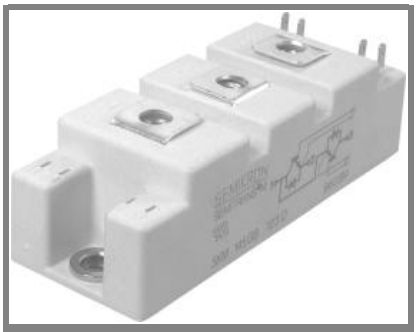
SKM 75GB123D



SEMITRANS® 2

IGBT Modules

SKM 75GB123D

SKM 75GAL123D

SKM 75GAR123D

Features

- MOS input (voltage controlled)
- Low inductance case
- Very low tail current with low temperature dependence
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- Latch-up free
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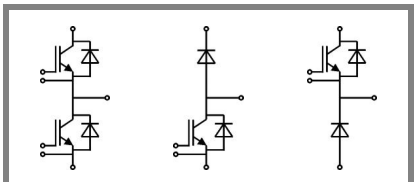
Typical Applications

- AC inverter drives
- UPS



GB GAL GAR

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	75	A
		T_{case} = 80 °C	60	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		150	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 = 150 °C	T_{case} = 25 °C	75	A
		T_{case} = 80 °C	50	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		150	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	480	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	95	A
		T_{case} = 80 °C	65	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		200	A
I_{FSM}	t_p = 10 ms; sin	T_j = 150 °C	720	A
Module				
$I_{t(RMS)}$			200	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 = 2 mA		4,5	5,5	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		1,4	1,6	V
		T_j = 125 °C		1,6	1,8	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		22	28	mΩ
		T_j = 125°C		30	38	mΩ
$V_{CE(sat)}$	I_{Cnom} = 50 A, V_{GE} = 15 V	T_j = °$C_{chiplev.}$		2,5	3	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		3,3	4,3	nF
C_{oes}				0,5	0,6	nF
C_{res}				0,22	0,3	nF
Q_G	V_{GE} = -8 - +20V			500		nC
R_{Gint}	T_j = °C			5		Ω
$t_{d(on)}$	R_{Gon} = 22 Ω	V_{CC} = 600V		44	100	ns
t_r		I_C= 50A		56	100	ns
E_{on}				8		mJ
$t_{d(off)}$	R_{Goff} = 22 Ω	T_j = 125 °C		380	500	ns
t_f		V_{GE} = ±15V		70	100	ns
E_{off}				5		mJ
$R_{th(j-c)}$	per IGBT				0,27	K/W

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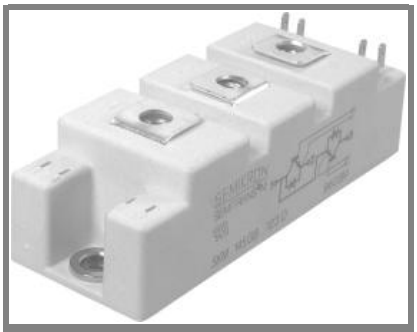

SEMITRANS® 2

IGBT Modules

SKM 75GB123D

SKM 75GAL123D

SKM 75GAR123D

Features

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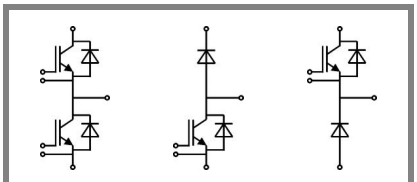

GB GAL GAR

Characteristics

Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 50 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 = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		18	26	mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_F = 50 A	T_j = 125 °C		35		A
Q_{rr}	di/dt = 800 A/µs					µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)D}$	per diode				0,6	K/W
Freewheeling Diode						
$V_F = V_{EC}$	I_{Fnom} = 50 A; V_{GE} = 0 V	T_j = 25 °C$_{chiplev.}$		1,85	2,2	V
		T_j = 125 °C$_{chiplev.}$		1,6		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		15	20	V
		T_j = 125 °C				V
I_{RRM}	I_F = 50 A	T_j = 125 °C		40		A
Q_{rr}						µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)FD}$	per diode				0,5	K/W
Module						
L_{CE}					30	nH
$R_{CC'+EE'}$	res., terminal-chip	T_{case}= 25 °C		0,75		mΩ
		T_{case}= 125 °C		1		mΩ
$R_{th(c-s)}$	per module				0,05	K/W
M_s	to heat sink M6		3		5	Nm
M_t	to terminals M5		2,5		5	Nm
w					160	g

