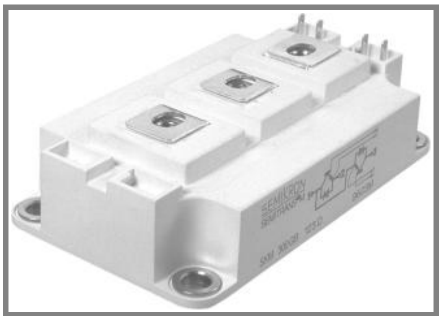
SKM 200GB123D



SEMITRANS® 3

IGBT Modules

SKM 200GB123D

SKM 200GAL123D

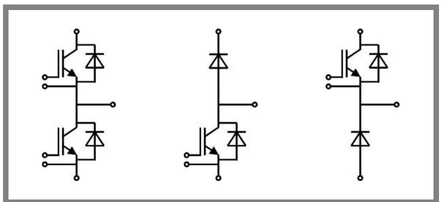
SKM 200GAR123D

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 (13 mm) and creepage distances (20 mm)

Typical Applications

- AC inverter drives
- UPS



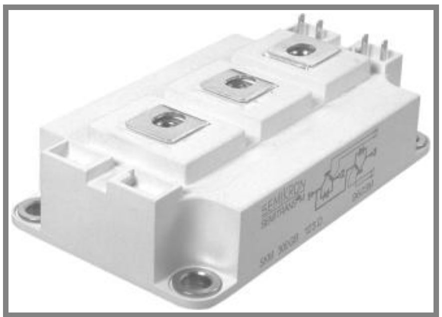
Absolute Maximum Ratings — T_c = 25 °C, unless otherwise specified

Symbol	Conditions		Values	Units
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_{case} = 25 °C	200	A
		T_{case} = 85 °C	180	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		300	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; V_{GE} ≤ 20 V; V_{CES} < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	200	A
		T_{case} = 80 °C	130	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		300	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	1440	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	260	A
		T_{case} = 80 °C	180	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		400	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	1800	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40 ... + 150 (125)	°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		0,1	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		7,33	9,33	mΩ
		T_j = 125°C		10	12,66	mΩ
$V_{CE(sat)}$	I_{Cnom} = 150 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		10	13	nF
C_{oes}				1,5	2	nF
C_{res}				0,8	1,2	nF
Q_G	V_{GE} = -8V - +20V			1500		nC
R_{Gint}	T_j = °C			2,5		Ω
$t_{d(on)}$	R_{Gon} = 5,6 Ω	V_{CC} = 600V		220	400	ns
t_r				100	200	ns
E_{on}		I_C= 150A		24		mJ
$t_{d(off)}$	R_{Goff} = 5,6 Ω	T_j = 125 °C		600	800	ns
t_f		V_{GE} = -15V		70	100	ns
E_{off}				17		mJ
$R_{th(j-c)}$	per IGBT				0,09	K/W

SKM 200GB123D



SEMITRANS® 3

IGBT Modules

SKM 200GB123D

SKM 200GAL123D

SKM 200GAR123D

Features

- MOS input (voltage controlled)
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- Low inductance case
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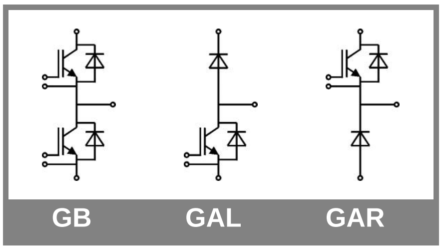
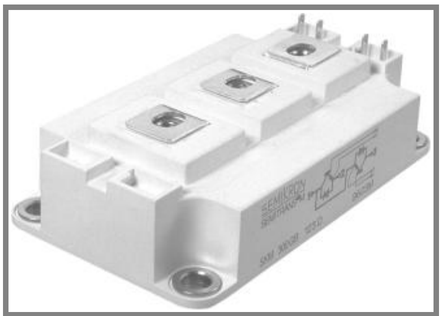


Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 150 A; V_{GE} = 0 V	T_j = 25 °C$_{\text{chiplev.}}$		2	2,5	V
		T_j = 125 °C$_{\text{chiplev.}}$		1,8		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		6	8,7	mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_F = 150 A	T_j = 125 °C		90		A
Q_{rr}	di/dt = 1500 A/µs			8		µC
E_{rr}	V_{GE} = -15 V; V_{cc} = 600V			6,6		mJ
$R_{th(j-c)D}$	per diode				0,25	K/W
Freewheeling Diode						
$V_F = V_{EC}$	I_{Fnom} = 200 A; V_{GE} = 0 V	T_j = 25 °C$_{\text{chiplev.}}$		2	2,5	V
		T_j = 125 °C$_{\text{chiplev.}}$		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		4,5	6,5	V
		T_j = 125 °C				V
I_{RRM}	I_F = 200 A	T_j = 125 °C		120		A
Q_{rr}	di/dt = 2000 A/µs			11		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V					mJ
$R_{th(j-c)FD}$	per diode				0,18	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, M4		2,5		5	Nm
w					325	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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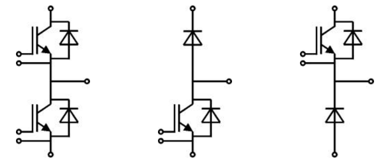


GB GAL GAR

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	59	mk/W
R_i	i = 2	23	mk/W
R_i	i = 3	6,8	mk/W
R_i	i = 4	1,2	mk/W
tau_i	i = 1	0,03	s
tau_i	i = 2	0,0087	s
tau_i	i = 3	0,002	s
tau_i	i = 4	0,0002	s
$Z_{th(j-c)D}$			
R_i	i = 1	170	mk/W
R_i	i = 2	66	mk/W
R_i	i = 3	12	mk/W
R_i	i = 4	2	mk/W
tau_i	i = 1	0,0348	s
tau_i	i = 2	0,0072	s
tau_i	i = 3	0,077	s
tau_i	i = 4	0,0002	s

