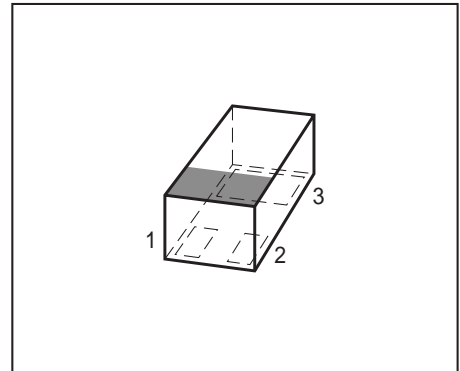**NPN Silicon RF Transistor***

- Low voltage/ Low current operation
- Transition frequency of 14 GHz
- High insertion gain
- Ideal for low current amplifiers and oscillators
- Pb-free (RoHS compliant) package[1]
- Qualified according AEC Q101

* Short term description

AEC Qualified **RoHS**

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

Type	Marking	Pin Configuration			Package
BFR340L3	FA	1 = B	2 = E	3 = C	TSLP-3-1

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	6	V
Collector-emitter voltage	V_{CES}	15	
Collector-base voltage	V_{CBO}	15	
Emitter-base voltage	V_{EBO}	2	
Collector current	I_C	10	mA
Base current	I_B	2	
Total power dissipation[2] $T_S \le 120°C$	P_{tot}	60	mW
Junction temperature	T_i	150	°C
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[3]	R_{thJS}	tbd	K/W

[1]Pb-containing package may be available upon special request
[2]T_S is measured on the collector lead at the soldering point to the pcb
[3]For calculation of R_{thJA} please refer to Application Note Thermal Resistance

2007-03-30

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, $I_B = 0$	$V_{(BR)CEO}$	6	9	-	V
Collector-emitter cutoff current $V_{CE} = 15$ V, $V_{BE} = 0$	I_{CES}	-	-	10	µA
Collector-base cutoff current $V_{CB} = 5$ V, $I_E = 0$	I_{CBO}	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 1$ V, $I_C = 0$	I_{EBO}	-	-	1	µA
DC current gain $I_C = 5$ mA, $V_{CE} = 3$ V, pulse measured	h_{FE}	90	120	160	-

2007-03-30

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 = 6 mA, V_{CE} = 3 V, f = 1 GHz	f_T	10	14	-	GHz
Collector-base capacitance V_{CB} = 5 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.17	0.4	pF
Collector emitter capacitance V_{CE} = 5 V, f = 1 MHz, V_{BE} = 0 , base grounded	C_{ce}	-	0.13	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	0.12	-	
Noise figure I_C = 1 mA, V_{CE} = 3 V, Z_S = Z_{Sopt}, f = 1.8 GHz	F_{min}	-	1.15	-	dB
Power gain, maximum stable[1] I_C = 5 mA, V_{CE} = 3 V, Z_S = Z_{Sopt} , Z_L = Z_{Lopt}, f = 1.8 GHz	G_{ms}	-	17.5	-	-
Power gain, maximum available[1] I_C = 5 mA, V_{CE} = 3 V, Z_S = Z_{Sopt} , Z_L = Z_{Lopt} , f = 3 GHz	G_{ma}	-	13	-	dB
Transducer gain I_C = 5 mA, V_{CE} = 3 V, Z_S = Z_L = 50Ω , f = 1.8 GHz f = 3 GHz	$\lvert S_{21e}\rvert^2$	 - -	 14 10	 - -	dB
Third order intercept point at output[2] V_{CE} = 3 V, I_C = 5 mA, f = 1.8 GHz, Z_S = Z_L = 50Ω	IP_3	-	12.5	-	dBm
1dB Compression point at output I_C = 5 mA, V_{CE} = 3 V, Z_S = Z_L = 50Ω , f = 1.8 GHz	P_{-1dB}	-	-1	-	

[1] G_{ma} = $\lvert S_{21e} / S_{12e}\rvert$ (k-(k²-1)$^{1/2}$), G_{ms} = $\lvert S_{21e} / S_{12e}\rvert$
[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

2007-03-30

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

Transistor Chip Data:

IS =	6.12	fA	BF =	98.48	-	NF =	0.4213	-
VAF =	42.228	V	IKF =	103	mA	ISE =	11.768	nA
NE =	2.4753	-	BR =	19.61	-	NR =	0.3253	-
VAR =	16.777	V	IKR =	0.834	A	ISC =	3.632	nA
NC =	0.8956	-	RB =	59.99	Ω	IRB =	0.01	mA
RBM =	0.2403	Ω	RE =	3.677	-	RC =	5.2493	Ω
CJE =	182	fF	VJE =	0.626	V	MJE =	0.4172	-
TF =	10.3	ps	XTF =	0	-	VTF =	0.262	V
ITF =	0.0017	mA	PTF =	0	deg	CJC =	222.63	fF
VJC =	0.5487	V	MJC =	0.319	-	XCJC =	0.3904	-
TR =	2.71	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	NK =	0.5	-	EG =	1.11	eV
XTI =	0	-	FC =	0.735		TNOM	300	K

