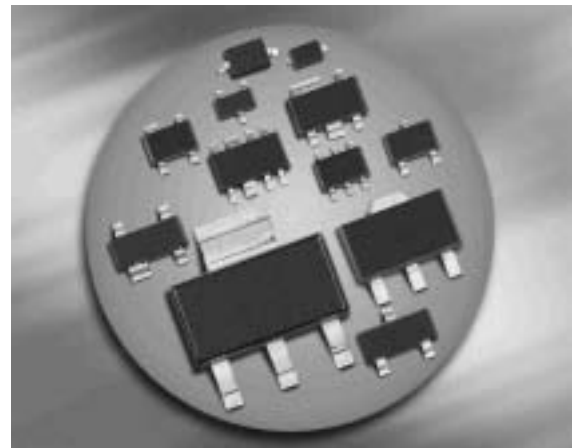


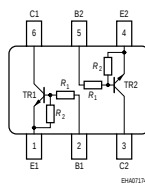
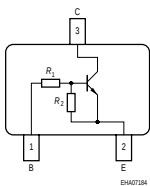
NPN Silicon Digital Transistor

- 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
- Pb-free (RoHS compliant) package¹⁾
- Qualified according AEC Q101



BCR133/W/F

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
BCR133S	WCs	1=E1	2=B1	3=C2	4=E2	5=B2	6=C1	SOT363
BCR133W	WCs	1=B	2=E	3=C	-	-	-	SOT323

¹Pb-containing package may be available upon special request

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, $T_S \leq 102^\circ\text{C}$ BCR133S, $T_S \leq 115^\circ\text{C}$ BCR133W, $T_S \leq 124^\circ\text{C}$ BCR133F, $T_S \leq \text{tbd}$	P_{tot}	200 250 250 250	mW
Junction temperature	T_j	150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ¹⁾ BCR133 BCR133S BCR133W BCR133F	R_{thJS}	≤ 240 ≤ 140 ≤ 105 $\leq \text{tbd}$	K/W

¹⁾For calculation of R_{thJA} please refer to Application Note Thermal Resistance

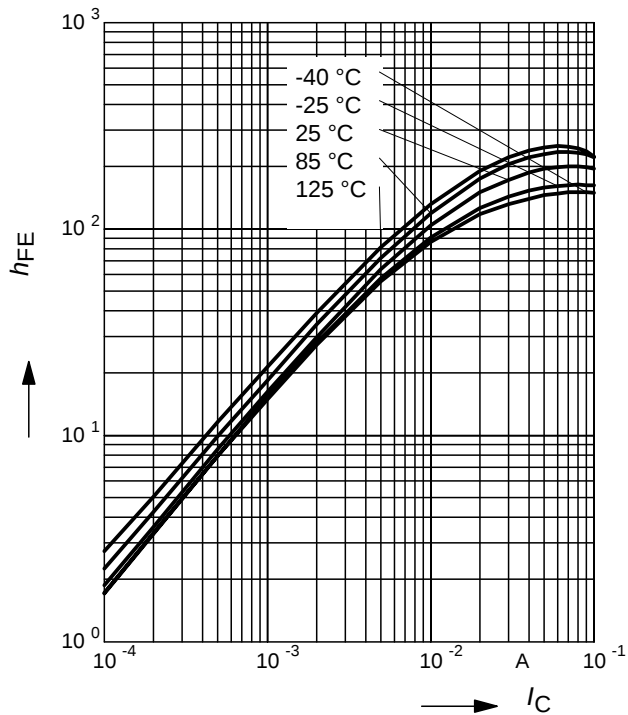
Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

