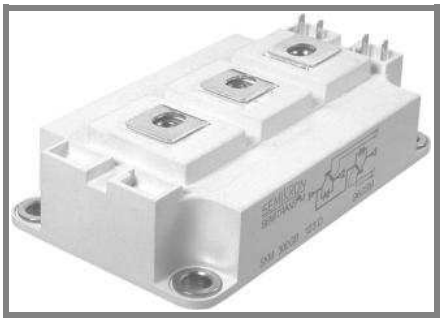
SKM 300GB063D



SEMITRANS® 3

Superfast IGBT Modules

SKM 300GB063D
SKM 300GAR063D
SKM 300GAL063D

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- Low tail current with low temperature dependence
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- 50 % less turn off losses
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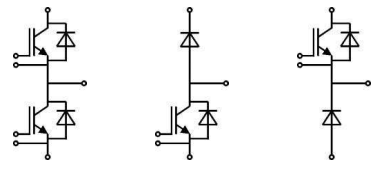
- Welding inverters



GB **GAL** **GAR**

Absolute Maximum Ratings			T_c = 25 °C, unless otherwise specified	
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		600	V
I_C	T_j = 150 °C	T_{case} = 25 °C	400	A
		T_{case} = 70 °C	300	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		600	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 300 V; $V_{GE} \leq$ 20 V; V_{CES} < 600 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}		600	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	1600	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_c = 25 °C	400	A
		T_c = 80 °C	270	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		800	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	2800	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40 ... + 150	°C
T_{stg}			- 40 ... + 125	°C
V_{isol}	AC, 1 min.		2500	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 = 6 mA		4,5	5,5	6,5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = V_{CES}	T_j = 25 °C		0,2	0,6	mA
V_{CE0}		T_j = 25 °C		1,05		V
		T_j = 125 °C		1		V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		3,2		mΩ
		T_j = 125°C		4,7		mΩ
$V_{CE(sat)}$	I_{Cnom} = 300 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		2,1	2,5	V
		T_j = 125°C$_{chiplev.}$		2,4	2,8	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		17		nF
C_{oes}				2		nF
C_{res}				1,2		nF
Q_G	V_{GE} = 0V...+15V			720		nC
R_{Gint}	T_j = °C			1,2		Ω
$t_{d(on)}$	R_{Gon} = 6 Ω	V_{CC} = 300V		160		ns
t_r		I_C= 300A		80		ns
E_{on}		T_j = 125 °C		14		mJ
$t_{d(off)}$	R_{Goff} = 6 Ω	V_{GE} = ± 15V		550		ns
t_f				50		ns
E_{off}				13		mJ
$R_{th(j-c)}$	per IGBT				0,09	K/W

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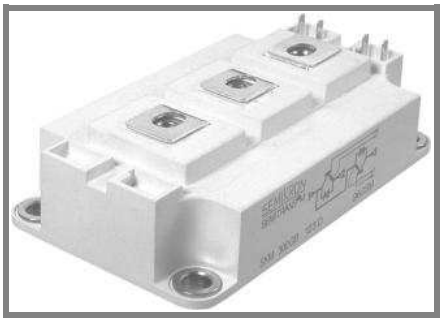
SKM 300GB063D



SEMITRANS® 3

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SKM 300GAL063D

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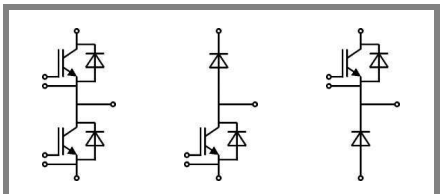

