

# SK50GARL065F



SEMITOP® 2

## IGBT Module

SK50GARL065F

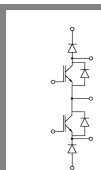
Preliminary Data

### Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- N-channel homogeneous silicon structure (NPT-Non punch-through IGBT)
- Low tail current with low temperature dependence
- Low threshold voltage
- Fast Turbo diode

### Typical Applications\*

- Switching (not for linear use)
- Inverter
- Switched mode power supplies
- UPS



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Absolute Maximum Ratings		$T_s = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$	$T_j = 25^\circ\text{C}$	600		V
$I_C$	$T_j = 125^\circ\text{C}$	$T_s = 25^\circ\text{C}$	54	A
		$T_s = 80^\circ\text{C}$	40	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	120		A
$V_{GES}$		$\pm 20$		V
$t_{psc}$	$V_{CC} = 300\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 600\text{ V}$	10		$\mu\text{s}$
<b>Inverse Diode</b>				
$I_F$	$T_j = 150^\circ\text{C}$	$T_s = 25^\circ\text{C}$	25	A
		$T_s = 80^\circ\text{C}$	17	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$			A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{half sine wave}$ $T_j = 150^\circ\text{C}$	100		A
<b>Freewheeling Diode</b>				
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	82	A
		$T_{case} = 80^\circ\text{C}$	50	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	120		A
<b>Module</b>				
$I_{t(RMS)}$				A
$T_{vj}$		-40 ... +150		$^\circ\text{C}$
$T_{stg}$		-40 ... +125		$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	2500		V

Characteristics		$T_s = 25^\circ\text{C}$ , unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
<b>IGBT</b>						
$V_{GE(th)}$	$V_{GE} = V_{CE}; I_C = 0,7\text{ mA}$	3	4	5	V	
$I_{CES}$	$V_{GE} = 600\text{ V}, V_{CE} = V_{CES}$ $T_j = 25^\circ\text{C}$			0,0022	mA	
$I_{GES}$	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}$ $T_j = 25^\circ\text{C}$			120	nA	
$V_{CE0}$		$T_j = 25^\circ\text{C}$	1,2	1,3	V	
		$T_j = 125^\circ\text{C}$	1,1	1,2	V	
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$			12	m $\Omega$
		$T_j = 125^\circ\text{C}$			22	m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 60\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,7	2	V	
		$T_j = 125^\circ\text{C}_{chiplev.}$	2,2	2,2	V	
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$ $f = 1\text{ MHz}$			3,2	nF	
$C_{oes}$				0,3	nF	
$C_{res}$				0,18	nF	
$Q_G$	$V_{GE} = 0 \dots 20\text{ V}$			368	nC	
$t_{d(on)}$	$R_{Gon} = 15\ \Omega$	$V_{CC} = 300\text{ V}$ $I_C = 40\text{ A}$			47	ns
$t_r$					40	ns
$E_{on}$	$R_{Goff} = 15\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$			1,03	mJ
$t_{d(off)}$					203	ns
$t_f$					33	ns
$E_{off}$					0,8	mJ
$R_{th(j-s)}$	per IGBT			0,85	K/W	

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## IGBT Module

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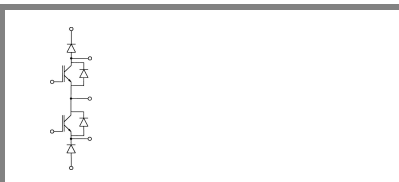
Preliminary Data