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

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

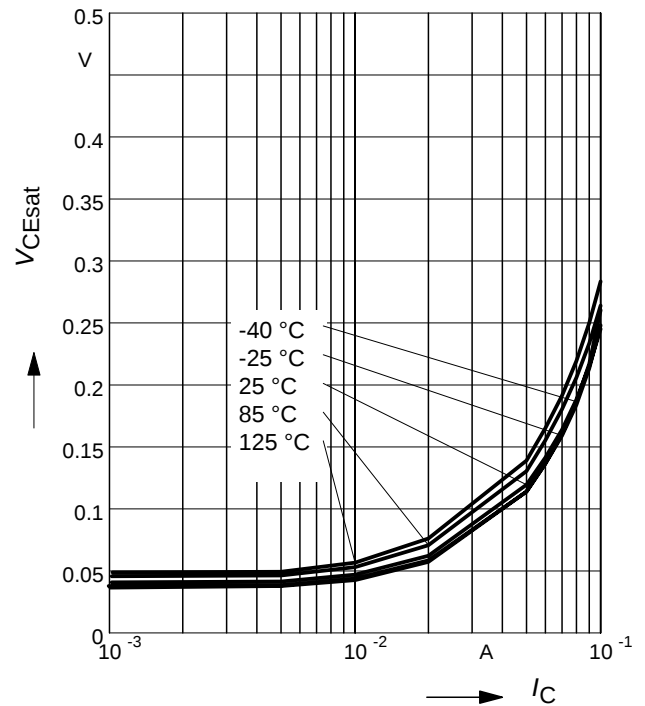
DC current gain $h_{FE} = f(I_C)$

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



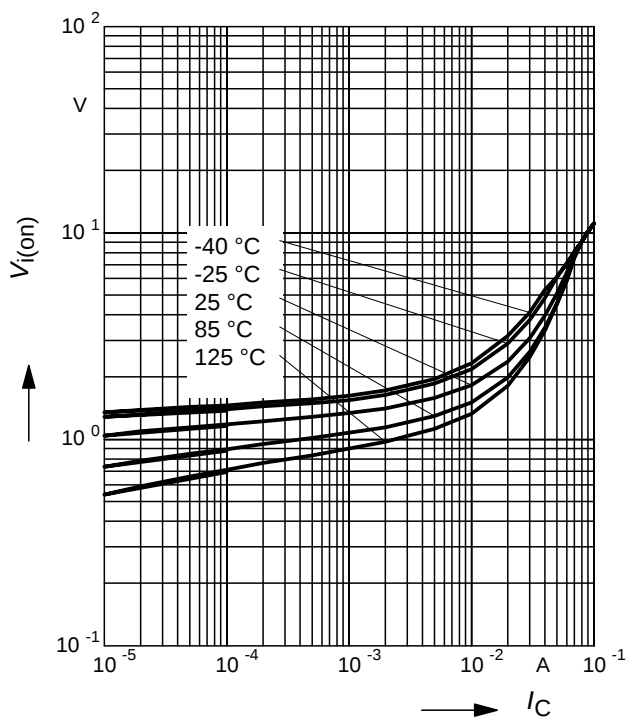
Collector-emitter saturation voltage

$V_{CEsat} = f(I_C)$, $I_C/I_B = 20$



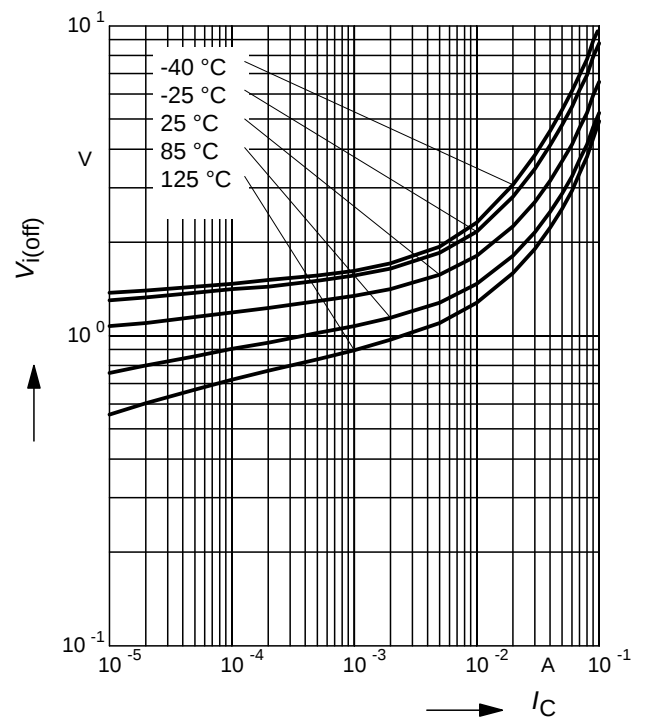