GB **GAL** **GAR**

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$_{chiplev.}$		1,65	2	V
		T_j = 125 °C$_{chiplev.}$		1,65	2	V
V_{F0}		T_j = 125 °C			0,9	V
r_F		T_j = 125 °C		3	3,7	mΩ
I_{RRM}	I_F = 300 A	T_j = 125 °C		120		A
Q_{rr}				18		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 300 V					mJ
$R_{th(j-c)D}$	per diode				0,25	K/W
Freewheeling Diode						
$V_F = V_{EC}$	I_{Fnom} = 400 A; V_{GE} = 0 V	T_j = 25 °C$_{chiplev.}$		1,65	2	V
		T_j = 125 °C$_{chiplev.}$		1,65	2	V
V_{F0}		T_j = 125 °C			0,9	V
r_F		T_j = 125 °C			3	V
I_{RRM}	I_F = 300 A	T_j = 125 °C		130		A
Q_{rr}				23		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 300 V					mJ
$R_{th(j-c)FD}$	per diode				0,15	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.

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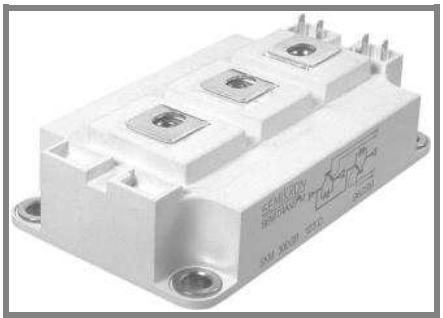

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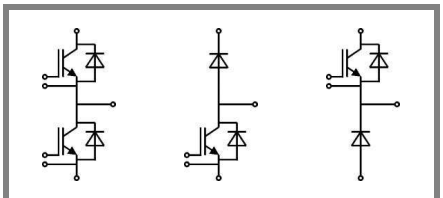

GB **GAL** **GAR**

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	65	mk/W
R_i	i = 2	19	mk/W
R_i	i = 3	4,7	mk/W
R_i	i = 4	1,3	mk/W
tau_i	i = 1	0,0518	s
tau_i	i = 2	0,0241	s
tau_i	i = 3	0,0021	s
tau_i	i = 4	0,0001	s
$Z_{th(j-c)D}$			
R_i	i = 1	140	mk/W
R_i	i = 2	85	mk/W
R_i	i = 3	20,55	mk/W
R_i	i = 4	4,45	mk/W
tau_i	i = 1	0,0613	s
tau_i	i = 2	0,0041	s
tau_i	i = 3	0,0045	s
tau_i	i = 4	0,0003	s

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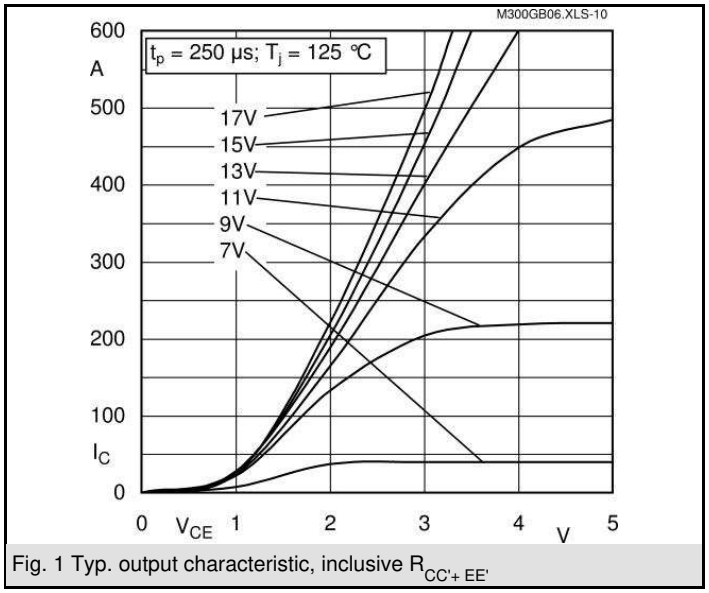

