SK50GARL065

SEMITOP® 2

IGBT Module

SK50GARL065

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

Typical Applications*

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

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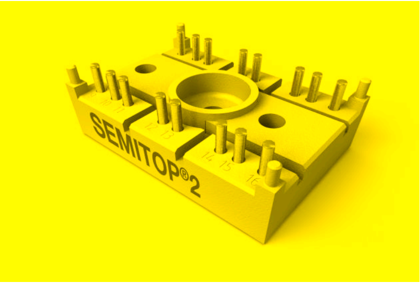
Absolute Maximum Ratings T_s = 25 °C, unless otherwise specified

Symbol	Conditions		Values	Units
IGBT				
V_{CES}	T_j = 25 °C		600	V
I_C	T_j = 125 °C	T_s = 25 °C	54	A
		T_s = 80 °C	40	A
I_{CRM}	I_{CRM}= 2 x I_{Cnom}		120	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 300 V; $V_{GE} \leq$ 20 V; VCES < 600 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_s = 25 °C	25	A
		T_s = 80 °C	17	A
I_{FRM}	I_{FRM}= 2 x I_{Fnom}			A
I_{FSM}	t_p = 10 ms; half sine wave	T_j = 150 °C	100	A
Freewheeling Diode				
I_F	T_j = 150 °C	T_s = 25 °C	64	A
		T_s = 80 °C	48	A
I_{FRM}				A
I_{FSM}	t_p = 10 ms; half sine wave	T_j = 150 °C	400	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 °C, unless otherwise specified

Symbol	Conditions		min.	typ.	max.	Units
IGBT						
$V_{GE(th)}$	$V_{GE} = V_{CE}$, I_C = 0,7 mA		3	4	5	V
I_{CES}	V_{GE} = 600 V, $V_{CE} = V_{CES}$	T_j = 25 °C			0,0022	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = 20 V	T_j = 25 °C			120	nA
V_{CE0}		T_j = 25 °C		1,2	1,3	V
		T_j = 125 °C		1,1	1,2	V
r_{CE}	V_{GE} = 15 V	T_j = 25°C			12	mΩ
		T_j = 125°C			22	mΩ
$V_{CE(sat)}$	I_{Cnom} = 60 A, V_{GE} = 15 V	T_j = 25°$C_{chiplev.}$		1,7	2	V
		T_j = 125°$C_{chiplev.}$		2,2	2,2	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		3,2		nF
C_{oes}				0,3		nF
C_{res}				0,18		nF
Q_G	V_{GE}=0 ... 20 V			375		nC
$t_{d(on)}$	R_{Gon} = 15 Ω	V_{CC} = 300V I_C= 40A T_j = 125 °C V_{GE}= ±15V		47		ns
t_r				60	80	ns
E_{on}				1,07	1,4	mJ
$t_{d(off)}$	R_{Goff} = 16 Ω			220	280	ns
t_f				20	26	ns
E_{off}				0,76	1	mJ
$R_{th(j-s)}$	per IGBT				0,85	K/W



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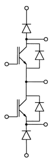

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Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 15 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		1,4	1,7	V
		T_j = 125 °$C_{chiplev.}$		1,4	1,7	V
V_{F0}		T_j = 125 °C		0,9	1	V
r_F		T_j = 125 °C		33	47	mΩ
I_{RRM}	I_F = 30 A	T_j = 125 °C				A
Q_{rr}	di/dt = 500 A/µs					µC
E_{rr}	V_{CC}=300V					mJ
$R_{th(j-s)D}$	per diode				2,3	K/W
Freewheeling diode						
$V_F = V_{EC}$	I_{Fnom} = 60 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		1,45	1,7	V
		T_j = 150 °$C_{chiplev.}$		1,4	1,75	V
V_{F0}		T_j = 125 °C		0,85	0,9	V
r_F		T_j = 125 °C		11	16	V
I_{RRM}	I_F = 50 A	T_j = 125 °C		40		A
Q_{rr}	di/dt = -1000 A/µs			3,6		µC
E_{rr}	V_R=300V			0,55		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.