Input on Voltage $V_{i(on)} = f(I_C)$

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



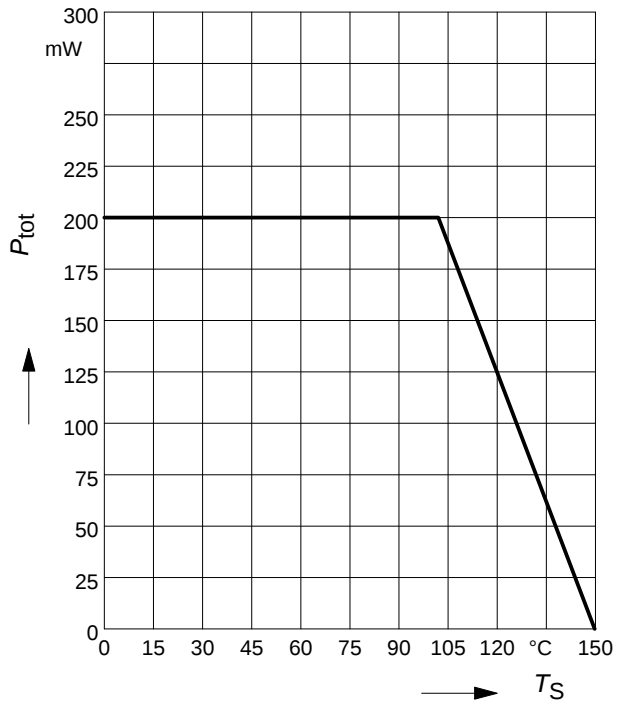
Input off voltage $V_{i(off)} = f(I_C)$

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



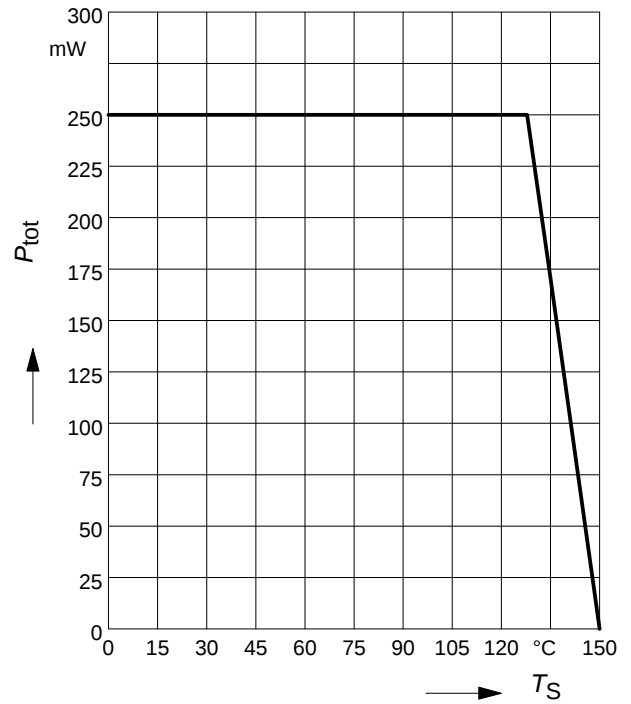
Total power dissipation $P_{\text{tot}} = f(T_S)$

BCR133



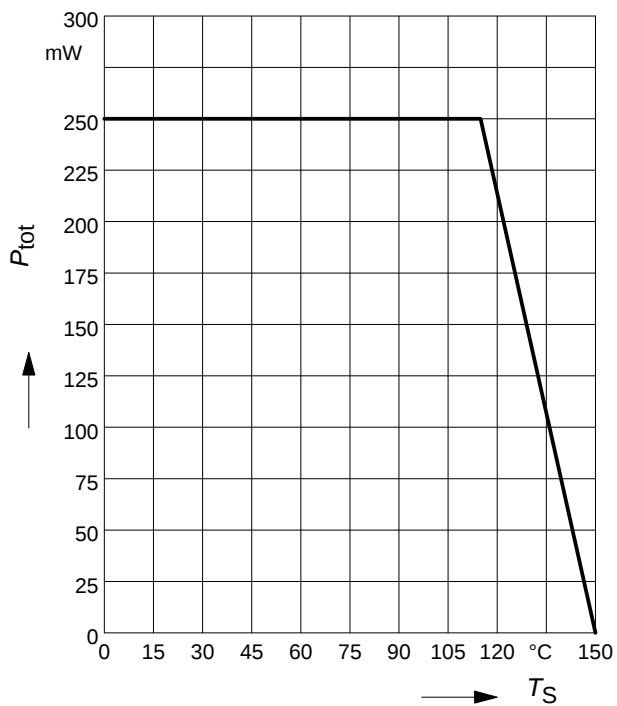
Total power dissipation $P_{\text{tot}} = f(T_S)$

