

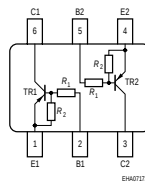
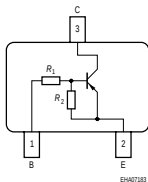
## PNP Silicon Digital Transistor

- Switching circuit, inverter, interface circuit, driver circuit
- Built in resistor ( $R_1=2.2k\Omega$ ,  $R_2=2.2k\Omega$ )
- For 6-PIN packages: two (galvanic) internal isolated transistors with good matching in one package



**BCR153/F/L3**  
**BCR153T**

**BCR153U**



| Type     | Marking | Pin Configuration |      |      |      |      |      | Package  |
|----------|---------|-------------------|------|------|------|------|------|----------|
| BCR153   | WBs     | 1=B               | 2=E  | 3=C  | -    | -    | -    | SOT23    |
| BCR153U  | WBs     | 1=E1              | 2=B1 | 3=C2 | 4=E2 | 5=B2 | 6=C1 | SC74     |
| BCR153L3 | WB      | 1=B               | 2=E  | 3=C  | -    | -    | -    | TSLP-3-4 |
| BCR153T  | WBs     | 1=B               | 2=E  | 3=C  | -    | -    | -    | SC75     |
| BCR153F  | WBs     | 1=B               | 2=E  | 3=C  | -    | -    | -    | TSFP-3   |

**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                                                                                                                                                                                                                      | $V_{i(on)}$ | 10                              |      |
| Collector current                                                                                                                                                                                                                     | $I_C$       | 100                             | mA   |
| Total power dissipation-<br>BCR153, $T_S \leq 102^\circ\text{C}$<br>BCR153F, $T_S \leq 128^\circ\text{C}$<br>BCR153L3, $T_S \leq 135^\circ\text{C}$<br>BCR153T, $T_S \leq 109^\circ\text{C}$<br>BCR153U, $T_S \leq 118^\circ\text{C}$ | $P_{tot}$   | 200<br>250<br>250<br>250<br>250 | mW   |
| Junction temperature                                                                                                                                                                                                                  | $T_j$       | 150                             |      |
| Storage temperature                                                                                                                                                                                                                   | $T_{stg}$   | -65 ... 150                     |      |

**Thermal Resistance**

| Parameter                                                                                       | Symbol     | Value                                                            | Unit |
|-------------------------------------------------------------------------------------------------|------------|------------------------------------------------------------------|------|
| Junction - soldering point <sup>1)</sup><br>BCR153<br>BCR153F<br>BCR153L3<br>BCR153T<br>BCR153U | $R_{thJS}$ | $\leq 240$<br>$\leq 90$<br>$\leq 60$<br>$\leq 165$<br>$\leq 133$ | K/W  |

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

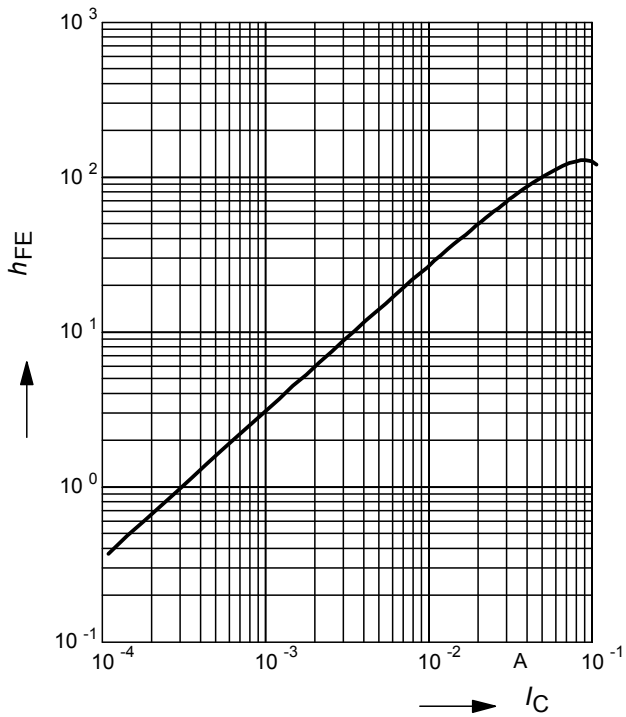
**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

