**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
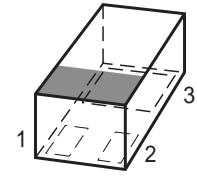
ESD (**E**lectro**s**tatic **d**ischarge) sensitive device, observe handling precaution!

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	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	30	mA
Base current	I_B	3	
Total power dissipation[1]	P_{tot}	160	mW
T_S ≤ 94°C			
Junction temperature	T_j	150	°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

2005-10-17

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[1]	R_{thJS}	≤ 350	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}	-	-	3	µA
DC current gain I_C = 25 mA, V_{CE} = 3 V, pulse measured	h_{FE}	160	250	400	-

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

2005-10-17

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

Parameter	Symbol	min.	typ.	max.	Unit
AC Characteristics (verified by random sampling)					
Transition frequency I_C = 25 mA, V_{CE} = 3 V, f = 2 GHz	f_T	-	42	-	GHz
Collector-base capacitance V_{CB} = 3 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.1	0.16	pF
Collector emitter capacitance V_{CE} = 3 V, f = 1 MHz, V_{BE} = 0 , base grounded	C_{ce}	-	0.18	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	0.38	-	
Noise figure I_C = 8 mA, V_{CE} = 3 V, f = 1.8 GHz, $Z_S = Z_{Sopt}$ I_C = 8 mA, V_{CE} = 3 V, f = 6 GHz, $Z_S = Z_{Sopt}$	F	 - -	 0.5 0.8	 - -	dB
Power gain, maximum stable[1] I_C = 25 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 = 25 mA, V_{CE} = 3 V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, f = 6 GHz	G_{ma}	-	14.5	-	dB
Transducer gain I_C = 25 mA, V_{CE} = 3 V, $Z_S = Z_L$ = 50 Ω, f = 1.8 GHz f = 6 GHz	$|S_{21e}|^2$	 - -	 21.5 12	 - -	dB
Third order intercept point at output[2] V_{CE} = 3 V, I_C = 25 mA, $Z_S = Z_L$ = 50 Ω, f = 1.8 GHz	IP_3	-	25	-	dBm
1dB Compression point at output I_C = 25 mA, V_{CE} = 3 V, $Z_S = Z_L$ = 50 Ω, f = 1.8 GHz	P_{-1dB}	-	11	-	

[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 50Ω from 0.1 MHz to 6 GHz

2005-10-17

**Total power dissipation** $P_{tot} = f(T_S)$
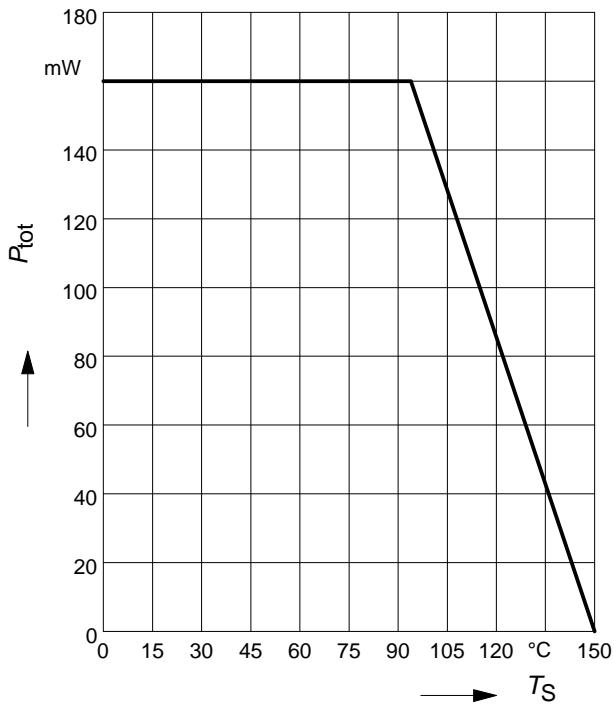
Permissible Pulse Load $R_{thJS} = f(t_p)$
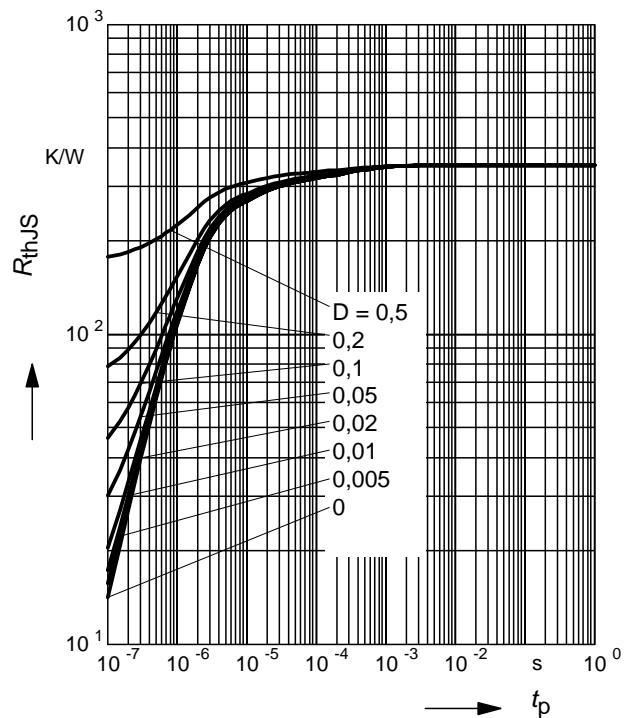

