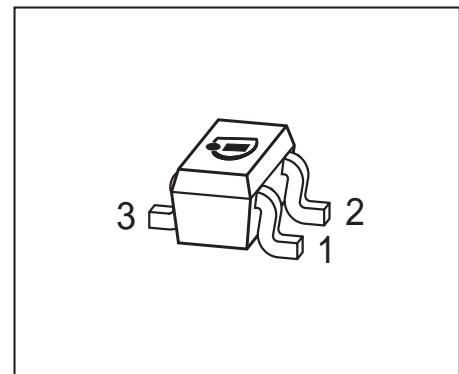**NPN Silicon RF Transistor***

• High current capability and low figure for
  wide dynamic range application

• Low voltage operation

• Ideal for low phase noise oscillators up to 3.5 GHz

• Low noise figure: 1.1 dB at 1.8 GHz

* Short term description

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

Type	Marking	Pin Configuration			Package
BFR380T	FC	1 = B	2 = E	3 = C	SC75

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	80	mA
Base current	I_B	14	
Total power dissipation[1]) $T_S \leq 66°C$	P_{tot}	380	mW
Junction temperature	T_j	150	°C
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[2])	R_{thJS}	≤ 220	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

2006-01-17

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 = 40 mA, VCE = 3 V, pulse measured	h_{FE}	90	120	160	-

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

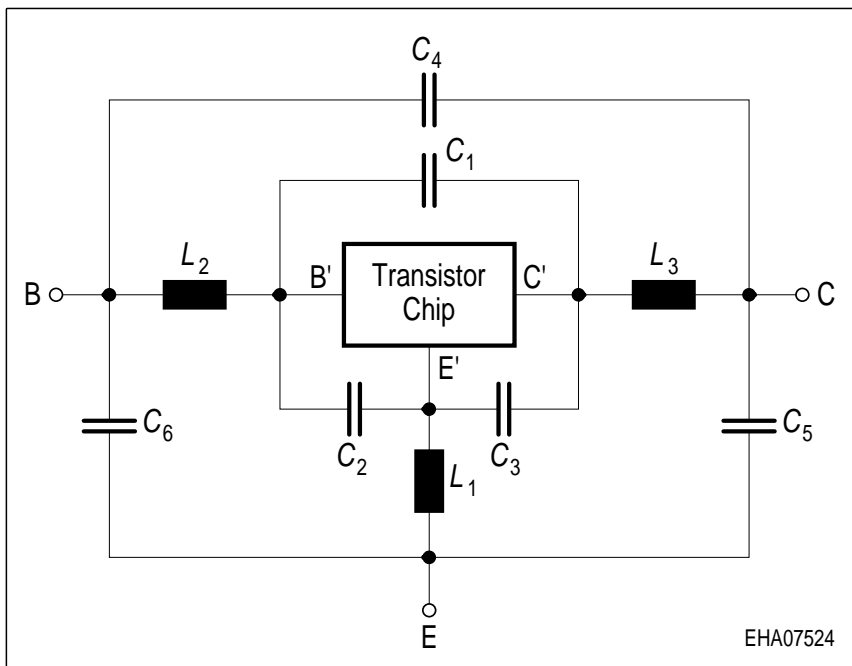| Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency $I_C = 40$ mA, $V_{CE} = 3$ V, $f = 1$ GHz	f_T	10	14	-	GHz
Collector-base capacitance $V_{CB} = 5$ V, $f = 1$ MHz, $V_{BE} = 0$, emitter grounded	C_{cb}	-	0.5	0.7	pF
Collector emitter capacitance $V_{CE} = 5$ 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}	-	1	-	
Noise figure $I_C = 8$ mA, $V_{CE} = 3$ V, $Z_S = Z_{Sopt}$, $f = 1.8$ GHz	F_{min}	-	1.1	-	dB
Power gain, maximum available[1] $I_C = 40$ mA, $V_{CE} = 3$ V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8$ GHz $f = 3$ GHz	G_{ma}	 - -	 12.5 8.5	 - -	
Transducer gain $I_C = 40$ mA, $V_{CE} = 3$ V, $Z_S = Z_L = 50\Omega$, $f = 1.8$ GHz $f = 3$ GHz	$\|S_{21e}\|^2$	 - -	 10 6	 - -	dB
Third order intercept point at output[2] $V_{CE} = 3$ V, $I_C = 40$ mA, $f = 1.8$ GHz, $Z_S = Z_L = 50\Omega$	IP_3	-	29.5	-	dBm
1dB Compression point at output $I_C = 40$ mA, $V_{CE} = 3$ V, $Z_S = Z_L = 50\Omega$, $f = 1.8$ GHz	P_{-1dB}	-	16	-	

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

[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

2006-01-17

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

Transitor Chip Data:

