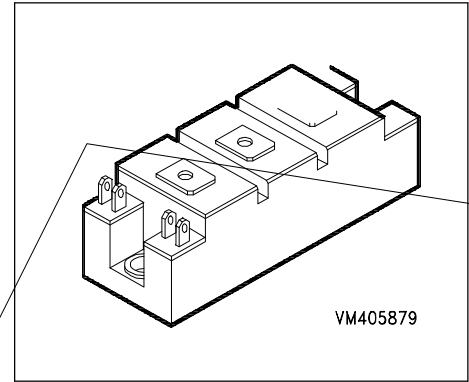


IGBT Power Module

- Half-bridge
- Including fast free-wheeling diodes
- Package with insulated metal base plate
- $R_{G\ on,min} = 22\ \text{Ohm}$



Type	V_{CE}	I_C	Package	Ordering Code
BSM 75 GB 170 DN2	1700V	110A	HALF-BRIDGE 1	C67070-A2702-A67

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V_{CE}	1700	V
Collector-gate voltage	V_{CGR}	1700	
$R_{GE} = 20\ \text{k}\Omega$			
Gate-emitter voltage	V_{GE}	± 20	
DC collector current	I_C		A
$T_C = 25\ ^\circ\text{C}$		110	
$T_C = 80\ ^\circ\text{C}$		75	
Pulsed collector current, $t_p = 1\ \text{ms}$	I_{Cpuls}		W 110
$T_C = 25\ ^\circ\text{C}$		220	
$T_C = 80\ ^\circ\text{C}$		150	
Power dissipation per IGBT	P_{tot}		W 110
$T_C = 25\ ^\circ\text{C}$		625	

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static Characteristics

Gate threshold voltage $V_{GE} = V_{CE}, I_C = 5\text{ mA}$	$V_{GE(th)}$	4.8	5.5	6.2	V
Collector-emitter saturation voltage $V_{GE} = 15\text{ V}, I_C = 75\text{ A}, T_j = 25\text{ °C}$ $V_{GE} = 15\text{ V}, I_C = 75\text{ A}, T_j = 125\text{ °C}$	$V_{CE(sat)}$	-	3.4 4.6	3.9 5.3	
Zero gate voltage collector current $V_{CE} = 1700\text{ V}, V_{GE} = 0\text{ V}, T_j = 25\text{ °C}$ $V_{CE} = 1700\text{ V}, V_{GE} = 0\text{ V}, T_j = 125\text{ °C}$	I_{CES}	-	0.5 2	0.75 -	mA
Gate-emitter leakage current $V_{GE} = 20\text{ V}, V_{CE} = 0\text{ V}$	I_{GES}	-	-	400	

AC Characteristics

Transconductance $V_{CE} = 20\text{ V}, I_C = 75\text{ A}$	g_{fs}	27	-	-	S
Input capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	C_{iss}	-	11	-	

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

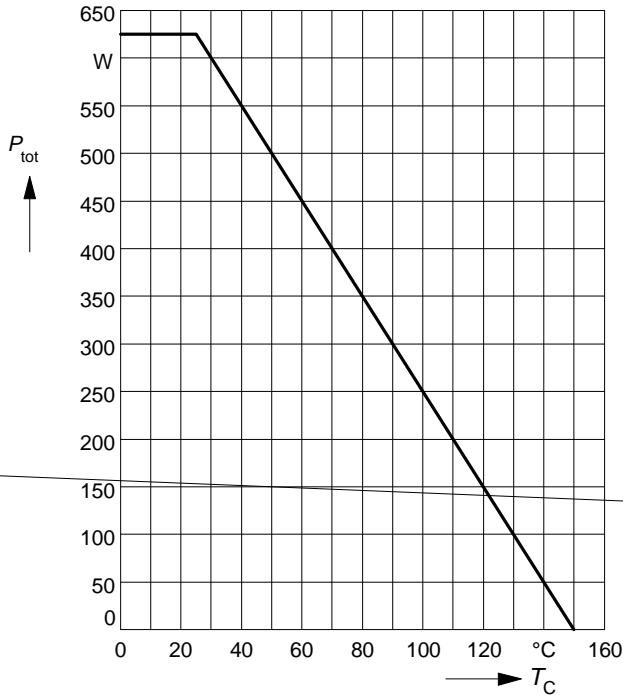
Switching Characteristics, Inductive Load at $T_j = 125\text{ °C}$

