

SK 50 GD 12T4 Tp



SEMITOP® 4 Press-Fit

IGBT module

SK 50 GD 12T4 Tp

Features

- One screw mounting module
- Solder free mounting with Press-Fit terminals
- Fully compatible with other SEMITOP® Press-Fit types
- Improved thermal performances by aluminium oxide substrate
- Trench4 IGBT technology
- CAL4F technology FWD
- Integrated NTC temperature sensor
- UL recognized, file no. E 63 532

Typical Applications*

- Inverter up to 26kVA
- Typical motor power 15kW

Absolute Maximum Ratings

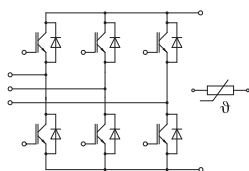
Symbol	Conditions		Values	Unit
IGBT 1				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 150 °C	T _s = 25 °C	65	A
		T _s = 70 °C	50	A
I _C	T _j = 175 °C	T _s = 25 °C	72	A
		T _s = 70 °C	59	A
I _{Cnom}			50	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		150	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 800 V V _{GE} ≤ 15 V V _{CES} ≤ 1200 V	T _j = 150 °C	10	µs
T _j			-40 ... 175	°C

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Diode 1				
V _{RRM}	T _j = 25 °C		1200	V
I _F	T _j = 150 °C	T _s = 25 °C	53	A
		T _s = 70 °C	40	A
I _F	T _j = 175 °C	T _s = 25 °C	60	A
		T _s = 70 °C	48	A
I _{Fnom}			50	A
I _{FRM}	I _{FRM} = 2 x I _{Fnom}		100	A
I _{FSM}	10 ms, sin 180°, T _j = 150 °C		270	A
T _j			-40 ... 175	°C

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Module			
$I_{t(RMS)}$	$T_{terminal} = 100\text{ °C}$, $T_s = 60\text{ °C}$, per pin	40	A
T_{stg}		-40 ... 125	°C
V_{isol}	AC, sinusoidal, $t = 1\text{ min}$	2500	V



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IGBT module

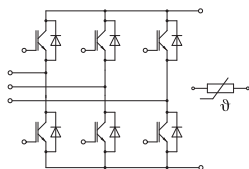
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT 1						
V _{CE(sat)}	I _C = 50 A	T _J = 25 °C		1.85	2.10	V
	V _{GE} = 15 V chipelevel	T _J = 150 °C		2.20	2.40	V
V _{CE0}	chipelevel	T _J = 25 °C		0.80	0.90	V
		T _J = 150 °C		0.70	0.80	V
r _{CE}	V _{GE} = 15 V	T _J = 25 °C		21	24	mΩ
	chipelevel	T _J = 150 °C		30	32	mΩ
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 1.7 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _J = 25 °C			0.67	mA
	V _{CE} = 1200 V			-		mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		2.77		nF
C _{oes}		f = 1 MHz		0.205		nF
C _{res}		f = 1 MHz		0.16		nF
Q _G	V _{GE} = -7V...+15V			375		nC
R _{Gint}	T _J = 25 °C			4.0		Ω
t _{d(on)}	V _{CC} = 600 V	T _J = 150 °C		63		ns
t _r	I _C = 50 A	T _J = 150 °C		65		ns
E _{on}	R _{G on} = 32 Ω	T _J = 150 °C		8.3		mJ
	R _{G off} = 32 Ω					
t _{d(off)}	di/dt _{on} = 920 A/μs	T _J = 150 °C		521		ns
t _f	di/dt _{off} = 920 A/μs	T _J = 150 °C		80		ns
E _{off}	V _{GE neg} = -7 V V _{GE pos} = 15 V	T _J = 150 °C		5		mJ
R _{th(j-s)}	per IGBT			0.65		K/W

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Diode 1						
V _F	I _F = 50 A	T _J = 25 °C		2.22	2.54	V
	chiplevel	T _J = 150 °C		2.18	2.50	V
V _{F0}	chiplevel	T _J = 25 °C		1.30	1.50	V
		T _J = 150 °C		0.90	1.10	V
r _F	chiplevel	T _J = 25 °C		18	21	mΩ
		T _J = 150 °C		26	28	mΩ
I _{RRM}	I _F = 50 A	T _J = 150 °C		30		A
Q _{rr}	di/dt _{off} = 920 A/μs	T _J = 150 °C		7.2		μC
E _{rr}	V _{GE} = -7 V	T _J = 150 °C		2.15		mJ
	V _{CC} = 600 V					
R _{th(j-s)}	per diode			0.97		K/W

