

# SKM 200 GARL 066 T



**SEMITRANS<sup>®</sup> 5**

## Trench IGBT Modules

### SKM 200 GARL 066 T

#### Features

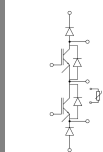
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$  with positive temperature coefficient
- Integrated NTC temperature sensor

#### 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



**GARL-T**

Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$	$T_j = 25^\circ\text{C}$	600		V
$I_C$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	280	A
		$T_c = 80^\circ\text{C}$	210	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	400		A
$V_{GES}$		$\pm 20$		V
$t_{psc}$	$V_{CC} = 360\text{ V}; V_{GE} \leq 15\text{ V}; T_j = 150^\circ\text{C}$ $V_{CES} < 600\text{ V}$	6		$\mu\text{s}$
<b>Inverse Diode</b>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	27	A
		$T_c = 80^\circ\text{C}$	20	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	40		A
$I_{FSM}$	$t_p = 10\text{ ms};$ half sine wave $T_j = 150^\circ\text{C}$	95		A
<b>Freewheeling Diode</b>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	270	A
		$T_c = 80^\circ\text{C}$	200	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	400		A
$I_{FSM}$	$t_p = 10\text{ ms};$ half sine wave $T_j = 150^\circ\text{C}$	1620		A
<b>Module</b>				
$I_{t(RMS)}$		500		A
$T_{vj}$		- 40 ... + 175		$^\circ\text{C}$
$T_{stg}$		- 40 ... + 125		$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	2500		V

Characteristics		$T_{case} = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 3,2\text{ mA}$	5	5,8	6,5	V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$ $T_j = 25^\circ\text{C}$			0,5	mA
$I_{GES}$	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}$ $T_j = 25^\circ\text{C}$			1200	nA
$V_{CE0}$		$T_j = 25^\circ\text{C}$	0,9	1	V
		$T_j = 150^\circ\text{C}$	0,7	0,8	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	2,7	4,5	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	5	6,5	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 200\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,45	1,9	V
		$T_j = 150^\circ\text{C}_{chiplev.}$	1,7	2,1	V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$ $f = 1\text{ MHz}$	12,3		nF	
$C_{oes}$		0,76		nF	
$C_{res}$		0,36		nF	
$Q_G$	$V_{GE} = -8\text{V}...+15\text{V}$	2254		nC	
$R_{Gint}$	$T_j = 25^\circ\text{C}$	1		$\Omega$	
$t_{d(on)}$	$R_{Gon} = 1\ \Omega$ $di/dt = 1700\text{ A}/\mu\text{s}$	93		ns	
$t_r$		113		ns	
$E_{on}$	$R_{Goff} = 1\ \Omega$ $di/dt = 2000\text{ A}/\mu\text{s}$	$V_{CC} = 300\text{V}$ $I_C = 200\text{A}$	2,24		mJ
$t_{d(off)}$		$T_j = 150^\circ\text{C}$	317		ns
$t_f$		$V_{GE} = -8\text{V}/+15\text{V}$	102		ns
$E_{off}$		7,89		mJ	
$R_{th(j-c)}$	per IGBT	0,21		K/W	