Turn-on delay time $V_{CC} = 1200\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 75\text{ A}$ $R_{Gon} = 22\ \Omega$	$t_{d(on)}$	-	400	800	ns
Rise time $V_{CC} = 1200\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 75\text{ A}$ $R_{Gon} = 22\ \Omega$	t_r	-	150	300	
Turn-off delay time $V_{CC} = 1200\text{ V}$, $V_{GE} = -15\text{ V}$, $I_C = 75\text{ A}$ $R_{Goff} = 22\ \Omega$	$t_{d(off)}$	-	650	1000	
Fall time $V_{CC} = 1200\text{ V}$, $V_{GE} = -15\text{ V}$, $I_C = 75\text{ A}$ $R_{Goff} = 22\ \Omega$	t_f	-	90	140	

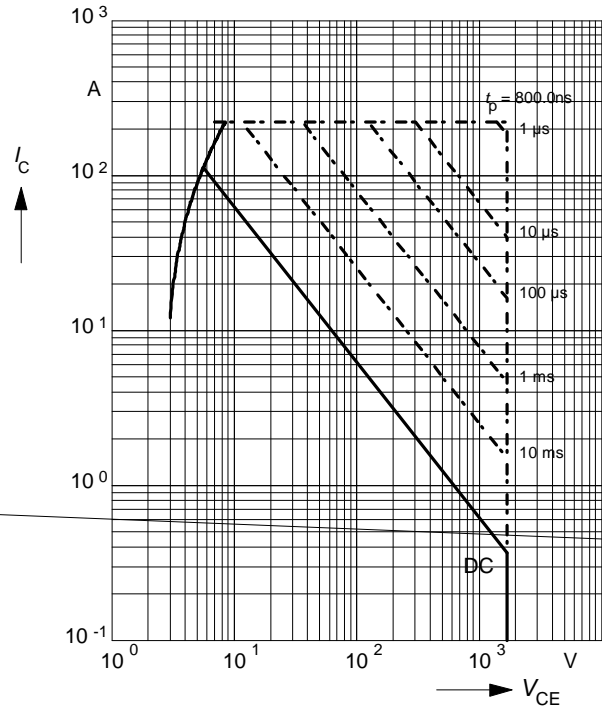
Free-Wheel Diode

Diode forward voltage $I_F = 75\text{ A}$, $V_{GE} = 0\text{ V}$, $T_j = 25\text{ °C}$ $I_F = 75\text{ A}$, $V_{GE} = 0\text{ V}$, $T_j = 125\text{ °C}$	V_F	-	2.3 2.1	2.8 -	V
Reverse recovery time $I_F = 75\text{ A}$, $V_R = -1200\text{ V}$, $V_{GE} = 0\text{ V}$ $di_F/dt = -800\text{ A}/\mu\text{s}$, $T_j = 125\text{ °C}$	t_{rr}	-	0.3	-	
Reverse recovery charge $I_F = 75\text{ A}$, $V_R = -1200\text{ V}$, $V_{GE} = 0\text{ V}$ $di_F/dt = -800\text{ A}/\mu\text{s}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	Q_{rr}	-	7 21	- -	μC

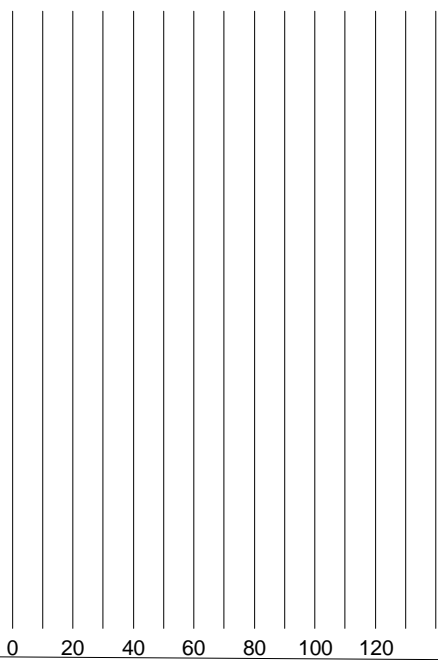
$P_{tot} = f(T_C)$
parameter: $T_j \leq 150\text{ }^\circ\text{C}$



$I_C = f(V_{CE})$
parameter: $D = 0, T_C = 25\text{ }^\circ\text{C}, T_j \leq 150\text{ }^\circ\text{C}$