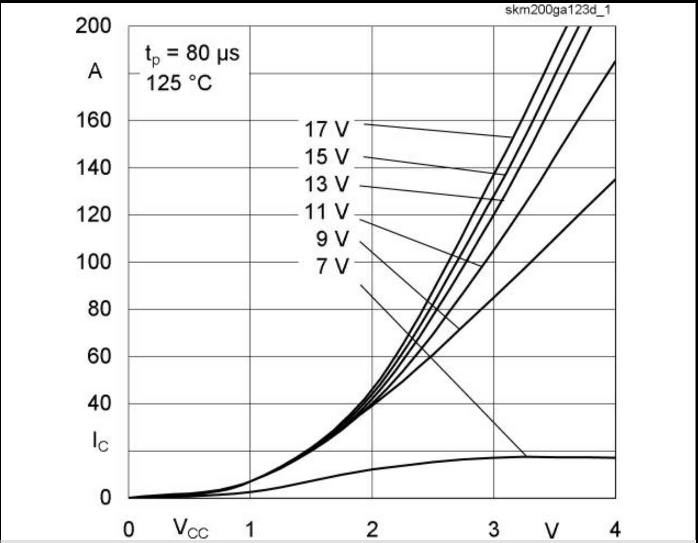


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

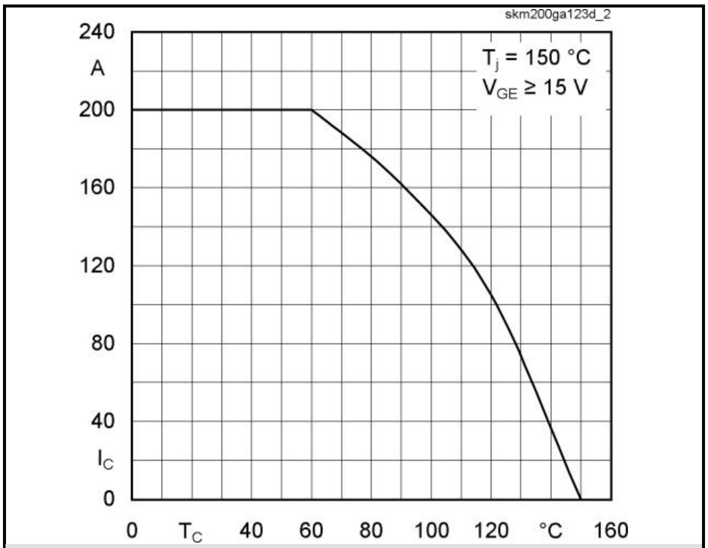


Fig. 2 Rated current vs. temperature $I_C = f (T_C)$

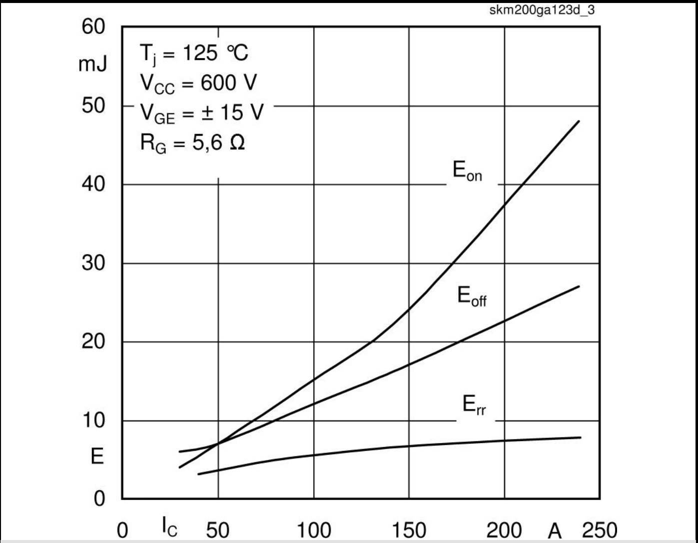


Fig. 3 Typ. turn-on /-off energy = f (I_C)

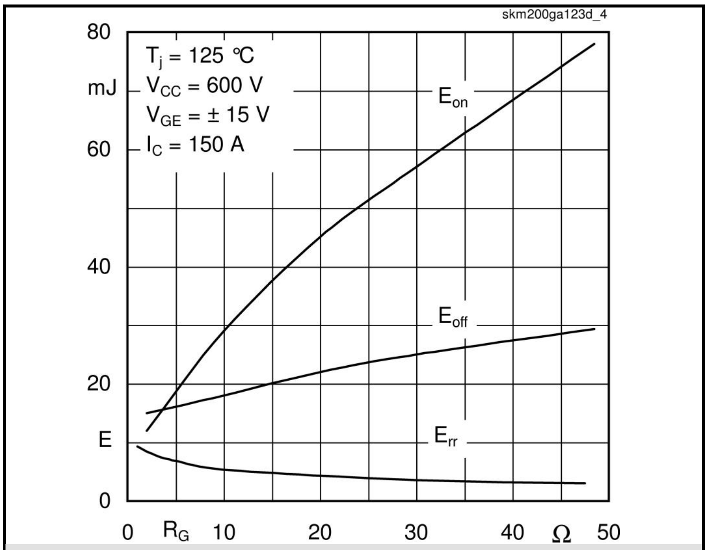


Fig. 4 Typ. turn-on /-off energy = f (R_G)