BCR133F



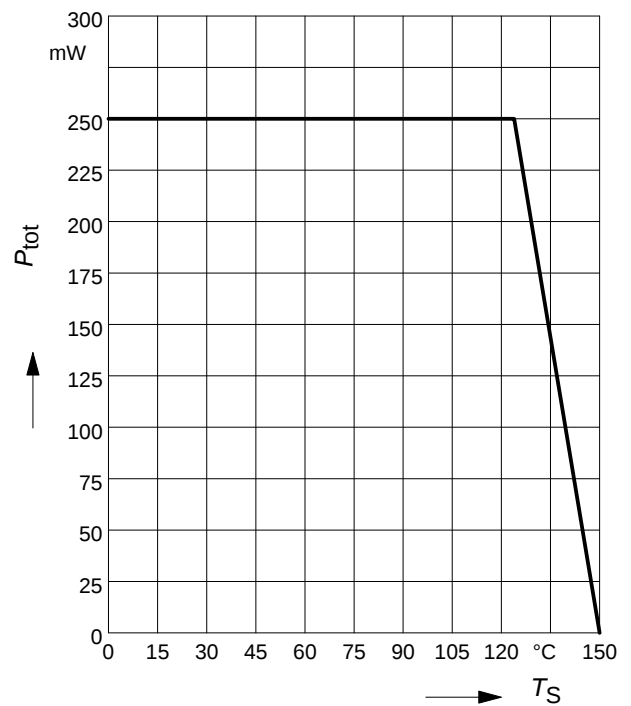
Total power dissipation $P_{\text{tot}} = f(T_S)$

BCR133S



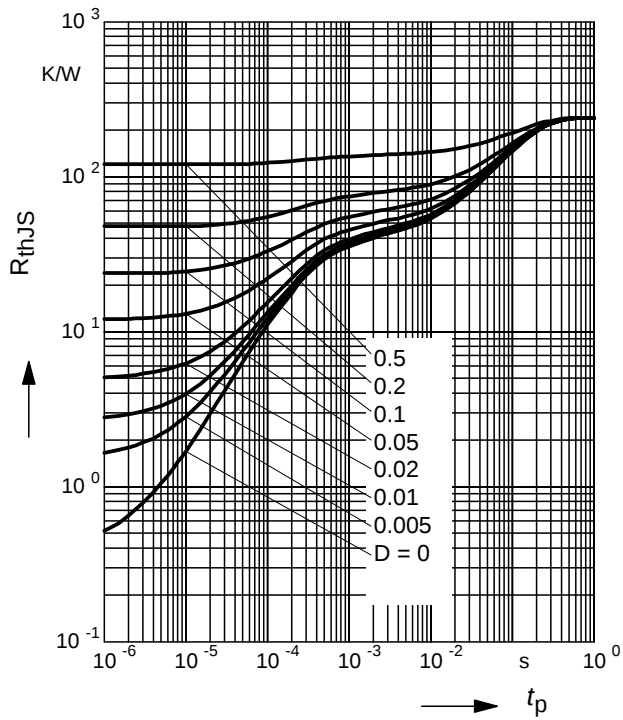
Total power dissipation $P_{\text{tot}} = f(T_S)$

