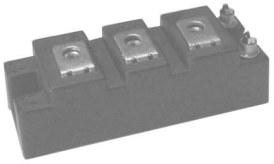
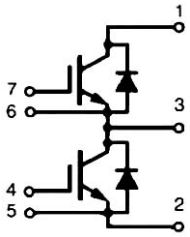
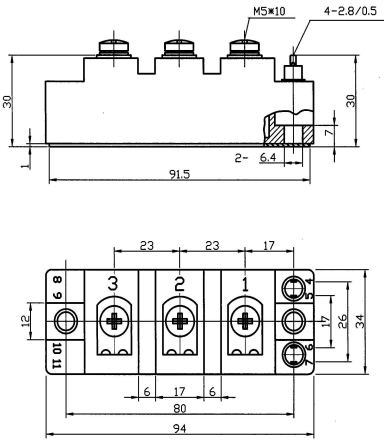
# SII100N12

## NPT IGBT Modules






Dimensions in mm (1mm = 0.0394")




**Absolute Maximum Ratings** $T_C$ = 25°C, unless otherwise specified

| Symbol | Conditions | Values | Units |
|---|---|---|---|
| $V_{CES}$ | | 1200 | V |
| $I_C$ | $T_C$= 25(80)°C | 145(100) | A |
| $I_{CRM}$ | $T_C$= 25(80)°C, $t_P$ =1ms | 290(200) | A |
| $V_{GES}$ | | ±20 | V |
| $P_{tot}$ | | 700 | W |
| $T_{Vj}$,($T_{stg}$) | $T_{OPERATION} \leq T_{stg}$ | −40...+125(150) | °C |
| $V_{isol}$ | AC, 1min | 2500 | V |
| $R_{thJC}$ | | ≤ 0.18 | K/W |
| $R_{thJCD}$ | | ≤ 0.36 | |

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**Electeical Characteristics** $T_C = 25^oC$, unless otherwise specified

| Symbol | Conditions | min. | typ. | max. | Units |
|---|---|---|---|---|---|
| **Static Characteristics** | | | | | |
| $V_{GE(th)}$ | $V_{GE} = V_{CE}$, $I_C$ =4mA | 4.5 | 5.5 | 6.5 | V |
| $I_{CES}$ | $V_{GE}$ = 0; $V_{CE}$ = 1200V; $T_j$ = 25(125)$^oC$ | | 1.5(6) | 2 | mA |
| $I_{GES}$ | $V_{GE}$ = 20V, $V_{CE}$ = 0 | | | 400 | nA |
| $V_{CE(sat)}$ | $I_C$ =100A; $V_{GE}$ = 15V; $T_j$ = 25(125)$^oC$; chip level | | 2.5(3.1) | 3(3.7) | V |
| **AC Characteristics** | | | | | |
| $C_{ies}$ | under following conditions | | 6.5 | | nF |
| $C_{oes}$ | $V_{GE}$ = 0, $V_{CE}$ = 25V, f = 1MHz | | 1 | | |
| $C_{res}$ | | | 0.5 | | |
| $g_{fs}$ | $V_{CE}$=20V, $I_C$=100A | 54 | | | S |
| **Switching Characteristics** | | | | | |
| $t_{d(on)}$ | $V_{CC}$ = 600V, $I_C$ = 100A | | 130 | 260 | ns |
| $t_r$ | $R_{Gon}$ = $R_{Goff}$ =6.8Ω, $T_j$ = 125$^oC$ | | 80 | 160 | |
| $t_{d(off)}$ | $V_{GE}$ = ± 15V | | 400 | 600 | |
| $t_f$ | | | 70 | 100 | |
| **FWD under following conditions:** | | | | | |
| $V_F$ | $I_F$ = 100A, $V_{GE}$ = 0V, $T_j$ = 25(125)$^oC$ | | 2.3(1.8) | 2.8 | V |
| $t_{rr}$ | $I_F$=100A, $V_R$=–600V,$V_{GE}$=0V,di/dt=–1000A/us,$T_j$ = 125$^oC$ | | 0.3 | | us |
| $Q_{rr}$ | $I_F$ = 100A, $V_{GE}$ = 0V, $V_R$=– 600V<br>di/dt=–1000A/us, $T_j$ = 25(125)$^oC$ | | 4(14) | | uC |
| **Mechanical Data** | | | | | |
| $M_s$ | to heatsink M6 | 3 | | 5 | Nm |
| $M_t$ | to terminals M5 | 2.5 | | 5 | Nm |
| w | | | | 160 | g |

