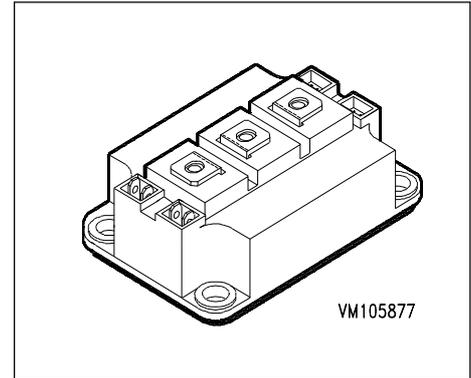## BSM 200 GB 120 DN2

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IGBT Power Module

• Half-bridge

• Including fast free-wheeling diodes

• Package with insulated metal base plate

VM105877

Type	V_{CE}	I_C	Package	Ordering Code
BSM 200 GB 120 DN2	1200V	290A	HALF-BRIDGE 2	C67070-A2300-A70

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V_{CE}	1200	V
Collector-gate voltage $R_{GE} = 20\ k\Omega$	V_{CGR}	1200	
Gate-emitter voltage	V_{GE}	± 20	
DC collector current $T_C = 25\ °C$ $T_C = 80\ °C$	I_C	290 200	A
Pulsed collector current, $t_p = 1$ ms $T_C = 25\ °C$ $T_C = 80\ °C$	I_{Cpuls}	580 400	
Power dissipation per IGBT $T_C = 25\ °C$	P_{tot}	1400	W
Chip temperature	T_j	+ 150	°C
Storage temperature	T_{stg}	-40 ... + 125	
Thermal resistance, chip case	R_{thJC}	≤ 0.09	K/W
Diode thermal resistance, chip case	$R_{thJC\mathbf{D}}$	≤ 0.18	
Insulation test voltage, $t = 1$min.	V_{is}	2500	Vac
Creepage distance	-	20	mm
Clearance	-	11	
DIN humidity category, DIN 40 040	-	F	sec
IEC climatic category, DIN IEC 68-1	-	40 / 125 / 56	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Gate threshold voltage	$V_{GE(th)}$				V
$V_{GE} = V_{CE,}\ I_C$ = 8 mA		4.5	5.5	6.5	
Collector-emitter saturation voltage	$V_{CE(sat)}$				
V_{GE} = 15 V, I_C = 200 A, T_j = 25 °C		-	2.5	3	
V_{GE} = 15 V, I_C = 200 A, T_j = 125 °C		-	3.1	3.7	
Zero gate voltage collector current	I_{CES}				mA
V_{CE} = 1200 V, V_{GE} = 0 V, T_j = 25 °C		-	3	4	
V_{CE} = 1200 V, V_{GE} = 0 V, T_j = 125 °C		-	12	-	
Gate-emitter leakage current	I_{GES}				nA
V_{GE} = 20 V, V_{CE} = 0 V		-	-	400	
AC Characteristics					
Transconductance	g_{fs}				S
V_{CE} = 20 V, I_C = 200 A		108	-	-	
Input capacitance	C_{iss}				nF
V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		-	13	-	
Output capacitance	C_{oss}				
V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		-	2	-	
Reverse transfer capacitance	C_{rss}				
V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		-	1	-	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Switching Characteristics, Inductive Load at T_j = 125 °C

Parameter	Symbol	min.	typ.	max.	Unit
Turn-on delay time V_{CC} = 600 V, V_{GE} = 15 V, I_C = 200 A R_{Gon} = 4.7 Ω	$t_{d(on)}$	-	110	220	ns
Rise time V_{CC} = 600 V, V_{GE} = 15 V, I_C = 200 A R_{Gon} = 4.7 Ω	t_r	-	80	160	
Turn-off delay time V_{CC} = 600 V, V_{GE} = -15 V, I_C = 200 A R_{Goff} = 4.7 Ω	$t_{d(off)}$	-	550	800	
Fall time V_{CC} = 600 V, V_{GE} = -15 V, I_C = 200 A R_{Goff} = 4.7 Ω	t_f	-	80	120	