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

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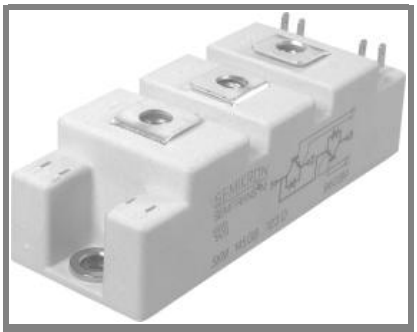

SEMITRANS® 2

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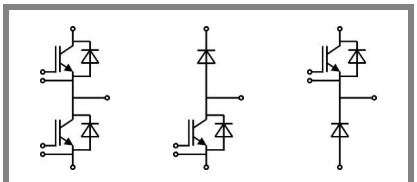

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Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	180	mk/W
R_i	i = 2	64	mk/W
R_i	i = 3	22	mk/W
R_i	i = 4	4	mk/W
tau_i	i = 1	0,0327	s
tau_i	i = 2	0,0479	s
tau_i	i = 3	0,008	s
tau_i	i = 4	0,005	s
$Z_{th(j-c)D}$			
R_i	i = 1	380	mk/W
R_i	i = 2	190	mk/W
R_i	i = 3	26	mk/W
R_i	i = 4	4	mk/W
tau_i	i = 1	0,0947	s
tau_i	i = 2	0,006	s
tau_i	i = 3	0,08	s
tau_i	i = 4	0,003	s

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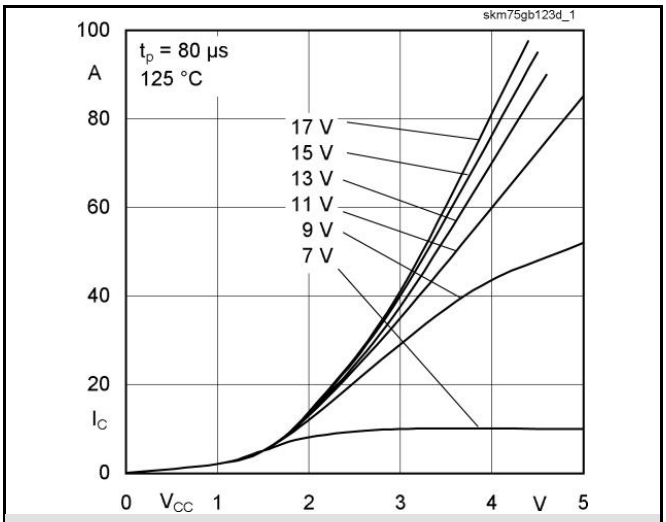