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Module					
M _s	to heatsink	2.5		2.75	Nm
w	weight		60		g

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Temperature Sensor					
R ₁₀₀	T _r = 100 °C	493 ± 5%			Ω
B _{100/125}	R _(T) =R ₁₀₀ exp[B _{100/125} (1/T-1/T ₁₀₀)]; T[K];	3550 ±2%			K

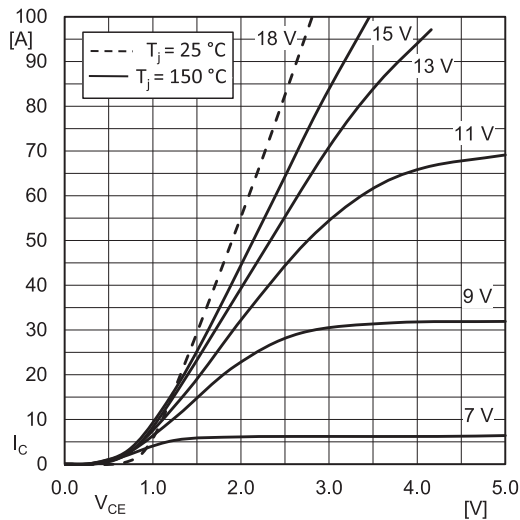


Fig. 1: Typ. IGBT1 output characteristic, incl. $R_{CC'+EE'}$

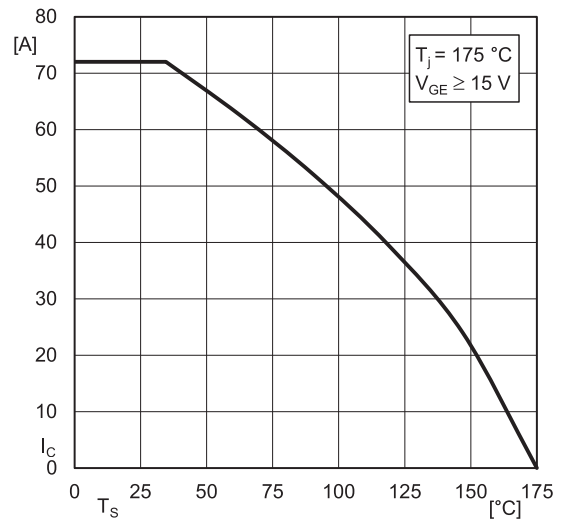


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_s)$

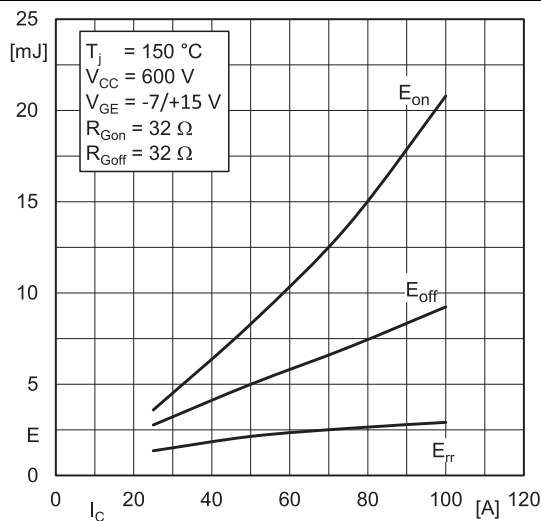


