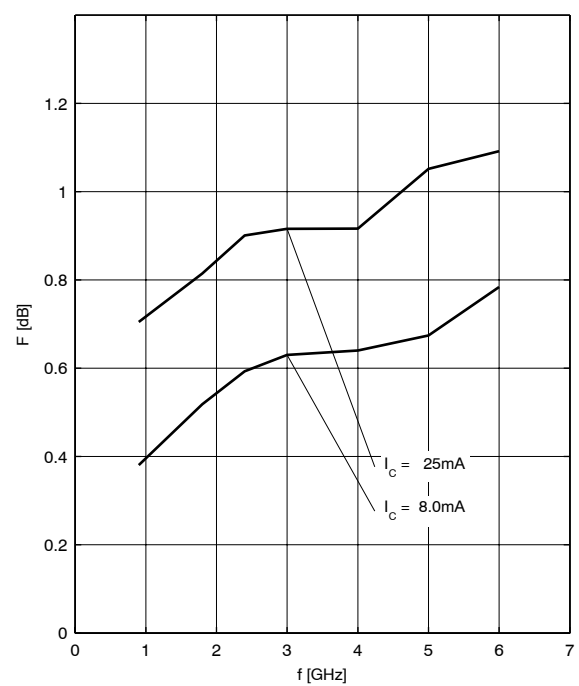
Noise figure $F = f(I_C)$

$V_{CE} = 3 \text{ V}$, $f = 1.8 \text{ GHz}$



Noise figure $F = f(f)$

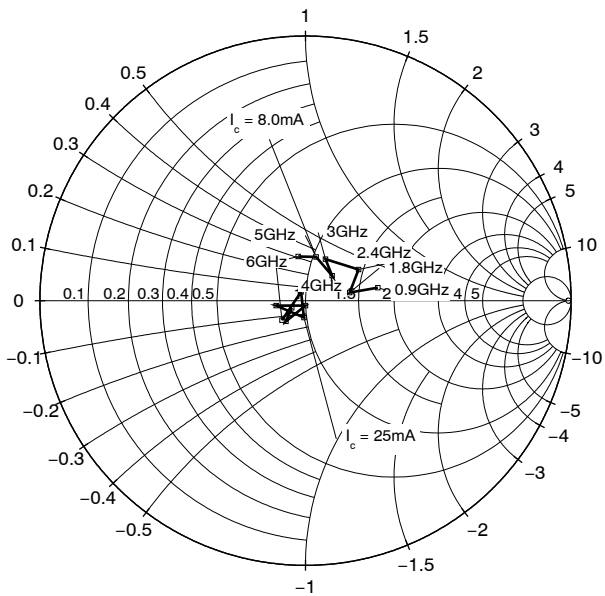
$V_{CE} = 3 \text{ V}$, $Z_S = Z_{Sopt}$



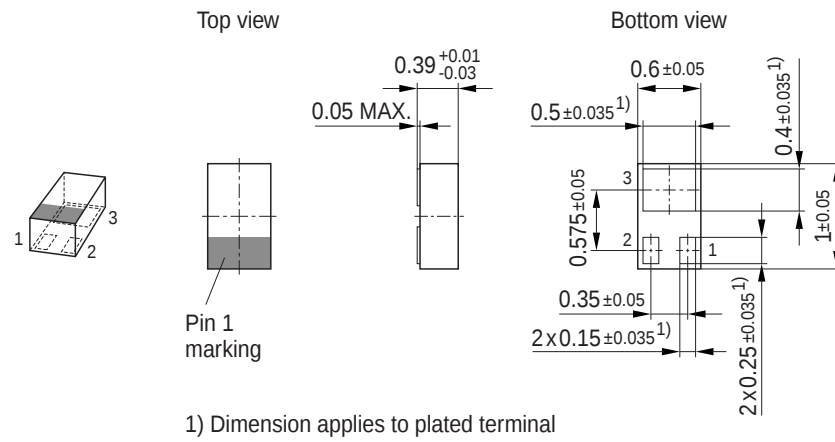
Source impedance for min.

noise figure vs. frequency

$V_{CE} = 3\text{ V}$, $I_C = 8\text{ mA} / 25\text{ mA}$

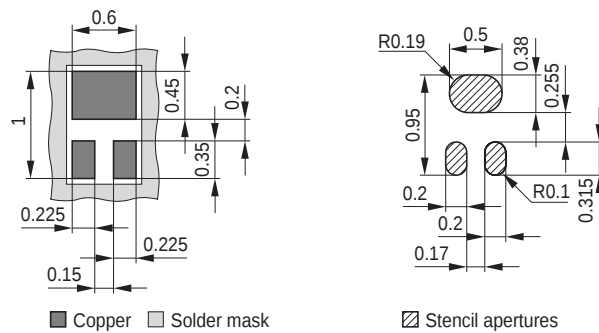


Package Outline

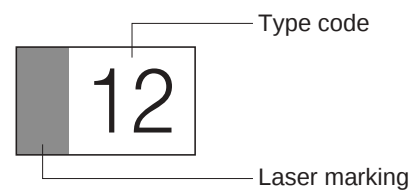


Foot Print

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

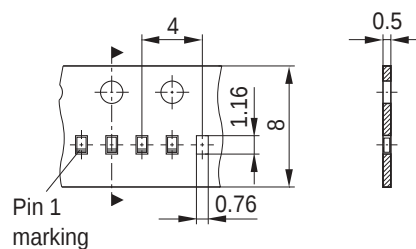


Marking Layout



Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



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