| Parameter                                                                                             | Symbol                      | Values |      |      | Unit |
|-------------------------------------------------------------------------------------------------------|-----------------------------|--------|------|------|------|
|                                                                                                       |                             | min.   | typ. | max. |      |
| DC Characteristics                                                                                    |                             |        |      |      |      |
| Collector-emitter breakdown voltage<br>$I_C = 100\ \mu\text{A}$ , $I_B = 0$                           | $V_{(\text{BR})\text{CEO}}$ | 50     | -    | -    | V    |
| Collector-base breakdown voltage<br>$I_C = 10\ \mu\text{A}$ , $I_E = 0$                               | $V_{(\text{BR})\text{CBO}}$ | 50     | -    | -    |      |
| Collector-base cutoff current<br>$V_{\text{CB}} = 40\ \text{V}$ , $I_E = 0$                           | $I_{\text{CBO}}$            | -      | -    | 100  | nA   |
| Emitter-base cutoff current<br>$V_{\text{EB}} = 5\ \text{V}$ , $I_C = 0$                              | $I_{\text{EBO}}$            | -      | -    | 3.5  | mA   |
| DC current gain <sup>1)</sup><br>$I_C = 20\ \text{mA}$ , $V_{\text{CE}} = 5\ \text{V}$                | $h_{\text{FE}}$             | 20     | -    | -    | -    |
| Collector-emitter saturation voltage <sup>1)</sup><br>$I_C = 20\ \text{mA}$ , $I_B = 1\ \text{mA}$    | $V_{\text{CEsat}}$          | -      | -    | 0.3  | V    |
| Input off voltage<br>$I_C = 100\ \mu\text{A}$ , $V_{\text{CE}} = 5\ \text{V}$                         | $V_{\text{i(off)}}$         | 0.8    | -    | 1.5  |      |
| Input on voltage<br>$I_C = 2\ \text{mA}$ , $V_{\text{CE}} = 0.3\ \text{V}$                            | $V_{\text{i(on)}}$          | 0.8    | -    | 2.5  |      |
| Input resistor                                                                                        | $R_1$                       | 1.5    | 2.2  | 2.9  | kΩ   |
| Resistor ratio                                                                                        | $R_1/R_2$                   | 0.9    | 1    | 1.1  | -    |
| AC Characteristics                                                                                    |                             |        |      |      |      |
| Transition frequency<br>$I_C = 10\ \text{mA}$ , $V_{\text{CE}} = 5\ \text{V}$ , $f = 100\ \text{MHz}$ | $f_{\text{T}}$              | -      | 200  | -    | MHz  |
| Collector-base capacitance<br>$V_{\text{CB}} = 10\ \text{V}$ , $f = 1\ \text{MHz}$                    | $C_{\text{cb}}$             | -      | 3    | -    | pF   |

