SKM 200GB173D

IGBT Modules

SKM 200GB173D

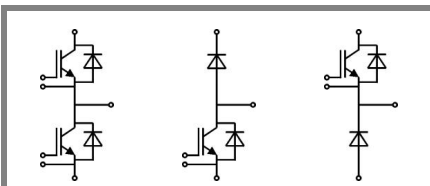**SKM 200GB173D1**

SKM 200GAL173D

SKM 200GAR173D

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 distance (20 mm)

Typical Applications

- AC inverter drives on mains 575 - 750 V_{AC}
- DC bus voltage 750 - 1200 V_{DC}
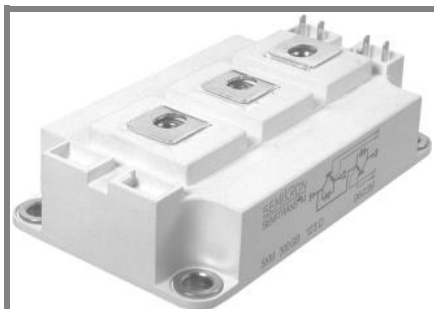- Public transport (auxiliary syst.)
- Switching (not for linear use)

GB   **GAL**   **GAR**

Absolute Maximum Ratings			T_c = 25 °C, unless otherwise specified	
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		1700	V
I_C	T_j = 150 °C	T_{case} = 25 °C	220	A
		T_{case} = 80 °C	150	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		300	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 1200 V; $V_{GE} \leq$ 20 V; T_j = 125 °C V_{CES} < 1700 V		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}		300	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	1450	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	230	A
		T_{case} = 80 °C	150	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		400	A
I_{FSM}	t_p = 10 ms; sin	T_j = 150 °C	2200	A
Module				
$I_{t(RMS)}$			500	A
T_{vj}			- 40 ... + 150	°C
T_{stg}			- 40 ... + 125	°C
V_{isol}	AC, 1 min.		4000	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 = 10 mA		4,8	5,5	6,2	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		1,65	1,9	V
		T_j = 125 °C		1,9	2,15	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C		11,7	13,3	mΩ
		T_j = 125°C		17,3	19	mΩ
$V_{CE(sat)}$	I_{Cnom} = 150 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		3,4	3,9	V
		T_j = 125°C$_{chiplev.}$		4,5	5	V
C_{ies}				20		nF
C_{oes}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		2		nF
C_{res}				0,55		nF
Q_G	VGE=0V/+20V			2000		nC
$t_{d(on)}$				580		ns
t_r	R_{Gon} = 4 Ω	V_{CC} = 1200V		100		ns
E_{on}		I_{Cnom}= 150A		95		mJ
$t_{d(off)}$	R_{Goff} = 4 Ω	T_j = 125 °C		750		ns
t_f		V_{GE} = ± 15V		40		ns
E_{off}				45		mJ
$R_{th(j-c)}$	per IGBT				0,1	K/W

