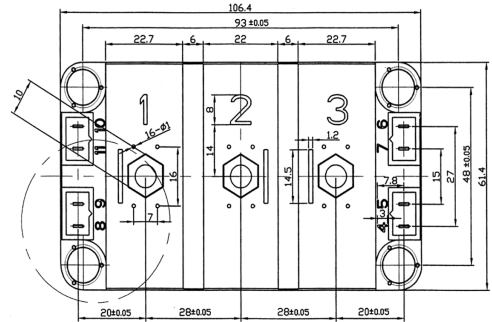
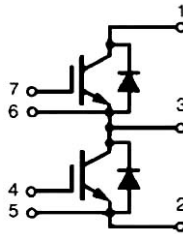
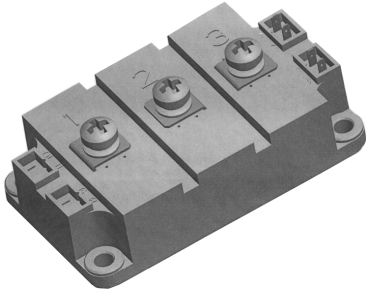


# SII200N12

## NPT IGBT Modules

Dimensions in mm (1mm = 0.0394")



### Absolute Maximum Ratings

$T_c = 25^{\circ}\text{C}$ , unless otherwise specified

Symbol	Conditions	Values	Units
$V_{CES}$		1200	V
$I_C$	$T_c = 25(80)^{\circ}\text{C}$	290(200)	A
$I_{CRM}$	$T_c = 25(80)^{\circ}\text{C}$ , $t_P = 1\text{ms}$	580(400)	A
$V_{GES}$		$\pm 20$	V
$P_{tot}$		1400	W
$T_{Vj}, (T_{stg})$	$T_{OPERATION} \leq T_{stg}$	$-40 \dots +125(150)$	$^{\circ}\text{C}$
$V_{isol}$	AC, 1min	2500	V
$R_{thJC}$		$\leq 0.09$	K/W
$R_{thJCD}$		$\leq 0.18$	

# SII200N12

## NPT IGBT Modules

### Electrical Characteristics

$T_c = 25^\circ\text{C}$ , unless otherwise specified

Symbol	Conditions	min.	typ.	max.	Units
<b>Static Characteristics</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_c = 8\text{mA}$	4.5	5.5	6.5	V
$I_{CES}$	$V_{GE} = 0; V_{CE} = 1200\text{V}; T_j = 25(125)^\circ\text{C}$		3(12)	4	mA
$I_{GES}$	$V_{GE} = 20\text{V}, V_{CE} = 0$			400	nA
$V_{CE(sat)}$	$I_c = 200\text{A}; V_{GE} = 15\text{V}; T_j = 25(125)^\circ\text{C}; \text{chip level}$		2.5(3.1)	3(3.7)	V
<b>AC Characteristics</b>					
$C_{ies}$	under following conditions		13		nF
$C_{oes}$	$V_{GE} = 0, V_{CE} = 25\text{V}, f = 1\text{MHz}$		2		
$C_{res}$			1		
$g_{fs}$	$V_{CE} = 20\text{V}, I_c = 200\text{A}$	108			S
<b>Switching Characteristics</b>					
$t_{d(on)}$	$V_{CC} = 600\text{V}, I_c = 200\text{A}$		110	220	ns
$t_r$	$R_{Gon} = R_{Goff} = 4.7\Omega, T_j = 125^\circ\text{C}$		80	160	
$t_{d(off)}$	$V_{GE} = \pm 15\text{V}$		550	800	
$t_f$			80	120	
<b>FWD under following conditions:</b>					
$V_F$	$I_F = 200\text{A}, V_{GE} = 0\text{V}, T_j = 25(125)^\circ\text{C}$		2(1.8)	2.5	V
$t_{rr}$	$I_F = 200\text{A}, V_R = -600\text{V}, V_{GE} = 0\text{V}, di/dt = 2000\text{A}/\mu\text{s}, T_j = 125^\circ\text{C}$		0.5		us
$Q_{rr}$	$I_F = 200\text{A}, V_{GE} = 0\text{V}, V_R = -600\text{V}, di/dt = -2000\text{A}/\mu\text{s}, T_j = 25(125)^\circ\text{C}$		12(36)		uC
<b>Mechanical Data</b>					
$M_s$	to heatsink M6	3		5	Nm
$M_t$	to terminals M5	2.5		5	Nm
$w$				325	g

