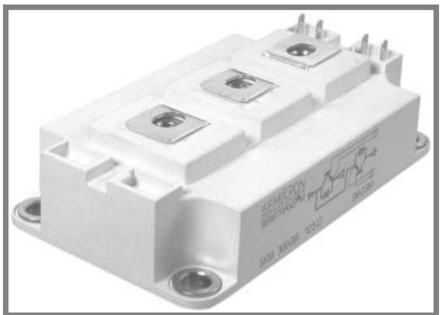
SKM 300GB126D



SEMITRANS® 3

Trench IGBT Module

SKM 300GB126D

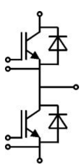
Preliminary Data

Features

- Trench = Trenchgate technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to 6 x I_c

Typical Applications

- Electronic welders
- AC inverter drives
- UPS



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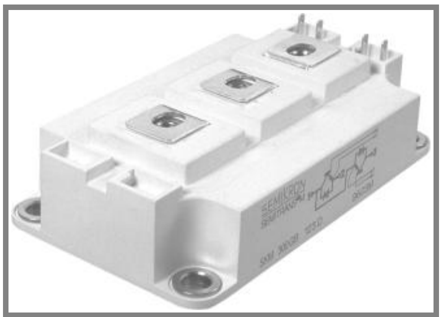
Absolute Maximum Ratings		T_c = 25 °C, unless otherwise specified		
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_{case} = 25 °C	310	A
		T_{case} = 80 °C	200	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		400	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; $V_{GE} \leq$ 20 V; VCES < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	250	A
		T_{case} = 80 °C	170	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		400	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40 ... + 150	°C
T_{stg}			-40....+125	°C
V_{isol}	AC, 1 min.		4000	V

Characteristics		T_c = 25 °C, unless otherwise specified				
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
IGBT						
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 8 mA		5	5,8	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C		0,1	0,3	mA
V_{CE0}		T_j = 25 °C		1	1,2	V
		T_j = 125 °C		0,9	1,1	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		3,5	4,7	mΩ
		T_j = 125°C		5,5	6,8	mΩ
$V_{CE(sat)}$	I_{Cnom} = 200 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		1,7	2,15	V
		T_j = 125°C$_{chiplev.}$		2	2,45	V
C_{ies}				15		nF
C_{oes}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		1,2		nF
C_{res}				1,1		nF
Q_G	V_{GE} = -8V - +20V			1800		nC
R_{Gint}	T_j = 25 °C			3,8		Ω
$t_{d(on)}$				280		ns
t_r	R_{Gon} = 1,5 Ω	V_{CC} = 600V		37		ns
E_{on}		I_C= 200A		21		mJ
$t_{d(off)}$	R_{Goff} = 1,5 Ω	T_j = 125 °C		560		ns
t_f		V_{GE} = ± 15V		100		ns
E_{off}				33		mJ
$R_{th(j-c)}$	per IGBT				0,12	K/W



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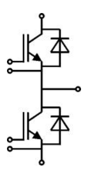

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Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse diode						
$V_F = V_{EC}$	I_{Fnom} = 200 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		1,6	1,8	V
		T_j = 125 °$C_{chiplev.}$		1,6	1,8	V
V_{F0}		T_j = 25 °C		1	1,1	V
		T_j = 125 °C		0,8	0,9	V
r_F		T_j = 25 °C		3	3,5	mΩ
		T_j = 125 °C		4	4,5	mΩ
I_{RRM}	I_F = 200 A	T_j = 125 °C		290		A
Q_{rr}	di/dt = 6200 A/µs			44		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 600 V			18		mJ
$R_{th(j-c)D}$	per diode				0,25	K/W
Module						
L_{CE}				15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,35		mΩ
		T_{case}= 125 °C		0,5		mΩ
$R_{th(c-s)}$	per module				0,038	K/W
M_s	to heat sink M6		3		5	Nm
M_t	to terminals M6		2,5		5	Nm
w					325	g