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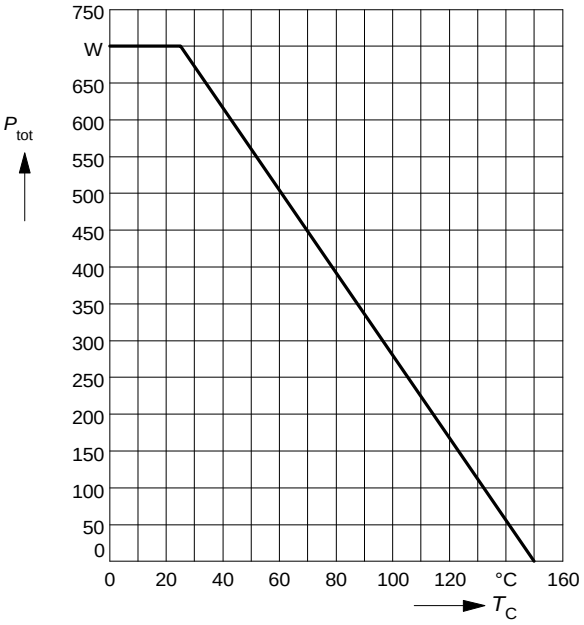
## NPT IGBT Modules

**Power dissipation**

$P_{tot} = f(T_C)$

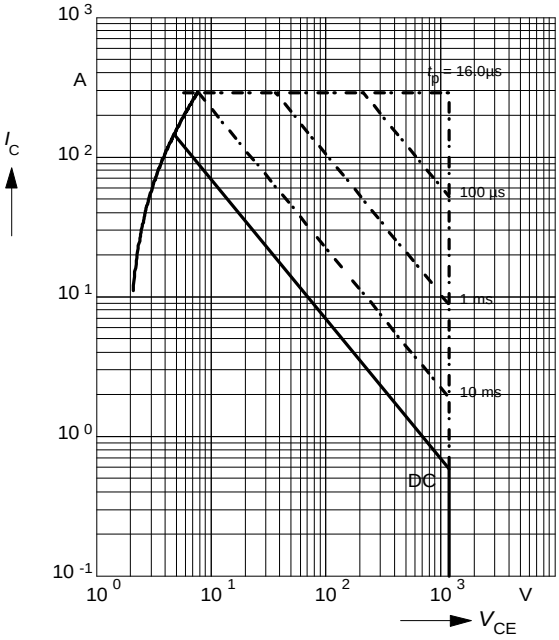
parameter: $T_j \leq 150$ °C




**Safe operating area**

$I_C = f(V_{CE})$

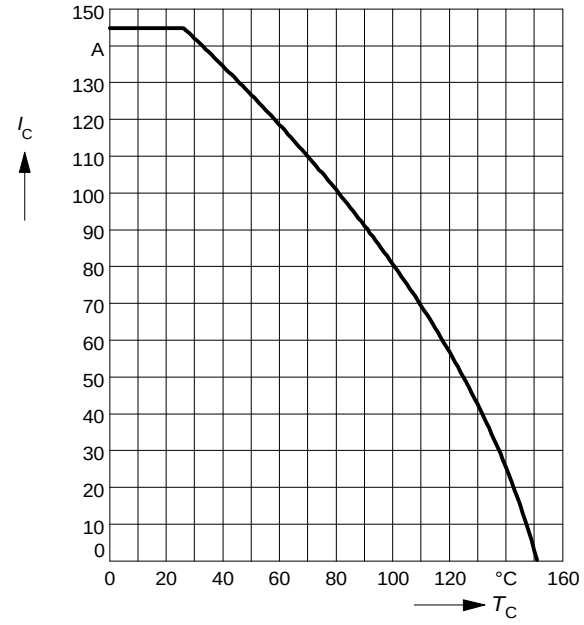
parameter: $D = 0$, $T_C = 25$°C , $T_j \leq 150$ °C




