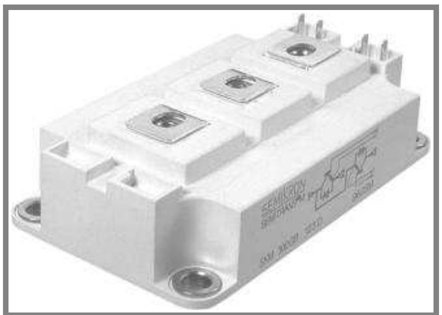
SKM 300GB066D



SEMITRANS® 3

Trench IGBT Modules

SKM 300GB066D

Features

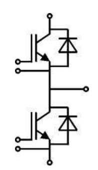
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to 6 x I_C

Typical Applications*

- AC inverter drives
- UPS
- Electronic welders

Remarks

- Case temperature limited to T_c = 125°C max, recommended T_{op} = -40 ... +150°C
- Product reliability results are valid for $T_j \leq$150°C
- Short circuit data: $t_p \leq$ 6 s; $V_{GE} \leq$ 15V; T_j = 150°C; $V_{cc} \leq$ 360V, use of soft R_G necessary !
- Take care of over-voltage caused by stray inductances



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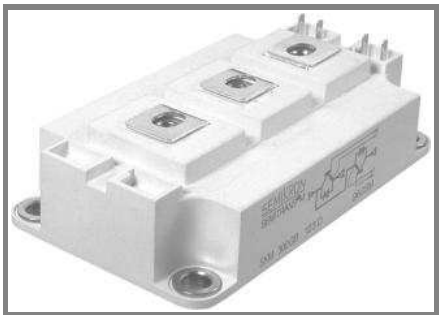
Absolute Maximum Ratings	T_{case} = 25°C, unless otherwise specified			
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		600	V
I_C	T_j = 175 °C	T_c = 25 °C	390	A
		T_c = 80 °C	300	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		600	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 360 V; $V_{GE} \leq$ 15 V; V_{CES} < 600 V	T_j = 150 °C	6	s
Inverse Diode				
I_F	T_j = 175 °C	T_c = 25 °C	350	A
		T_c = 80 °C	250	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		600	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 175 °C	1760	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40 ... + 175	°C
T_{stg}			- 40 ... + 125	°C
V_{isol}	AC, 1 min.		4000	V

Characteristics	T_{case} = 25°C, unless otherwise specified					
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
IGBT						
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 4,8 mA		5	5,8	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C		0,15	0,45	mA
V_{CE0}		T_j = 25 °C		0,9	1	V
		T_j = 150 °C		0,85	0,9	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		1,8	3	mΩ
		T_j = 150°C		2,7	3,8	mΩ
$V_{CE(sat)}$	I_{Cnom} = 300 A, V_{GE} = 15 V	T_j = 25°$C_{chiplev.}$		1,45	1,9	V
		T_j = 150°$C_{chiplev.}$		1,7	2,1	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		18,5		nF
C_{oes}				1,2		nF
C_{res}				0,55		nF
Q_G	V_{GE} = -8V...+15V			2400		nC
R_{Gint}	T_j = °C			1		Ω
$t_{d(on)}$	R_{Gon} = 2,4 Ω	V_{CC} = 300V		150		ns
t_r		I_C= 300A		48		ns
E_{on}		T_j = 150 °C		7,5		mJ
$t_{d(off)}$	R_{Goff} = 2,4 Ω	V_{GE} = -8V/+15V		540		ns
t_f				53		ns
E_{off}				11,5		mJ
$R_{th(j-c)}$	per IGBT				0,15	K/W



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SKM 300GB066D

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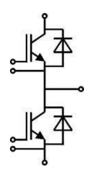

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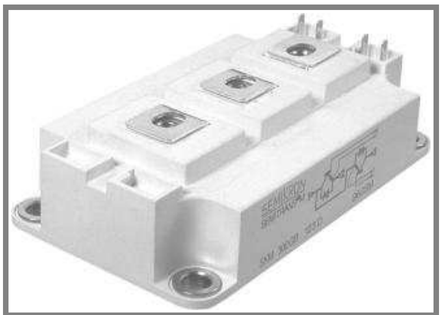
Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 300 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		1,4	1,6	V
V_{F0}		T_j = 25 °C		0,95	1	V
r_F		T_j = 25 °C		1,5	2	mΩ
I_{RRM}	I_F = 300 A	T_j = 150 °C		340		A
Q_{rr}	di/dt = 7000 A/ s			47		C
E_{rr}	V_{GE} = -8 V; V_{CC} = 300 V			10,5		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.