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

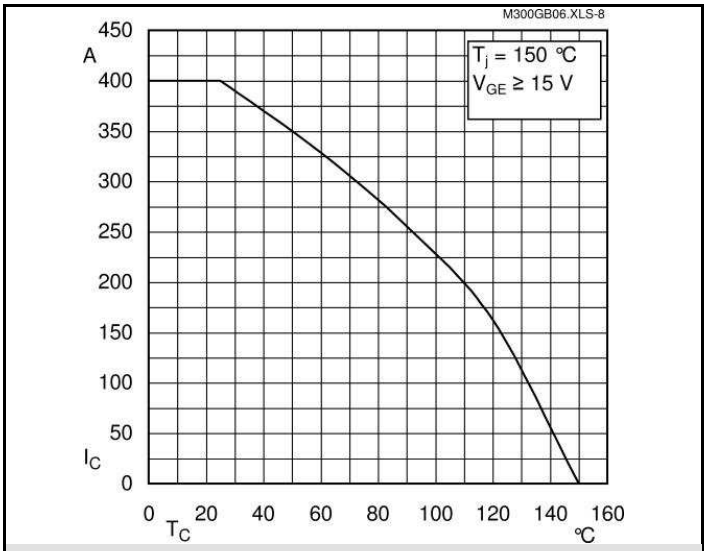

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

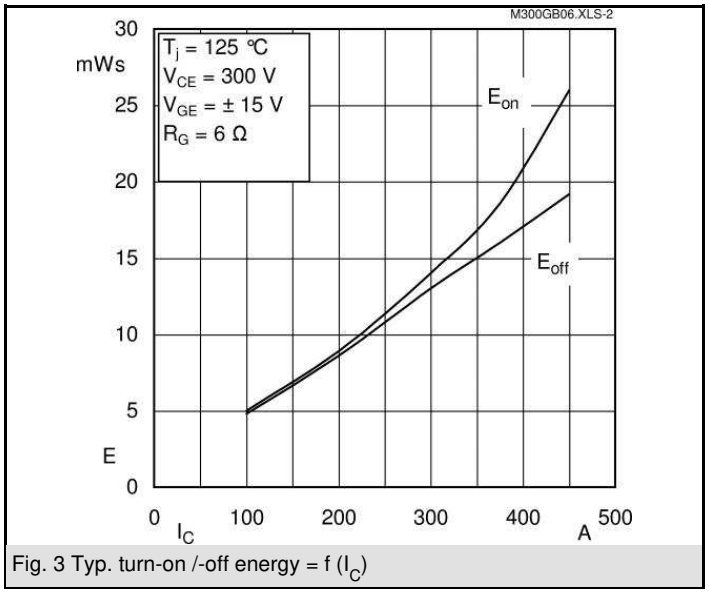

Fig. 3 Typ. turn-on /-off energy = f (I_C)

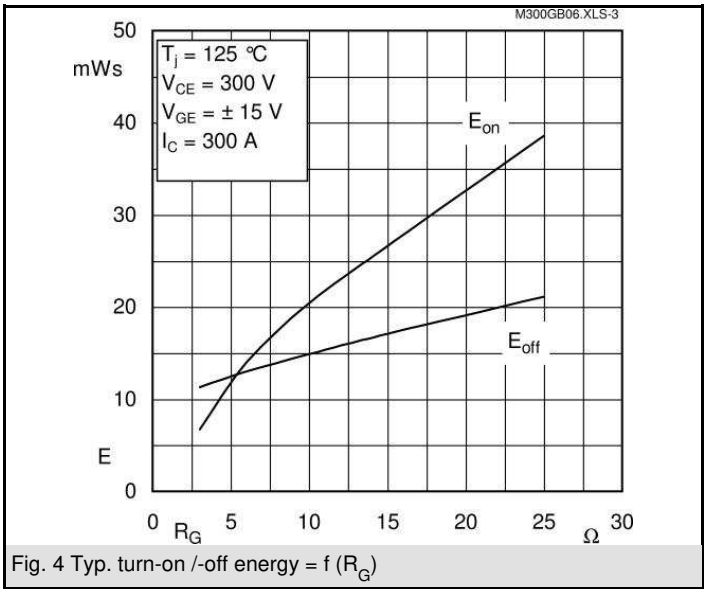

Fig. 4 Typ. turn-on /-off energy = f (R_G)

