SK 35 GAR 12T4



SEMITOP® 2

IGBT module

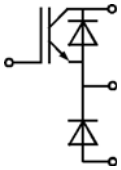
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Features

- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
- High short circuit capability
- Trench4 IGBT technology
- CAL4F diode technology
- $V_{CE,sat}$ with positive coefficient
- UL recognized, file no. E 63 532

Typical Applications*

- Inverter
- Motor drive



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Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
Chopper IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 175 °C	T_s = 25 °C	43	A
		T_s = 70 °C	35	A
I_{Cnom}			35	A
I_{CRM}	I_{CRM} = 3 x I_{Cnom}		105	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 800 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 1200 V	T_j = 150 °C	10	µs
T_j			-40 ... 175	°C
Chopper Diode				
I_F	T_j = 175 °C	T_s = 25 °C	38	A
		T_s = 70 °C	30	A
I_{Fnom}			35	A
I_{FRM}	I_{FRM} = 3 x I_{Fnom}		105	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		170	A
T_j			-40 ... 175	°C
Freewheeling Diode				
I_F	T_j = 175 °C	T_s = 25 °C	38	A
		T_s = 70 °C	30	A
I_{Fnom}			35	A
I_{FRM}	I_{FRM} = 3xI_{Fnom}		105	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		170	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$				A
T_{stg}			-40 ... 125	°C
V_{isol}	AC, sinusoidal, t = 1 min		2500	V

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Chopper IGBT						
$V_{CE(sat)}$	I_C = 35 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.1	V
		T_j = 150 °C		2.25	2.45	V
V_{CE0}	chiplevel	T_j = 25 °C		0.8	0.9	V
		T_j = 150 °C		0.7	0.8	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		30.0	34.3	mΩ
		T_j = 150 °C		44.3	47.1	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE} V, I_C = 1.2 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 1200 V	T_j = 25 °C		0.062	0.186	mA
		T_j = 150 °C				mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		1.95		nF
C_{oes}		f = 1 MHz		0.155		nF
C_{res}		f = 1 MHz		0.115		nF
Q_G	- 8 V...+ 15 V			189		nC
R_{Gint}	T_j = 25 °C			-		Ω

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IGBT module

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Features

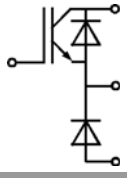
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- Heat transfer and isolation through direct copper bonded aluminium oxide ceramic (DCB)
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- UL recognized, file no. E 63 532

Typical Applications*

- Inverter
- Motor drive

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Chopper IGBT						
$t_{d(on)}$	V_{CC} = 600 V	T_j = 150 °C		28		ns
t_r	I_C = 35 A	T_j = 150 °C		25		ns
E_{on}	$R_{G\ on}$ = 22 Ω	T_j = 150 °C		3.27		mJ
$t_{d(off)}$	$R_{G\ off}$ = 22 Ω	T_j = 150 °C		303		ns
t_f	di/dt_{on} = 2900 A/µs	T_j = 150 °C		70		ns
E_{off}	di/dt_{off} = 2900 A/µs V_{GE} = +15/-7 V	T_j = 150 °C		3.3		mJ
$R_{th(j-s)}$	per IGBT			1.21		K/W
Chopper Diode						
$V_F = V_{EC}$	I_F = 35 A V_{GE} = 15 V chiplevel	T_j = 25 °C		2.3	2.62	V
		T_j = 150 °C		2.29	2.62	V
V_{F0}	chiplevel	T_j = 25 °C		1.3	1.5	V
		T_j = 150 °C		0.9	1.1	V
r_F	chiplevel	T_j = 25 °C		28.6	32.0	mΩ
		T_j = 150 °C		39.7	43.4	mΩ
I_{RRM}	I_F = 35 A di/dt_{off} = 2900 A/µs V_{GE} = -7 V V_R = 600 V	T_j = 150 °C		30		A
Q_{rr}		T_j = 150 °C		2		µC
E_{rr}		T_j = 150 °C		1.46		mJ
$R_{th(j-s)}$	per Diode			1.55		K/W
Freewheeling Diode						
$V_F = V_{EC}$	I_F = 35 A V_{GE} = 15 V chiplevel	T_j = 25 °C		2.3	2.60	V
		T_j = 150 °C		2.29	2.62	V
V_{F0}	chiplevel	T_j = 25 °C		1.3	1.5	V
		T_j = 150 °C		0.9	1.1	V
r_F	chiplevel	T_j = 25 °C		28.6	32.0	mΩ
		T_j = 150 °C		39.7	43.4	mΩ
I_{RRM}	I_F = 35 A di/dt_{off} = 2900 A/µs V_{GE} = -7 V V_R = 600 V	T_j = 150 °C		30		A
Q_{rr}		T_j = 150 °C		2		µC
E_{rr}		T_j = 150 °C		1.46		mJ
$R_{th(j-s)}$	per Diode			1.55		K/W
Module						
L_{CE}						nH
$R_{CC'+EE'}$		T_s = 25 °C				mΩ
						mΩ
M_s	Mounting torque to heatsink		1.8		2	Nm
M_t						Nm
						Nm
w				19		g
Temperature Sensor						
R_{100}						Ω
$B_{100/125}$						K