**Collector current**

$I_C = f(T_C)$

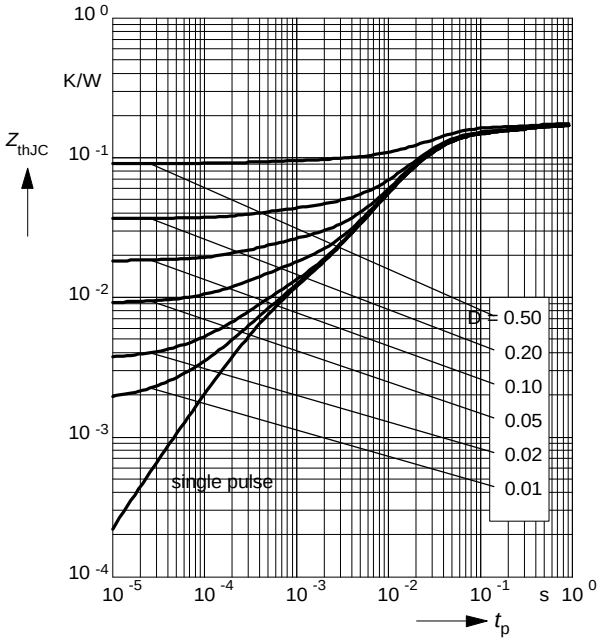
parameter: $V_{GE} \geq 15$ V , $T_j \leq 150$ °C




**Transient thermal impedance IGBT**

$Z_{th\,JC} = f(t_p)$

parameter: $D = t_p / T$



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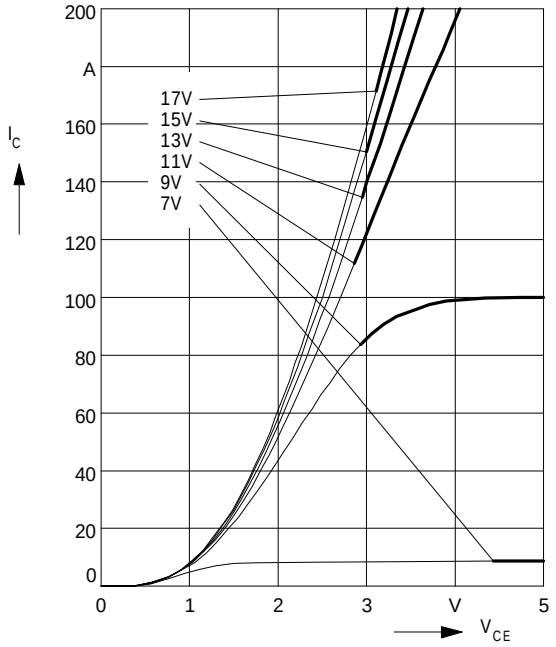
## NPT IGBT Modules

Typ. output characteristics

$I_C = f(V_{CE})$

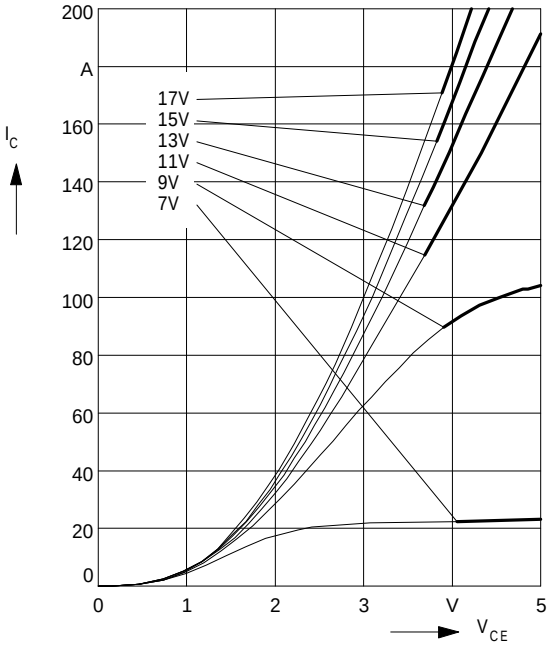
parameter: $t_p = 80\ \mu s$, $T_j = 25\ °C$




Typ. output characteristics

$I_C = f(V_{CE})$

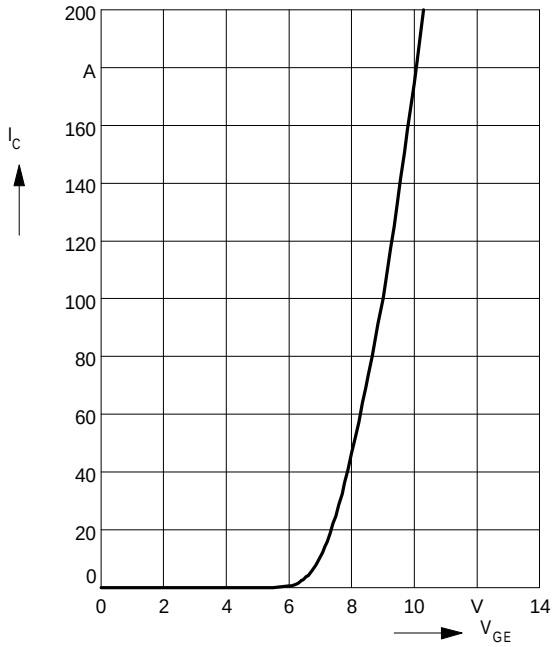
parameter: $t_p = 80\ \mu s$, $T_j = 125\ °C$




