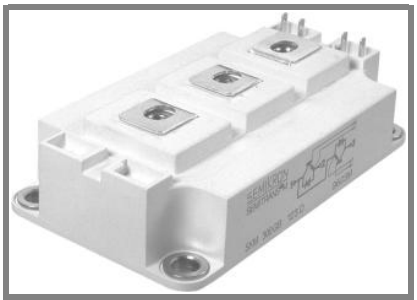
SKM 150GB123D



SEMITRANS® 3

IGBT Modules

SKM 150GB123D

SKM 150GAL123D

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
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- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding
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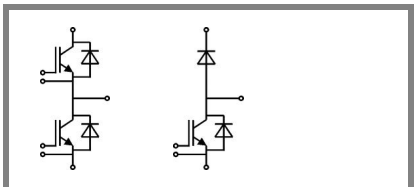
Typical Applications*

- AC inverter drives
- UPS



GB GAL

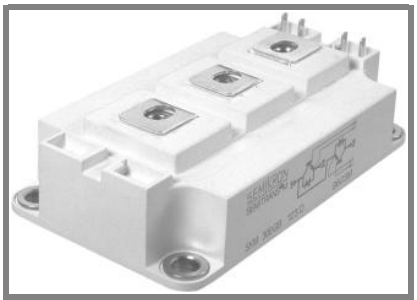
Absolute Maximum Ratings T_c = 25 °C, unless otherwise specified

Symbol	Conditions		Values	Units
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_{case} = 25 °C	150	A
		T_{case} = 80 °C	110	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		200	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	150	A
		T_{case} = 80 °C	100	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		200	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	1100	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	200	A
		T_{case} = 80 °C	135	A
I_{FRM}			300	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	1440	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 = 4 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
		T_j = 125 °C				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		11	14	mΩ
		T_j = 125°C		15	19	mΩ
$V_{CE(sat)}$	I_{Cnom} = 100 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		6,5	8,5	nF
C_{oes}				1	1,5	nF
C_{res}				0,5	0,6	nF
Q_G	V_{GE} = -8V - +20V			1000		nC
R_{Gint}	T_j = °C			2,5		Ω
$t_{d(on)}$	R_{Gon} = 6,8 Ω	V_{CC} = 600V		160	320	ns
t_r		I_C= 100A		80	160	ns
E_{on}				13		mJ
$t_{d(off)}$	R_{Goff} = 6,8 Ω	T_j = 125 °C		400	520	ns
t_f		V_{GE} = ± 15V		70	100	ns
E_{off}				11		mJ
$R_{th(j-c)}$	per IGBT				0,15	K/W

SKM 150GB123D



SEMITRANS® 3

IGBT Modules

SKM 150GB123D

SKM 150GAL123D

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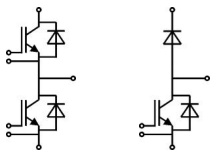


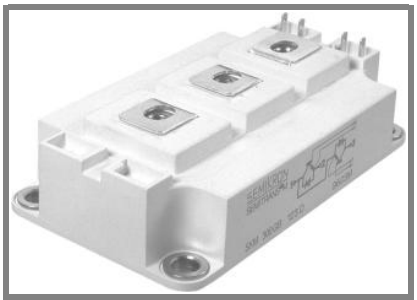
GB GAL

Characteristics

Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 100 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		9	13	mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_F = 100 A	T_j = 125 °C		50		A
Q_{rr}	di/dt = 1000 A/µs			5		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)D}$	per diode				0,3	K/W
Freewheeling Diode						
$V_F = V_{EC}$	I_{Fnom} = 150 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		6	8,7	V
		T_j = 125 °C				V
I_{RRM}	I_F = 100 A	T_j = 25 °C		40		A
Q_{rr}				5		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)FD}$	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.



