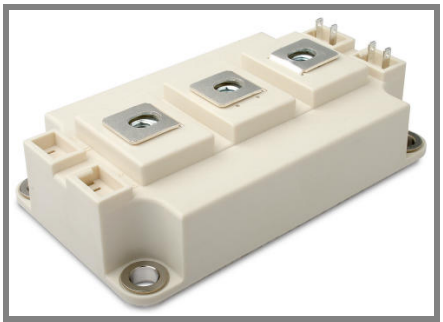
SKM200GBD126D



SEMITRANS^{TM} 3

Trench IGBT Modules

SKM 200GBD126D

Preliminary Data

Features

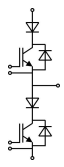
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to 6 x I_C

Typical Applications*

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

- The Fig.1 to Fig.9 are based on measurements of the SKM200GB126D
- The series diodes (FWD) have the data of the inverse diodes of SKM 300GB126D

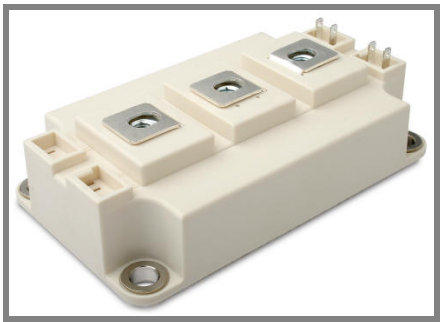


GBD

Absolute Maximum Ratings	T_{case} = 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_c = 25 °C	240	A
		T_c = 80 °C	170	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		480	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; $V_{GE} \leq$ 20 V; V_{CES} < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = °C	T_c = 25 °C	25	A
		T_c = 80 °C	15	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		50	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	200	A
Freewheeling Diode				
I_F	T_j = °C	T_c = 25 °C	250	A
		T_c = 80 °C	170	A
I_{FRM}			480	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	720	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40 ... +150 (125)	°C
T_{stg}			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 = 6 mA		5	5,8	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C			1,3	mA
		T_j = 125 °C				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		4,7	6,3	mΩ
		T_j = 125°C		7,3	9	mΩ
$V_{CE(sat)}$	I_{Cnom} = 150 A, V_{GE} = 15 V	T_j = °$C_{chiplev.}$		1,7	2,15	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		10,8		nF
C_{oes}				0,9		nF
C_{res}				0,9		nF
$t_{d(on)}$	R_{Gon} = 1,5 Ω	V_{CC} = 600V		260		ns
t_r		I_C= 150A		40		ns
E_{on}		T_j = 125 °C		18		mJ
$t_{d(off)}$	R_{Goff} = 5 Ω			540		ns
t_f				110		ns
E_{off}				24		mJ
$R_{th(j-c)}$	per IGBT				0,13	K/W

SKM200GBD126D



SEMITRANS^{TM} 3

Trench IGBT Modules

SKM 200GBD126D

Preliminary Data

Features

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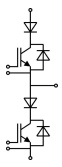

GBD

Characteristics

Symbol	Conditions		min.	typ.	max.	Units
Inverse diode						
$V_F = V_{EC}$	I_{Fnom} = 15 A; V_{GE} = 0 V	T_j = 25 °C$_{chiplev.}$		2	2,5	V
		T_j = 125 °C$_{chiplev.}$		1,8		V
V_{F0}		T_j = °C				V
		T_j = 125 °C			1,2	V
r_F		T_j = °C				mΩ
		T_j = 125 °C		45	70	mΩ
I_{RRM}	I_F = 15 A	T_j = 25 °C		12		A
Q_{rr}	di/dt = 150 A/µs			1		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)D}$	per diode				1,5	K/W
FWD						
$V_F = V_{EC}$	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	V
		T_j = 125 °C		4	4,5	V
I_{RRM}	I_F = 200 A	T_j = 25 °C		290		A
Q_{rr}	di/dt = 6200 A/µs			44		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V			18		mJ
$R_{th(j-c)FD}$	per diode				0,25	K/W
Module						
L_{CE}					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		3		5	Nm
M_t	to terminals		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.