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

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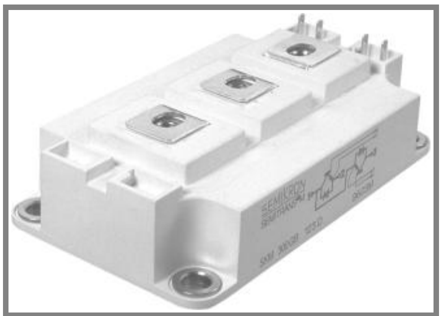

SEMITRANS® 3

Trench IGBT Module

SKM 300GB126D

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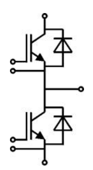

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Symbol	Conditions	Values	Units
Z_{th}			
$Z_{th(j-c)I}$			
R_i	i = 1	80	mk/W
R_i	i = 2	30	mk/W
R_i	i = 3	8,5	mk/W
R_i	i = 4	1,5	mk/W
tau_i	i = 1	0,0576	s
tau_i	i = 2	0,01	s
tau_i	i = 3	0,002	s
tau_i	i = 4	0,0002	s
$Z_{th(j-c)D}$			
R_i	i = 1	150	mk/W
R_i	i = 2	75	mk/W
R_i	i = 3	22	mk/W
R_i	i = 4	3	mk/W
tau_i	i = 1	0,0331	s
tau_i	i = 2	0,0113	s
tau_i	i = 3	0,0012	s
tau_i	i = 4	0,001	s

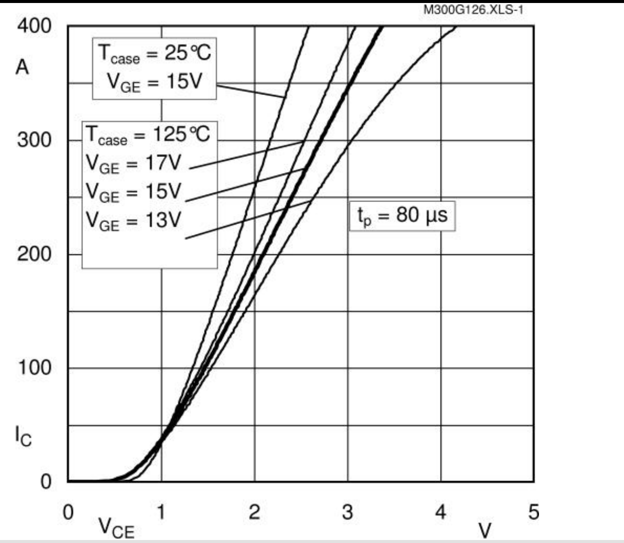

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

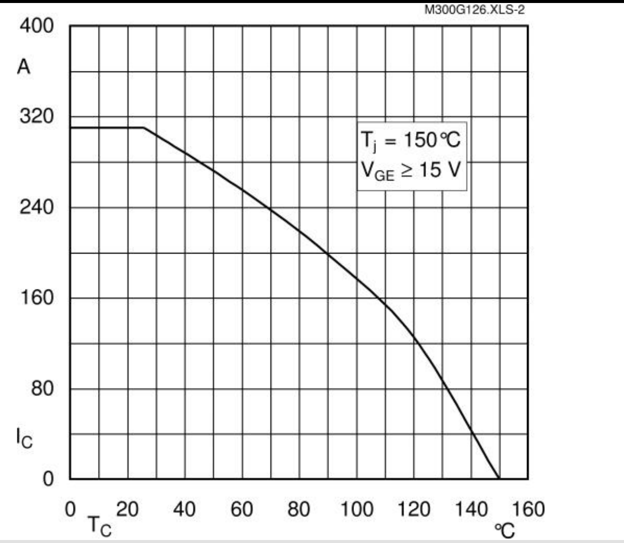

Fig. 2 Rated current vs. temperature I_C = f (T_C)

