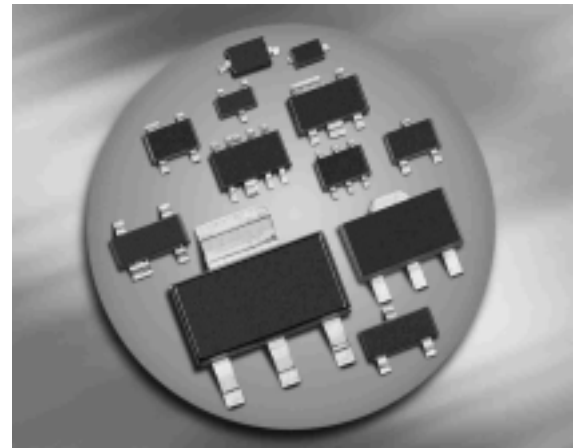
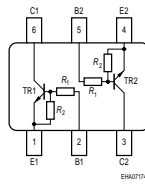
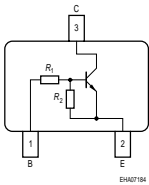


**NPN Silicon Digital Transistor**

- Switching in circuit, inverter, interface circuit, drive circuit
- Built in bias resistor ( $R_1 = 10\text{ k}\Omega$ ,  $R_2 = 10\text{ k}\Omega$ )
- BCR133S: Two internally isolated transistors with good matching in one multichip package
- BCR133S: For orientation in reel see package information below


**BCR133/F/L3  
BCR133T/W**
**BCR133S**


Type	Marking	Pin Configuration						Package
BCR133	WCs	1=B	2=E	3=C	-	-	-	SOT23
BCR133F	WCs	1=B	2=E	3=C	-	-	-	TSFP-3
BCR133L3	WC	1=B	2=E	3=C	-	-	-	TSLP-3-4
BCR133S	WCs	1=E1	2=B1	3=C2	4=E2	5=B2	6=C1	SOT363
BCR133T	WC	1=B	2=E	3=C	-	-	-	SC75
BCR133W	WCs	1=B	2=E	3=C	-	-	-	SOT323

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CEO}$	50	V
Collector-base voltage	$V_{CBO}$	50	
Input forward voltage	$V_{i(fwd)}$	40	
Input reverse voltage	$V_{i(rev)}$	10	
Collector current	$I_C$	100	mA
Total power dissipation- BCR133, $T_S \leq 102^\circ\text{C}$ BCR133F, $T_S \leq 128^\circ\text{C}$ BCR133L3, $T_S \leq 135^\circ\text{C}$ BCR133S, $T_S \leq 115^\circ\text{C}$ BCR133T, $T_S \leq 109^\circ\text{C}$ BCR133W, $T_S \leq 124^\circ\text{C}$	$P_{tot}$	200 250 250 250 250 250	mW
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-65 ... 150	

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>1)</sup>	$R_{thJS}$		K/W
BCR133		$\leq 240$	
BCR133F		$\leq 90$	
BCR133L3		$\leq 60$	
BCR133S		$\leq 140$	
BCR133T		$\leq 165$	
BCR133W		$\leq 105$	

<sup>1)</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

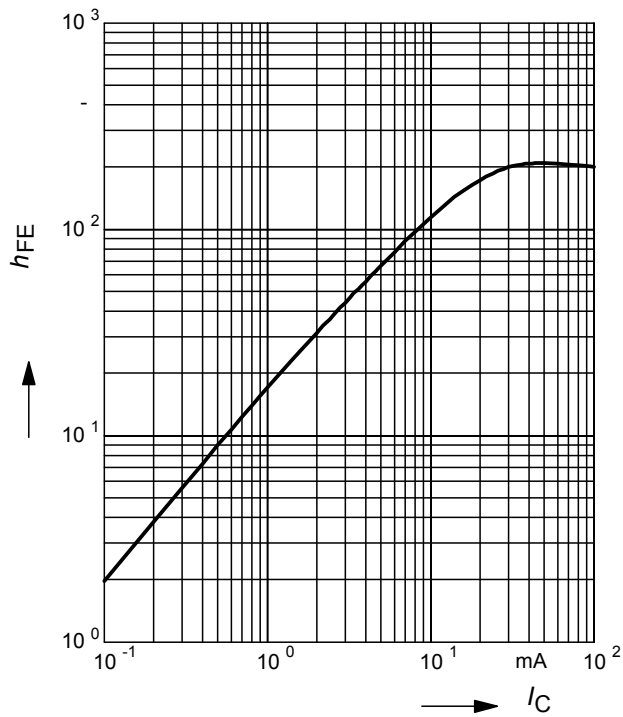
**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 100 \mu\text{A}, I_B = 0$	$V_{(BR)CEO}$	50	-	-	V
Collector-base breakdown voltage $I_C = 10 \mu\text{A}, I_E = 0$	$V_{(BR)CBO}$	50	-	-	
Collector-base cutoff current $V_{CB} = 40 \text{ V}, I_E = 0$	$I_{CBO}$	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 10 \text{ V}, I_C = 0$	$I_{EBO}$	-	-	0.75	mA
DC current gain <sup>1)</sup> $I_C = 5 \text{ mA}, V_{CE} = 5 \text{ V}$	$h_{FE}$	30	-	-	-
Collector-emitter saturation voltage <sup>1)</sup> $I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}$	$V_{CEsat}$	-	-	0.3	V
Input off voltage $I_C = 100 \mu\text{A}, V_{CE} = 5 \text{ V}$	$V_{i(off)}$	0.8	-	1.5	
Input on voltage $I_C = 2 \text{ mA}, V_{CE} = 0.3 \text{ V}$	$V_{i(on)}$	1	-	2.5	
Input resistor	$R_1$	7	10	13	k $\Omega$
Resistor ratio	$R_1/R_2$	0.9	1	1.1	-
<b>AC Characteristics</b>					
Transition frequency $I_C = 10 \text{ mA}, V_{CE} = 5 \text{ V}, f = 100 \text{ MHz}$	$f_T$	-	130	-	MHz
Collector-base capacitance $V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$	$C_{cb}$	-	3	-	pF