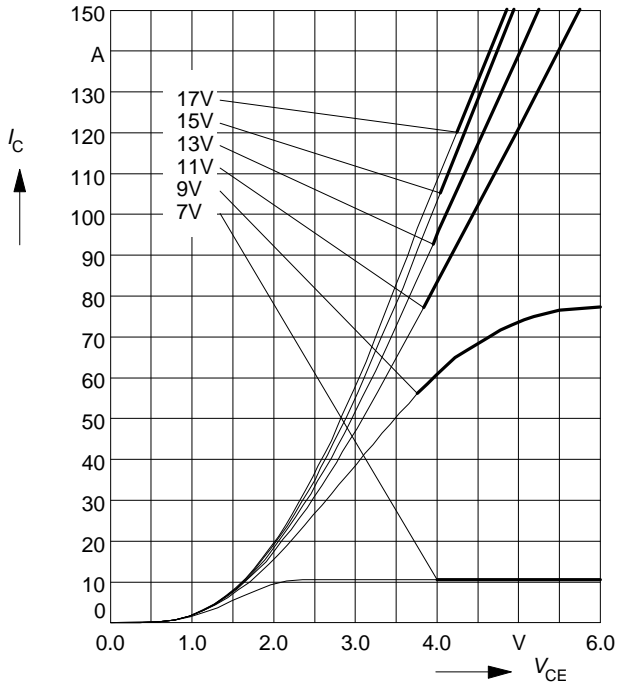
$I_C = f(T_C)$
parameter: $V_{GE} \geq 15\text{ V}, T_j \leq 150\text{ }^\circ\text{C}$



Typ. output characteristics

$I_C = f(V_{CE})$

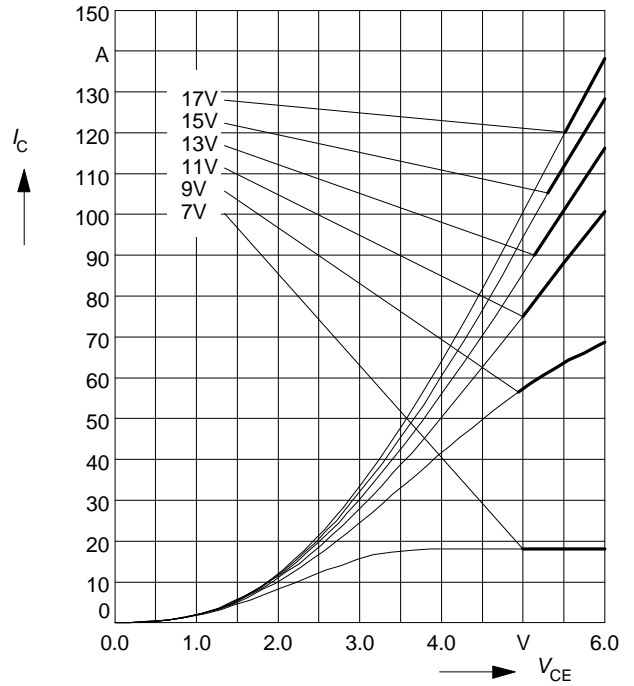
parameter: $t_p = 80 \mu s, T_j = 25 \text{ }^\circ\text{C}$



Typ. output characteristics

$I_C = f(V_{CE})$

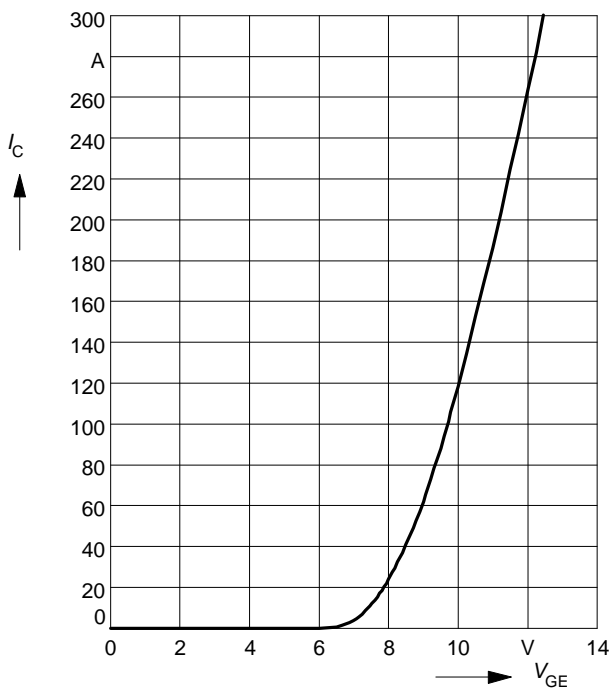
parameter: $t_p = 80 \mu s, T_j = 125 \text{ }^\circ\text{C}$