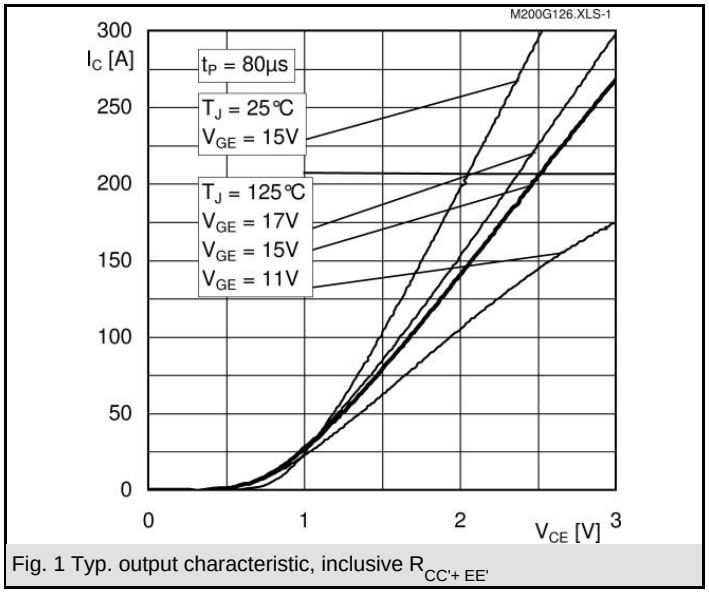

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

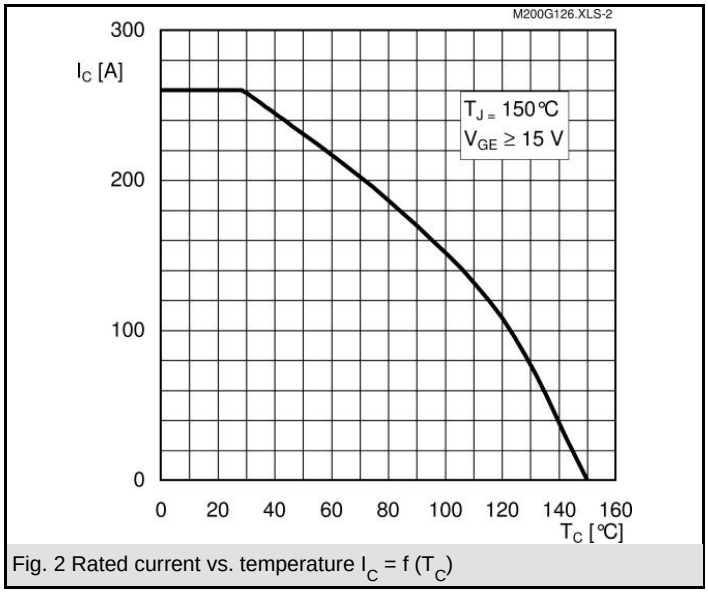

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

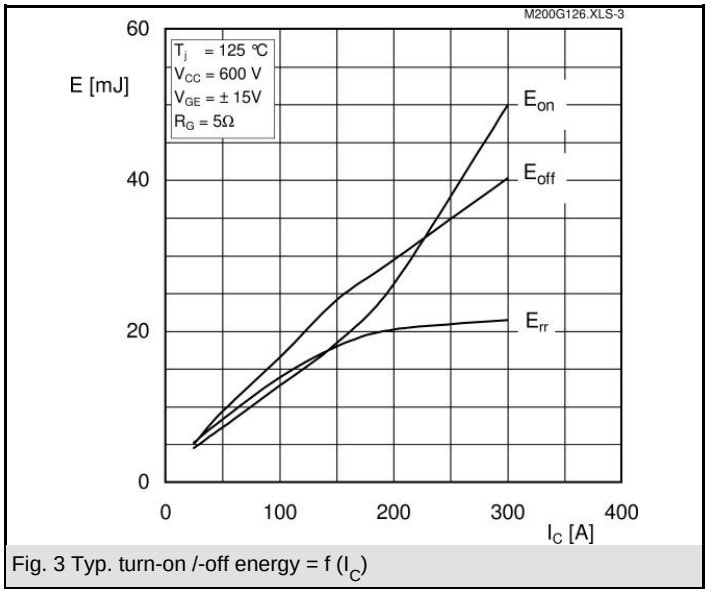

Fig. 3 Typ. turn-on /-off energy = f (I_C)

