



SEMITOP® 2

IGBT module

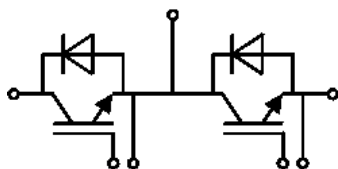
SK 35 GB 12T4

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
- UL recognized, file no. E 63 532

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	44	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} ≤ 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	40	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
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 = 35 A	T _j = 25 °C		1.85	2.10	V
	V _{GE} = 15 V chiplevel	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		30.0	34.3	mΩ
	chiplevel	T _j = 150 °C		44.3	47.1	mΩ
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 1.2 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C			0.062	mA
	V _{CE} = 1200 V	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
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	T _j = 150 °C		3.3		mJ
R _{th(i-s)}	per IGBT			1.21		K/W



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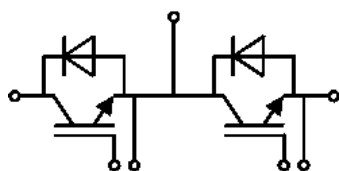
Features

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Typical Applications*

- Inverter
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
V _F = V _{EC}	I _F = 35 A	T _j = 25 °C		2.30	2.62	V
	V _{GE} = 15 V chiplevel	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	T _j = 150 °C		30		A
Q _{rr}	di/dt _{off} = 2900 A/μs	T _j = 150 °C		2		μC
E _{rr}	V _{GE} = -7 V	T _j = 150 °C		1.46		mJ
R _{th(j-s)}	V _{CC} = 600 V			1.55		K/W
Module						
M _s	Mounting torque to heatsink		1.8		2	Nm
w				19		g
Temperature Sensor						
R ₁₀₀						Ω
R(T)	, ,					



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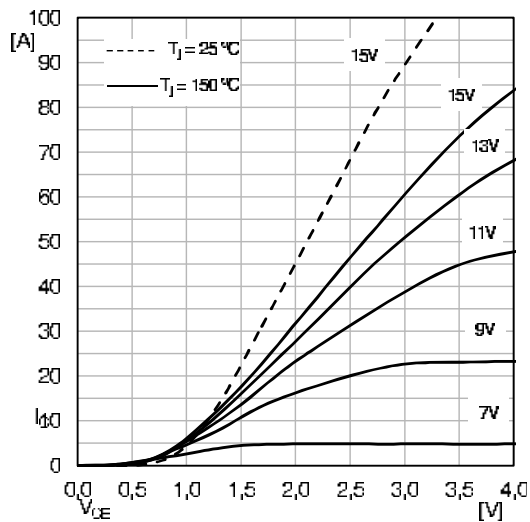