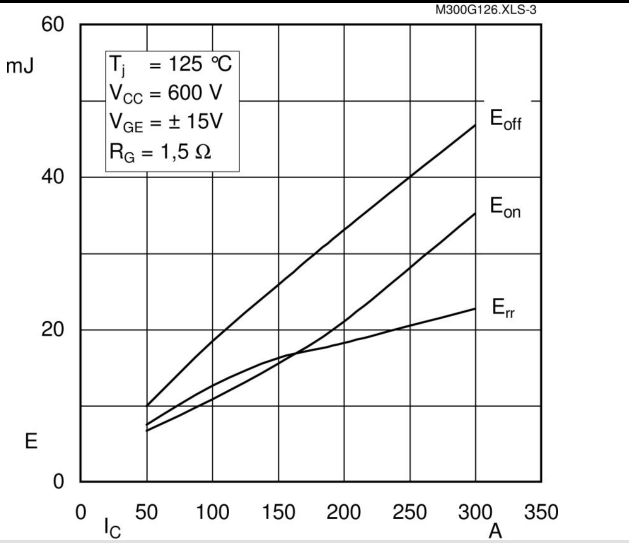

Fig. 3 Typ. turn-on /-off energy = f (I_C)

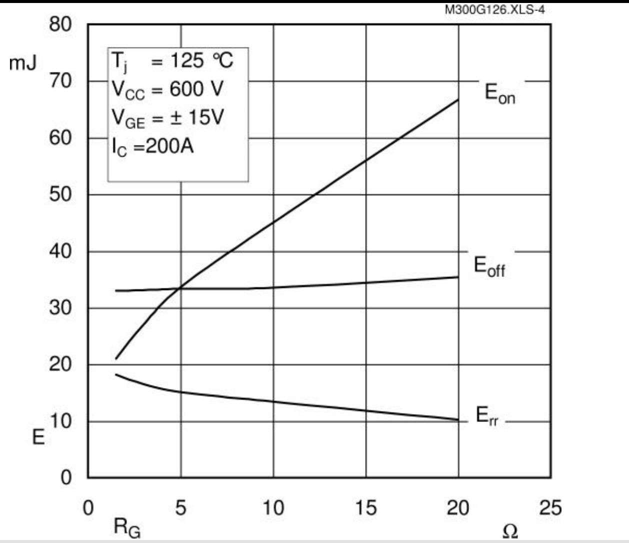

Fig. 4 Typ. turn-on /-off energy = f (R_G)