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

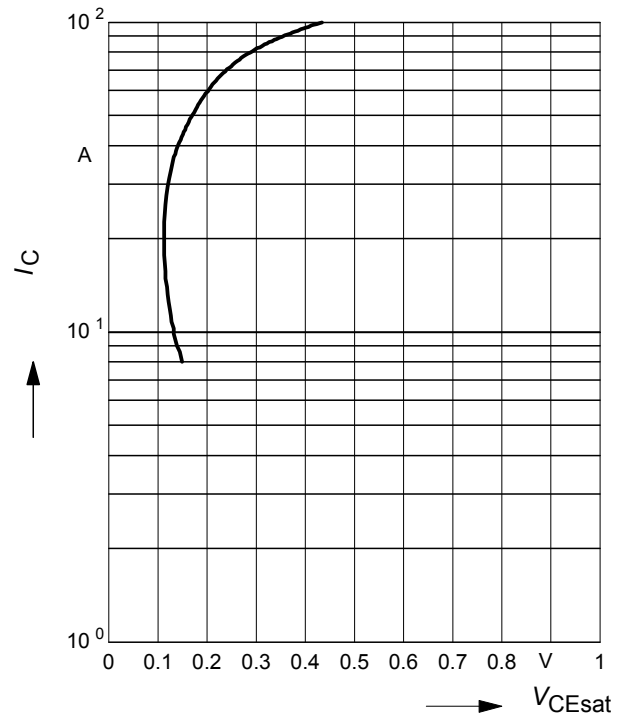
**DC current gain  $h_{FE} = f(I_C)$**

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



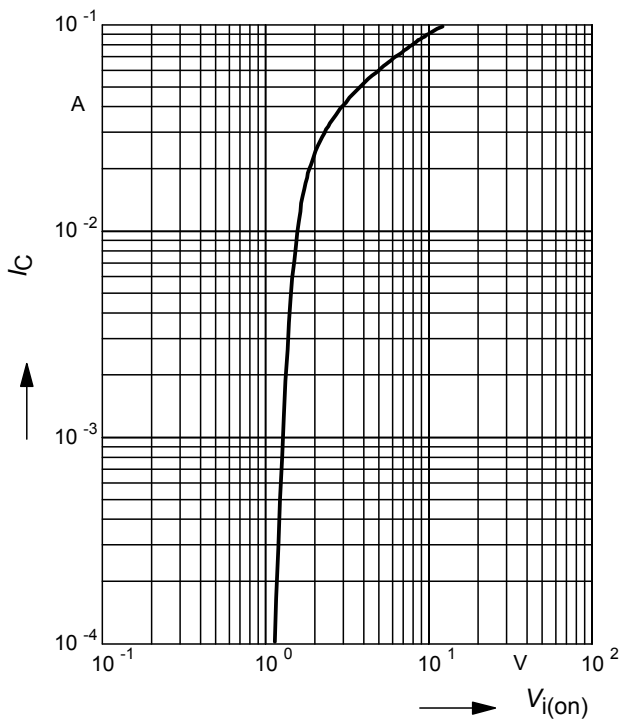
**Collector-emitter saturation voltage**

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



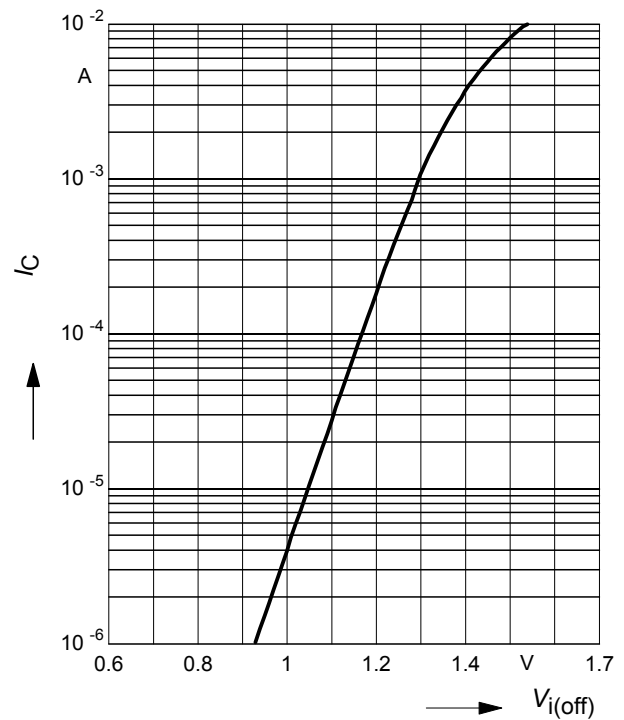
**Input on Voltage  $V_{i(on)} = f(I_C)$**

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



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

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



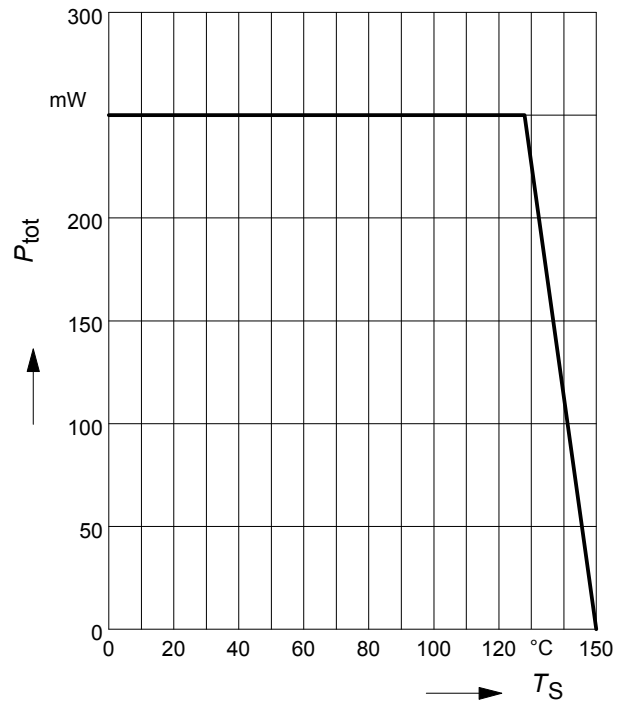
**Total power dissipation  $P_{\text{tot}} = f(T_S)$**

