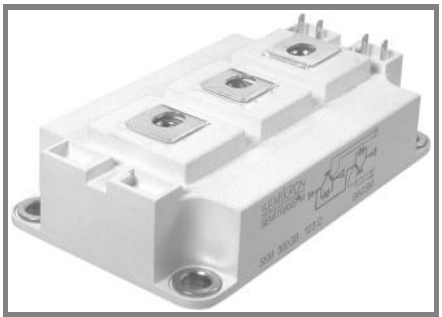
SKM 200GB173D



SEMITRANS® 3

IGBT Modules

SKM 200GB173D

SKM 200GB173D1

SKM 200GAL173D

SKM 200GAR173D

Features

- MOS input (voltage controlled)
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- Latch-up free
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- AC inverter drives on mains 575 - 750 V_{AC}
- DC bus voltage 750 - 1200 V_{DC}
- Public transport (auxiliary syst.)
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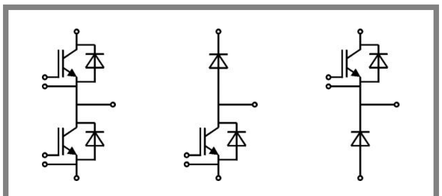
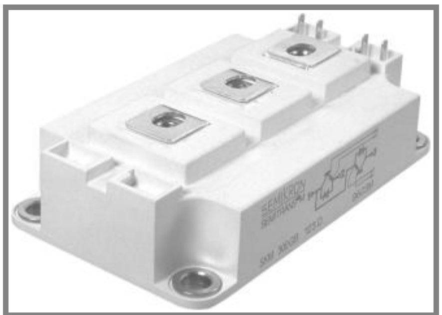


GB GAL GAR

Absolute Maximum Ratings	T_c = 25 °C, unless otherwise specified			
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		1700	V
I_C	T_j = 150 °C	T_{case} = 25 °C	220	A
		T_{case} = 80 °C	150	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		300	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 1200 V; $V_{GE} \leq$ 20 V; V_{CES} < 1700 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	150	A
		T_{case} = 80 °C	100	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		300	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	1450	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	230	A
		T_{case} = 80 °C	150	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		400	A
I_{FSM}	t_p = 10 ms; sin	T_j = 150 °C	2200	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 = 10 mA		4,8	5,5	6,2	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		1,65	1,9	V
		T_j = 125 °C		1,9	2,15	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		11,7	13,3	mΩ
		T_j = 125°C		17,3	19	mΩ
$V_{CE(sat)}$	I_{Cnom} = 150 A, V_{GE} = 15 V	T_j = 25°$C_{chiplev.}$		3,4	3,9	V
		T_j = 125°$C_{chiplev.}$		4,5	5	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		20		nF
C_{oes}				2		nF
C_{res}				0,55		nF
Q_G	VGE=0V/+20V			2000		nC
$t_{d(on)}$	R_{Gon} = 4 Ω	V_{CC} = 1200V		580		ns
t_r		I_C= 150A		100		ns
E_{on}		T_j = 125 °C		95		mJ
$t_{d(off)}$	R_{Goff} = 4 Ω	V_{GE} = ± 15V		750		ns
t_f				40		ns
E_{off}				45		mJ
$R_{th(j-c)}$	per IGBT				0,1	K/W



SEMITRANS® 3

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SKM 200GAL173D

SKM 200GAR173D

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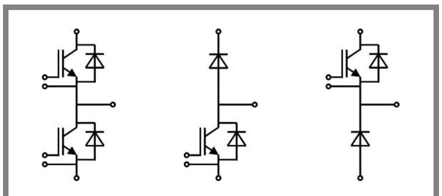
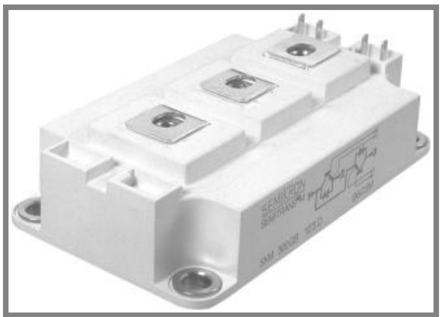


