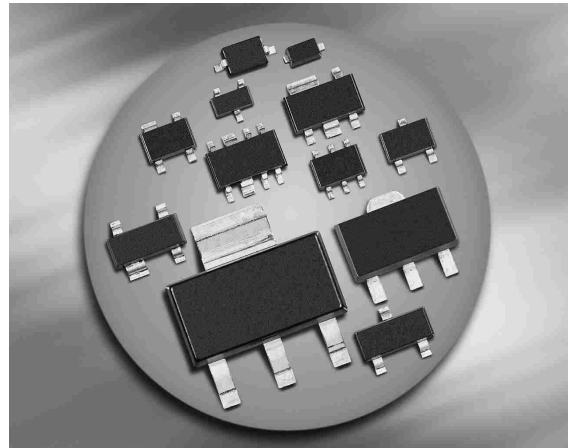


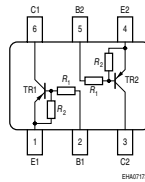
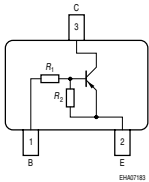
**PNP Silicon Digital Transistor**

- 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
		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
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 <sup>1)</sup>	$R_{thJS}$		K/W
BCR166		$\leq 240$	
BCR166F		$\leq 90$	
BCR166L3		$\leq 60$	
BCR166T		$\leq 165$	
BCR166W		$\leq 105$	
SEMB13		$\leq 300$	

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

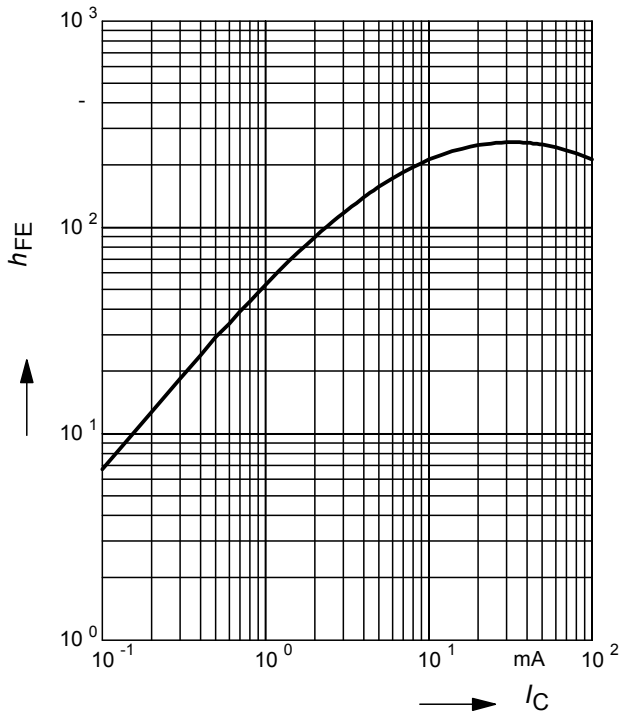
**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

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 $V_{EB} = 5 \text{V}, I_C = 0$	$I_{EBO}$	-	-	155	$\mu\text{A}$
DC current gain <sup>1)</sup> $I_C = 5 \text{mA}, V_{CE} = 5 \text{V}$	$h_{FE}$	70	-	-	-
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 $I_C = 100 \mu\text{A}, V_{CE} = 5 \text{V}$	$V_{i(off)}$	0.4	-	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	$\text{k}\Omega$
Resistor ratio	$R_1/R_2$	0.09	0.1	0.11	-
<b>AC Characteristics</b>					
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