BCR153



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

BCR153F



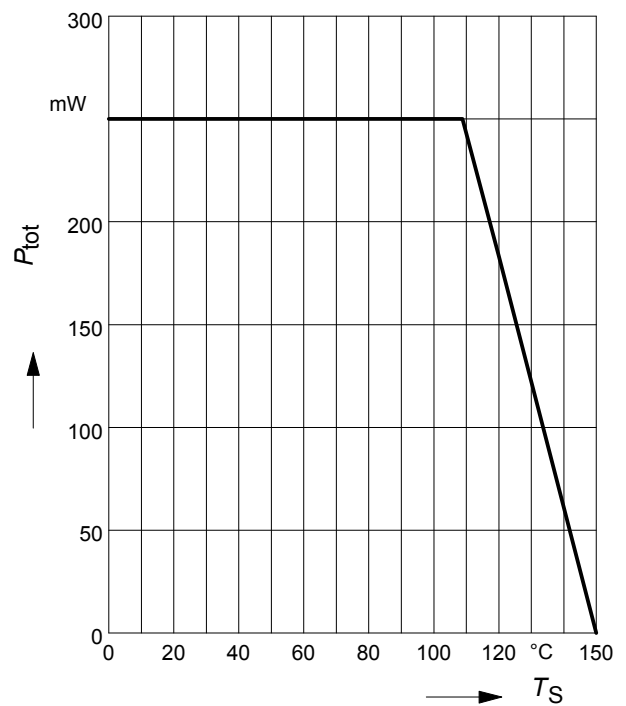
**Total power dissipation  $P_{\text{tot}} = f(T_S)$**

BCR153L3



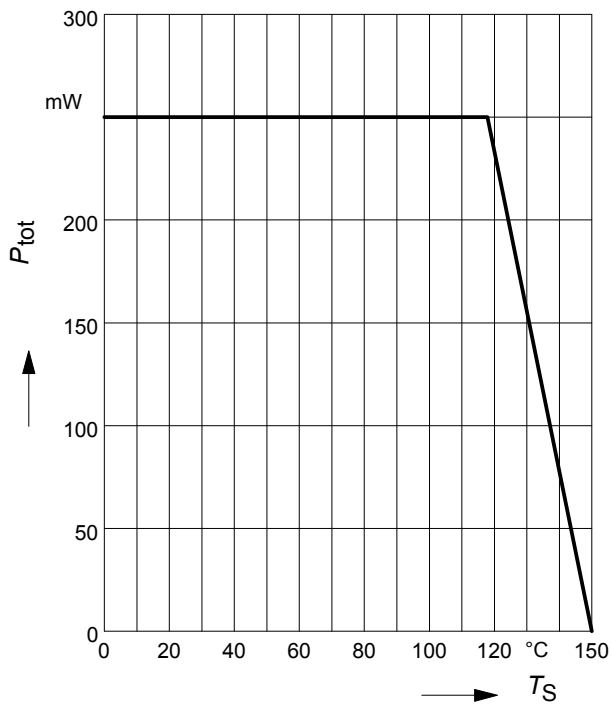
**Total power dissipation  $P_{\text{tot}} = f(T_S)$**

BCR153T



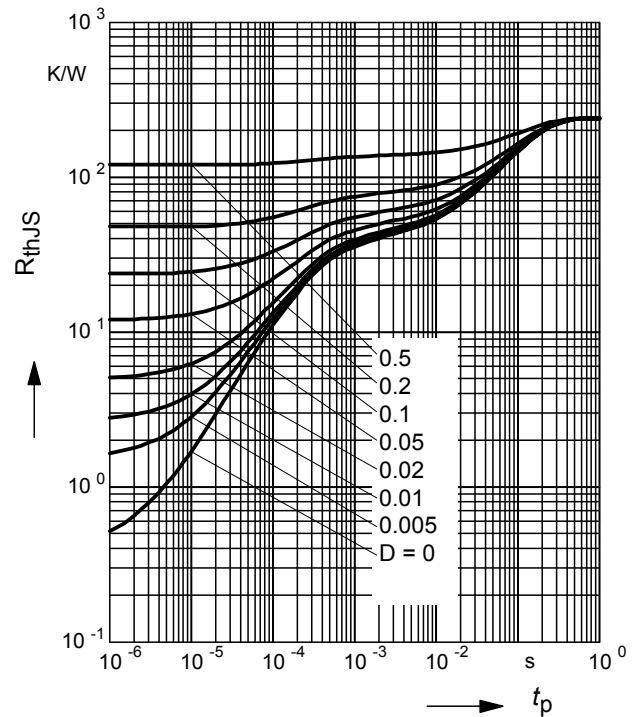
**Total power dissipation**  $P_{\text{tot}} = f(T_S)$