SEMITRANS® 3

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SKM 150GAL123D

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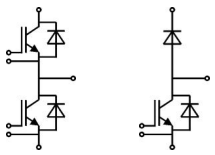

GB GAL

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	105	mk/W
R_i	i = 2	35	mk/W
R_i	i = 3	8	mk/W
R_i	i = 4	2	mk/W
tau_i	i = 1	0,03	s
tau_i	i = 2	0,03	s
tau_i	i = 3	0,0014	s
tau_i	i = 4	0,0001	s
$Z_{th(j-c)D}$			
R_i	i = 1	210	mk/W
R_i	i = 2	70	mk/W
R_i	i = 3	16	mk/W
R_i	i = 4	4	mk/W
tau_i	i = 1	0,0623	s
tau_i	i = 2	0,0083	s
tau_i	i = 3	0,003	s
tau_i	i = 4	0,0002	s

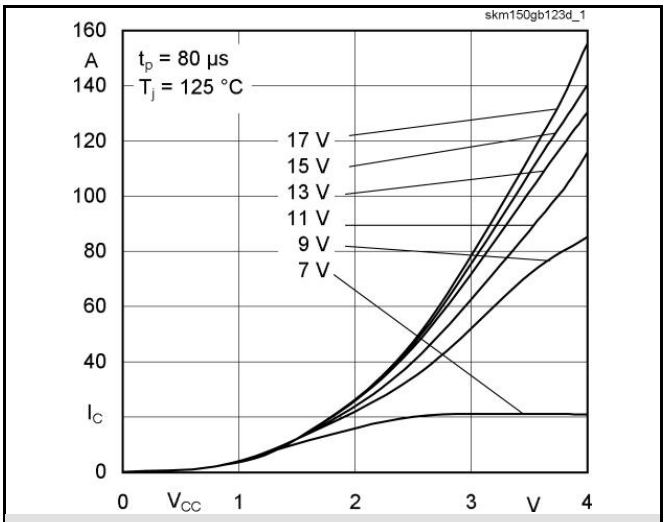

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

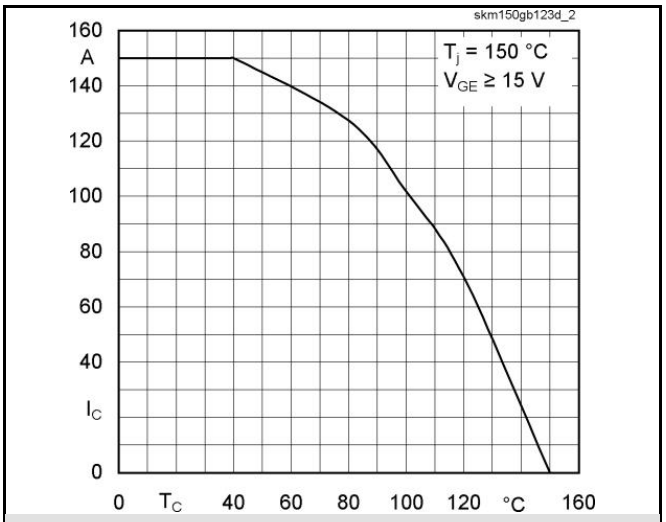

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

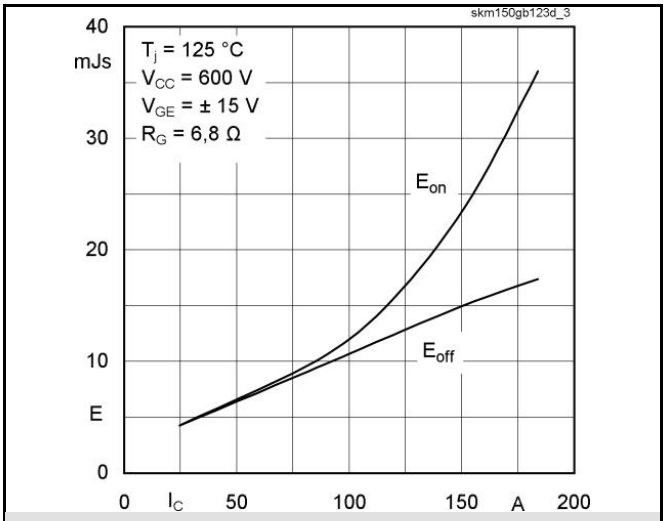

Fig. 3 Typ. turn-on /-off energy = f (I_C)

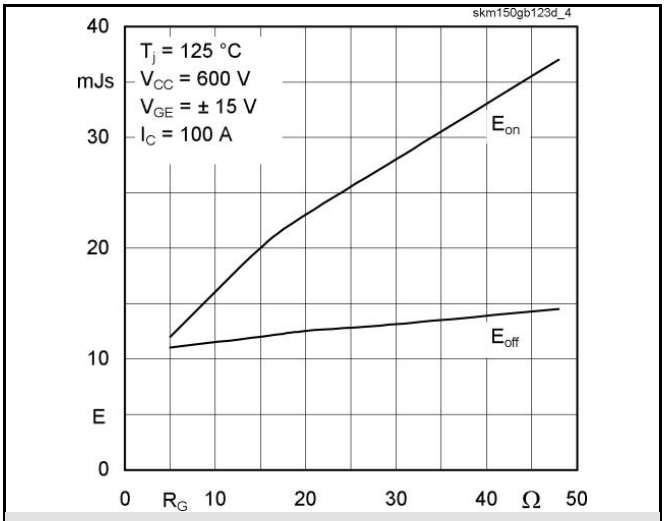

Fig. 4 Typ. turn-on /-off energy = f (R_G)