BCR133W



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

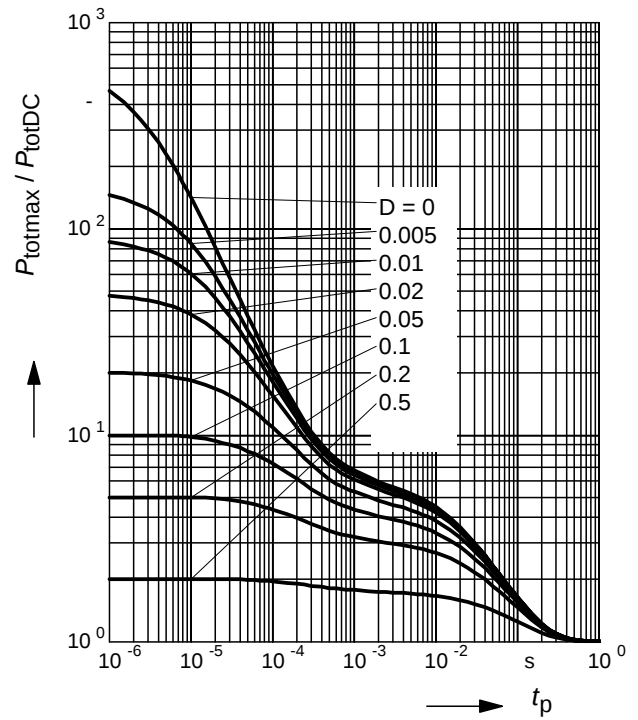
BCR133



Permissible Pulse Load

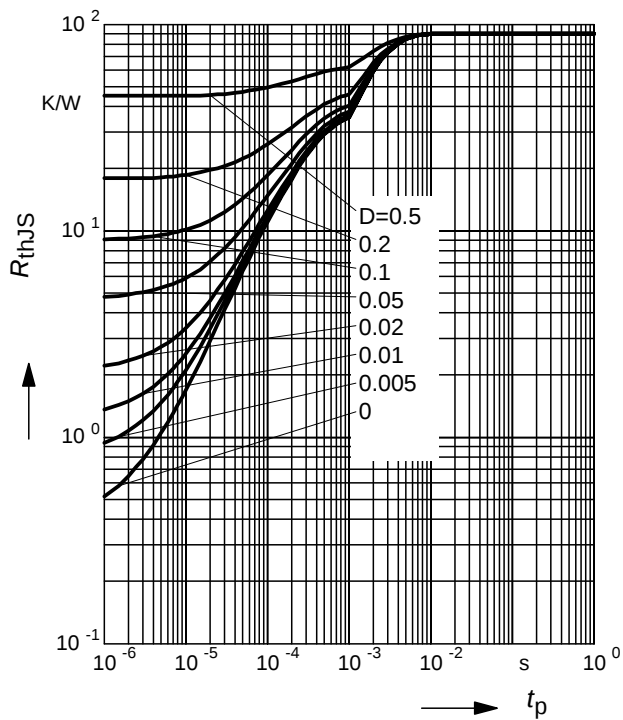
$$P_{totmax}/P_{totDC} = f(t_p)$$

BCR133



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

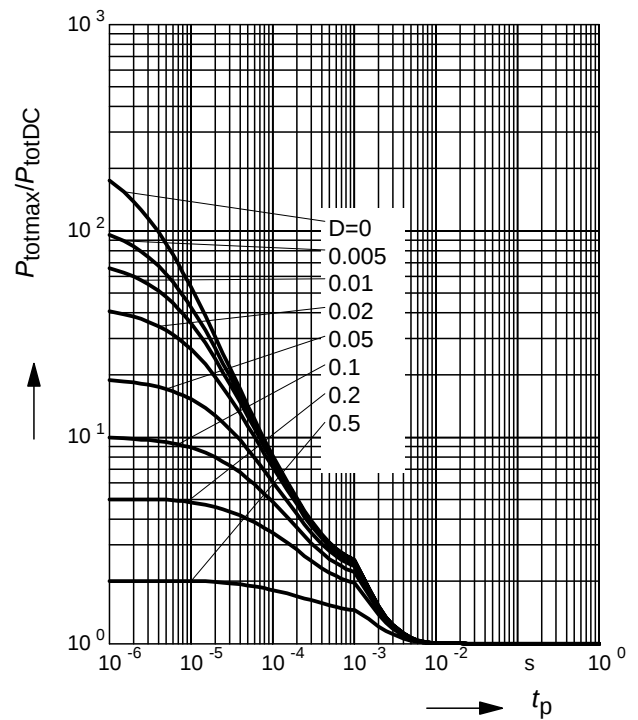
BCR133F



Permissible Pulse Load

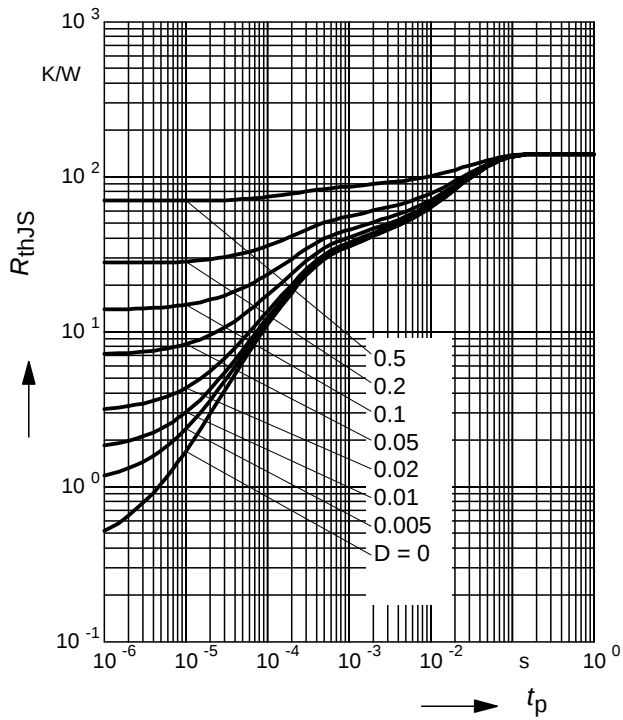
$$P_{totmax}/P_{totDC} = f(t_p)$$