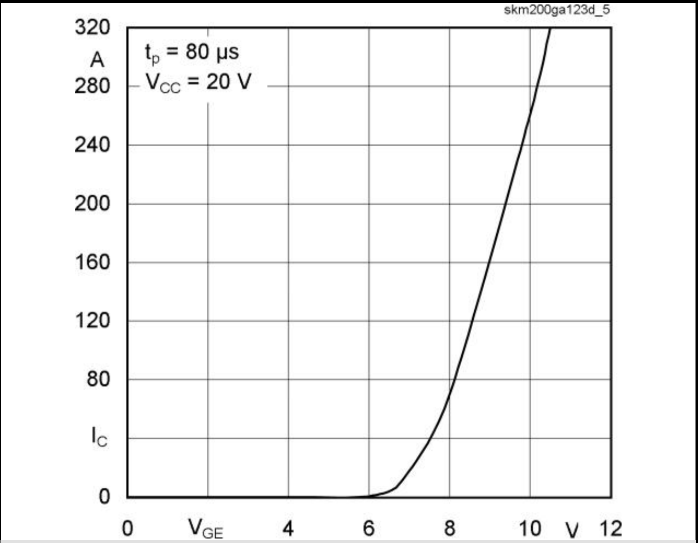


Fig. 5 Typ. transfer characteristic

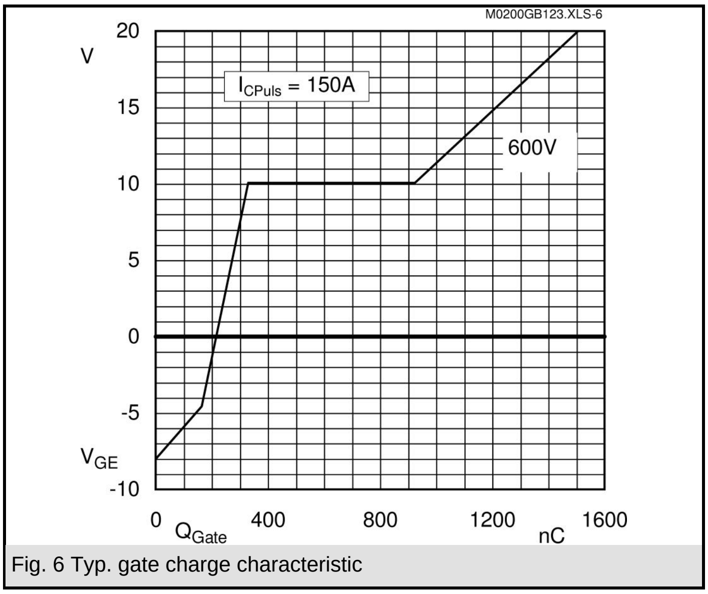


Fig. 6 Typ. gate charge characteristic

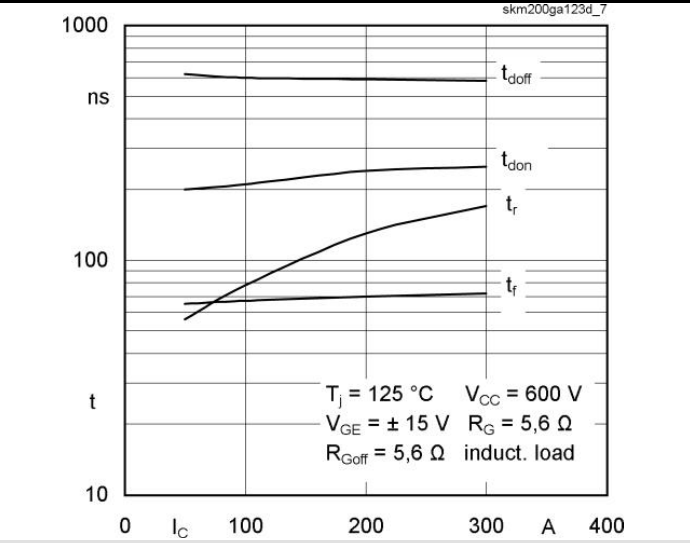


Fig. 7 Typ. switching times vs. I_C

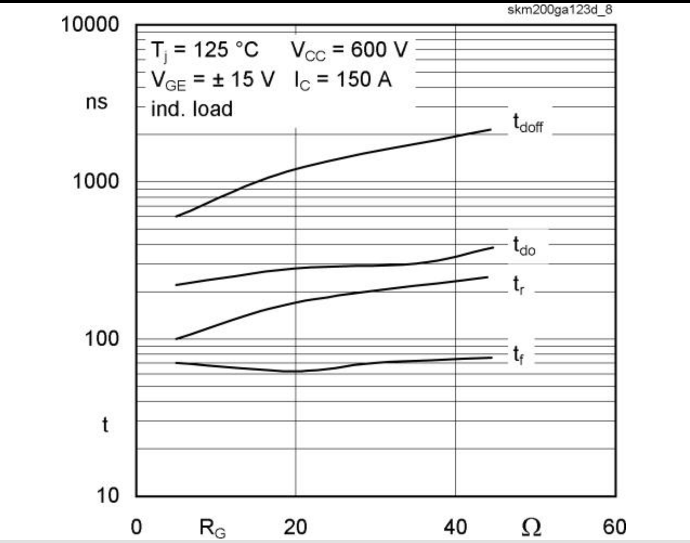


Fig. 8 Typ. switching times vs. gate resistor R_G

