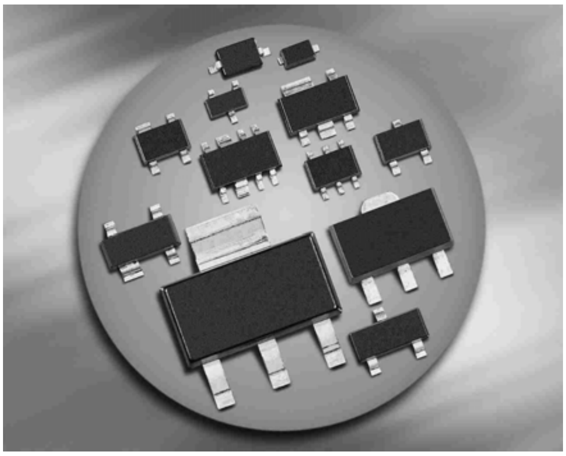
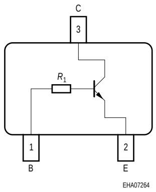
NPN Silicon Digital Transistor

- Switching circuit, inverter, interface circuit, driver circuit
- Built in bias resistor (R_1=22kΩ)



BCR139/F/L3
BCR139T



Type	Marking	Pin Configuration						Package
BCR139	WYs	1=B	2=E	3=C	-	-	-	SOT23
BCR139F	WYs	1=B	2=E	3=C	-	-	-	TSFP-3
BCR139L3	WY	1=B	2=E	3=C	-	-	-	TSLP-3-4
BCR139T	WYs	1=B	2=E	3=C	-	-	-	SC75

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	$V_{i(on)}$	30	
Collector current	I_C	100	mA
Total power dissipation- BCR139, $T_S \leq 102°C$ BCR139F, $T_S \leq 128°C$ BCR139L3, $T_S \leq 135°C$ BCR139T, $T_S \leq 109°C$	P_{tot}	 200 250 250 250	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[1] BCR139 BCR139F BCR139L3 BCR139T	R_{thJS}	 ≤ 240 ≤ 90 ≤ 60 ≤ 165	K/W

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

Electrical Characteristics at T_A = 25°C, unless otherwise specified

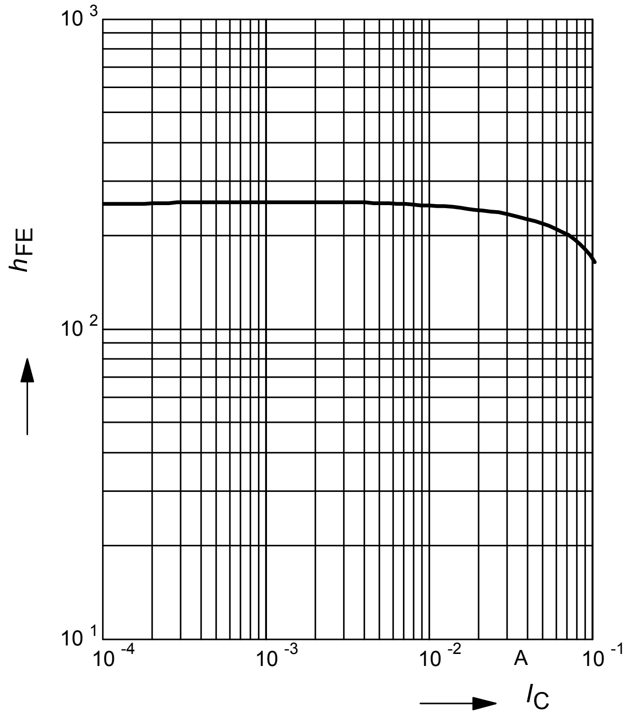
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage I_C = 100 µA, I_B = 0	$V_{(BR)CEO}$	50	-	-	V
Collector-base breakdown voltage I_C = 10 µA, I_E = 0	$V_{(BR)CBO}$	50	-	-	
Emitter-base breakdown voltage I_E = 10 µA, I_C = 0	$V_{(BR)EBO}$	5	-	-	
Collector-base cutoff current V_{CB} = 40 V, I_E = 0	I_{CBO}	-	-	100	nA
DC current gain[1] I_C = 5 mA, V_{CE} = 5 V	h_{FE}	120	-	630	-
Collector-emitter saturation voltage[1] I_C = 10 mA, I_B = 0.5 mA	V_{CEsat}	-	-	0.3	V
Input off voltage I_C = 100 µA, V_{CE} = 5 V	$V_{i(off)}$	0.4	-	0.8	
Input on voltage I_C = 2 mA, V_{CE} = 0.3 V	$V_{i(on)}$	0.5	-	1.1	
Input resistor	R_1	15	22	29	kΩ