SKM 200GB173D

SEMITRANS® 3

IGBT Modules

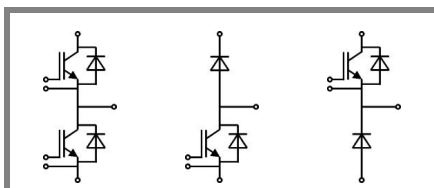**SKM 200GB173D**

SKM 200GB173D1

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GB   **GAL**   **GAR**

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$_{chiplev.}$			2,2	2,7	V
		T_j = 125 °C$_{chiplev.}$			1,9		V
V_{F0}		T_j = 125 °C			1,3	1,5	V
r_F		T_j = 125 °C			4,5	6,2	mΩ
I_{RRM}	I_{Fnom} = 150 A	T_j = 125 °C			85		A
Q_{rr}	di/dt = 1000 A/µs				38		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 1200 V						mJ
$R_{th(j-c)D}$	per diode					0,32	K/W
FWD							
$V_F = V_{EC}$	I_{Fnom} = 150 A; V_{GE} = 0 V	T_j = 25 °C$_{chiplev.}$			2	2,4	V
		T_j = 125 °C$_{chiplev.}$			1,8		V
V_{F0}		T_j = 125 °C			1,3	1,5	V
r_F		T_j = 125 °C			3,5	4,5	V
I_{RRM}	I_{Fnom} = 150 A	T_j = 125 °C			110		A
Q_{rr}					50		µC
E_{rr}	V_{GE} = -15 V; V_{CC} = 1200 V						mJ
$R_{th(j-c)FD}$	per diode					0,21	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
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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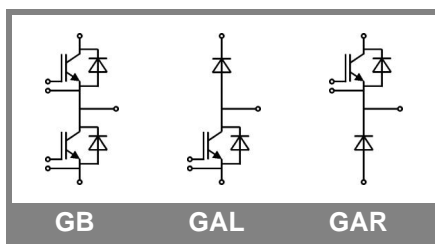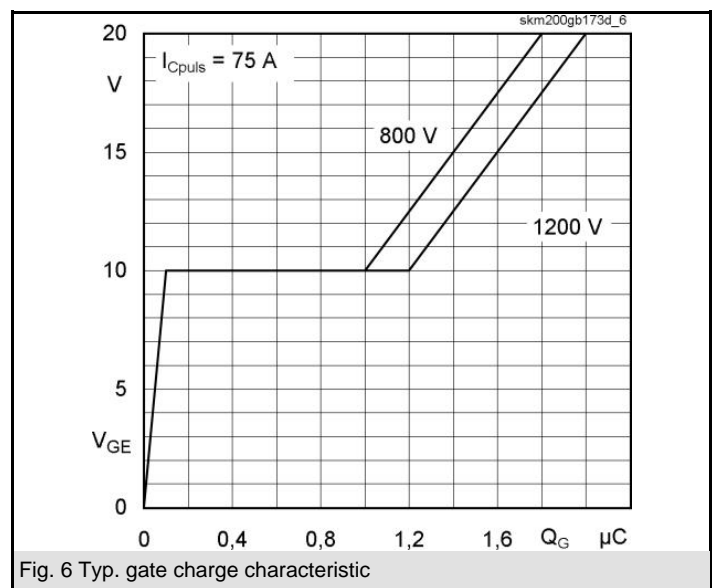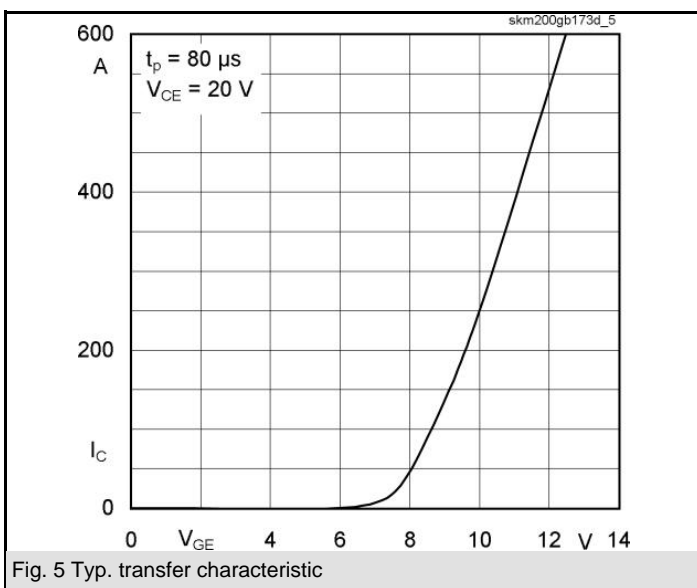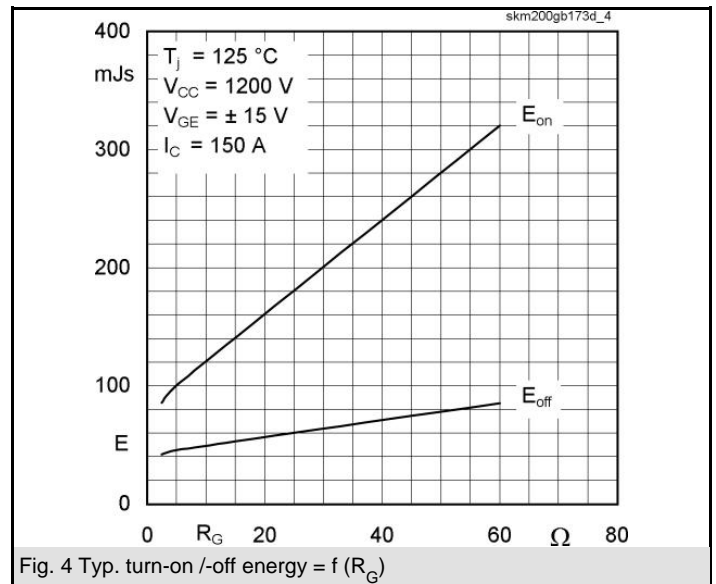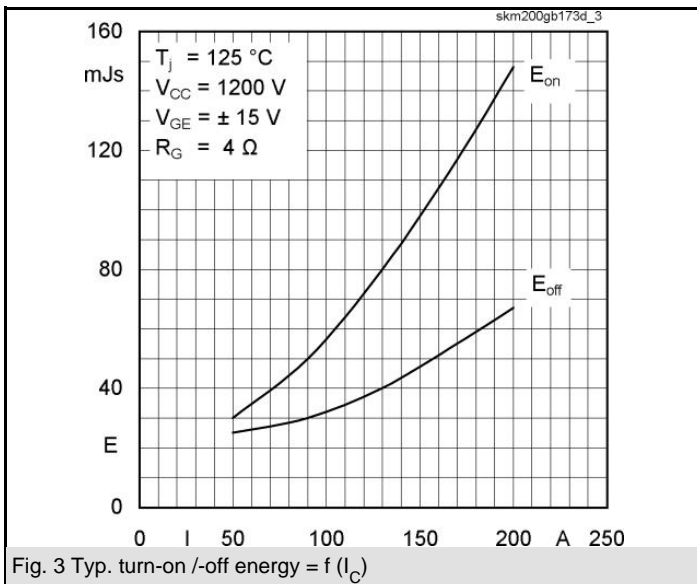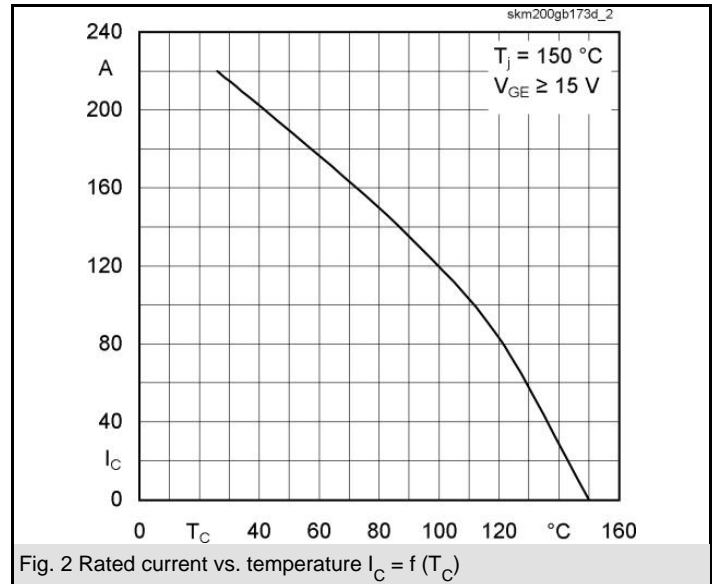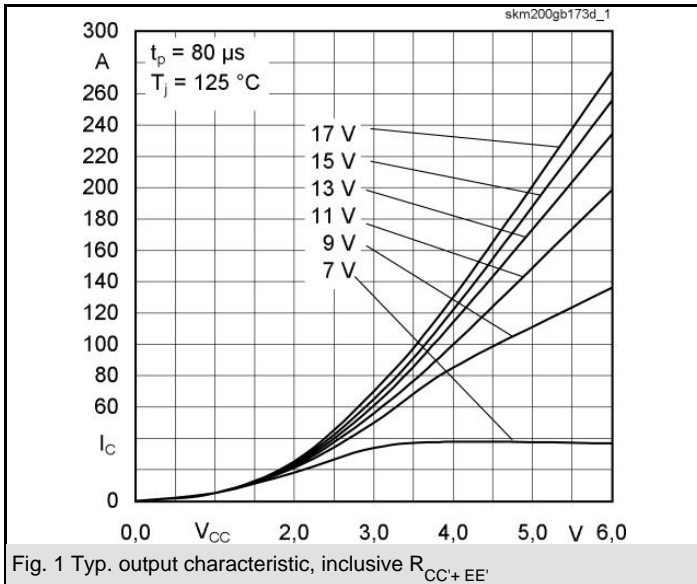**SKM 200GAL173D**

