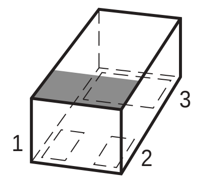
NPN Silicon RF Transistor*

- For low noise, high-gain amplifiers up to 2 GHz
- For linear broadband amplifiers
- f_T = 8 GHz, F = 1 dB at 900 MHz

* Short term description



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

Type	Marking	Pin Configuration			Package
BFR193L3	RC	1 = B	2 = E	3 = C	TSLP-3-1

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	12	V
Collector-emitter voltage	V_{CES}	20	
Collector-base voltage	V_{CBO}	20	
Emitter-base voltage	V_{EBO}	2	
Collector current	I_C	80	mA
Base current	I_B	10	
Total power dissipation[1)] $T_S \le 95°C$	P_{tot}	580	mW
Junction temperature	T_j	150	°C
Ambient temperature	T_A	-55 ... 150	
Storage temperature	T_{stg}	-55 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[2)]	R_{thJS}	tbd	K/W

[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°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	12	-	-	V
Collector-emitter cutoff current V_{CE} = 20 V, V_{BE} = 0	I_{CES}	-	-	100	µA
Collector-base cutoff current V_{CB} = 10 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 = 30 mA, V_{CE} = 8 V, pulse measured	h_{FE}	70	100	140	-

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 = 50 mA, V_{CE} = 8 V, f = 500 MHz	f_T	6	8	-	GHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.63	0.9	pF
Collector emitter capacitance V_{CE} = 10 V, f = 1 MHz, V_{BE} = 0 , base grounded	C_{ce}	-	0.22	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	2.25	-	
Noise figure I_C = 10 mA, V_{CE} = 8 V, $Z_S = Z_{Sopt}$, f = 900 MHz I_C = 10 mA, V_{CE} = 8 V, $Z_S = Z_{Sopt}$, f = 1.8 GHz	F	 - -	 1 1.6	 - -	dB
Power gain, maximum available[1)] I_C = 30 mA, V_{CE} = 8 V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, f = 900 MHz I_C = 30 mA, V_{CE} = 8 V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, f = 1.8 GHz	G_{ma}	 - -	 19 12.5	 - -	
Transducer gain I_C = 30 mA, V_{CE} = 8 V, $Z_S = Z_L$ = 50Ω , f = 900 MHz I_C = 30 mA, V_{CE} = 8 V, $Z_S = Z_L$ = 50Ω , f = 1.8 GHz	$\|S_{21e}\|^2$	 - -	 14.5 9	 - -	dB

[1] $G_{ma} = |S_{21} / S_{12}| \, (k-(k^2-1)^{1/2})$

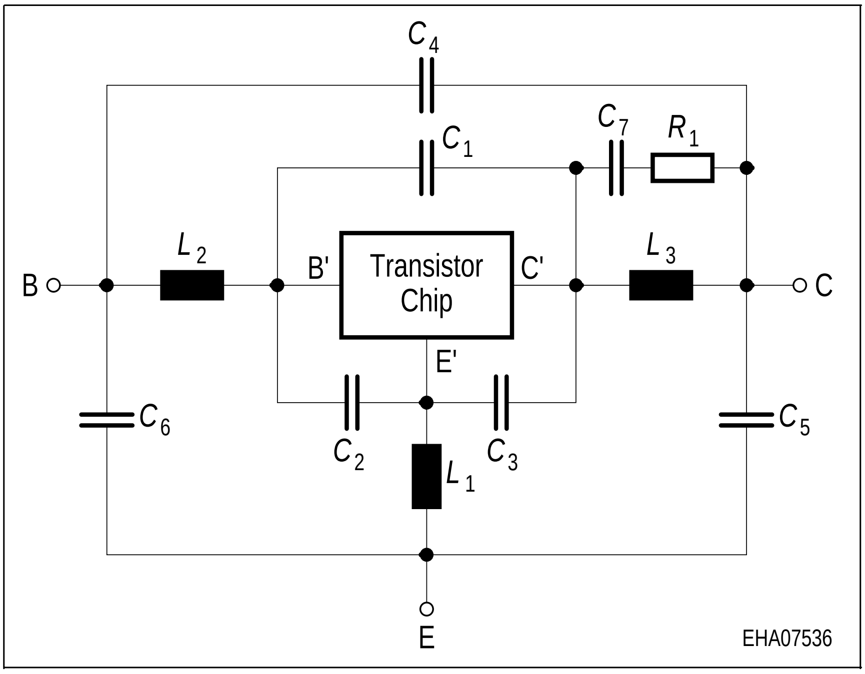
SPICE Parameter (Gummel-Poon Model, Berkley-SPICE 2G.6 Syntax):

