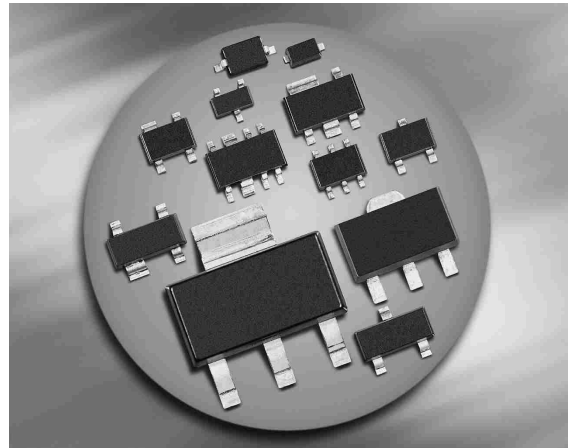
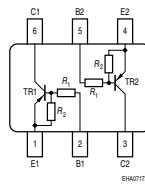
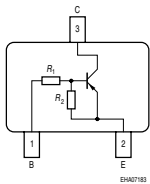


PNP Silicon Digital Transistor

- Switching circuit, inverter, interface circuit, driver circuit
- Built in bias resistor ($R_1 = 4.7k\Omega$, $R_2 = 47k\Omega$)


BCR166/F/L3
BCR166T/W
SEMB13


Type	Marking	Pin Configuration						Package
BCR166	WTs	1=B	2=E	3=C	-	-	-	SOT23
BCR166F	WTs	1=B	2=E	3=C	-	-	-	TSFP-3
BCR166L3	WT	1=B	2=E	3=C	-	-	-	TSLP-3-4
BCR166T	WTs	1=B	2=E	3=C	-	-	-	SC75
BCR166W	WTs	1=B	2=E	3=C	-	-	-	SOT323
SEMB13	WB	1=E1	2=B1	3=C2	4=E2	5=B2	6=C1	SOT666

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	50	V
Collector-base voltage	V_{CBO}	50	
Emitter-base voltage	V_{EBO}	5	
Input on voltage	$V_{I(on)}$	15	
Collector current	I_C	100	mA
Total power dissipation- BCR166, $T_S \leq 102^\circ\text{C}$ BCR166F, $T_S \leq 128^\circ\text{C}$ BCR166L3, $T_S \leq 135^\circ\text{C}$ BCR166T, $T_S \leq 109^\circ\text{C}$ BCR166W, $T_S \leq 124^\circ\text{C}$ SEMB13, $T_S \leq 75^\circ\text{C}$	P_{tot}	200 250 250 250 250 250	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ¹⁾ BCR166 BCR166F BCR166L3 BCR166T BCR166W SEMB13	R_{thJS}	≤ 240 ≤ 90 ≤ 60 ≤ 165 ≤ 105 ≤ 300	K/W

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

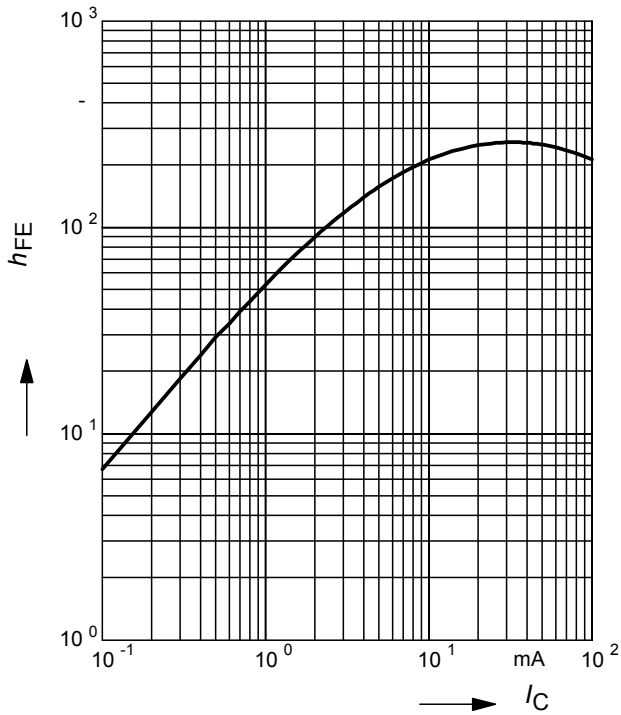
Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