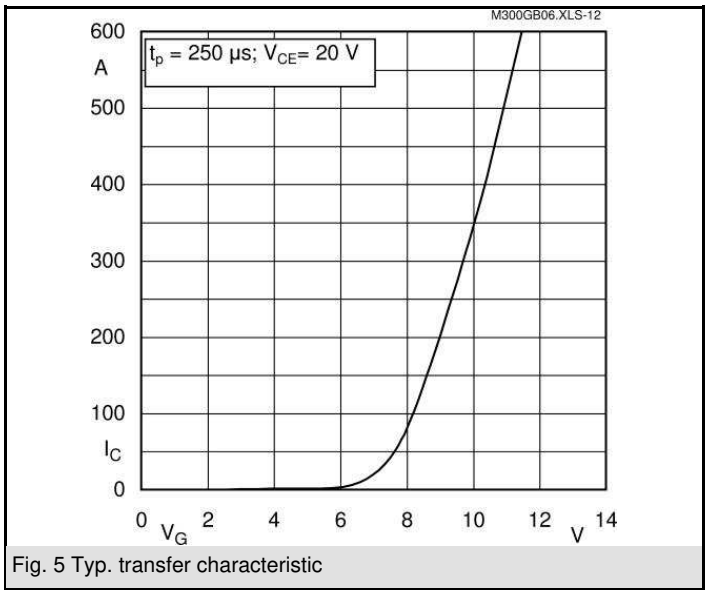

Fig. 5 Typ. transfer characteristic

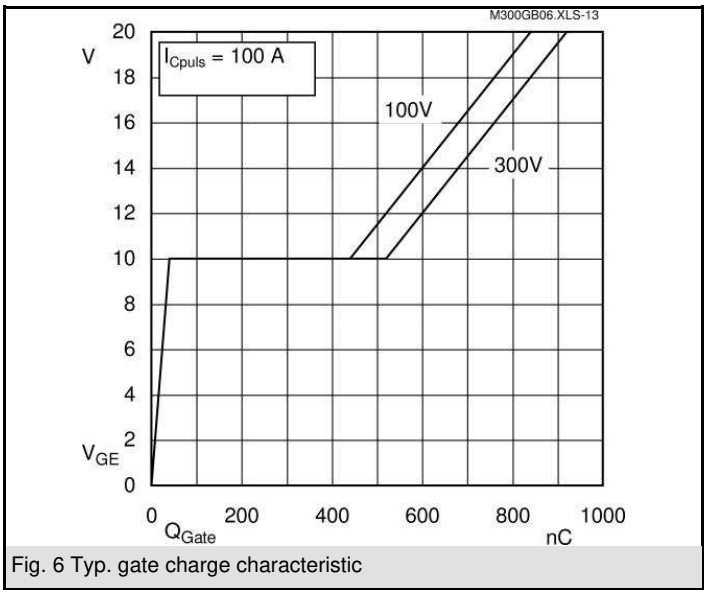

Fig. 6 Typ. gate charge characteristic

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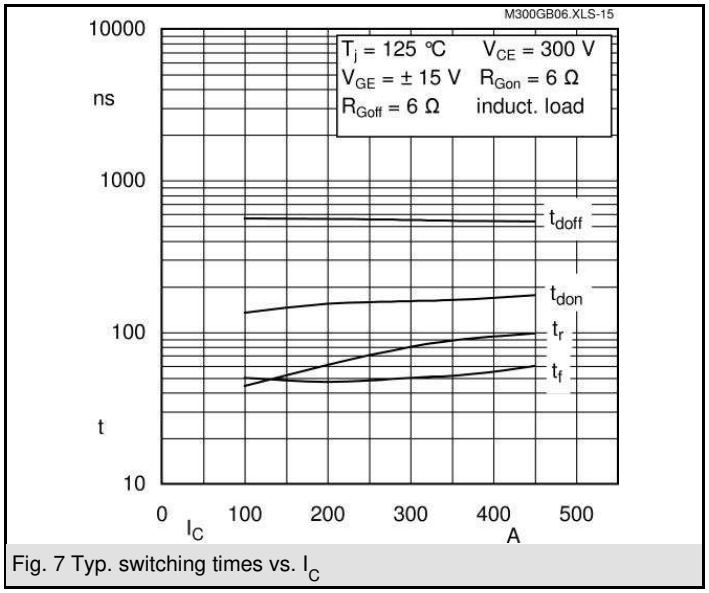