Free-Wheel Diode

Parameter	Symbol	min.	typ.	max.	Unit
Diode forward voltage I_F = 200 A, V_{GE} = 0 V, T_j = 25 °C I_F = 200 A, V_{GE} = 0 V, T_j = 125 °C	V_F	- -	2 1.8	2.5 -	V
Reverse recovery time I_F = 200 A, V_R = -600 V, V_{GE} = 0 V di_F/dt = -2000 A/μs, T_j = 125 °C	t_{rr}	-	0.5	-	μs
Reverse recovery charge I_F = 200 A, V_R = -600 V, V_{GE} = 0 V di_F/dt = -2000 A/μs T_j = 25 °C T_j = 125 °C	Q_{rr}	- -	12 36	- -	μC

Power dissipation
$P_{tot} = f(T_C)$
parameter: $T_j \leq 150\ °C$
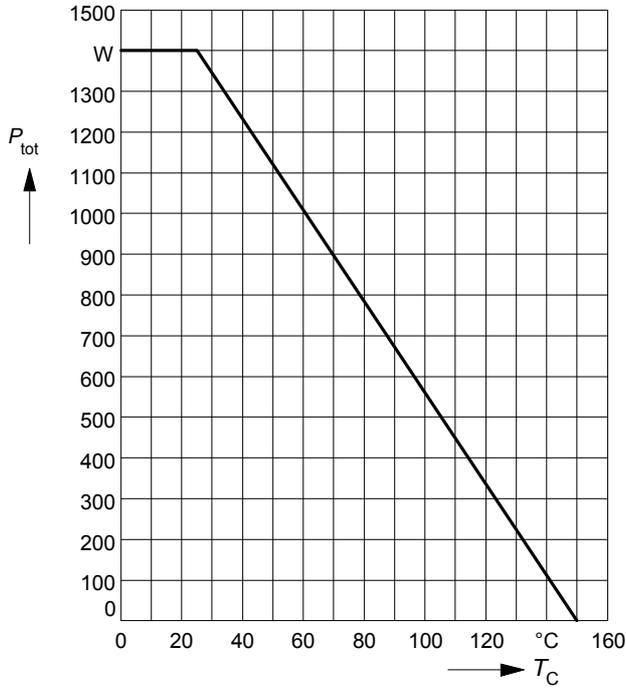