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

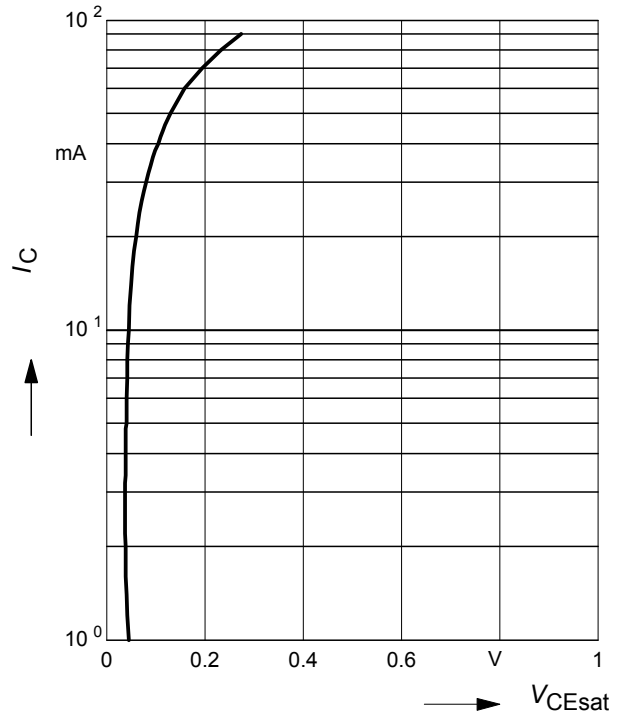
**DC current gain  $h_{FE} = f(I_C)$**

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



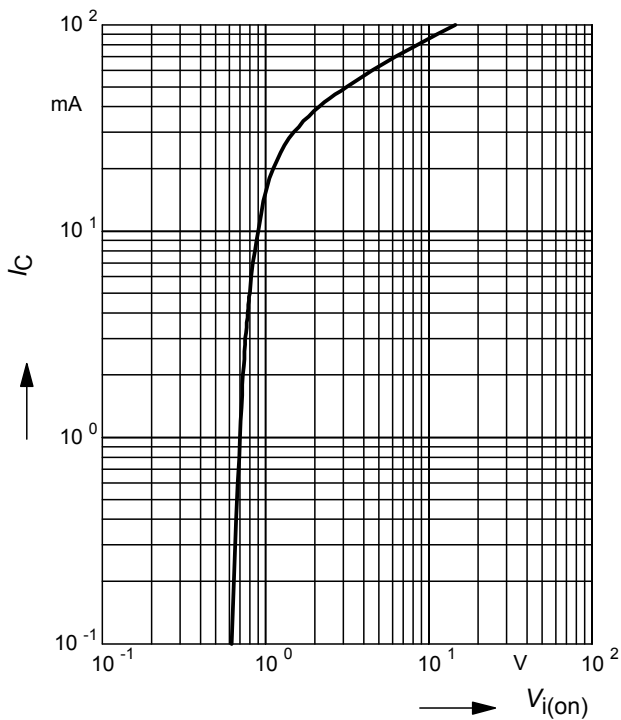
**Collector-emitter saturation voltage**

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



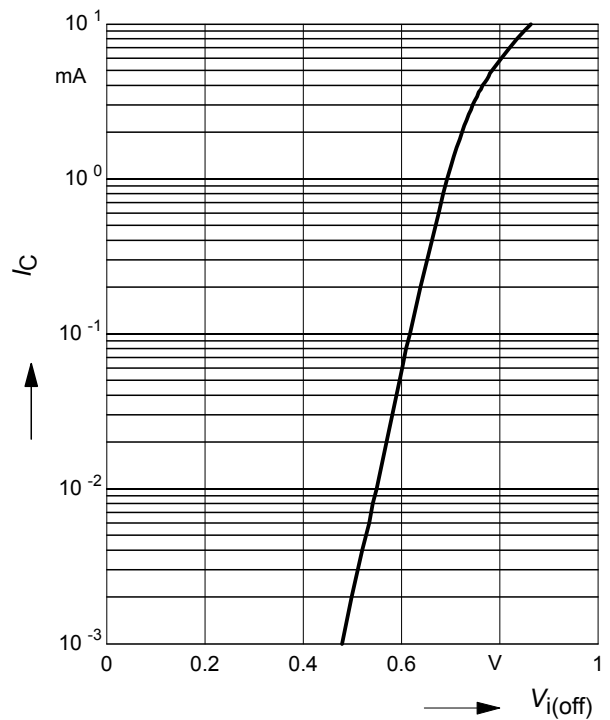
**Input on Voltage  $V_{i(on)} = f(I_C)$**