IS =	9.965	fA	BF =	116.376	-	NF =	1.107	-
VAF =	27.69	V	IKF =	736	mA	ISE =	0.2676	fA
NE =	1.64	-	BR =	22.802	-	NR =	1.056	-
VAR =	30	V	IKR =	0.011	A	ISC =	6.9739	pA
NC =	1.678	-	RB =	9.71	Ω	IRB =	0.2564	mA
RBM =	1.322	Ω	RE =	221	mΩ	RC =	0.101	Ω
CJE =	116.7	fF	VJE =	0.782	V	MJE =	0.5	-
TF =	8.789	ps	XTF =	0.496	-	VTF =	0.338	V
ITF =	1.529	mA	PTF =	0	deg	CJC =	840	fF
VJC =	6.949	V	MJC =	0.472	-	XCJC =	0.202	-
TR =	6.949	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	NK =	0.5	-	EG =	1.11	eV
XTI =	0	-	FC =	0.975		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)
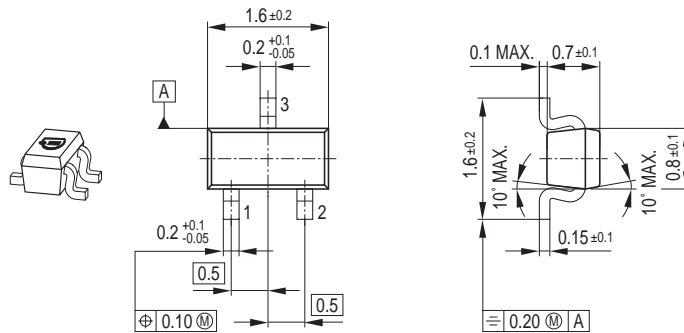
Package Equivalent Circuit:

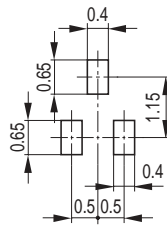|		
$L_1 =$	0.762	nH
$L_2 =$	0.706	nH
$L_3 =$	0.382	nH
$C_1 =$	62	fF
$C_2 =$	84	fF
$C_3 =$	180	fF
$C_4 =$	7	fF
$C_5 =$	40	fF
$C_6 =$	48	fF

Valid up to 6GHz

EHA07524

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
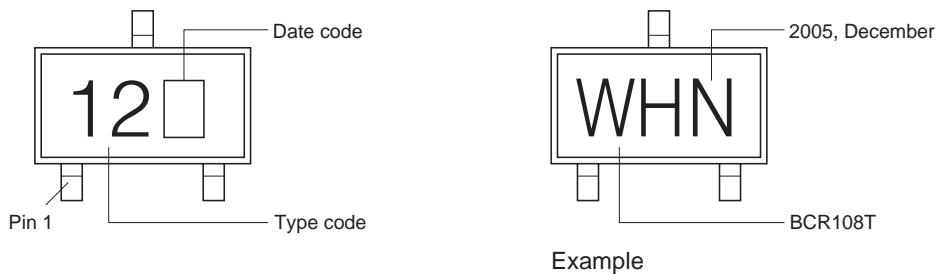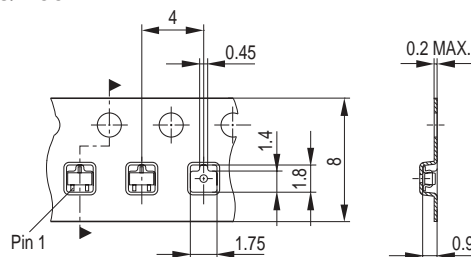
Package Outline

Foot Print

Marking Layout

Date code

2005, December

12

WHN

Pin 1   Type code

BCR108T

Example

Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel

Pin 1

Date Code marking for discrete packages with one digit (SCD80, SC79, SC75[1]) CES-Code

Month	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
01	a	p	A	P	a	p	A	P	a	p	A	P
02	b	q	B	Q	b	q	B	Q	b	q	B	Q
03	c	r	C	R	c	r	C	R	c	r	C	R
04	d	s	D	S	d	s	D	S	d	s	D	S
05	e	t	E	T	e	t	E	T	e	t	E	T
06	f	u	F	U	f	u	F	U	f	u	F	U
07	g	v	G	V	g	v	G	V	g	v	G	V
08	h	x	H	X	h	x	H	X	h	x	H	X
09	j	y	J	Y	j	y	J	Y	j	y	J	Y
10	k	z	K	Z	k	z	K	Z	k	z	K	Z
11	l	2	L	4	l	2	L	4	l	2	L	4
12	n	3	N	5	n	3	N	5	n	3	N	5

1) New Marking Layout for SC75, implemented at October 2005.

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6   2006-01-17

Attention please!

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2006-01-17