Typ. transfer characteristics

$I_C = f(V_{GE})$

parameter: $t_p = 80\ \mu s$, $V_{CE} = 20\ V$



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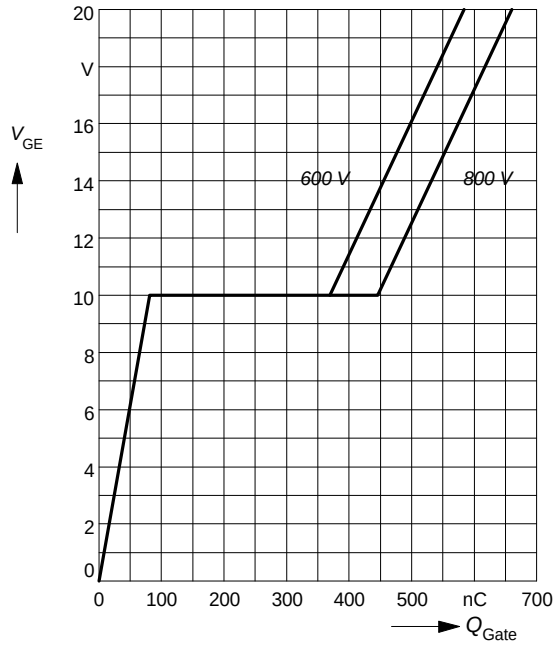
## NPT IGBT Modules