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



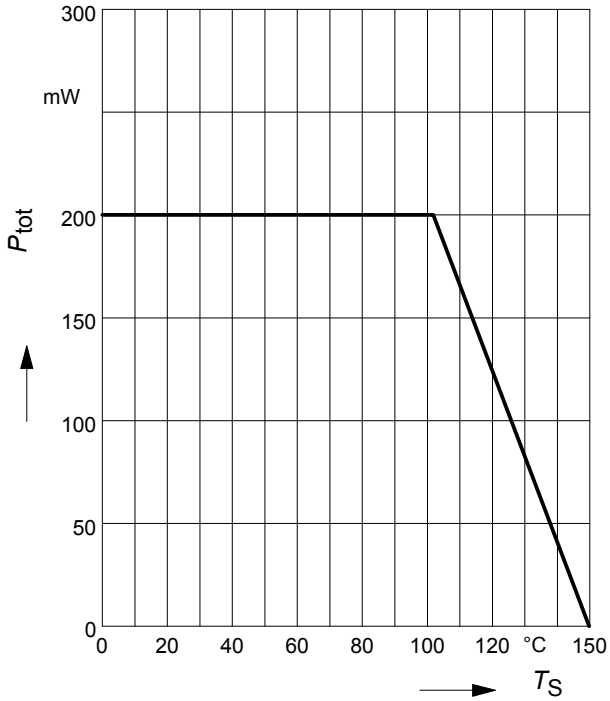
**Input off voltage  $V_{i(off)} = f(I_C)$**

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



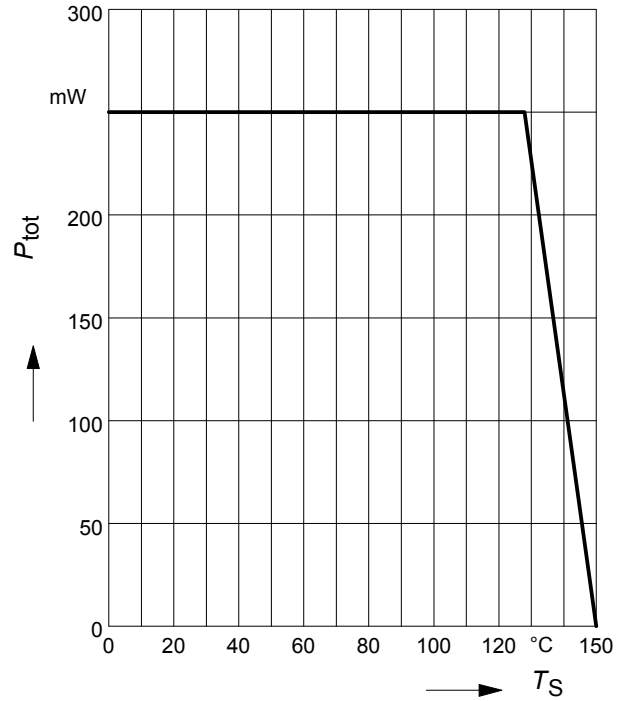
Total power dissipation  $P_{tot} = f(T_S)$

BCR166



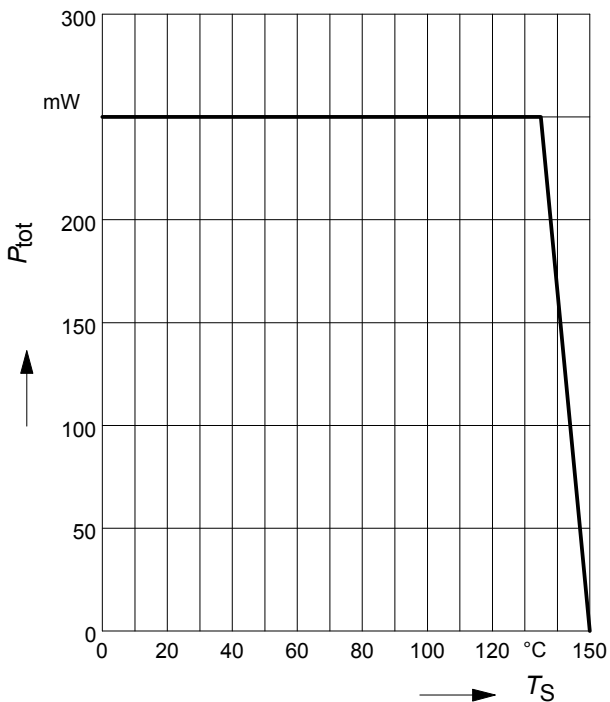
Total power dissipation  $P_{tot} = f(T_S)$