Fig. 7 Typ. switching times vs. I_C

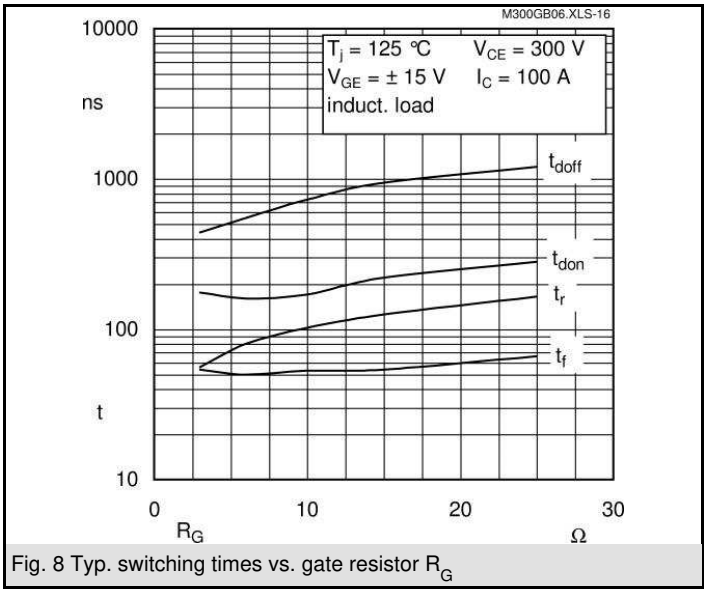

Fig. 8 Typ. switching times vs. gate resistor R_G

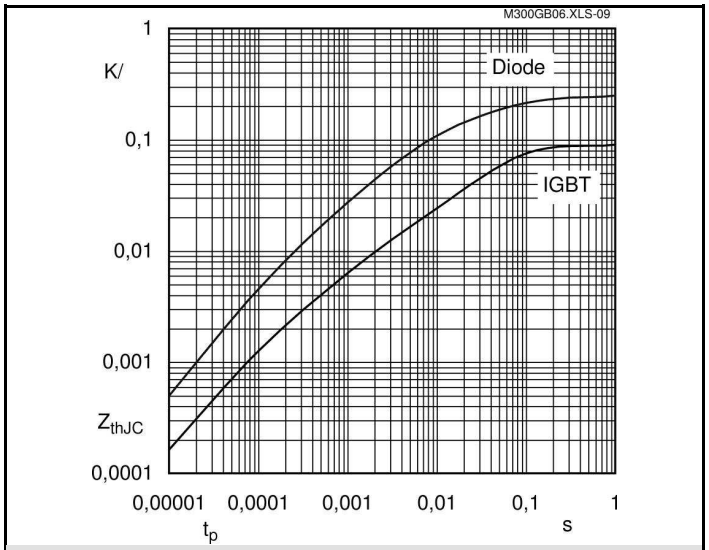

Fig. 9 Transient thermal impedance of IGBT and Diode

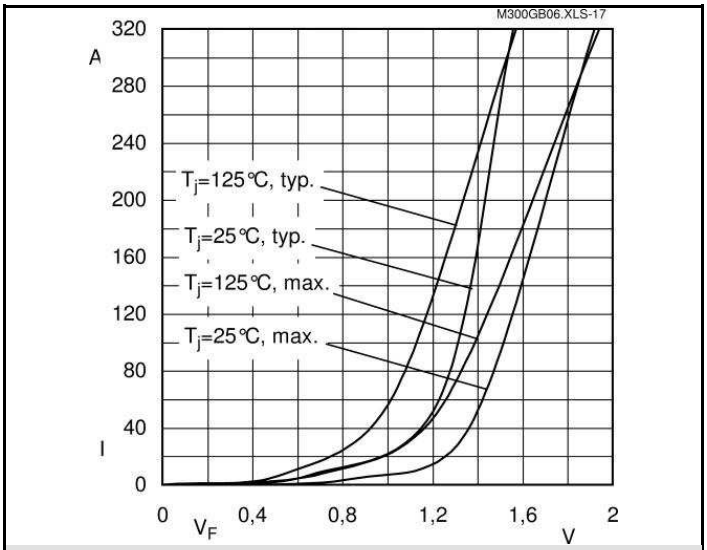