GB GAL GAR

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 150 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2,2	2,7	V
		T_j = 125 °$C_{chiplev.}$		1,9		V
V_{F0}		T_j = 125 °C		1,3	1,5	V
r_F		T_j = 125 °C		4,5	6,2	mΩ
I_{RRM}	I_F = 150 A	T_j = 125 °C		85		A
Q_{rr}	di/dt = 1000 A/µs			38		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 1200 V					mJ
$R_{th(j-c)D}$	per diode				0,32	K/W
FWD						
$V_F = V_{EC}$	I_{Fnom} = 150 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,4	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 125 °C		1,3	1,5	V
r_F		T_j = 125 °C		3,5	4,5	V
I_{RRM}	I_F = 150 A	T_j = 125 °C		110		A
Q_{rr}				50		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 1200 V					mJ
$R_{th(j-c)FD}$	per diode				0,21	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
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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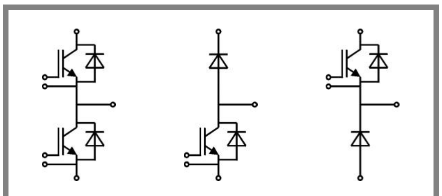


Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	72	mk/W
R_i	i = 2	19	mk/W
R_i	i = 3	6,9	mk/W
R_i	i = 4	2,1	mk/W
tau_i	i = 1	0,0946	s
tau_i	i = 2	0,011	s
tau_i	i = 3	0,0011	s
tau_i	i = 4	0	s
$Z_{th(j-c)D}$			
R_i	i = 1	230	mk/W
R_i	i = 2	70	mk/W
R_i	i = 3	17	mk/W
R_i	i = 4	3	mk/W
tau_i	i = 1	0,0839	s
tau_i	i = 2	0,0069	s
tau_i	i = 3	0,0028	s
tau_i	i = 4	0,0002	s