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 $V_{\text{EB}} = 5\ \text{V}$, $I_C = 0$	I_{EBO}	-	-	155	μA
DC current gain ¹⁾ $I_C = 5\ \text{mA}$, $V_{\text{CE}} = 5\ \text{V}$	h_{FE}	70	-	-	-
Collector-emitter saturation voltage ¹⁾ $I_C = 10\ \text{mA}$, $I_B = 0.5\ \text{mA}$	V_{CEsat}	-	-	0.3	V
Input off voltage $I_C = 100\ \mu\text{A}$, $V_{\text{CE}} = 5\ \text{V}$	$V_{\text{i(off)}}$	0.4	-	0.8	
Input on voltage $I_C = 2\ \text{mA}$, $V_{\text{CE}} = 0.3\ \text{V}$	$V_{\text{i(on)}}$	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 $I_C = 10\ \text{mA}$, $V_{\text{CE}} = 5\ \text{V}$, $f = 100\ \text{MHz}$	f_{T}	-	160	-	MHz
Collector-base capacitance $V_{\text{CB}} = 10\ \text{V}$, $f = 1\ \text{MHz}$	C_{cb}	-	3	-	pF

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

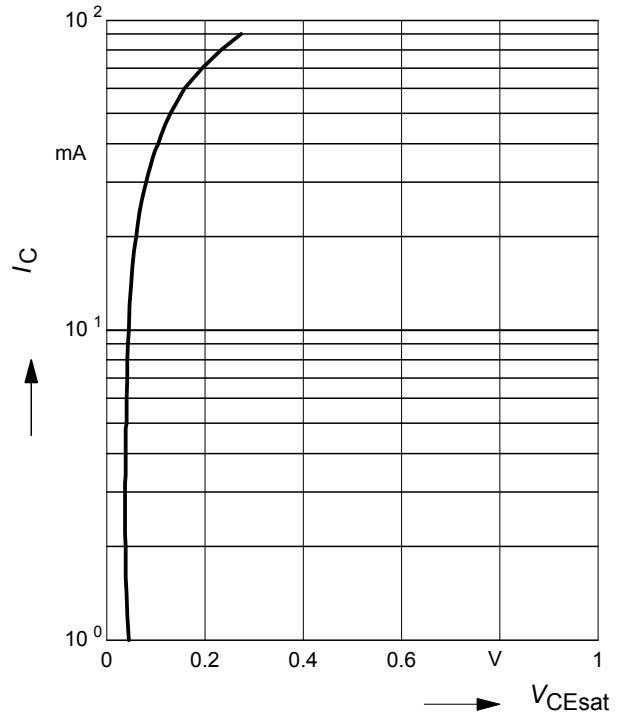
DC current gain $h_{FE} = f(I_C)$

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



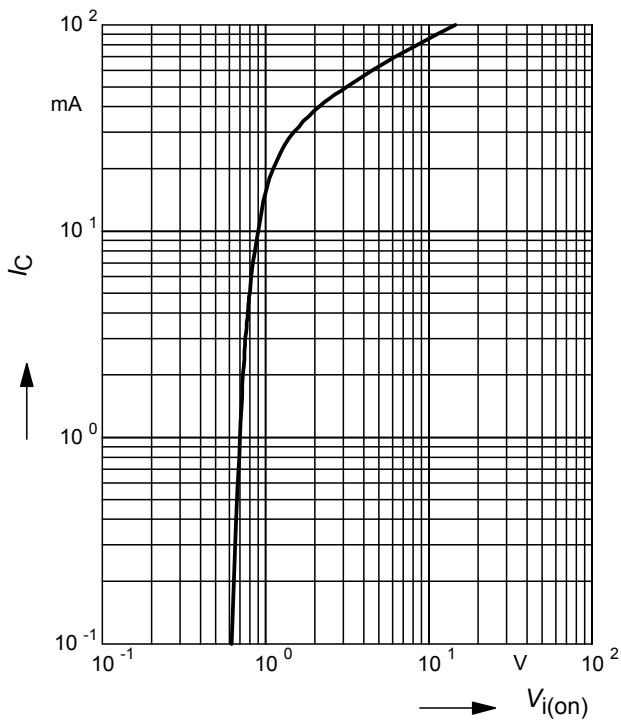
Collector-emitter saturation voltage

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



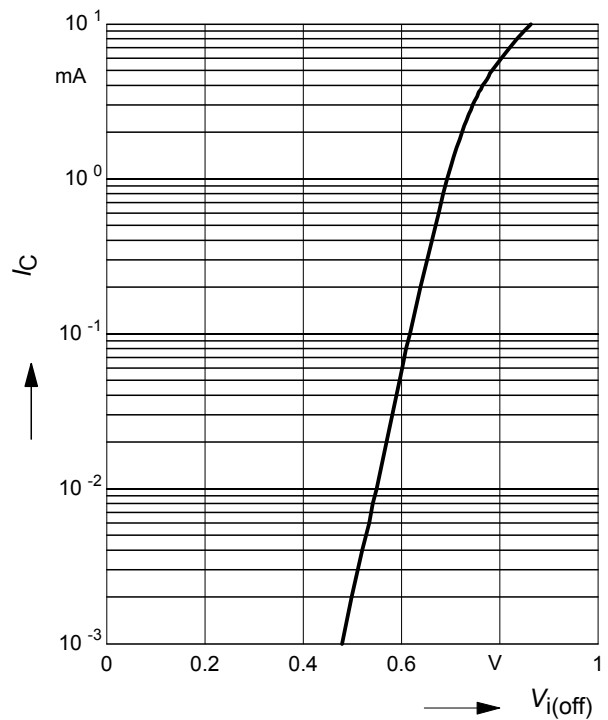
Input on Voltage $V_{i(on)} = f(I_C)$

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



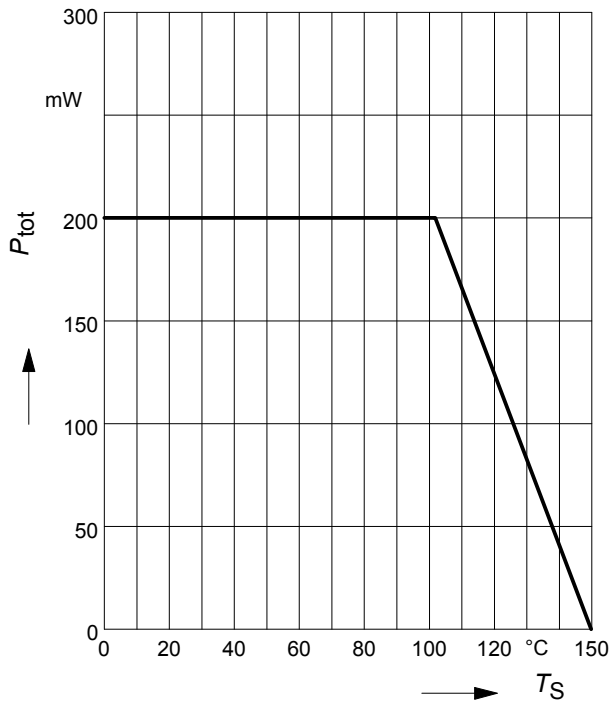
Input off voltage $V_{i(off)} = f(I_C)$

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



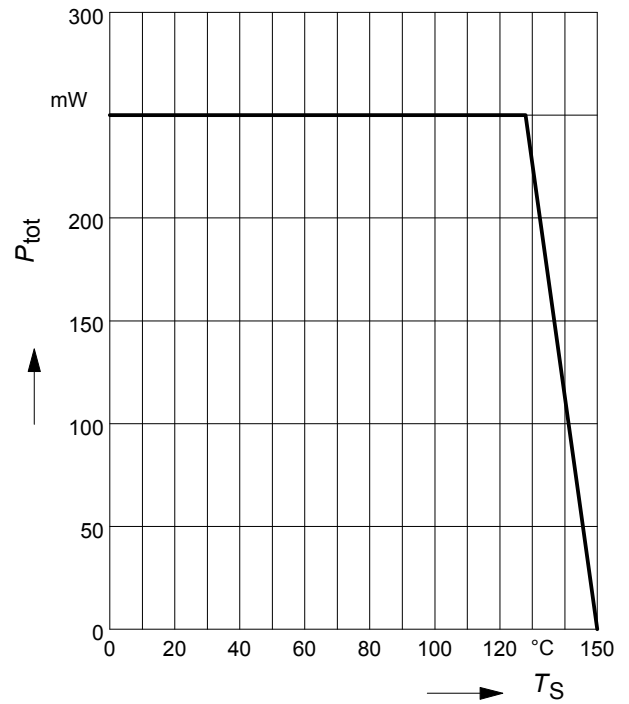
Total power dissipation $P_{\text{tot}} = f(T_S)$

BCR166



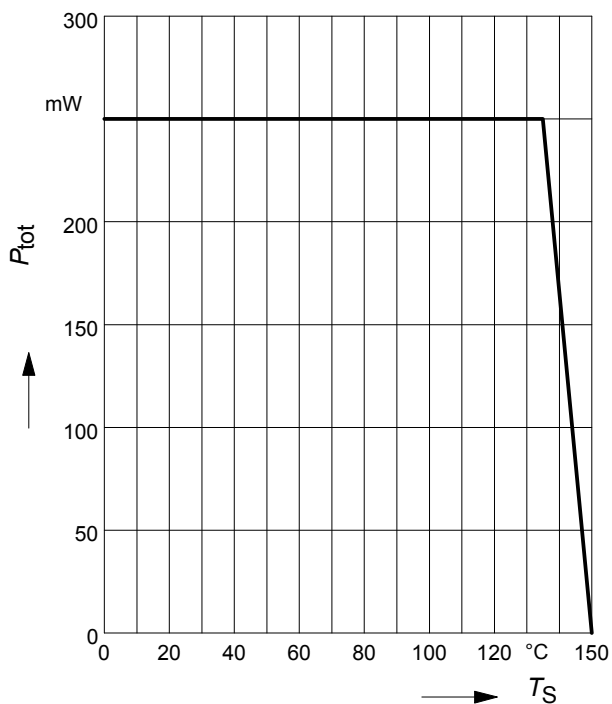
Total power dissipation $P_{\text{tot}} = f(T_S)$

