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[BFR750L3RHE6327XTSA1](#)

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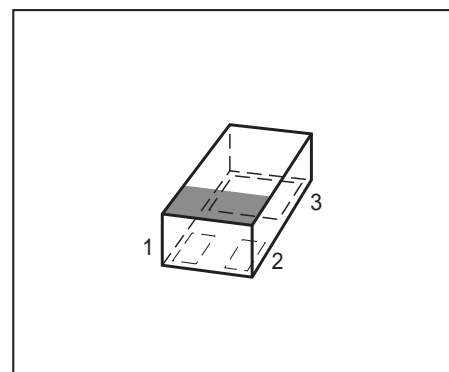
[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)



## BFR750L3RH

### 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
- Ideal for WLAN and all 5-6 GHz applications
- High  $OIP_3$  and  $P_{-1dB}$  for driver stages
- High maximum stable and available gain  
 $G_{ms} = 21$  dB at 1.8 GHz,  $G_{ma} = 11.5$  dB at 6 GHz
- 150 GHz  $f_T$ -Silicon Germanium technology
- Extremely small and flat leadless package, reduced height 0.32 mm max.
- Pb-free (RoHS compliant) package<sup>1)</sup>
- Qualified according AEC Q101



\* Short term description



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

Type	Marking	Pin Configuration			Package
BFR750L3RH	R8	1=B	2=C	3=E	TSLP-3-9

<sup>1</sup>Pb-containing package may be available upon special request



## BFR750L3RH

### Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage $T_A > 0^\circ\text{C}$ $T_A \leq 0^\circ\text{C}$	$V_{\text{CEO}}$	4 3.5	V
Collector-emitter voltage	$V_{\text{CES}}$	13	
Collector-base voltage	$V_{\text{CBO}}$	13	
Emitter-base voltage	$V_{\text{EBO}}$	1.2	
Collector current	$I_{\text{C}}$	90	mA
Base current	$I_{\text{B}}$	9	
Total power dissipation <sup>1)</sup> $T_{\text{S}} \leq 96^\circ\text{C}$	$P_{\text{tot}}$	360	mW
Junction temperature	$T_{\text{j}}$	150	$^\circ\text{C}$
Ambient temperature	$T_{\text{A}}$	-65 ... 150	
Storage temperature	$T_{\text{stg}}$	-65 ... 150	

### Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>2)</sup>	$R_{\text{thJS}}$	$\leq 150$	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 $I_{\text{C}} = 3 \text{ mA}, I_{\text{B}} = 0$	$V_{(\text{BR})\text{CEO}}$	4	4.7	-	V
Collector-emitter cutoff current $V_{\text{CE}} = 13 \text{ V}, V_{\text{BE}} = 0$	$I_{\text{CES}}$	-	-	100	$\mu\text{A}$
Collector-base cutoff current $V_{\text{CB}} = 5 \text{ V}, I_{\text{E}} = 0$	$I_{\text{CBO}}$	-	-	100	nA
Emitter-base cutoff current $V_{\text{EB}} = 0.5 \text{ V}, I_{\text{C}} = 0$	$I_{\text{EBO}}$	-	-	10	$\mu\text{A}$
DC current gain $I_{\text{C}} = 60 \text{ mA}, V_{\text{CE}} = 3 \text{ V}$ , pulse measured	$h_{\text{FE}}$	160	250	400	-

<sup>1</sup>  $T_{\text{S}}$  is measured on the collector lead at the soldering point to the pcb

<sup>2</sup> For calculation of  $R_{\text{thJA}}$  please refer to Application Note Thermal Resistance

$R_{\text{thJS}}$  demanded by  $P_{\text{tot}}$  and  $T_{\text{S}}$ , to be fulfilled by design



