

**SEMITOP<sup>®</sup> 3**

## IGBT Module

**SK75GARL065E**

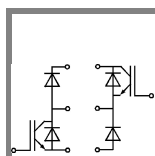
Preliminary Data

### 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)
- High short circuit capability
- Low tail current with low temperature dependence

### Typical Applications\*

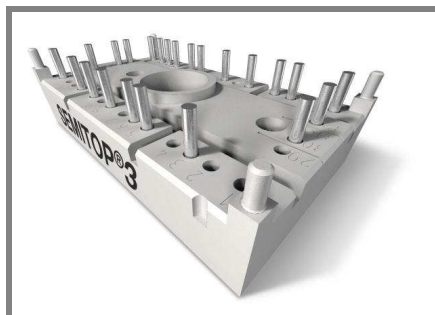
- Switching (not for linear use)
- Switched mode power supplies
- UPS
- Double PFC
- Multilevel inverter



**GARL-E**

Absolute Maximum Ratings		$T_s = 25\text{ °C}$ , unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$	$T_j = 25\text{ °C}$	600		V
$I_C$	$T_j = 125\text{ °C}$	$T_s = 25\text{ °C}$	80	A
		$T_s = 80\text{ °C}$	55	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	180		A
$V_{GES}$		± 20		V
$t_{psc}$	$V_{CC} = 300\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ °C}$ $V_{CES} < 600\text{ V}$	10		µs
<b>Inverse Diode</b>				
$I_F$	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	57	A
		$T_s = 80\text{ °C}$	38	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$			A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{half sine wave } T_j = 150\text{ °C}$	440		A
<b>Freewheeling Diode</b>				
$I_F$	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	103	A
		$T_{case} = 80\text{ °C}$	69	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$			A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{half sine wave } T_j = 150\text{ °C}$	880		A
<b>Module</b>				
$I_{t(RMS)}$				A
$T_{vj}$		-40 ... +150		°C
$T_{stg}$		-40 ... +125		°C
$V_{isol}$	AC, 1 min.	2500		V

Characteristics		$T_s = 25\text{ °C}$ , unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
<b>IGBT</b>						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 2,1\text{ mA}$	3	4	5	V	
$I_{CES}$	$V_{GE} = 600\text{ V}, V_{CE} = V_{CES} T_j = 25\text{ °C}$			0,0066	mA	
$I_{GES}$	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V } T_j = 25\text{ °C}$			360	nA	
$V_{CE0}$		$T_j = 25\text{ °C}$	1,2	1,3	V	
		$T_j = 125\text{ °C}$	1,1	0,9	V	
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$			7,7	mΩ
		$T_j = 125\text{ °C}$			14	mΩ
$V_{CE(sat)}$	$I_{Cnom} = 90\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}_{chiplev.}$	1,7	2	V	
		$T_j = 125\text{ °C}_{chiplev.}$	2,2	2,2	V	
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V} \quad f = 1\text{ MHz}$			4,8	nF	
$C_{oes}$				0,45	nF	
$C_{res}$				0,27	nF	
$Q_G$	$V_{GE} = 0 \dots 20\text{ V}$			750	nC	
$t_{d(on)}$	$R_{Gon} = 13\text{ } \Omega$	$V_{CC} = 300\text{ V}$ $I_C = 100\text{ A}$			54	ns
$t_r$					58	ns
$E_{on}$	$R_{Goff} = 13\text{ } \Omega$	$T_j = 125\text{ °C}$ $V_{GE} = \pm 15\text{ V}$			2,71	mJ
$t_{d(off)}$					410	ns
$t_f$					36	ns
$E_{off}$	per IGBT			2,75	mJ	
$R_{th(j-s)}$				0,6	K/W	