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

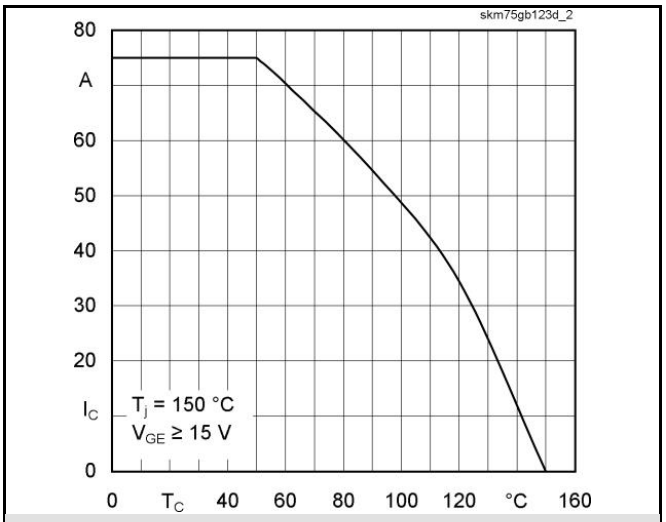

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

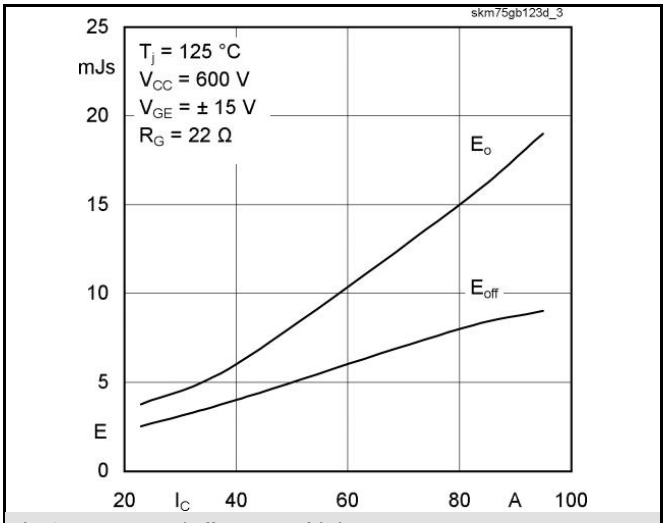

Fig. 3 Typ. turn-on /-off energy = f (I_C)

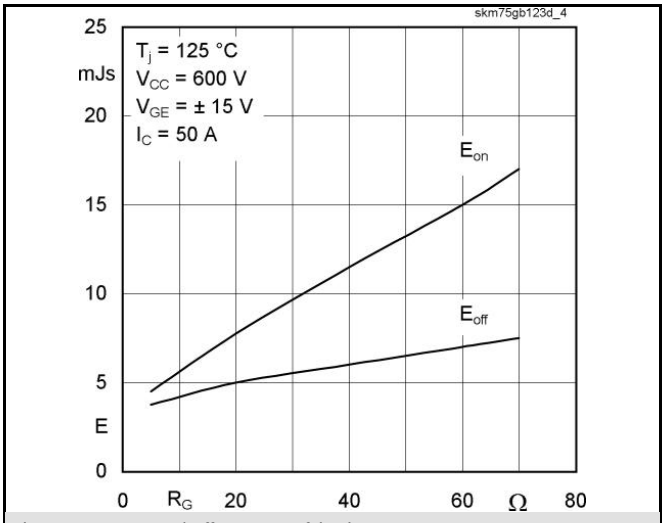

Fig. 4 Typ. turn-on /-off energy = f (R_G)