SKM 200GAR173D

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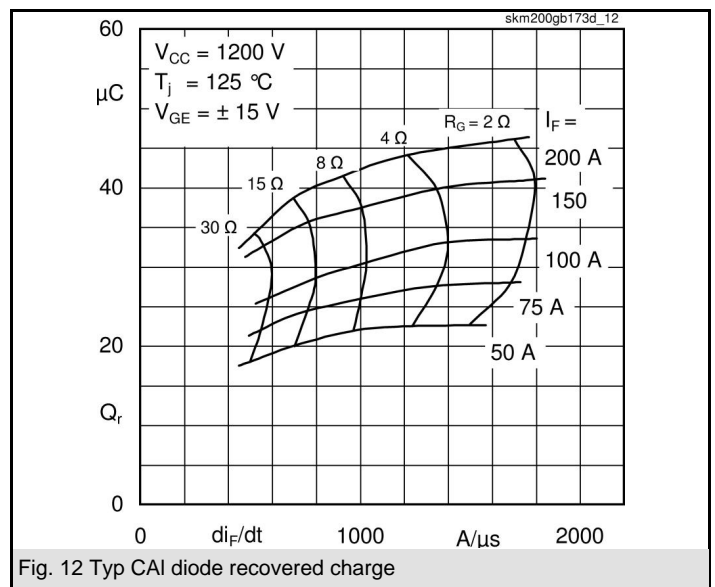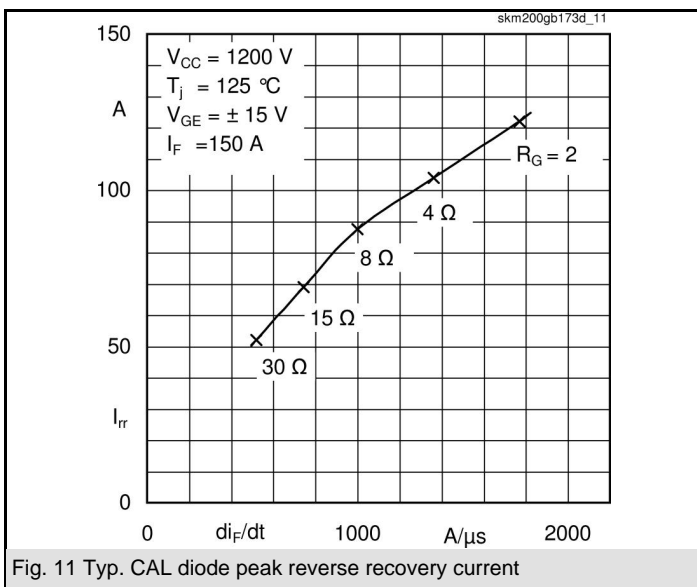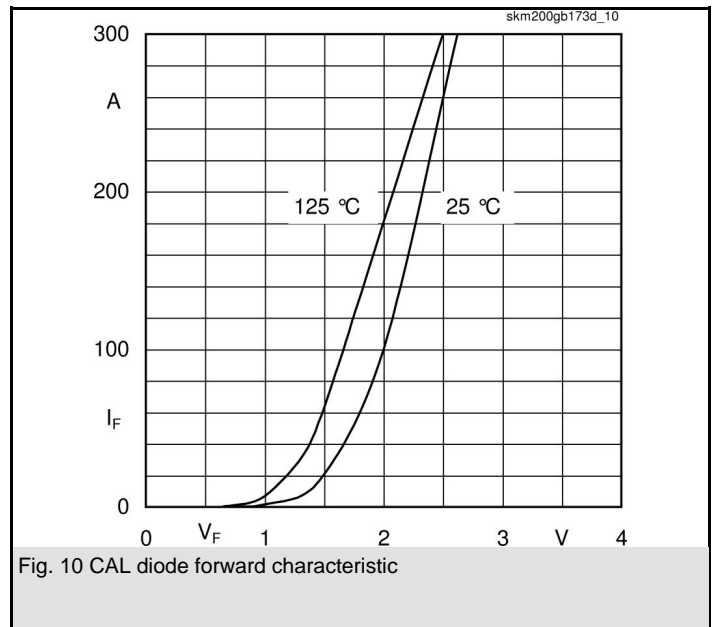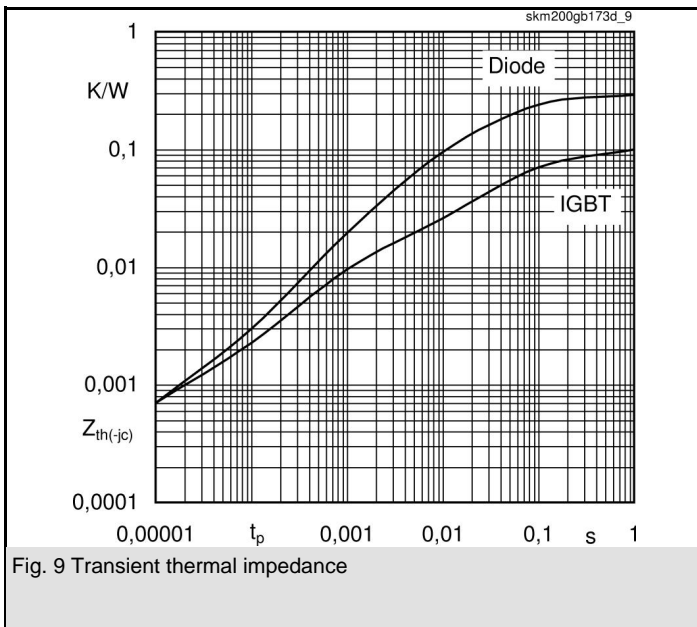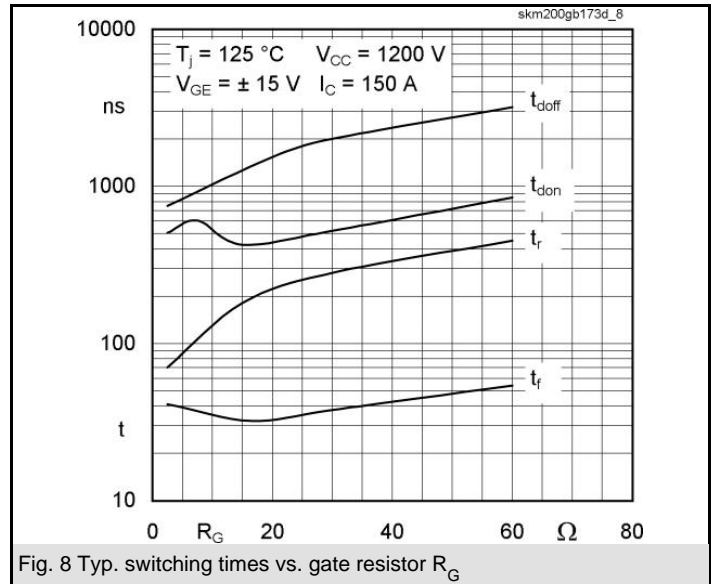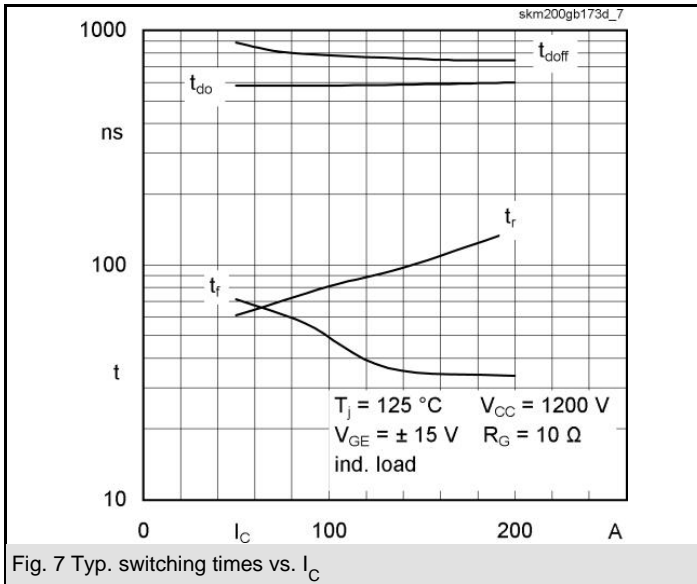- Large clearance (13 mm) and creepage distance (20 mm)