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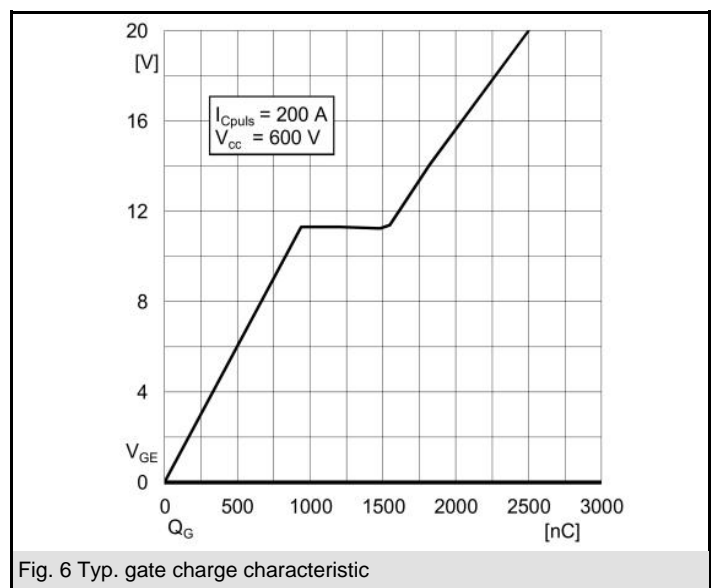
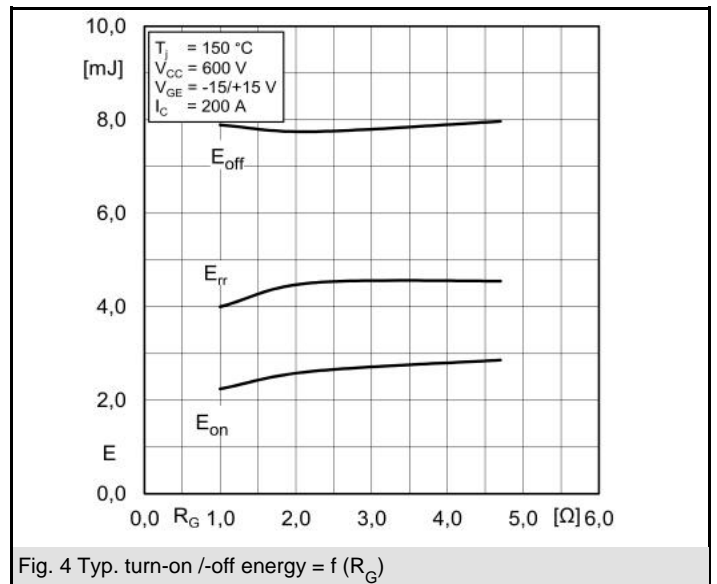
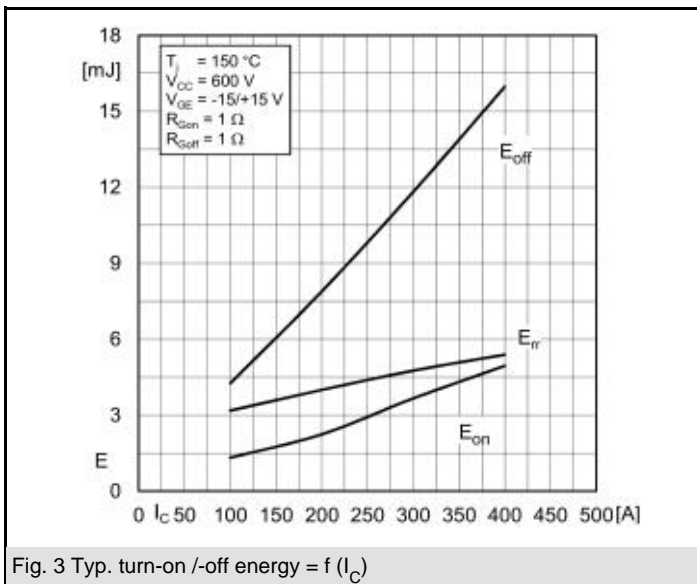
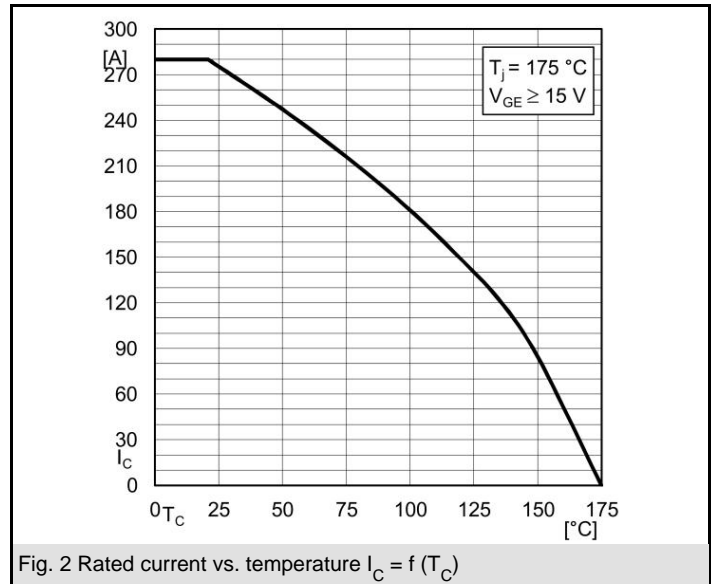
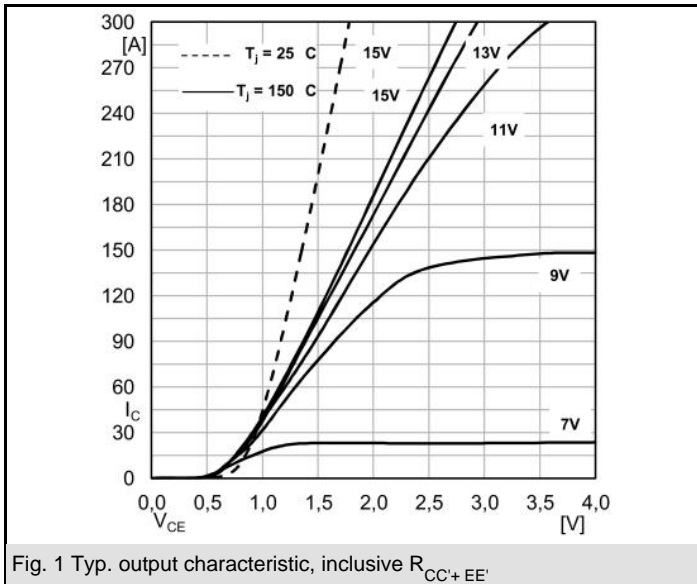