[1] Pulse test: t < 300µs; D < 2%

Parameter	Symbol	min.	typ.	max.	Unit
AC Characteristics					
Transition frequency I_C = 10 mA, V_{CE} = 5 V, f = 100 MHz	f_T	-	150	-	MHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz	C_{cb}	-	3	-	pF

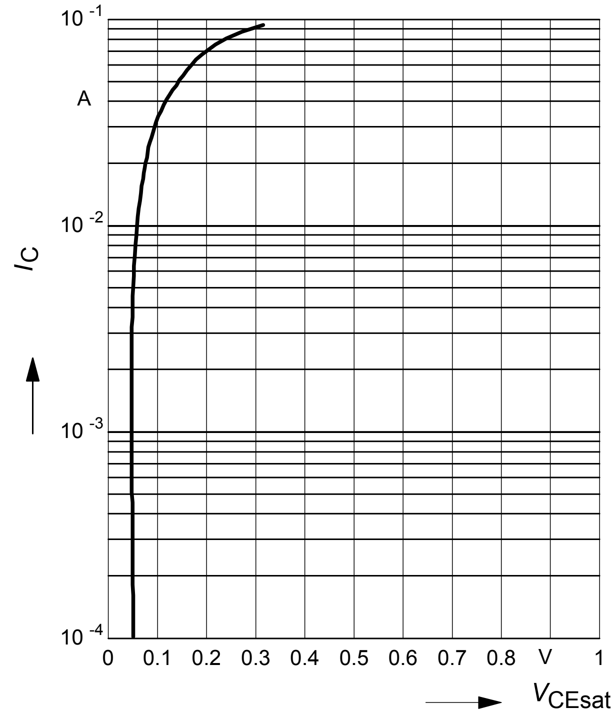
DC current gain h_{FE} = $f(I_C)$

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



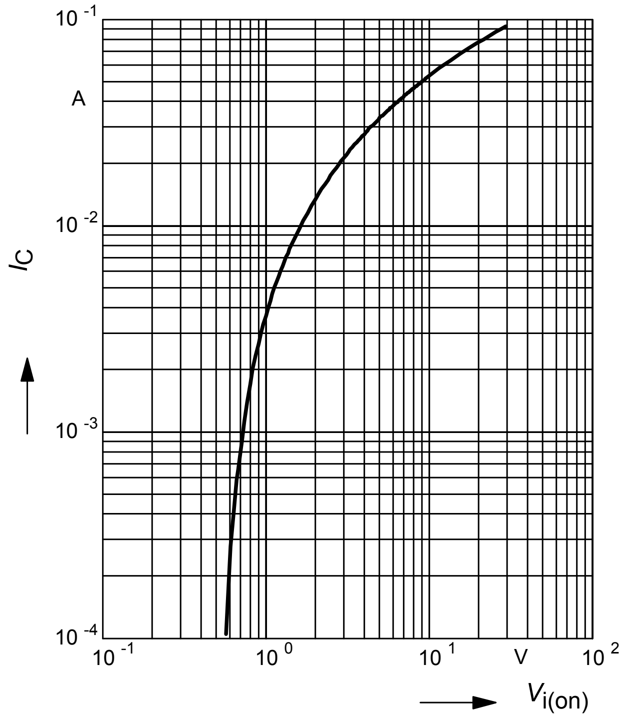
Collector-emitter saturation voltage

