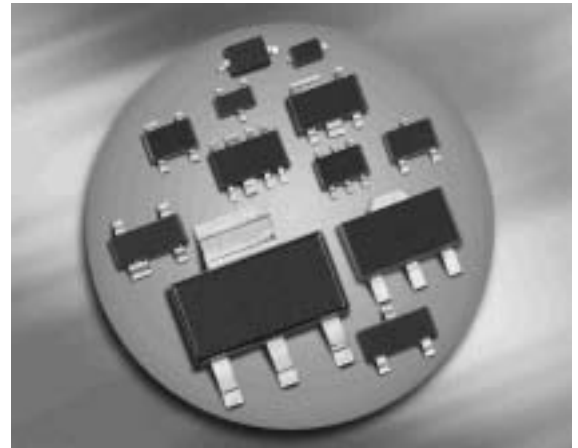
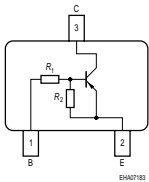


PNP Silicon Digital Transistor

- Switching circuit, inverter, interface circuit, driver circuit
- Built in bias resistor ($R_1 = 4.7\text{ k}\Omega$, $R_2 = 47\text{ k}\Omega$)
- Pb-free (RoHS compliant) package¹⁾
- Qualified according AEC Q101


BCR166/F
BCR166W


Type	Marking	Pin Configuration						Package
		1=B	2=E	3=C	-	-	-	
BCR166	WTs	1=B	2=E	3=C	-	-	-	SOT23
BCR166F	WTs	1=B	2=E	3=C	-	-	-	TSFP-3
BCR166W	WTs	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	$V_{I(fwd)}$	30	
Input reverse voltage	$V_{I(rev)}$	5	
Collector current	I_C	100	mA
Total power dissipation-	P_{tot}		mW
BCR166, $T_S \leq 102^\circ\text{C}$		200	
BCR166F, $T_S \leq 128^\circ\text{C}$ BCR166W, $T_S \leq 124^\circ\text{C}$		250	
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-65 ... 150	

¹Pb-containing package may be available upon special request

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ¹⁾	R_{thJS}		K/W
BCR166		≤ 240	
BCR166F		≤ 90	
BCR166W		≤ 105	

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 $I_C = 100 \mu\text{A}$, $I_B = 0$	$V_{(BR)CEO}$	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 $V_{EB} = 5 \text{ V}$, $I_C = 0$	I_{EBO}	-	-	155	μA
DC current gain ²⁾ $I_C = 5 \text{ mA}$, $V_{CE} = 5 \text{ V}$	h_{FE}	70	-	-	-
Collector-emitter saturation voltage ²⁾ $I_C = 10 \text{ mA}$, $I_B = 0.5 \text{ mA}$	V_{CEsat}	-	-	0.3	V
Input off voltage $I_C = 100 \mu\text{A}$, $V_{CE} = 5 \text{ V}$	$V_{i(off)}$	0.4	-	0.8	
Input on voltage $I_C = 2 \text{ mA}$, $V_{CE} = 0.3 \text{ V}$	$V_{i(on)}$	0.5	-	1.4	
Input resistor	R_1	3.2	4.7	6.2	k Ω
Resistor ratio	R_1/R_2	0.09	0.1	0.11	-

AC Characteristics

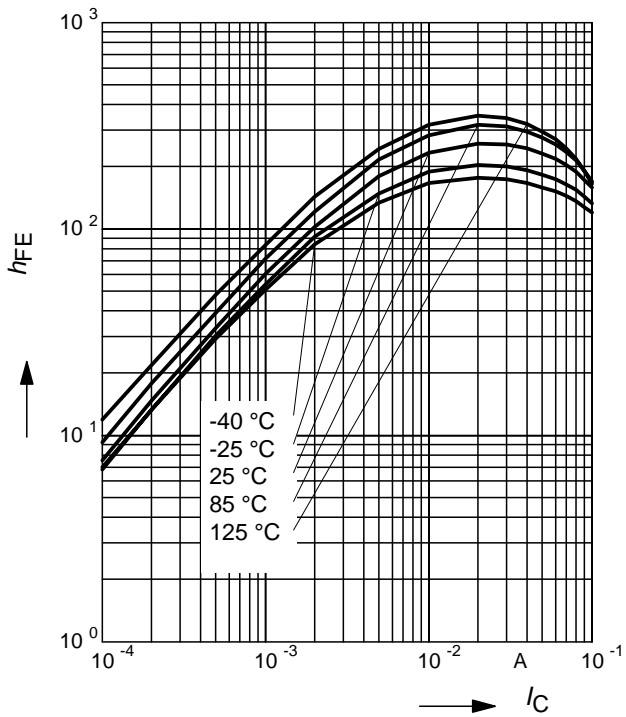
Transition frequency $I_C = 10 \text{ mA}$, $V_{CE} = 5 \text{ V}$, $f = 100 \text{ MHz}$	f_T	-	160	-	MHz
Collector-base capacitance $V_{CB} = 10 \text{ V}$, $f = 1 \text{ MHz}$	C_{cb}	-	3	-	pF