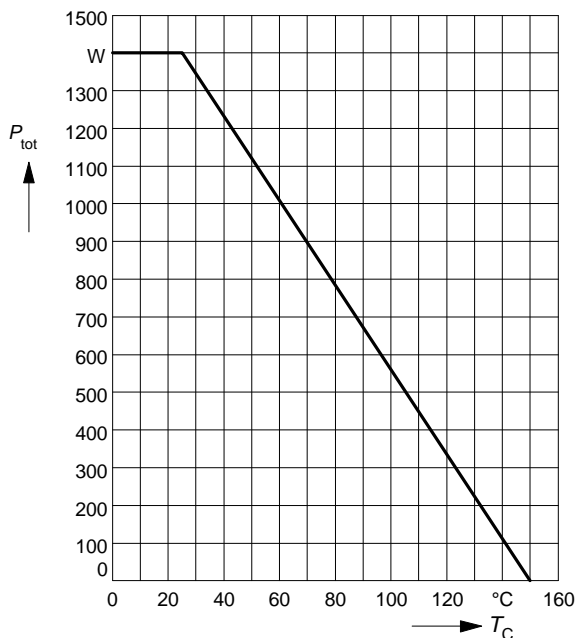
# SII200N12

## NPT IGBT Modules

### Power dissipation

$$P_{\text{tot}} = f(T_C)$$

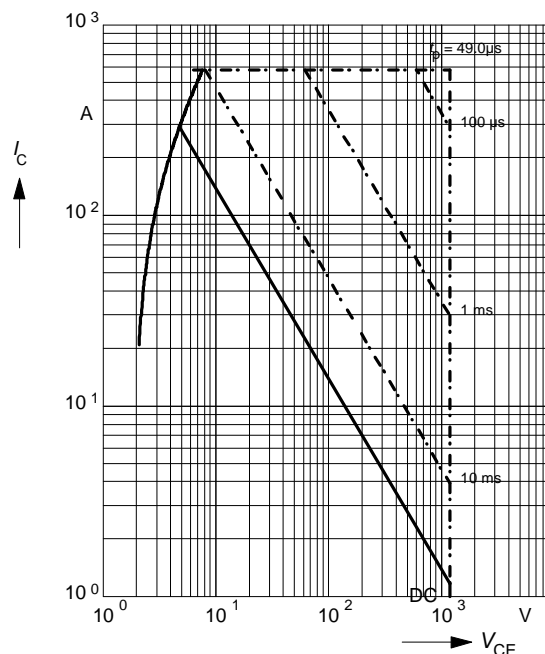
parameter:  $T_j \leq 150\text{ }^\circ\text{C}$



### Safe operating area

$$I_C = f(V_{\text{CE}})$$

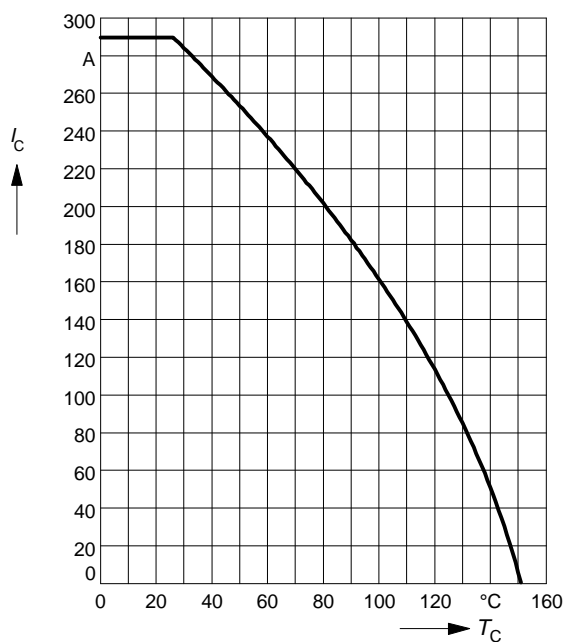
parameter:  $D = 0, T_C = 25\text{ }^\circ\text{C}, T_j \leq 150\text{ }^\circ\text{C}$