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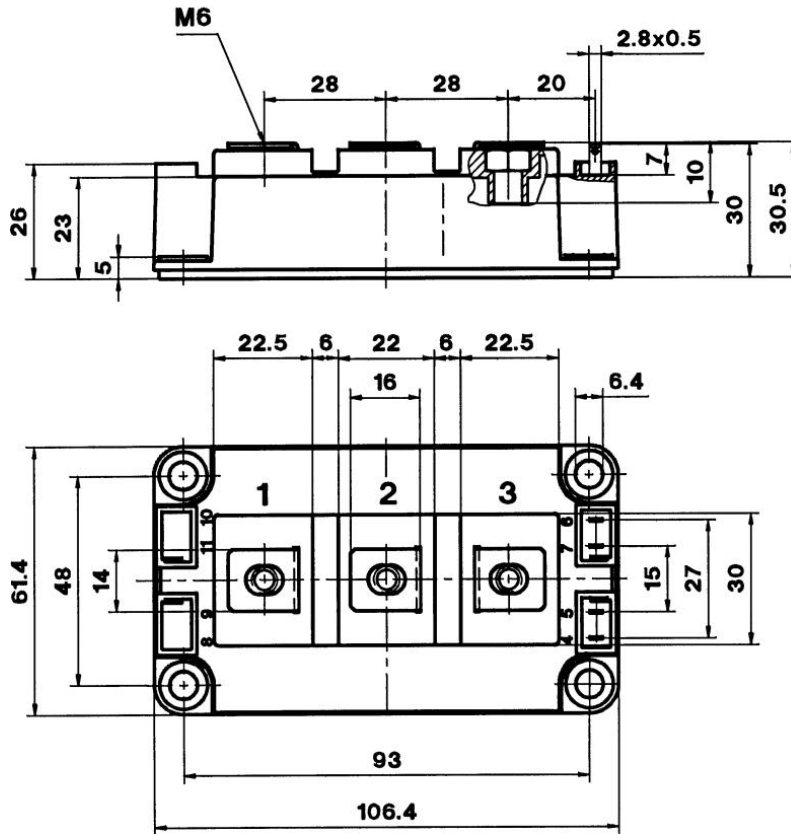- Switching (not for linear use)