BCR153U



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

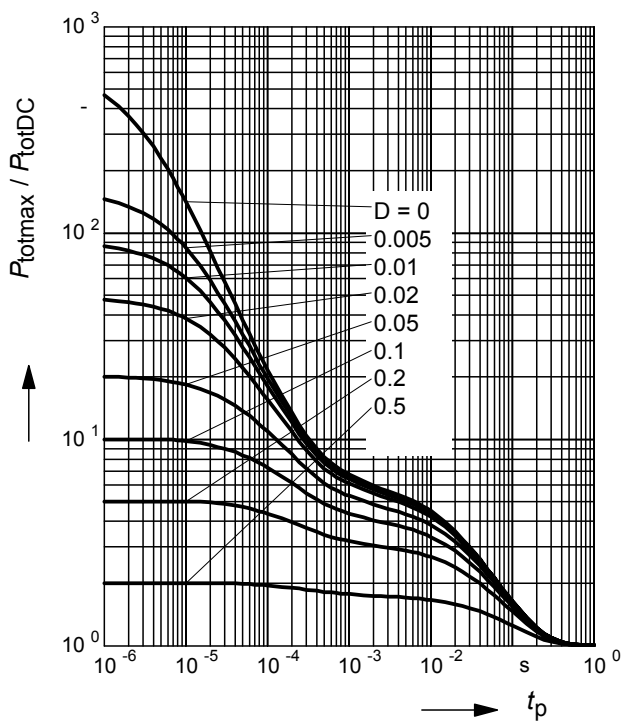
BCR153



**Permissible Pulse Load**

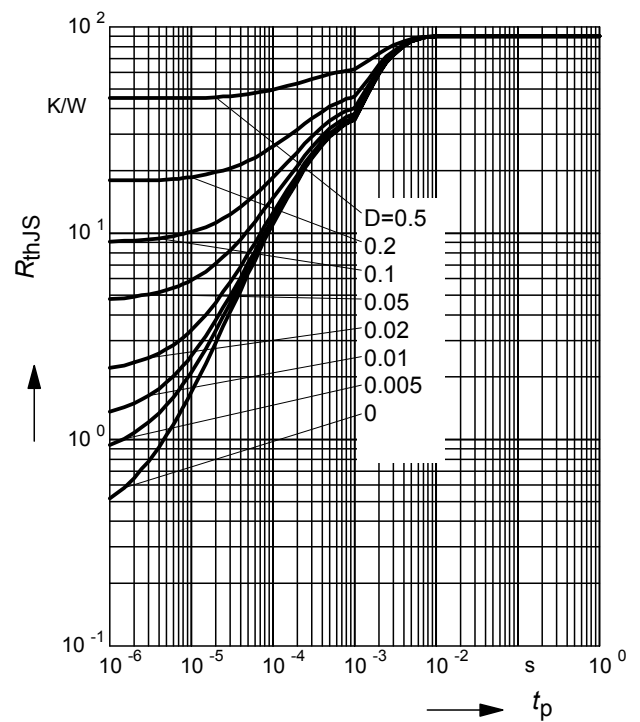
$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$

