SEMITOP® 3

IGBT module

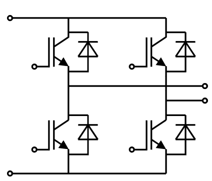
SK 25 GH 12T4

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

Typical Applications*

- Inverter
- Motor drive



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Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
Inverter - IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 175 °C	T_s = 25 °C	35	A
		T_s = 70 °C	29	A
I_{Cnom}			25	A
I_{CRM}	I_{CRM} = 3 x I_{Cnom}		75	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 800 V V_{GE} ≤ 15 V V_{CES} ≤ 1200 V	T_j = 150 °C	10	µs
T_j			-40 ... 175	°C
Inverse - Diode				
I_F	T_j = 175 °C	T_s = 25 °C	28	A
		T_s = 70 °C	22	A
I_{Fnom}			25	A
I_{FRM}	I_{FRM} = 3 x I_{Fnom}		75	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		100	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**
Inverter - IGBT						
$V_{CE(sat)}$	I_C = 25 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.10	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	T_j = 25 °C		42.0	48.0	mΩ
		T_j = 150 °C		62.0	66.0	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 0.85 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 1200 V	T_j = 25 °C				mA
						mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		1.43		nF
C_{oes}		f = 1 MHz		0.115		nF
C_{res}		f = 1 MHz		0.085		nF
Q_G	- 8 V...+ 15 V			142		nC
R_{Gint}	T_j = 25 °C			0.00		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 25 A $R_{G\,on}$ = 19 Ω $R_{G\,off}$ = 19 Ω di/dt$_{on}$ = 2825 A/µs di/dt$_{off}$ = 2825 A/µs V_{GE} = +15/-7 V	T_j = 150 °C		22		ns
t_r		T_j = 150 °C		19.5		ns
E_{on}		T_j = 150 °C		2.27		mJ
$t_{d(off)}$		T_j = 150 °C		288		ns
t_f		T_j = 150 °C		77.5		ns
E_{off}		T_j = 150 °C		2.7		mJ
$R_{th(j-s)}$	per IGBT			1.31		K/W

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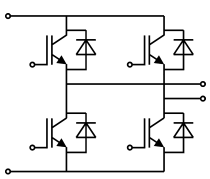

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Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Inverse - Diode						
$V_F = V_{EC}$	I_F = 25 A	T_j = 25 °C		2.41	2.74	V
	chiplevel	T_j = 150 °C		2.45	2.79	V
V_{F0}		T_j = 25 °C	1.1	1.3	1.5	V
		T_j = 150 °C	0.7	0.9	1.1	V
r_F		T_j = 25 °C	36.0	44.4	49.6	mΩ
		T_j = 150 °C		62.0	67.6	mΩ
I_{RRM}	I_F = 25 A	T_j = 150 °C		31.5		A
Q_{rr}	di/dt_{off} = 2825 A/µs V_{GE} = -7 V	T_j = 150 °C		1.15		µC
E_{rr}	V_{CC} = 600 V	T_j = 150 °C		1.28		mJ
$R_{th(j-s)}$	per diode			1.91		K/W
Module						
M_s	Mounting torque		2.3		2.5	Nm
w				29		g
Temperatur Sensor						
R_{100}						Ω
R(T)	, ,					

