SEMITOP® 2

IGBT module

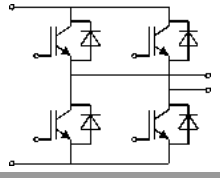
SK 15 GH 066

Features*

- Compact design
- One screw mounting module
- Heat transfer and insulation through direct copper bonded aluminium oxide ceramic (DBC)
- 600V Trench IGBT3 technology
- 600V CAL IHD diode technology
- Integrated NTC temperature sensor
- UL recognized, file no. E 63 532

Typical Applications

- DC/DC Converter
- Motor Drives
- Welding



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Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}	T_j = 25 °C		600	V
I_C	T_j = 175 °C	T_s = 25 °C	24	A
		T_s = 70 °C	20	A
I_{Cnom}			15	A
I_{CRM}			30	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 360 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 600 V	T_j = 150 °C	6	µs
T_j			-40 ... 175	°C
Inverse - Diode				
V_{RRM}	T_j = 25 °C		600	V
I_F	T_j = 175 °C	T_s = 25 °C	32	A
		T_s = 70 °C	25	A
I_{FRM}			30	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		95	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$\Delta T_{terminal}$ at PCB joint = 30 K, per pin		60	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 = 15 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.45	1.90	V
		T_j = 150 °C		1.65	2.05	V
V_{CE0}	chiplevel	T_j = 25 °C		0.90	1.00	V
		T_j = 150 °C		0.85	0.90	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		37	60	mΩ
		T_j = 150 °C		53	77	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}$, I_C = 0.21 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V, V_{CE} = 600 V, T_j = 25 °C				0.1	mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		0.86		nF
C_{oes}		f = 1 MHz		0.055		nF
C_{res}		f = 1 MHz		0.024		nF
Q_G	V_{GE} = -8V ... +15V			100		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 300 V	T_j = 150 °C		9		ns
t_r	I_C = 15 A	T_j = 150 °C		9		ns
E_{on}	$R_{G\ on}$ = 6.2 Ω	T_j = 150 °C		0.3		mJ
$t_{d(off)}$	$R_{G\ off}$ = 6.2 Ω di/dt_{on} = 1506 A/µs	T_j = 150 °C		135		ns
t_f	di/dt_{off} = 325 A/µs	T_j = 150 °C		68		ns
E_{off}	V_{GE} = +15/-8 V	T_j = 150 °C		0.35		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			2.19		K/W

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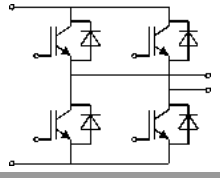

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Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Inverse - Diode						
$V_F = V_{EC}$	I_F = 15 A	T_j = 25 °C		1.23	1.48	V
	chiplevel	T_j = 150 °C		1.15	1.34	V
V_{F0}	chiplevel	T_j = 25 °C		0.99	1.10	V
		T_j = 150 °C		0.80	0.89	V
r_F	chiplevel	T_j = 25 °C		16	26	mΩ
		T_j = 150 °C		23	30	mΩ
I_{RRM}	I_F = 15 A di/dt_{off} = 1506 A/µs V_{GE} = -8 V V_{CC} = 300 V	T_j = 150 °C		16		A
Q_{rr}		T_j = 150 °C		1.25		µC
E_{rr}		T_j = 150 °C		0.26		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			2.7		K/W
Module						
L_{CE}				-		nH
M_s	to heatsink		1.8		2	Nm
w				19		g