BCR166F



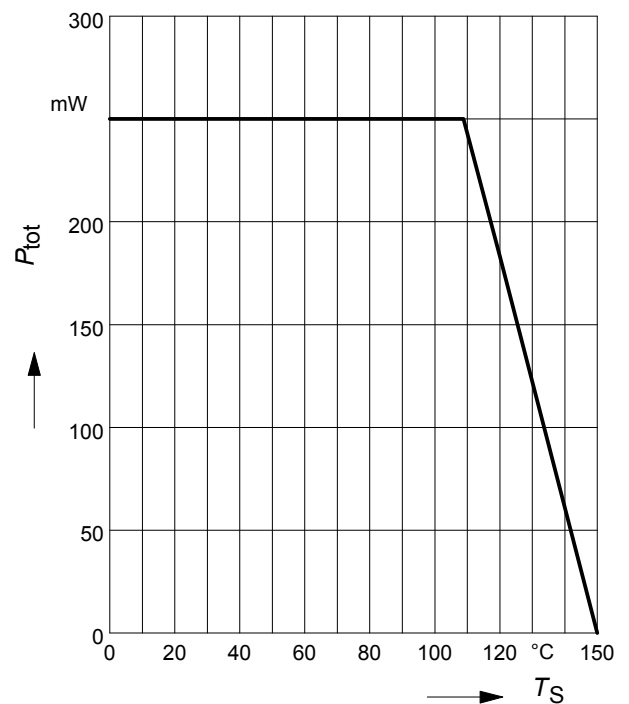
Total power dissipation $P_{\text{tot}} = f(T_S)$

BCR166L3



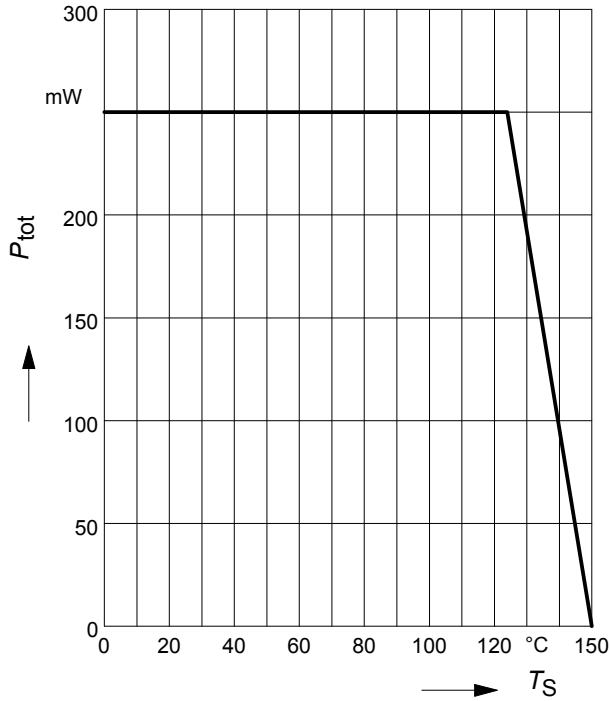
Total power dissipation $P_{\text{tot}} = f(T_S)$

BCR166T



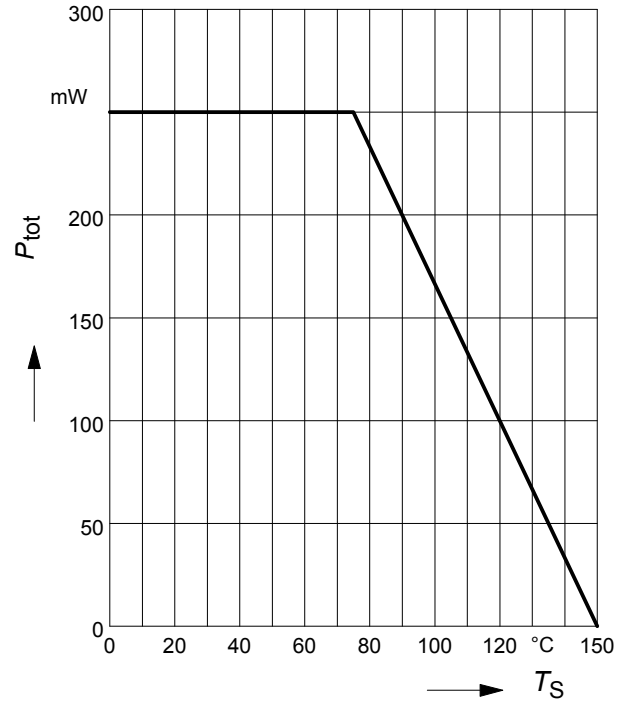
Total power dissipation $P_{\text{tot}} = f(T_S)$