Safe operating area
$I_C = f(V_{CE})$
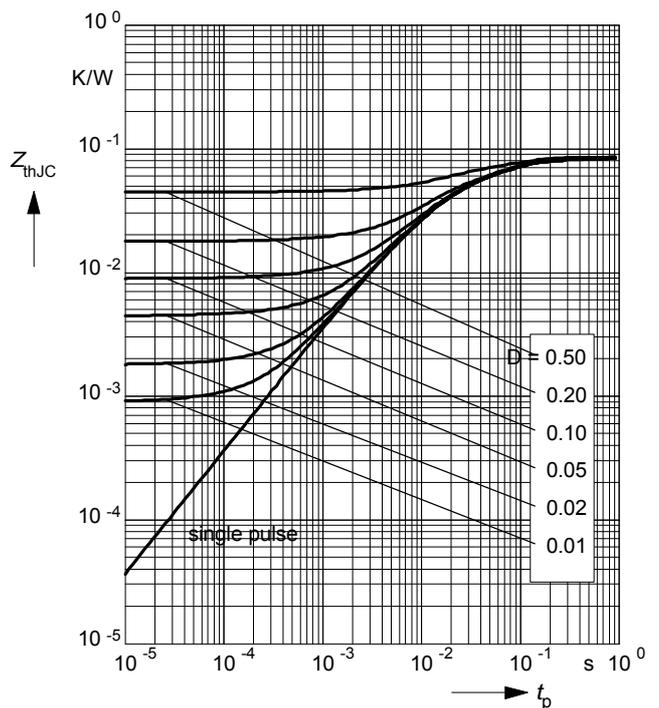parameter: $D = 0,\ T_C = 25°C\ ,\ T_j \leq 150\ °C$
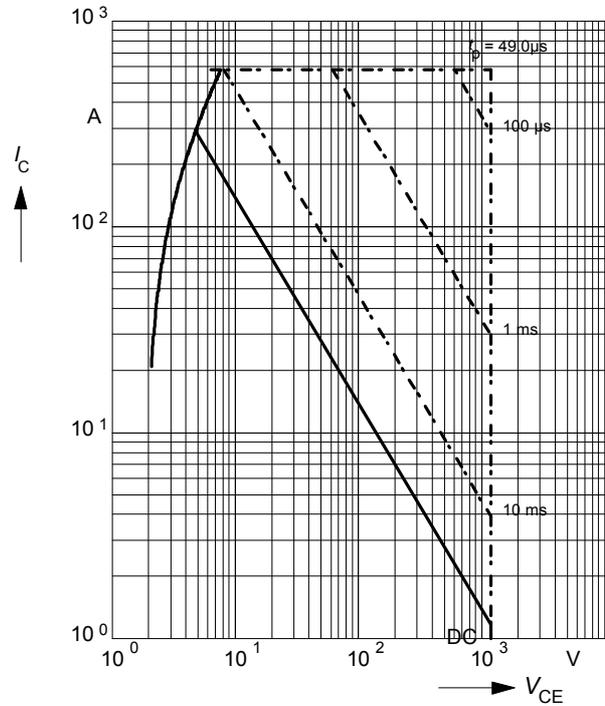
Collector current
$I_C = f(T_C)$
parameter: $V_{GE} \geq 15\ V\ ,\ T_j \leq 150\ °C$
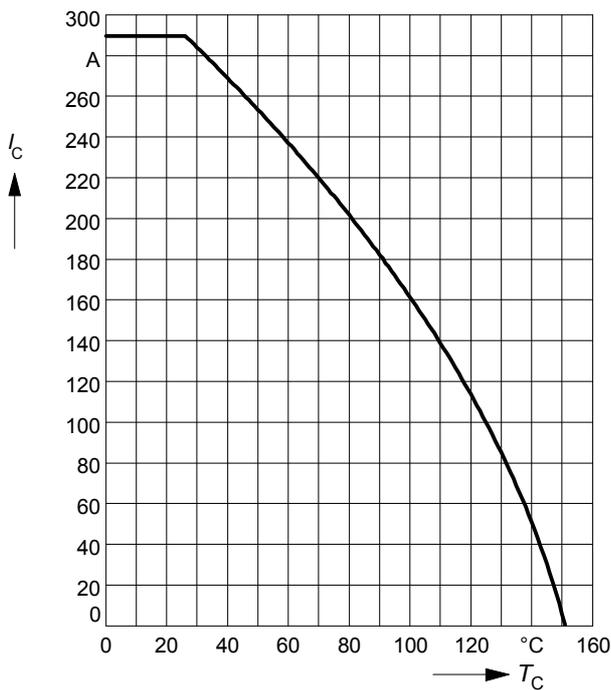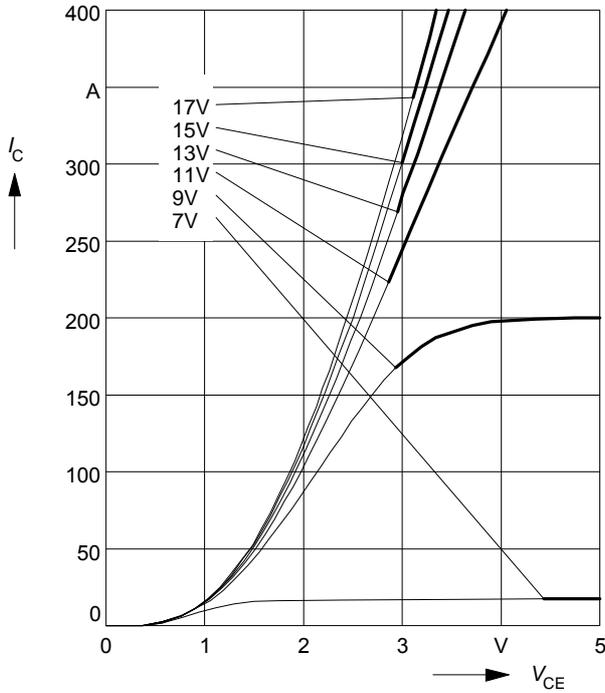
Transient thermal impedance   IGBT
$Z_{th\ JC} = f(t_p)$
parameter: $D = t_p\ /\ T$
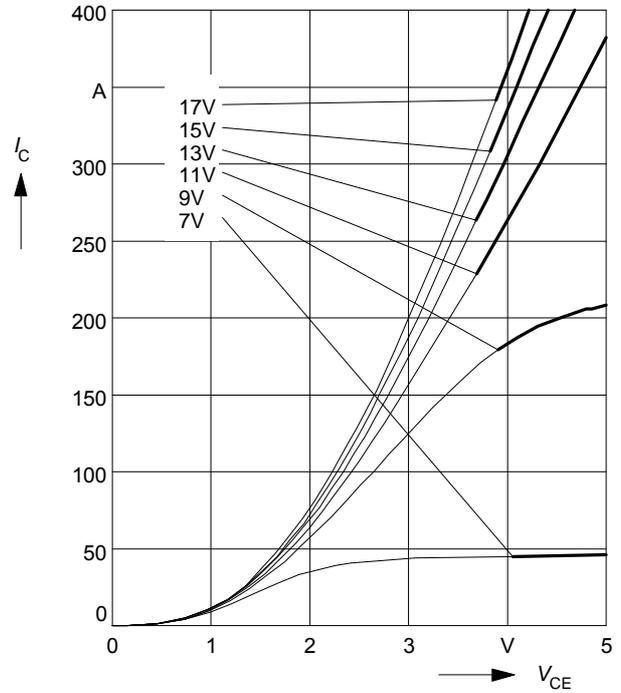
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Typ. output characteristics