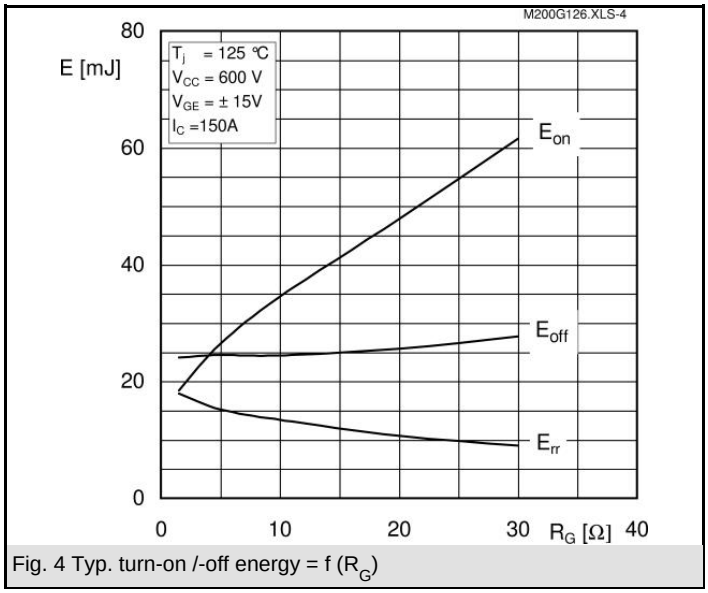

Fig. 4 Typ. turn-on /-off energy = f (R_G)

