

SKM 200 GARL 066 T



SEMITRANS® 5

Trench IGBT Modules

SKM 200 GARL 066 T

Features

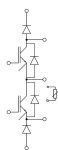
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- Integrated NTC temperature sensor

Typical Applications*

- UPS
- INVERTER

Remarks

- Case temperature limited to $T_c = 125^\circ\text{C}$ max, recommended $T_{op} = -40..+150^\circ\text{C}$
- Recommended $T_{op} = -40..+150^\circ\text{C}$
- T_{vj} is intended as absolute maximum rating
- Fig.2 is referred to IGBT current capability



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Absolute Maximum Ratings			T _{case} = 25°C, unless otherwise specified	
Symbol	Conditions		Values	Units
IGBT				
V _{CES}	T _j = 25 °C		600	V
I _C	T _j = 175 °C	T _c = 25 °C	280	A
		T _c = 80 °C	210	A
I _{CRM}	I _{CRM} =2xI _{Cnom}		400	A
V _{GES}			± 20	V
t _{psc}	V _{CC} = 360 V; V _{GE} ≤ 15 V; T _j = 150 °C V _{CES} < 600 V		6	μs
Inverse Diode				
I _F	T _j = 175 °C	T _c = 25 °C	27	A
		T _c = 80 °C	20	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		40	A
I _{FSM}	t _p = 10 ms; half sine wave T _j = 150 °C		95	A
Freewheeling Diode				
I _F	T _j = 175 °C	T _c = 25 °C	270	A
		T _c = 80 °C	200	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		400	A
I _{FSM}	t _p = 10 ms; half sine wave T _j = 150 °C		1620	A
Module				
I _{t(RMS)}			500	A
T _{vj}			- 40 ... + 175	°C
T _{stg}			- 40 ... + 125	°C
V _{isol}	AC, 1 min.		2500	V

Characteristics			T _{case} = 25°C, unless otherwise specified			
Symbol	Conditions		min.	typ.	max.	Units
IGBT						
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 3,2 mA		5	5,8	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C				0,5	mA
I _{GES}	V _{CE} = 0 V, V _{GE} = 20 V T _j = 25 °C				1200	nA
V _{CE0}	T _j = 25 °C			0,9	1	V
	T _j = 150 °C			0,7	0,8	V
r _{CE}	V _{GE} = 15 V T _j = 25°C			2,7	4,5	mΩ
	T _j = 150°C			5	6,5	mΩ
V _{CE(sat)}	I _{Cnom} = 200 A, V _{GE} = 15 V T _j = 25°C _{chiplev.}			1,45	1,9	V
	T _j = 150°C _{chiplev.}			1,7	2,1	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz			12,3		nF
C _{oes}				0,76		nF
C _{res}				0,36		nF
Q _G	V _{GE} = -8V...+15V			2254		nC
R _{Gint}	T _j = 25 °C			1		Ω
t _{d(on)}	R _{Gon} = 1 Ω di/dt = 1700 A/μs	V _{CC} = 300V I _C = 200A T _j = 150 °C V _{GE} = -8V/+15V		93		ns
t _r				113		ns
E _{on}				2,24		mJ
t _{d(off)}	R _{Goff} = 1 Ω di/dt = 2000 A/μs			317		ns
t _f				102		ns
E _{off}				7,89		mJ
R _{th(j-c)}	per IGBT			0,21		K/W

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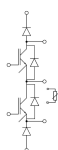
Remarks

- Case temperature limited to $T_C = 125^\circ\text{C}$ max, recommended $T_{op} = -40..+150^\circ\text{C}$
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- Fig.2 is referred to IGBT current capability

Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 20\text{ A}; V_{GE} = 0\text{ V}$				
	$T_j = 25^\circ\text{C}_{chiplev.}$		1,45	1,7	V
	$T_j = 150^\circ\text{C}_{chiplev.}$		1,45	1,7	V
V_{F0}					
	$T_j = 25^\circ\text{C}$		1	1,1	V
	$T_j = 150^\circ\text{C}$		0,9	1	V
r_F					
	$T_j = 25^\circ\text{C}$		22,5	30	mΩ
	$T_j = 150^\circ\text{C}$		27,5	35	mΩ
I_{RRM}	$I_F = 20\text{ A}$				A
Q_{rr}					μC
E_{rr}	$V_{GE} = -8\text{ V}; V_{CC} = 300\text{ V}$				mJ
$R_{th(j-c)D}$	per diode		3		K/W
Free-wheeling diode					
$V_F = V_{EC}$	$I_{Fnom} = 200\text{ A}; V_{GE} = 0\text{ V}$				
	$T_j = 25^\circ\text{C}_{chiplev.}$		1,4	1,6	V
	$T_j = 150^\circ\text{C}_{chiplev.}$		1,3	1,45	V
V_{F0}					
	$T_j = 25^\circ\text{C}$		0,95	1	V
	$T_j = 150^\circ\text{C}$		0,85	0,9	V
r_F					
	$T_j = 25^\circ\text{C}$		2,2	3	V
	$T_j = 150^\circ\text{C}$		2,1	2,7	V
I_{RRM}	$I_F = 200\text{ A}$		175,8		A
Q_{rr}	$di/dt = 2000\text{ A}/\mu\text{s}$		12		μC
E_{rr}	$V_{GE} = -15/+15\text{ V}; V_{CC} = 300\text{ V}$		4		mJ
$R_{th(j-c)FD}$	per diode		0,39		K/W
$R_{th(c-s)}$	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				310	g
Temperature sensor					
R_{100}	$T_s = 100^\circ\text{C} (R_{25} = 5\text{ k}\Omega)$		493±5%		Ω
					K

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 staff.



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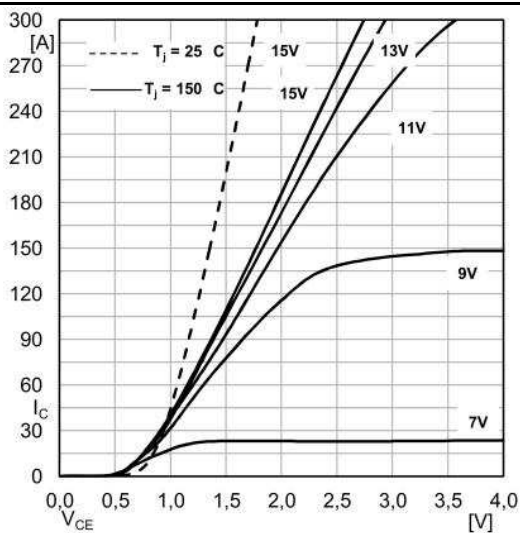