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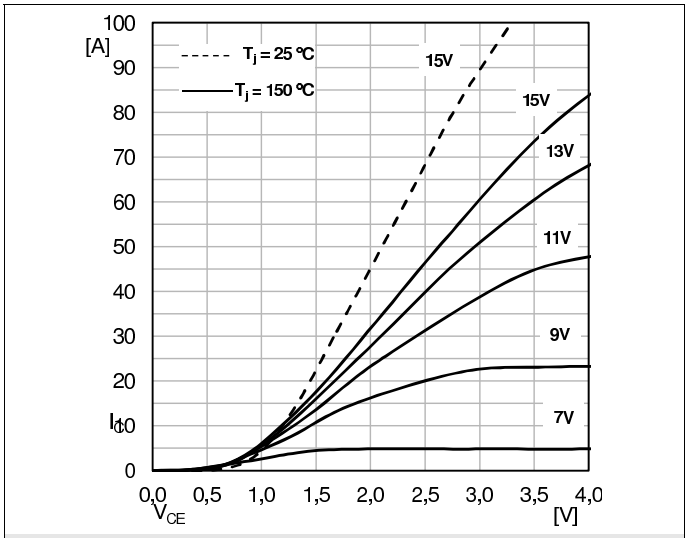


Fig. 1: Typical IGBT output characteristics

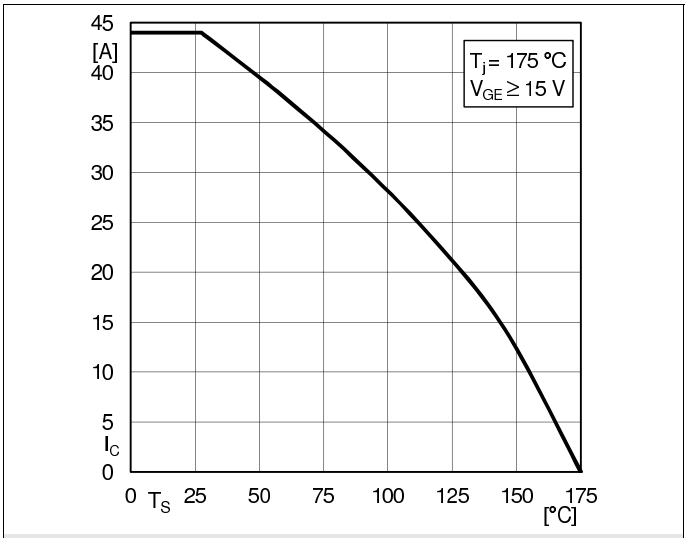


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

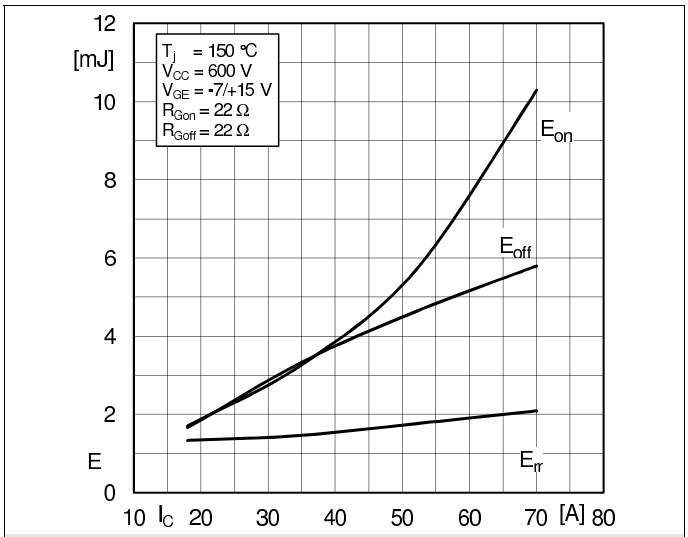


Fig. 3: Typ. turn-on /-off energy = f (I_C)

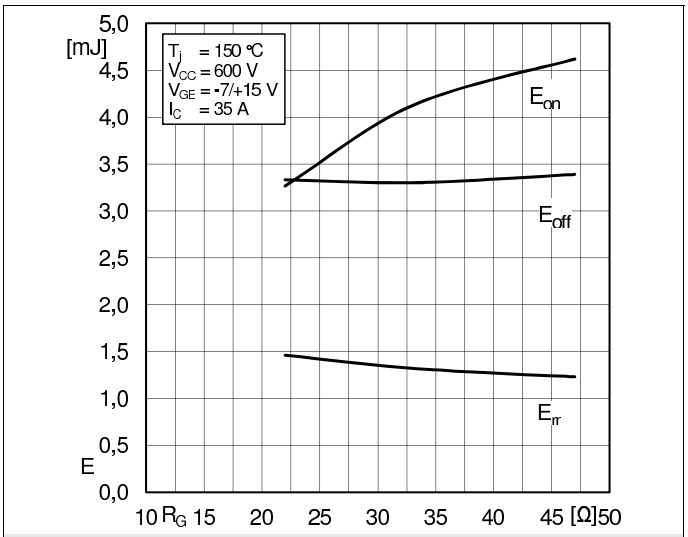


Fig. 4: Typ. turn-on /-off energy = f (R_G)

