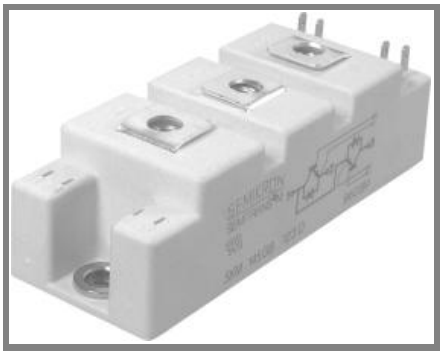
SKM 100GB123D



SEMITRANS® 2

IGBT Modules

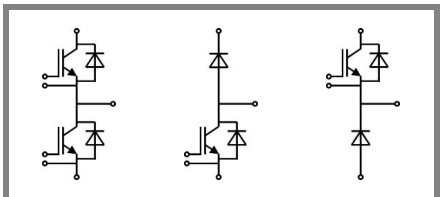
SKM 100GB123D
SKM 100GAL123D
SKM 100GAR123D

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to 6 x I_{cnom}
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (10 mm) and creepage distances (20 mm)

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	100	A
		T_{case} = 80 °C	90	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	95	A
		T_{case} = 80 °C	65	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		150	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	720	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	130	A
		T_{case} = 80 °C	90	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		200	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	900	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		14,6	18,6	mΩ
		T_j = 125°C		20	25,3	mΩ
$V_{CE(sat)}$	I_{Cnom} = 75 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		5	6,6	nF
C_{oes}				0,72	0,9	nF
C_{res}				0,38	0,5	nF
Q_G	V_{GE} = -8V - +20V			750		nC
R_{Gint}	T_j = °C			5		Ω
$t_{d(on)}$	R_{Gon} = 15 Ω	V_{CC} = 600V		30	60	ns
t_r		I_{Cnom}= 75A		70	140	ns
E_{on}		T_j = 125 °C		10		mJ
$t_{d(off)}$	R_{Goff} = 15 Ω	V_{GE} = ± 15V		450	600	ns
t_f				70	90	ns
E_{off}				8		mJ
$R_{th(j-c)}$	per IGBT				0,18	K/W

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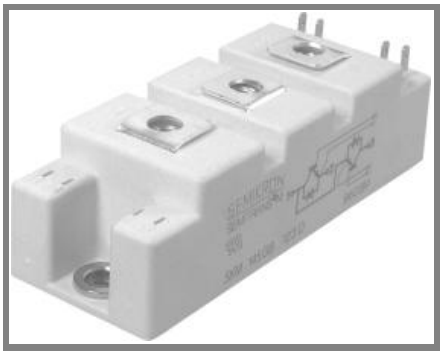
SKM 100GB123D



SEMITRANS® 2

IGBT Modules

SKM 100GB123D

SKM 100GAL123D

SKM 100GAR123D

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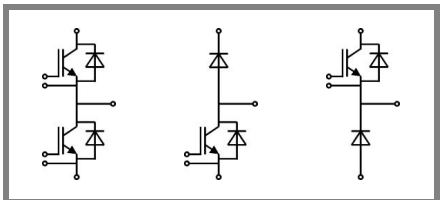
- UPS



GB GAL GAR

Characteristics

Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 75 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		12	17	mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_{Fnom} = 75 A	T_j = 125 °C		40		A
Q_{rr}	di/dt = 800 A/µs			3		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)D}$	per diode				0,5	K/W
Freewheeling 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	V
		T_j = 125 °C				V
I_{RRM}	I_{Fnom} = 100 A	T_j = 25 °C		50		A
Q_{rr}	di/dt = 1000 A/µs			5		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)FD}$	per diode				0,36	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.

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

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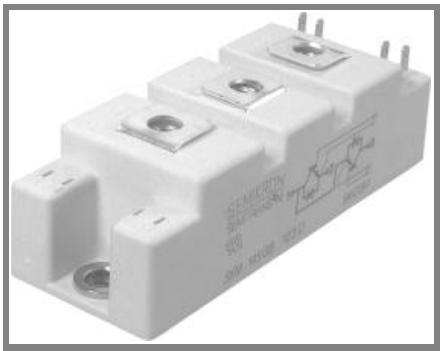
SKM 100GB123D