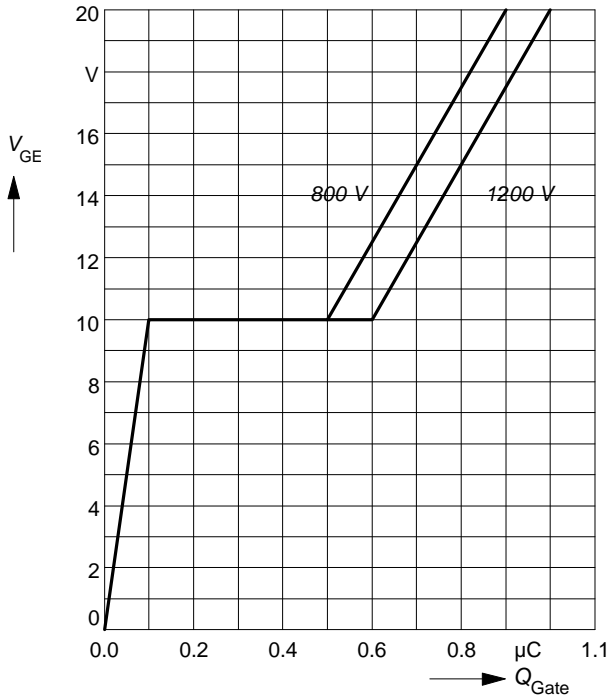
Typ. transfer characteristics

$I_C = f(V_{GE})$

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

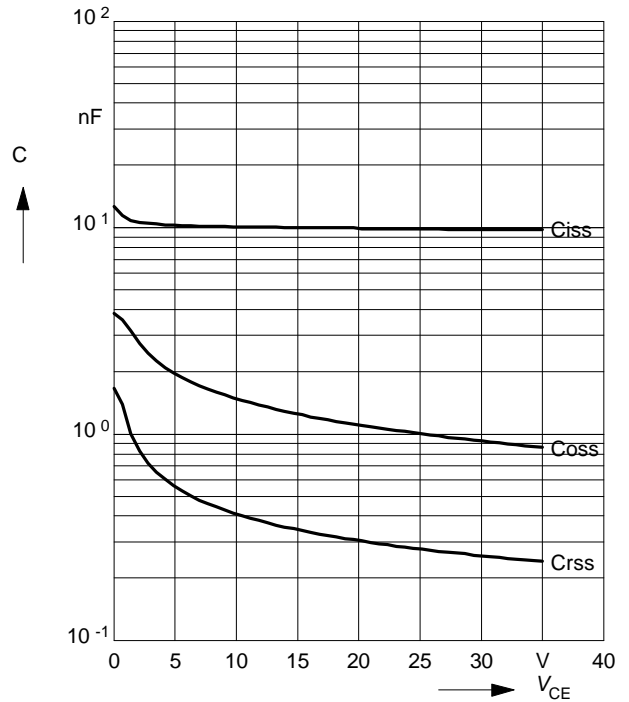


$V_{GE} = f(Q_{Gate})$
 parameter: $I_{C puls} = 75 A$



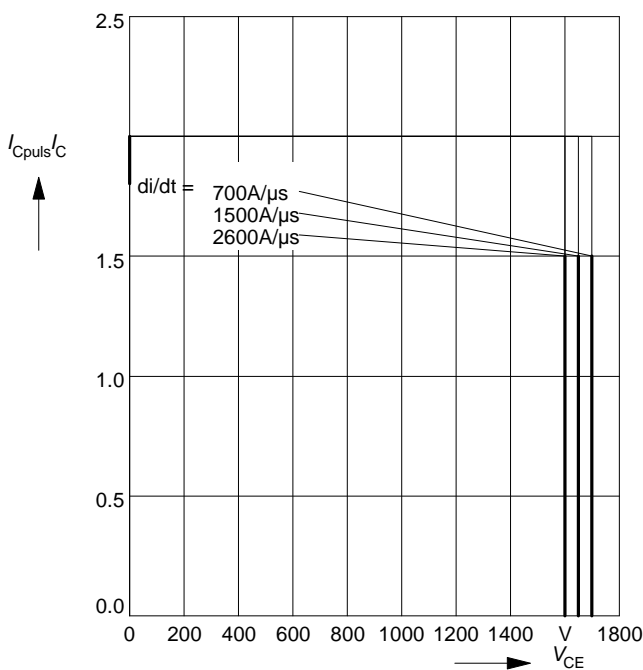
Typ. capacitances

$C = f(V_{CE})$
 parameter: $V_{GE} = 0, f = 1 MHz$