BCR166W



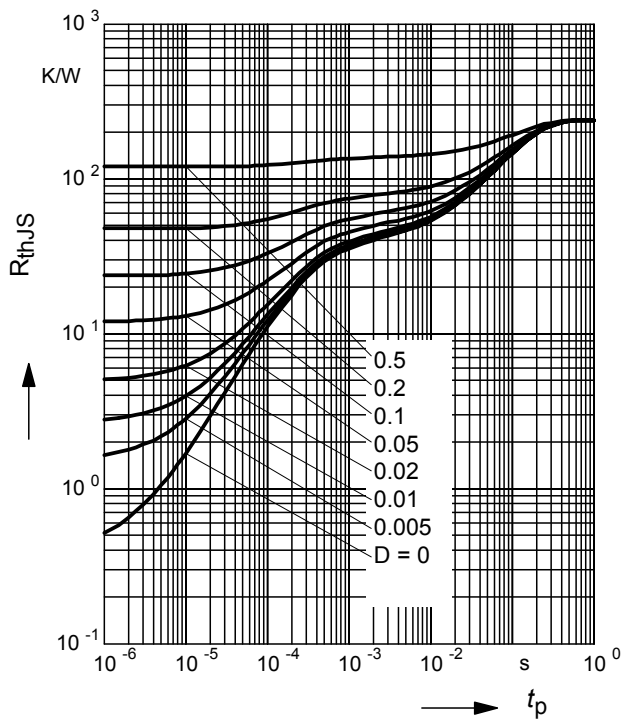
Total power dissipation $P_{\text{tot}} = f(T_S)$

SEMB13



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

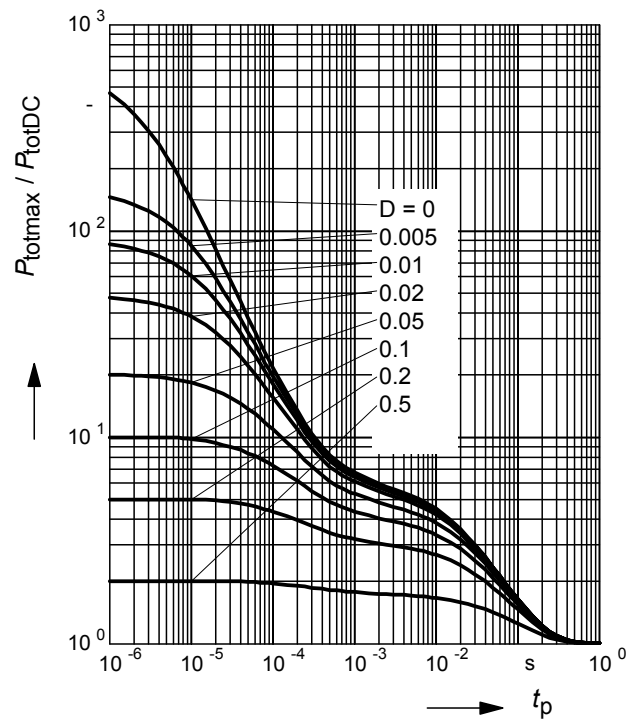
BCR166



Permissible Pulse Load

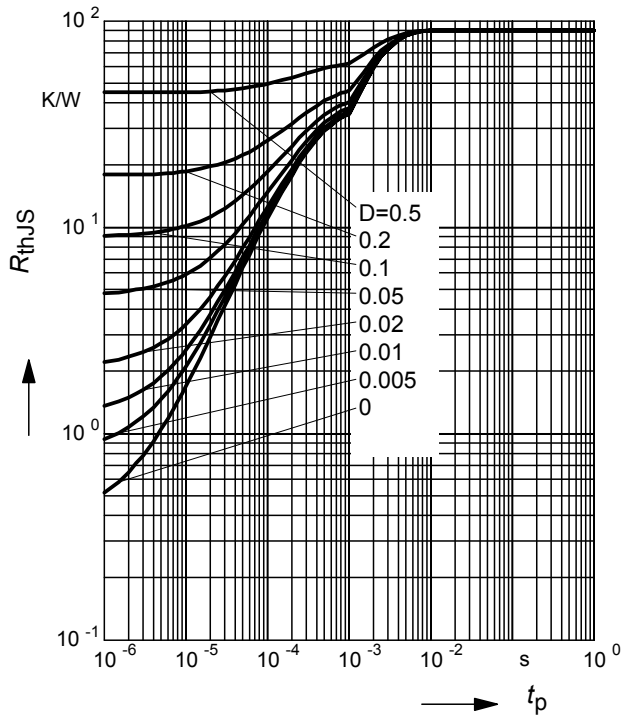
$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$