<sup>1</sup>Pulse test:  $t < 300 \mu\text{s}$ ;  $D < 2\%$

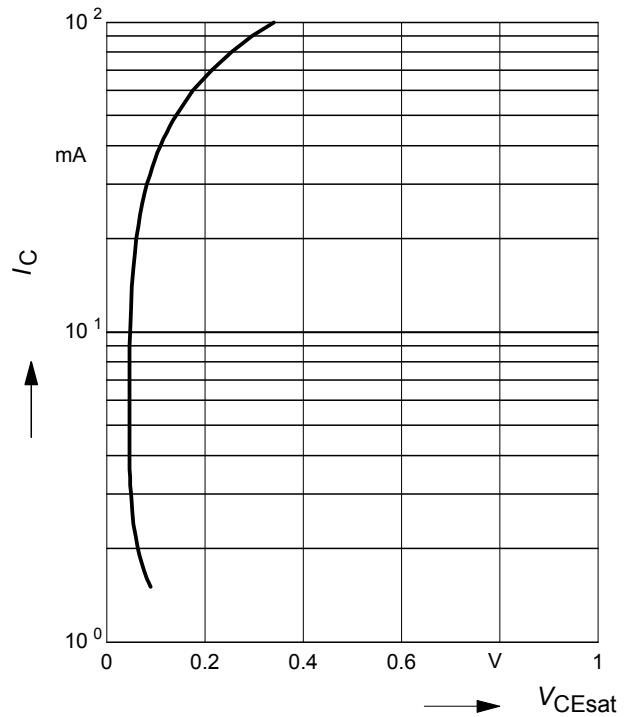
**DC current gain  $h_{FE} = f(I_C)$**

$V_{CE} = 5\text{ V}$  (common emitter configuration)



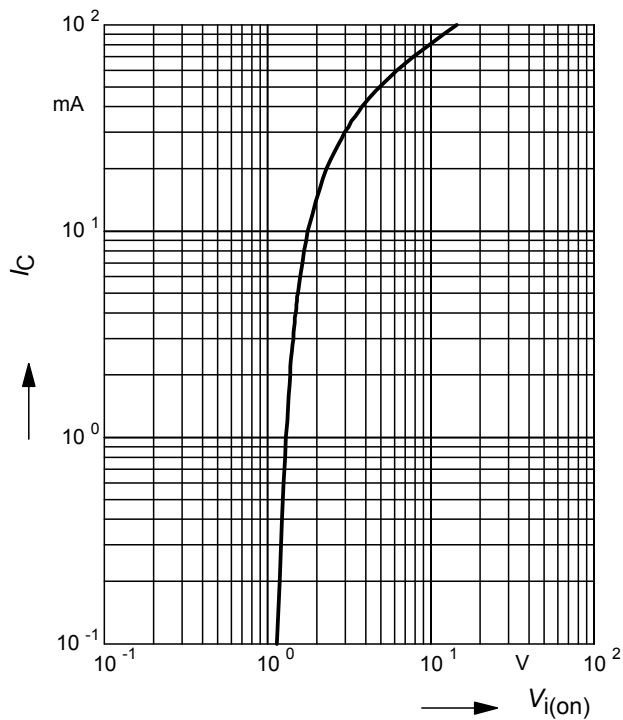
**Collector-emitter saturation voltage**

$V_{CEsat} = f(I_C), h_{FE} = 20$



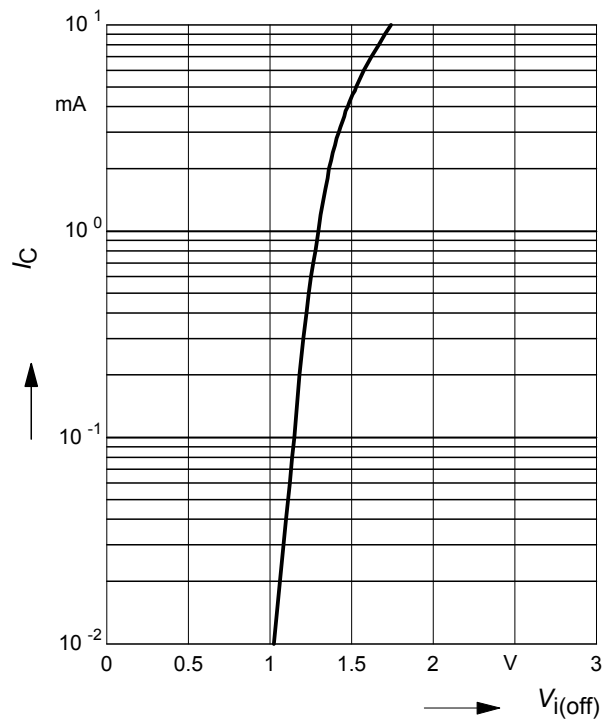
**Input on Voltage  $V_{i(on)} = f(I_C)$**

$V_{CE} = 0.3\text{ V}$  (common emitter configuration)



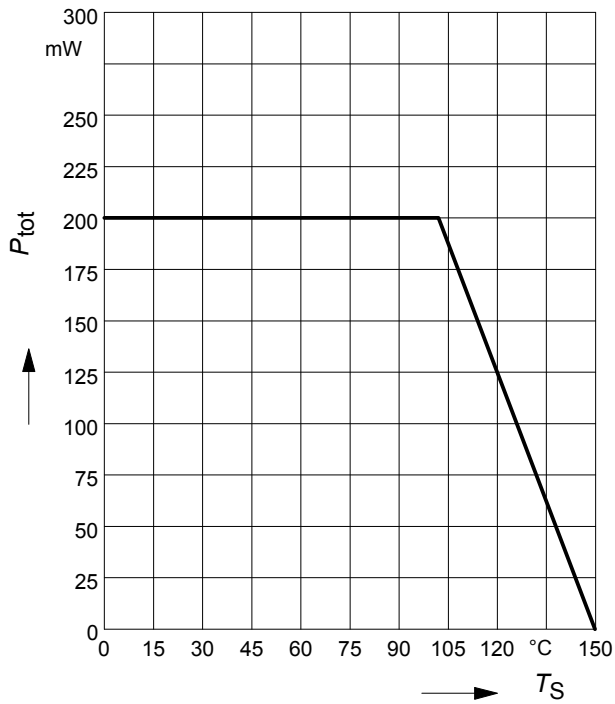
**Input off voltage  $V_{i(off)} = f(I_C)$**

$V_{CE} = 5\text{ V}$  (common emitter configuration)