BCR166F



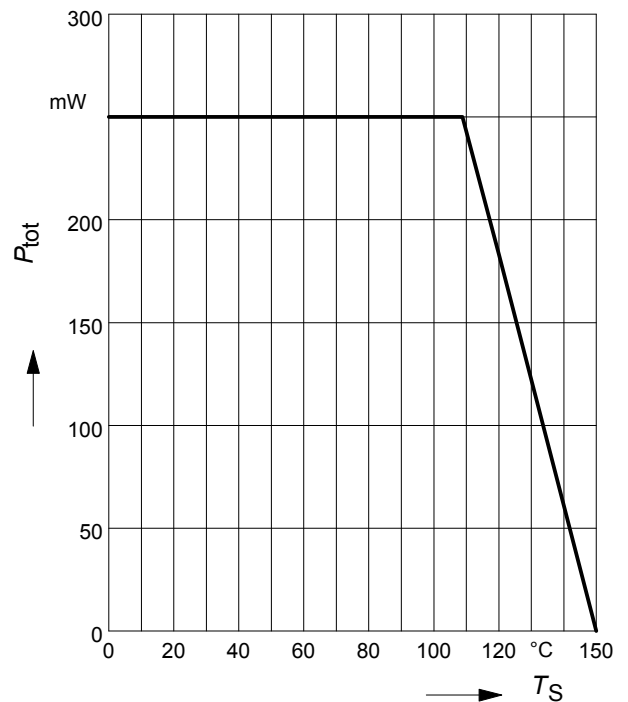
Total power dissipation  $P_{tot} = f(T_S)$

BCR166L3



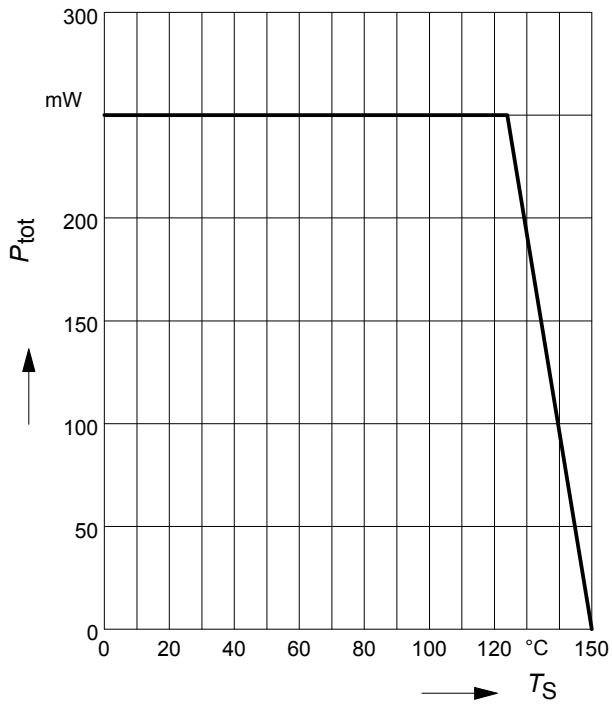
Total power dissipation  $P_{tot} = f(T_S)$

BCR166T



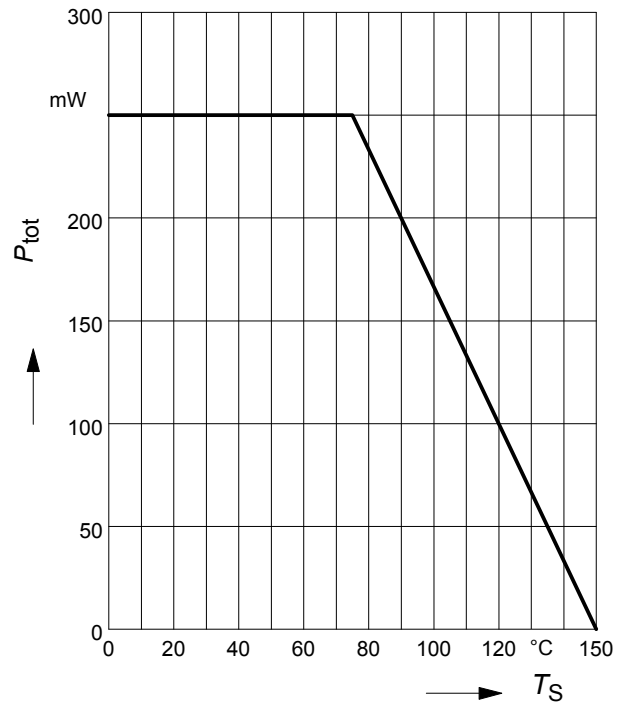
**Total power dissipation  $P_{tot} = f(T_S)$**