BCR133F



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

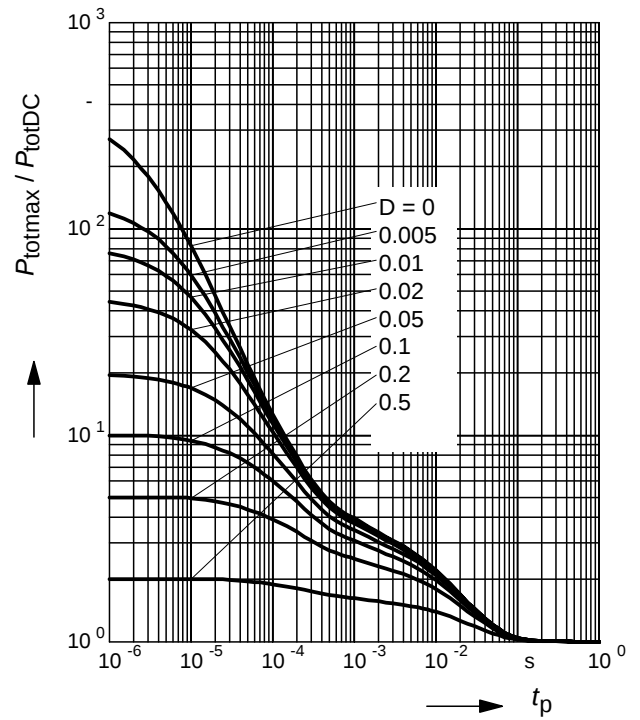
BCR133S



Permissible Pulse Load

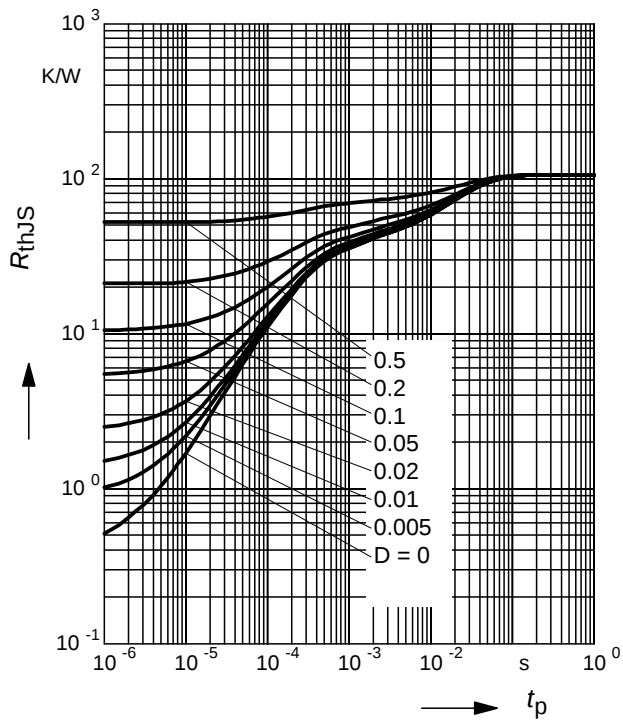
$$P_{totmax}/P_{totDC} = f(t_p)$$

BCR133S



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

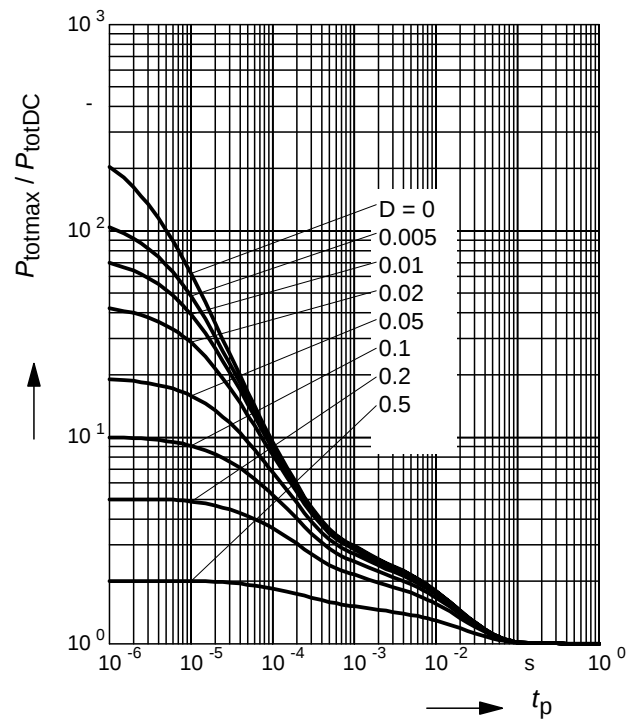
BCR133W



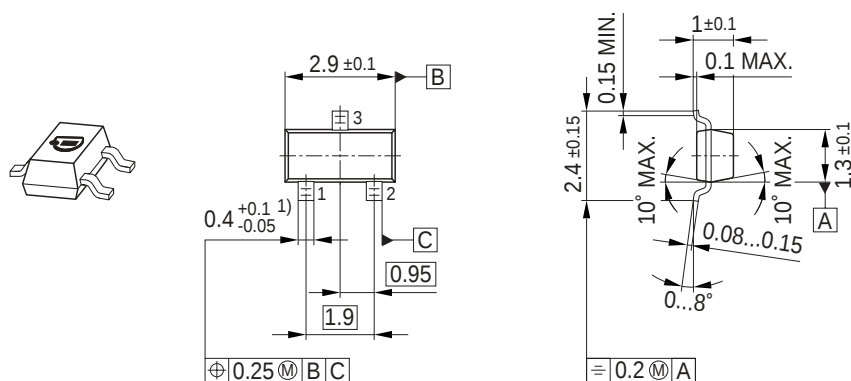
Permissible Pulse Load