Permissible Pulse Load

$P_{totmax}/P_{totDC} = f(t_p)$
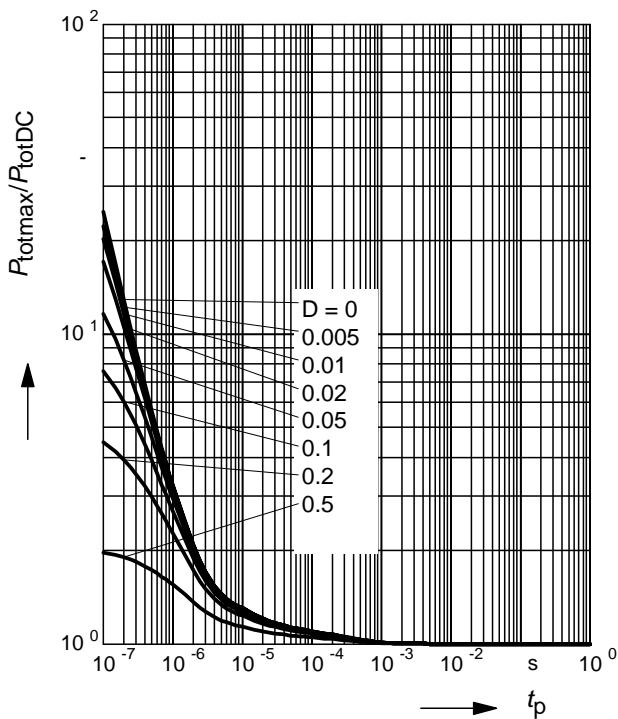
**Collector-base capacitance** $C_{cb} = f(V_{CB})$

$f = 1\ \text{MHz}$

4   2005-10-17
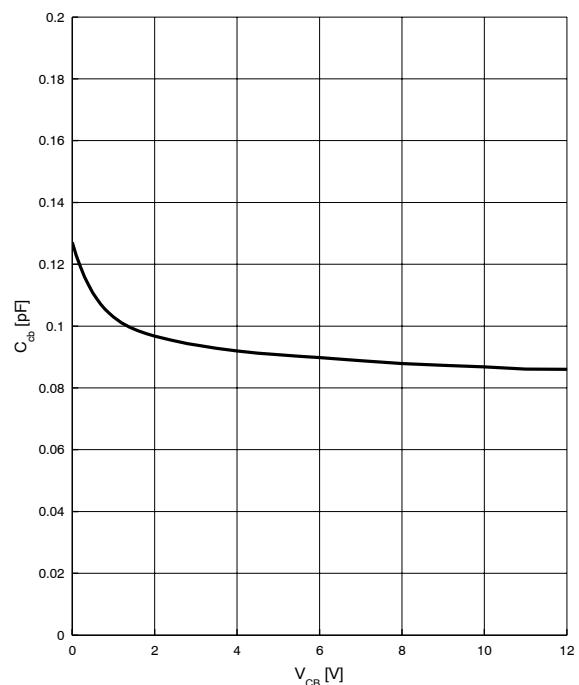
Third order Intercept Point $IP_3 = f\,(I_C)$