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



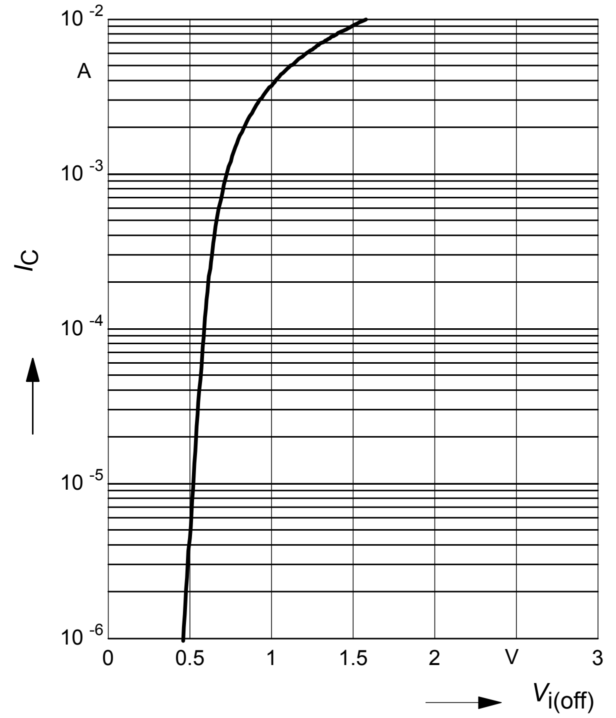
Input on Voltage $Vi_{(on)}$ = $f(I_C)$

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



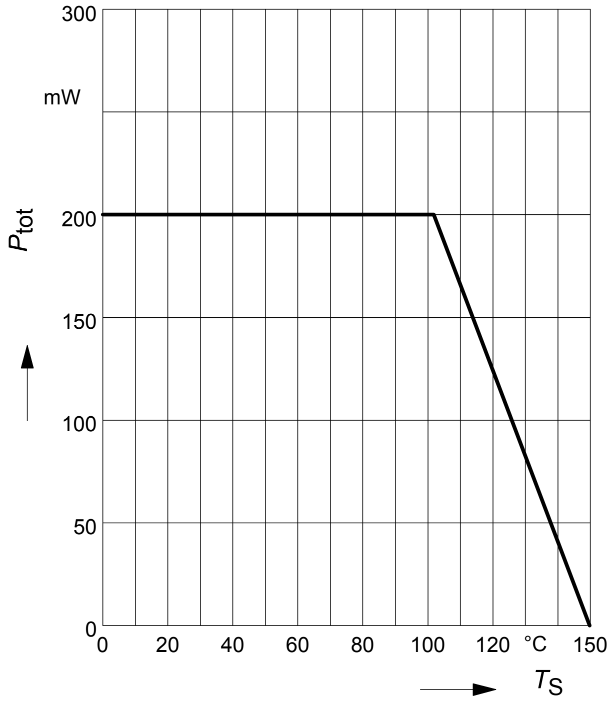
Input off voltage $V_{i(off)}$ = $f(I_C)$

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



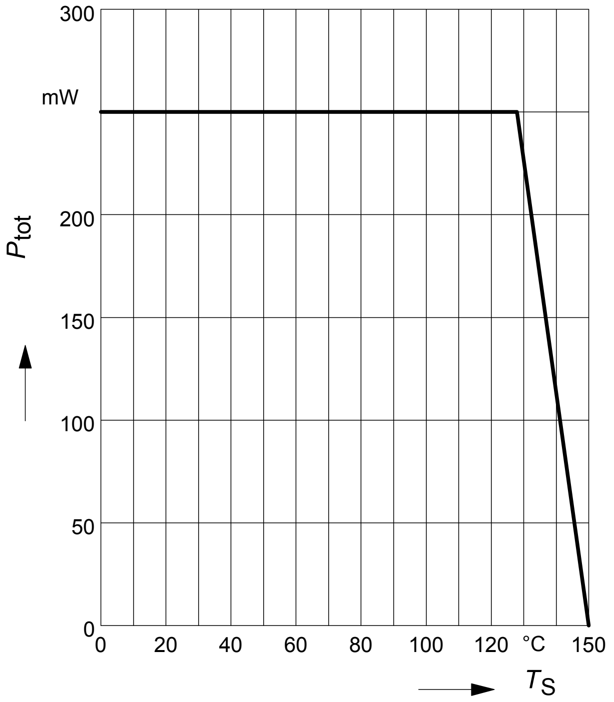
Total power dissipation $P_{tot} = f(T_S)$