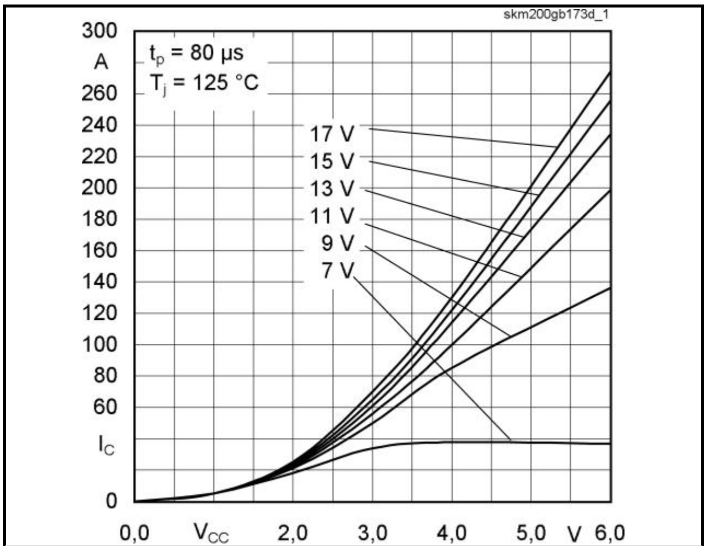


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

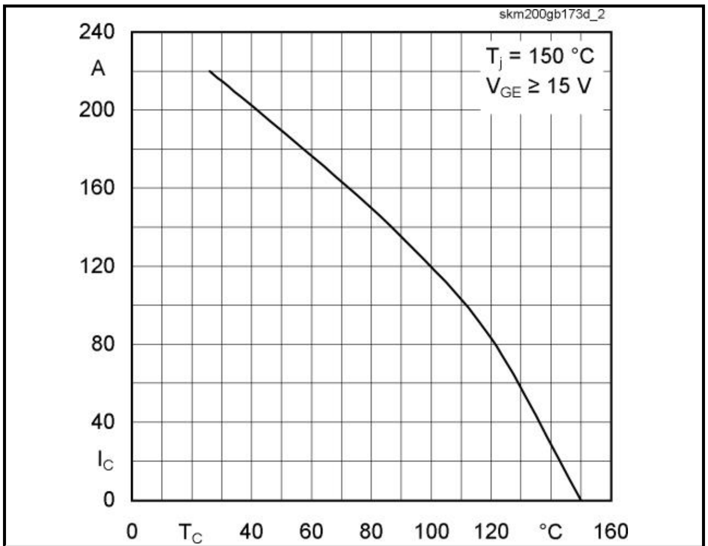


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

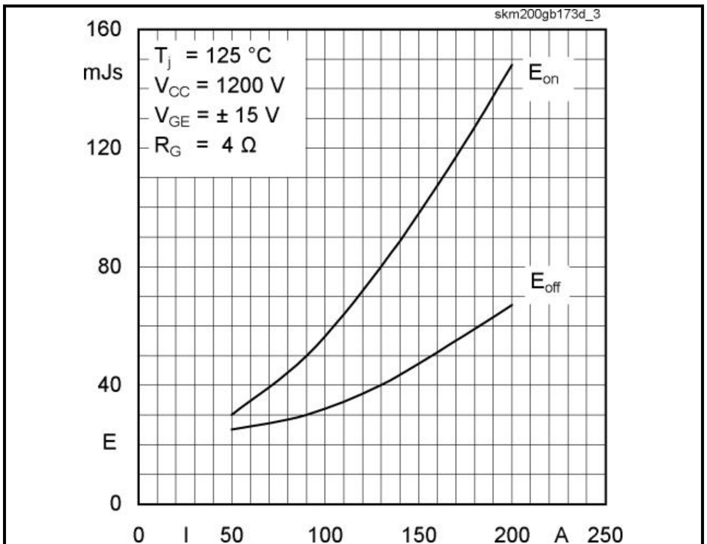


Fig. 3 Typ. turn-on /-off energy = f (I_C)

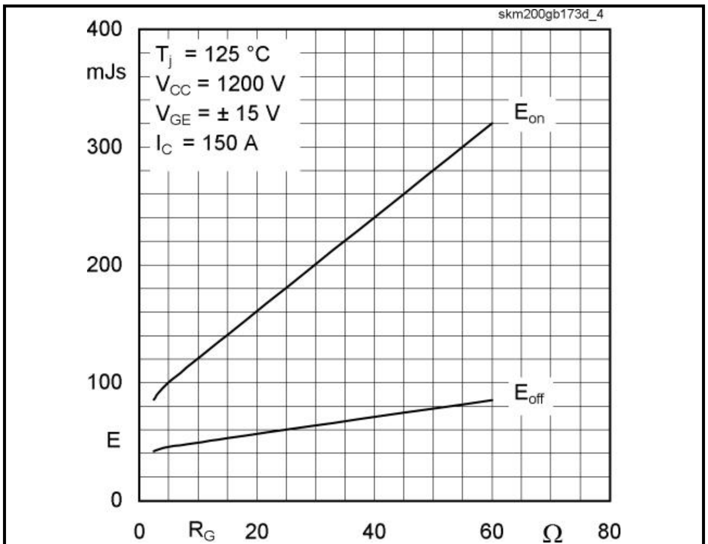


Fig. 4 Typ. turn-on /-off energy = f (R_G)