BCR166



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

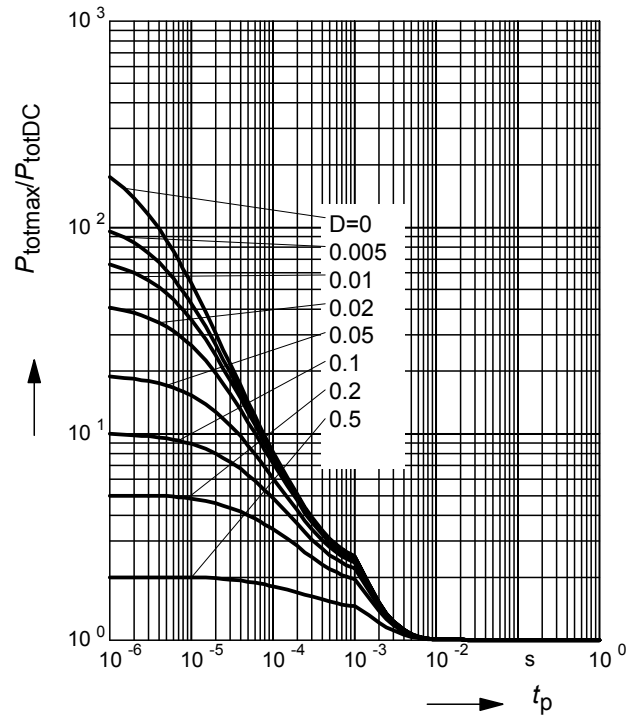
BCR166F



Permissible Pulse Load

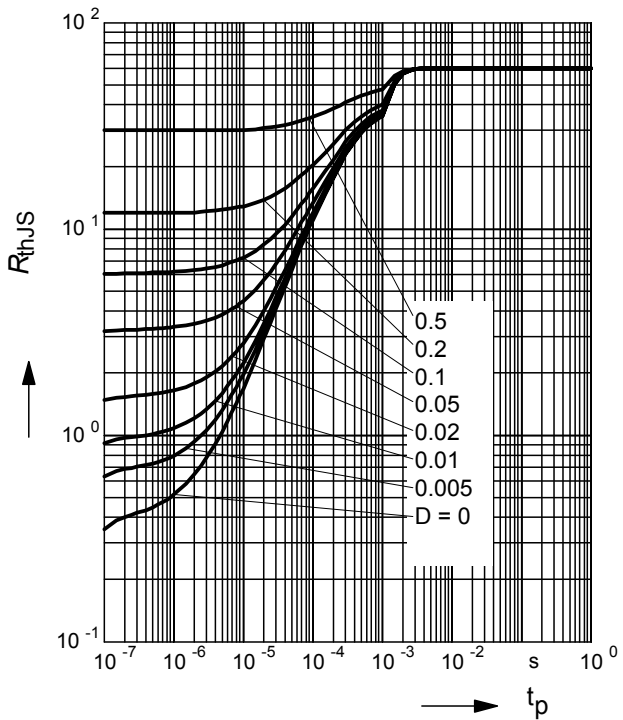
$$P_{totmax}/P_{totDC} = f(t_p)$$

BCR166F



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

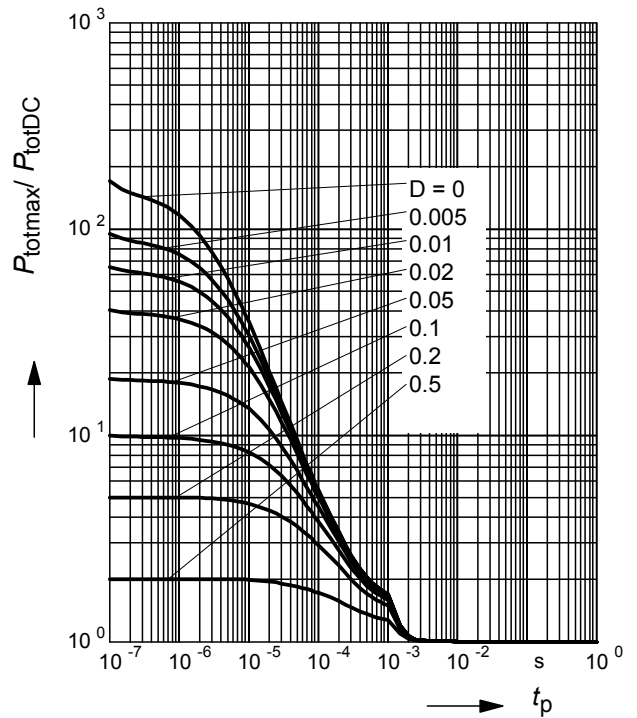
BCR166L3



Permissible Pulse Load