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

V_{CE} = parameter, f = 1.8 GHz

Transition frequency $f_T = f(I_C)$

V_{CE} = parameter, f = 2 GHz
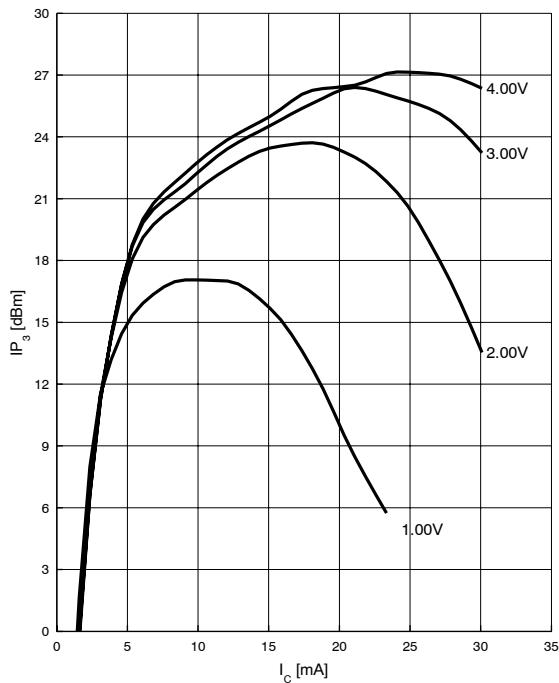
Power gain G_{ma}, $G_{ms} = f\,(f)$
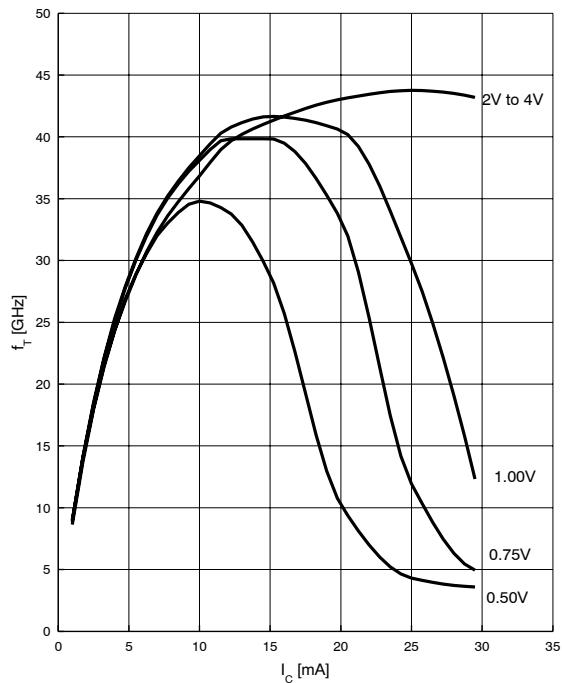
V_{CE} = 3 V, I_C = 25 mA