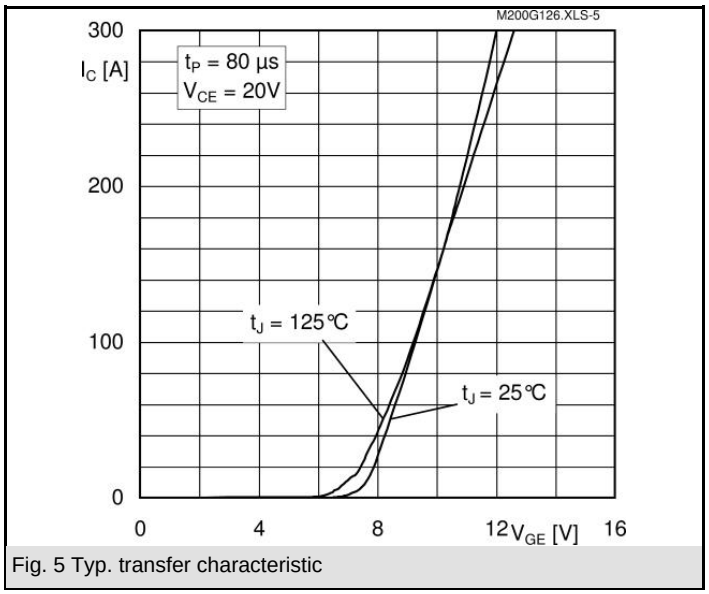

Fig. 5 Typ. transfer characteristic

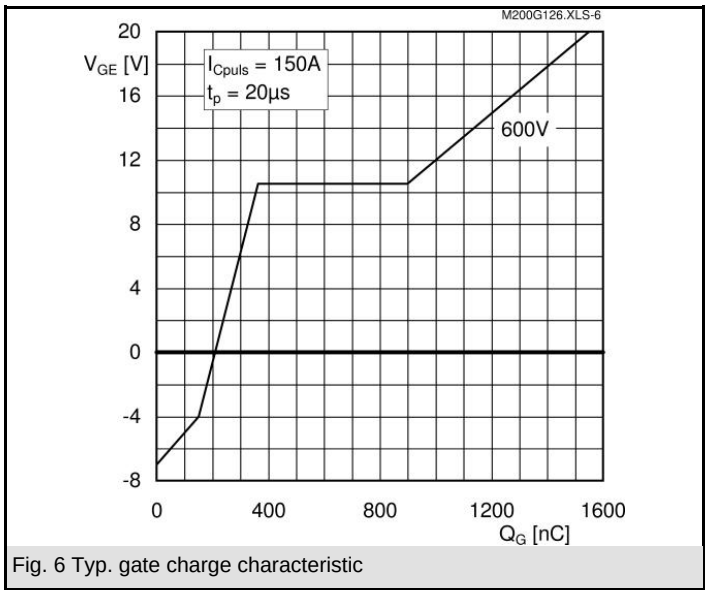

Fig. 6 Typ. gate charge characteristic

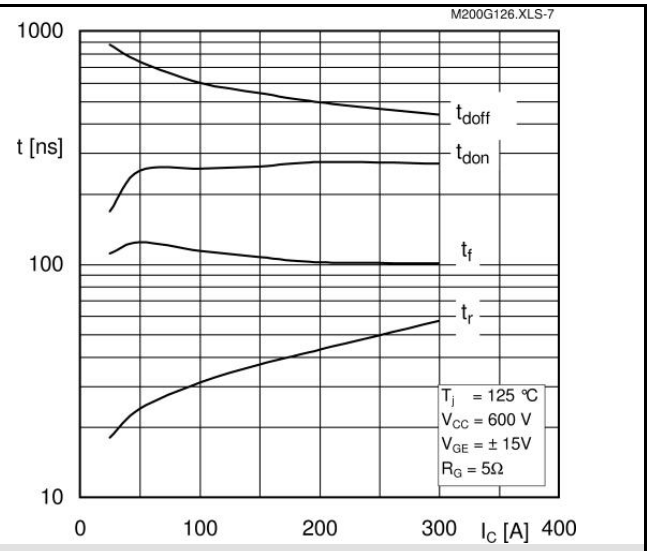

Fig. 7 Typ. switching times vs. I_C

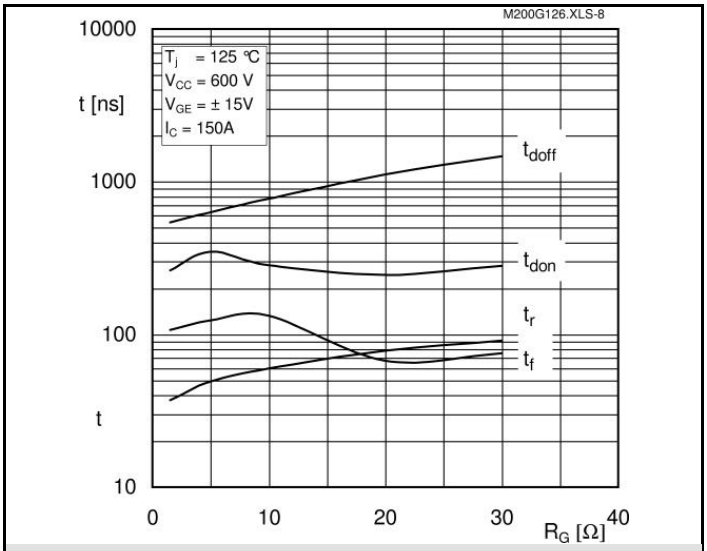

Fig. 8 Typ. switching times vs. gate resistor R_G