**Typ. gate charge**

$V_{GE} = f(Q_{Gate})$

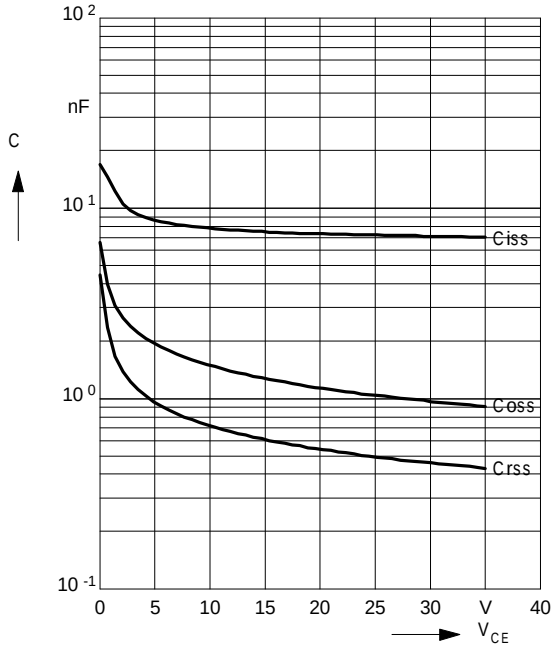
parameter: $I_{C\ puls}$ = 100 A




Typ. capacitances

$C = f(V_{CE})$

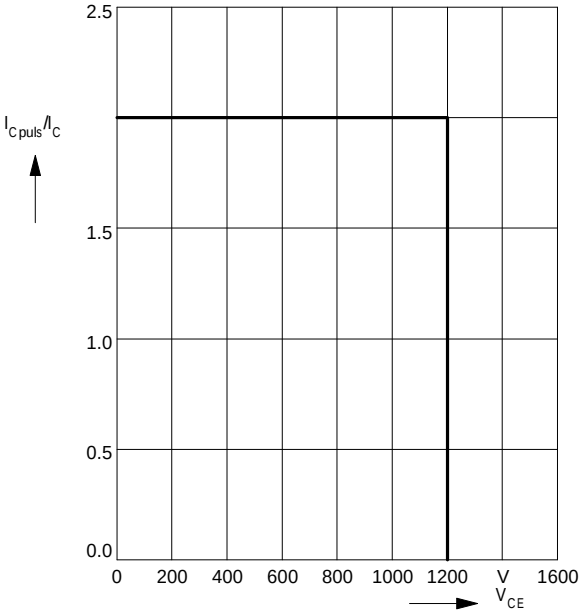
parameter: $V_{GE}$ = 0 V, f = 1 MHz




Reverse biased safe operating area

$I_{C puls} = f(V_{CE})$, $T_j$ = 150°C

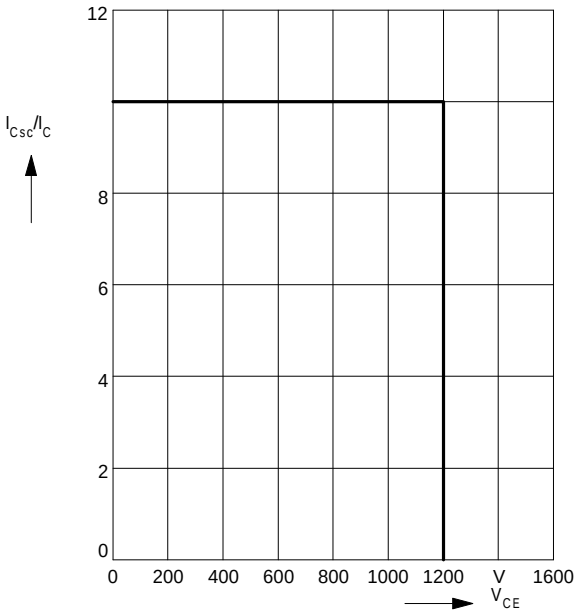
parameter: $V_{GE}$ = 15 V




Short circuit safe operating area

$I_{Csc} = f(V_{CE})$, $T_j$ = 150°C

parameter: $V_{GE}$ = ± 15 V, $t_{SC}$ ≤ 10 µs, L < 50 nH

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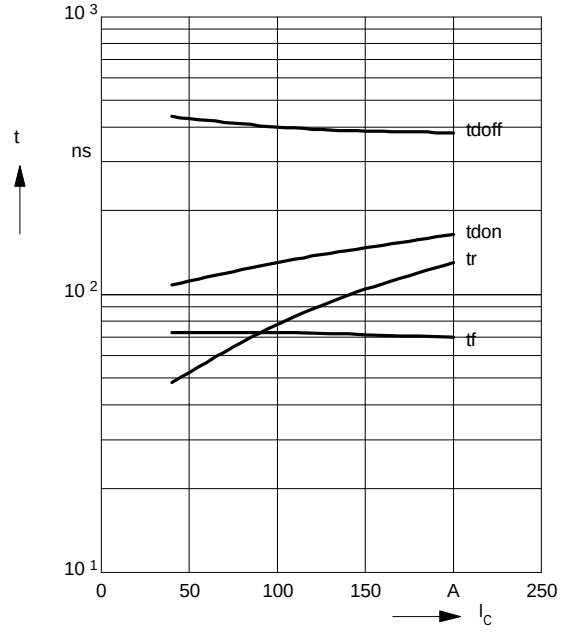
## NPT IGBT Modules

Typ. switching time

$I = f(I_C)$ , inductive load , $T_j = 125°C$

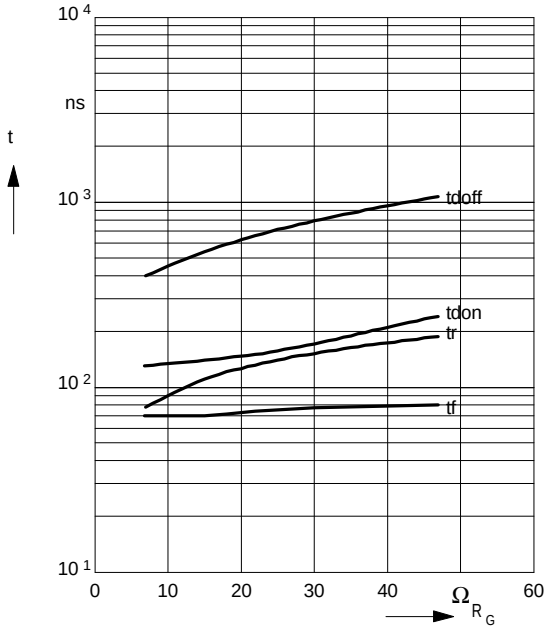
par.: $V_{CE} = 600$ V, $V_{GE} = \pm 15$ V, $R_G = 6.8\ \Omega$