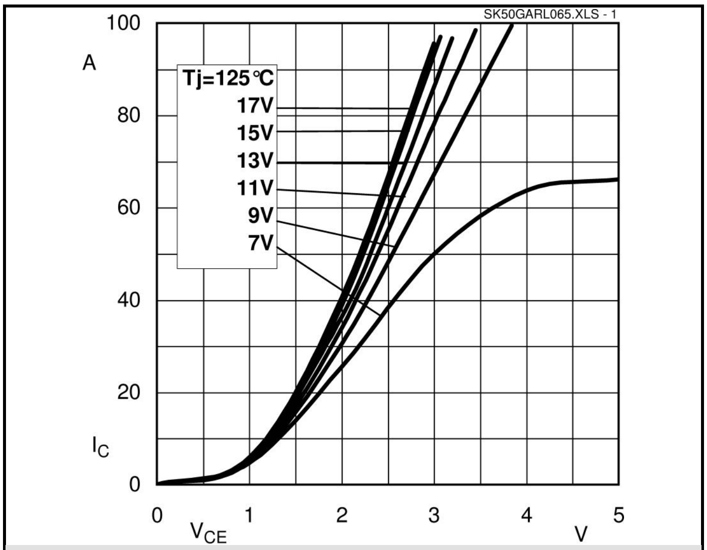


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+ EE'}$

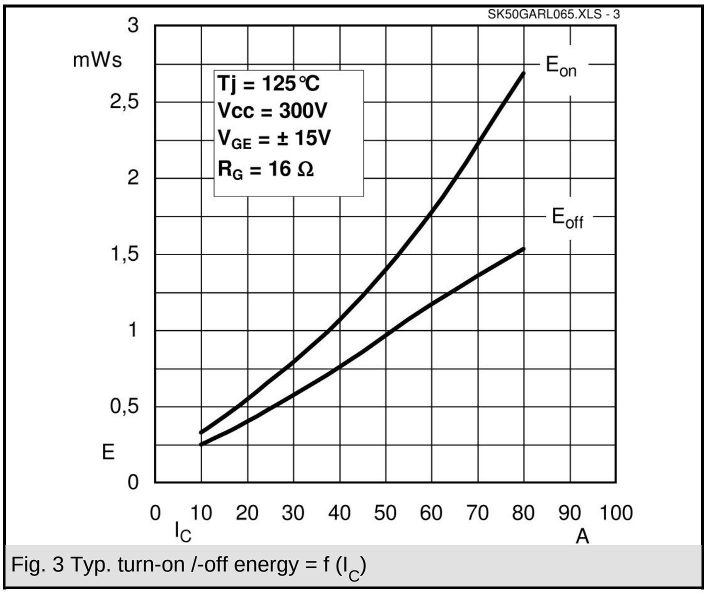


Fig. 3 Typ. turn-on /-off energy = f (I_C)

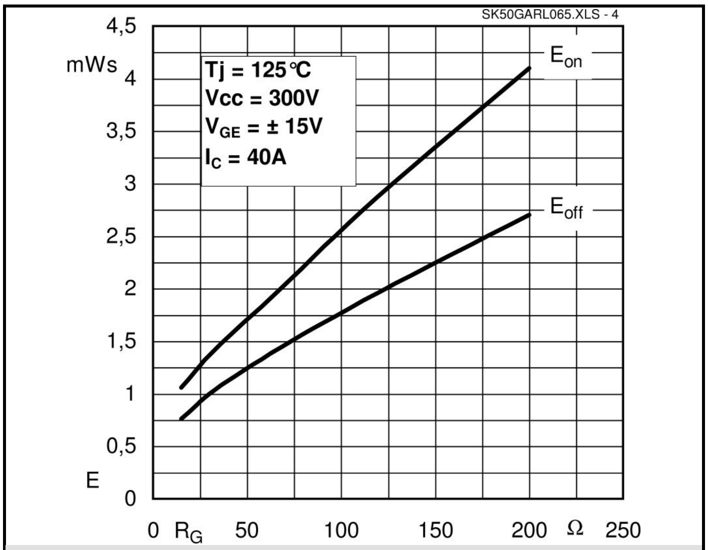


Fig. 4 Typ. turn-on /-off energy = f (R_G)