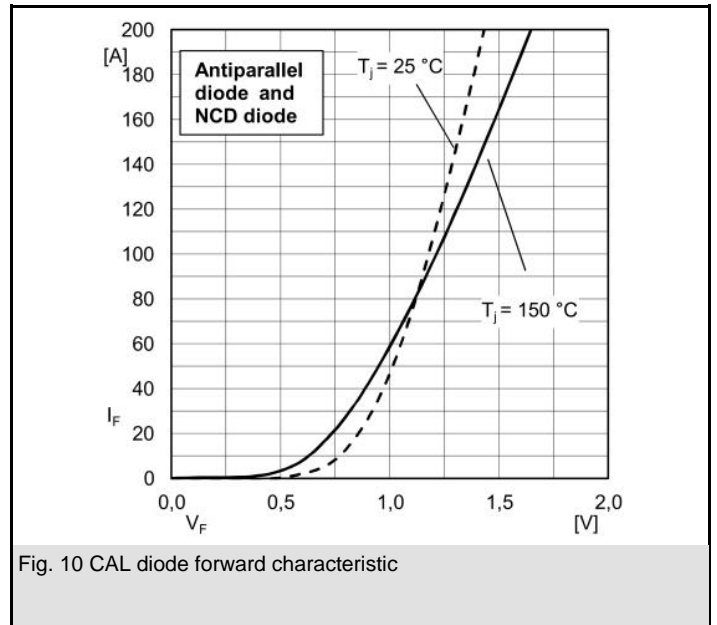
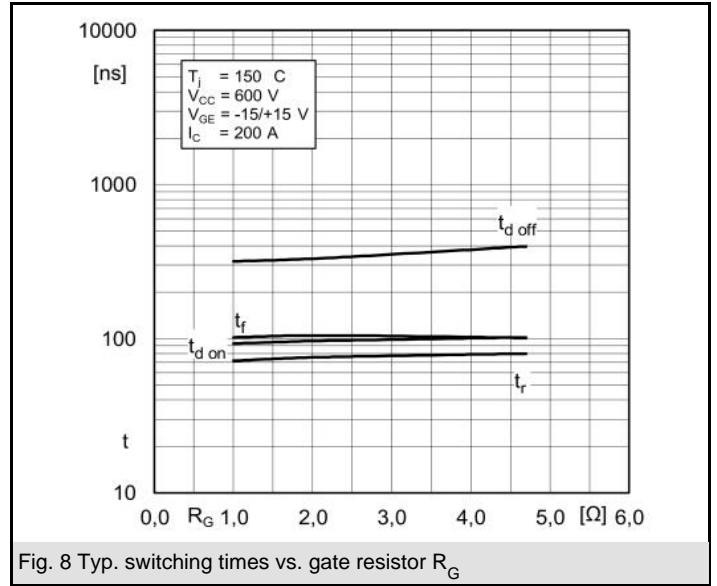
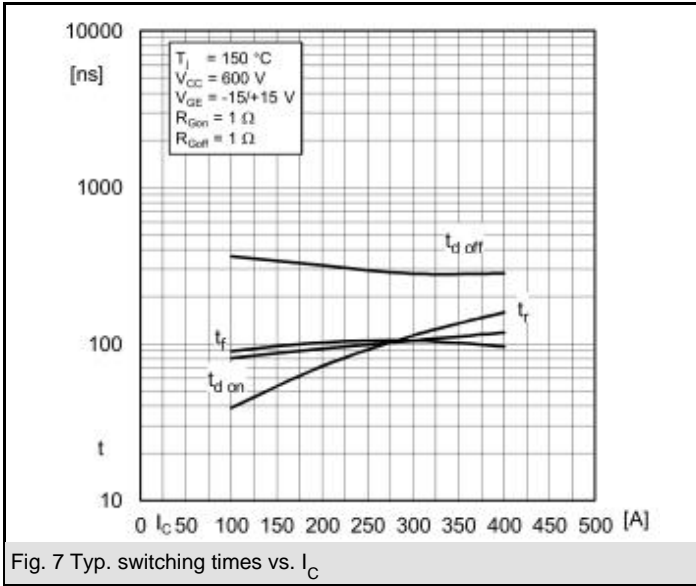
**GARL-T**