Typ. switching time

$t = f(R_G)$ , inductive load , $T_j = 125°C$

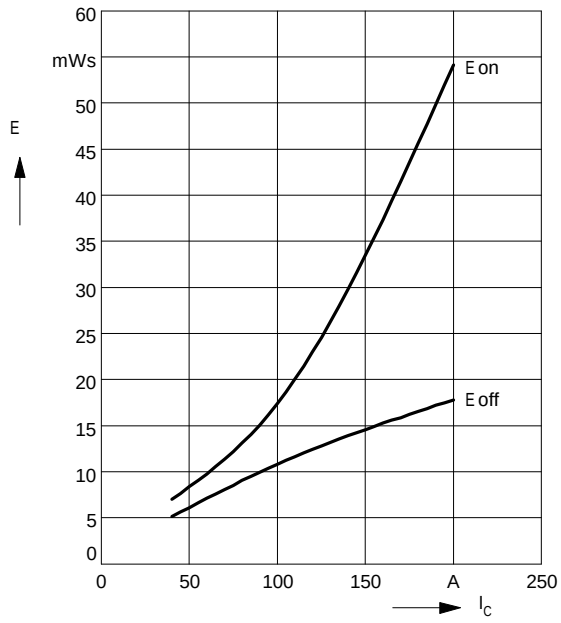
par.: $V_{CE} = 600$ V, $V_{GE} = \pm 15$ V, $I_C = 100$ A




Typ. switching losses

$E = f(I_C)$ , inductive load , $T_j = 125°C$

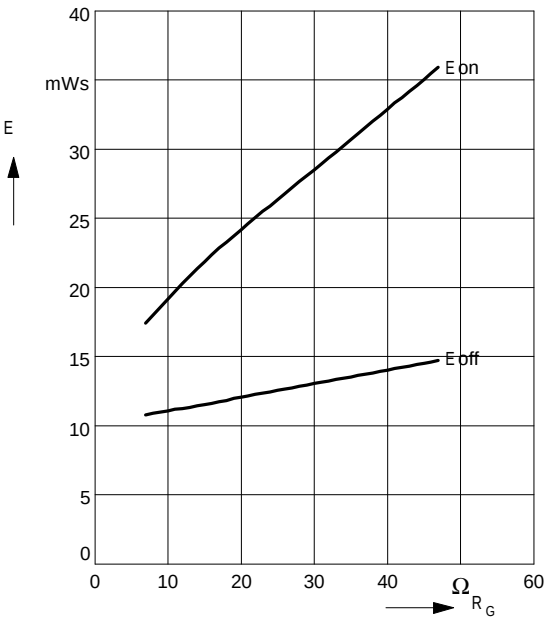
par.: $V_{CE} = 600$ V, $V_{GE} = \pm 15$ V, $R_G = 6.8\ \Omega$




Typ. switching losses

$E = f(R_G)$ , inductive load , $T_j = 125°C$

par.: $V_{CE} = 600$V, $V_{GE} = \pm 15$ V, $I_C = 100$ A

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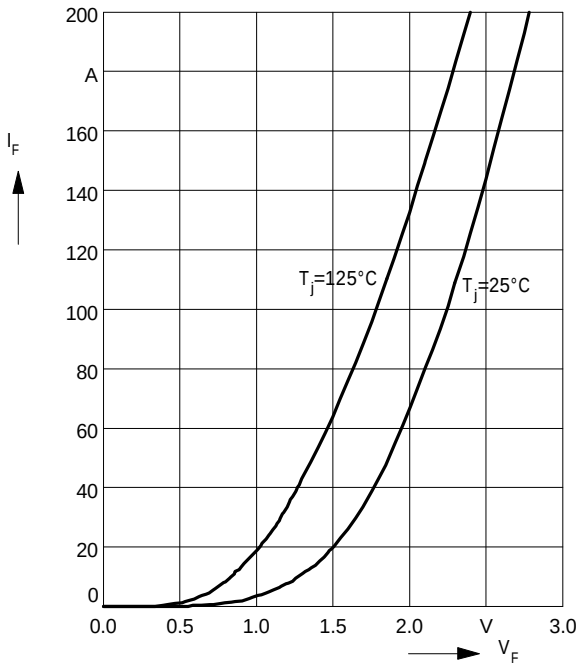
## NPT IGBT Modules

Forward characteristics of fast recovery reverse diode $I_F = f(V_F)$
parameter: $T_j$




**Transient thermal impedance Diode**
$Z_{th\,JC} = f(t_p)$
parameter: $D = t_p / T$