$I_C = f (V_{CE})$

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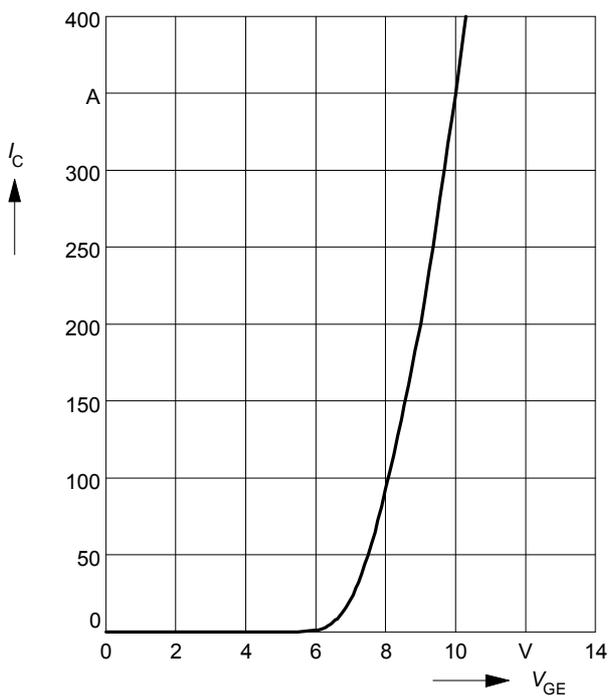

Typ. output characteristics

$I_C = f (V_{CE})$

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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Typ. gate charge