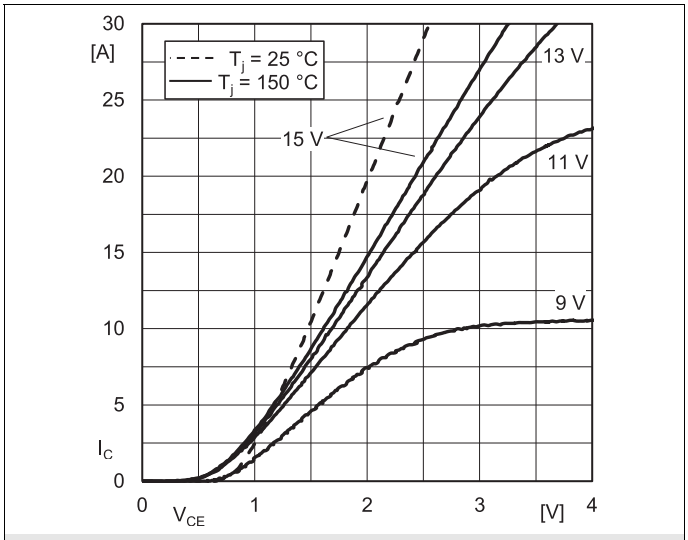


Fig. 1: Typ. IGBT output characteristic, incl. $R_{CC+ EE'}$

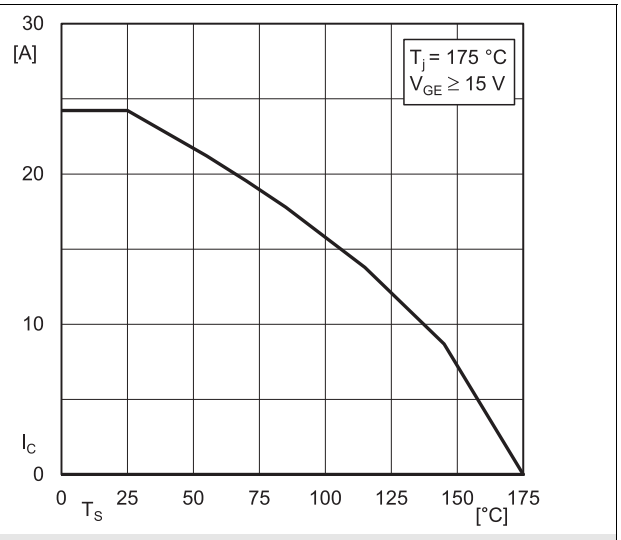


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

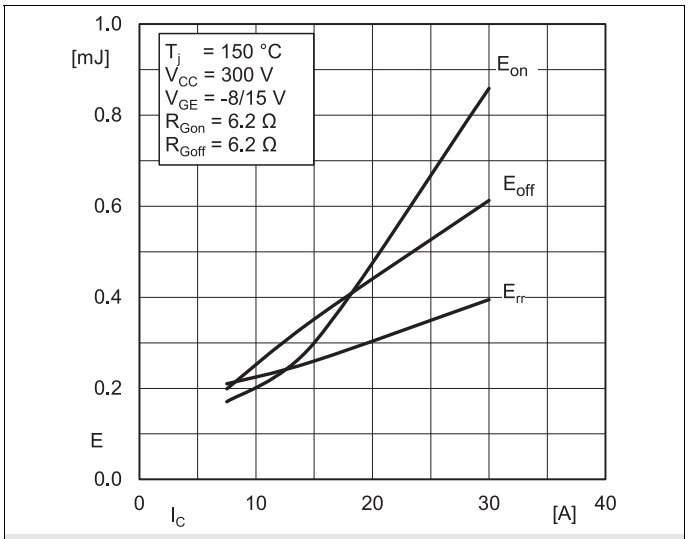


Fig. 3: Typ. turn-on /-off energy = f (I_C)

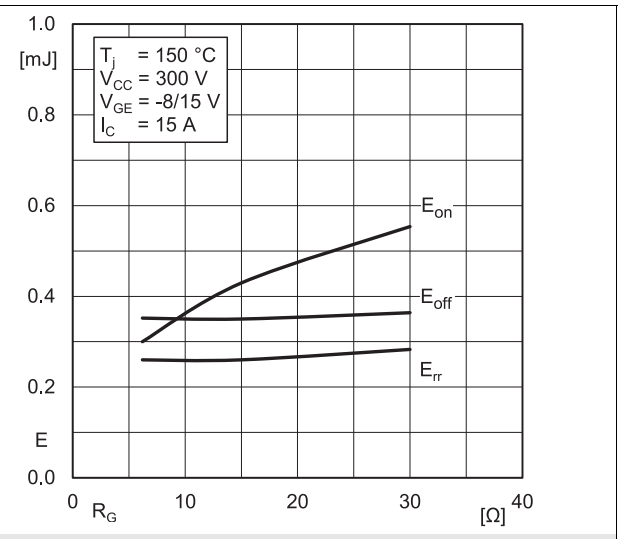


Fig. 4: Typ. turn-on /-off energy = f (R_G)