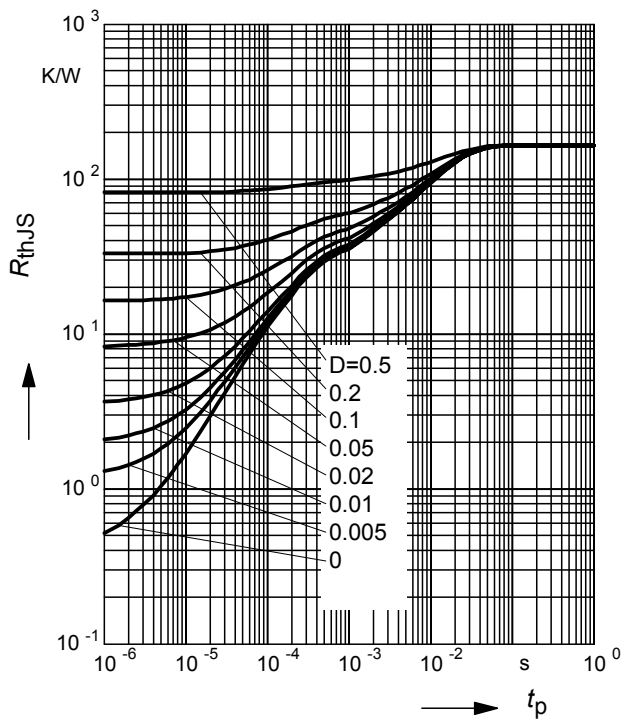
$$P_{totmax}/P_{totDC} = f(t_p)$$

BCR166L3



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

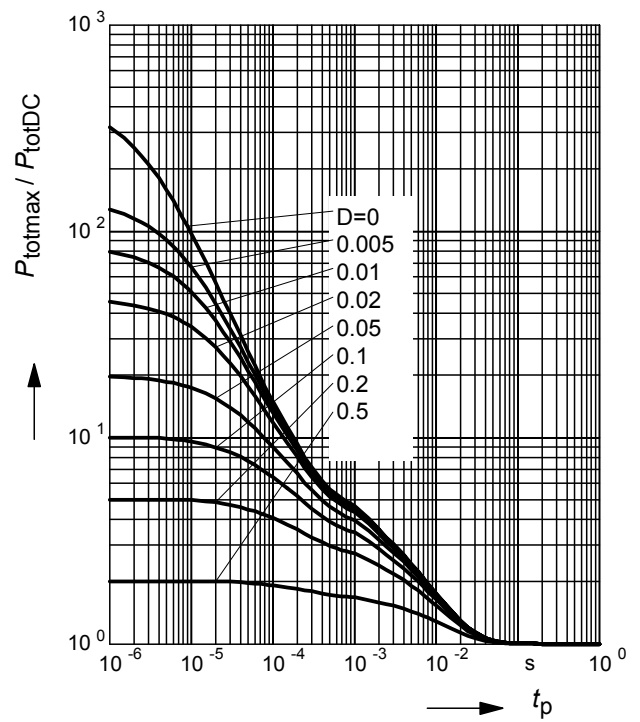
BCR166T



Permissible Pulse Load

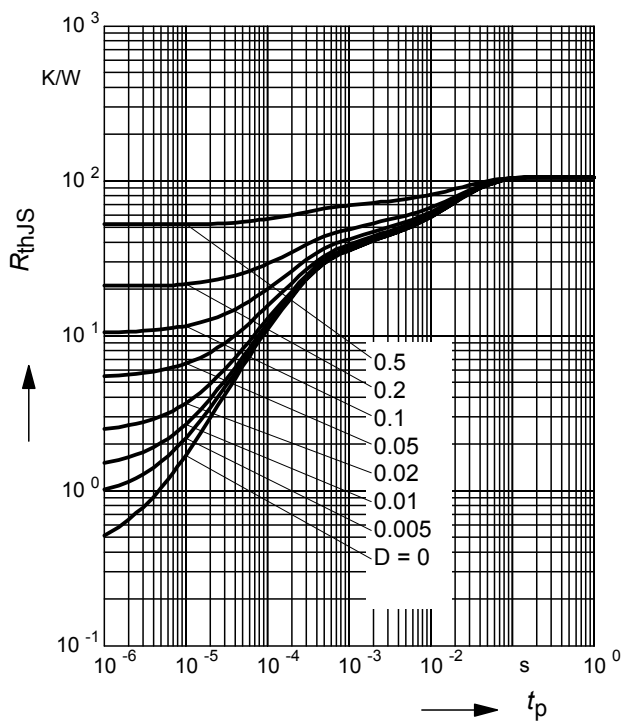
$$P_{totmax}/P_{totDC} = f(t_p)$$

BCR166T



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

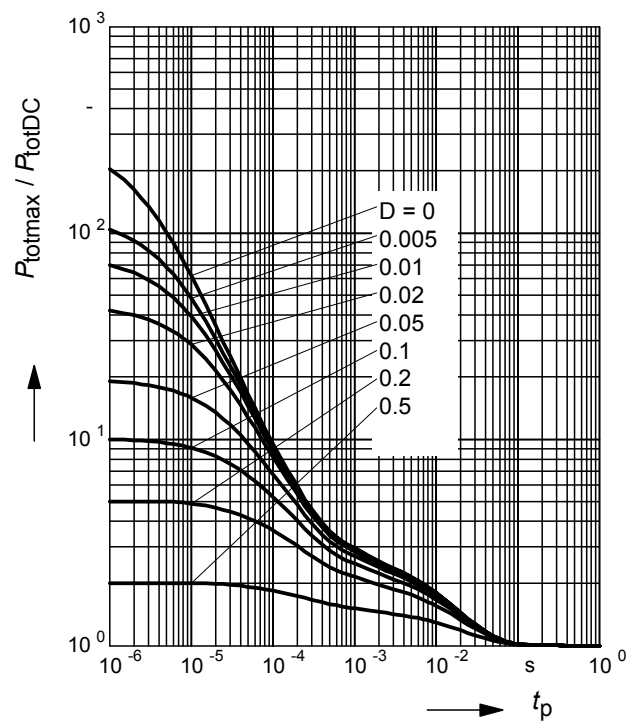