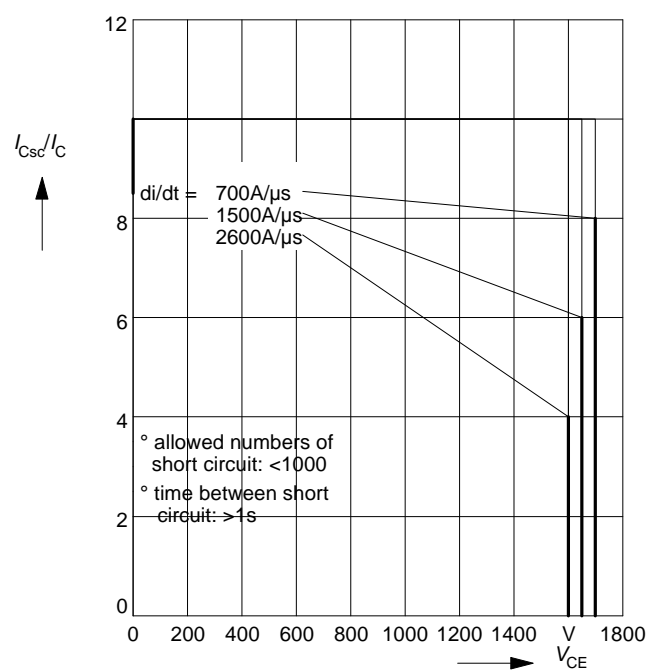
Reverse biased safe operating area

$I_{C puls} = f(V_{CE}), T_j = 150^\circ C$
 parameter: $V_{GE} = \pm 15 V, t_p \leq 1 ms, L < 50 nH$



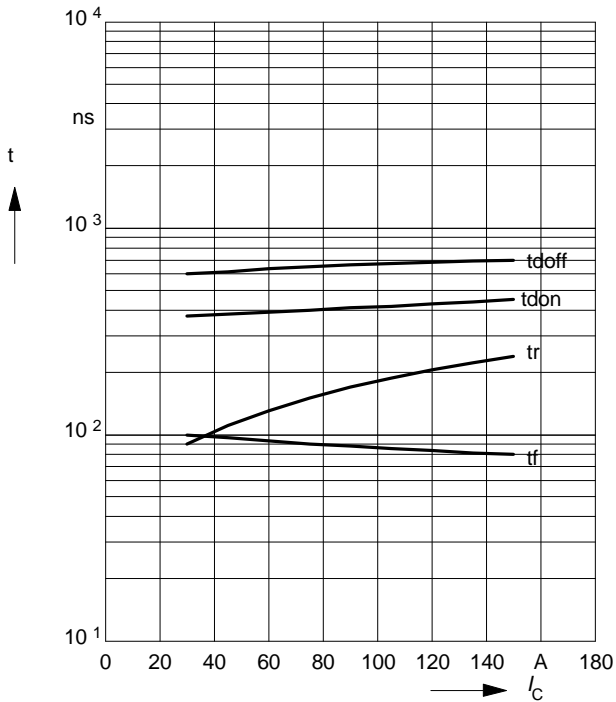
Short circuit safe operating area

$I_{C sc} = f(V_{CE}), T_j = 150^\circ C$
 parameter: $V_{GE} = \pm 15 V, t_p \leq 10 \mu s, L < 50 nH$