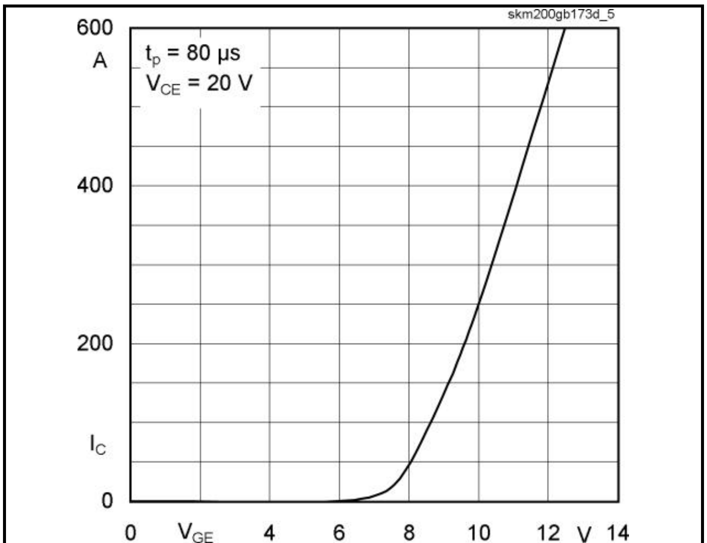


Fig. 5 Typ. transfer characteristic

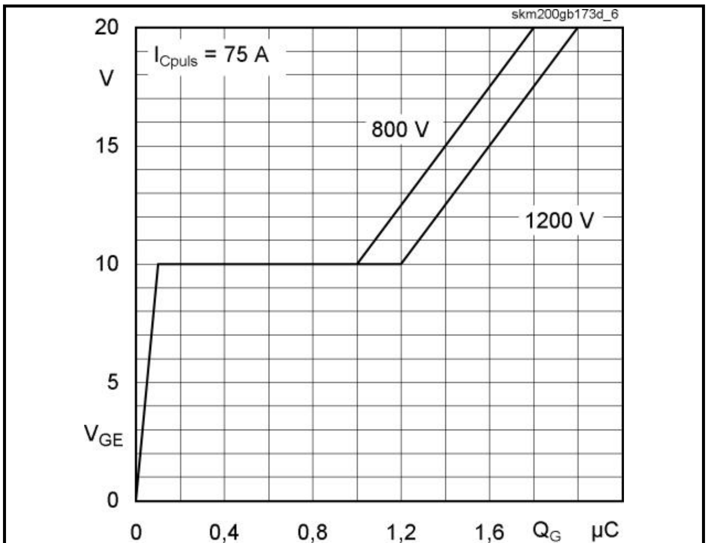


Fig. 6 Typ. gate charge characteristic

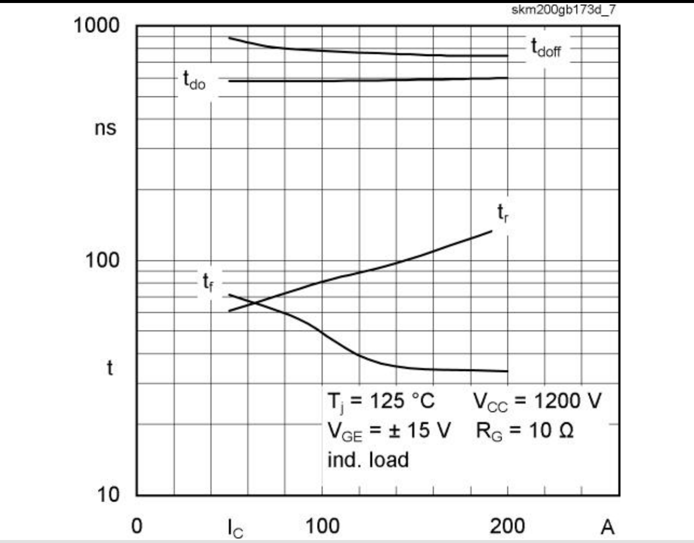


Fig. 7 Typ. switching times vs. I_C