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

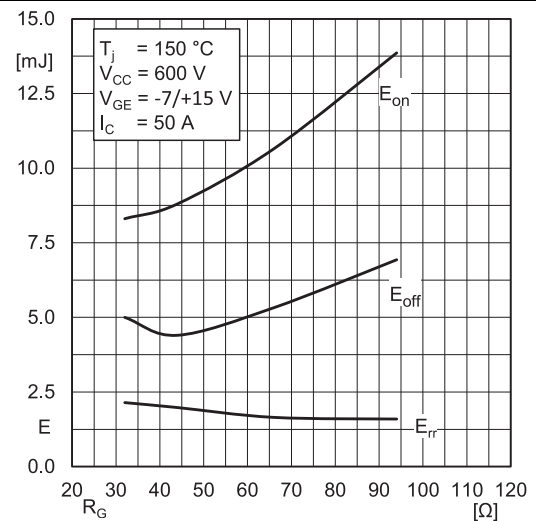


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

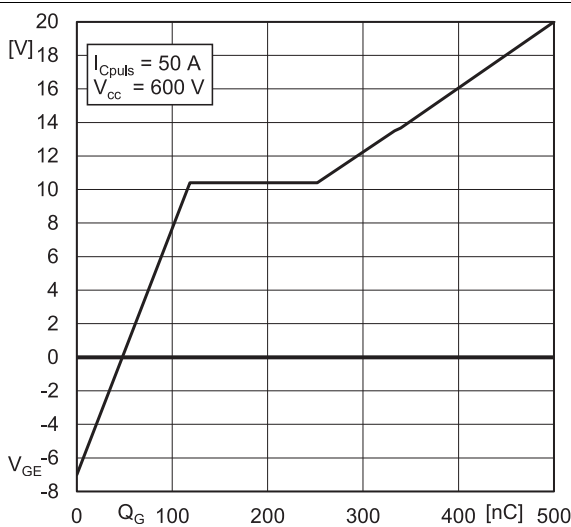


Fig. 6: Typ. gate charge characteristic

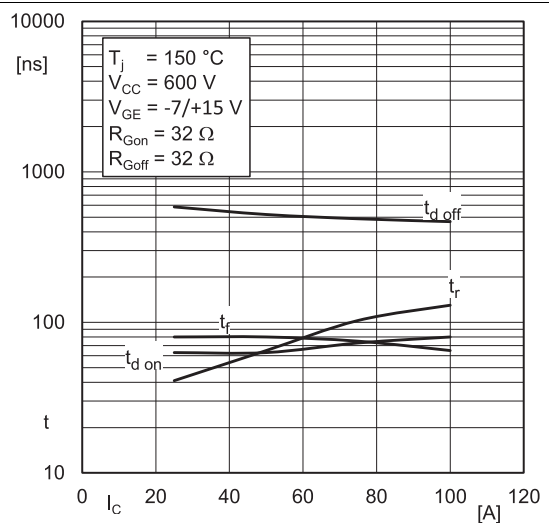


Fig. 7: Typ. switching times vs. I_C

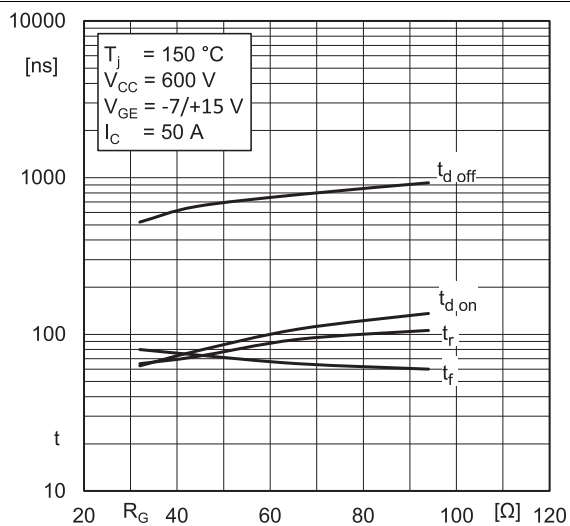


Fig. 8: Typ. switching times vs. gate resistor R_G

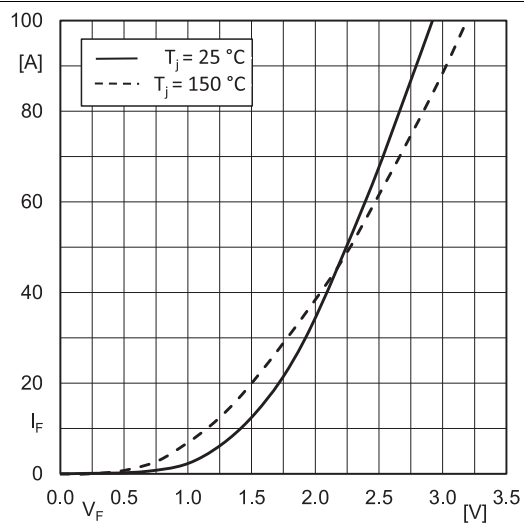
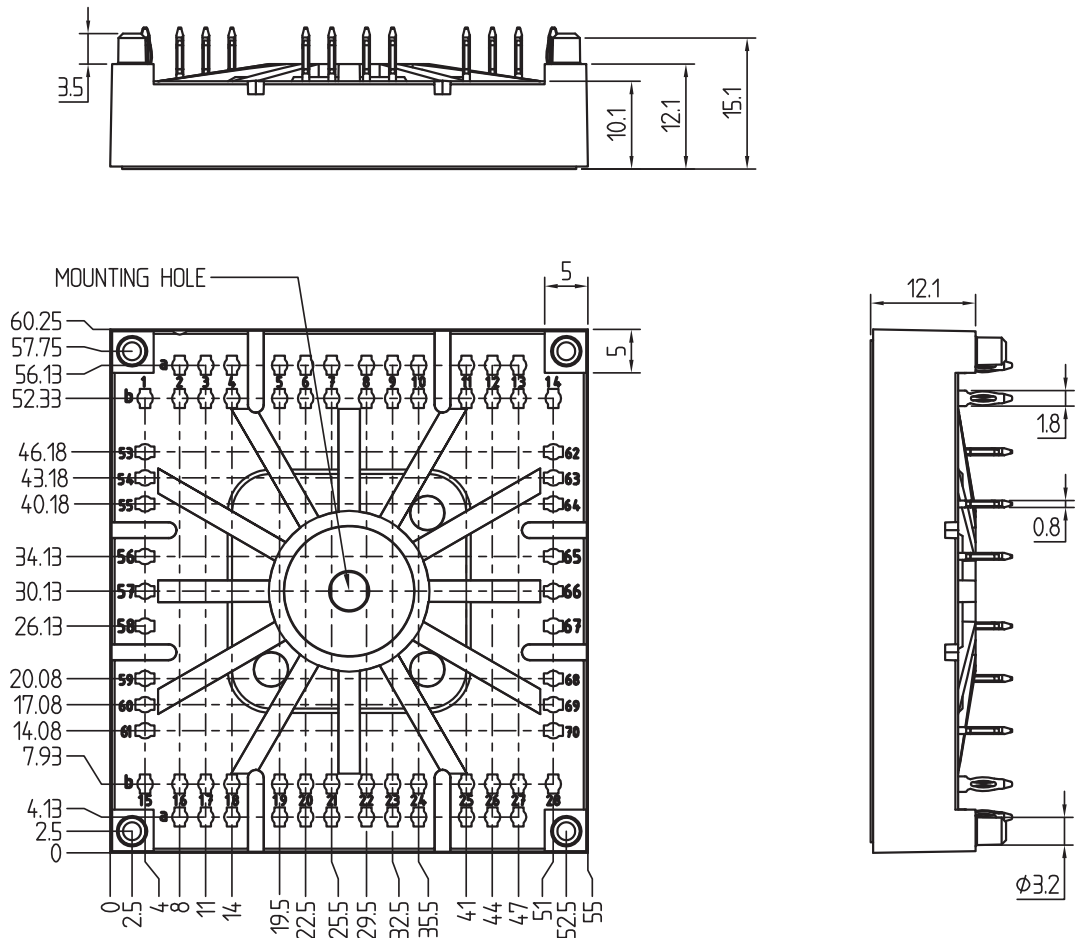


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

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dimensions in mm

tolerance system: ISO 2768-m



Suggested drilled hole diameter for terminal pins in the circuit board:

- minimum: 1.575mm
- typical: 1.6mm
- maximum: 1.625mm

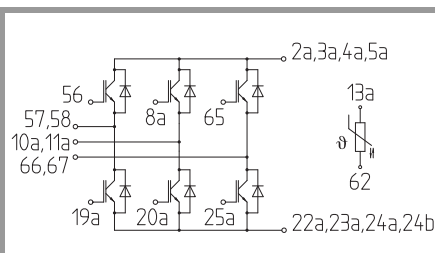
Suggested hole diameter for the mounting pins in the circuit board: 3.6mm

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SEMITOP 4 Press-Fit



GD-T

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

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