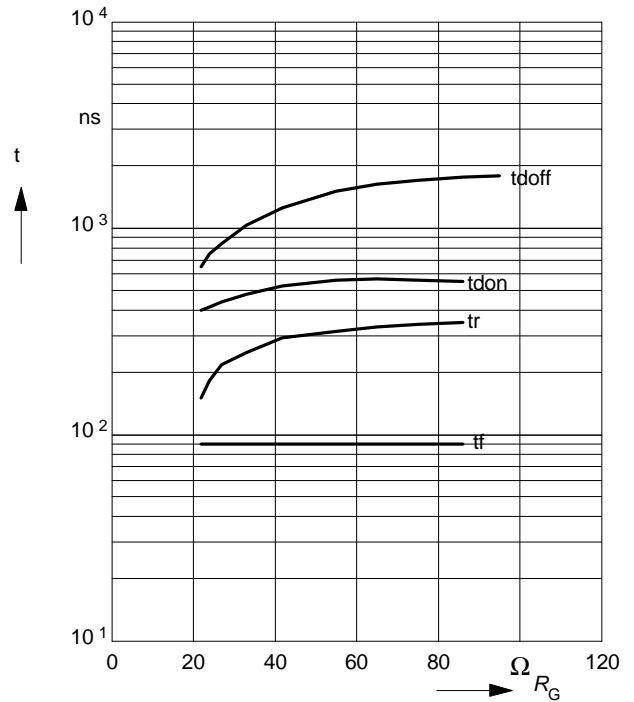
Typ. switching time

$t = f(I_C)$, inductive load, $T_j = 125^\circ\text{C}$
 par.: $V_{CE} = 1200\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_G = 22\ \Omega$



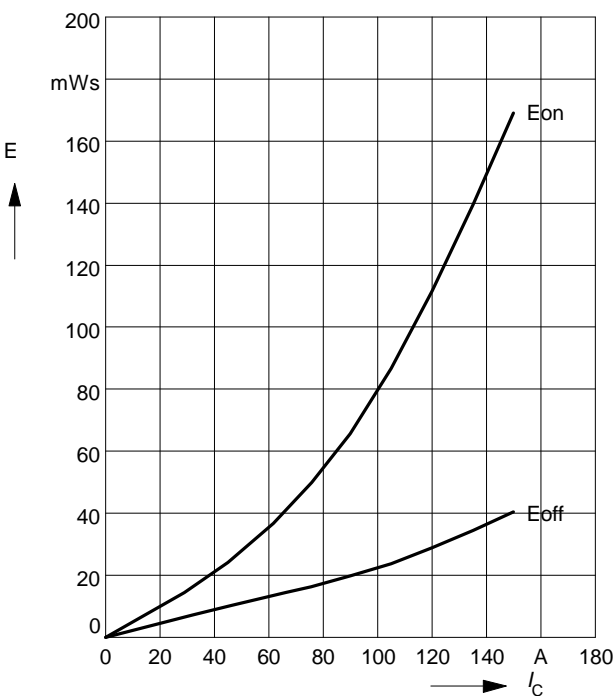
Typ. switching time

$t = f(R_G)$, inductive load, $T_j = 125^\circ\text{C}$
 par.: $V_{CE} = 1200\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $I_C = 75\text{ A}$



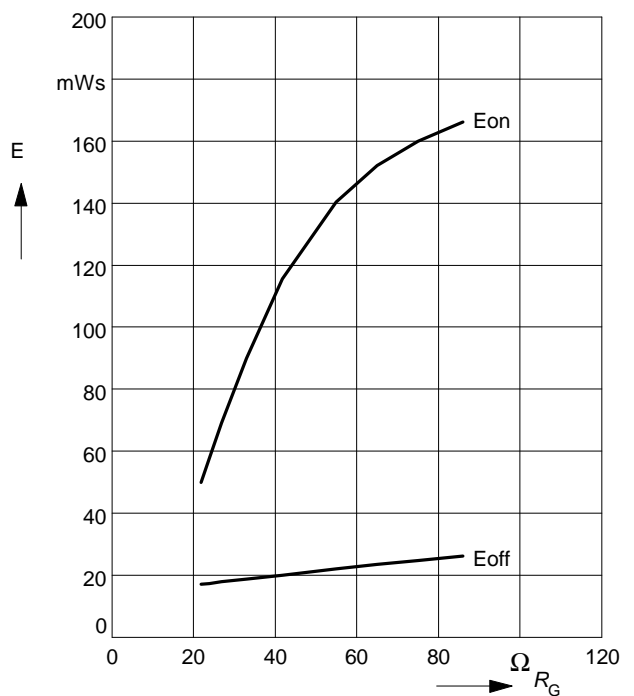
Typ. switching losses

$E = f(I_C)$, inductive load, $T_j = 125^\circ\text{C}$
 par.: $V_{CE} = 1200\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $R_G = 22\ \Omega$