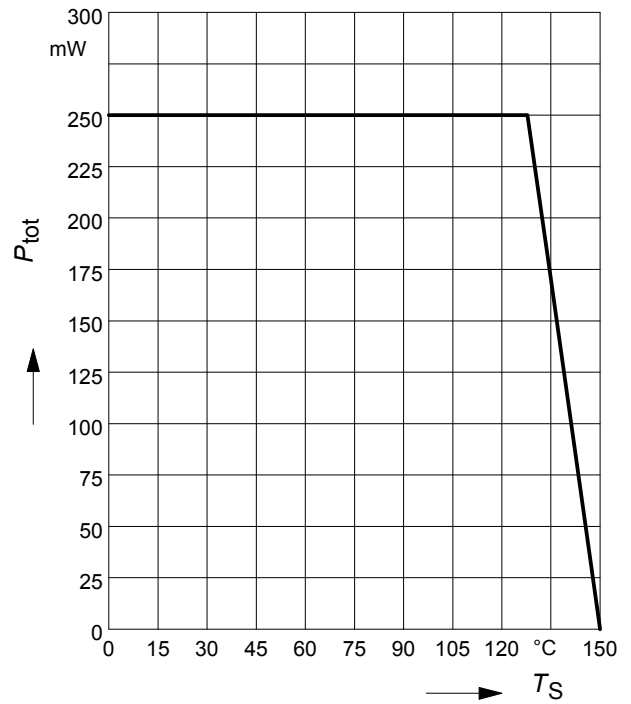
Total power dissipation  $P_{tot} = f(T_S)$

BCR133



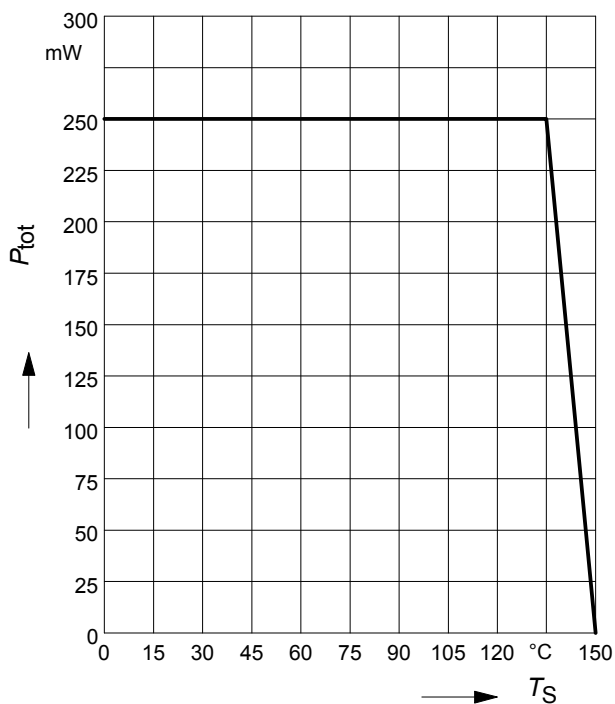
Total power dissipation  $P_{tot} = f(T_S)$

BCR133F



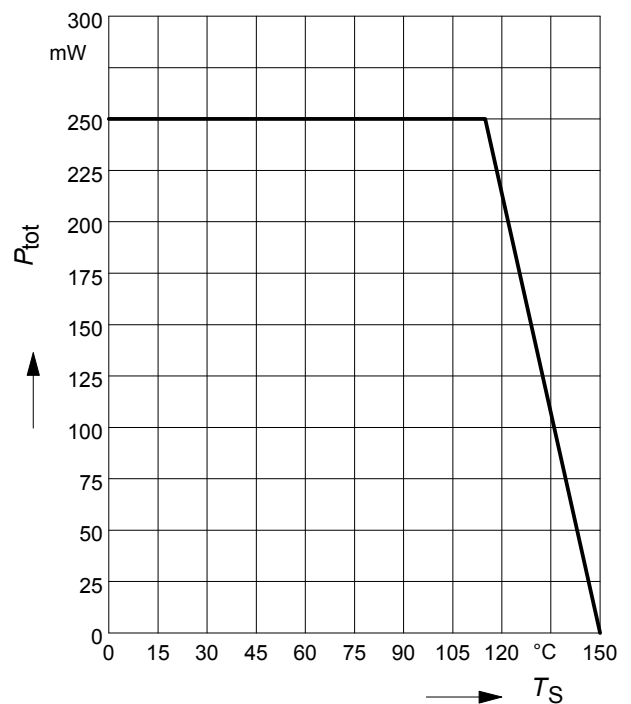
Total power dissipation  $P_{tot} = f(T_S)$

BCR133L3



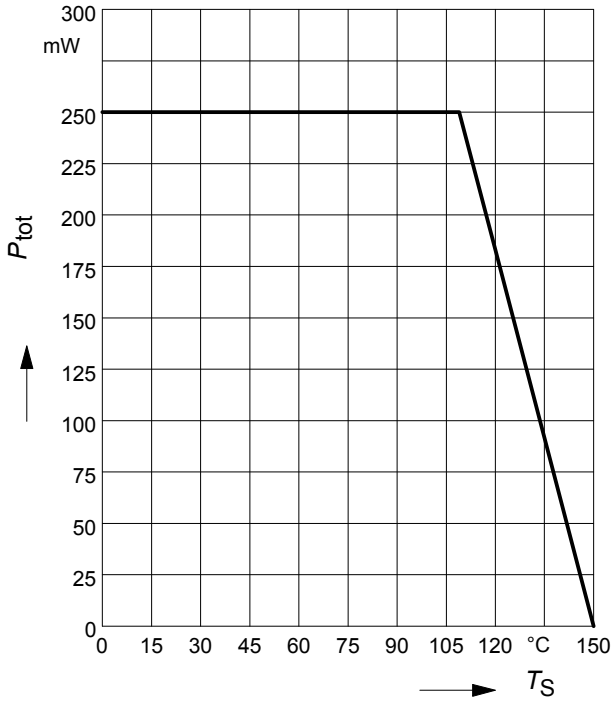
Total power dissipation  $P_{tot} = f(T_S)$

BCR133S



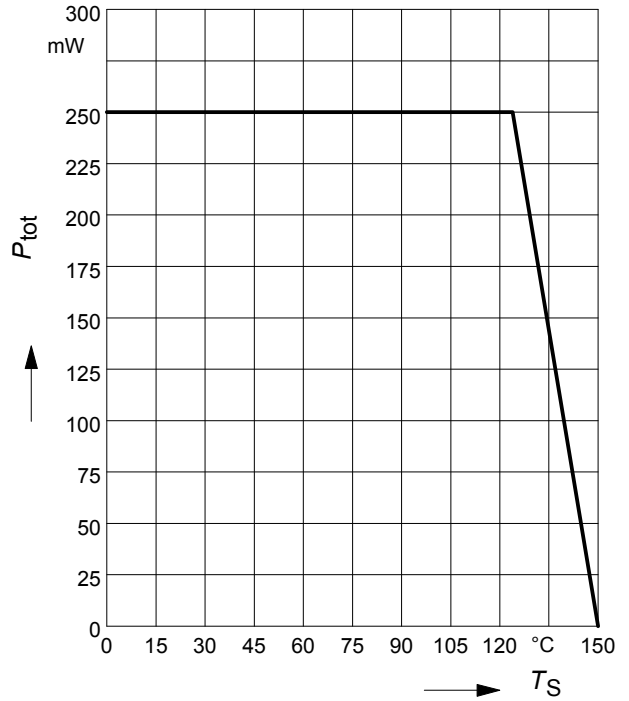
**Total power dissipation  $P_{tot} = f(T_S)$**