BCR166W



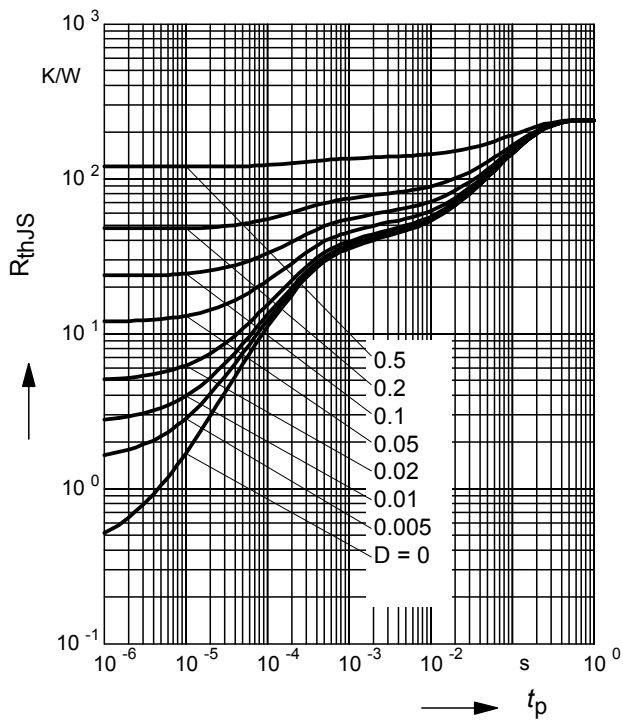
**Total power dissipation  $P_{tot} = f(T_S)$**