All parameters are ready to use, no scalling is necessary. Extracted on behalf of Infineon Technologies AG by: Institut für Mobil- und Satellitentechnik (IMST)
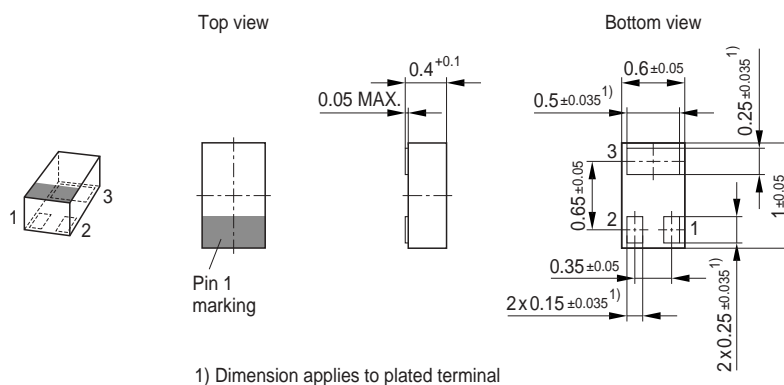
Package Equivalent Circuit:
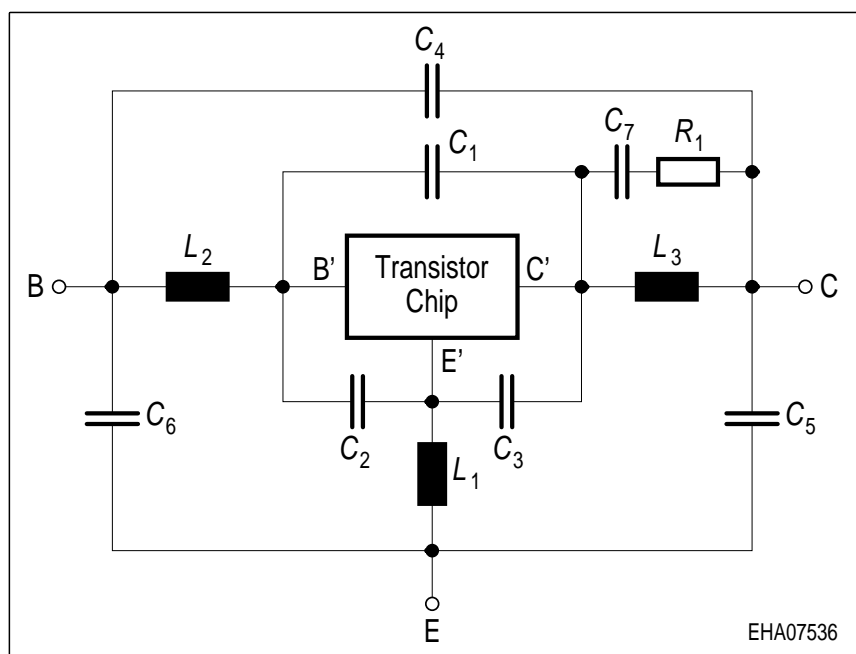
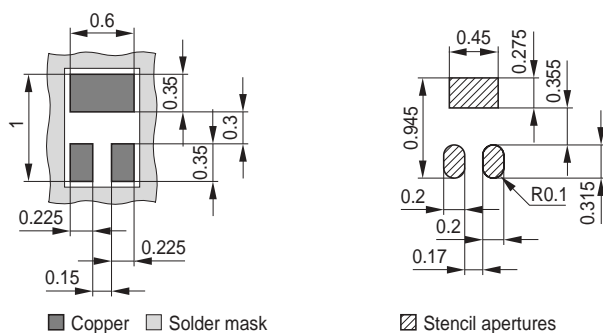|		
L_1 =	0.575	nH
L_2 =	0.575	nH
L_3 =	0.275	nH
C_1 =	33	fF
C_2 =	28	fF
C_3 =	131	fF
C_4 =	8	fF
C_5 =	8	fF
C_6 =	24	fF
C_7 =	300	fF
R_1 =	204	Ω

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
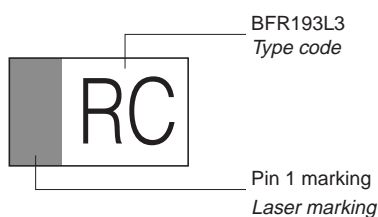
Package Outline

Top view   Bottom view

$0.4^{+0.1}$

0.05 MAX.

0.5 ± 0.035 1) 0.6 ± 0.05 0.25 ± 0.035 1)

3

0.65 ± 0.05

1 ± 0.05

2   1

0.35 ± 0.05

$2 \times 0.15 \pm 0.035$ 1)

$2 \times 0.25 \pm 0.035$ 1)

Pin 1
marking

1) Dimension applies to plated terminal

Foot Print

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

0.6

0.35

0.3

1

0.35

0.225

0.225

0.15

0.45   0.275

0.355

0.945

0.2   R0.1   0.315

0.2

0.17

■ Copper   □ Solder mask   ▨ Stencil apertures

Marking Layout (Example)

BFR193L3
Type code

RC

Pin 1 marking
Laser marking

Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel
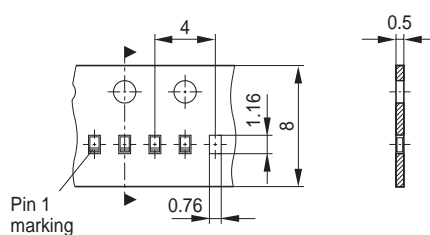
4   0.5

1.16

8

Pin 1
marking   0.76

Attention please!

The information given in this dokument shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie"). With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office (**www.infineon.com**).

Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.
Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system.
Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.