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

V_{CE} = 3 V

f = parameter

2005-10-17
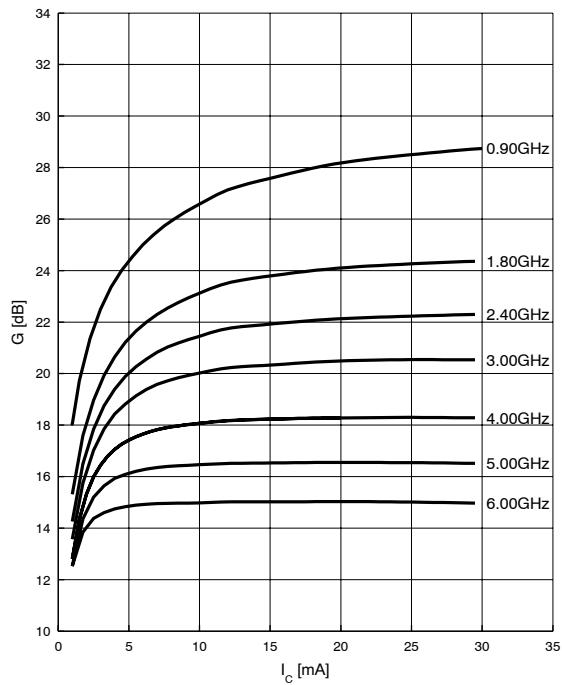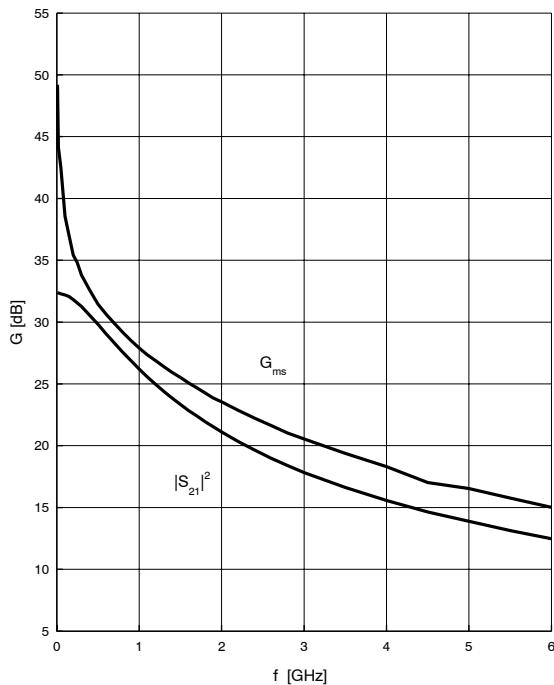
Power gain G_{ma}, $G_{ms} = f\ (V_{CE})$

$I_C = 25$ mA

f = parameter

Noise figure $F = f(I_C)$

$V_{CE} = 3$ V, f = parameter
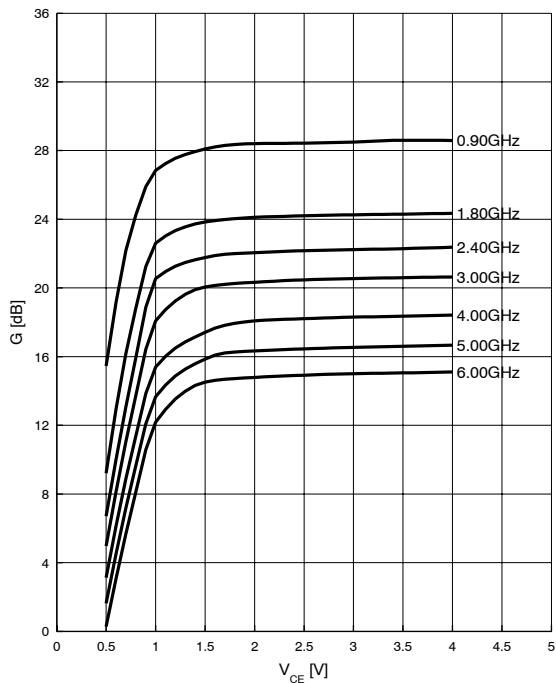
$Z_S = Z_{Sopt}$