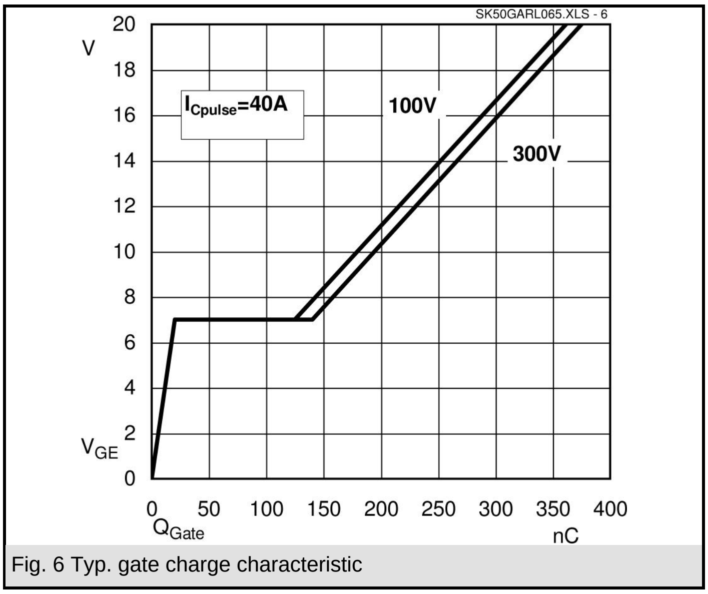


Fig. 6 Typ. gate charge characteristic

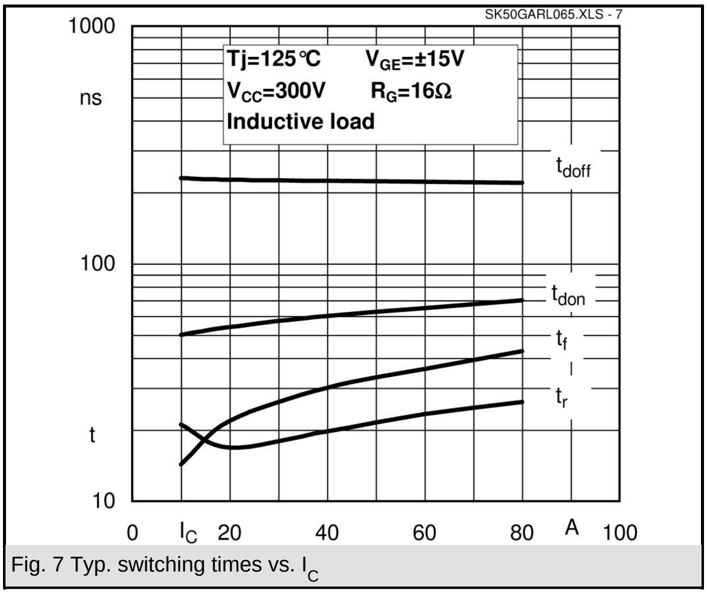


Fig. 7 Typ. switching times vs. I_C

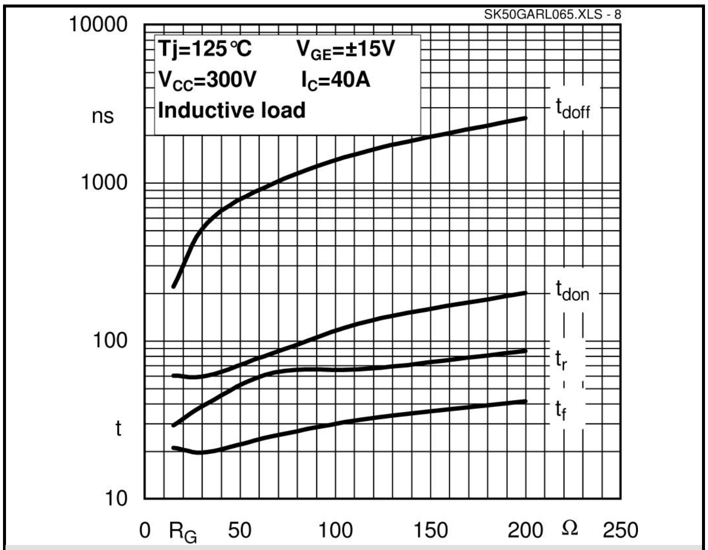


Fig. 8 Typ. switching times vs. gate resistor R_G