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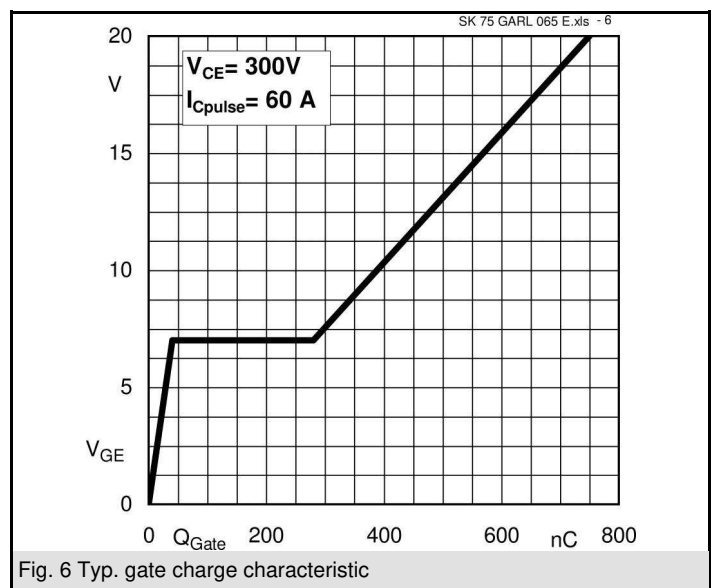
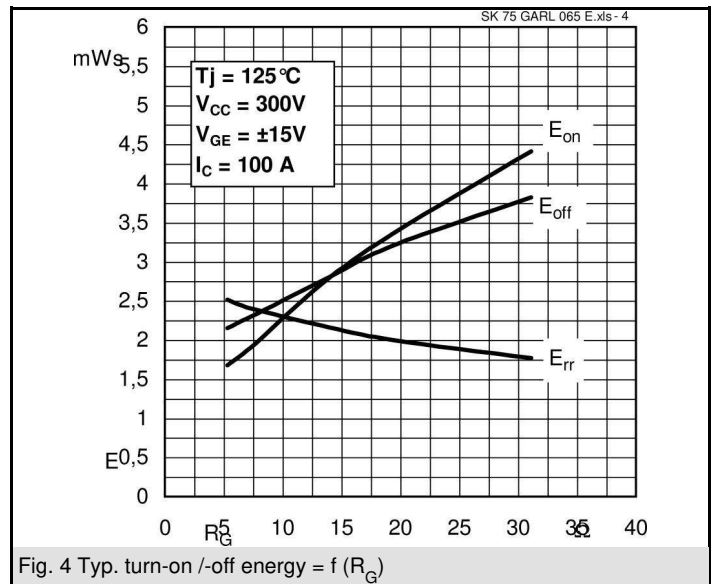
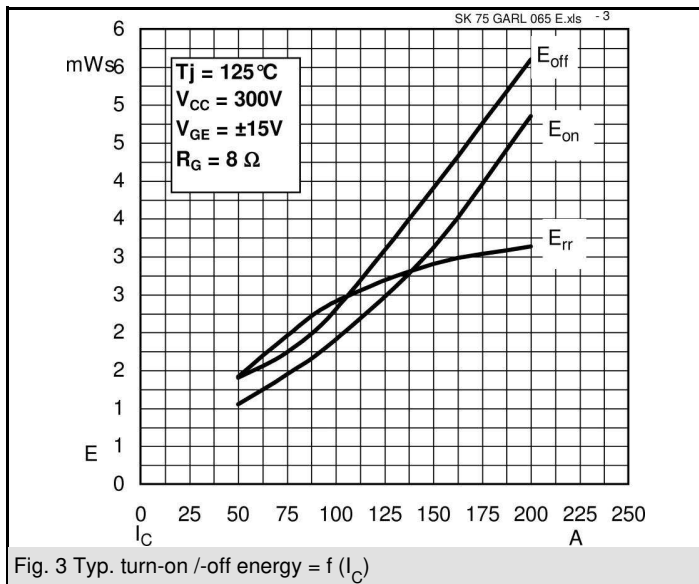
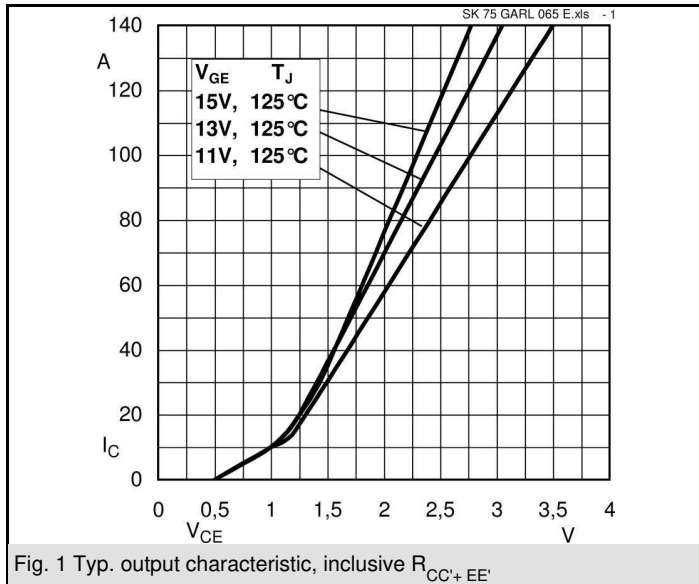