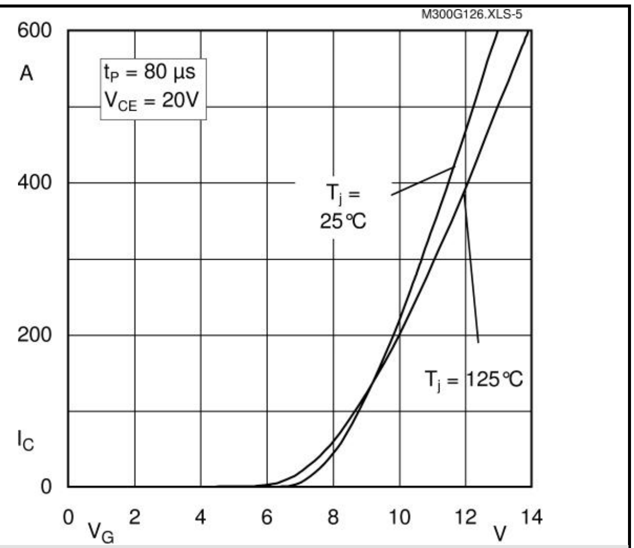

Fig. 5 Typ. transfer characteristic

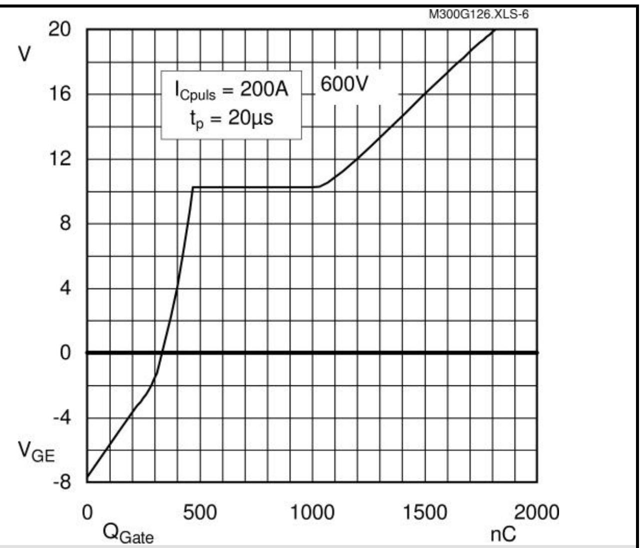

Fig. 6 Typ. gate charge characteristic

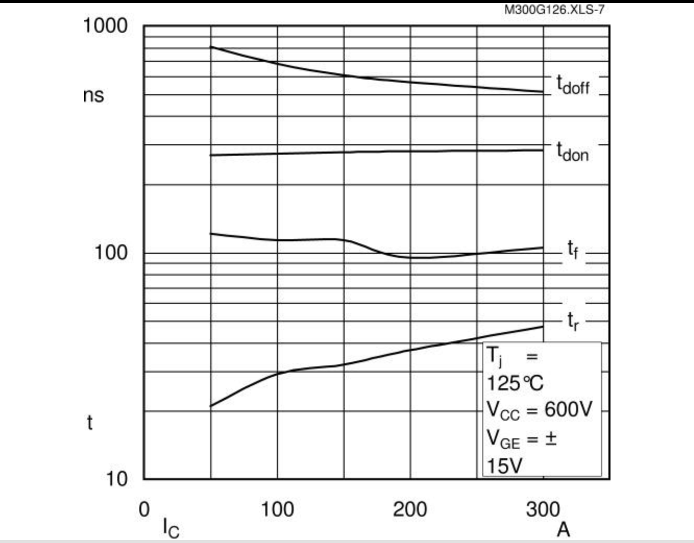

Fig. 7 Typ. switching times vs. I_C

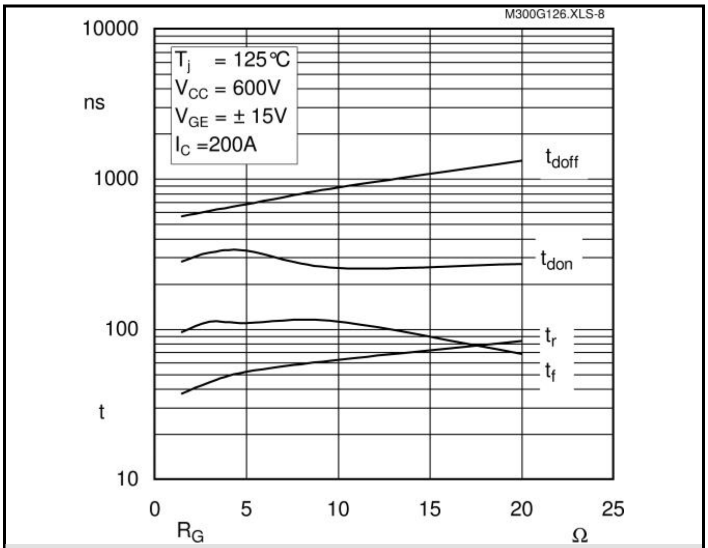