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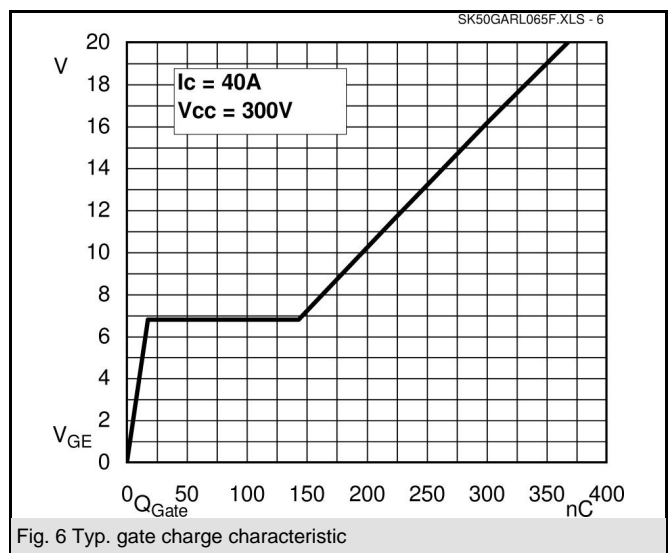
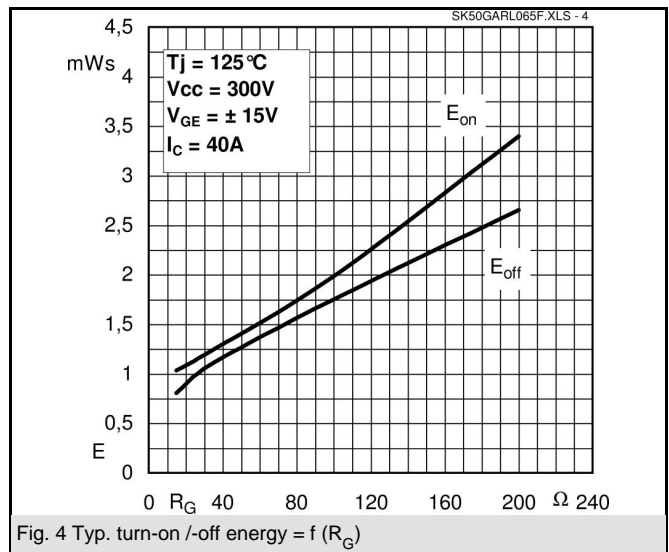
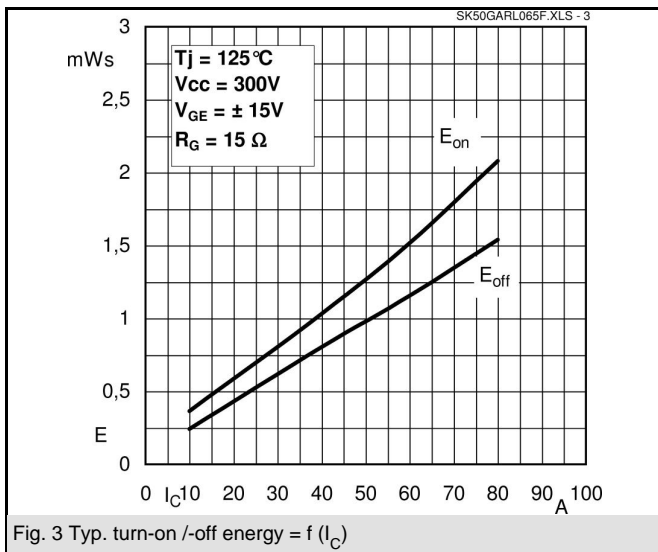
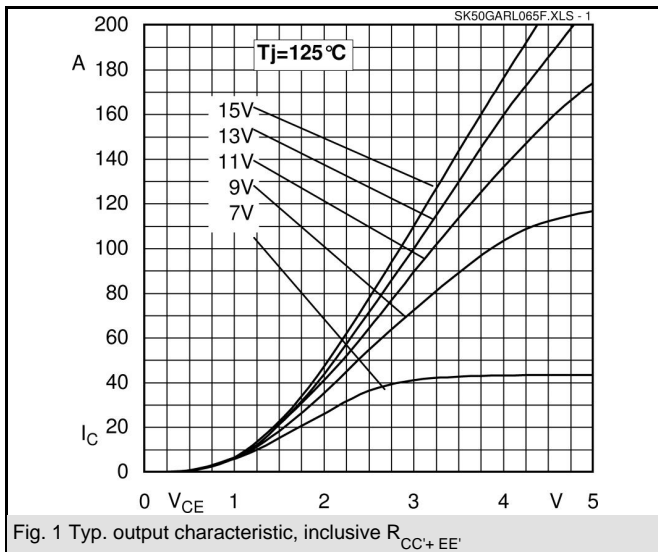