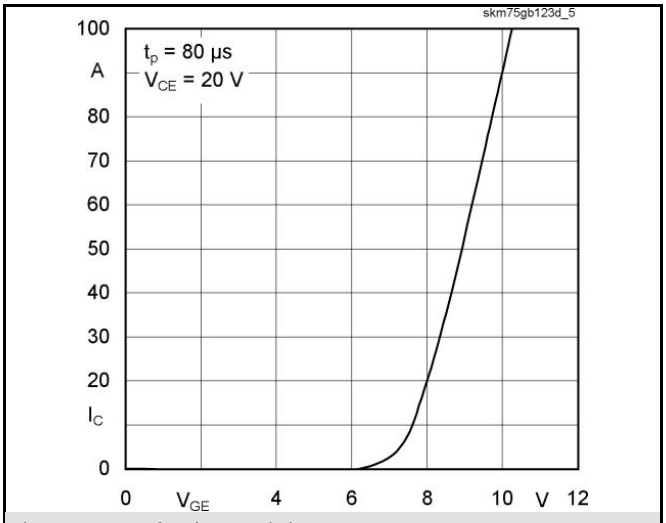

Fig. 5 Typ. transfer characteristic

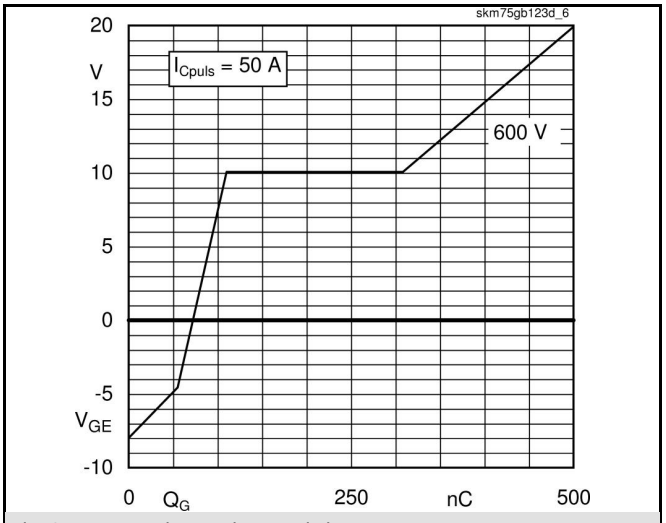

Fig. 6 Typ. gate charge characteristic

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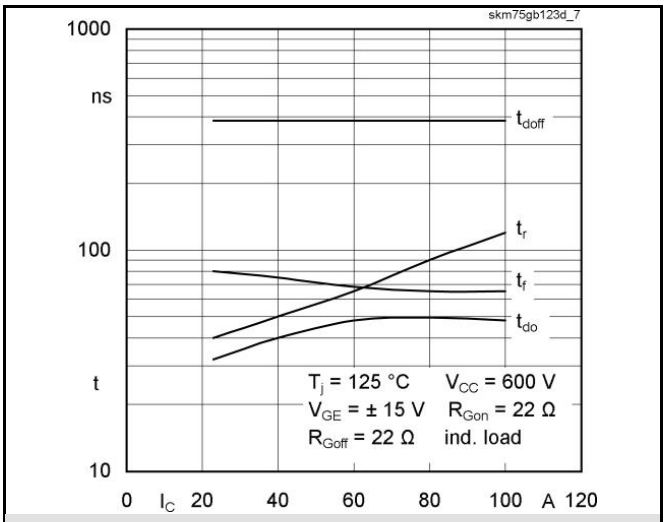