BCR139



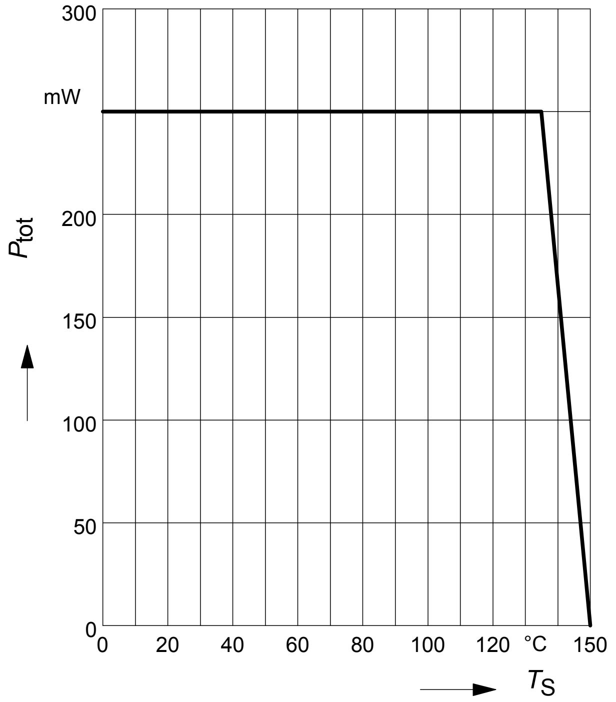
Total power dissipation $P_{tot} = f(T_S)$

BCR139F



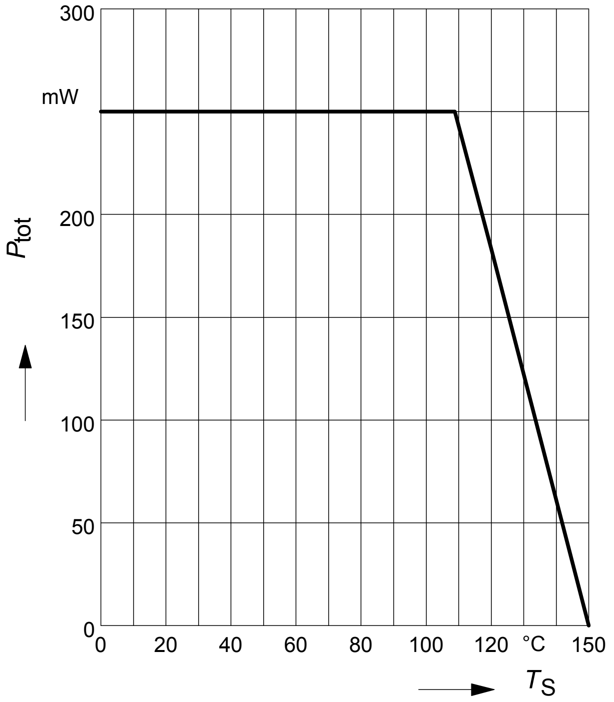
Total power dissipation $P_{tot} = f(T_S)$

BCR139L3



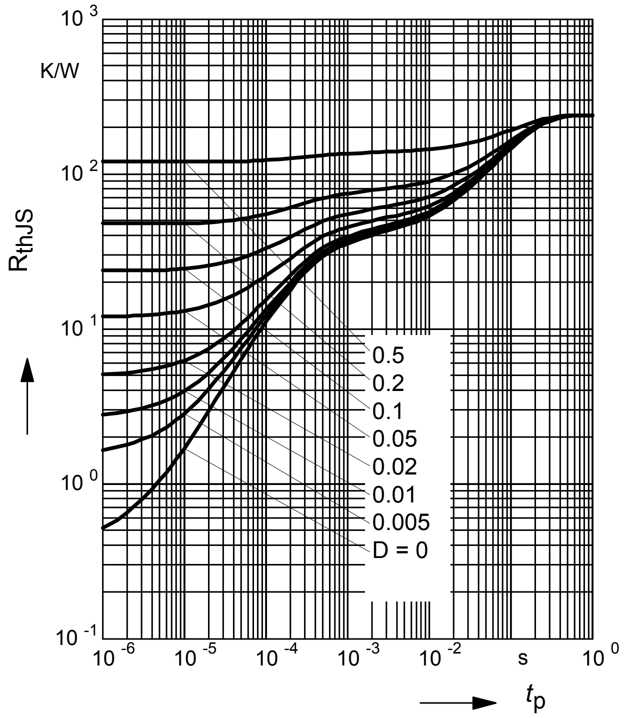
Total power dissipation $P_{tot} = f(T_S)$

