

# SKM 300 GARL 066 T



**SEMITRANS<sup>®</sup> 5**

## Trench IGBT Modules

### SKM 300 GARL 066 T

#### Target Data

#### Features

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

#### Typical Applications

- UPS
- 3 Level Inverter

#### Remarks

- Case temperature limited to  $T_c = 125^\circ\text{C}$  max, recommended  $T_{op} = -40..+150^\circ\text{C}$



**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	
$I_C$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	400	A
		$T_c = 80^\circ\text{C}$	300	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	600	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>				
$I_F$	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	40	A
		$T_c = 80^\circ\text{C}$	30	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	60	A	
$I_{FSM}$	$t_p = 10\text{ ms}; \text{half sine wave } T_j = 150^\circ\text{C}$	160	A	
<b>Freewheeling Diode</b>				
$I_F$	$T_j = 175^\circ\text{C}$	$T_c = 25^\circ\text{C}$	400	A
		$T_c = 80^\circ\text{C}$	290	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	600	A	
$I_{FSM}$	$t_p = 10\text{ ms}; \text{half sine wave } T_j = 150^\circ\text{C}$	2100	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>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 4,8\text{ mA}$	5	5,8	6,5	V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES} T_j = 25^\circ\text{C}$			0,015	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
		$T_j = 150^\circ\text{C}$	0,85	0,9	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	1,8	3	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	2,7	3,8	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 300\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,45	1,9	V
		$T_j = 150^\circ\text{C}_{chiplev.}$	1,7	2,1	V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V} f = 1\text{ MHz}$		18,4		nF
$C_{oes}$			1,14		nF
$C_{res}$			0,54		nF
$R_{Gint}$	$T_j = ^\circ\text{C}$		1		$\Omega$
$t_{d(on)}$	$R_{Gon} = 1\ \Omega$	$V_{CC} = 300\text{ V}$ $I_C = 300\text{ A}$ $T_j = 150^\circ\text{C}$ $V_{GE} = -8\text{ V}/+15\text{ V}$	1,56		ns
$t_r$					ns
$E_{on}$					mJ
$t_{d(off)}$	$R_{Goff} = 2\ \Omega$				ns
$t_f$					ns
$E_{off}$				9,4	mJ
$R_{th(j-c)}$	per IGBT		0,15		K/W

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Characteristics		min.	typ.	max.	Units
Symbol	Conditions				
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 30\text{ A}; V_{GE} = 0\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,45	1,7	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	1,45	1,7	V
$V_{F0}$		$T_j = 25^\circ\text{C}$	1	1,1	V
		$T_j = 125^\circ\text{C}$	0,9	1	V
$r_F$		$T_j = 25^\circ\text{C}$	15	20	mΩ
		$T_j = 125^\circ\text{C}$	18	23,3	mΩ
$I_{RRM}$	$I_F = 30\text{ A}$	$T_j = 125^\circ\text{C}$			A
$Q_{rr}$					μC
$E_{rr}$	$V_{GE} = -8\text{ V}; V_{CC} = 300\text{ V}$				mJ
$R_{th(j-c)D}$	per diode		2		K/W
<b>Free-wheeling diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 300\text{ A}; V_{GE} = 0\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,35	1,6	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	1,3	1,5	V
$V_{F0}$		$T_j = 25^\circ\text{C}$	0,9	1	V
		$T_j = 125^\circ\text{C}$	0,85	0,9	V
$r_F$		$T_j = 25^\circ\text{C}$	1,5	2	V
		$T_j = 125^\circ\text{C}$	1,5	2	V
$I_{RRM}$	$I_F = 300\text{ A}$	$T_j = 125^\circ\text{C}$			A
$Q_{rr}$					μC
$E_{rr}$	$V_{GE} = 0\text{ V}; V_{CC} = 600\text{ V}$		5		mJ
$R_{th(j-c)FD}$	per diode		0,26		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

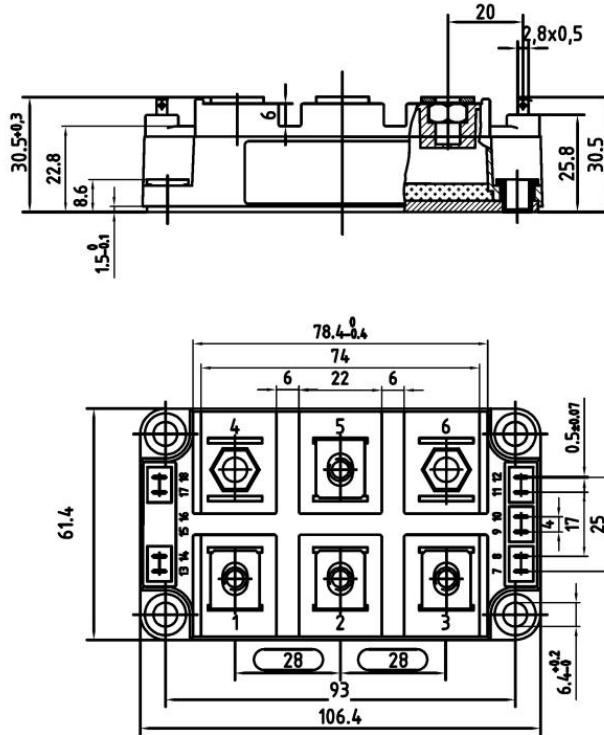
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

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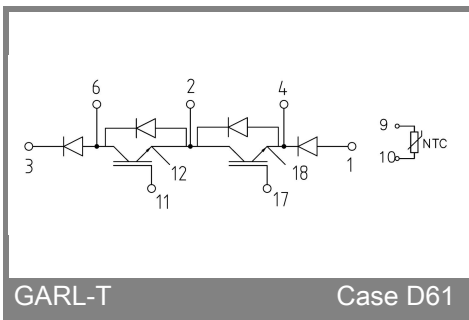


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Case D61



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