## BFR750L3RH

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics</b> (verified by random sampling)					
Transition frequency $I_C = 60\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 2\text{ GHz}$	$f_T$	-	37	-	GHz
Collector-base capacitance $V_{CB} = 3\text{ V}$ , $f = 1\text{ MHz}$ , emitter grounded	$C_{cb}$	-	0.24	0.42	pF
Collector emitter capacitance $V_{CE} = 3\text{ V}$ , $f = 1\text{ MHz}$ , base grounded	$C_{ce}$	-	0.31	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , collector grounded	$C_{eb}$	-	0.97	-	
Noise figure $I_C = 25\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_{Sopt}$ $I_C = 25\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 6\text{ GHz}$ , $Z_S = Z_{Sopt}$	$F$	-	0.6 1.1	-	dB
Power gain, maximum stable <sup>1)</sup> $I_C = 60\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8\text{ GHz}$	$G_{ms}$	-	21	-	dB
Power gain, maximum available <sup>1)</sup> $I_C = 60\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 6\text{ GHz}$	$G_{ma}$	-	11.5	-	dB
Transducer gain $I_C = 60\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ , $f = 1.8\text{ GHz}$ $I_C = 60\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ , $f = 6\text{ GHz}$	$ S_{21e} ^2$	-	18 8	-	dB
Third order intercept point at output <sup>2)</sup> $V_{CE} = 3\text{ V}$ , $I_C = 60\text{ mA}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_L = 50\ \Omega$	$IP_3$	-	29.5	-	dBm
1dB Compression point at output $I_C = 60\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ , $f = 1.8\text{ GHz}$	$P_{-1dB}$	-	16.5	-	

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

<sup>2</sup>IP3 value depends on termination of all intermodulation frequency components.

Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz



**BFR750L3RH**

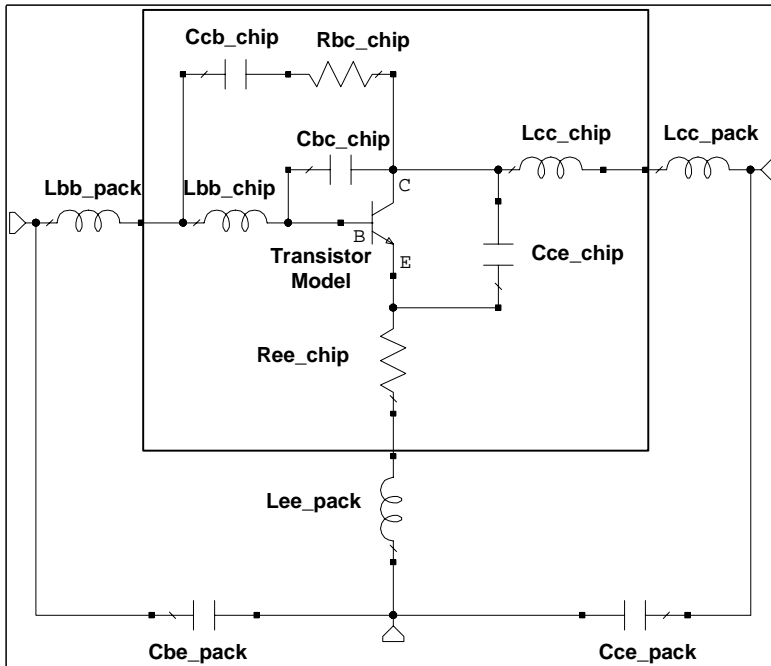
**SPICE Parameter (Gummel-Poon Model, Berkley-SPICE 2G.6 Syntax):**