Noise figure $F = f(I_C)$

$V_{CE} = 3$V, $f = 1.8$ GHz
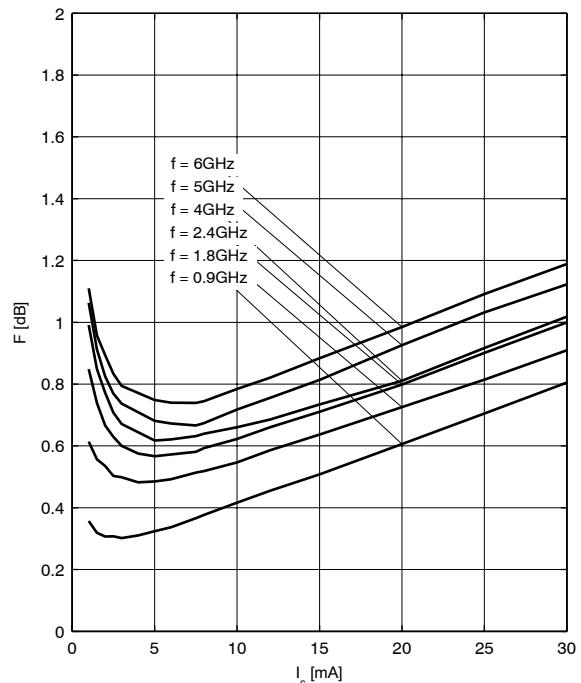
Noise figure $F = f(f)$

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

2005-10-17
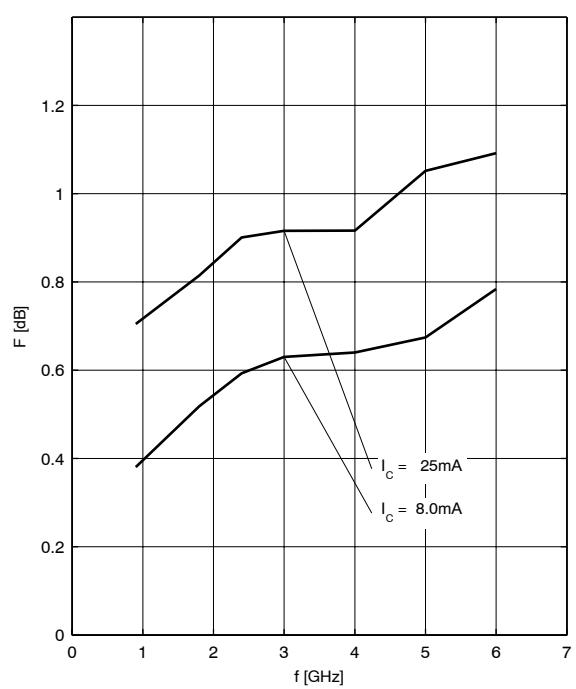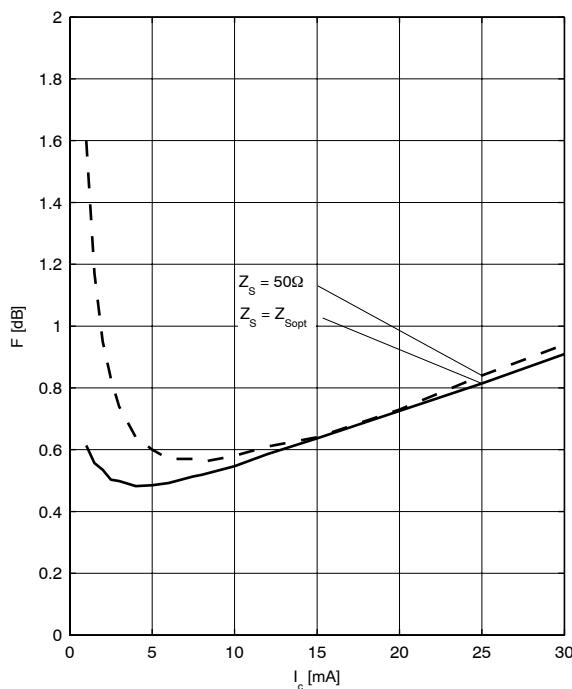
Source impedance for min.

noise figure vs. frequency

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

Package Outline

Top view

Bottom view

$0.39^{+0.01}_{-0.03}$

0.05 MAX.

0.6 ± 0.05

0.5 ± 0.035 [1]

0.4 ± 0.035 [1]

0.575 ± 0.05

1 ± 0.05

3

2

1

0.35 ± 0.05

$2 \times 0.15 \pm 0.035$ [1]

$2 \times 0.25 \pm 0.035$ [1]