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

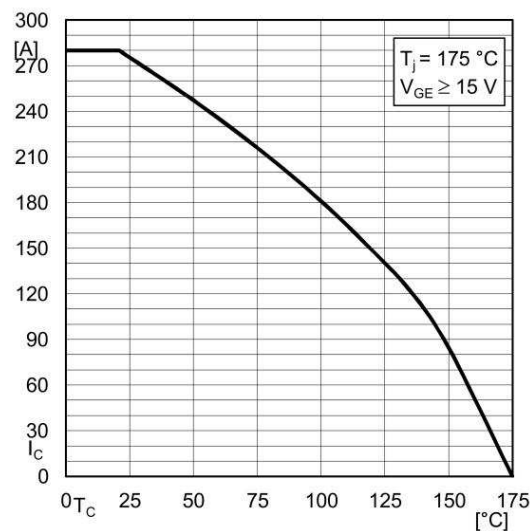


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

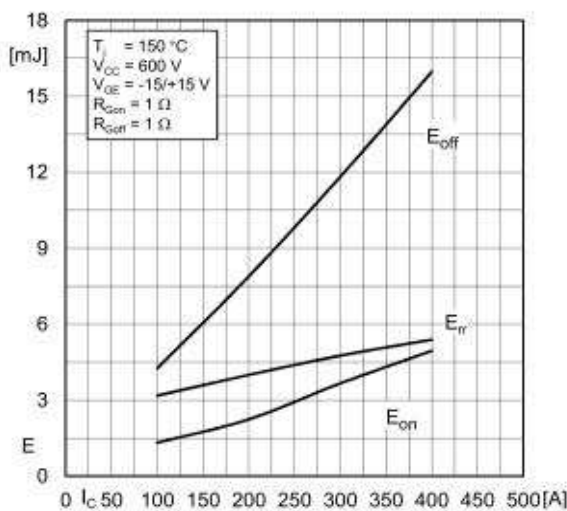


Fig. 3 Typ. turn-on /off energy = $f(I_C)$

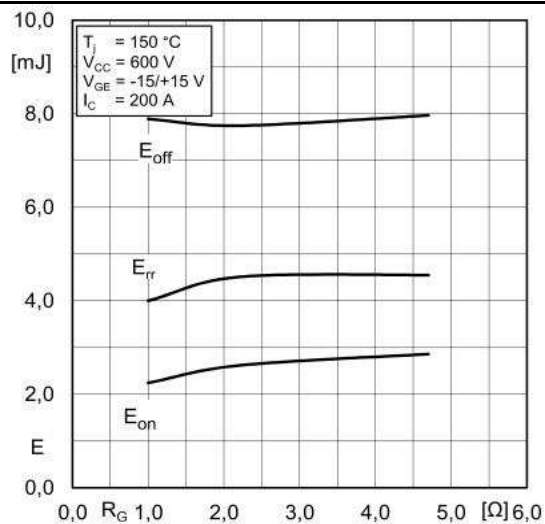


Fig. 4 Typ. turn-on /off energy = $f(R_G)$

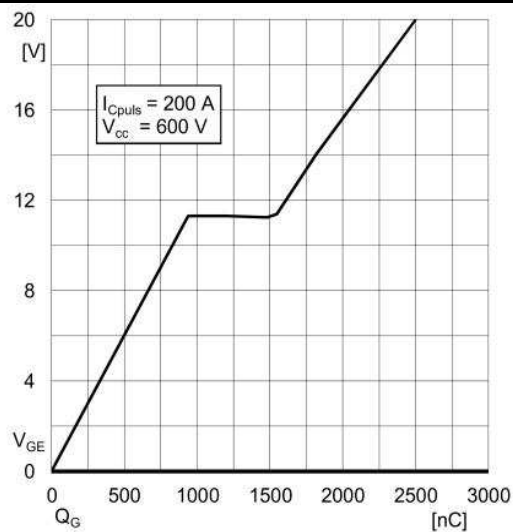
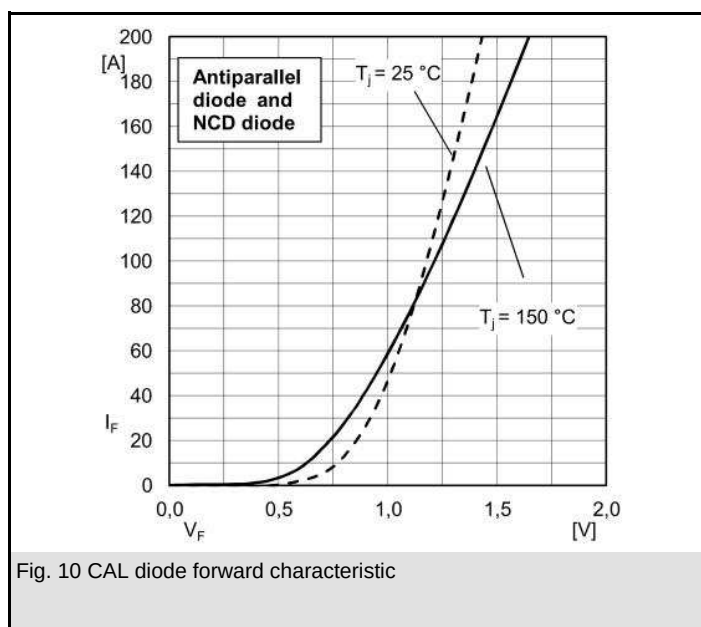
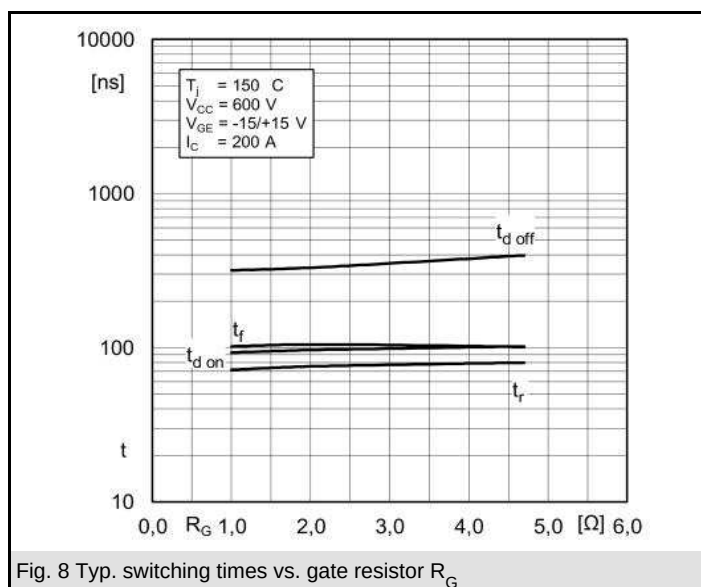
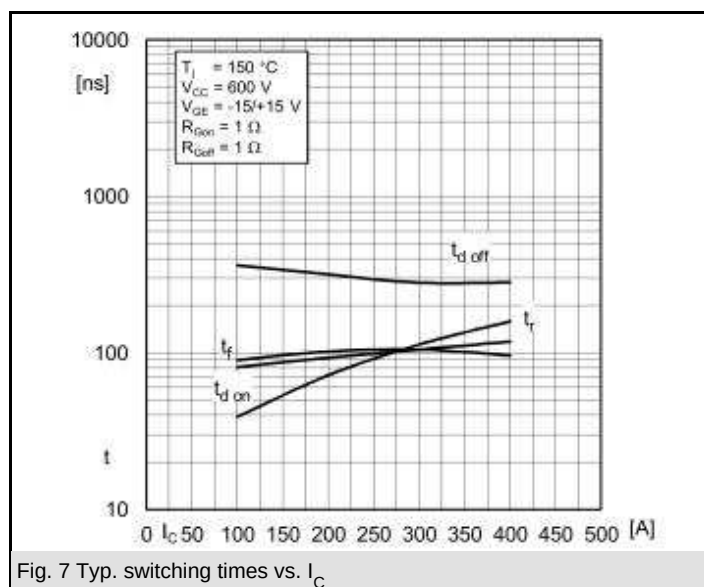