BCR133T



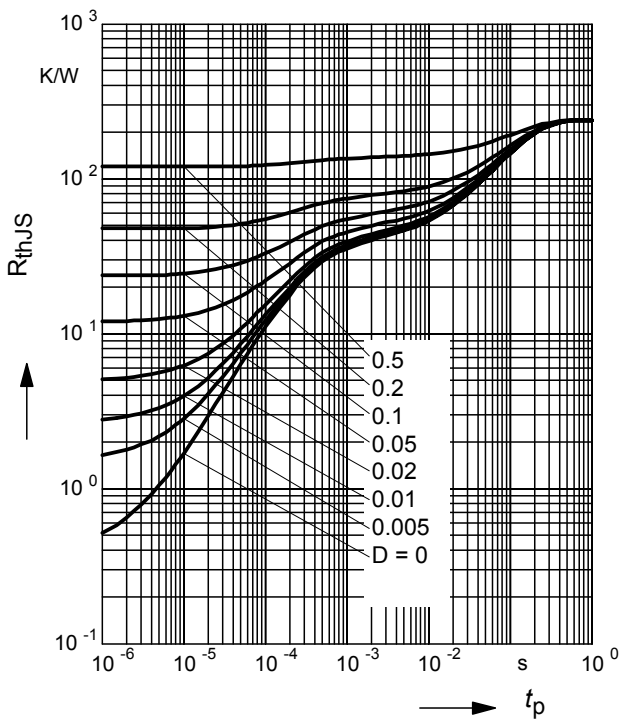
**Total power dissipation  $P_{tot} = f(T_S)$**