SEMITRANS® 2

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SKM 100GAL123D

SKM 100GAR123D

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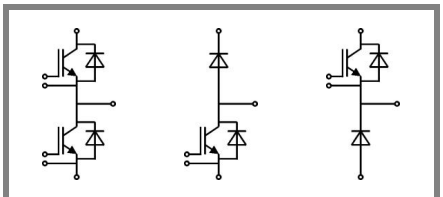

GB **GAL** **GAR**

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	162	mk/W
R_i	i = 2	14	mk/W
R_i	i = 3	2,7	mk/W
R_i	i = 4	1,3	mk/W
tau_i	i = 1	0,204	s
tau_i	i = 2	0,0242	s
tau_i	i = 3	0,0013	s
tau_i	i = 4	0	s
$Z_{th(j-c)D}$			
R_i	i = 1	320	mk/W
R_i	i = 2	150	mk/W
R_i	i = 3	0,0265	mk/W
R_i	i = 4	3,5	mk/W
tau_i	i = 1	0,05	s
tau_i	i = 2	0,0104	s
tau_i	i = 3	0,0034	s
tau_i	i = 4	0,0003	s

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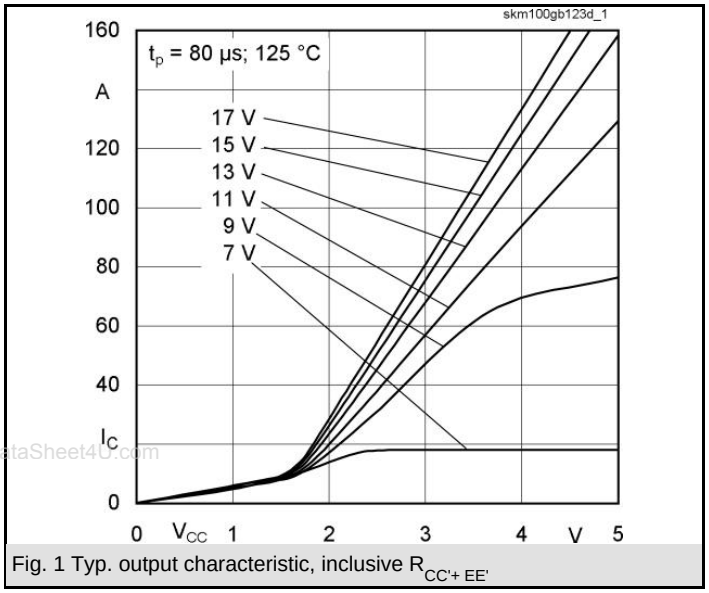