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.



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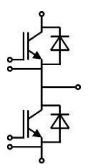

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Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	107	mk/W
R_i	i = 2	30	mk/W
R_i	i = 3	11,6	mk/W
R_i	i = 4	1,4	mk/W
tau_i	i = 1	0,054	s
tau_i	i = 2	0,0144	s
tau_i	i = 3	0,0007	s
tau_i	i = 4	0,0004	s
$Z_{th(j-c)D}$			
R_i	i = 1	140	mk/W
R_i	i = 2	82	mk/W
R_i	i = 3	23,5	mk/W
R_i	i = 4	4,5	mk/W
tau_i	i = 1	0,054	s
tau_i	i = 2	0,01	s
tau_i	i = 3	0,0015	s
tau_i	i = 4	0,0002	s

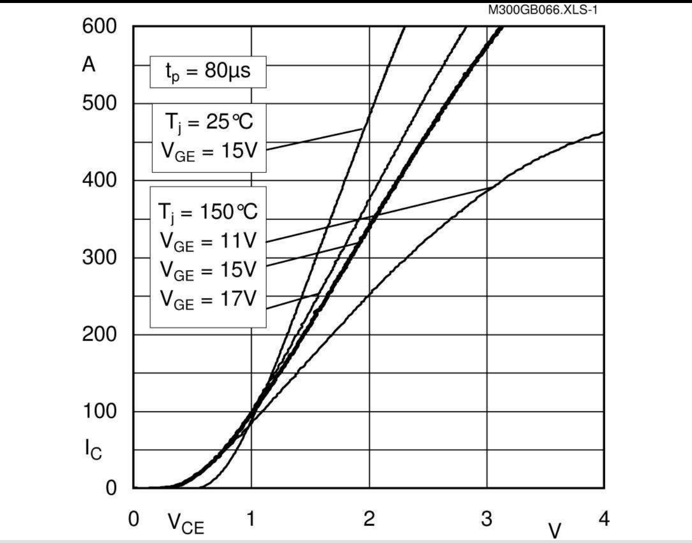

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

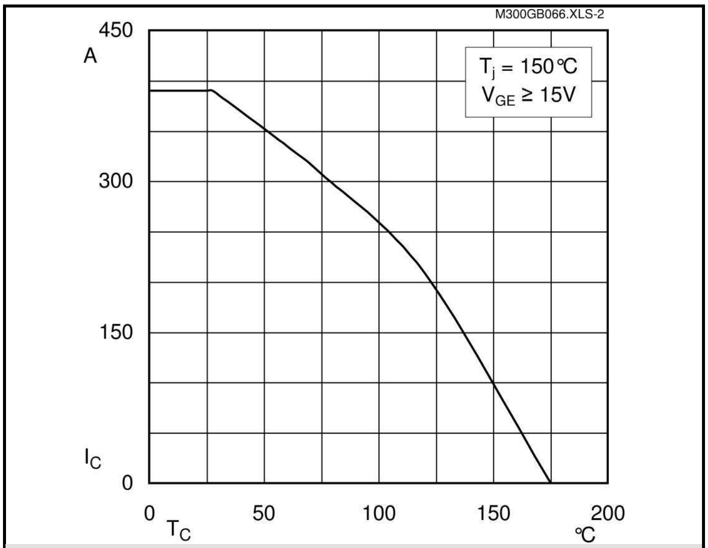

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

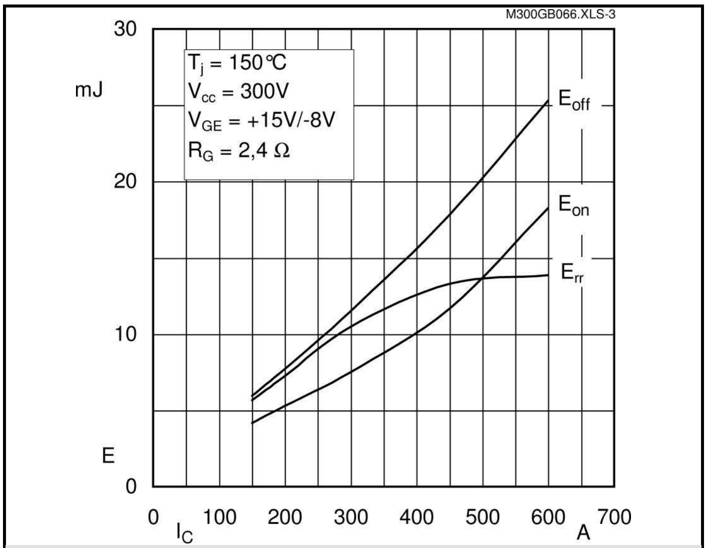

Fig. 3 Typ. turn-on /-off energy = f (I_C)

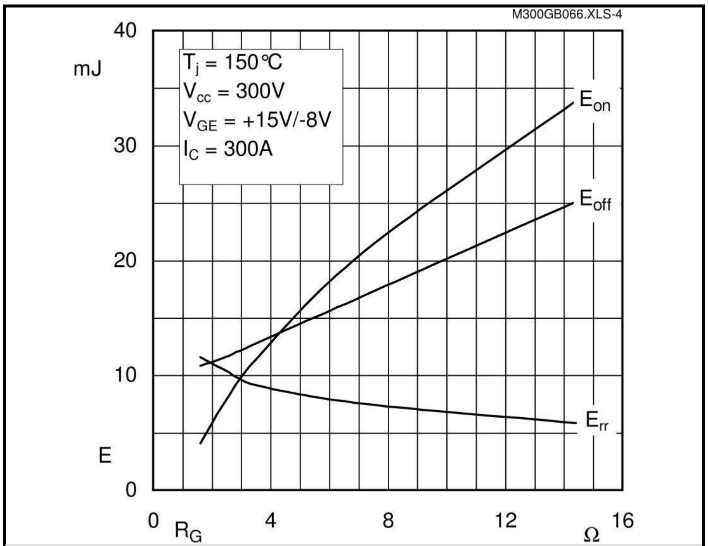

Fig. 4 Typ. turn-on /-off energy = f (R_G)