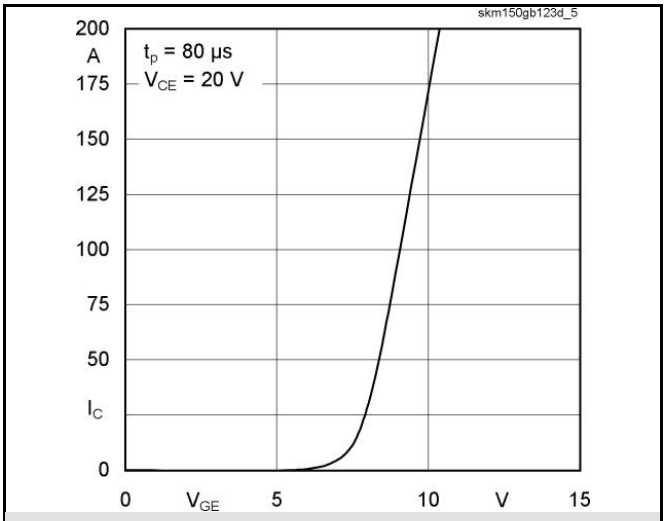

Fig. 5 Typ. transfer characteristic

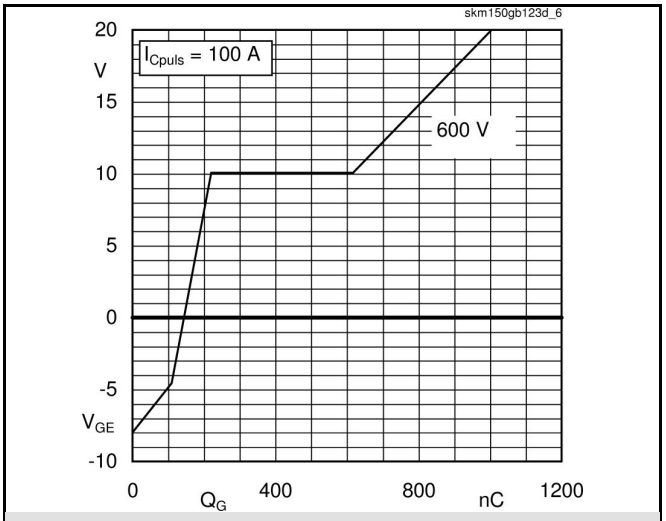

Fig. 6 Typ. gate charge characteristic

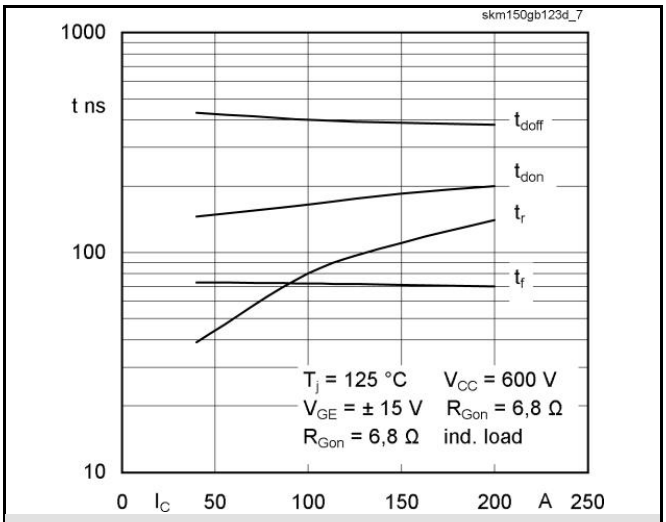

Fig. 7 Typ. switching times vs. I_C

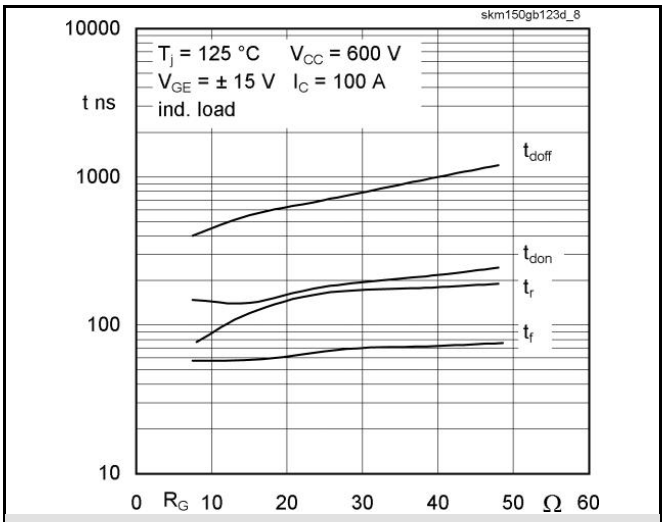

Fig. 8 Typ. switching times vs. gate resistor R_G