**Transistor Chip Data:**

IS =	2.66 e-12	mA	BF =	753	-	NF =	1.015	-
VAF =	95	V	IKF =	292	mA	ISE =	1.54 e-11	mA
NE =	1.8	-	BR =	76	-	NR =	1	-
VAR =	1.33	V	IKR =	1.33	mA	ISC =	1 e-27	mA
NC =	2	-	RB =	1	Ω	IRB =	1 e15	A
RBM =	0.9	Ω	RE =	20	mΩ	RC =	0.9	Ω
CJE =	0.475	pF	VJE =	0.69	V	MJE =	0.085	-
TF =	0.0021	ns	XTF =	3	-	VTF =	2.1	V
ITF =	2540	mA	PTF =	0.5	-	CJC =	0.173	pF
VJC =	0.45	V	MJC =	0.31	-	XCJC =	0.01	-
TR =	1.2	ns	CJS =	0.325	pF	VJS =	0.65	V
MJS =	0.25	-	XTB =	-2.2	-	EG =	1.11	-
XTI =	0.436	-	FC =	0.5	-	TNOM	25	°C
AF =	1	-	KF =	0	-			

All parameters are ready to use, no scaling is necessary.

**Package Equivalent Circuit:**



$L_{bb\_chip}$	=	0.212	nA
$L_{cc\_chip}$	=	0.07472	nH
$L_{bb\_pack}$	=	0.0184	nH
$L_{cc\_pack}$	=	0.277	nH
$L_{ee\_pack}$	=	0.239	nH
$C_{bc\_chip}$	=	0.015	pF
$C_{cb\_chip}$	=	0.013	pF
$C_{ce\_chip}$	=	0.282	pF
$C_{be\_pack}$	=	0.064	pF
$C_{ce\_pack}$	=	0.0492	pF
$R_{bc\_chip}$	=	7	Ω
$R_{ee\_chip}$	=	0.566	Ω

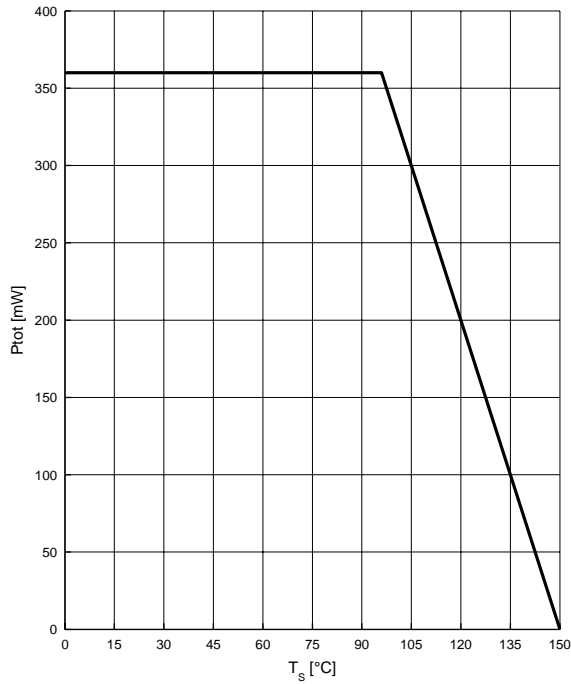
Valid up to 6GHz

For examples and ready to use parameters please contact your local Infineon Technologies distributor or sales office to obtain a Infineon Technologies CD-ROM or see Internet: <http://www.infineon.com>