Fig. 8 Typ. switching times vs. gate resistor R_G

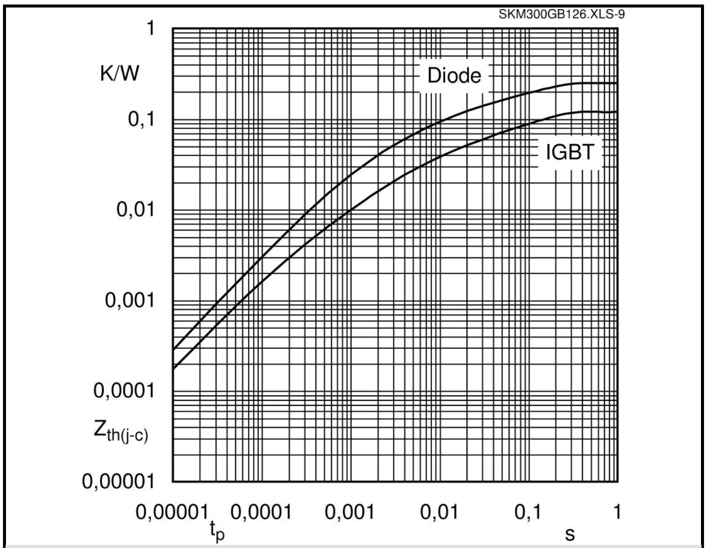

Fig. 9 Transient thermal impedance

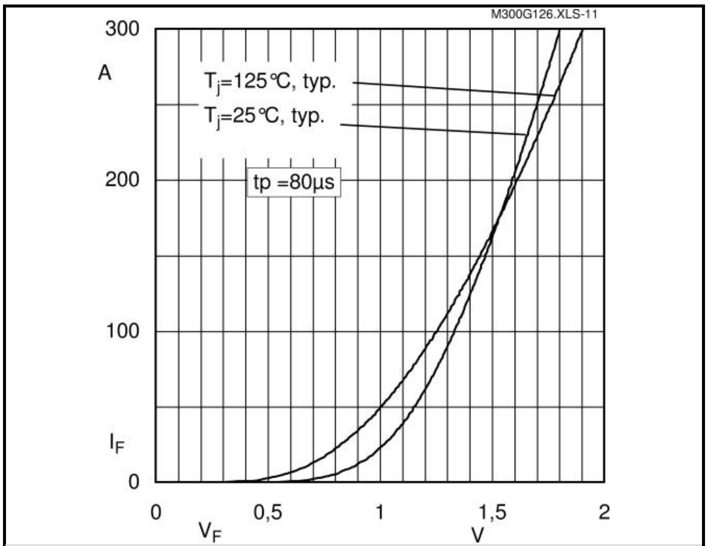

Fig. 10 CAL diode forward characteristic

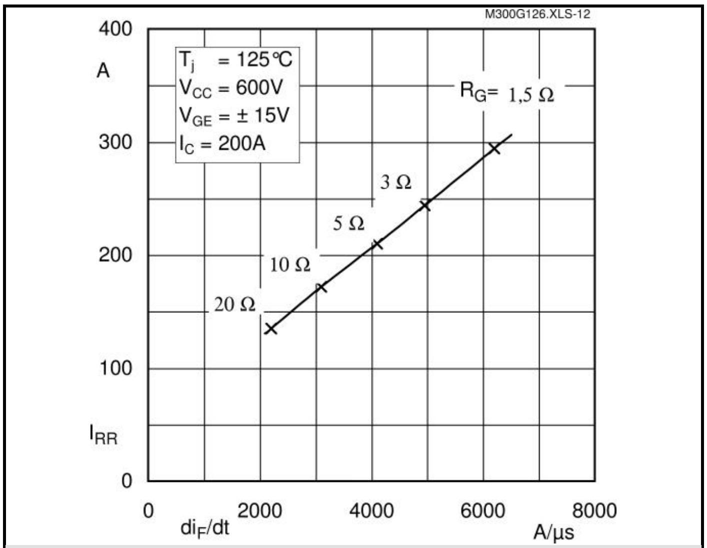

Fig. 11 Typ. CAL diode peak reverse recovery current