BCR133W



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

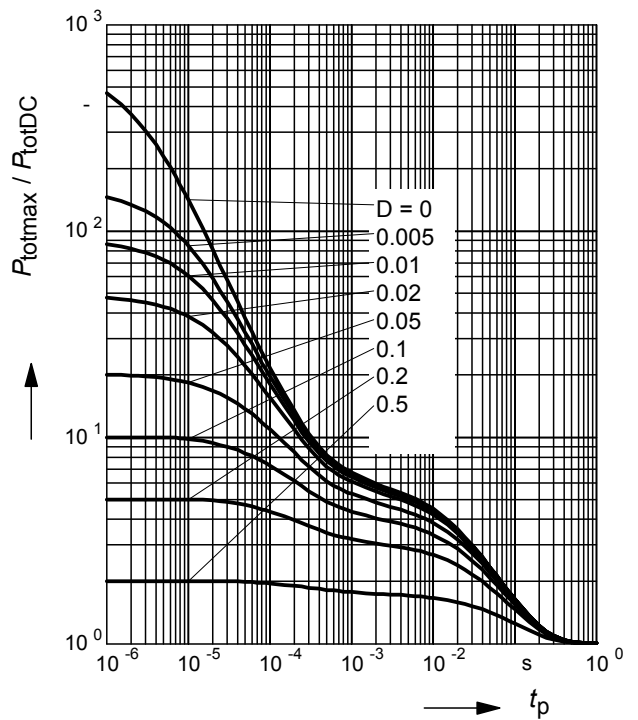
BCR133



**Permissible Pulse Load**

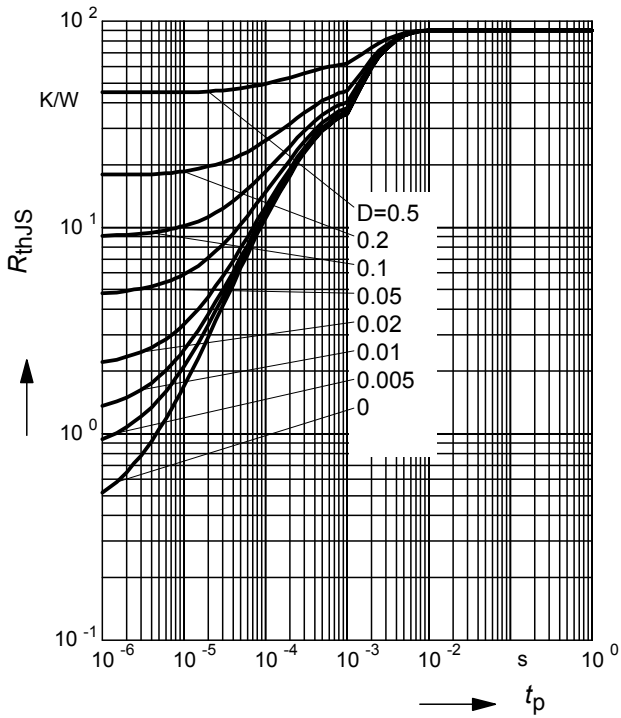
$P_{totmax}/P_{totDC} = f(t_p)$

BCR133



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

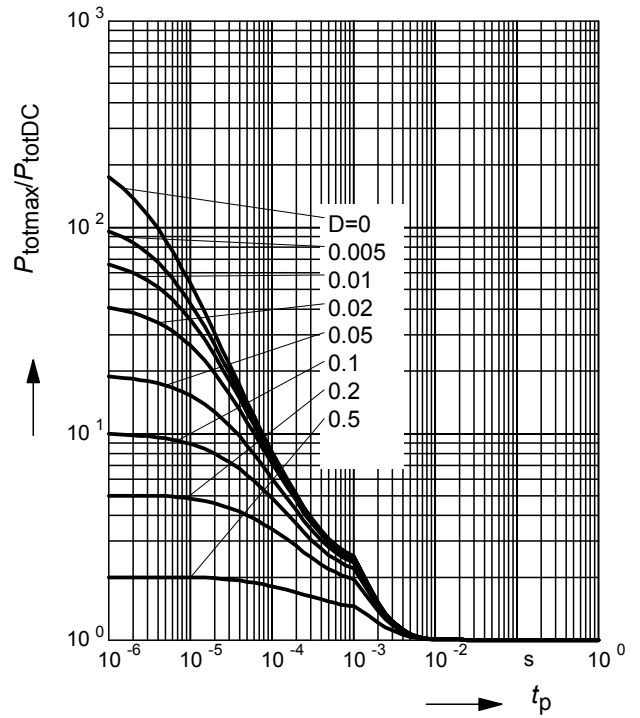
BCR133F



**Permissible Pulse Load**

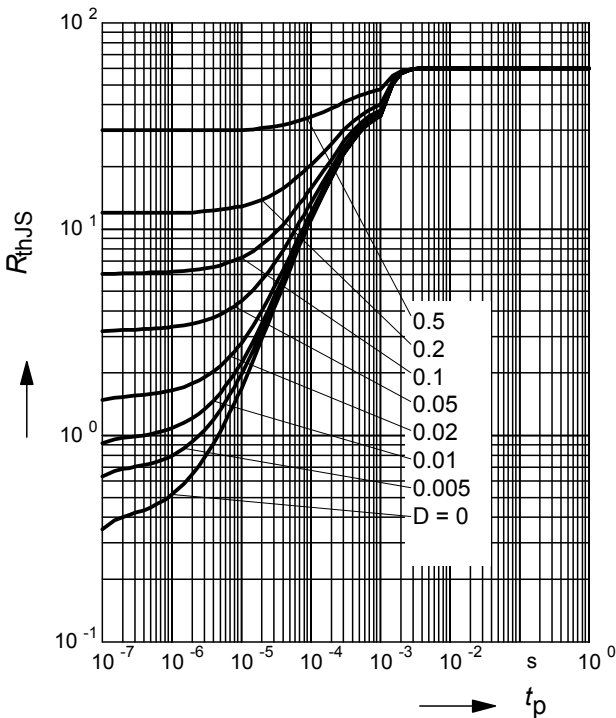
$P_{totmax}/P_{totDC} = f(t_p)$

BCR133F



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

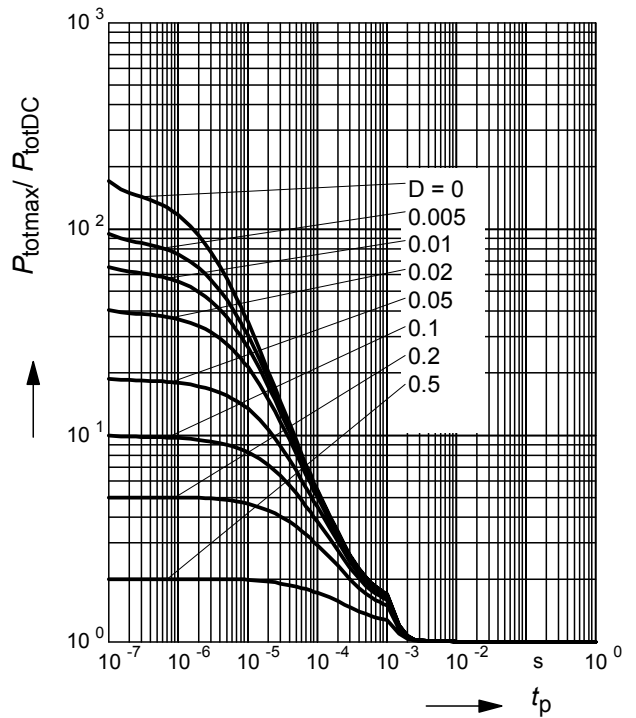
BCR133L3



**Permissible Pulse Load**

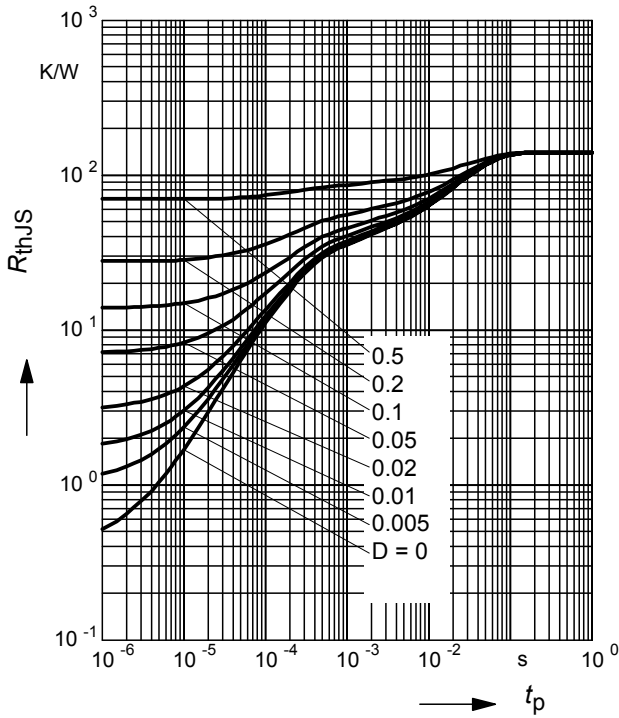
$P_{totmax}/P_{totDC} = f(t_p)$

BCR133L3



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

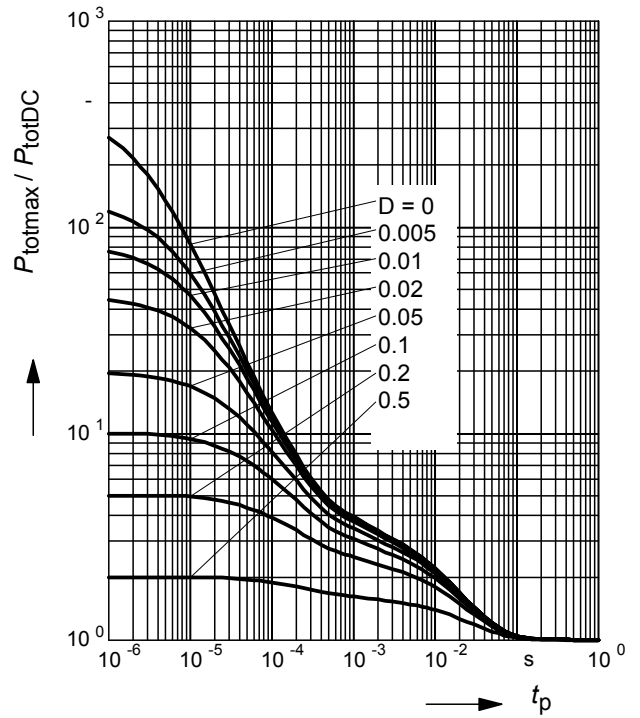
BCR133S



**Permissible Pulse Load**

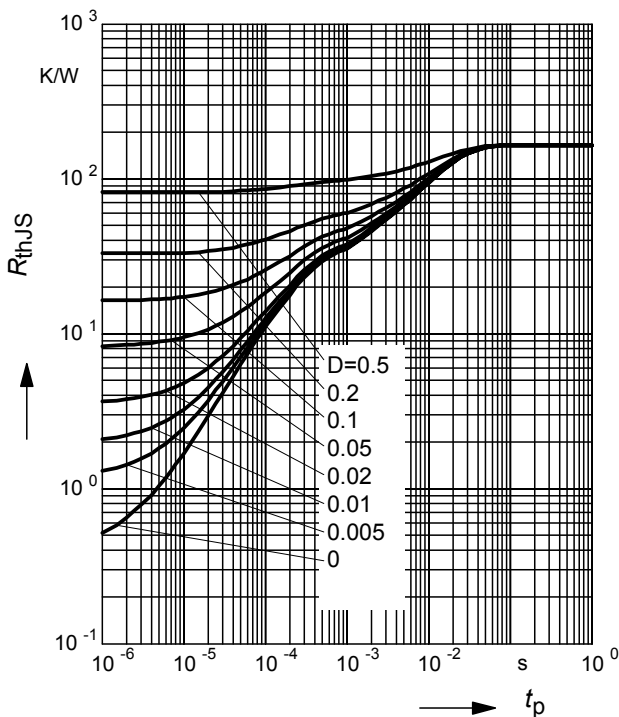
$P_{totmax}/P_{totDC} = f(t_p)$

BCR133S