Fig. 7 Typ. switching times vs. I_C

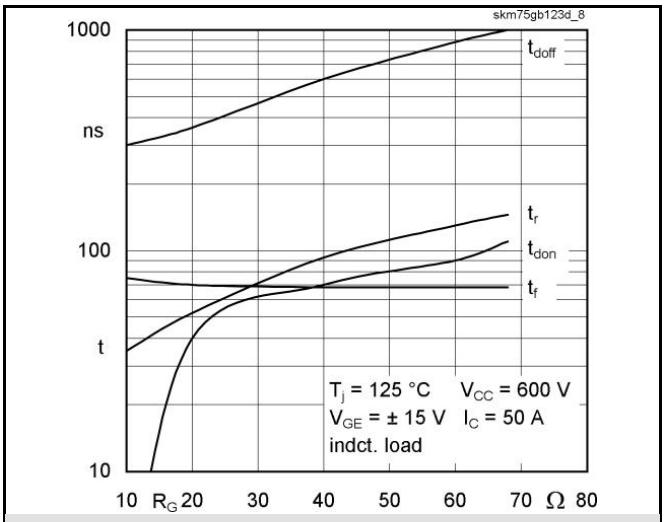

Fig. 8 Typ. switching times vs. gate resistor R_G

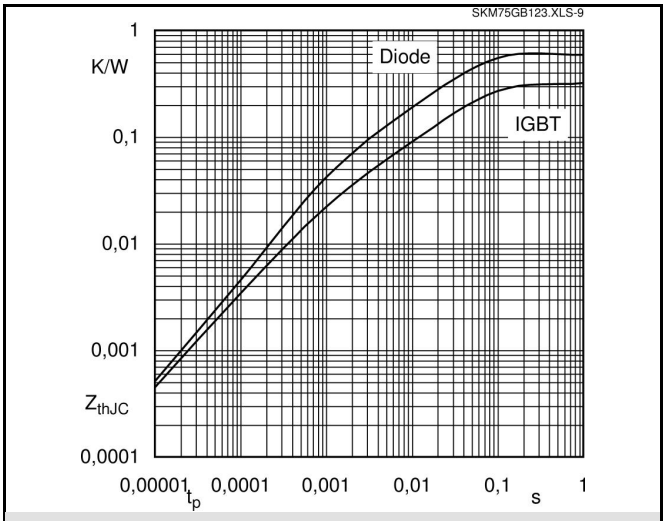

Fig. 9 Typ. transient thermal impedance

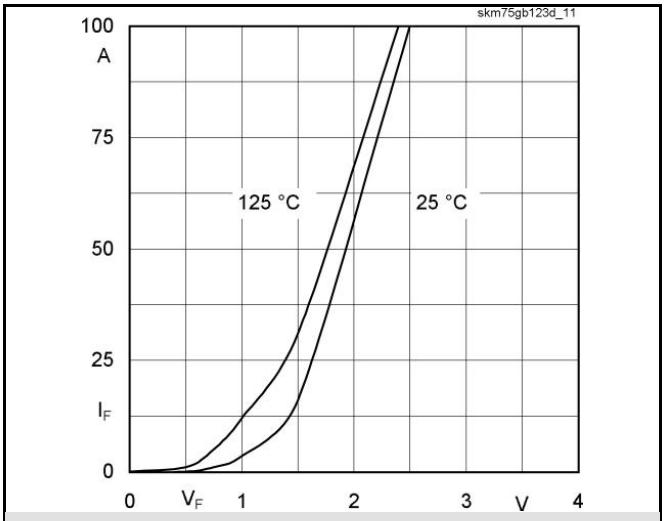

Fig. 10 CAL diode forward characteristic

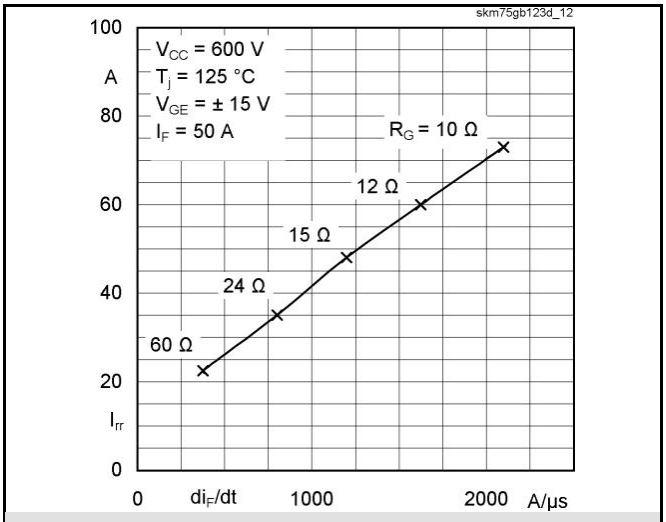

Fig. 11 Typ. CAL diode peak reverse recovery current

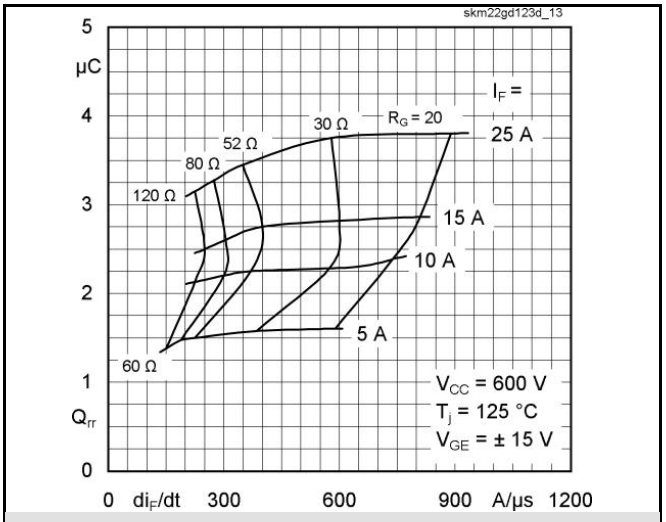