Fig. 10 CAL diode forward characteristic, inclusive $R_{CC'+ EE'}$

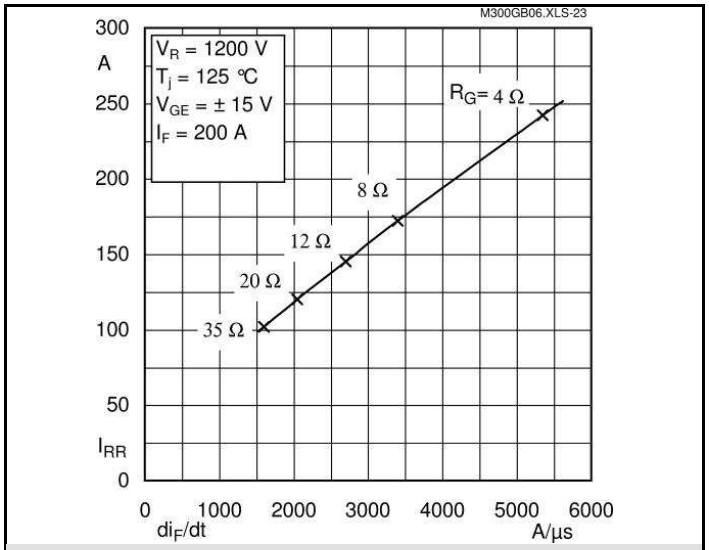

Fig. 11 Typ. CAL diode peak reverse recovery current

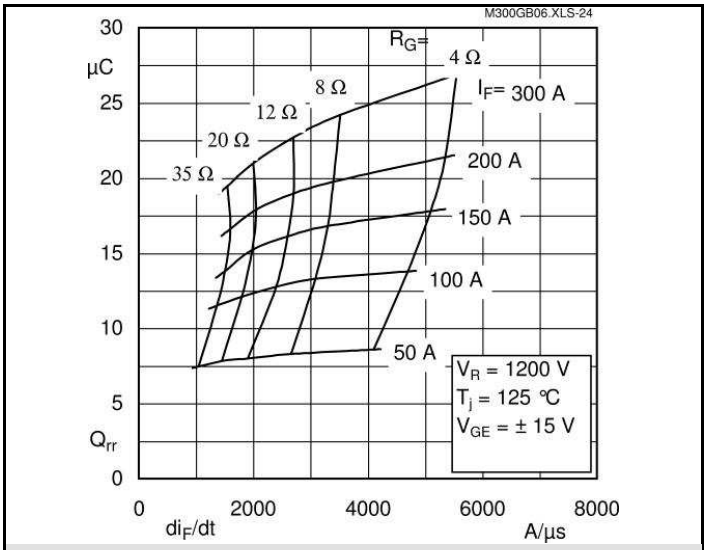

Fig. 12 Typ. CAL diode recovered charge

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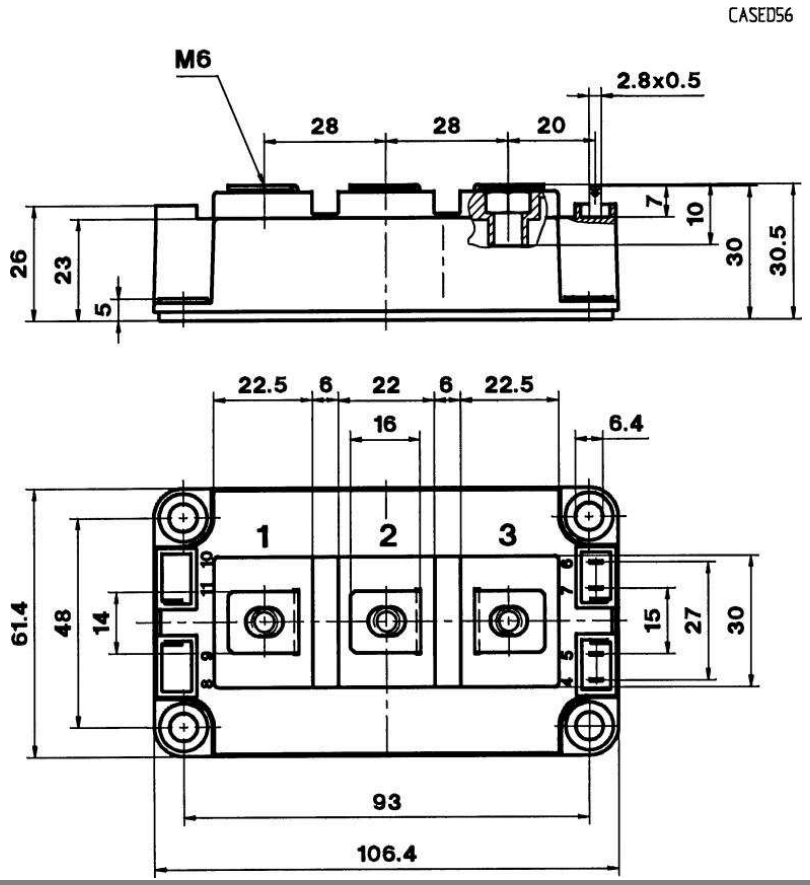