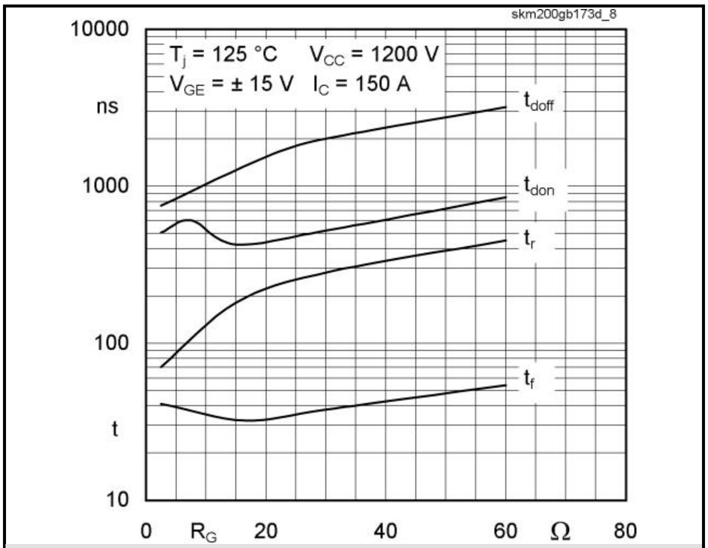


Fig. 8 Typ. switching times vs. gate resistor R_G

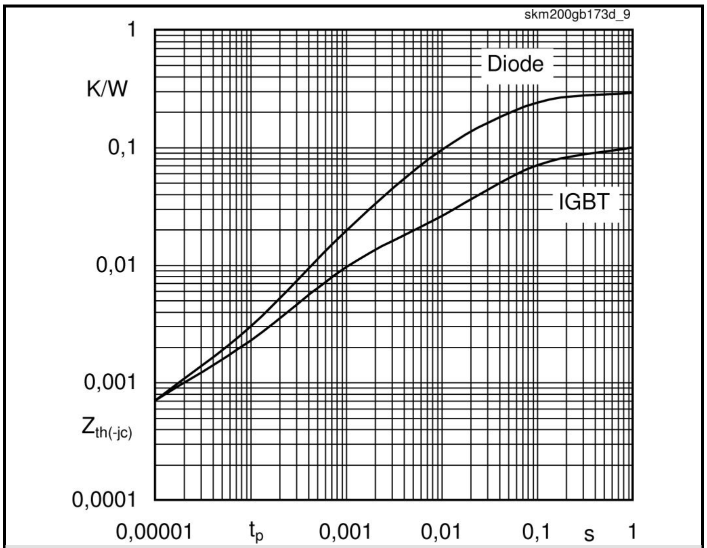


Fig. 9 Transient thermal impedance

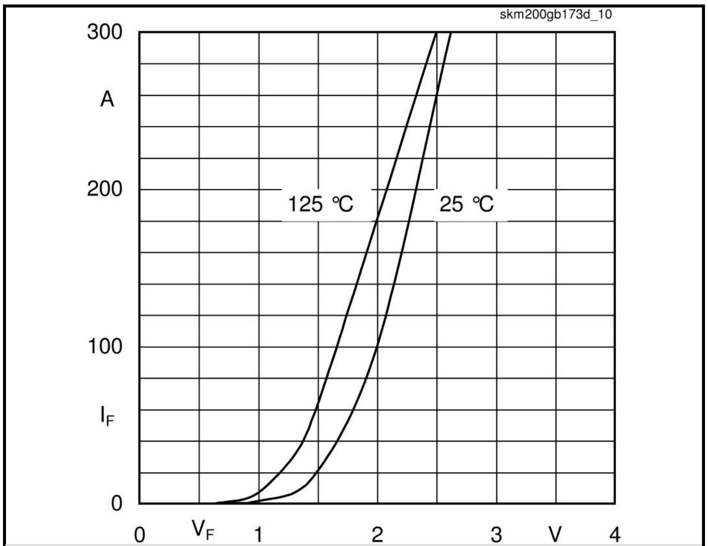


