



SEMITOP® 3

IGBT Module

SK55GARL065E

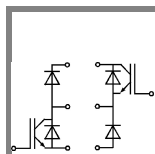
Preliminary Data

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*

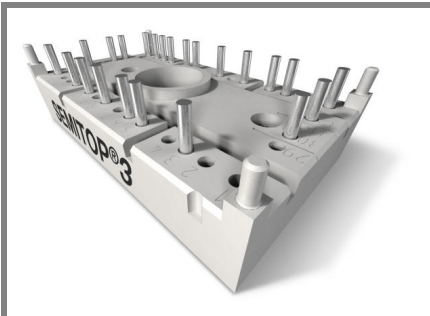
- Switching (not for linear use)
- Switched mode power supplies
- UPS
- Double PFC
- Multilevel inverter



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Absolute Maximum Ratings		$T_s = 25\text{ °C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25\text{ °C}$	600		V
I_C	$T_j = 125\text{ °C}$	$T_s = 25\text{ °C}$	54	A
		$T_s = 80\text{ °C}$	40	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	120		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
Inverse Diode				
I_F	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	36	A
		$T_s = 80\text{ °C}$	24	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$			A
I_{FSM}	$t_p = 10\text{ ms}; \text{half sine wave } T_j = 150\text{ °C}$	200		A
Freewheeling Diode				
I_F	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	64	A
		$T_s = 80\text{ °C}$	48	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
Module				
$I_{t(RMS)}$				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	
IGBT						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1,4\text{ mA}$	3	4	5	V	
I_{CES}	$V_{GE} = 600\text{ V}, V_{CE} = V_{CES} T_j = 25\text{ °C}$			0,0044	mA	
I_{GES}	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V } T_j = 25\text{ °C}$			240	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}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$			12	mΩ
		$T_j = 125\text{ °C}$			22	mΩ
$V_{CE(sat)}$	$I_{Cnom} = 60\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}_{chiplev.}$	1,7	2	V	
		$T_j = 125\text{ °C}_{chiplev.}$	2,2	2,2	V	
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V} \quad f = 1\text{ MHz}$			3,2	nF	
C_{oes}				0,3	nF	
C_{res}				0,18	nF	
Q_G	$V_{GE} = 0 \dots 20\text{ V}$			375	nC	
$t_{d(on)}$	$R_{Gon} = 16\text{ } \Omega$	$V_{CC} = 300\text{ V}$ $I_C = 40\text{ A}$	60	80	ns	
t_r			30	40	ns	
E_{on}	$R_{Goff} = 16\text{ } \Omega$	$T_j = 125\text{ °C}$ $V_{GE} = \pm 15\text{ V}$	1,1		mJ	
$t_{d(off)}$			220	280	ns	
t_f			20	26	ns	
E_{off}			0,76		mJ	
$R_{th(j-s)}$	per IGBT			0,85	K/W	