### Collector current

$$I_C = f(T_C)$$

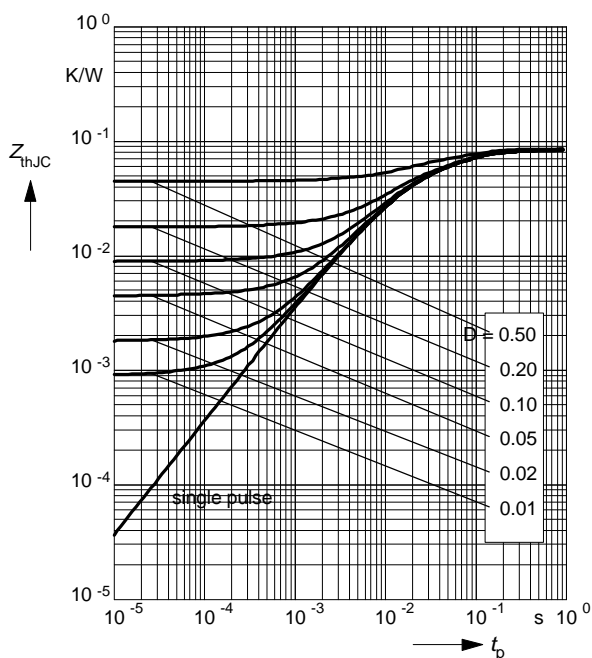
parameter:  $V_{\text{GE}} \geq 15\text{ V}, T_j \leq 150\text{ }^\circ\text{C}$



### Transient thermal impedance IGBT

$$Z_{\text{thJC}} = f(t_p)$$

parameter:  $D = t_p / T$



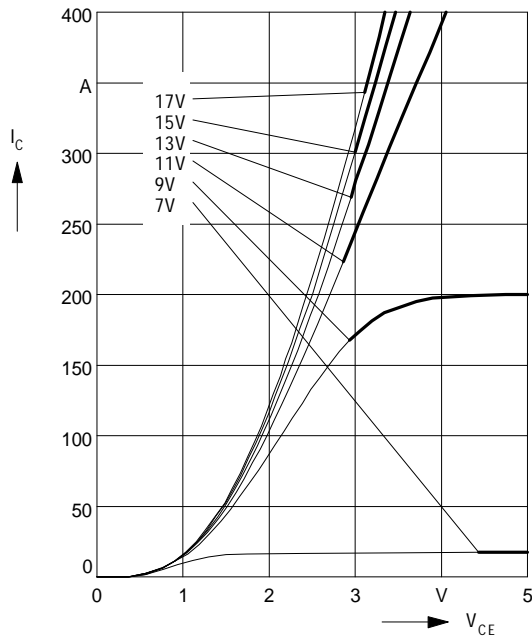
# SII200N12

## NPT IGBT Modules

Typ. output characteristics

$$I_C = f(V_{CE})$$

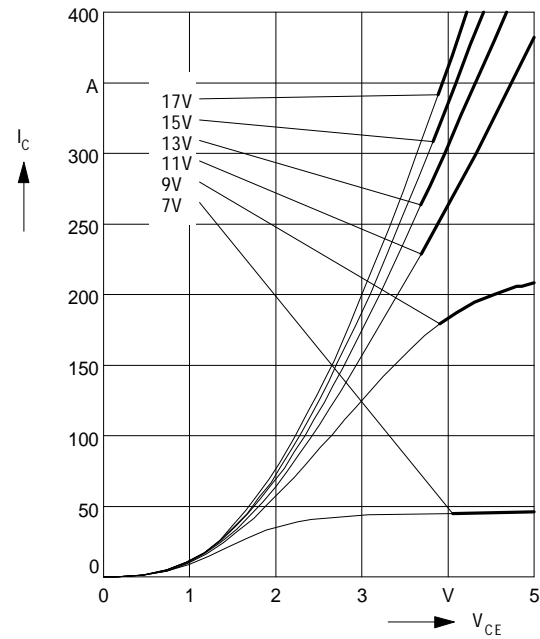
parameter:  $t_p = 80 \mu s, T_j = 25^\circ C$



Typ. output characteristics

$$I_C = f(V_{CE})$$

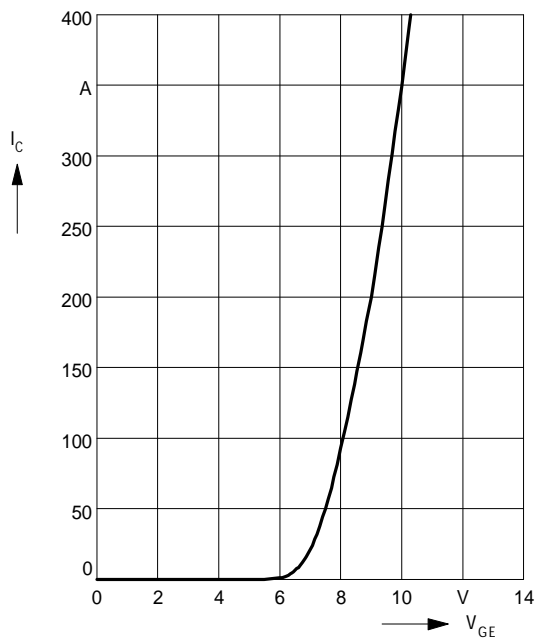
parameter:  $t_p = 80 \mu s, T_j = 125^\circ C$