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

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

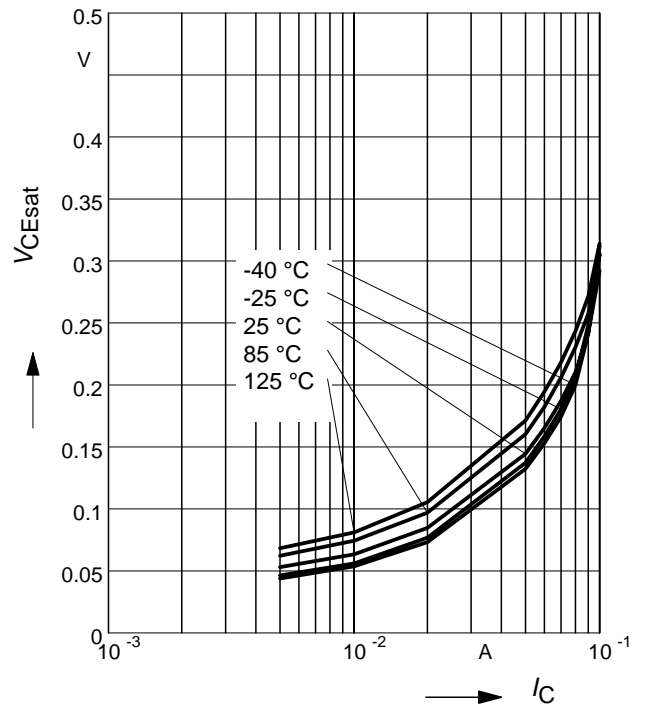
DC current gain $h_{FE} = f(I_C)$

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



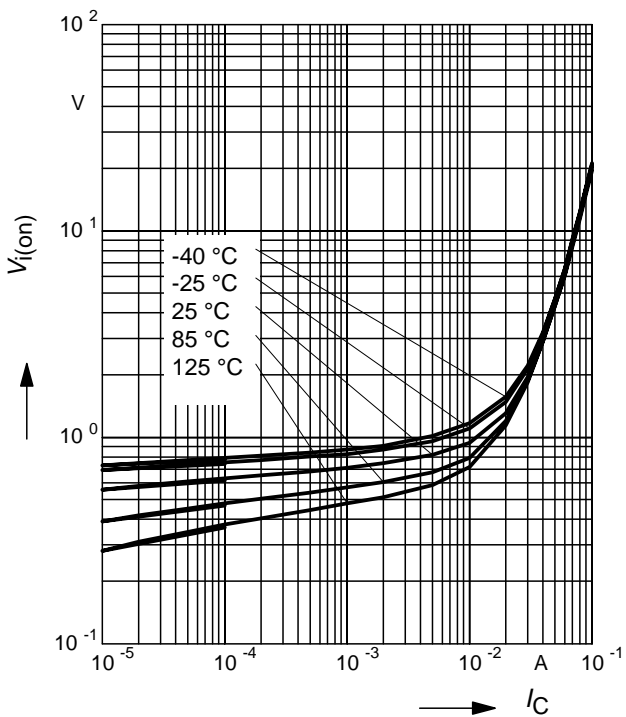
Collector-emitter saturation voltage

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