Fig. 12 Typ. CAL diode reverse recovery charge

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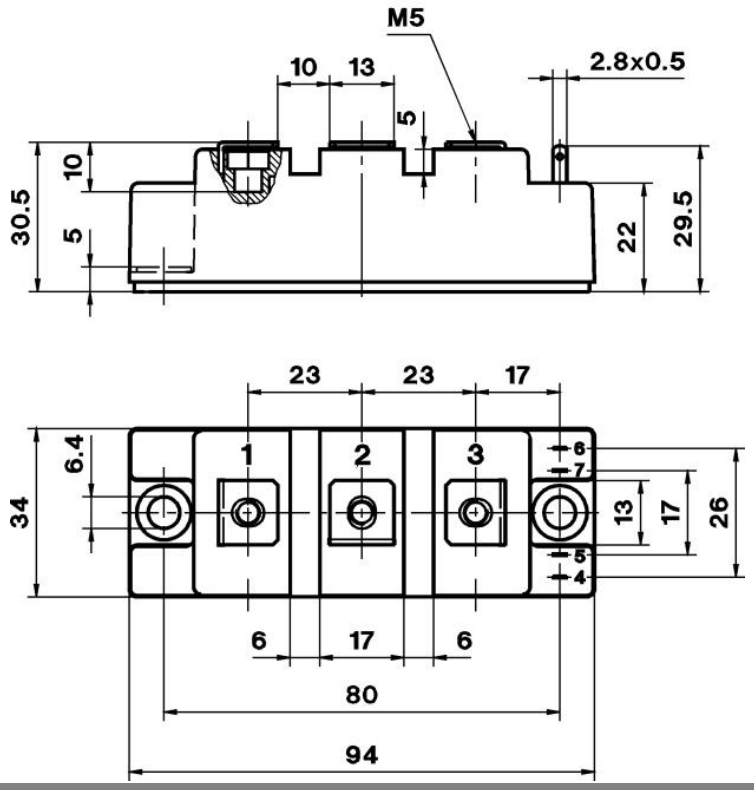
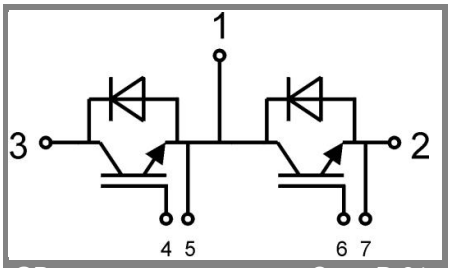
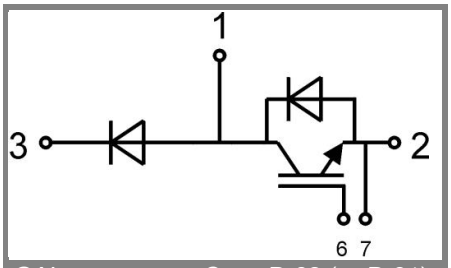


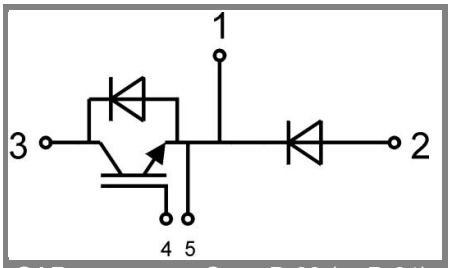
Case D 61



GB Case D 61



GAL Case D 62 (➞ D 61)



GAR Case D 63 (➞ D 61)

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