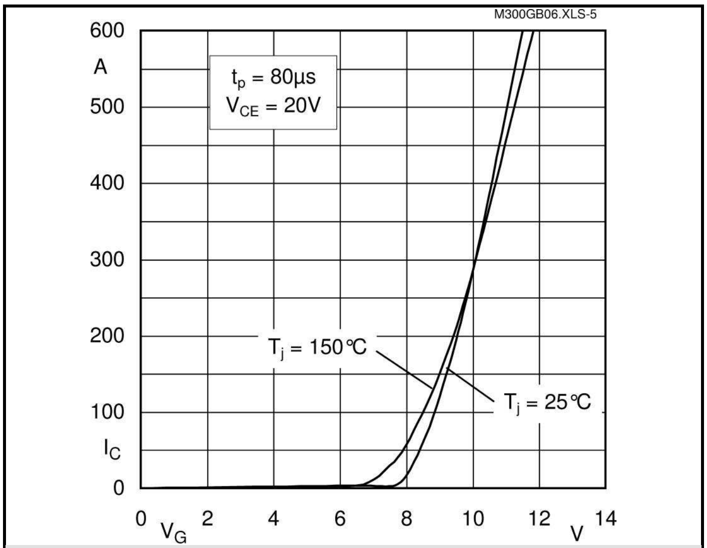

Fig. 5 Typ. transfer characteristic

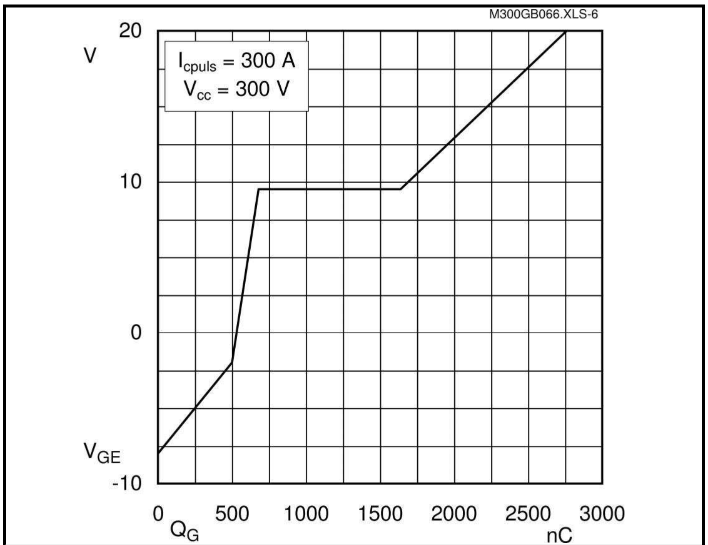

Fig. 6 Typ. gate charge characteristic

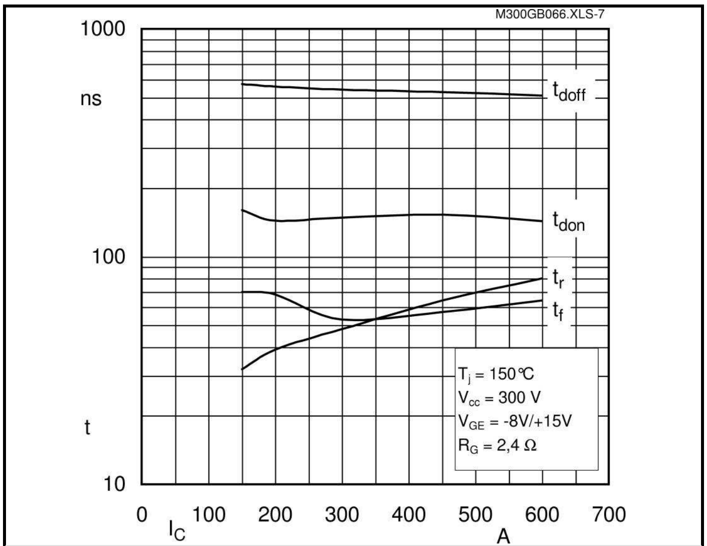

Fig. 7 Typ. switching times vs. I_C

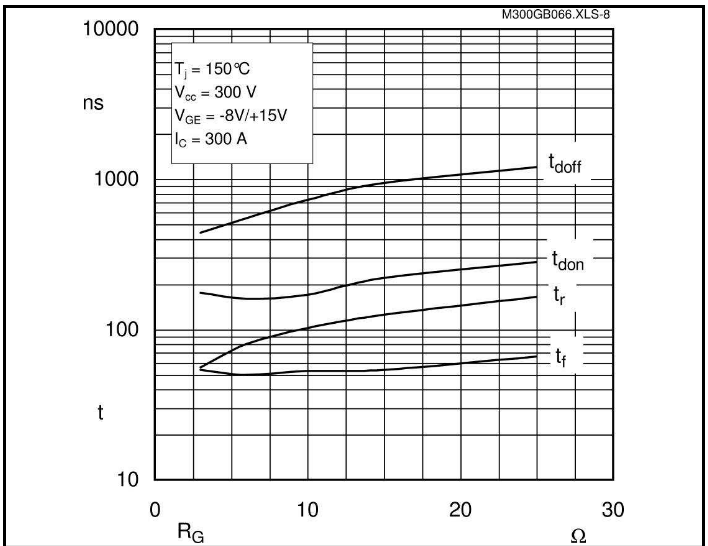