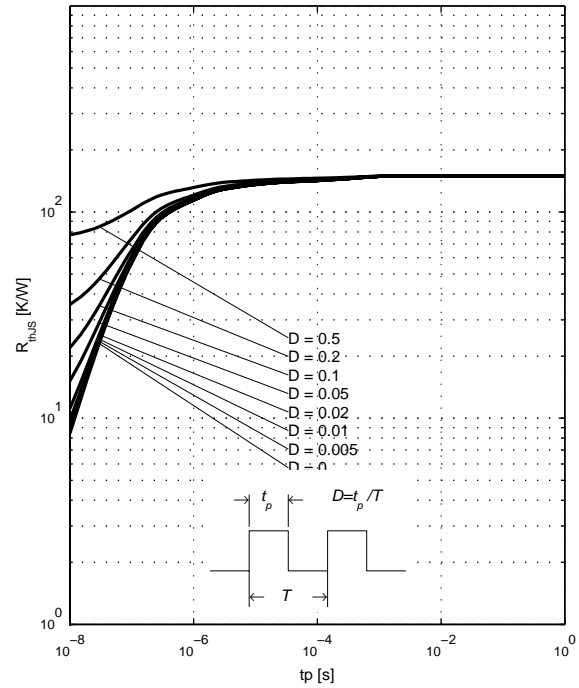


**BFR750L3RH**

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

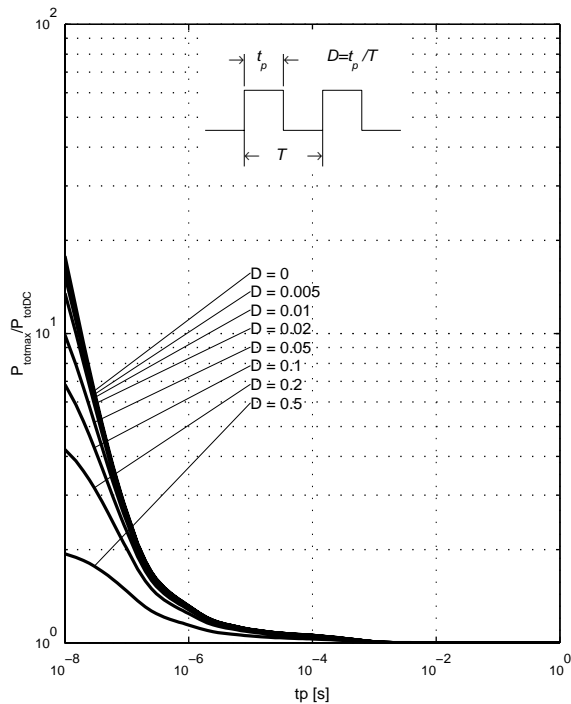


**Permissible Puls Load  $R_{thJS} = f(t_p)$**



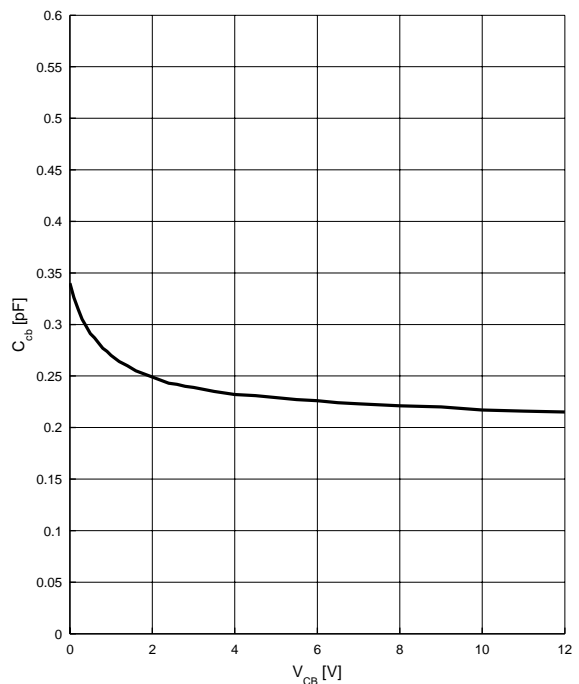
**Permissible Pulse Load**

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



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