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

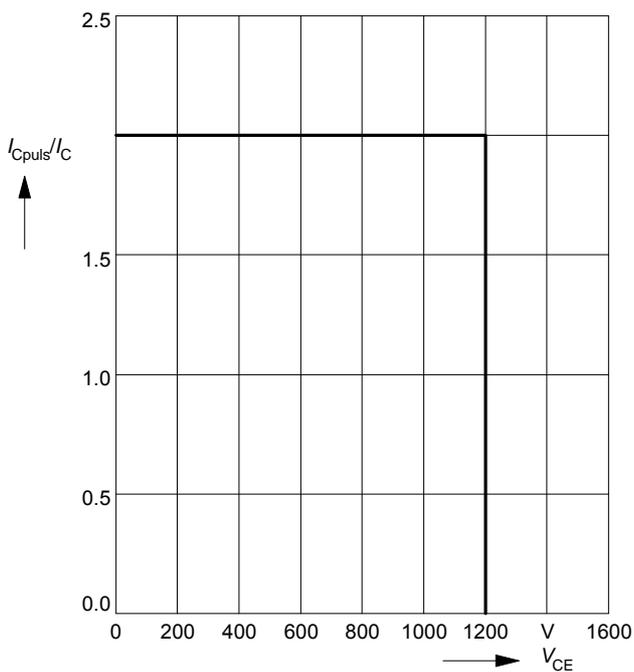parameter: $I_{C\,puls} = 200$ A
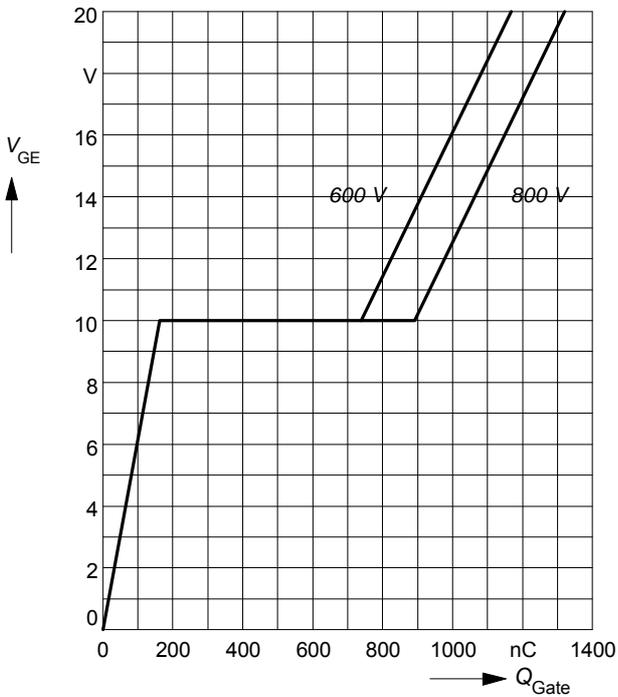
Typ. capacitances

$C = f(V_{CE})$

parameter: $V_{GE} = 0$ V, f = 1 MHz
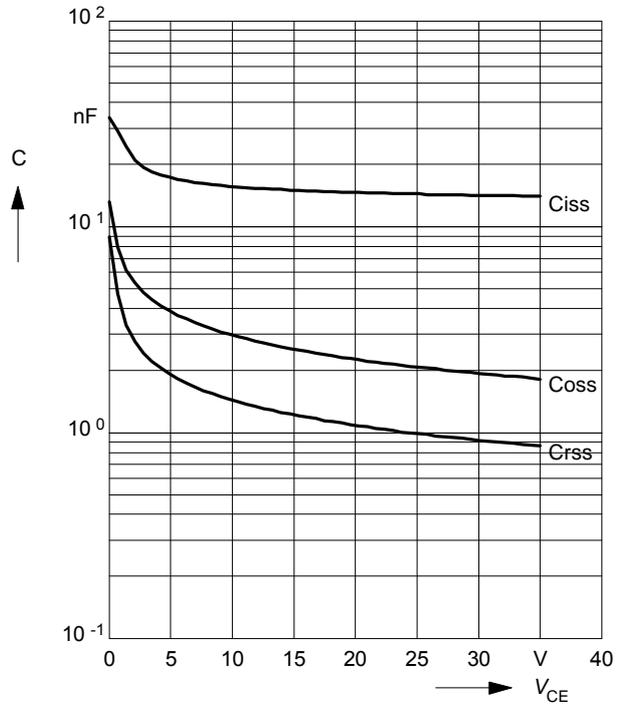
Reverse biased safe operating area