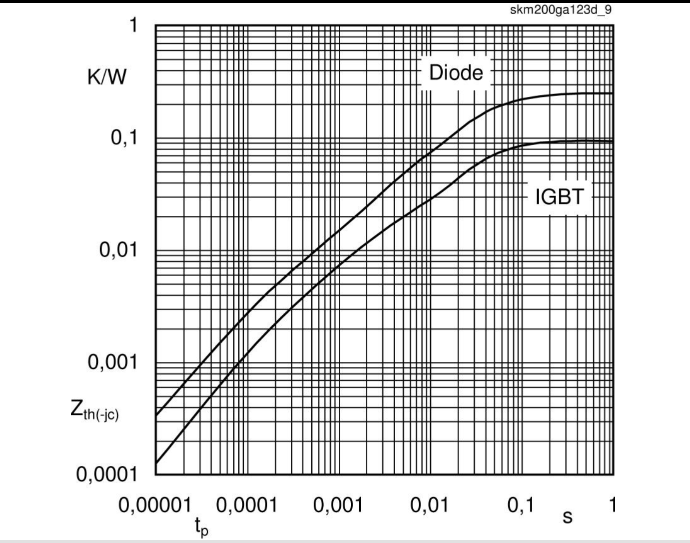


Fig. 9 Transient thermal impedance

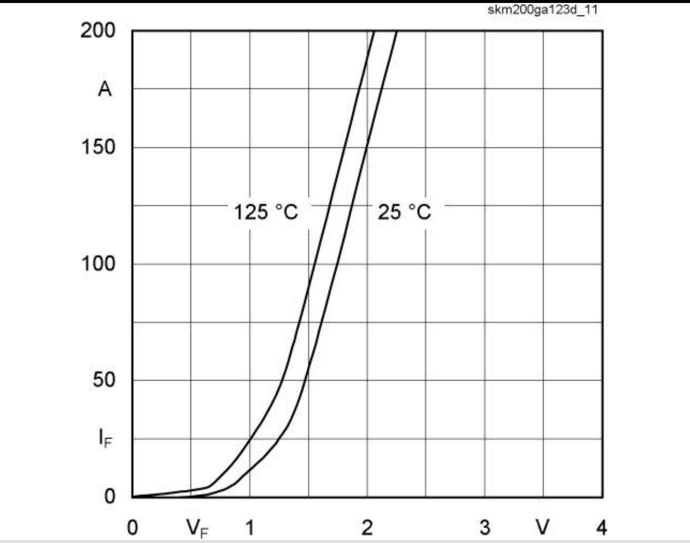


Fig. 10 CAL diode forward characteristic

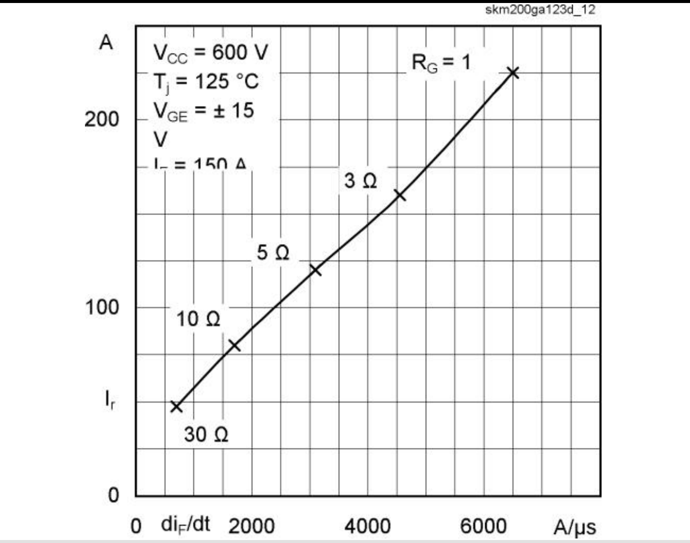


Fig. 11 Typ. CAL diode peak reverse recovery current

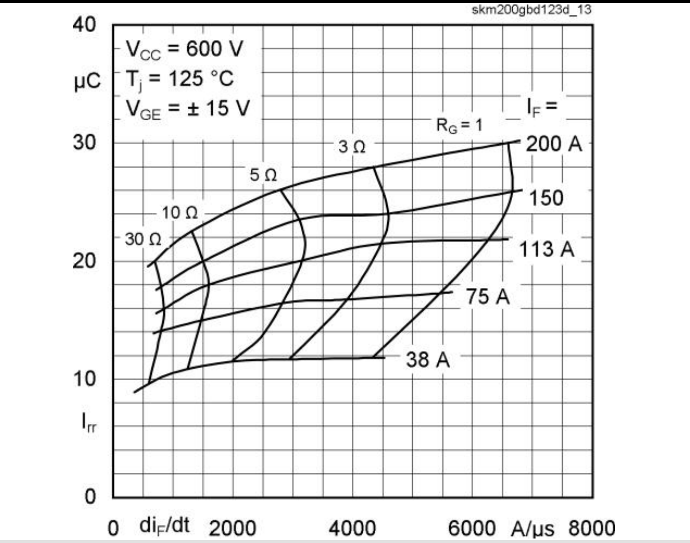
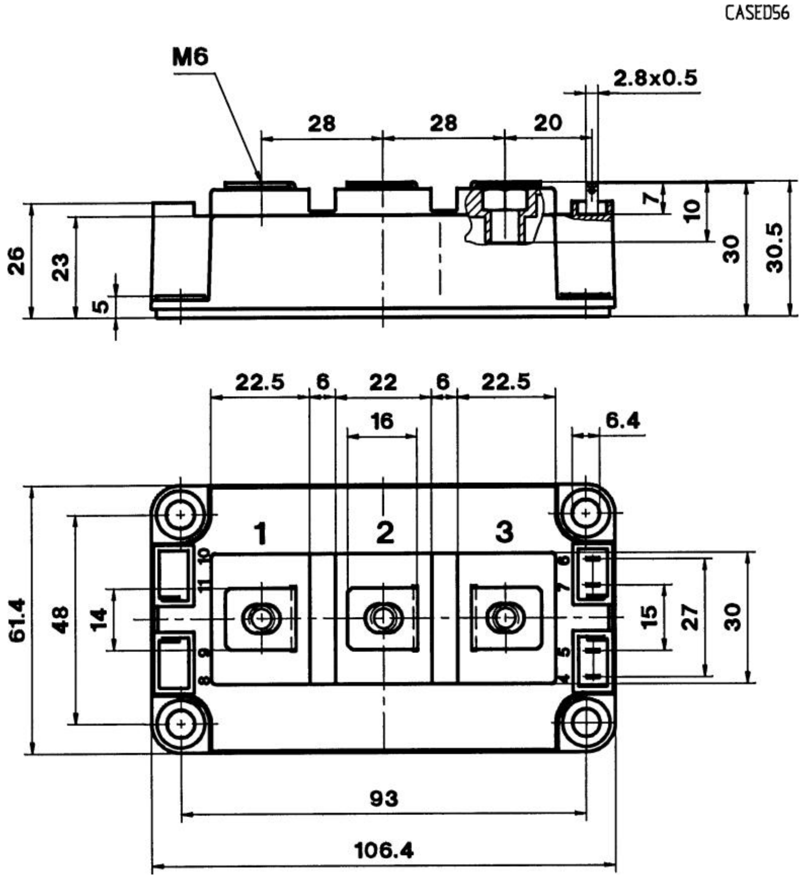