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

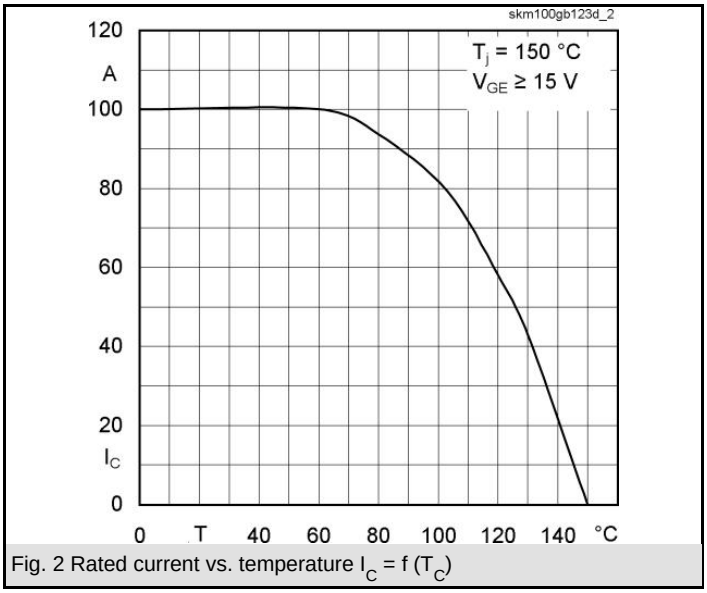

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

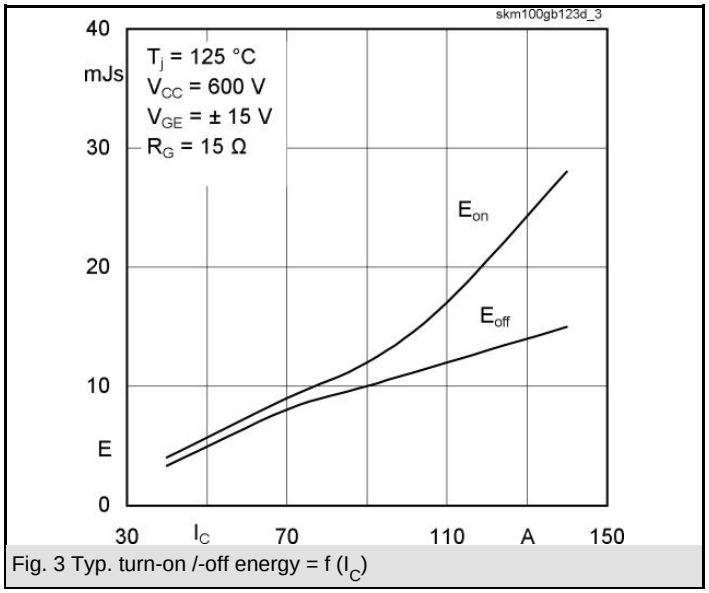

Fig. 3 Typ. turn-on /-off energy = f (I_C)

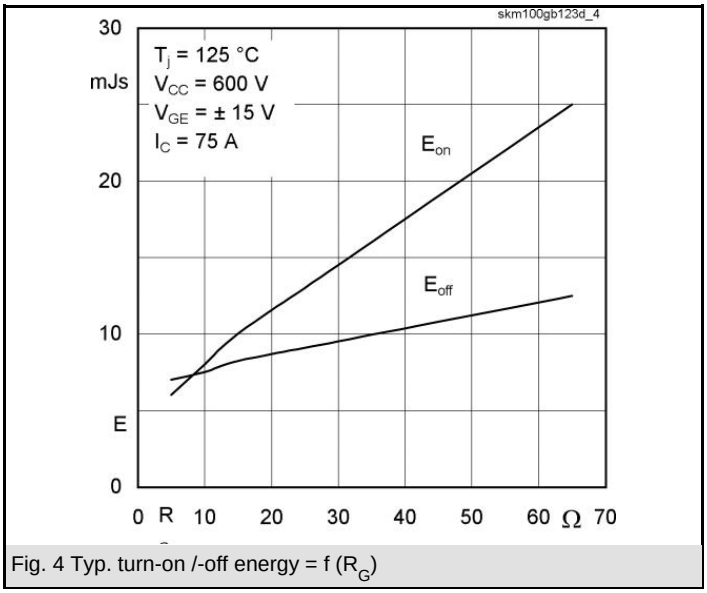

Fig. 4 Typ. turn-on /-off energy = f (R_G)