BCR166W



Permissible Pulse Load

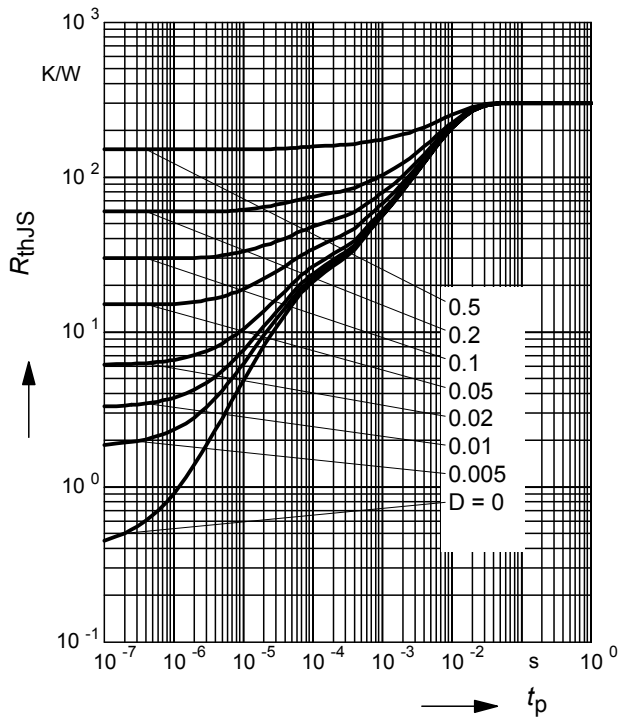
$$P_{totmax}/P_{totDC} = f(t_p)$$

BCR166W



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

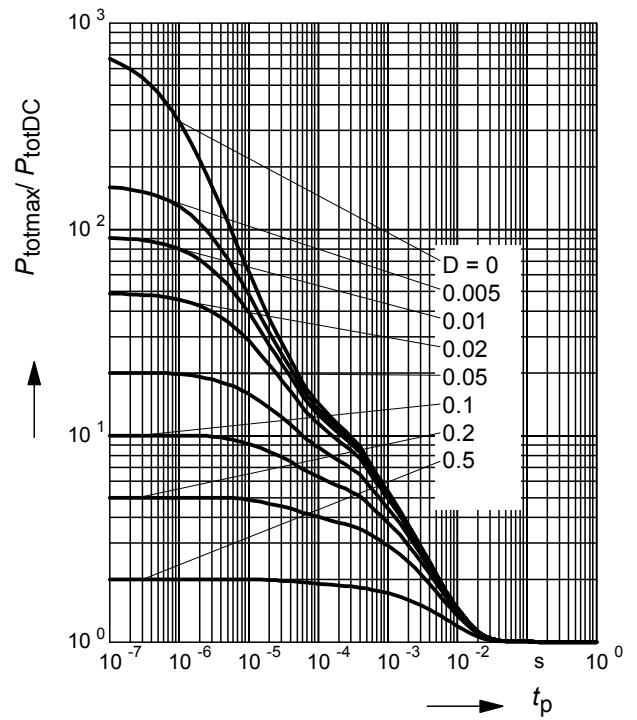
SEMB13



Permissible Pulse Load

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

SEMB13



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