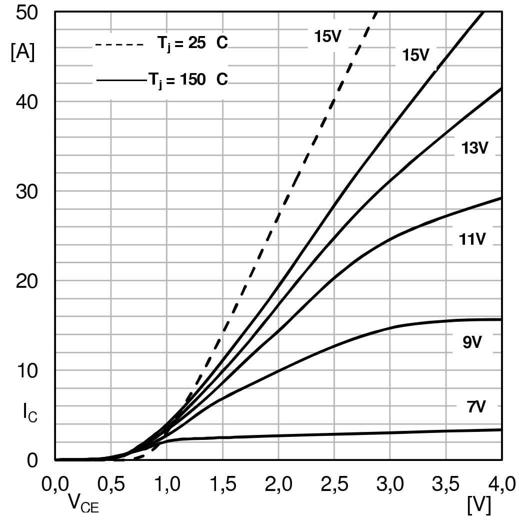


Fig. 1: Typical IGBT output characteristic

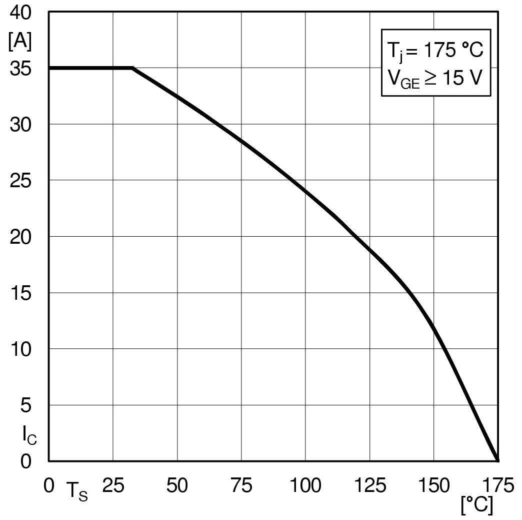


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

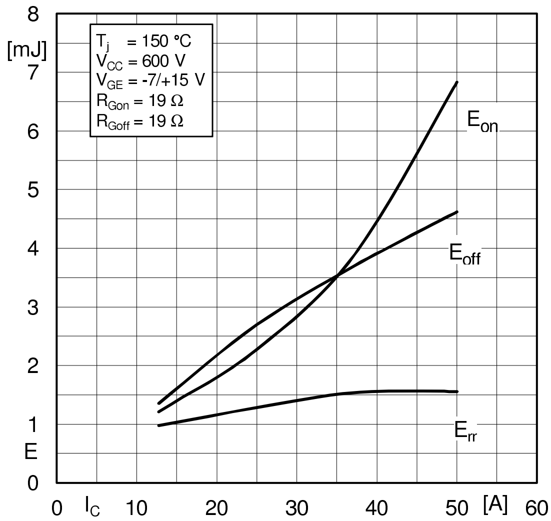


Fig. 3: Typ. turn-on /-off energy = f (I_C)

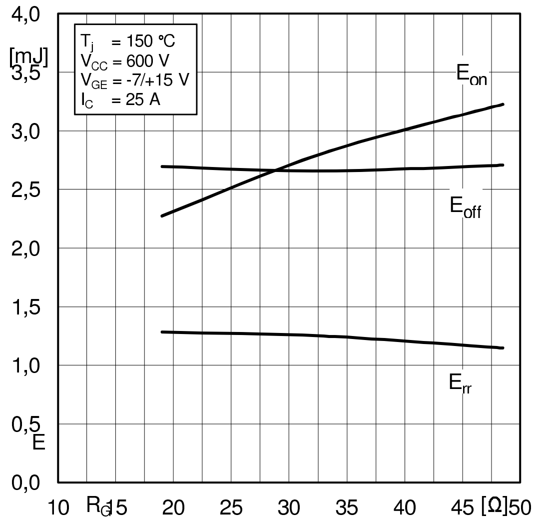


Fig. 4: Typ. turn-on /-off energy = f (R_G)