| GB | GAL | GAR |

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	72	mk/W
R_i	i = 2	19	mk/W
R_i	i = 3	6,9	mk/W
R_i	i = 4	2,1	mk/W
tau_i	i = 1	0,0946	s
tau_i	i = 2	0,011	s
tau_i	i = 3	0,0011	s
tau_i	i = 4	0	s
$Z_{th(j-c)D}$			
R_i	i = 1	230	mk/W
R_i	i = 2	70	mk/W
R_i	i = 3	17	mk/W
R_i	i = 4	3	mk/W
tau_i	i = 1	0,0839	s
tau_i	i = 2	0,0069	s
tau_i	i = 3	0,0028	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

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Fig. 7 Typ. switching times vs. I_C

T_j = 125 °C V_{CC} = 1200 V
V_{GE} = ± 15 V R_G = 10 Ω
ind. load

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

T_j = 125 °C V_{CC} = 1200 V
V_{GE} = ± 15 V I_C = 150 A

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Fig. 9 Transient thermal impedance

$Z_{th(-jc)}$

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Fig. 10 CAL diode forward characteristic

skm200gb173d_11

Fig. 11 Typ. CAL diode peak reverse recovery current

V_{CC} = 1200 V
T_j = 125 °C
V_{GE} = ± 15 V
I_F = 150 A

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Fig. 12 Typ CAI diode recovered charge
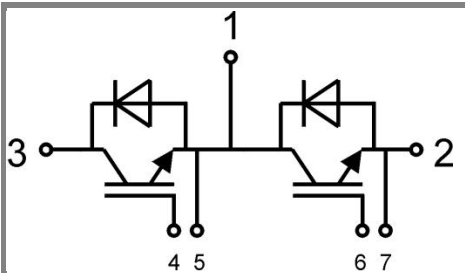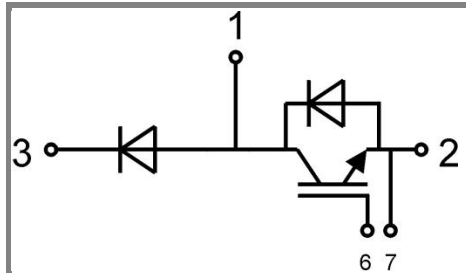
V_{CC} = 1200 V
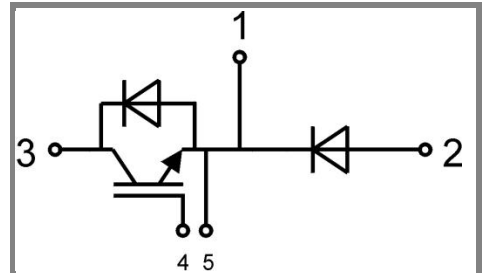T_j = 125 °C
V_{GE} = ± 15 V

CASED56

Case D 56

GB — Case D 56

GAL — Case D 57 (➜ D 56)

GAR — Case D 58 (➜ D 56)