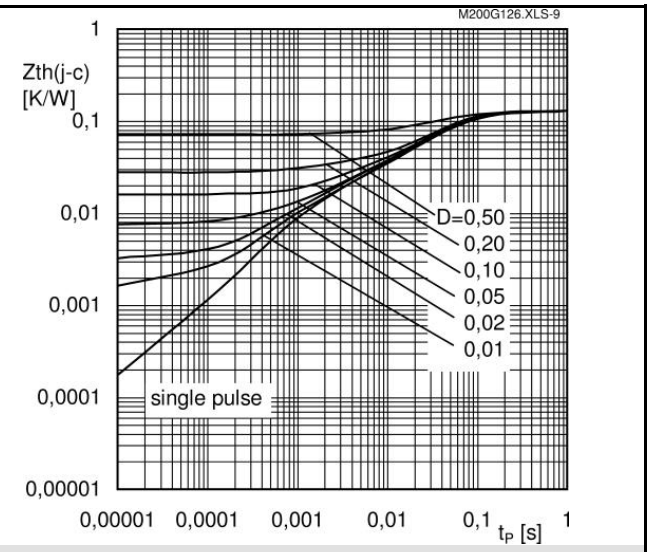

Fig. 9 Transient thermal impedance of IGBT

$Z_{thp(j-c)} = f(t_p)$; $D = t_p/t_c = t_p * f$

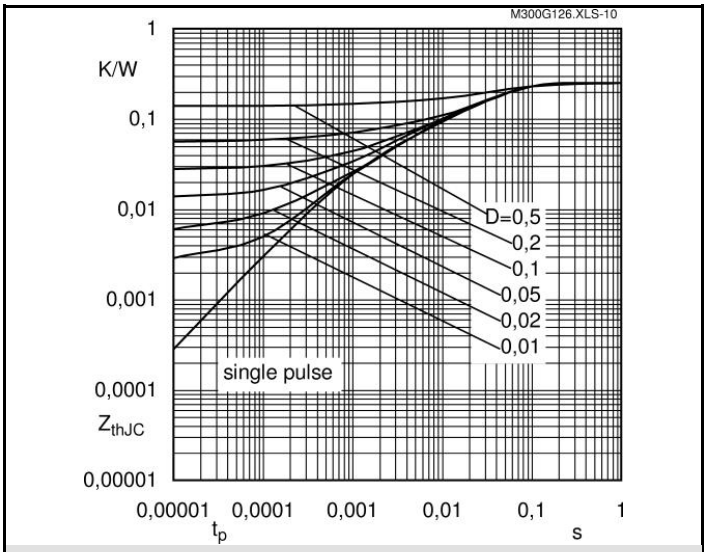

Fig. 10 Transient thermal impedance of FWD

$Z_{thp(j-c)} = f(t_p)$; $D = t_p/t_c = t_p * f$

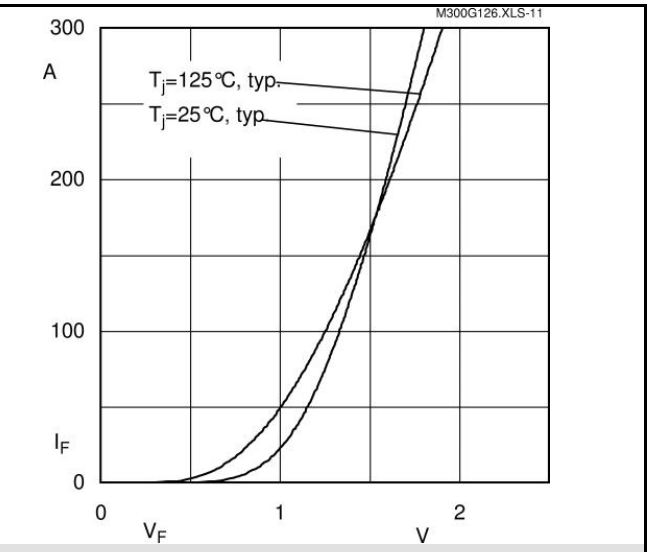