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

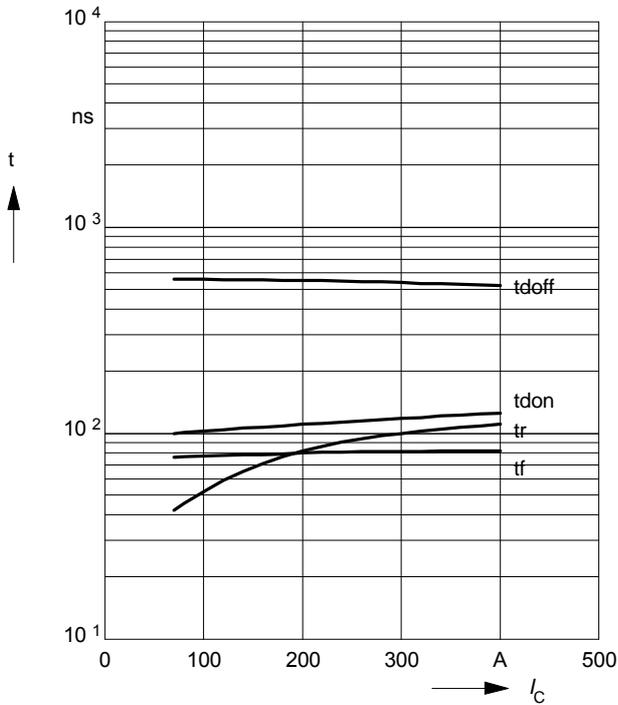parameter: $V_{GE} = 15$ V

Short circuit safe operating area

$I_{Csc} = f(V_{CE})$, $T_j = 150°C$

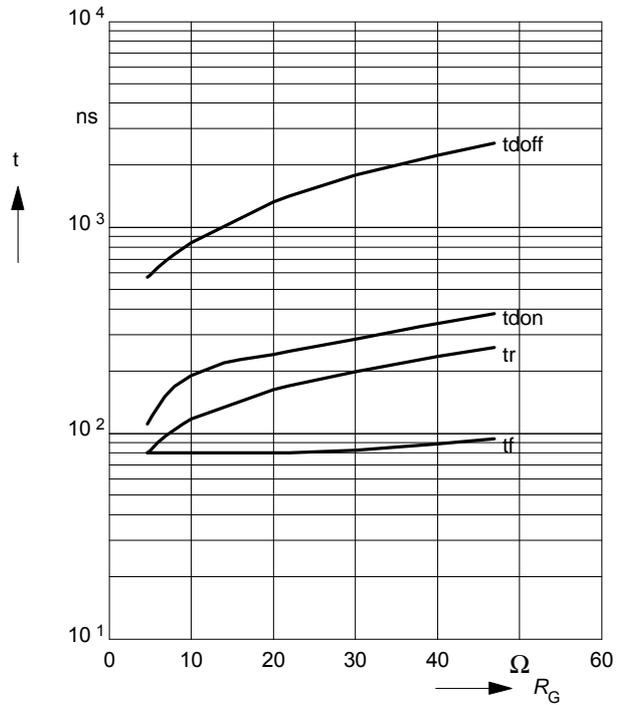parameter: $V_{GE} = \pm 15$ V, $t_{SC} \leq 10$ µs, L < 25 nH