Characteristics			min.	typ.	max.	Units
Symbol	Conditions					
<b>Inverse Diode</b>						
$V_F = V_{EC}$	$I_{Fnom} = 20 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$		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
$I_{RRM}$	$I_F = 20 \text{ A}$	$T_j = 150^\circ\text{C}$				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
<b>Free-wheeling diode</b>						
$V_F = V_{EC}$	$I_{Fnom} = 200 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$		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
$I_{RRM}$	$I_F = 200 \text{ A}$	$T_j = 150^\circ\text{C}$		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
<b>Temperature sensor</b>						
$R_{100}$	$T_s = 100^\circ\text{C} (R_{25} = 5\text{k}\Omega)$			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.

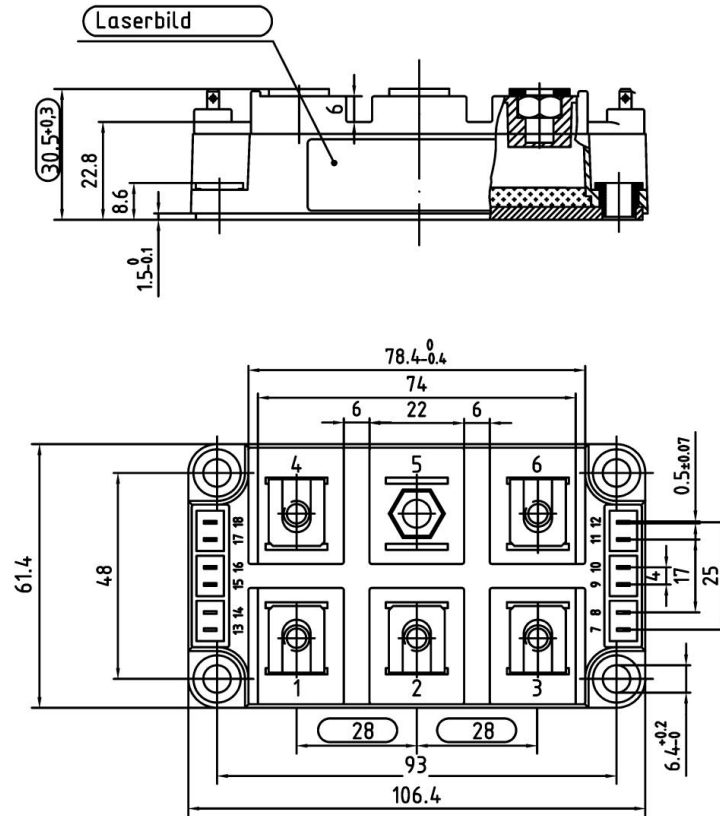




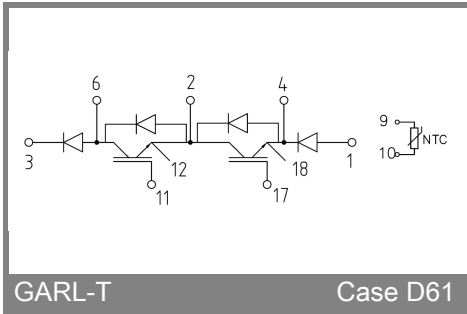
# SKM 200 GARL 066 T

UL recognized

file no. E 63 532



Case D61



GARL-T

Case D61