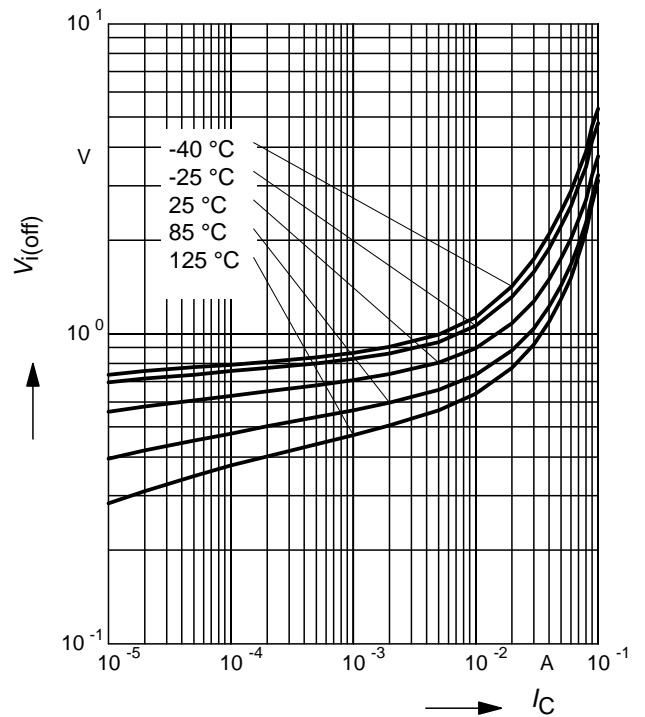
Input on Voltage $V_{i(on)} = f(I_C)$

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



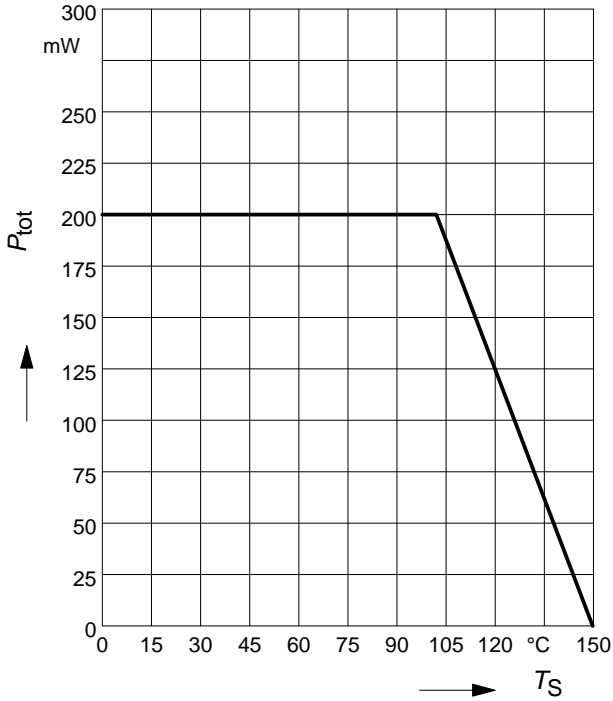
Input off voltage $V_{i(off)} = f(I_C)$

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



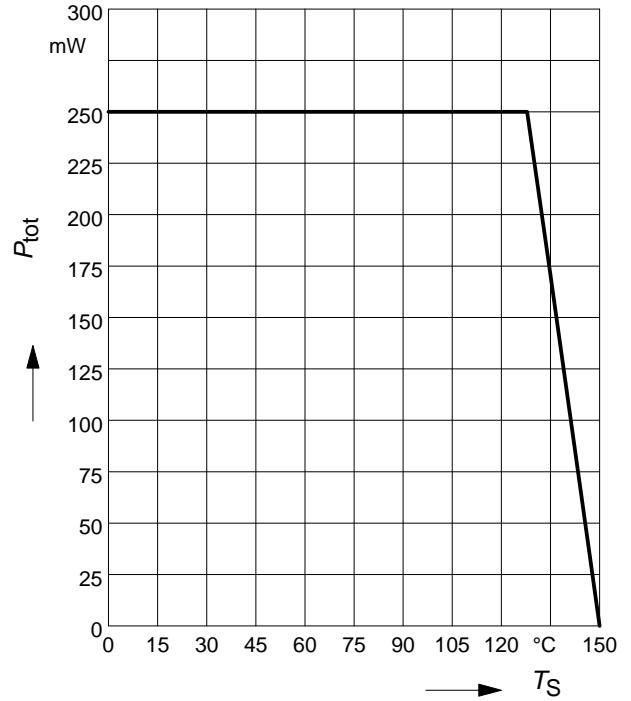
Total power dissipation $P_{tot} = f(T_S)$