Typ. transfer characteristics

$$I_C = f(V_{GE})$$

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



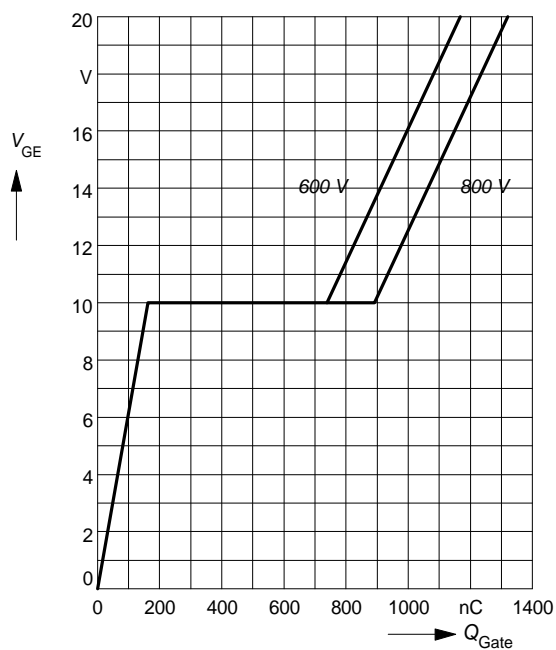
# SII200N12

## NPT IGBT Modules

### Typ. gate charge

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

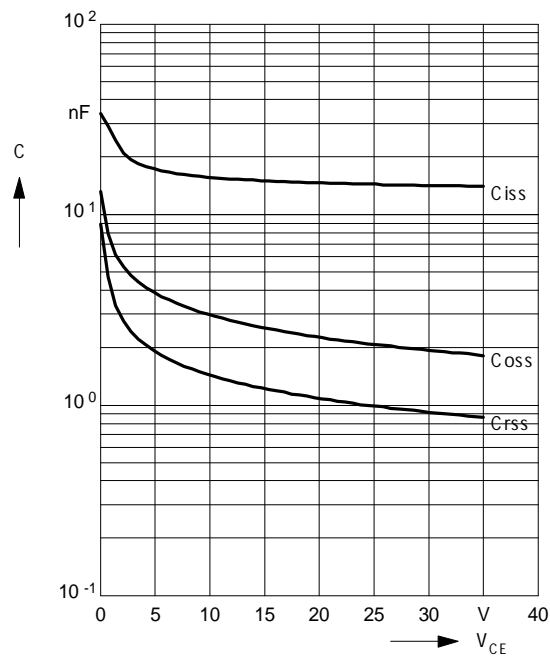
parameter:  $I_{C\ puls} = 200\ A$



### Typ. capacitances

$$C = f(V_{CE})$$

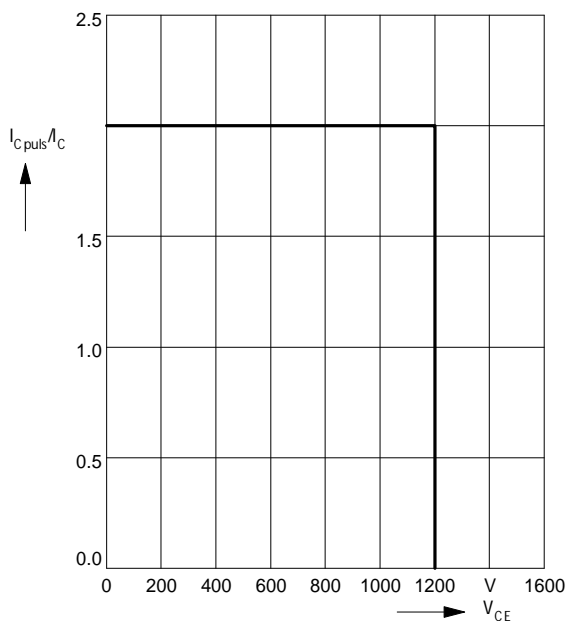
parameter:  $V_{GE} = 0\ V, f = 1\ MHz$



### Reverse biased safe operating area

$$I_{C\ puls} = f(V_{CE}), T_j = 150^\circ C$$