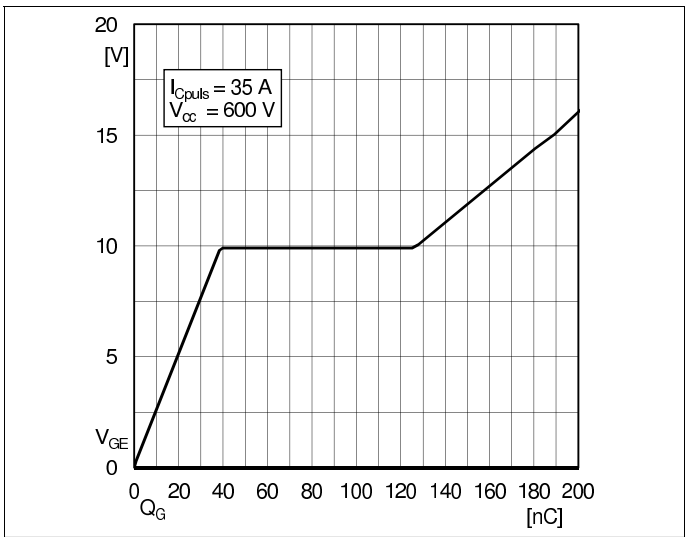


Fig. 6: Typ. gate charge characteristic

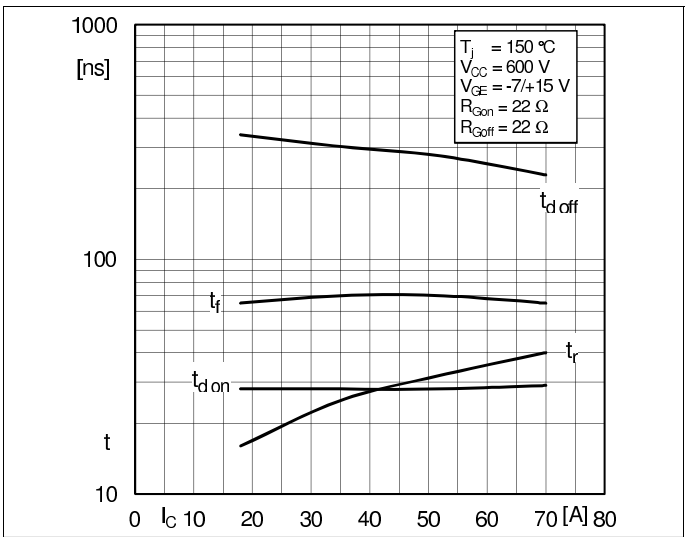


Fig. 7: Typ. switching times vs. I_C

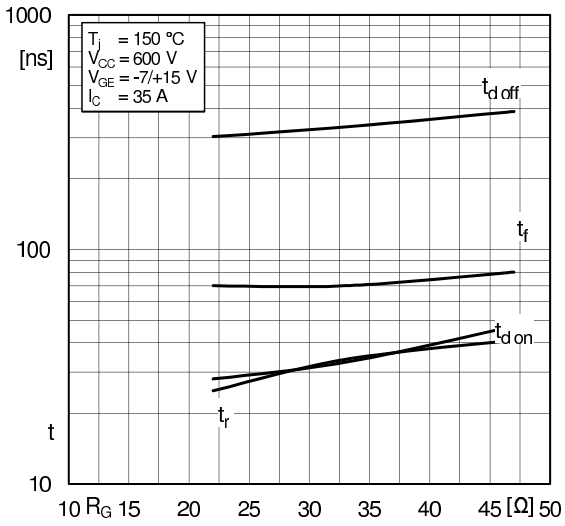


Fig. 8: Typ. switching times vs. gate resistor R_G

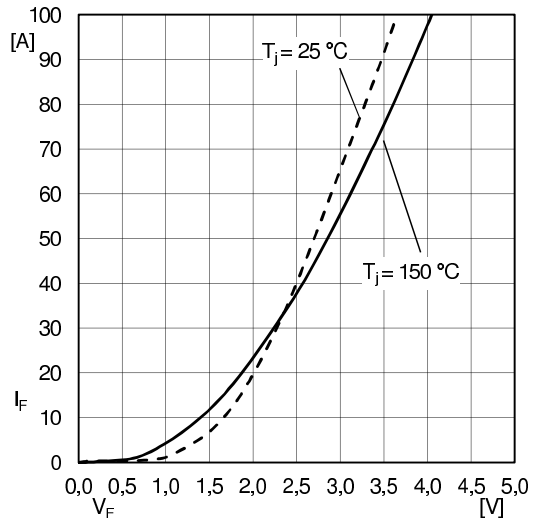
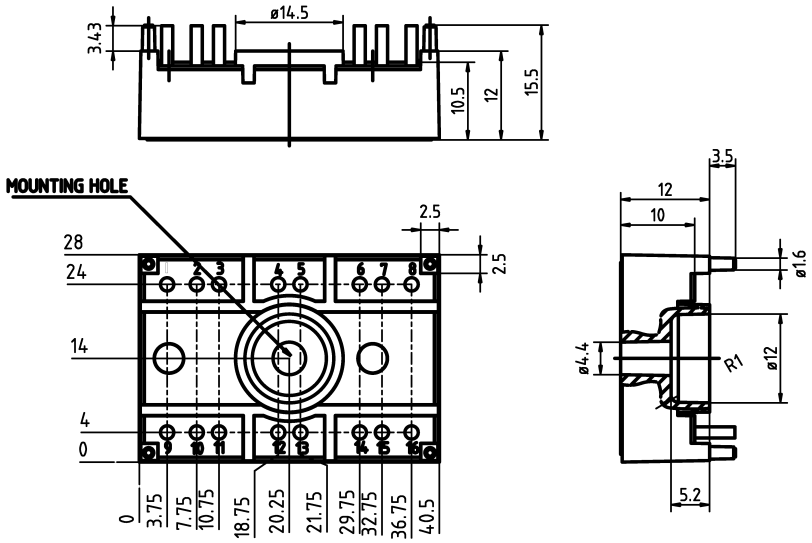


Fig. 10: Typ. FWD diode forward characteristic

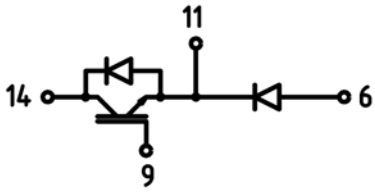
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dimensions in mm
tolerance system: ISO 2768-m



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

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

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