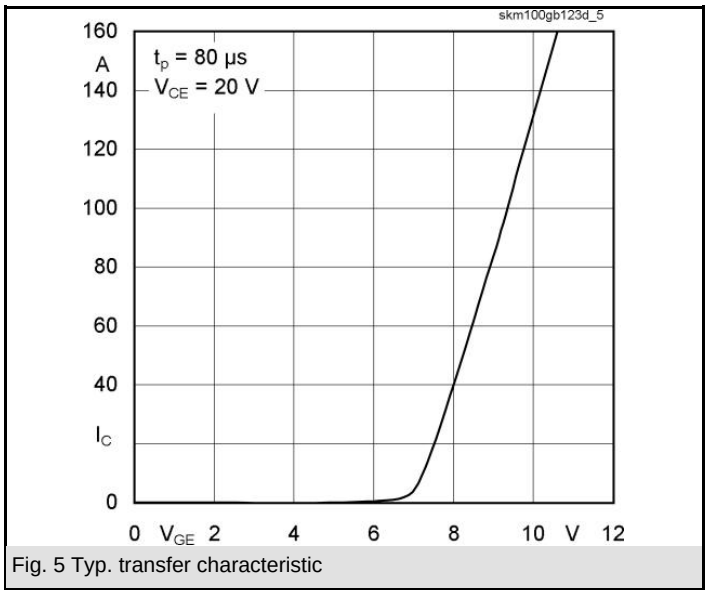

Fig. 5 Typ. transfer characteristic

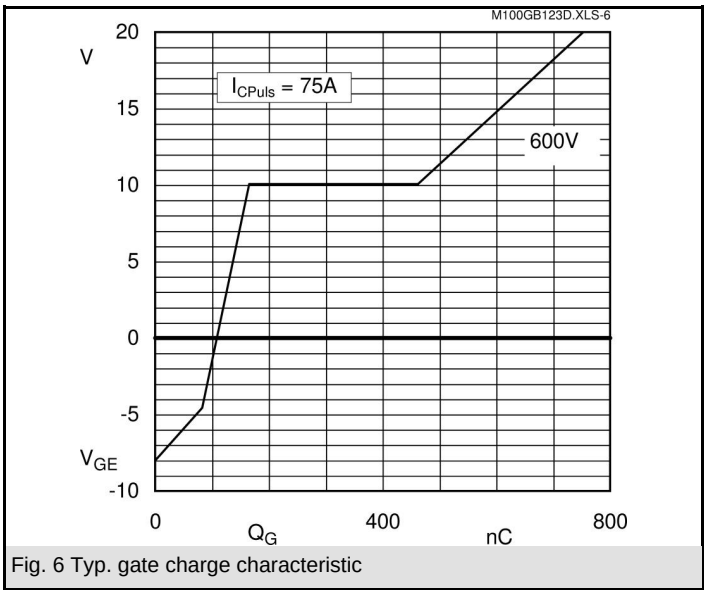

Fig. 6 Typ. gate charge characteristic

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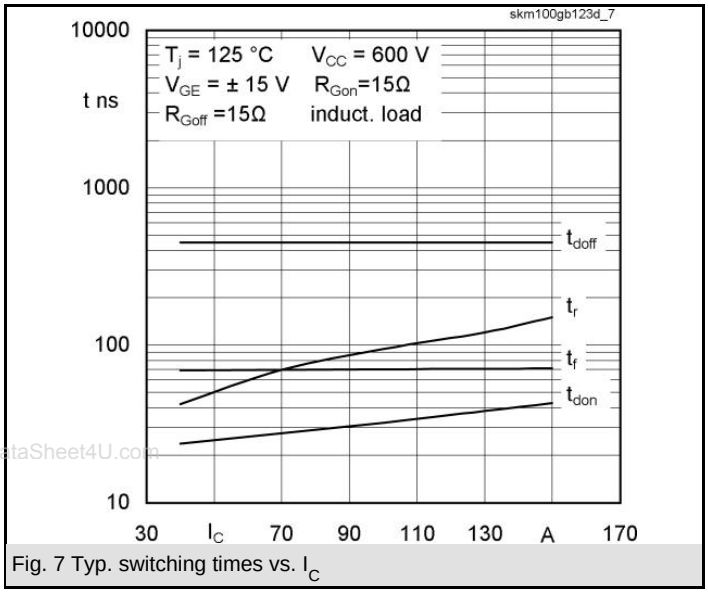