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

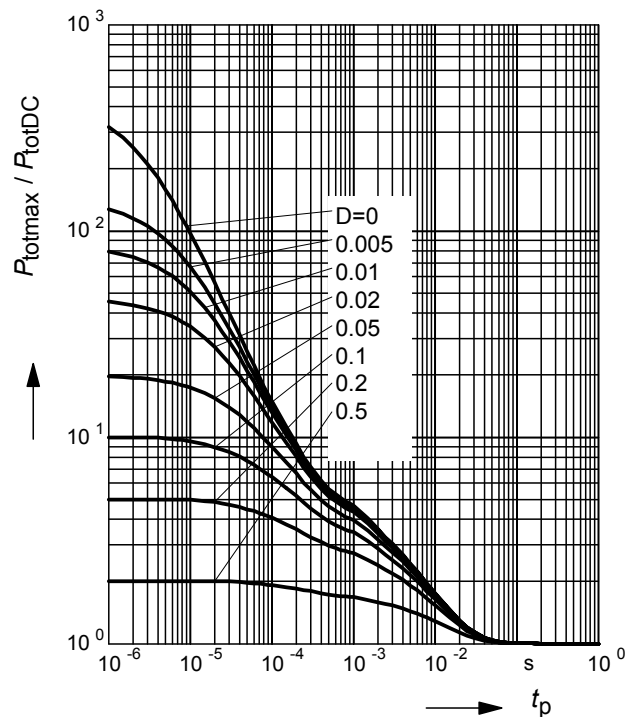
BCR133T



**Permissible Pulse Load**

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

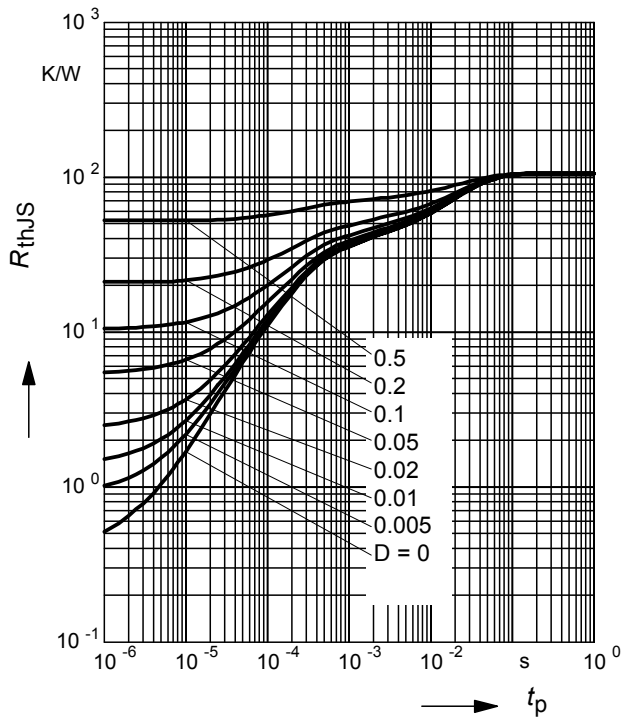
BCR133T





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

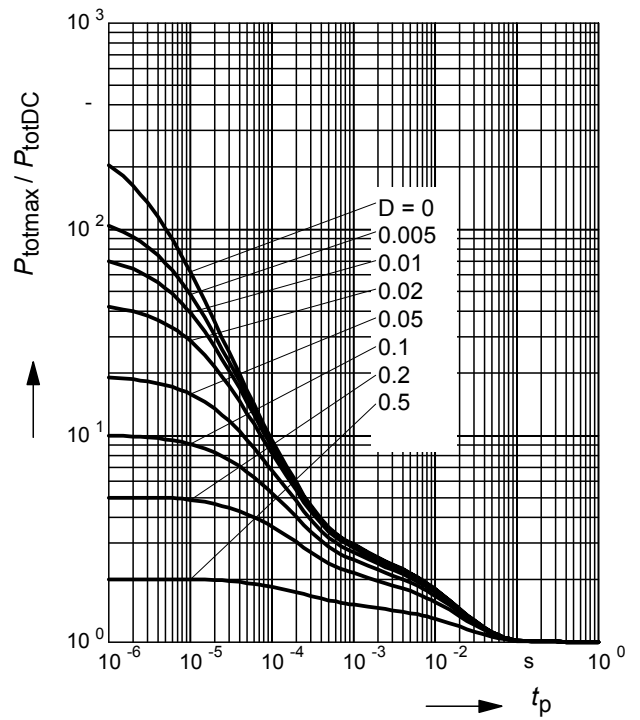
BCR133W



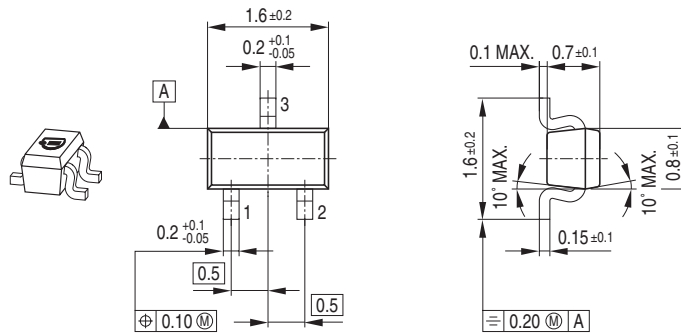
**Permissible Pulse Load**

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

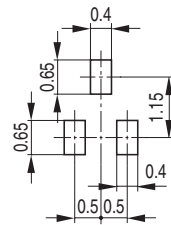
BCR133W



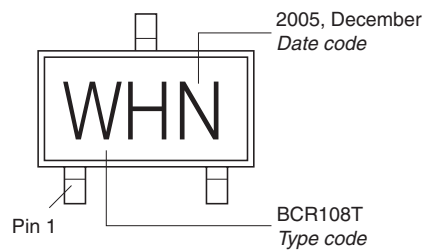
Package Outline



Foot Print

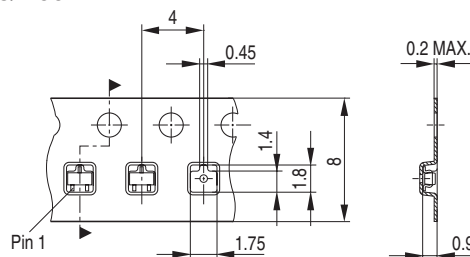


Marking Layout (Example)



Standard Packing

Reel  $\phi 180 \text{ mm} = 3.000 \text{ Pieces/Reel}$   
 Reel  $\phi 330 \text{ mm} = 10.000 \text{ Pieces/Reel}$

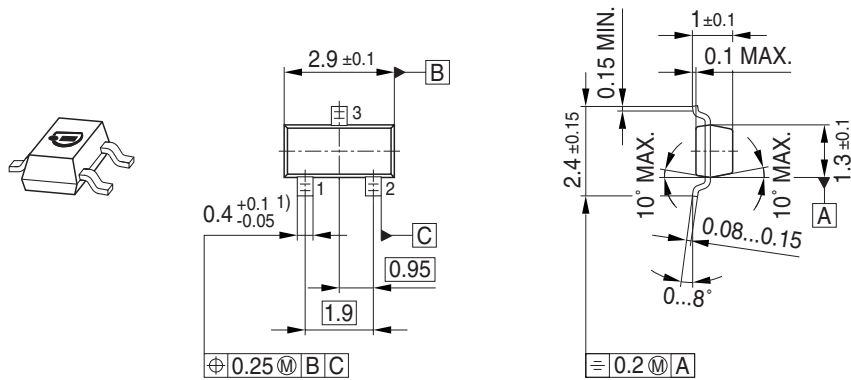