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

BCR133W

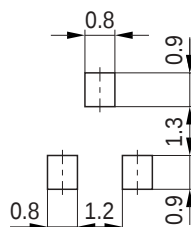


Package Outline

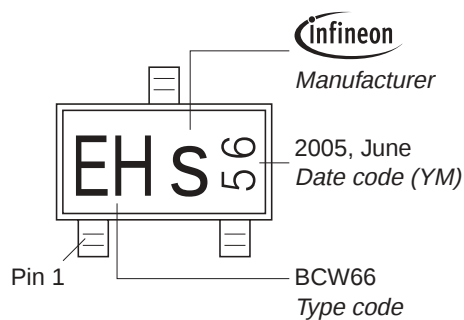


1) Lead width can be 0.6 max. in dambar area

Foot Print

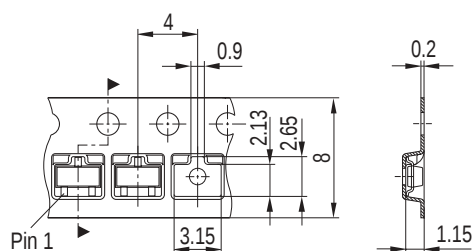


Marking Layout (Example)

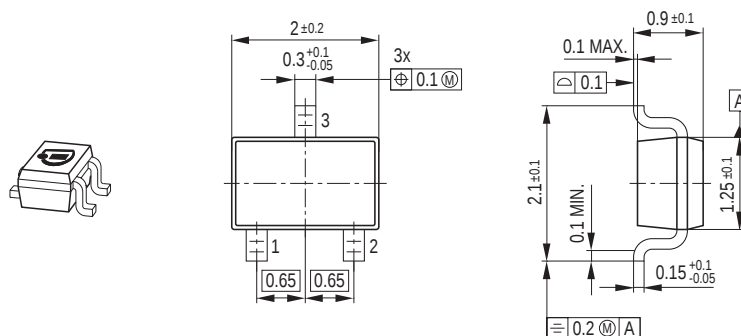


Standard Packing

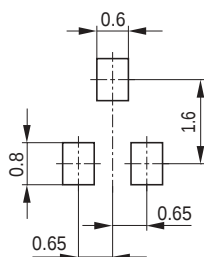
Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