Typ. switching losses

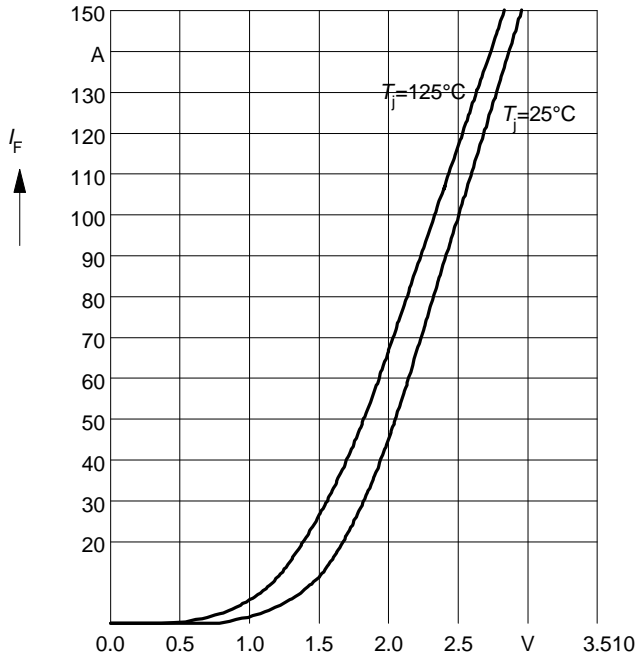
$E = f(R_G)$, inductive load, $T_j = 125^\circ\text{C}$
 par.: $V_{CE} = 1200\text{ V}$, $V_{GE} = \pm 15\text{ V}$, $I_C = 75\text{ A}$



Forward characteristics of fast recovery

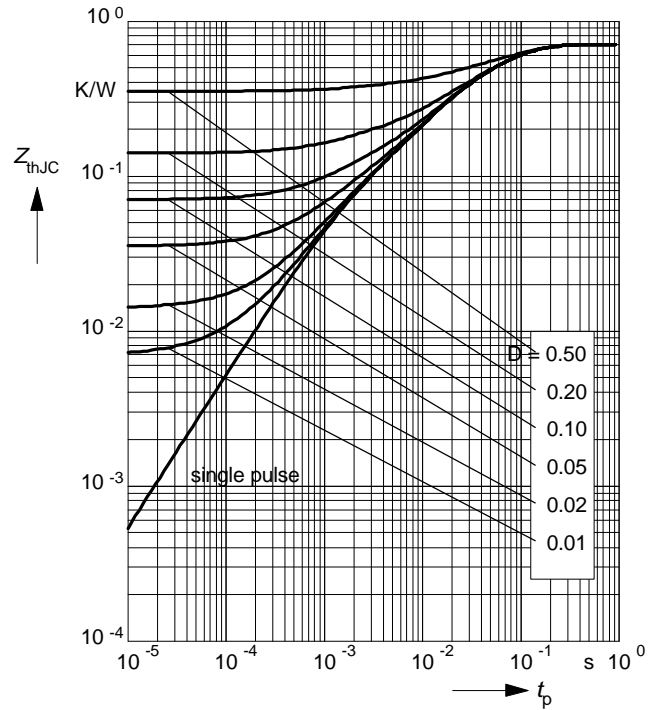
reverse diode $I_F = f(V_F)$

parameter: T_j

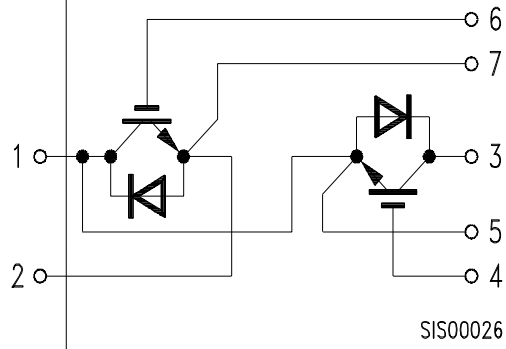


$Z_{thJC} = f(t_p)$

parameter: $D = t_p / T$



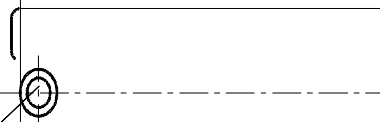
Circuit Diagram



Package Outlines

Dimensions in mm

Weight: 250 g



GM005946

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