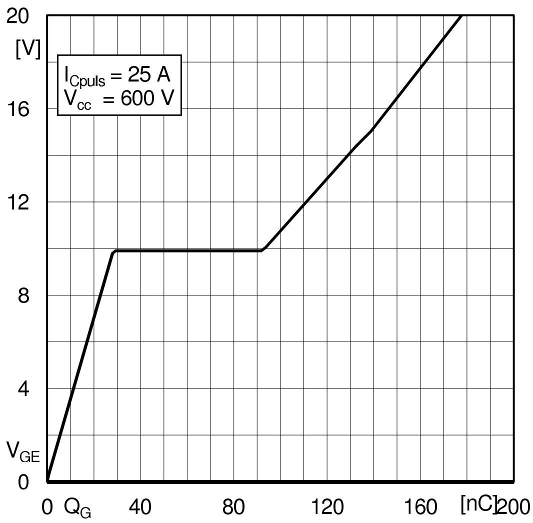


Fig. 6: Typ. gate charge characteristic

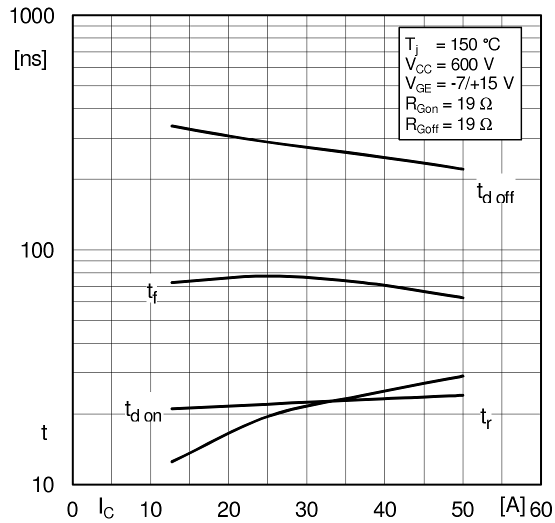


Fig. 7: Typ. switching times vs. I_C

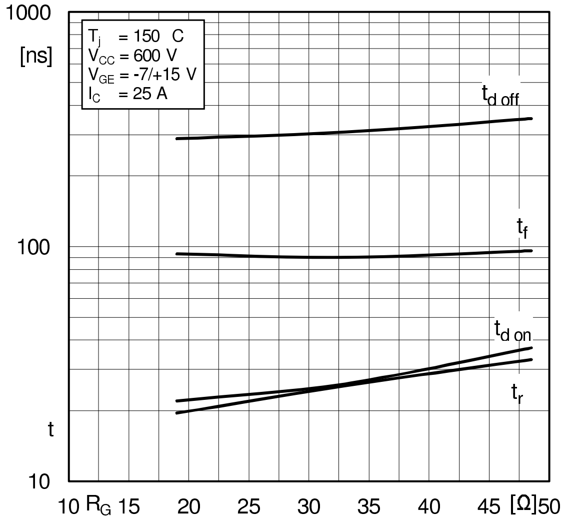


Fig. 8: Typ. switching times vs. gate resistor R_G

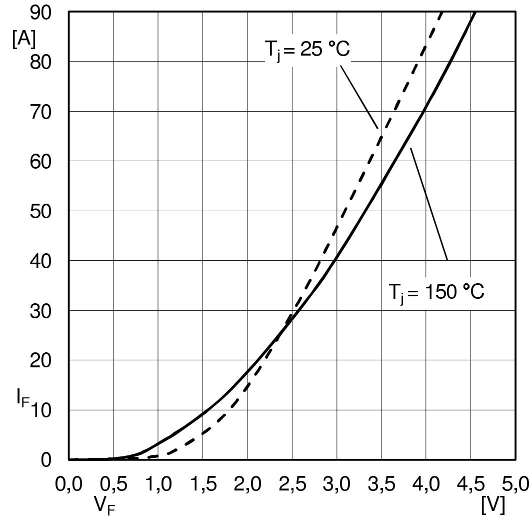
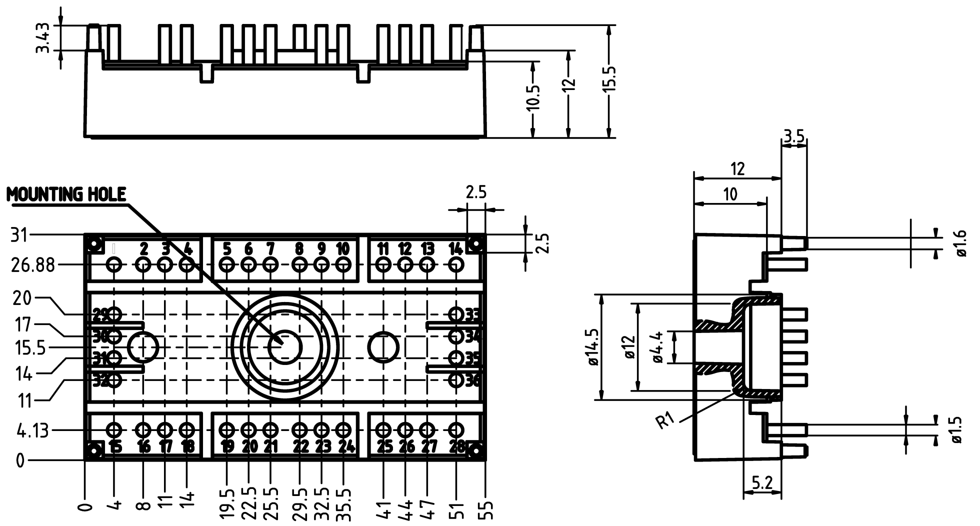
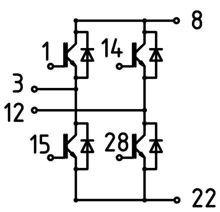


Fig. 10: CAL diode forward characteristic

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

* 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 staff.