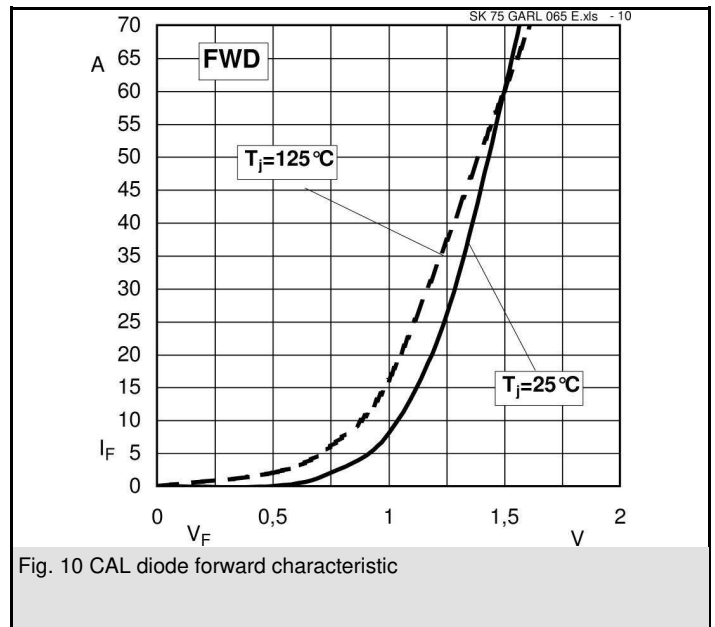
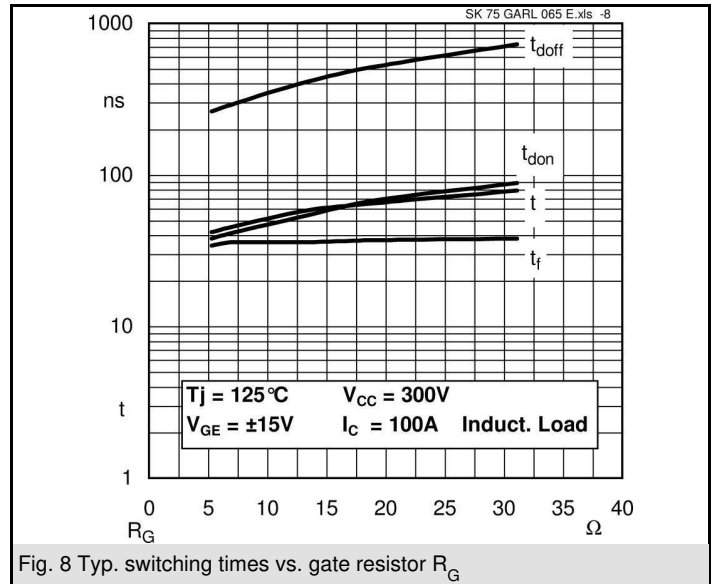
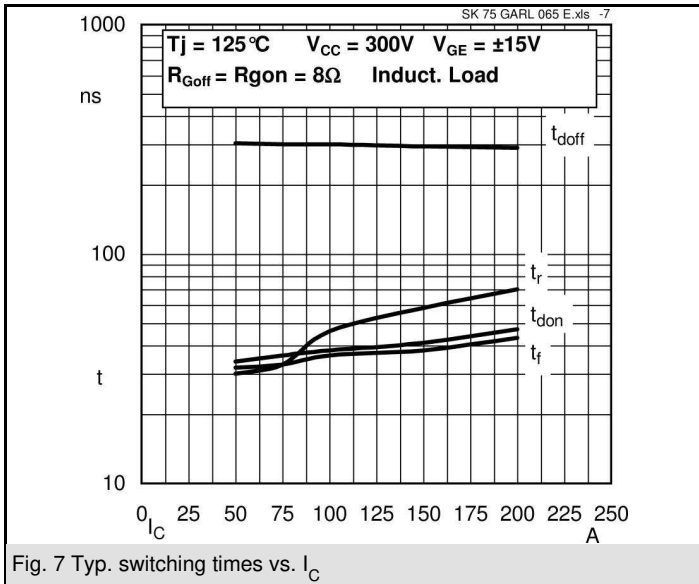
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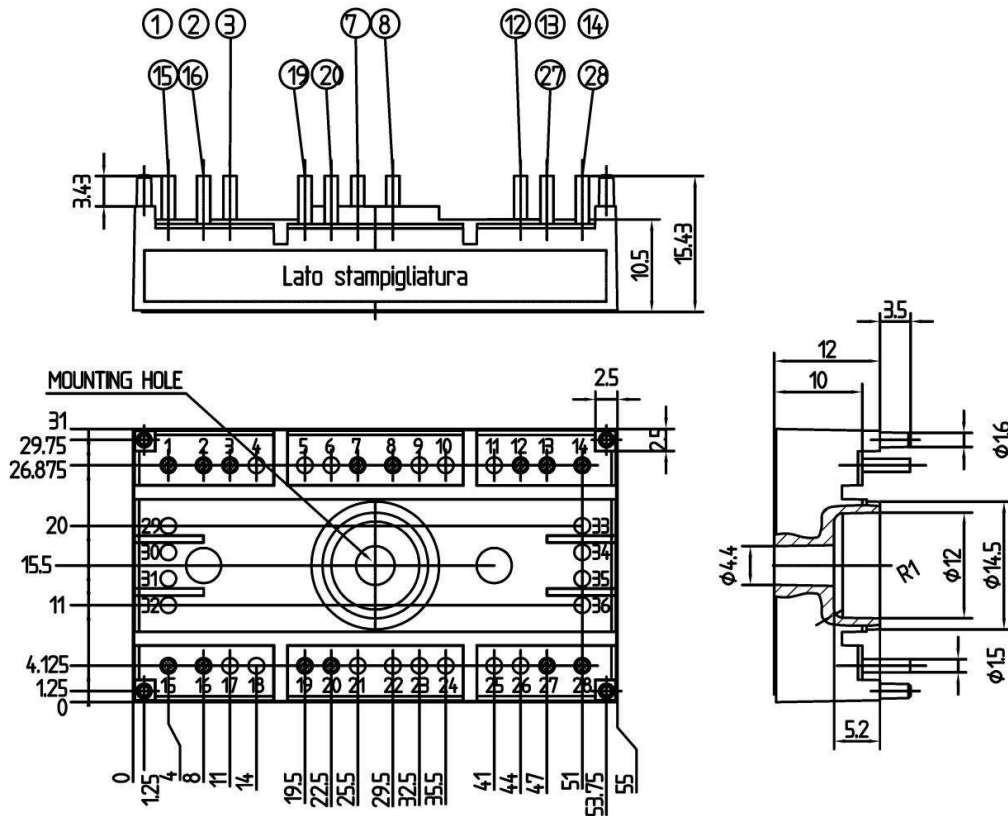
Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 30 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{\text{chiplev.}}$	1,3	1,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{\text{chiplev.}}$	1,2	1,45	V
$V_{F0}$		$T_j = 125 \text{ }^\circ\text{C}$	0,85	0,9	V
$r_F$		$T_j = 125 \text{ }^\circ\text{C}$	9	16	mΩ
$I_{RRM}$	$I_F = 30 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	22		A
$Q_{rr}$	$di/dt = -500 \text{ A}/\mu\text{s}$		2,2		μC
$E_{rr}$	$V_{CC} = 300 \text{ V}$		0,2		mJ
$R_{th(j-s)D}$	per diode			1,2	K/W
<b>Freewheeling diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 60 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{\text{chiplev.}}$	1,45		V