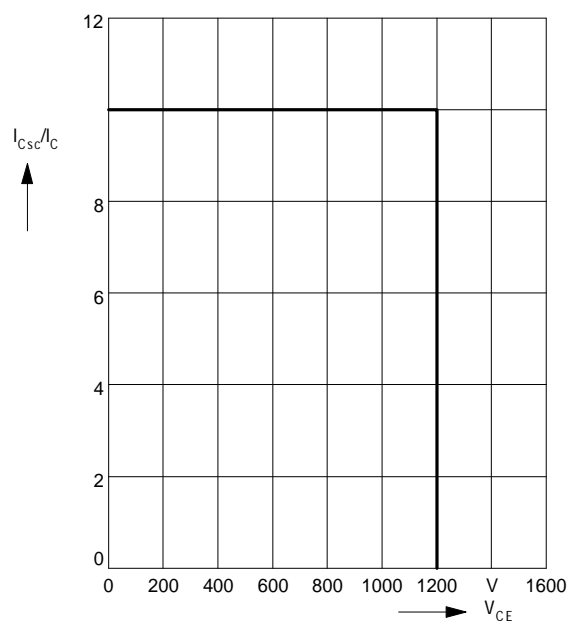
parameter:  $V_{GE} = 15\ V$



### Short circuit safe operating area

$$I_{C\ SC} = f(V_{CE}), T_j = 150^\circ C$$

parameter:  $V_{GE} = \pm 15\ V, t_{SC} \leq 10\ \mu s, L < 25\ nH$



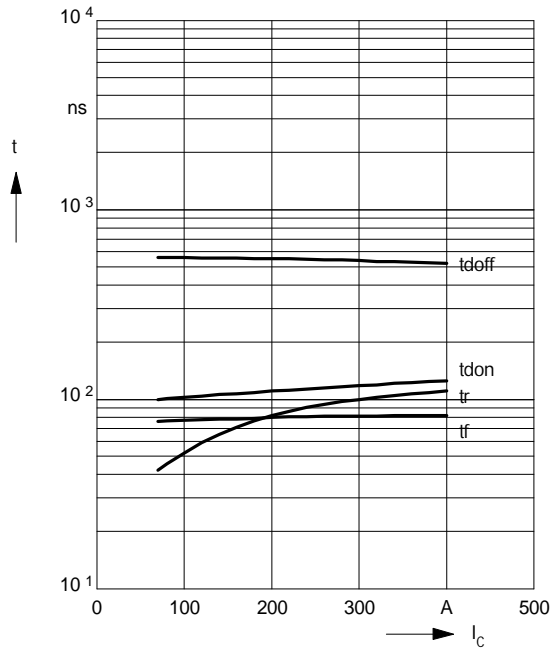
# SII200N12

## NPT IGBT Modules

Typ. switching time

$t = f(I_C)$ , inductive load,  $T_j = 125^\circ\text{C}$

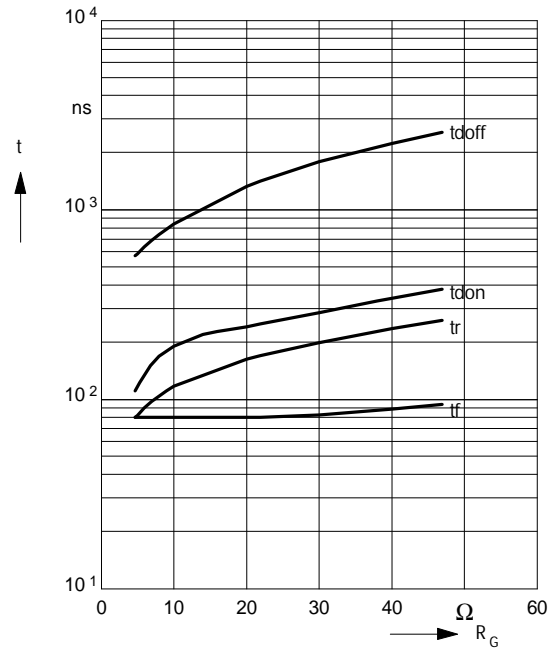
par.:  $V_{CE} = 600\text{ V}$ ,  $V_{GE} = \pm 15\text{ V}$ ,  $R_G = 4.7\ \Omega$