BCR139T



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

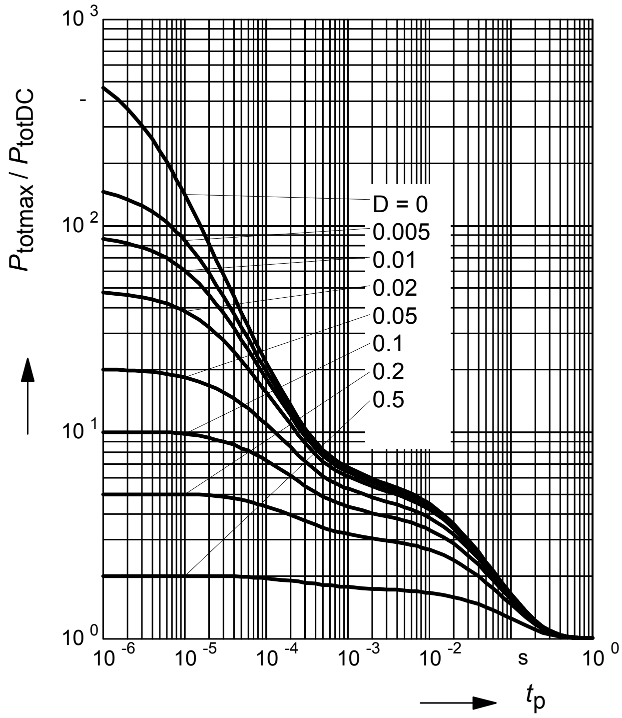
BCR139



Permissible Pulse Load

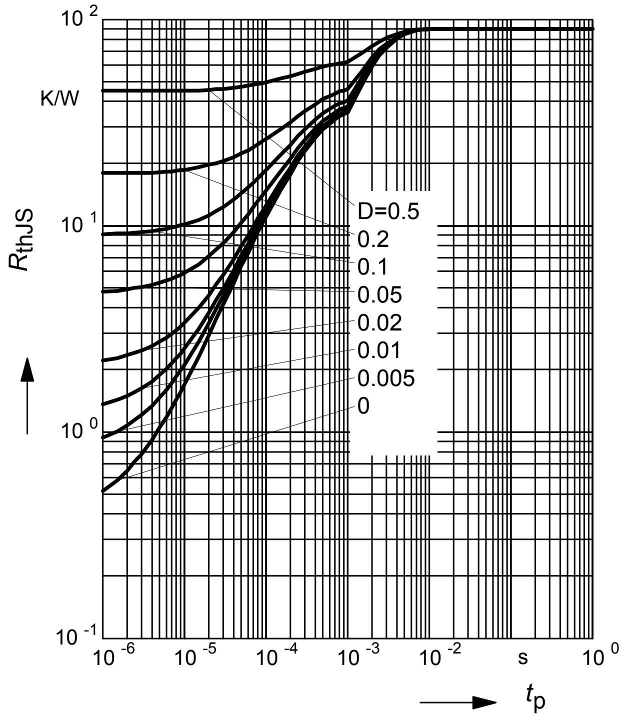
$P_{totmax}/P_{totDC} = f(t_p)$

BCR139



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

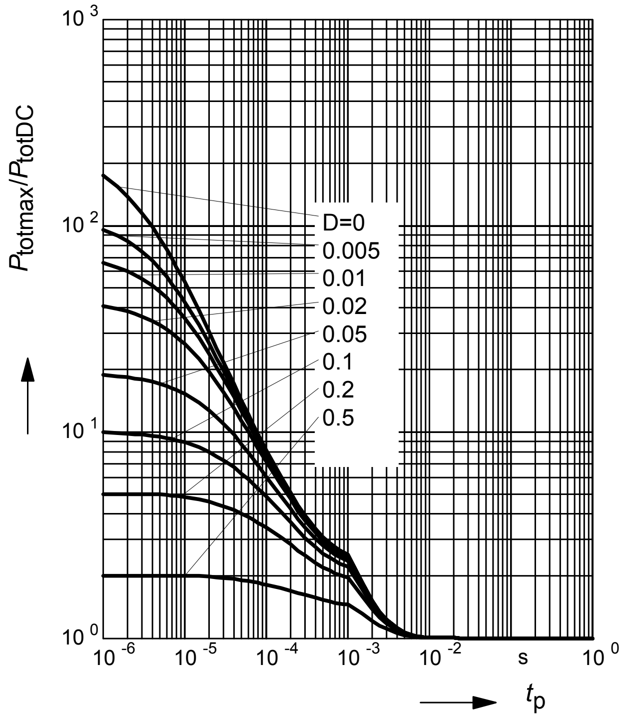
BCR139F



Permissible Pulse Load

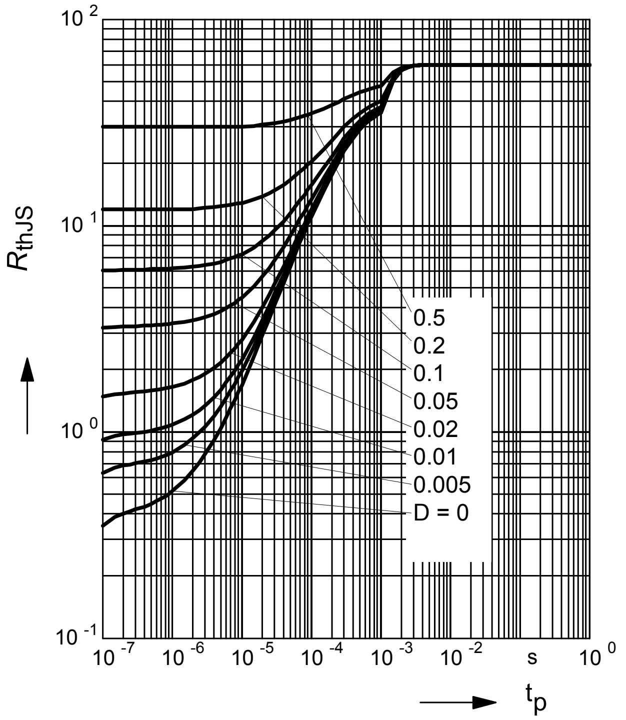