Fig. 1: Typical IGBT output characteristics

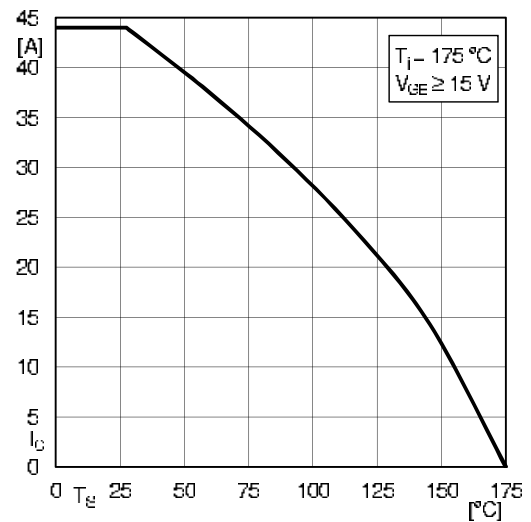


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

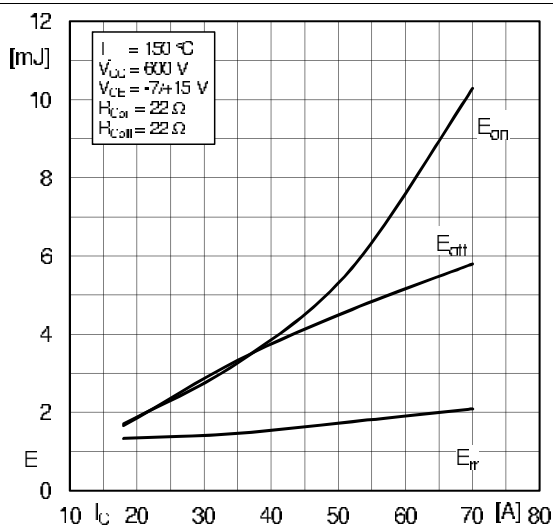


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

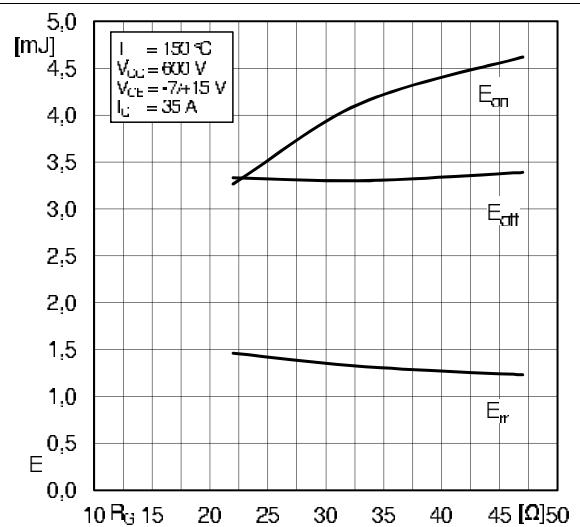


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

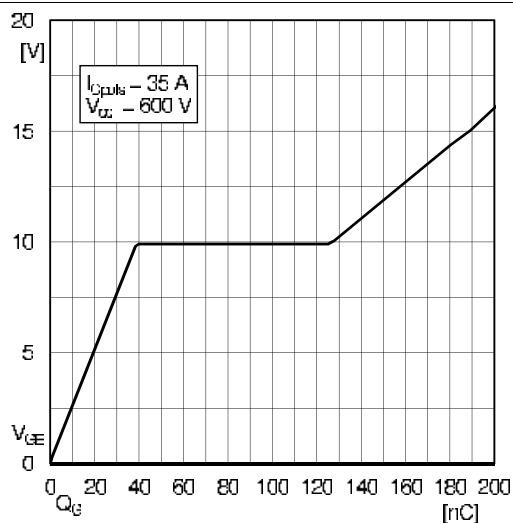


Fig. 6: Typ. gate charge characteristic

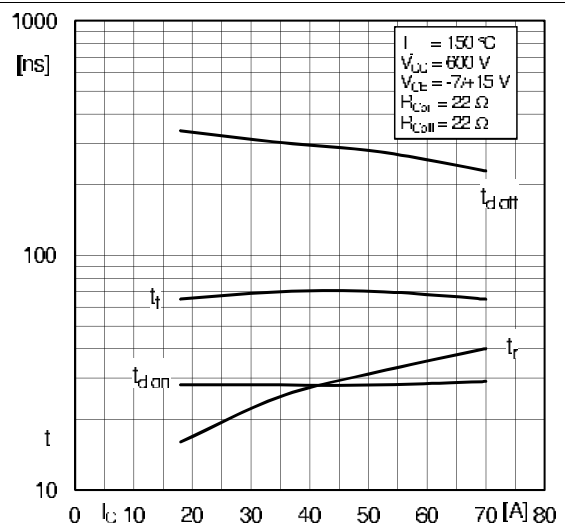


Fig. 7: Typ. switching times vs. I_C

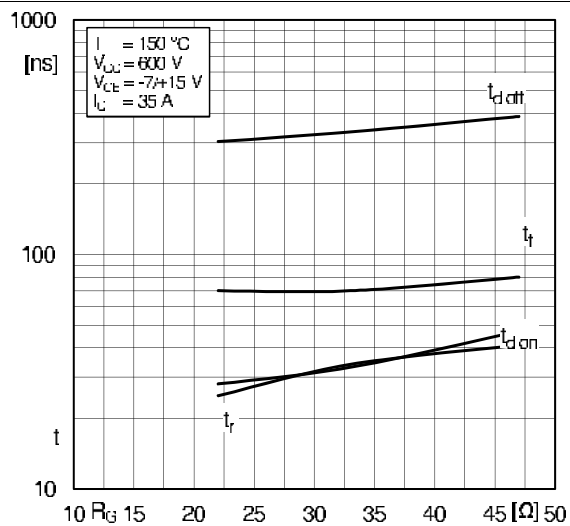


Fig. 8: Typ. switching times vs. gate resistor R_G

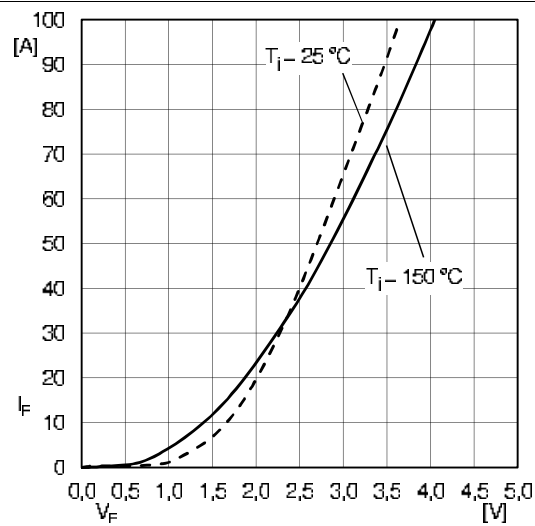
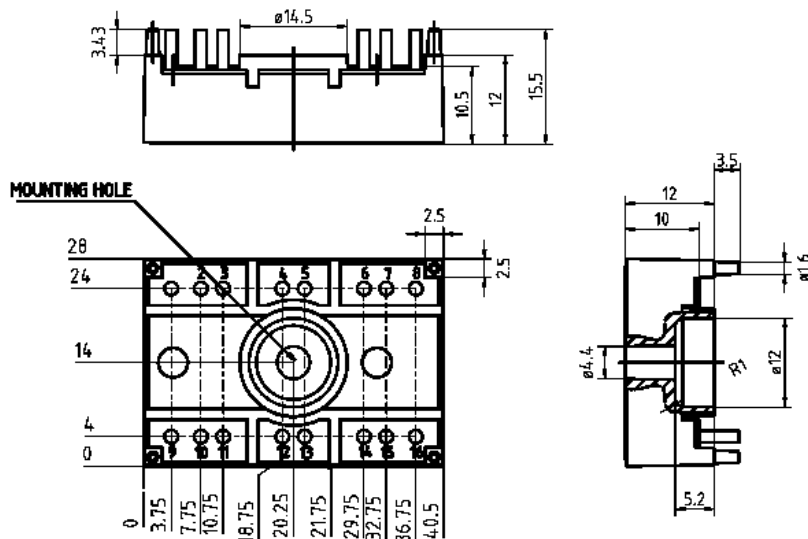


Fig. 10: CAL diode forward characteristic

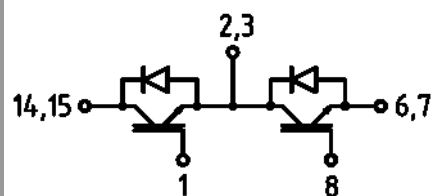
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dimensions in mm
tolerance system: ISO 2768-m



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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