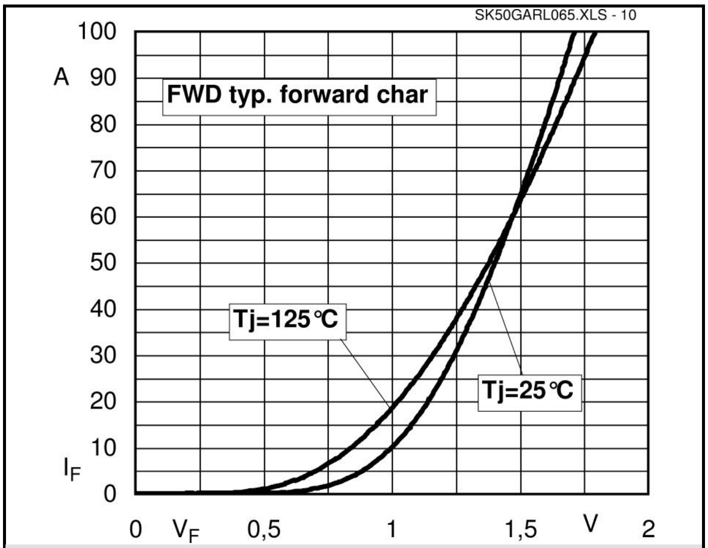
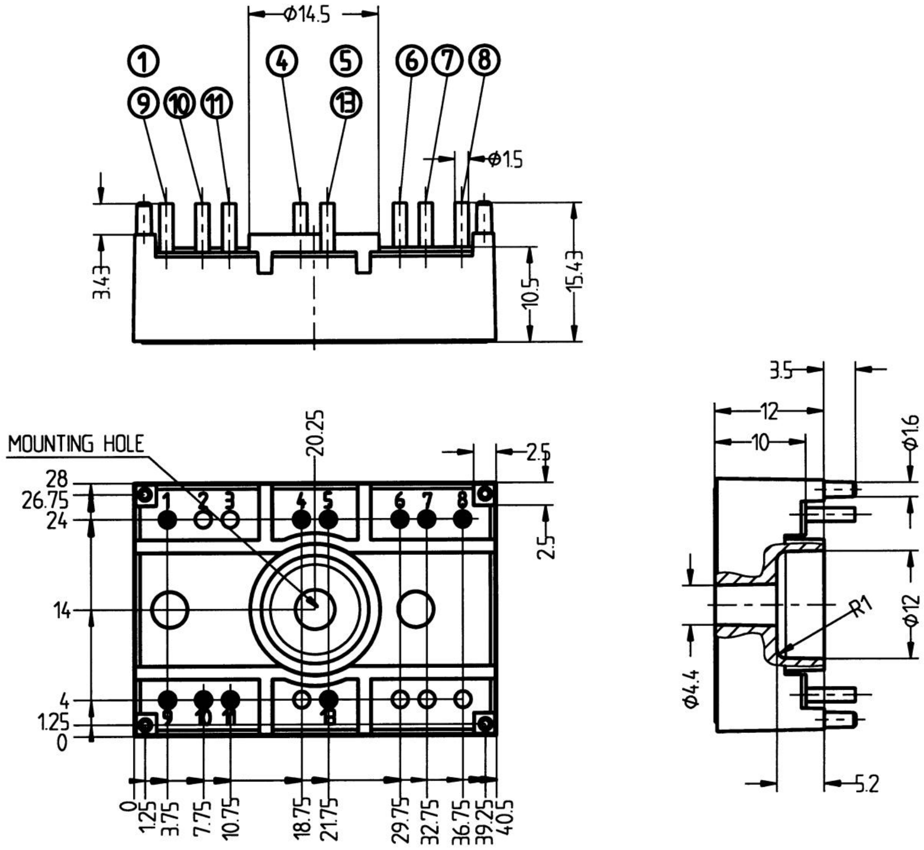
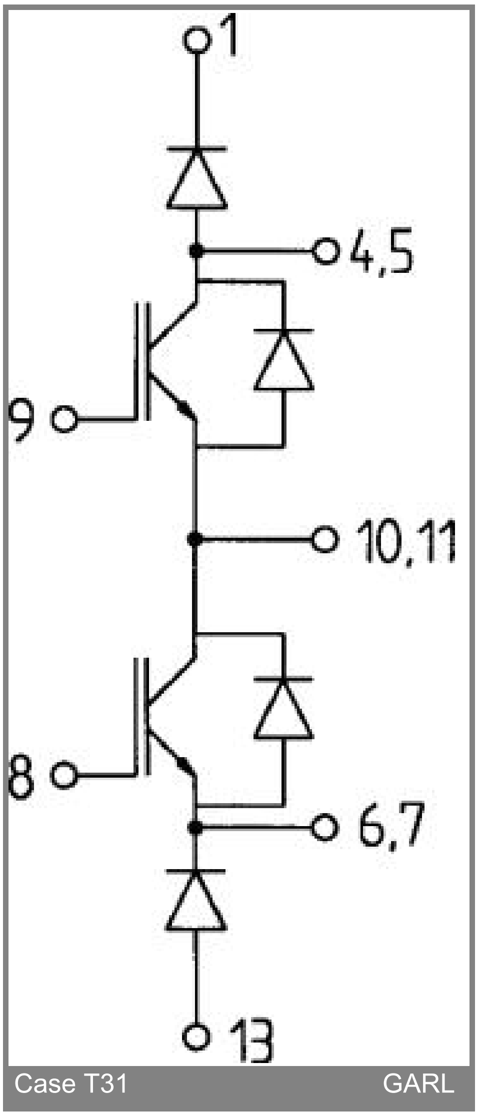


Fig. 10 CAL diode forward characteristic

UL recognized file no. E 63 532



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



Case T31 GARL