BCR166



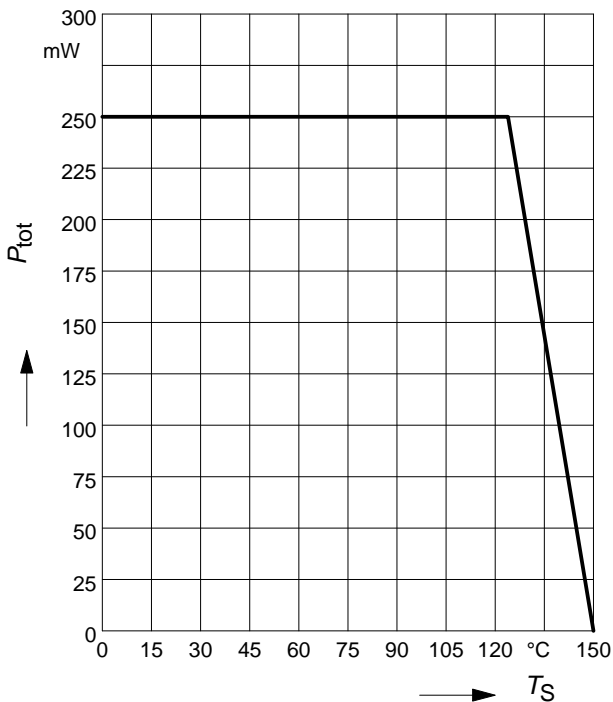
Total power dissipation $P_{tot} = f(T_S)$

BCR166F



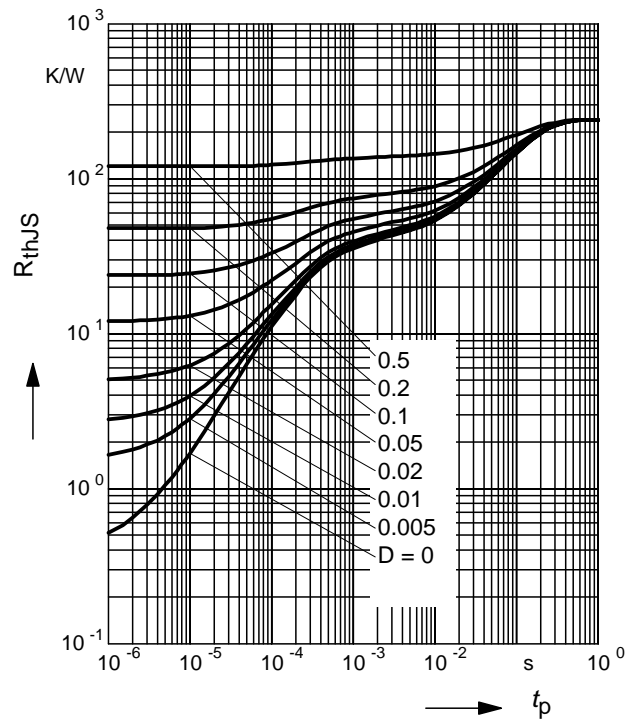
Total power dissipation $P_{tot} = f(T_S)$