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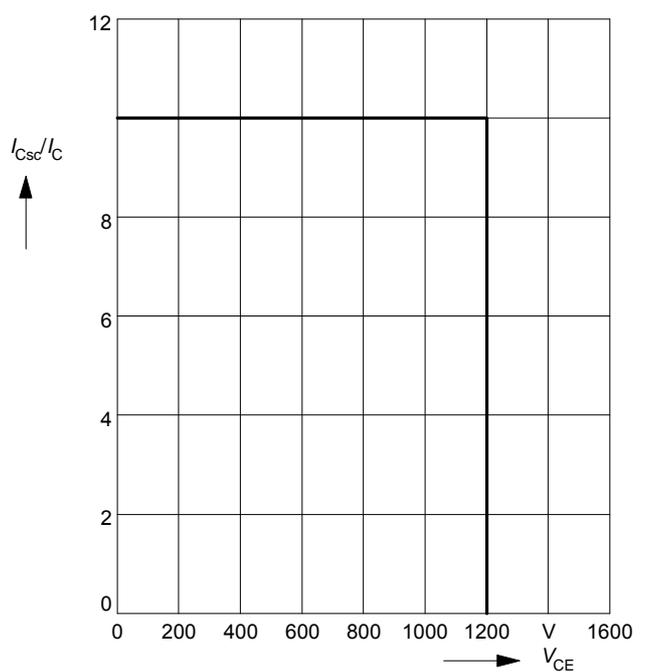
Typ. switching time

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

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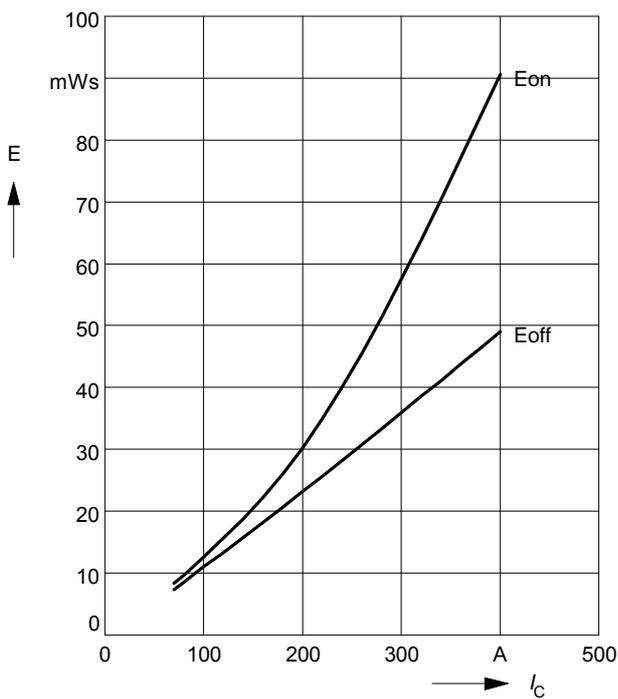

Typ. switching time

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

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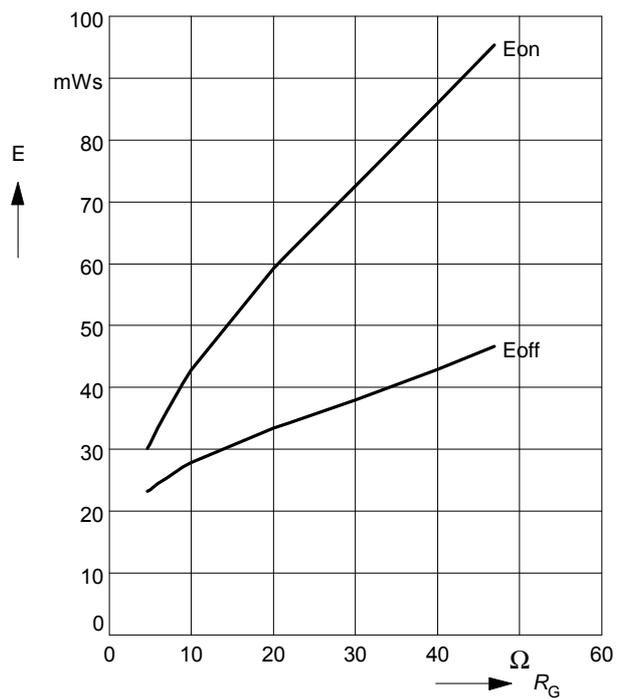