Typ. switching time

$t = f(R_G)$ , inductive load,  $T_j = 125^\circ\text{C}$

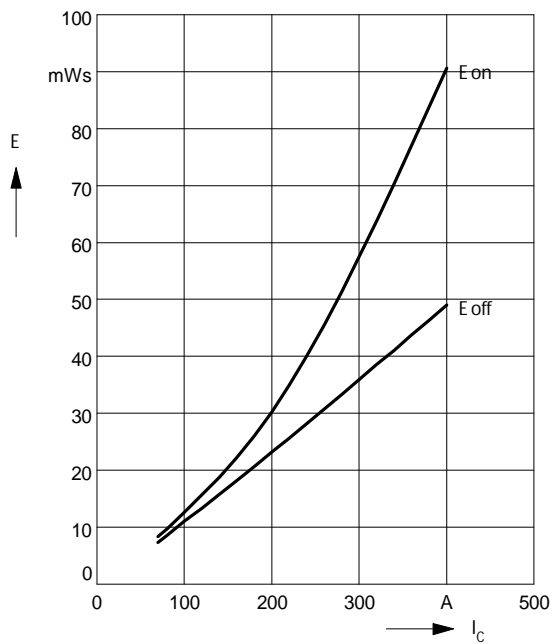
par.:  $V_{CE} = 600\text{ V}$ ,  $V_{GE} = \pm 15\text{ V}$ ,  $I_C = 200\text{ A}$



Typ. switching losses

$E = f(I_C)$ , inductive load,  $T_j = 125^\circ\text{C}$

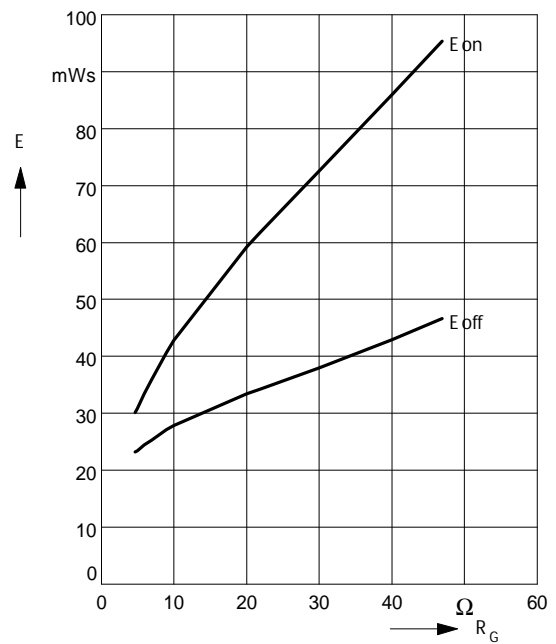
par.:  $V_{CE} = 600\text{ V}$ ,  $V_{GE} = \pm 15\text{ V}$ ,  $R_G = 4.7\ \Omega$



Typ. switching losses

$E = f(R_G)$ , inductive load,  $T_j = 125^\circ\text{C}$

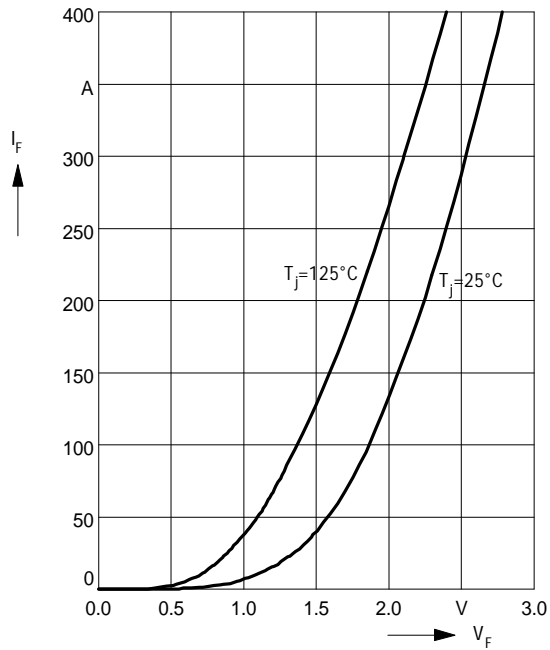
par.:  $V_{CE} = 600\text{ V}$ ,  $V_{GE} = \pm 15\text{ V}$ ,  $I_C = 200\text{ A}$



# SII200N12

## NPT IGBT Modules

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



Transient thermal impedance Diode

$Z_{thJC} = f(t_p)$   
parameter:  $D = t_p / T$