BCR166W



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

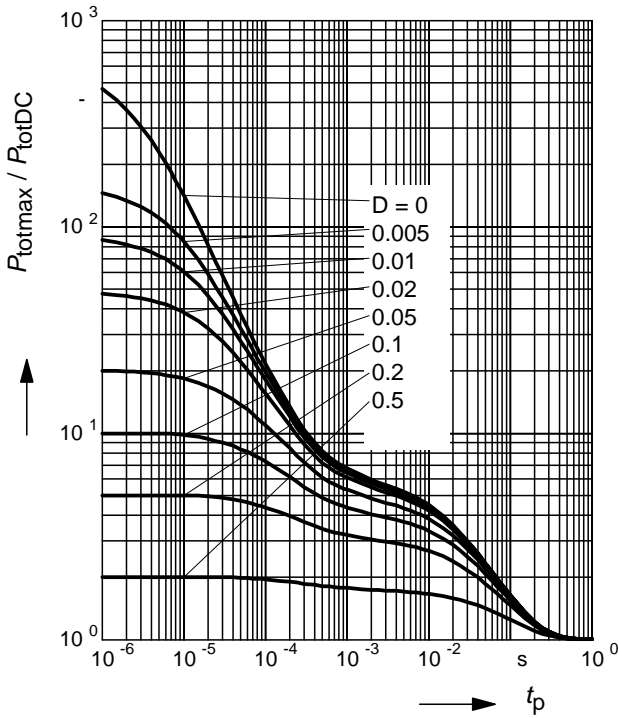
BCR166



Permissible Pulse Load

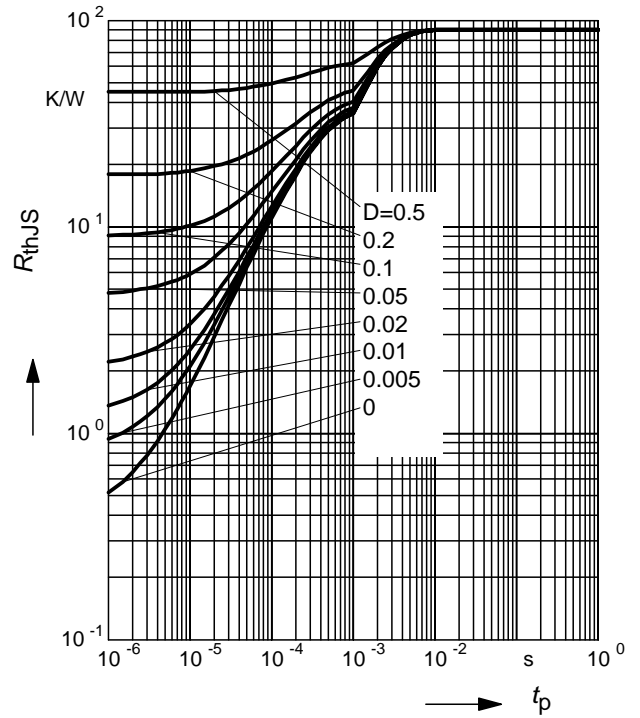
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$

BCR166



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

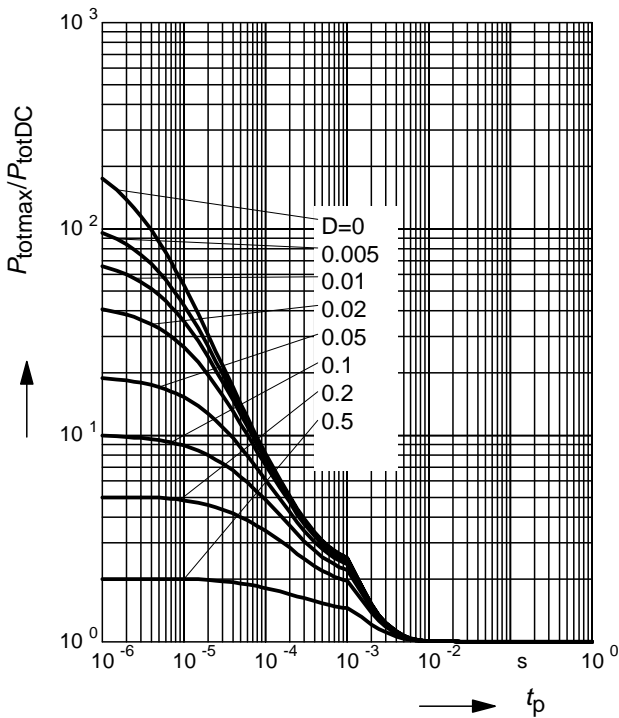
BCR166F



Permissible Pulse Load

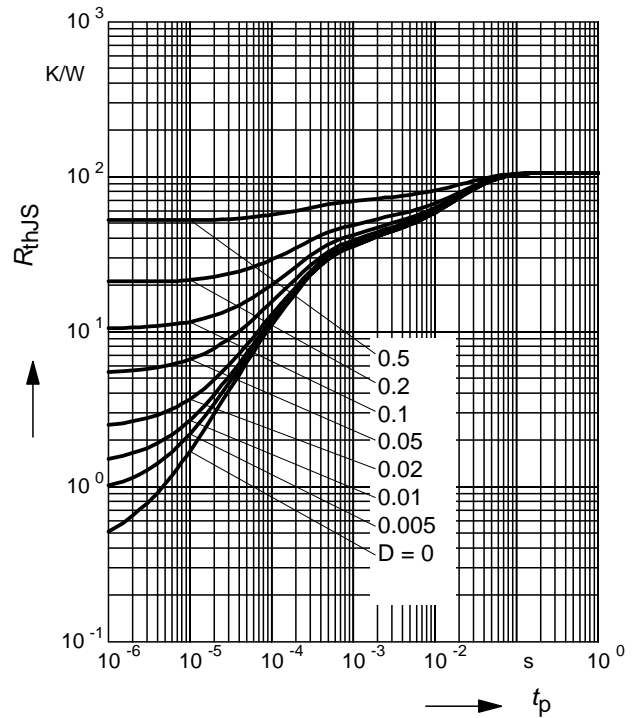
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$