Fig. 8 Typ. switching times vs. gate resistor R_G

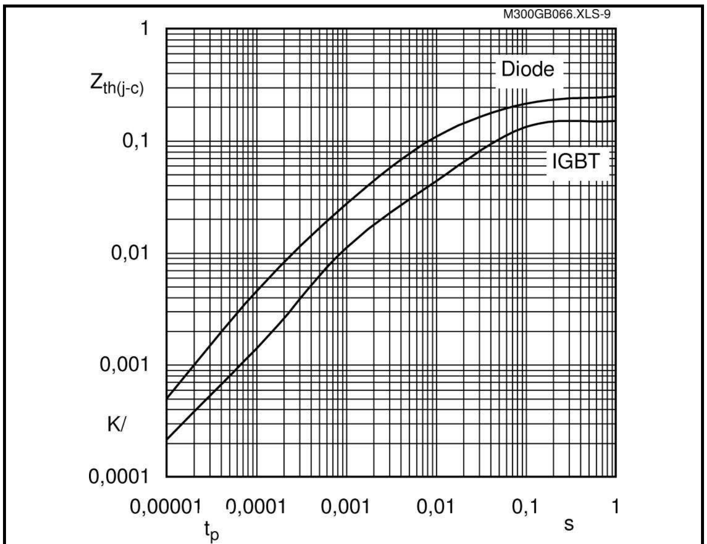

Fig. 9 Transient thermal impedance of IGBT and Diode

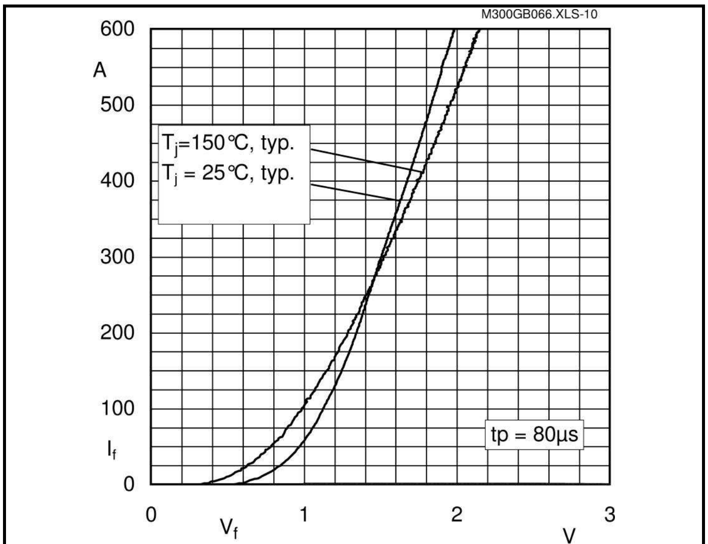

Fig. 10 CAL diode forward characteristic

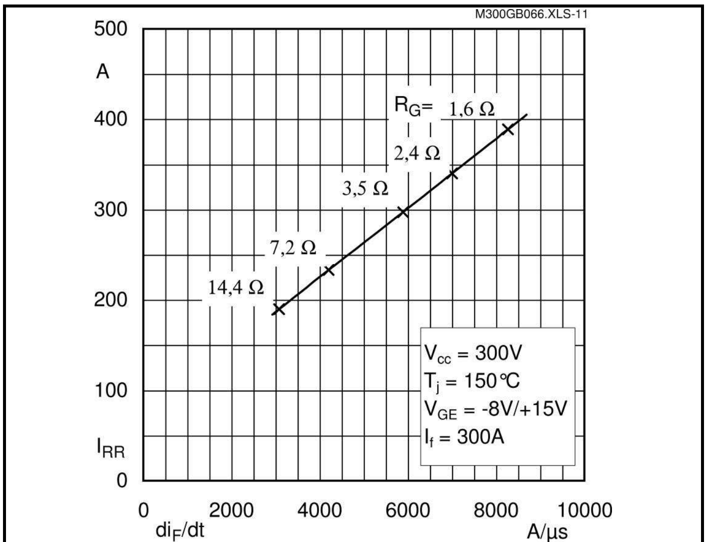