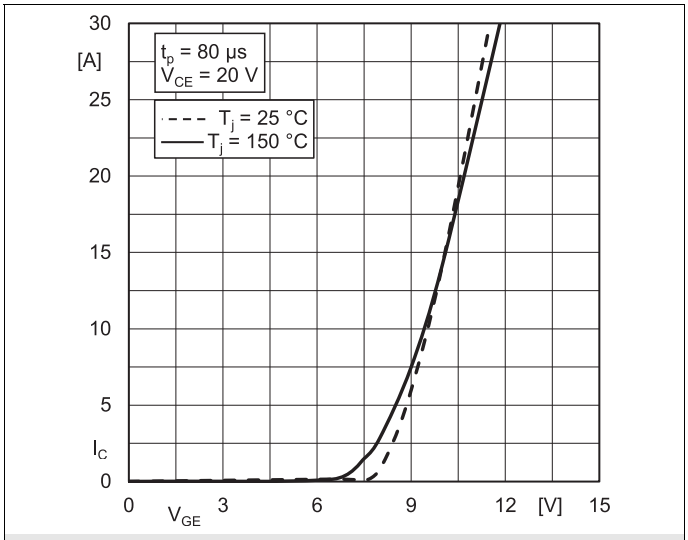


Fig. 5: Typ. IGBT transfer characteristic

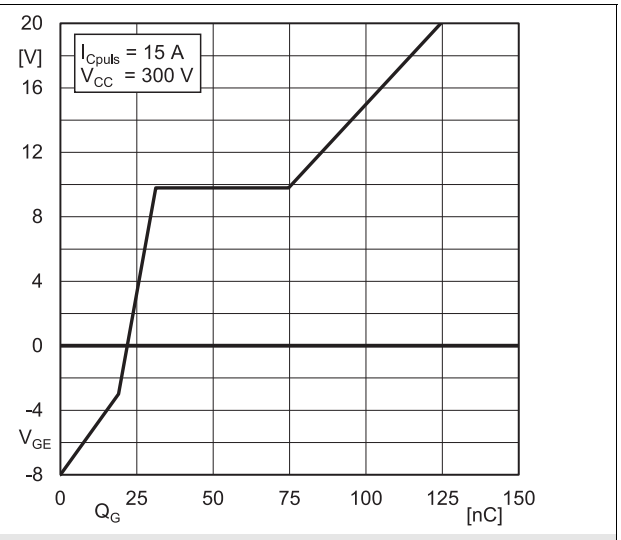


Fig. 6: Typ. IGBT gate charge characteristic

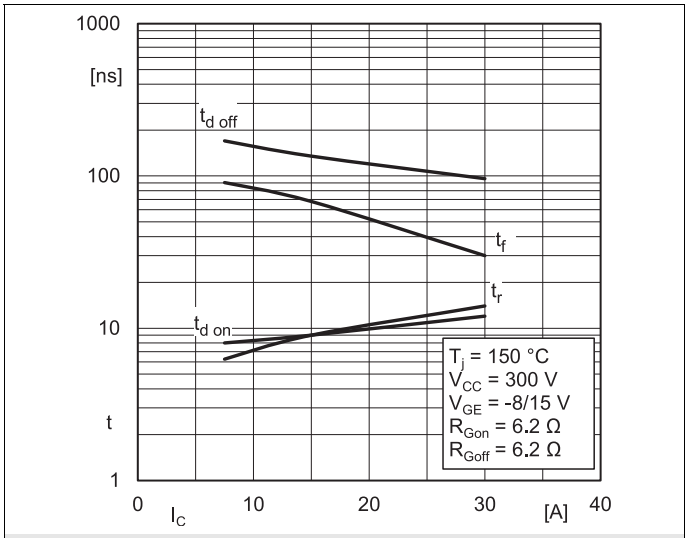


Fig. 7: Typ. switching times = f (I_C)

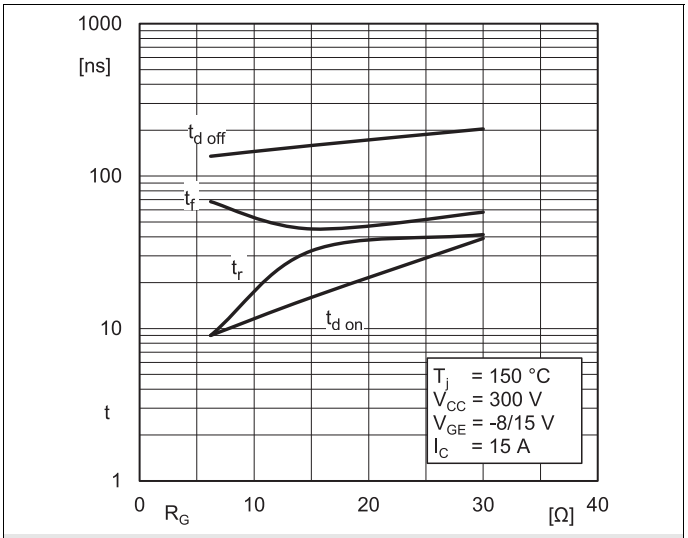


Fig. 8: Typ. switching times = f (R_G)