SEMB13



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

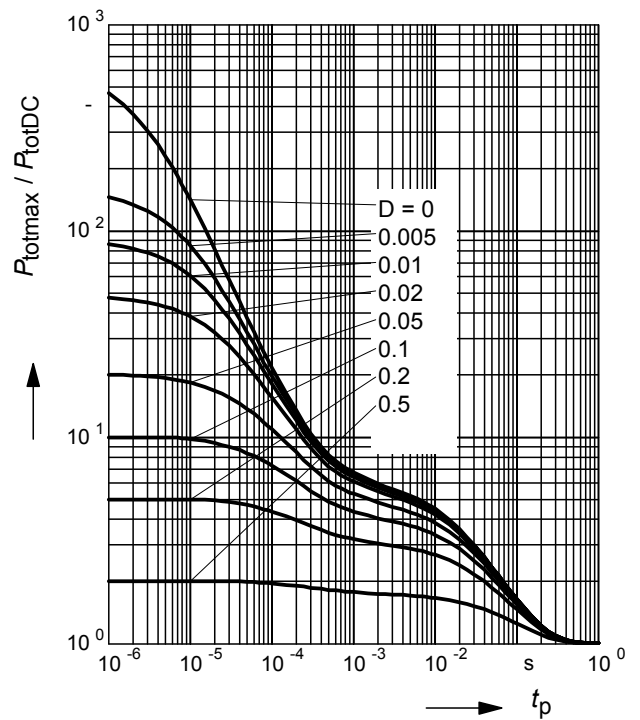
BCR166



**Permissible Pulse Load**

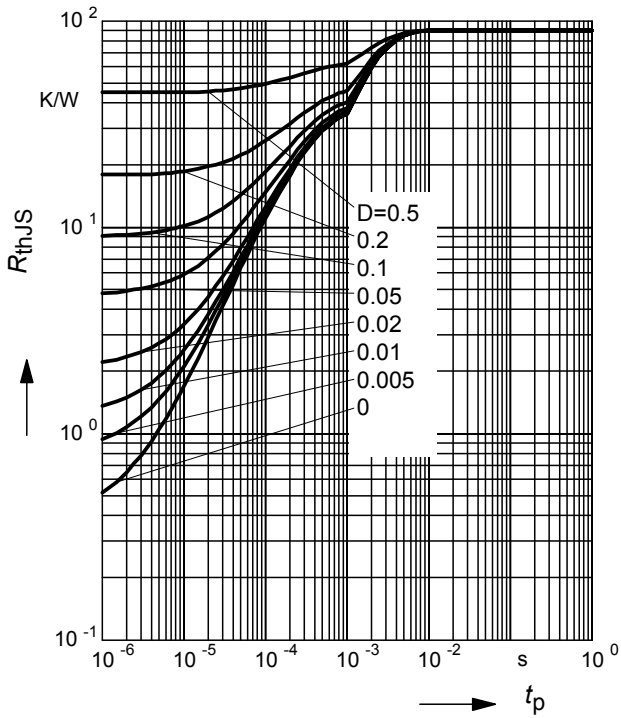
$P_{totmax}/P_{totDC} = f(t_p)$

BCR166



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

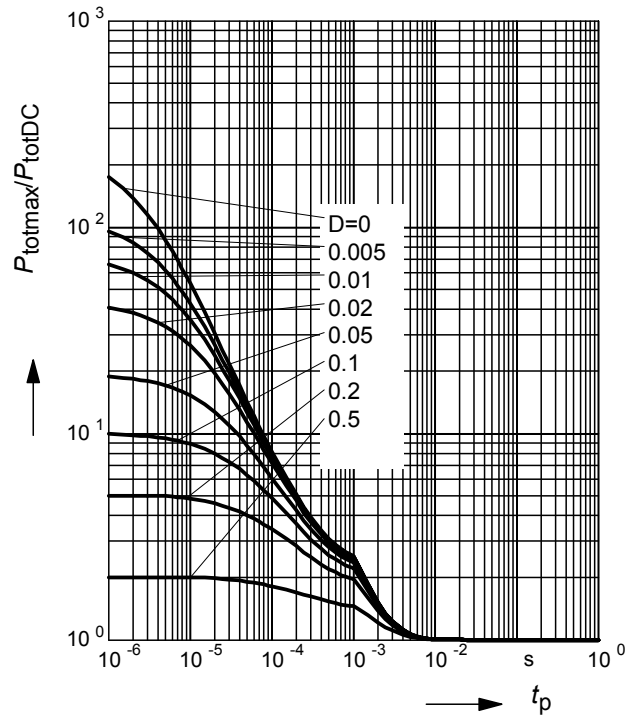
BCR166F



**Permissible Pulse Load**

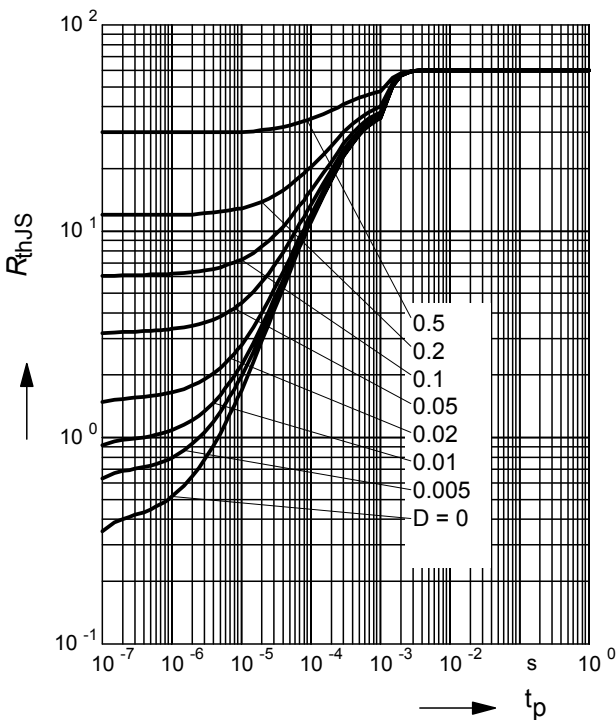
$P_{totmax}/P_{totDC} = f(t_p)$