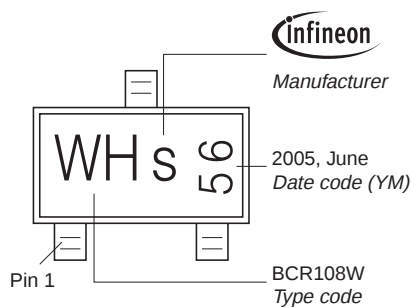
Package Outline



Foot Print

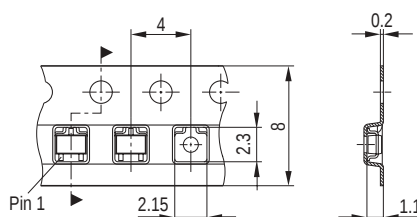


Marking Layout (Example)

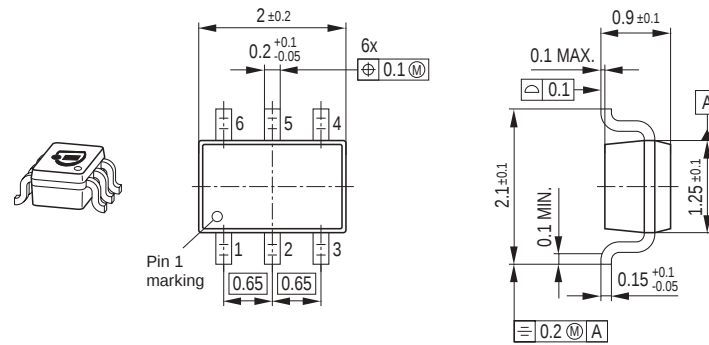


Standard Packing

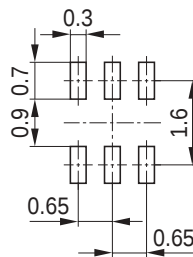
Reel $\varnothing 180$ mm = 3.000 Pieces/Reel
 Reel $\varnothing 330$ mm = 10.000 Pieces/Reel



Package Outline

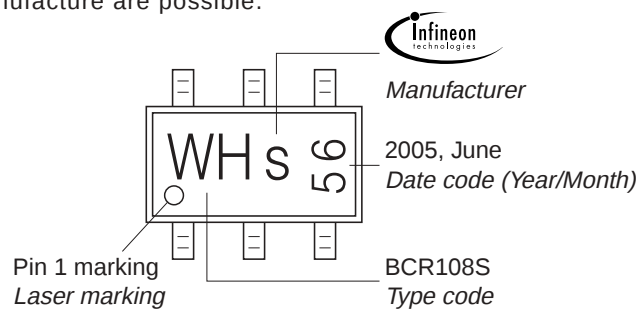


Foot Print



Marking Layout (Example)

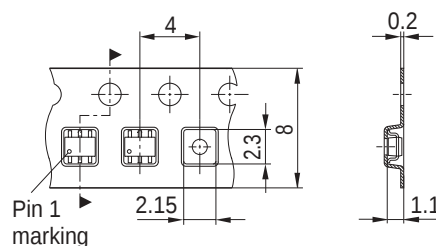
Small variations in positioning of Date code, Type code and Manufacture are possible.



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.



The technical drawing shows two views of the M80-100 connector:

- Front View (Left):** Shows the top profile of the connector. Dimensions include a total width of 1.2 ± 0.05 , a mounting hole diameter of $\varnothing 0.2 \pm 0.05$, a central pin height of 3, and a base thickness of 1. Pin positions are indicated by numbers 1, 2, and 3.
- Side View (Right):** Shows the side profile of the connector. Dimensions include a total height of 1.2 ± 0.05 , a mounting hole diameter of $\varnothing 0.2 \pm 0.05$, a contact length of 0.55 ± 0.04 , a contact angle of 10° MAX. , a base thickness of 0.15 ± 0.05 , and a total depth of 0.8 ± 0.05 .

Technical drawing of a mechanical part. The drawing shows a top view and a side view. The top view is a rectangle with a width of 0.4 and a height of 0.45. The side view is a rectangle with a width of 0.4 and a height of 1.05. The drawing is labeled with dimensions: 0.4, 0.45, 1.05, and 0.4.

Technical drawing of a mechanical part with dimensions. The drawing shows a side view and a cross-section. Dimensions include: 4, 0.3, 1.2, 1.5, 8, 0.2, 0.7, 1.35, and Pin 1.

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