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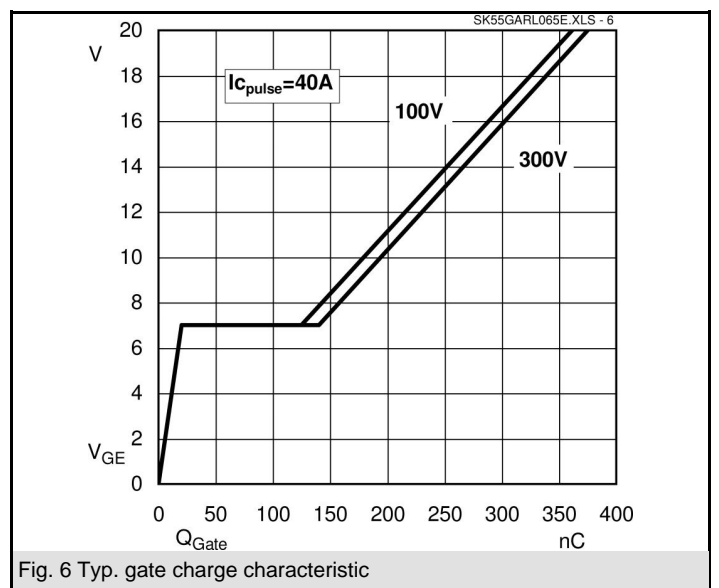
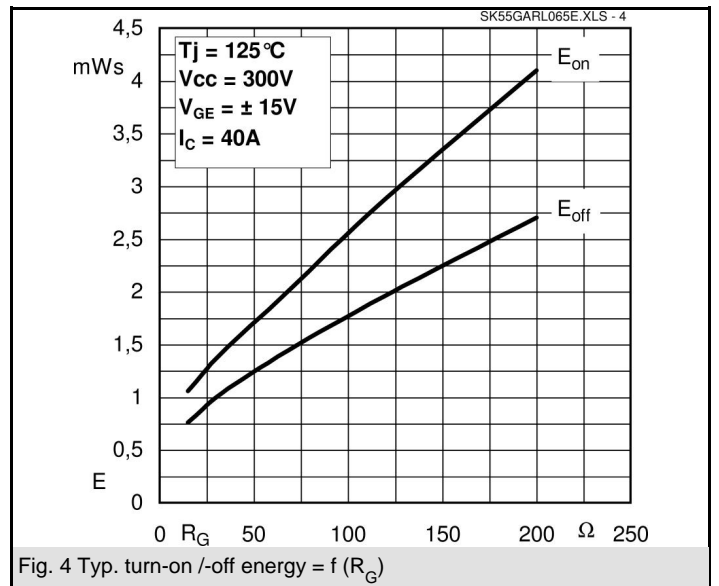
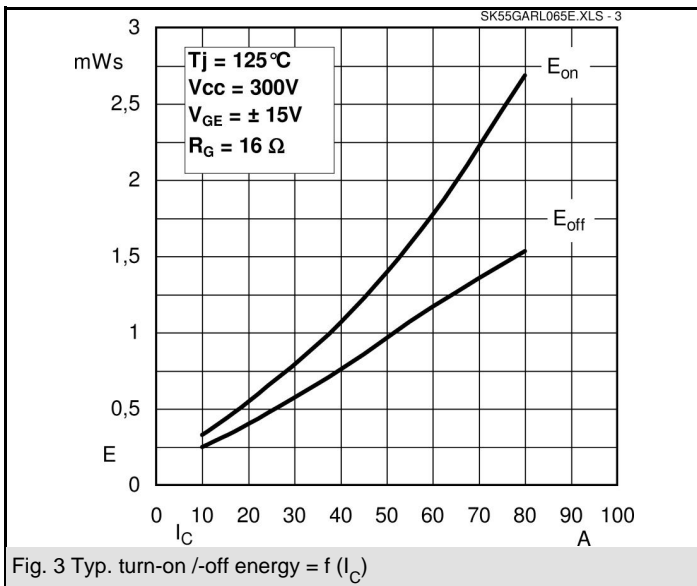
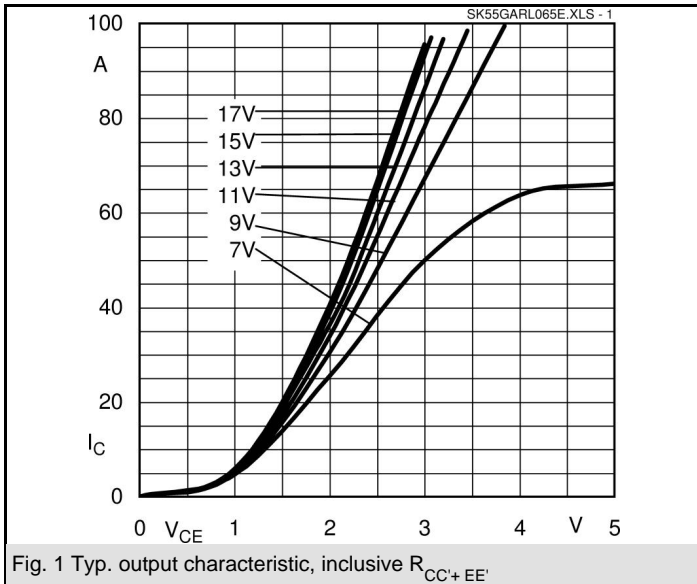