BCR166F



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

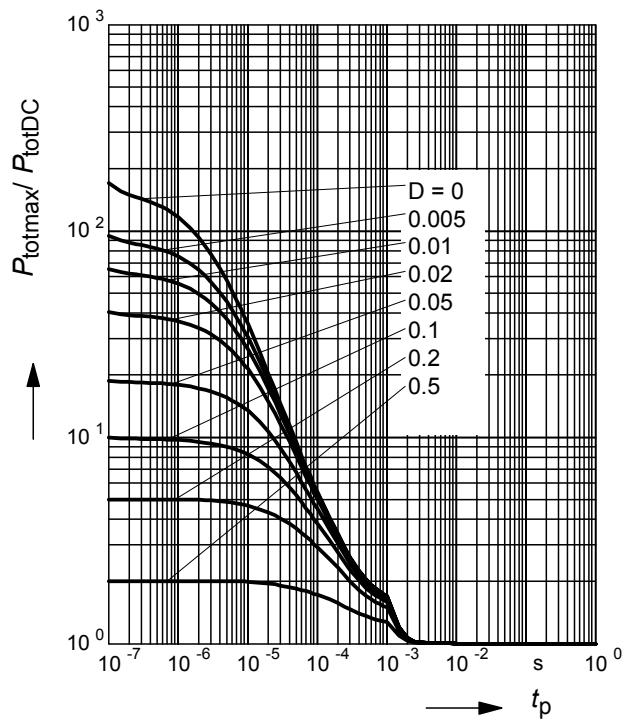
BCR166L3



**Permissible Pulse Load**

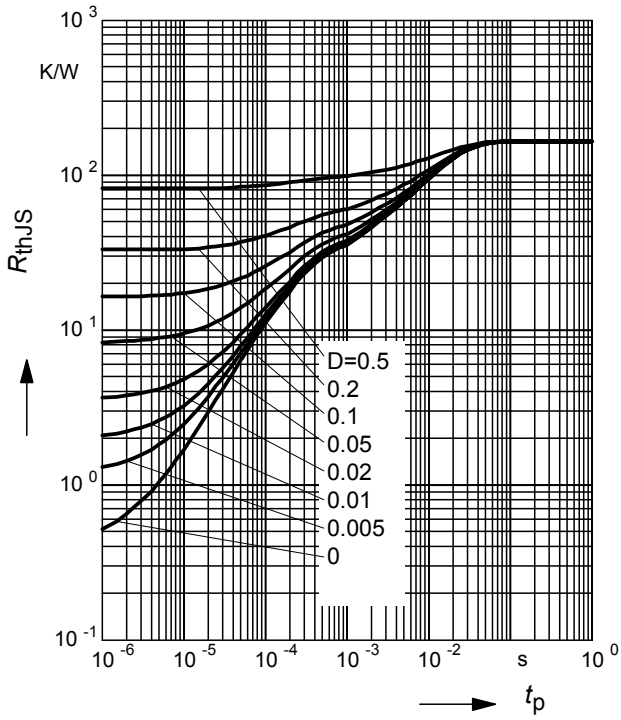
$P_{totmax}/P_{totDC} = f(t_p)$

BCR166L3



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

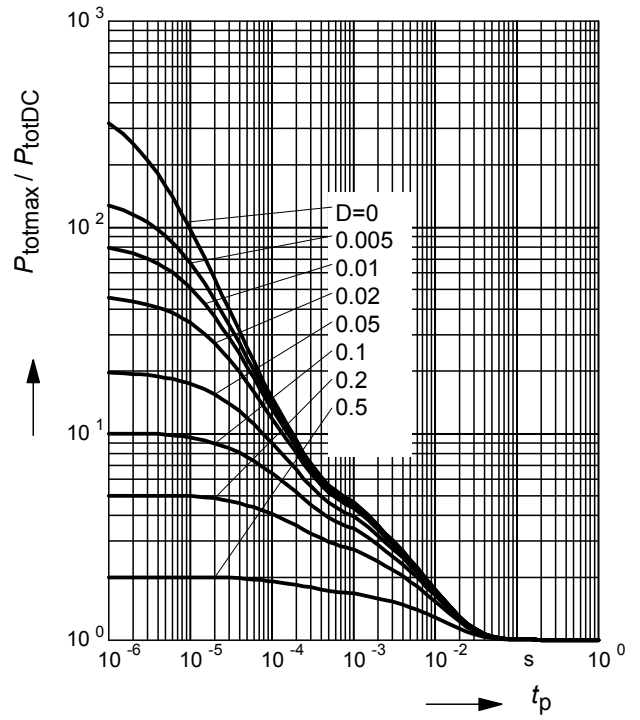
BCR166T



**Permissible Pulse Load**

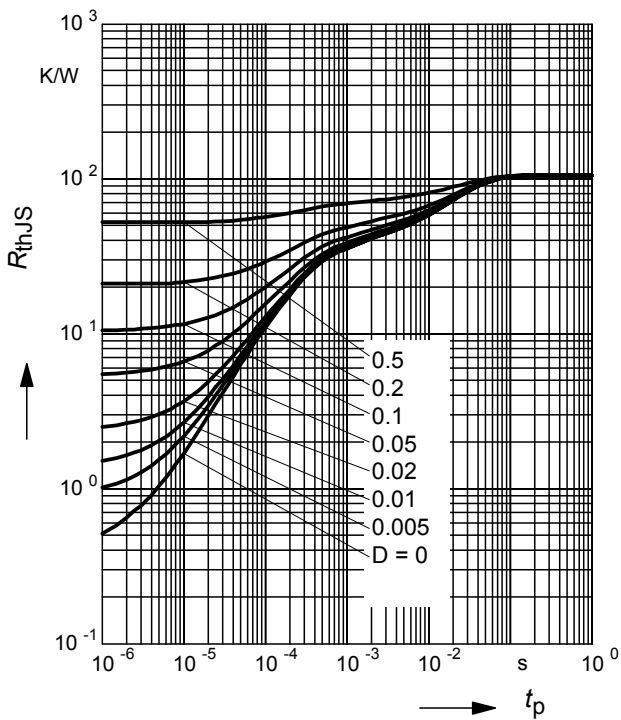