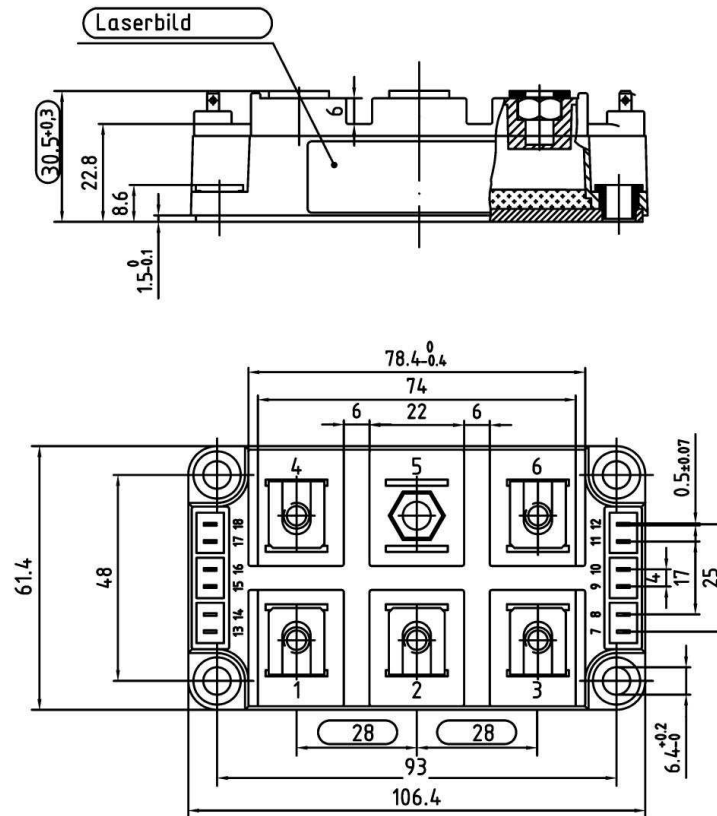
Fig. 6 Typ. gate charge characteristic



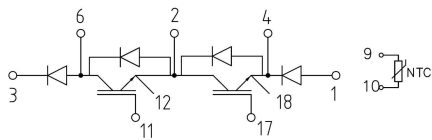
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Case D61



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Case D61