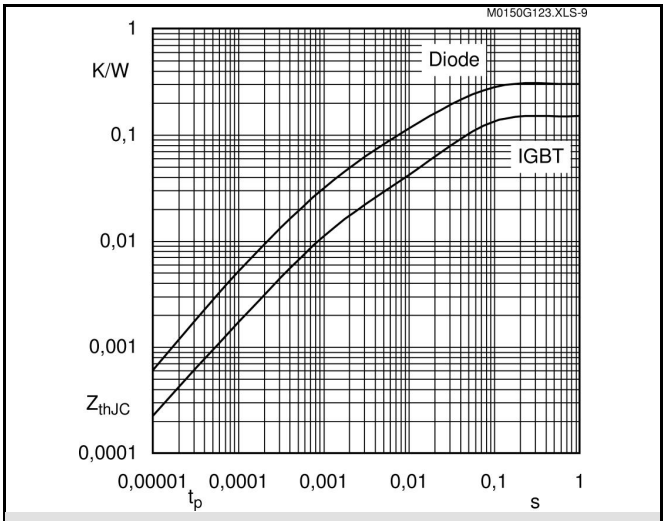

Fig. 9 Transient thermal impedance of IGBT

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

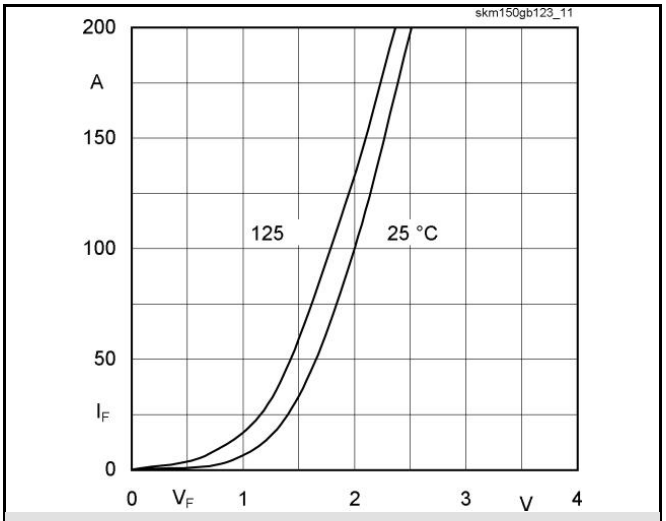

Fig. 10 Transient thermal impedance of FWD

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

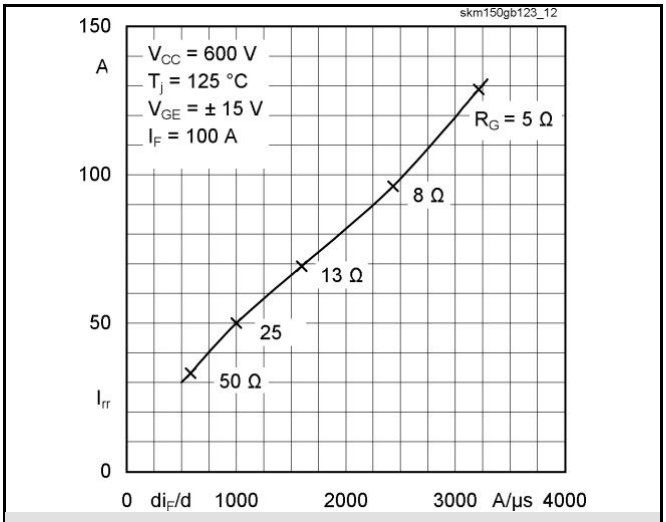

Fig. 11 CAL diode forward characteristic