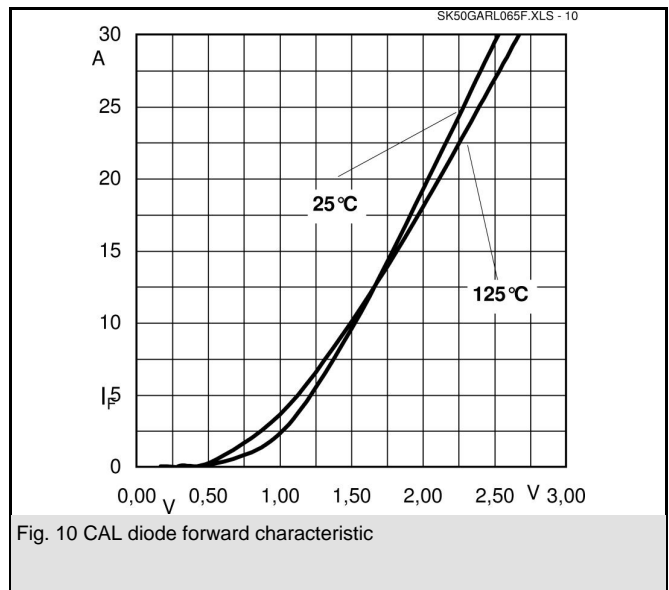
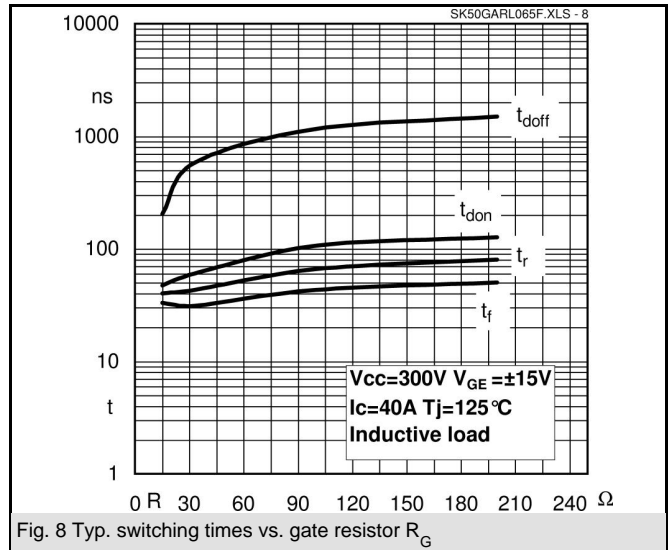
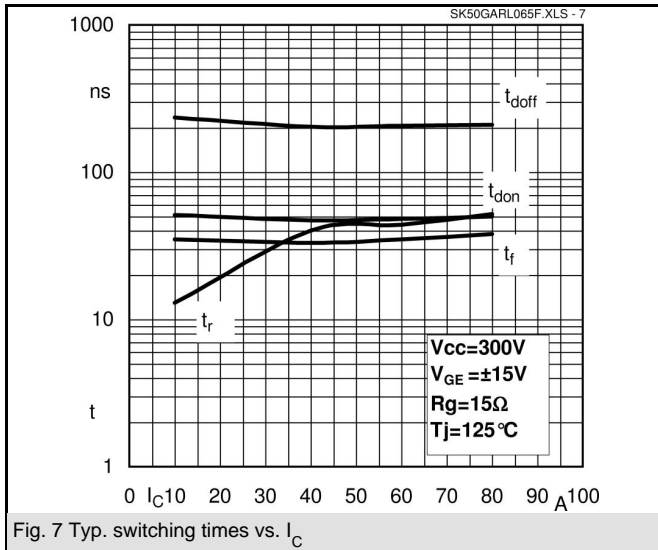
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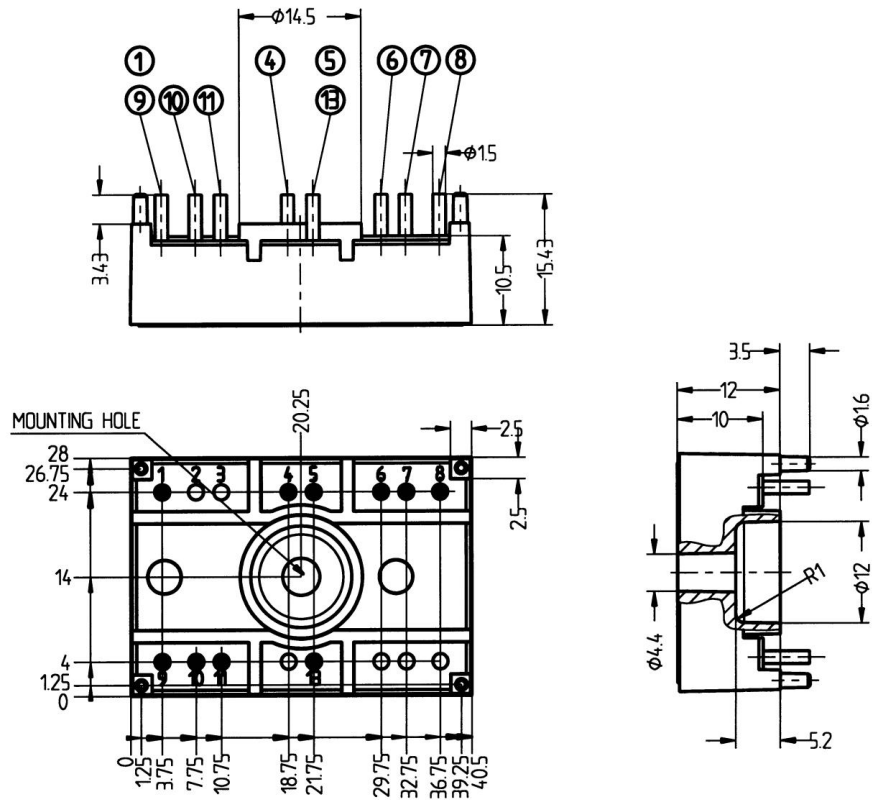
Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 15 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	1,4	1,7	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	1,4	1,7	V
$V_{F0}$		$T_j = 125 \text{ }^\circ\text{C}$	0,9	1	V
$r_F$		$T_j = 125 \text{ }^\circ\text{C}$	33	47	m $\Omega$
$I_{RRM}$	$I_F = 30 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$			A
$Q_{rr}$	$di/dt = 500 \text{ A}/\mu\text{s}$				$\mu\text{C}$
$E_{rr}$	$V_{CC} = 300 \text{ V}$				mJ
$R_{th(j-s)D}$	per diode			2,3	K/W
<b>Freewheeling diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 60 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	1,1	1,6	V
		$T_j = 150 \text{ }^\circ\text{C}_{chiplev.}$		1,25	V
$V_{F0}$		$T_j = 150 \text{ }^\circ\text{C}$	0,85		V
$r_F$		$T_j = 150 \text{ }^\circ\text{C}$	7		V
$I_{RRM}$	$I_F = 50 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	38		A
$Q_{rr}$	$di/dt = -1000 \text{ A}/\mu\text{s}$		2		$\mu\text{C}$
$E_{rr}$	$V_R = 300 \text{ V}$		0,45		mJ
$R_{th(j-s)D}$	per diode			1,1	K/W
$M_s$	to heat sink		1,8	2	Nm
w			19		g