Fig. 10 CAL diode forward characteristic

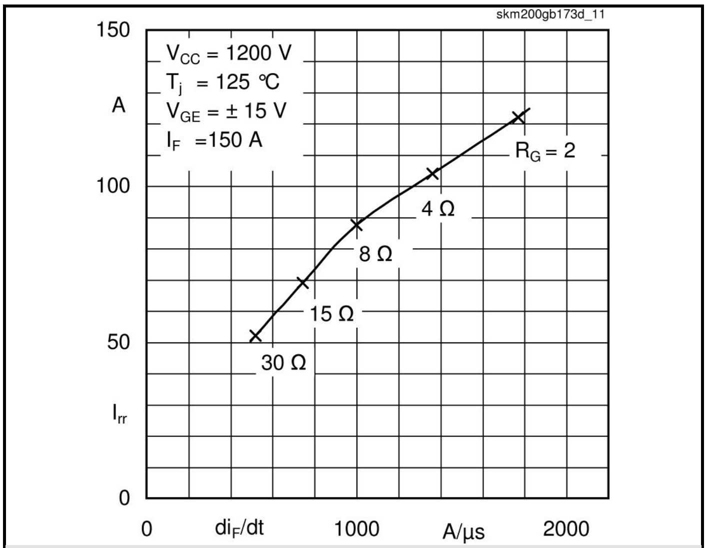


Fig. 11 Typ. CAL diode peak reverse recovery current

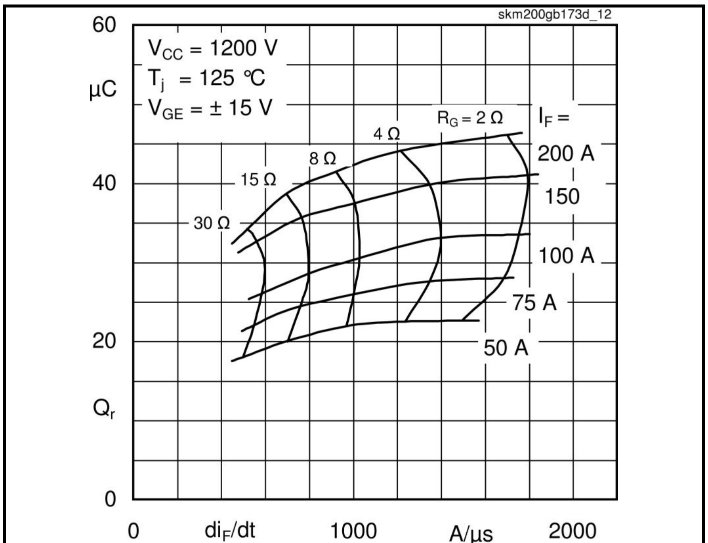
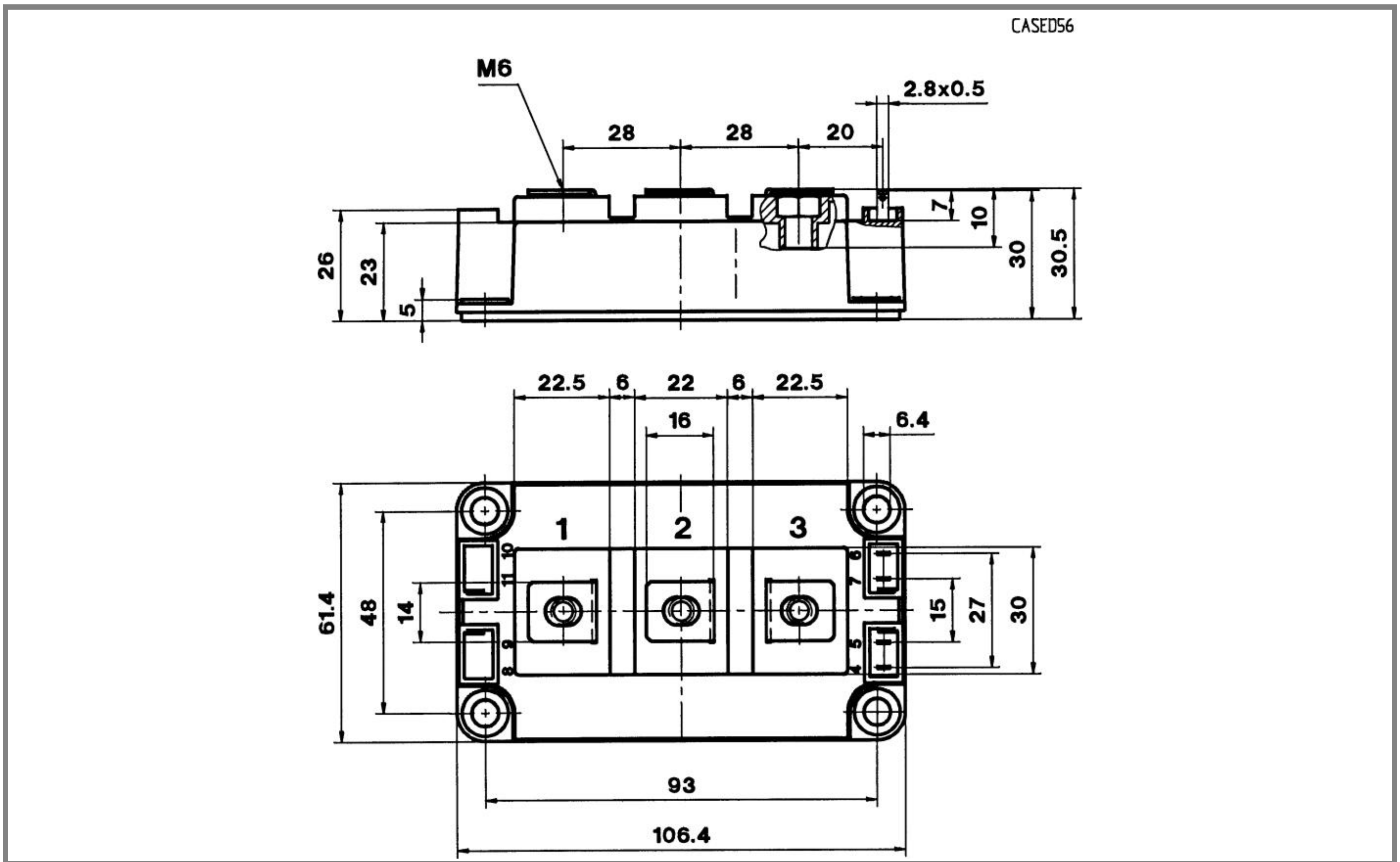