Fig. 11 CAL diode forward characteristic

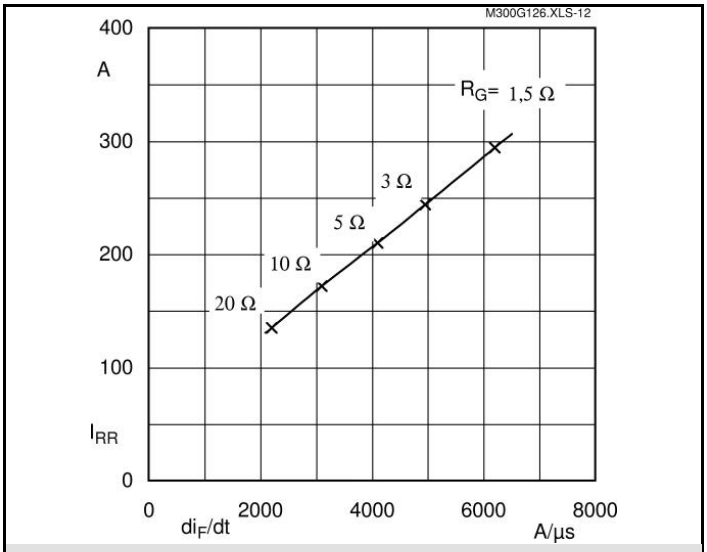

Fig. 12 Typ. CAL diode peak reverse recovery current

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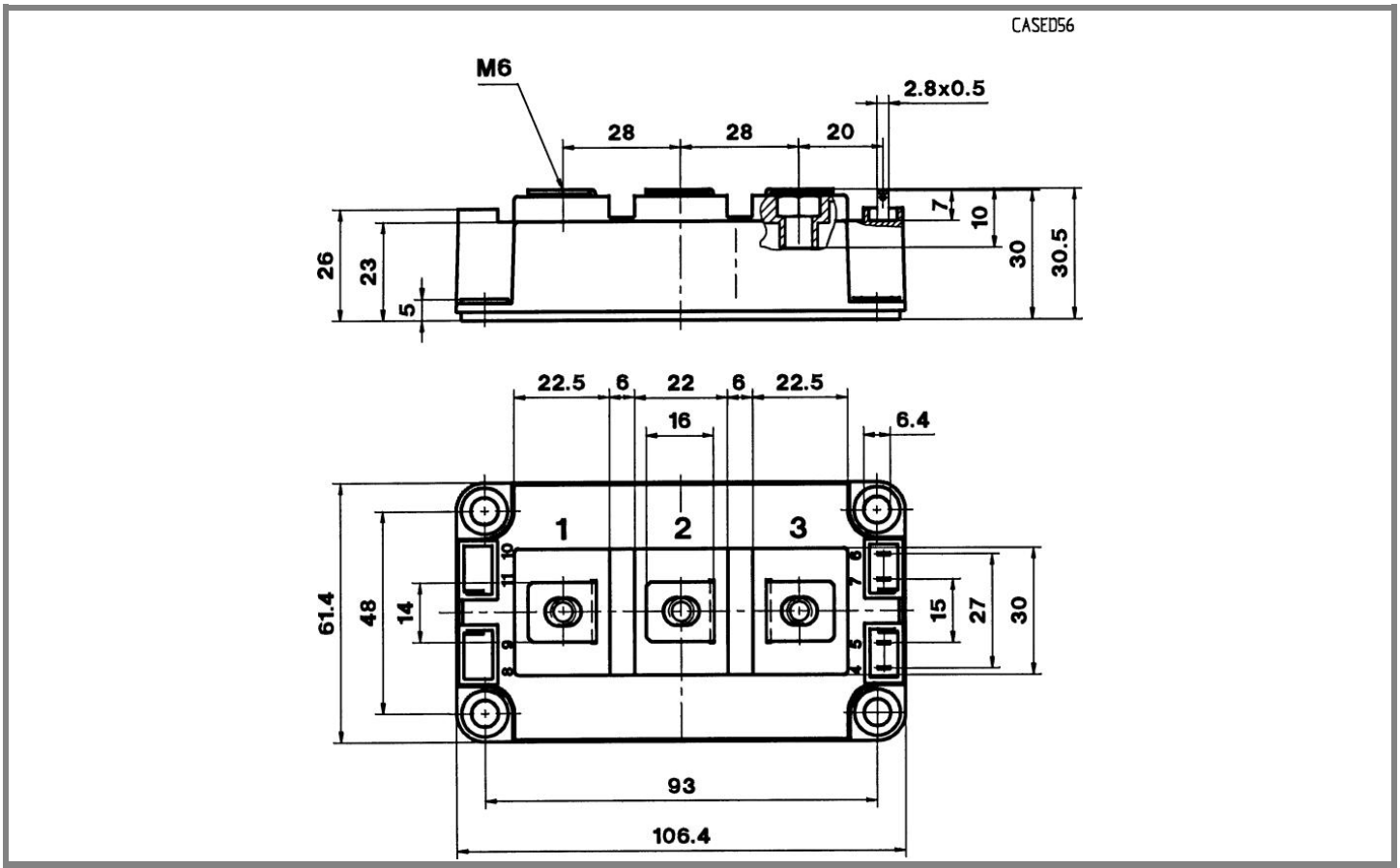
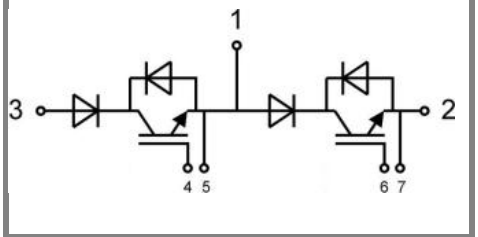


Case D 56



Case D56 GBD