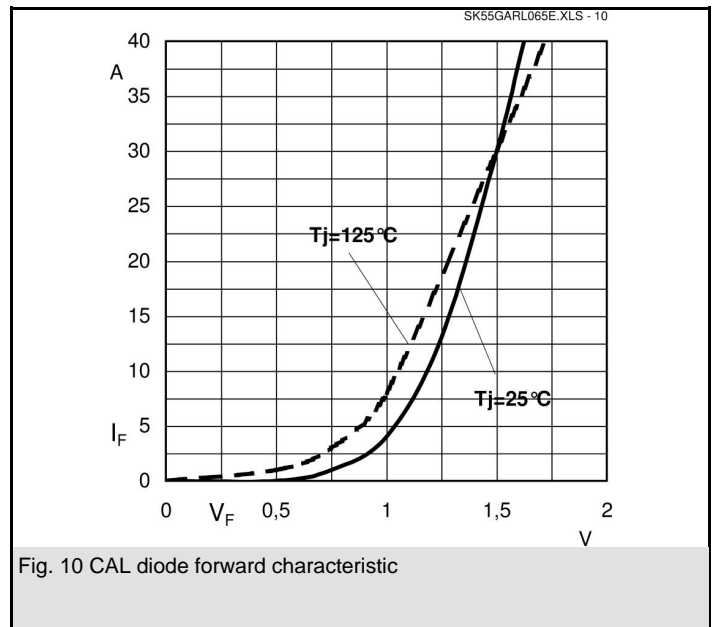
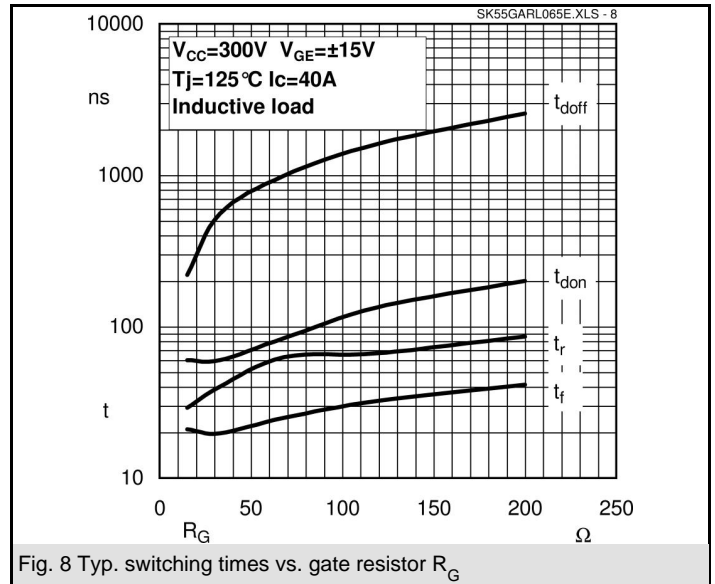
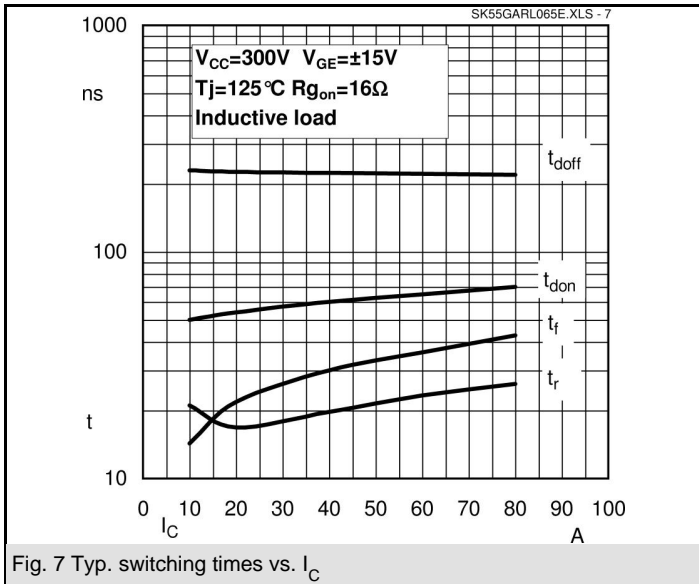
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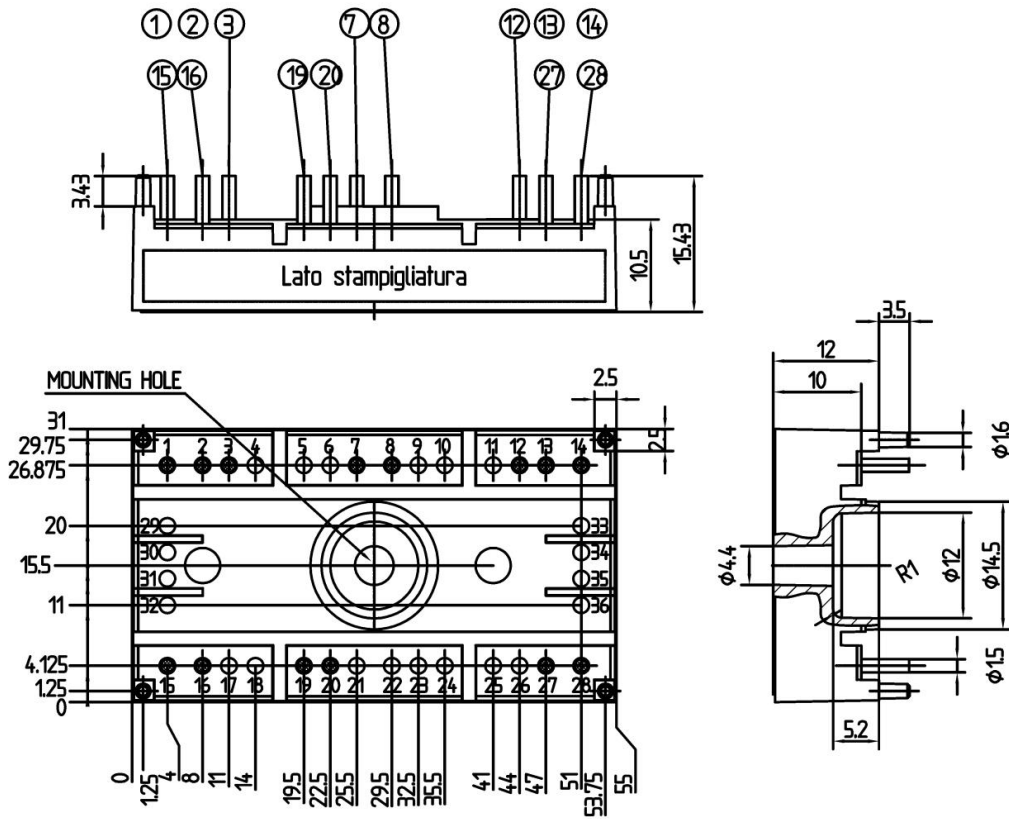
Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 25 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{\text{chiplev.}}$	1,45	1,7	V
		$T_j = 125 \text{ }^\circ\text{C}_{\text{chiplev.}}$	1,4	1,75	V
V_{F0}		$T_j = 125 \text{ }^\circ\text{C}$	0,85	0,9	V
r_F		$T_j = 125 \text{ }^\circ\text{C}$	22	32	mΩ
I_{RRM}	$I_F = 50 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	57		A
Q_{rr}	$di/dt = -2400 \text{ A}/\mu\text{s}$		4,6		μC
E_{rr}	$V_{CC} = 300 \text{ V}$		0,9		mJ
$R_{th(j-s)D}$	per diode			1,7	K/W
Freewheeling diode					
$V_F = V_{EC}$	$I_{Fnom} = 50 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{\text{chiplev.}}$	1,45	1,7	V
		$T_j = 125 \text{ }^\circ\text{C}_{\text{chiplev.}}$	1,4	1,75	V
V_{F0}		$T_j = 125 \text{ }^\circ\text{C}$	0,85	0,9	V
r_F		$T_j = 125 \text{ }^\circ\text{C}$	11	16	V
I_{RRM}	$I_F = 50 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	30		A
Q_{rr}	$di/dt = -800 \text{ A}/\mu\text{s}$		3,6		μC
E_{rr}	$V_R = 300 \text{ V}$		0,95		mJ
$R_{th(j-s)D}$	per diode			1,1	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.

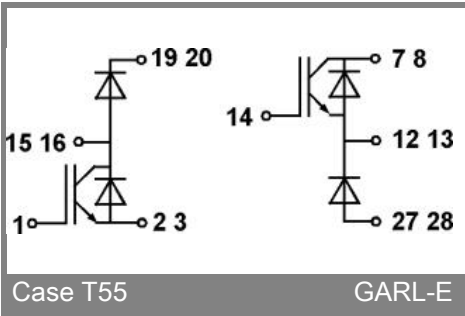
* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and 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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