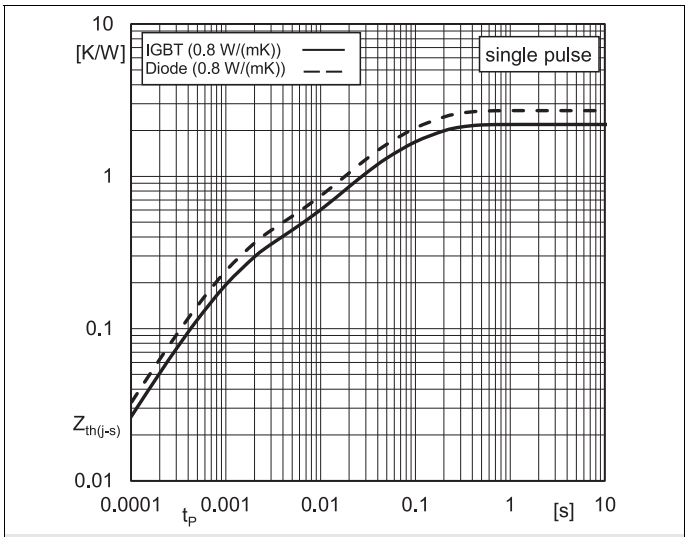


Fig. 9: Typ. transient thermal impedance

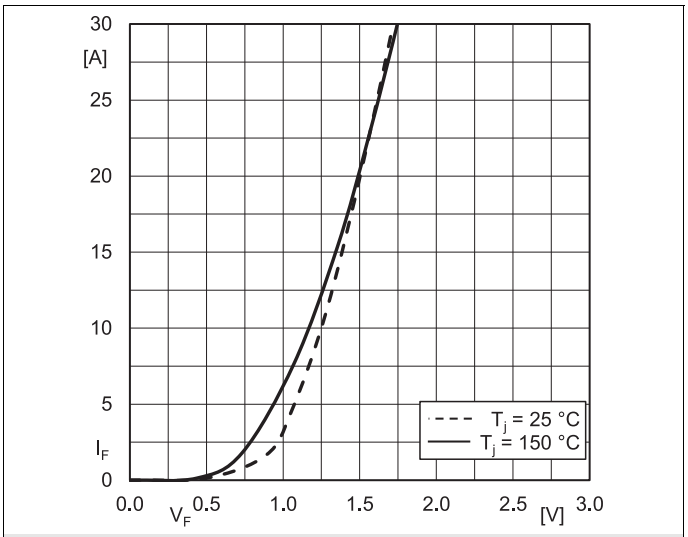


Fig. 10: Typ. Diode forward charact., incl. $R_{CC'+EE'}$

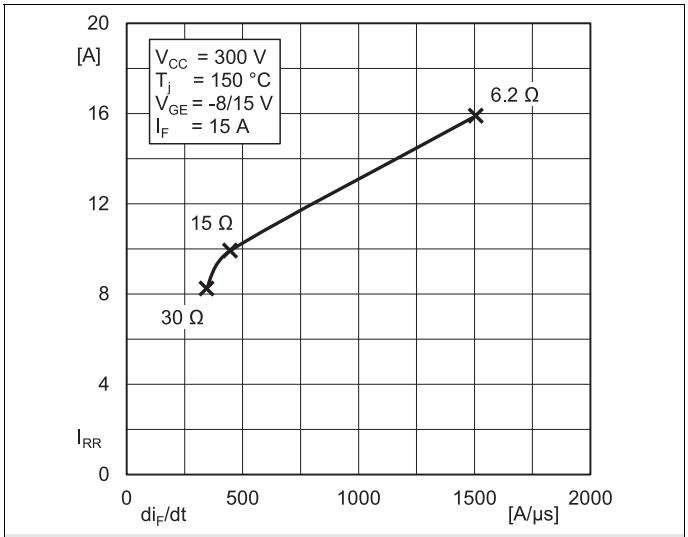


Fig. 11: Typ. Diode peak reverse recovery current

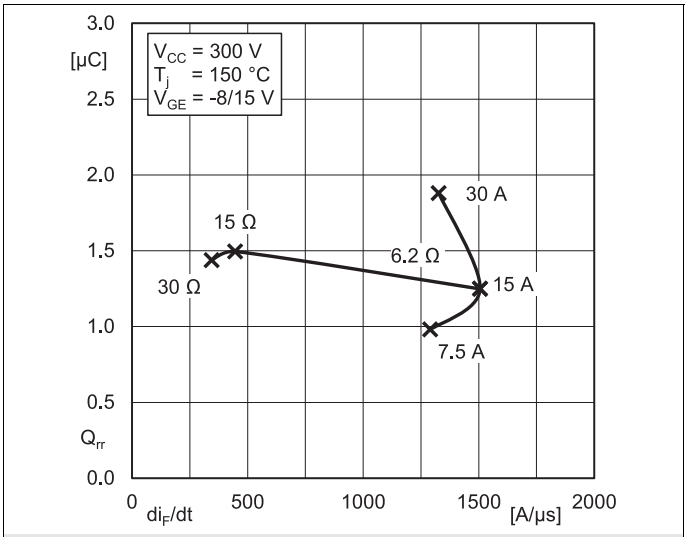
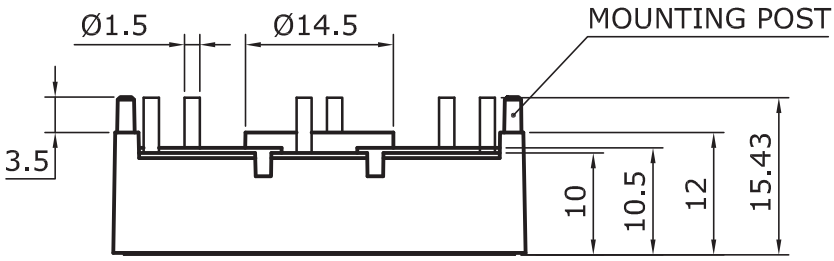
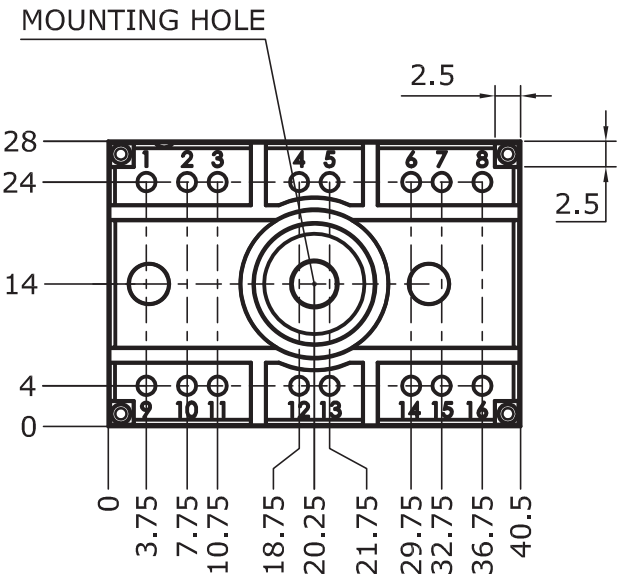
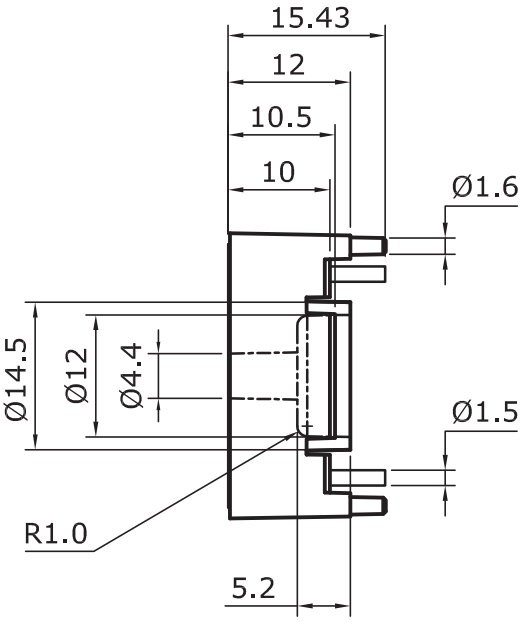


Fig. 12: Typ. Diode reverse recovery charge

Dimensions: mm
Tolerance system: ISO 2768-m







Suggested hole diameter for solder pins in the circuit board:

- 2.0 mm

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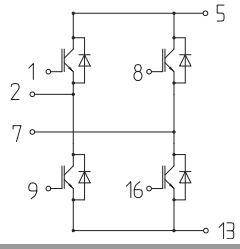

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This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

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