Date Code marking for discrete packages with one digit (SCD80, SC79, SC75<sup>1)</sup>) CES-Code

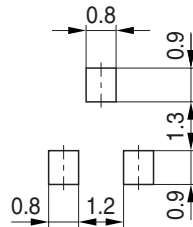
Month	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
01	a	p	A	P	a	p	A	P	a	p	A	P
02	b	q	B	Q	b	q	B	Q	b	q	B	Q
03	c	r	C	R	c	r	C	R	c	r	C	R
04	d	s	D	S	d	s	D	S	d	s	D	S
05	e	t	E	T	e	t	E	T	e	t	E	T
06	f	u	F	U	f	u	F	U	f	u	F	U
07	g	v	G	V	g	v	G	V	g	v	G	V
08	h	x	H	X	h	x	H	X	h	x	H	X
09	j	y	J	Y	j	y	J	Y	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.

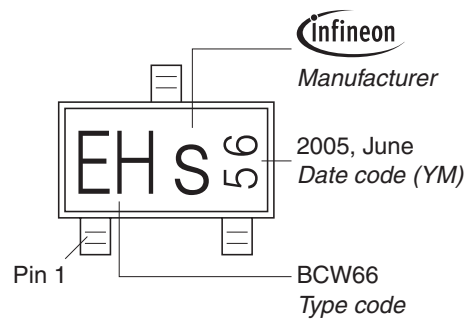
Package Outline



Foot Print

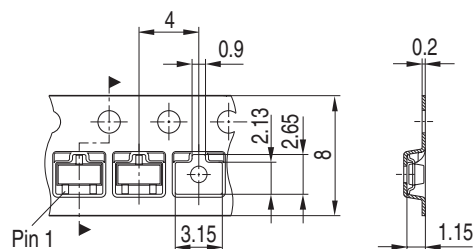


Marking Layout (Example)

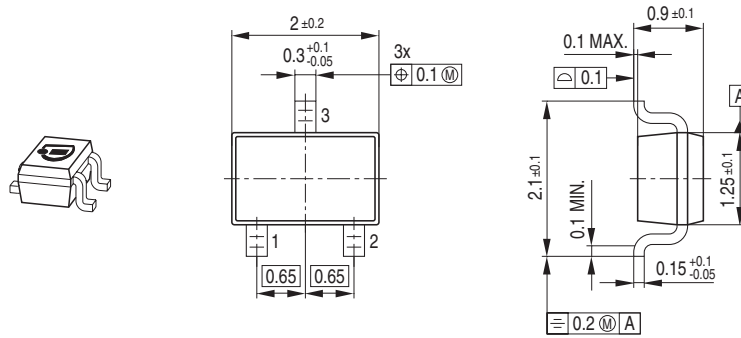


Standard Packing

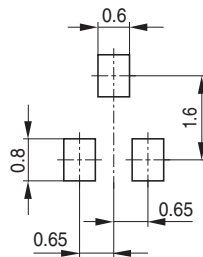
Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel



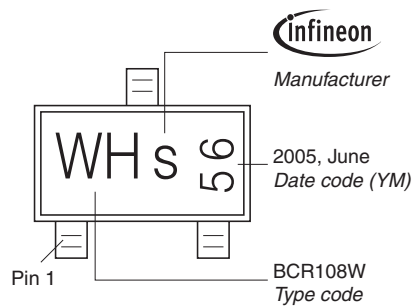
Package Outline



Foot Print

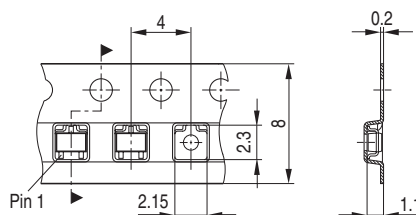


Marking Layout (Example)