BCR153



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

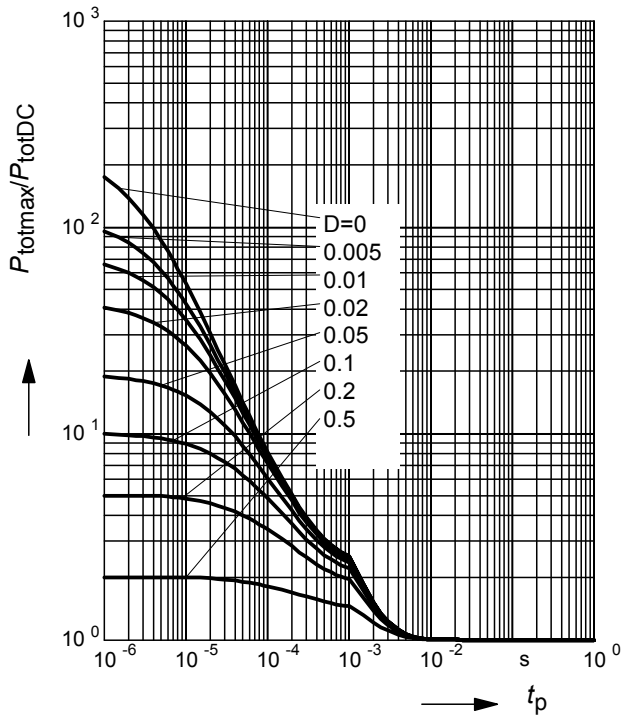
BCR153F



### Permissible Pulse Load

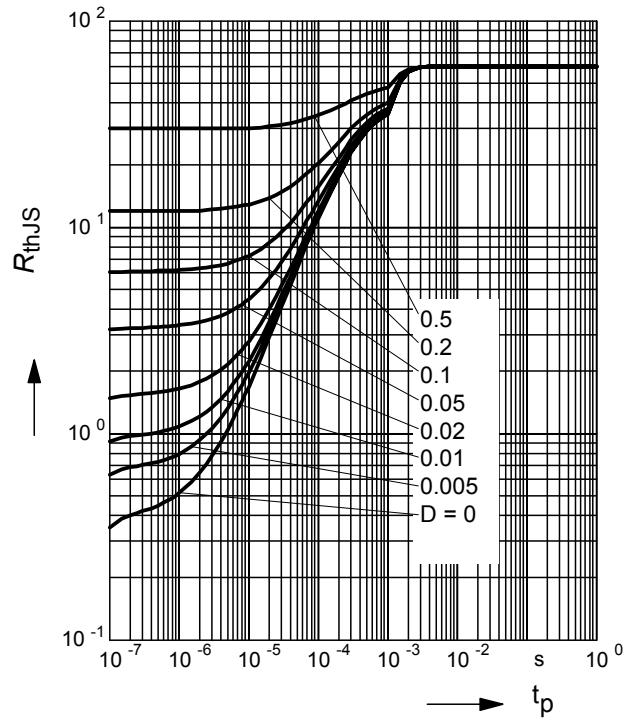
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$