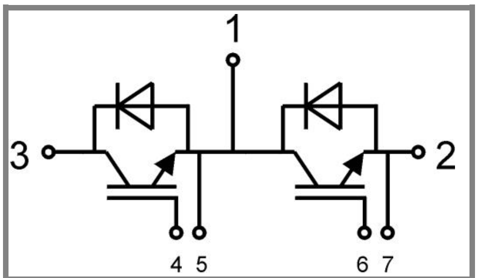


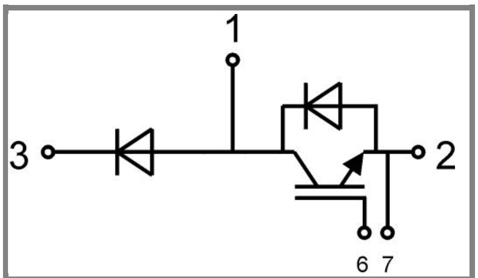
Fig. 12 Typ CAl diode recovered charge



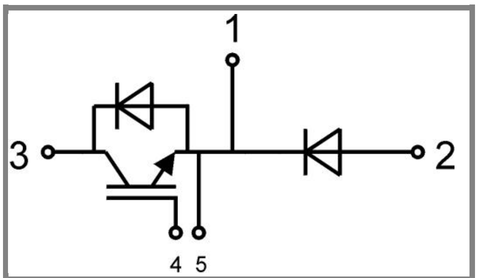
Case D 56



GB Case D 56



GAL Case D 57 (➞ D 56)



GAR Case D 58 (➞ D 56)