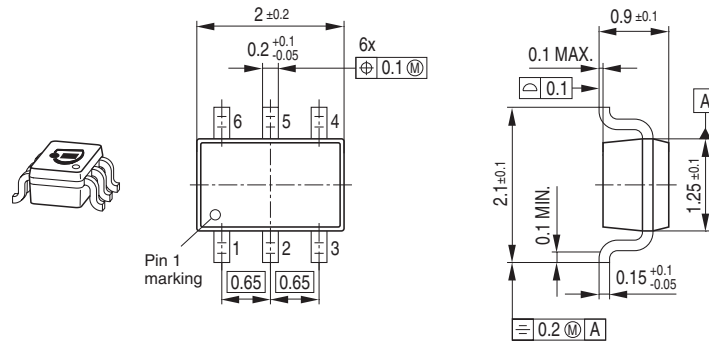


Standard Packing

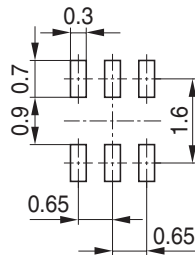
Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel



Package Outline

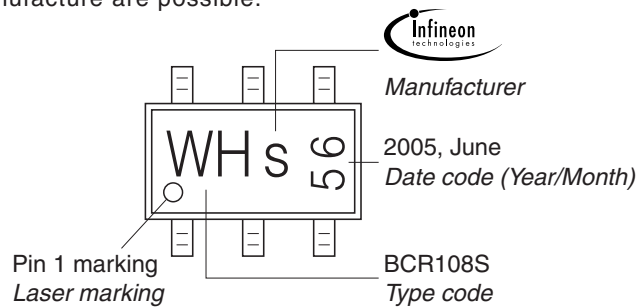


Foot Print



Marking Layout (Example)

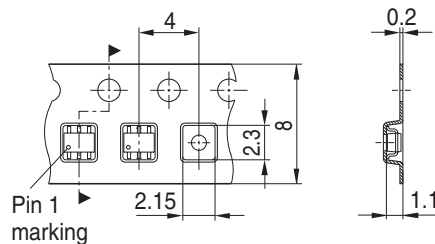
Small variations in positioning of Date code, Type code and Manufacture are possible.



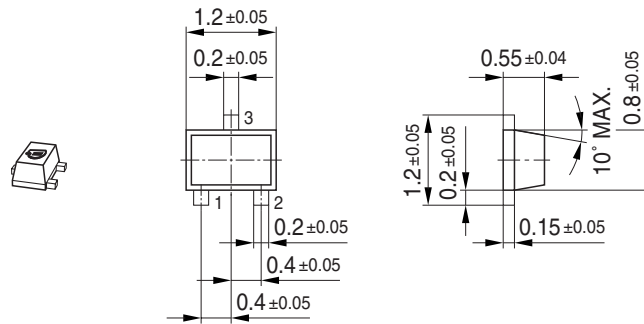
Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel

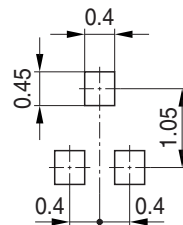
For symmetric types no defined Pin 1 orientation in reel.



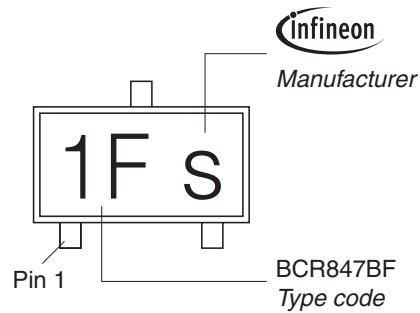
Package Outline



Foot Print

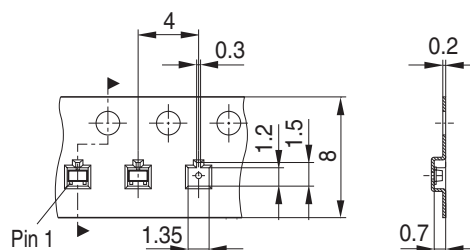


Marking Layout (Example)

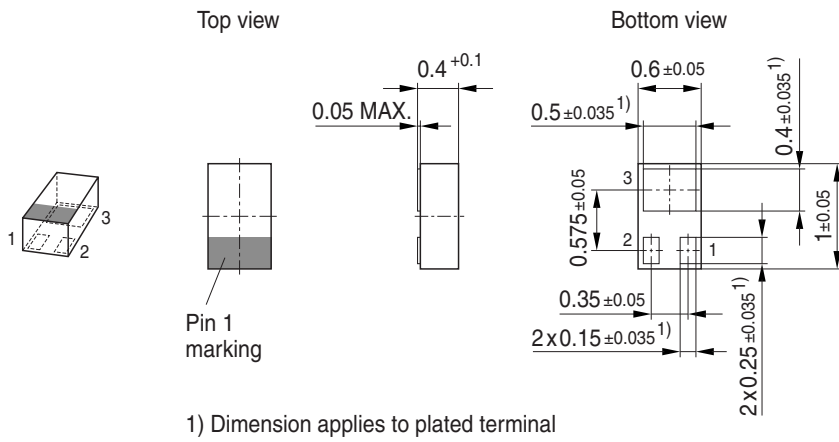


Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel

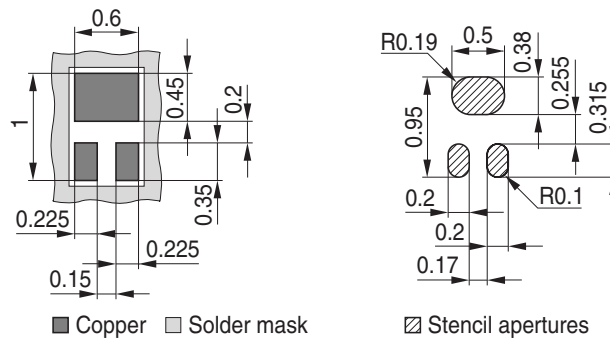


### Package Outline

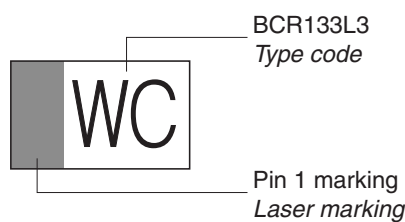


### Foot Print

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

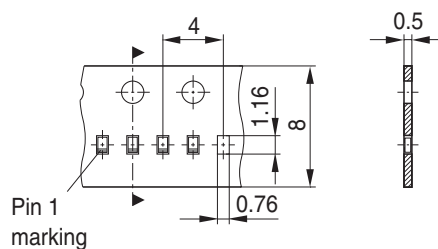


### Marking Layout



### Standard Packing

Reel ø180 mm = 15.000 Pieces/Reel





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