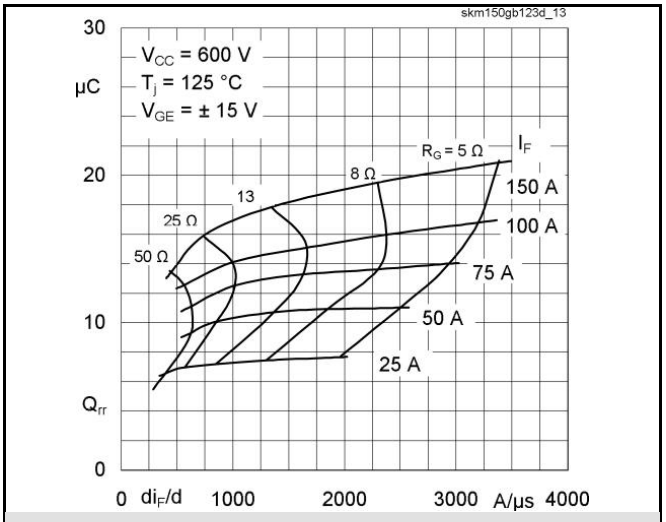

Fig. 12 Typ. CAL diode peak reverse recovery current

UL Recognized File no. E63 532

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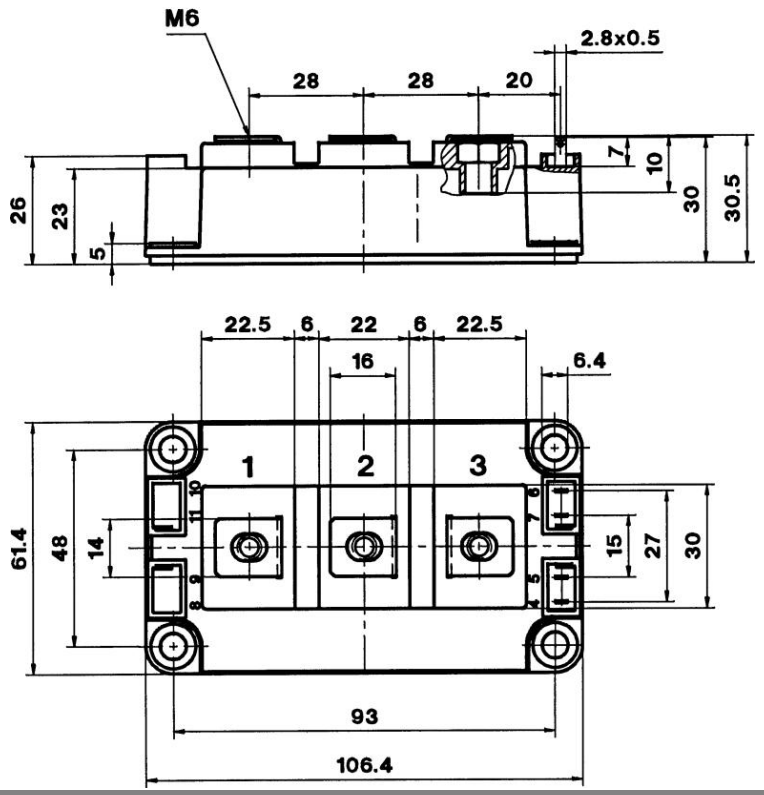
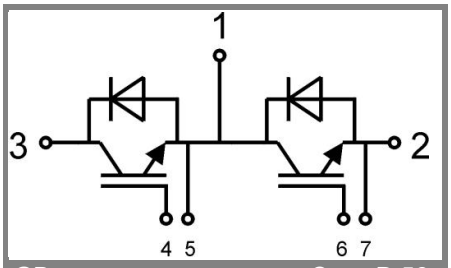
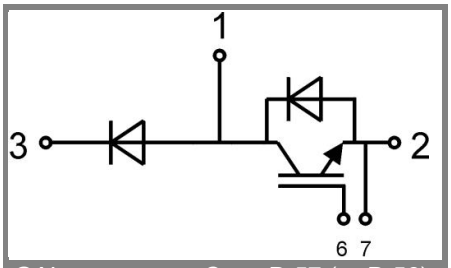


Case D 56



GB Case D 56



GAL Case D 57 (→ D 56)