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

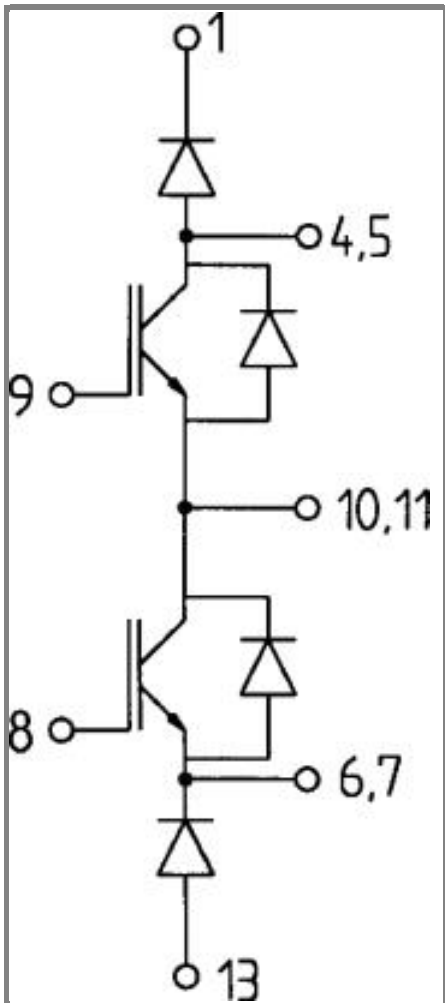
\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.







Case T31 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T31

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