Fig. 7 Typ. switching times vs. I_C

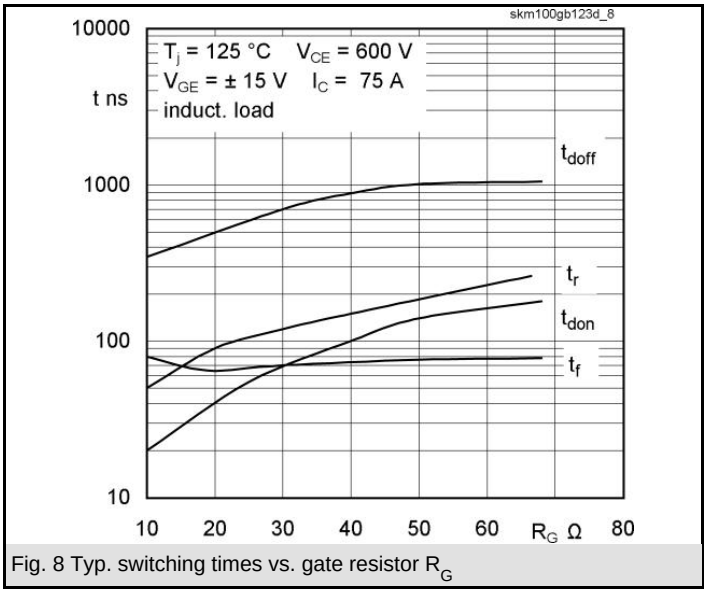

Fig. 8 Typ. switching times vs. gate resistor R_G

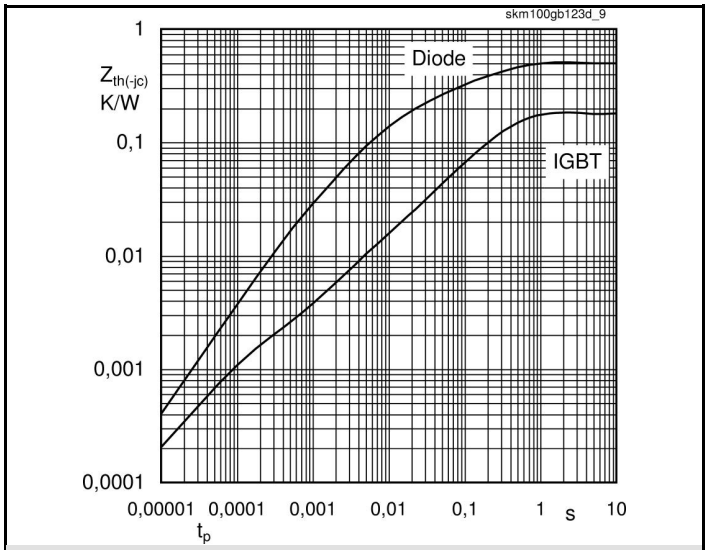

Fig. 9 Transient thermal impedance

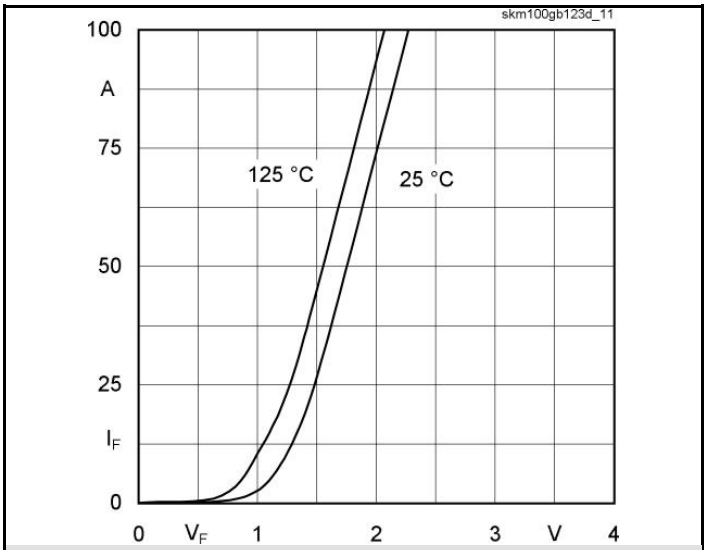

Fig. 10 CAL diode forward characteristic

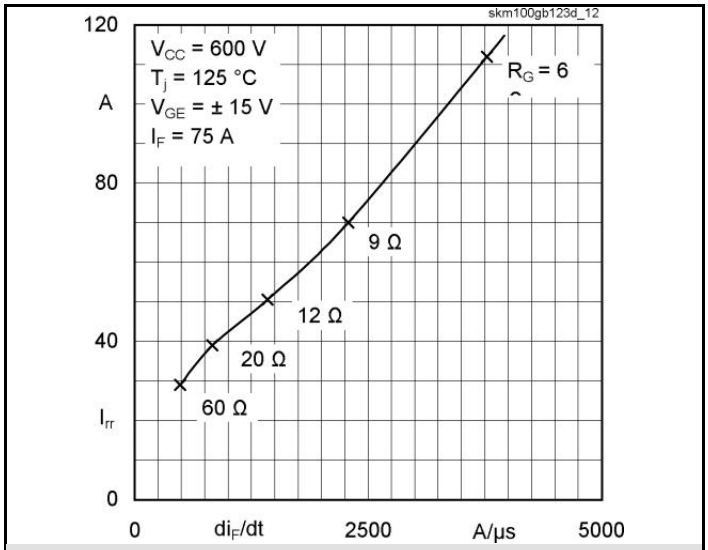

Fig. 11 Typ. CAL diode peak reverse recovery current

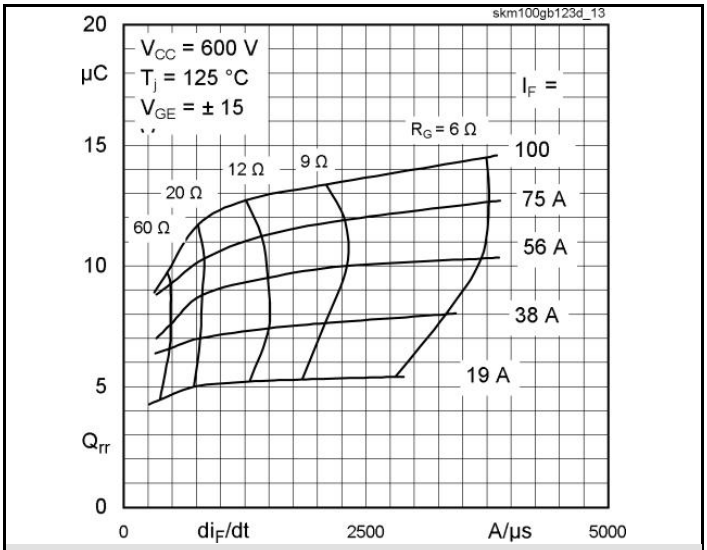