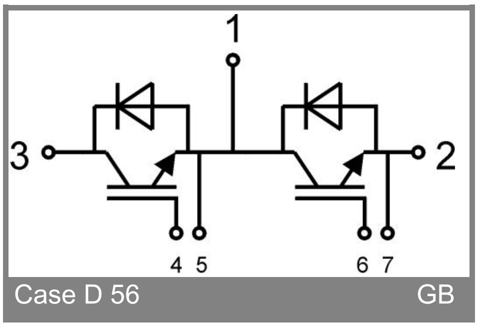
Fig. 12 Typ. CAL diode peak reverse recovery charge

UL Recognized

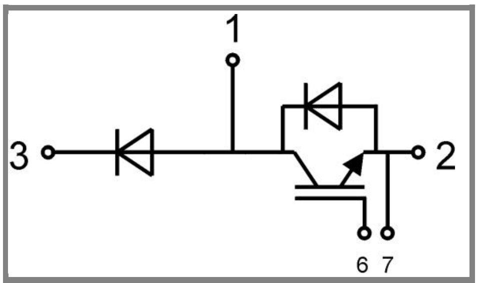
File 63 532



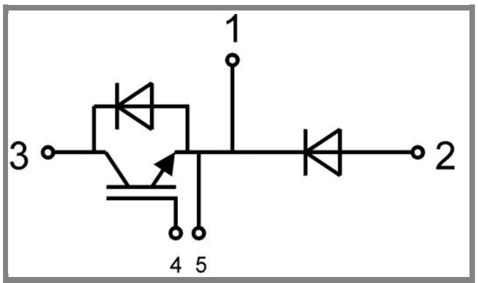
Case D 56



Case D 56 GB



Case D 57 GAL
(56)



Case D 58 GAR
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