		$T_j = 125 \text{ }^\circ\text{C}_{\text{chiplev.}}$	1,4		V
$V_{F0}$		$T_j = 125 \text{ }^\circ\text{C}$	0,85	0,9	V
$r_F$		$T_j = 125 \text{ }^\circ\text{C}$	5	9	V
$I_{RRM}$	$I_F = 100 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	92		A
$Q_{rr}$	$di/dt = -9200 \text{ A}/\mu\text{s}$		39,1		μC
$E_{rr}$	$V_R = 300 \text{ V}$		1,85		mJ
$R_{th(j-s)D}$	per diode			0,6	K/W
$M_s$	to heat sink		2,25	2,5	Nm
w			30		g

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

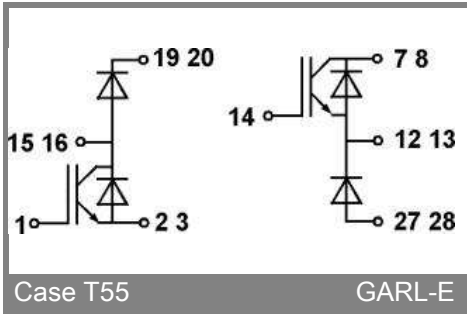
\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification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







Case T55 (Suggested hole diameter, in the PCB, for solder pins and plastic mounting pins: 2mm)



Case T55

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