BCR153F



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

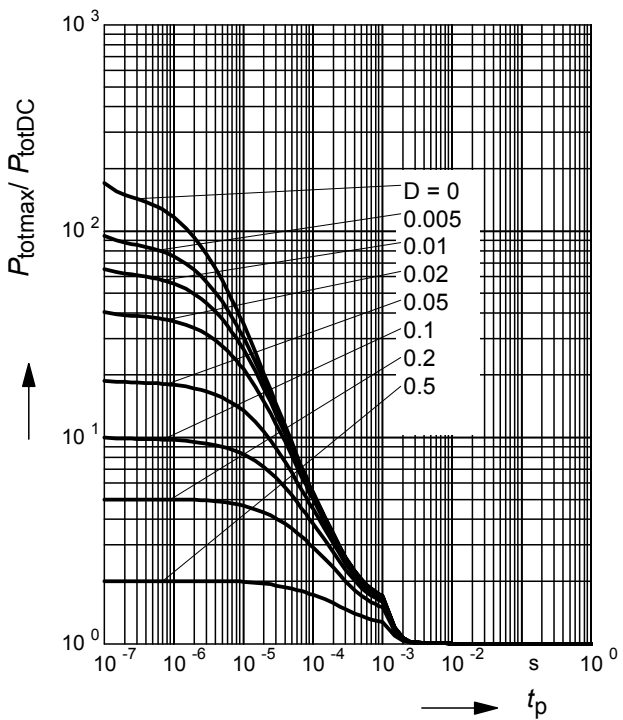
BCR153L3



### Permissible Pulse Load

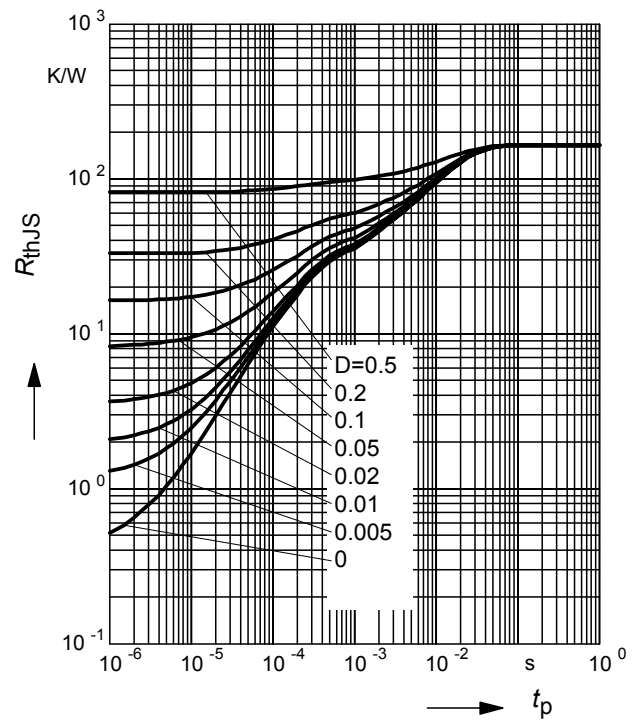
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$

BCR153L3



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

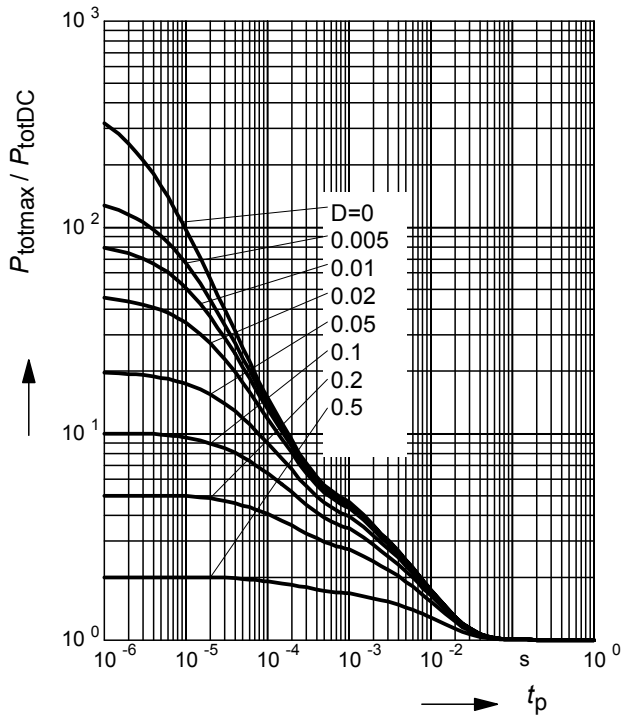
BCR153T



### Permissible Pulse Load

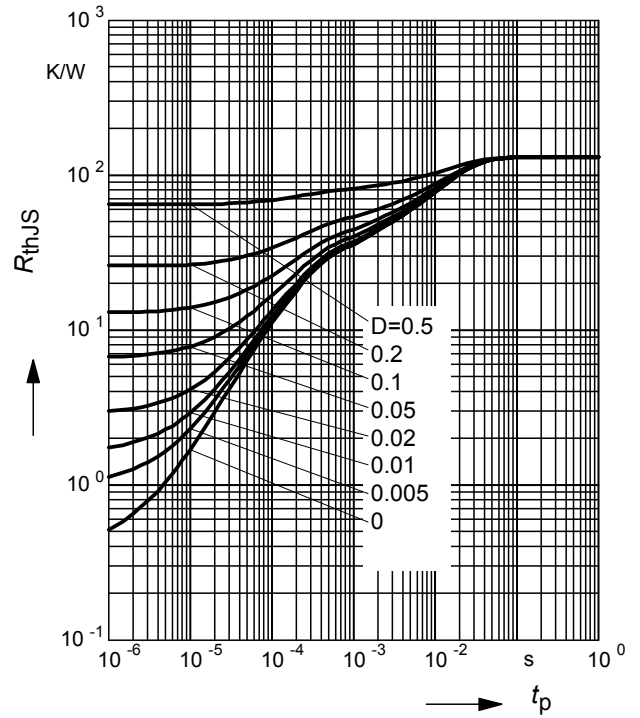
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$$

BCR153T



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

BCR153U



### Permissible Pulse Load

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

BCR153U