Typ. switching losses

$E = f (I_C)$, inductive load , $T_j = 125°C$
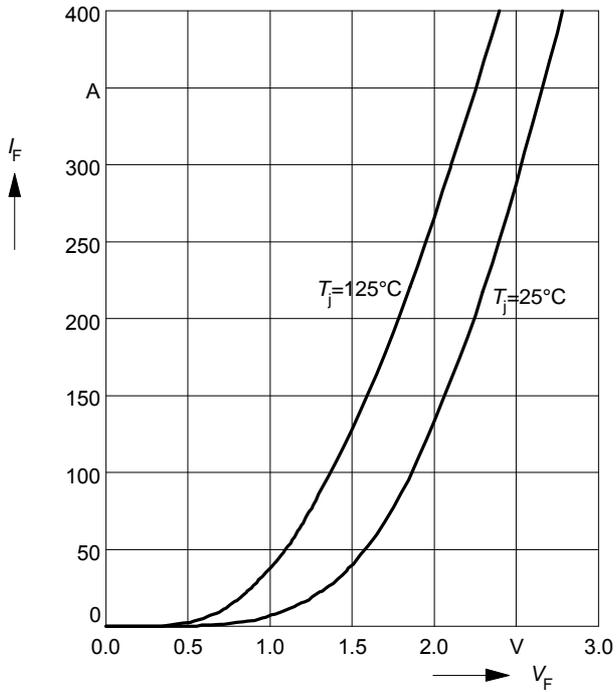
par.: $V_{CE} = 600$ V, $V_{GE} = \pm 15$ V, $R_G = 4.7$ Ω

Typ. switching losses

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

par.: $V_{CE} = 600$V, $V_{GE} = \pm 15$ V, $I_C = 200$ A
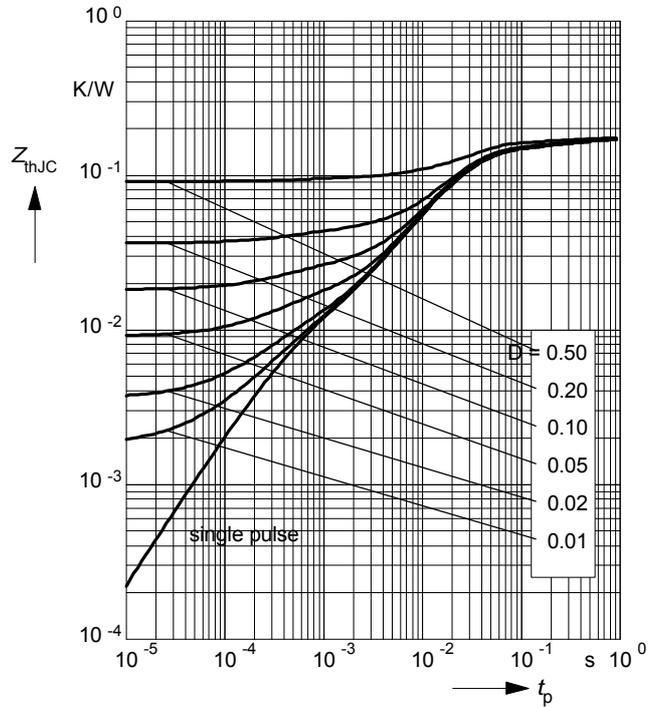
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BSM 200 GB 120 DN2

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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: $D = t_p\ /\ T$

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Circuit Diagram

SIS00026
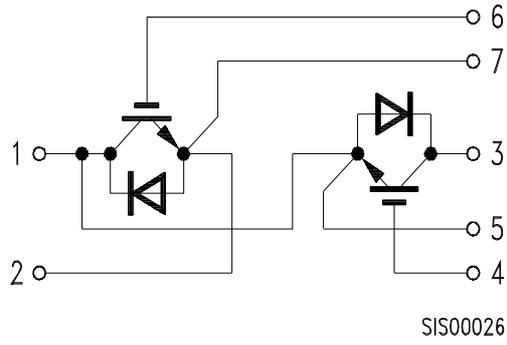
Package Outlines

Dimensions in mm

Weight: 420 g

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