$P_{totmax}/P_{totDC} = f(t_p)$

BCR139F



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

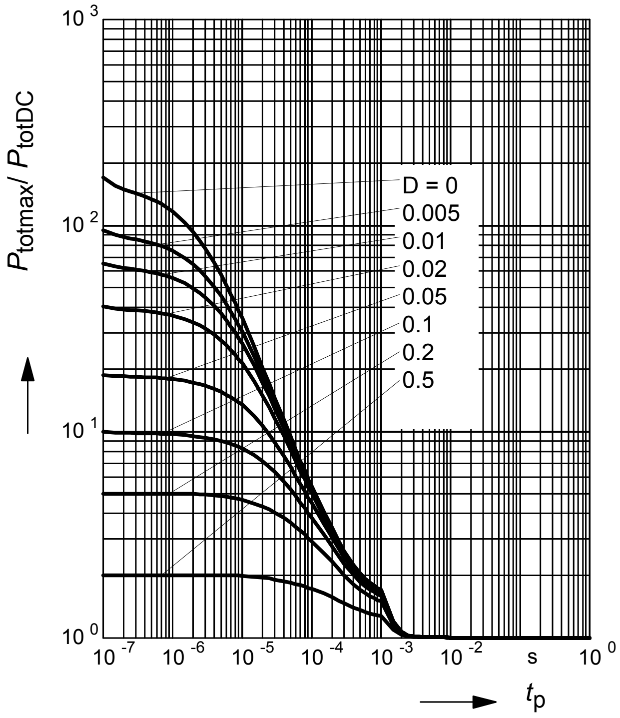
BCR139L3



Permissible Pulse Load

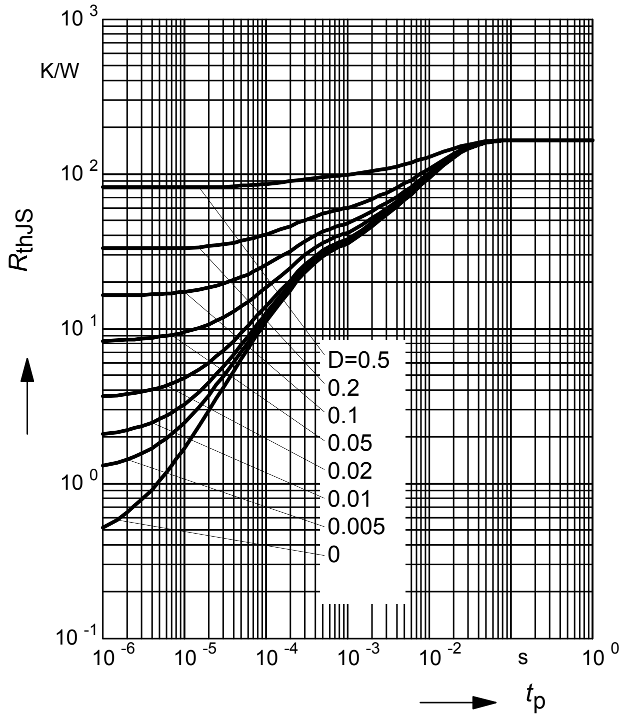
$P_{totmax}/P_{totDC} = f(t_p)$

BCR139L3



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

BCR139T



Permissible Pulse Load

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

BCR139T