Fig. 11 Typ. CAL diode peak reverse recovery current

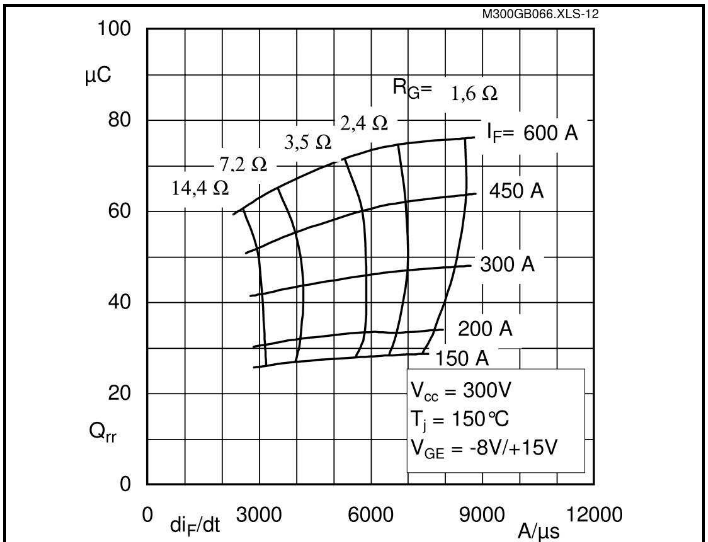

Fig. 12 CAL diode recovered charge

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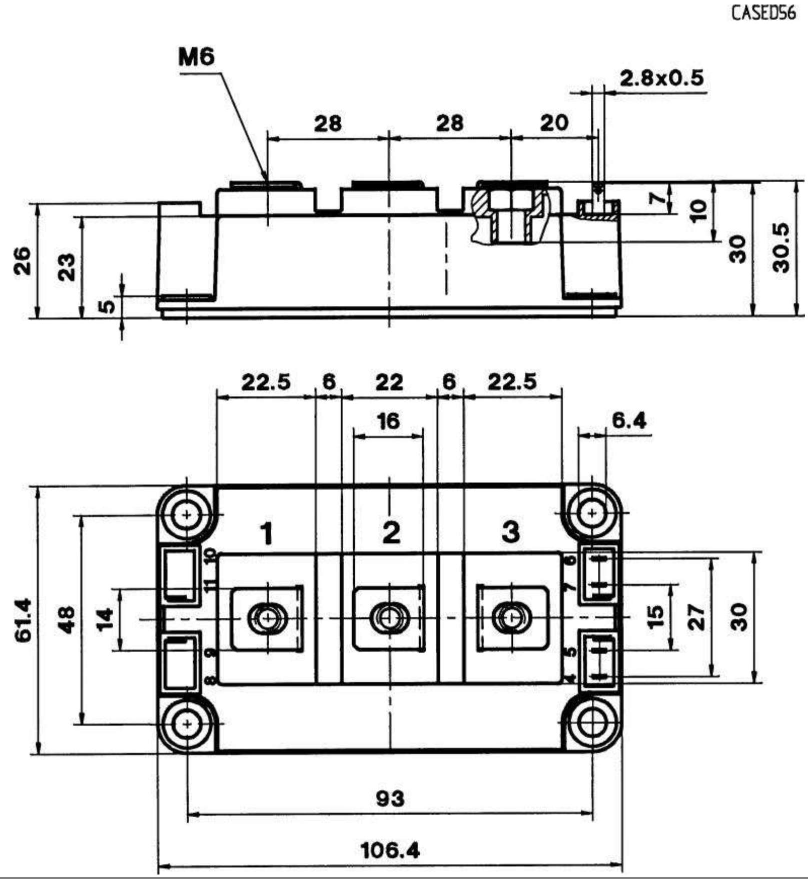
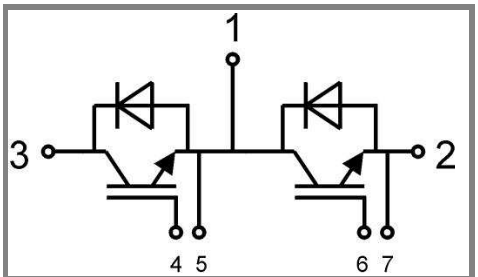


Case D 56



GB Case D56