BCR166F



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

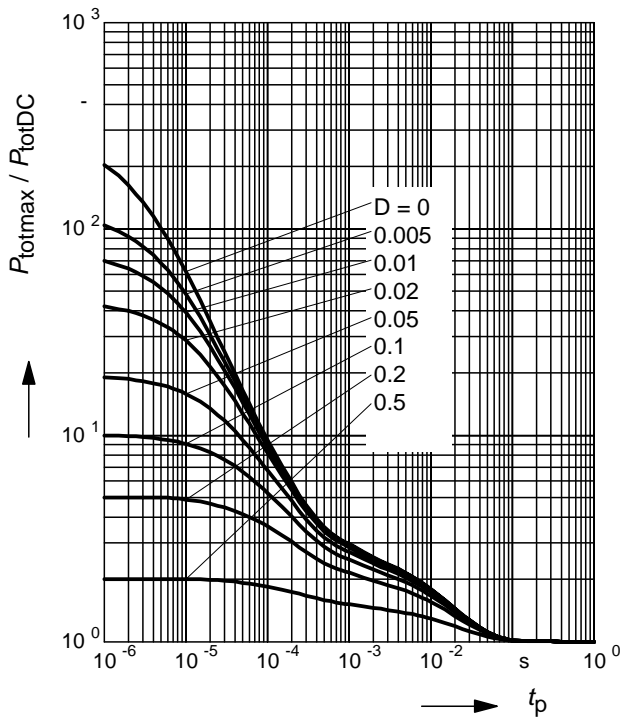
BCR166W



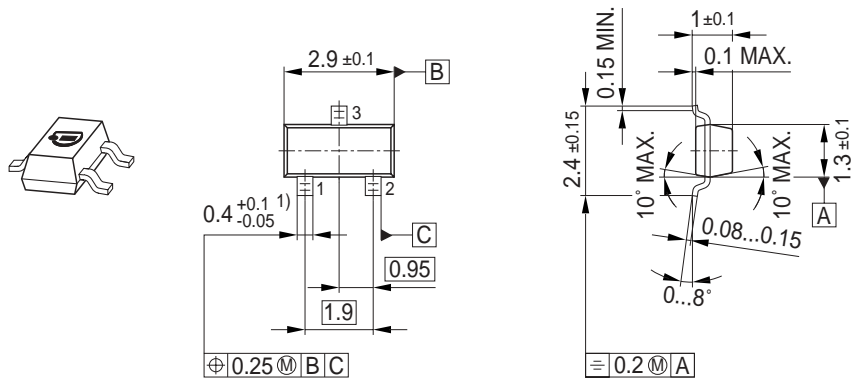
Permissible Pulse Load

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

BCR166W

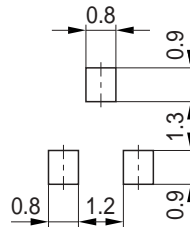


Package Outline

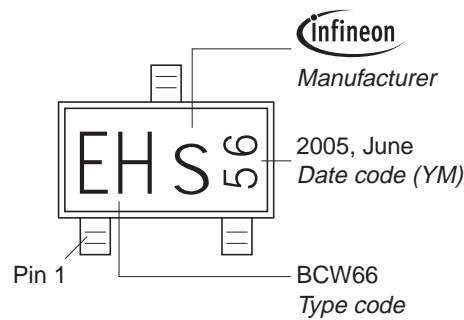


1) Lead width can be 0.6 max. in dambar area

Foot Print

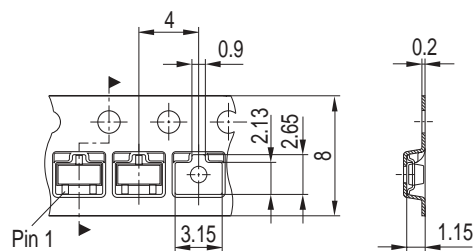


Marking Layout (Example)