1

2

3

Pin 1
marking

1) Dimension applies to plated terminal
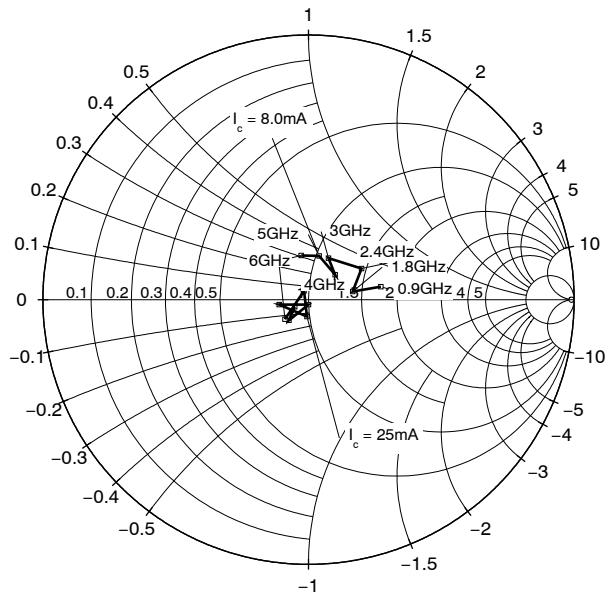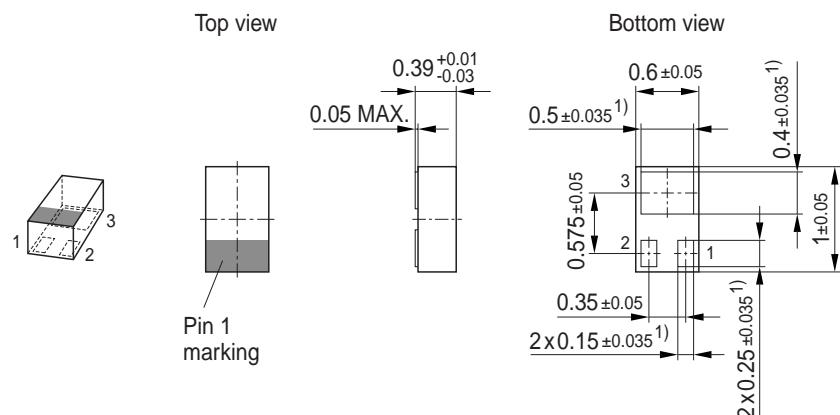
Foot Print

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

0.6

0.45

0.2

1

0.35

0.225

0.225

0.15

R0.19

0.5

0.38

0.255

0.95

0.315

0.2

R0.1

0.2

0.17

■ Copper   □ Solder mask

▨ Stencil apertures

Marking Layout

Type code

12

Laser marking
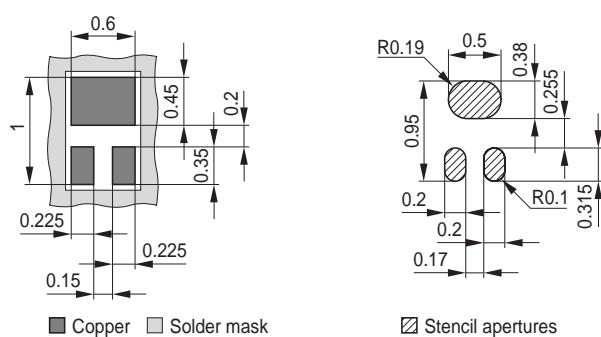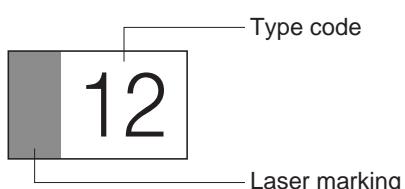
Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel
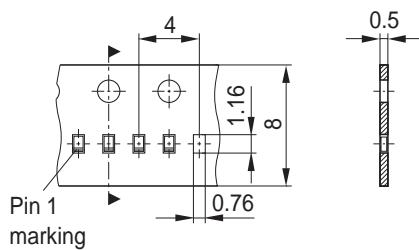
4

1.16

8

0.5

Pin 1
marking

0.76

2005-10-17

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2005-10-17