$P_{totmax}/P_{totDC} = f(t_p)$

BCR166T



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

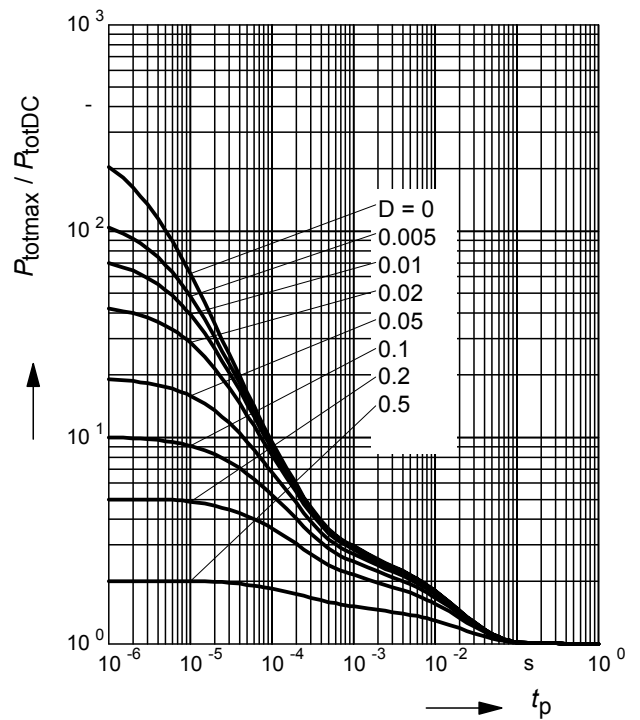
BCR166W



**Permissible Pulse Load**

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

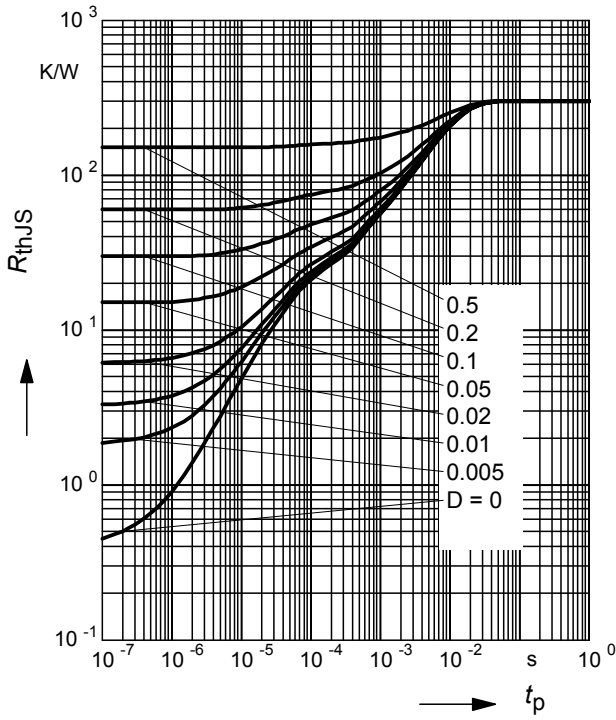
BCR166W





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

SEMB13



**Permissible Pulse Load**

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

SEMB13