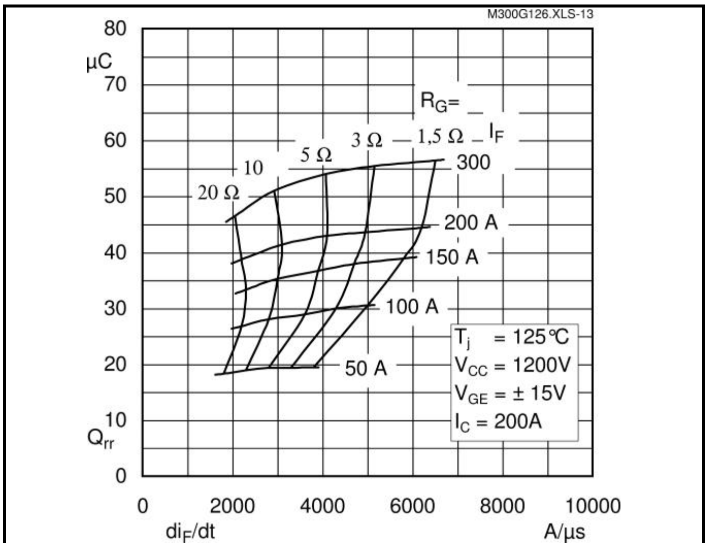

Fig. 12 Typ. CAL diode peak reverse recovery charge

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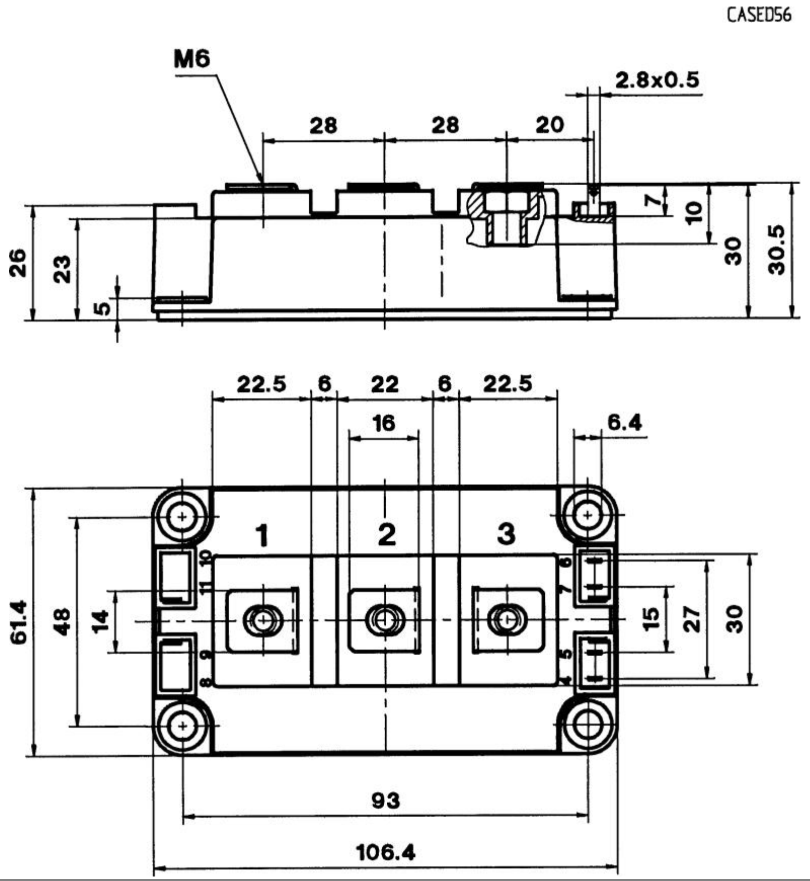
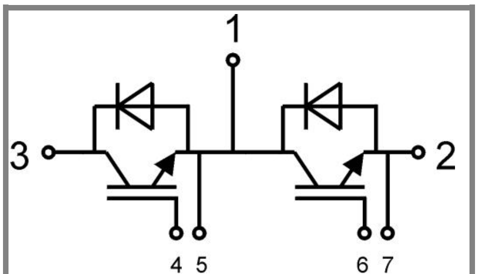


Case D 56



GB Case D 56