$f = 1 \text{ MHz}$

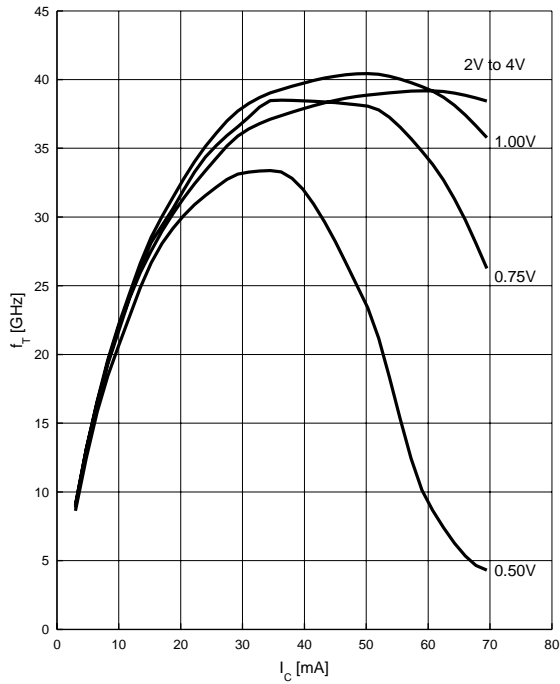




**BFR750L3RH**

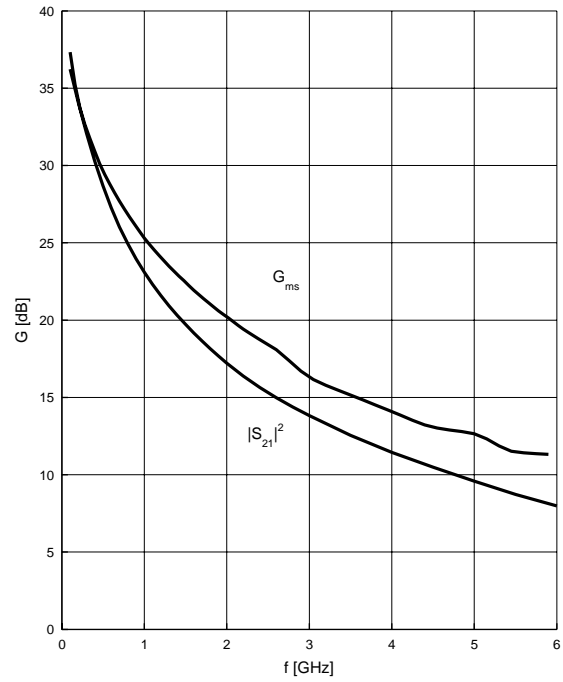
**Transition frequency  $f_T = f(I_C)$**

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



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

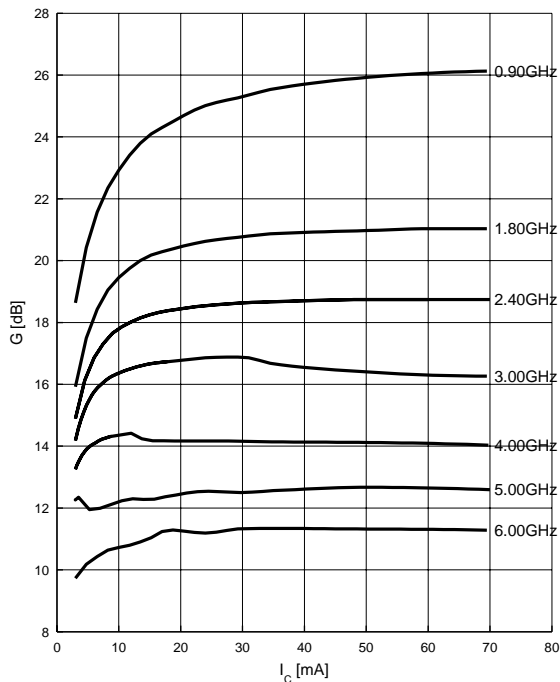
$V_{CE} = 3 \text{ V}, I_C = 60 \text{ mA}$