Transitor Chip Data:

IS =	0.2738	fA	BF =	125	-	NF =	0.95341	-
VAF =	24	V	IKF =	0.26949	A	ISE =	10.627	fA
NE =	1.935	-	BR =	14.267	-	NR =	1.4289	-
VAR =	3.8742	V	IKR =	0.037925	A	ISC =	0.037409	fA
NC =	0.94371	-	RB =	1.8368	Ω	IRB =	0.91763	mA
RBM =	1	Ω	RE =	0.76534	-	RC =	0.11938	Ω
CJE =	1.1824	fF	VJE =	0.70276	V	MJE =	0.48654	-
TF =	18.828	ps	XTF =	0.69477	-	VTF =	0.8	V
ITF =	0.96893	mA	PTF =	0	deg	CJC =	935.03	fF
VJC =	1.1828	V	MJC =	0.30002	-	XCJC =	0.053563	-
TR =	1.0037	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	NK =	0	-	EG =	1.11	eV
XTI =	3	-	FC =	0.72063		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:

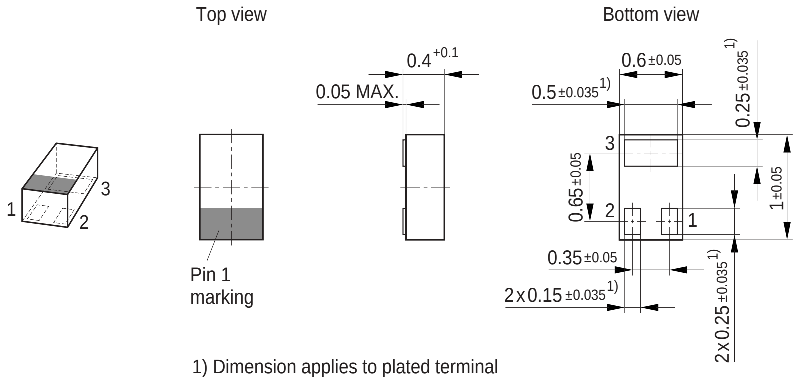


L_1 =	0.575	nH
L_2 =	0.575	nH
L_3 =	0.275	nH
C_1 =	33	fF
C_2 =	28	fF
C_3 =	131	fF
C_4 =	8	fF
C_5 =	8	fF
C_6 =	24	fF
C_7 =	300	fF
R_1 =	204	Ω

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/silicondiscretes

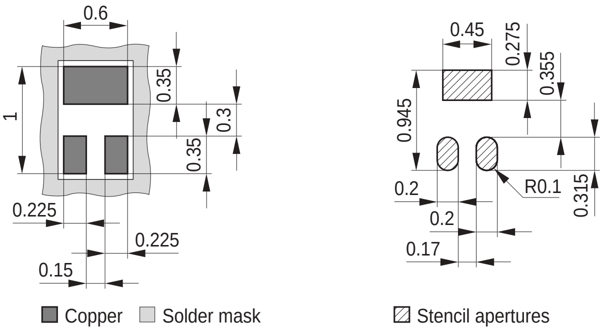
Package Outline



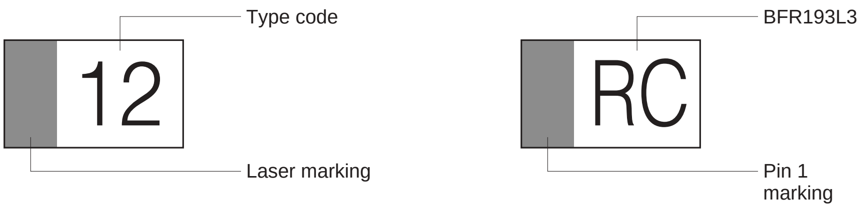
1) Dimension applies to plated terminal

Foot Print

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

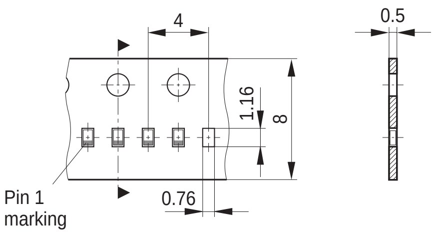


Marking Layout



Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel



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