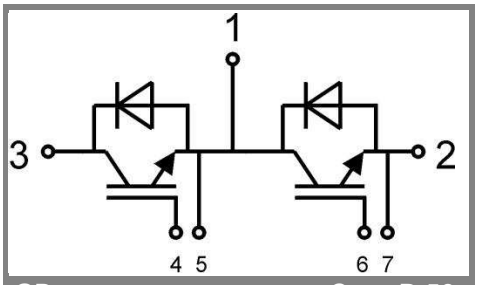
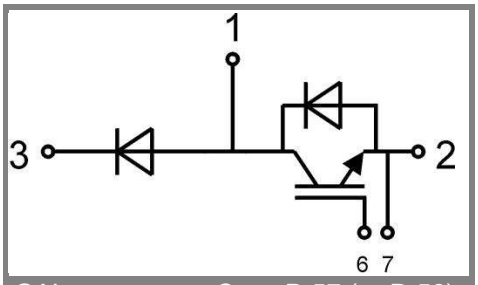


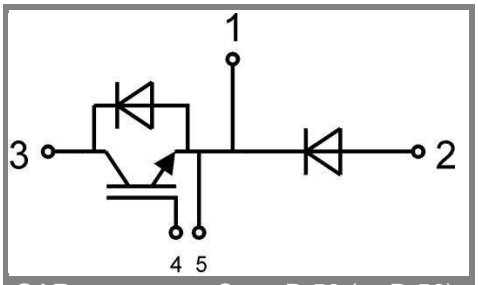
Case D 56



GB Case D 56



GAL Case D 57 (➞ D 56)



GAR Case D 58 (➞ D 56)

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