Fig. 12 Typ. CAL diode peak reverse recovery charge

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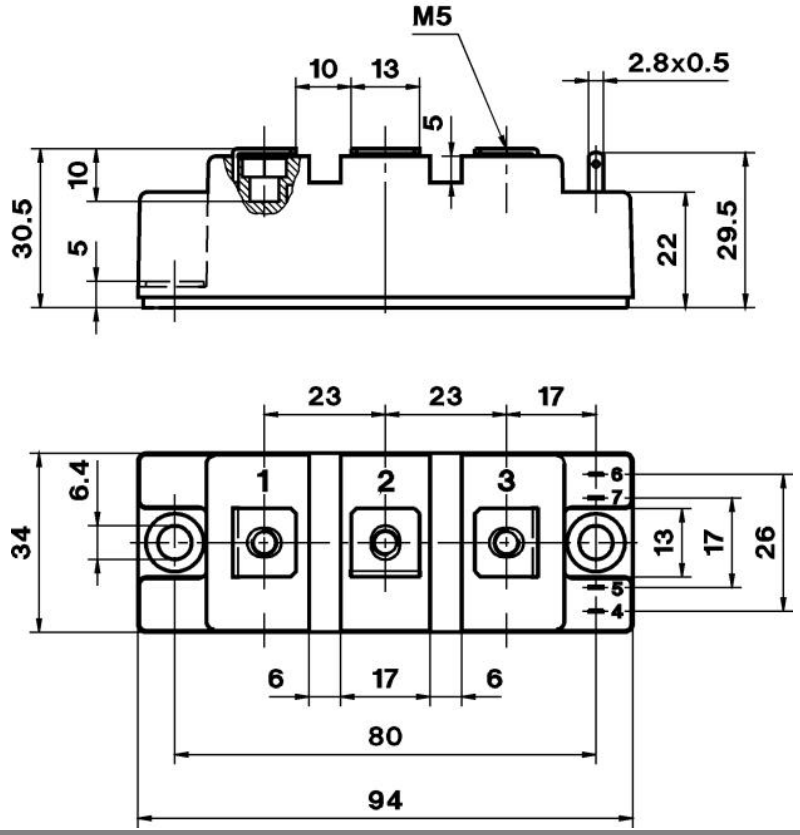
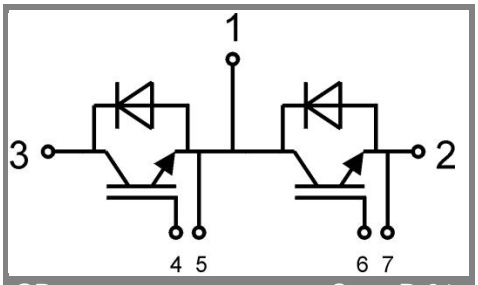
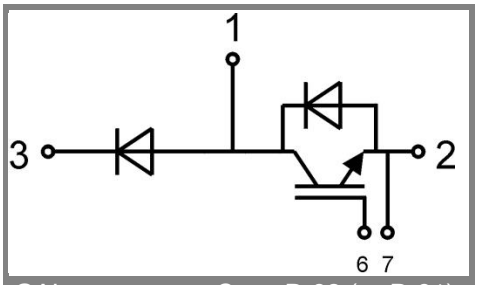


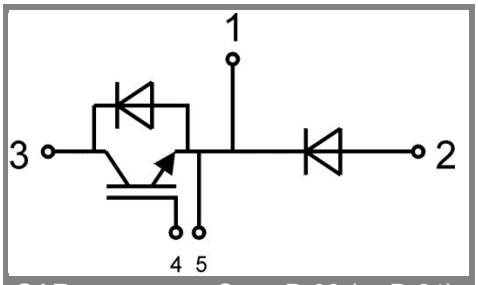
Case D 61



GB Case D 61



GAL Case D 62 (➞ D 61)



GAR Case D 63 (➞ D 61)

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