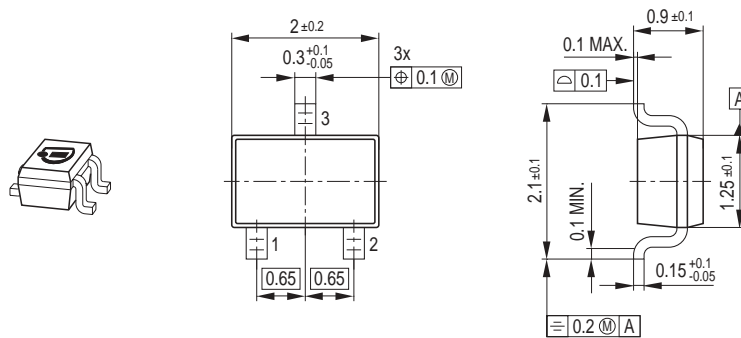


Standard Packing

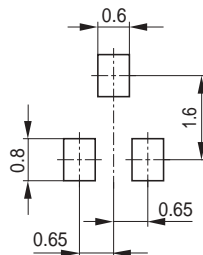
Reel \varnothing 180 mm = 3.000 Pieces/Reel
 Reel \varnothing 330 mm = 10.000 Pieces/Reel



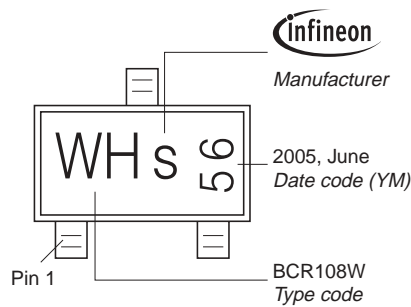
Package Outline



Foot Print

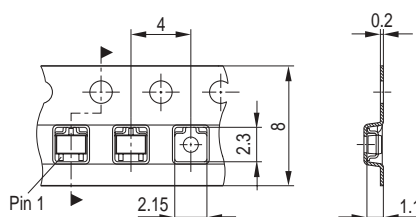


Marking Layout (Example)

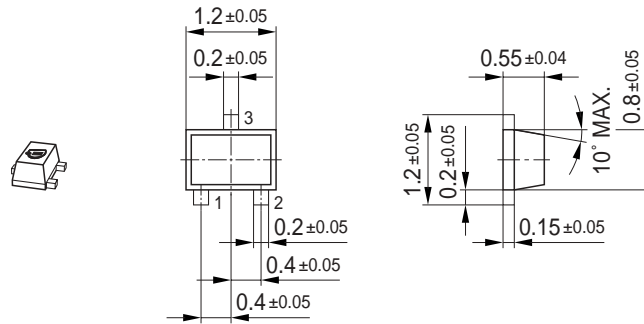


Standard Packing

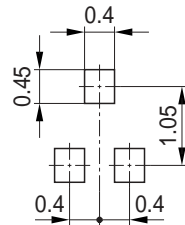
Reel $\varnothing 180$ mm = 3.000 Pieces/Reel
 Reel $\varnothing 330$ mm = 10.000 Pieces/Reel



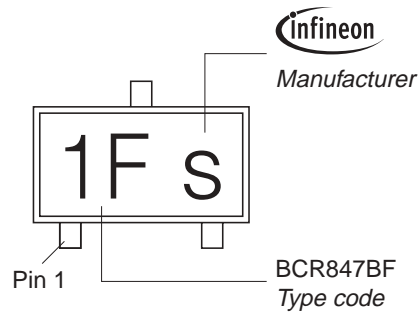
Package Outline



Foot Print

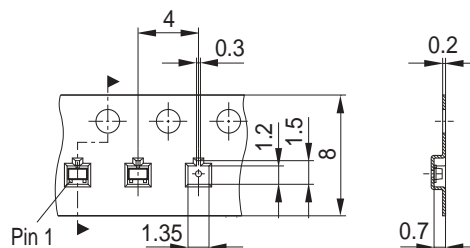


Marking Layout (Example)



Standard Packing

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



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