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

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

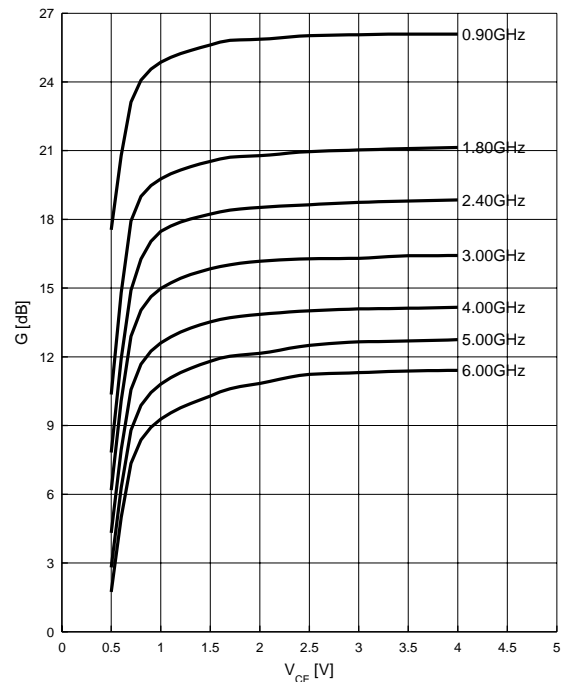
$f = \text{parameter}$



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

$I_C = 60 \text{ mA}$

$f = \text{parameter}$

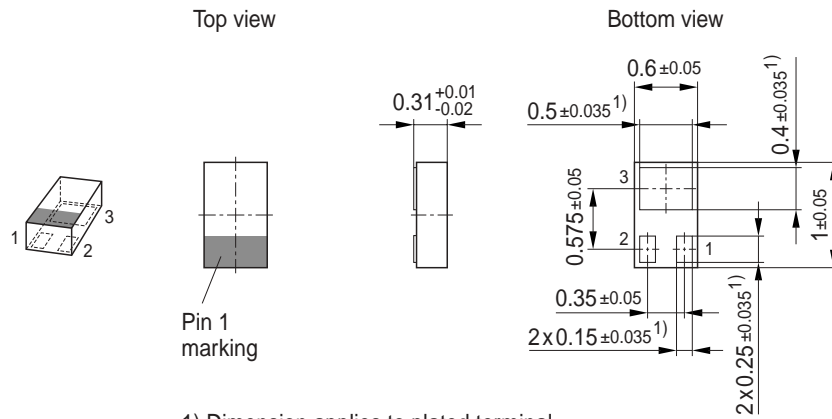




**Package TSLP-3-9**

**BFR750L3RH**

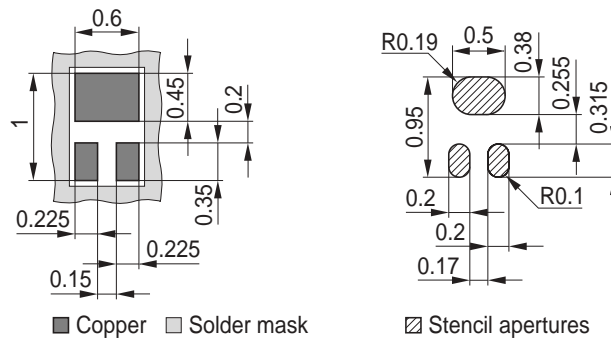
**Package Outline**



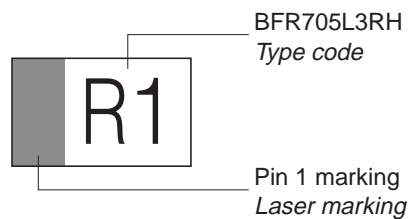
1) Dimension applies to plated terminal

**Foot Print**

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

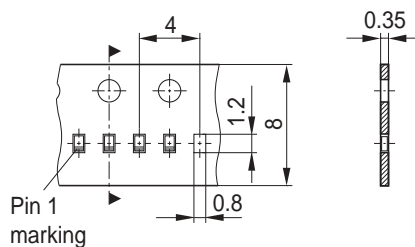


**Marking Layout (Example)**



**Standard Packing**

Reel ø180 mm = 15.000 Pieces/Reel







**BFR750L3RH**

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