

SK 80 GD 12F4 T



SEMITOP® 4

IGBT module

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Features*

- One screw mounting module
- Fully compatible with SEMITOP® 1,2,3
- Improved thermal performances by aluminium oxide substrate
- Trench4 Fast IGBT technology
- CAL4F technology FWD
- Integrated NTC temperature sensor
- UL recognized, file no. E 63 532

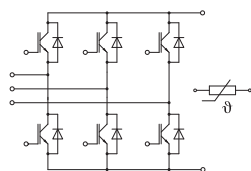
Typical Applications

- Inverter

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT 1				
V _{CES}			1200	V
I _C	T _j = 150 °C	T _s = 25 °C	82	A
		T _s = 70 °C	63	A
I _C	T _j = 175 °C	T _s = 25 °C	91	A
		T _s = 70 °C	74	A
I _{Chom}			80	A
I _{CRM}			160	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	90	A
		T _s = 70 °C	67	A
I _F	T _j = 175 °C	T _s = 25 °C	101	A
		T _s = 70 °C	80	A
I _{FRM}			200	A
I _{FSM}	10 ms, sin 180°, T _j = 150 °C		550	A
T _j			-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
Module			
I _{t(RMS)}	ΔT _{terminal} at PCB joint = 30 K, per pin	60	A
T _{stg}		-40 ... 125	°C
V _{isol}	AC, sinusoidal, t = 1 min	2500	V



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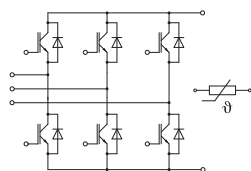
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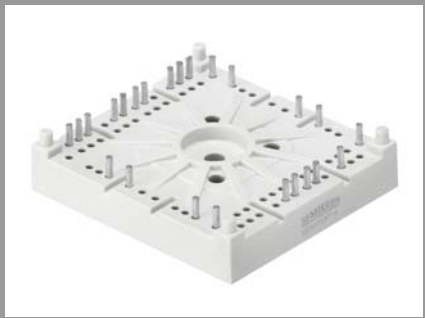
Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT 1						
V _{CE(sat)}	I _C = 80 A	T _j = 25 °C		2.05	2.40	V
	V _{GE} = 15 V chipelevel	T _j = 150 °C		2.59	2.85	V
V _{CE0}	chipelevel	T _j = 25 °C		0.80	0.90	V
		T _j = 150 °C		0.70	0.80	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C		16	19	mΩ
	chipelevel	T _j = 150 °C		24	26	mΩ
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 3 mA		5.2	5.8	6.4	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C			1.36	mA
	V _{CE} = 1200 V			-		mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		4.6		nF
C _{oes}		f = 1 MHz		0.37		nF
C _{res}		f = 1 MHz		0.27		nF
Q _G		V _{GE} = -15V...+15V			275	
R _{Gint}	T _j = 25 °C			2.4		Ω
t _{d(on)}	V _{CC} = 600 V	T _j = 150 °C		155		ns
t _r	I _C = 80 A	T _j = 150 °C		51		ns
E _{on}	V _{GE neg} = -15 V V _{GE pos} = 15 V	T _j = 150 °C		5.8		mJ
t _{d(off)}	R _{G on} = 3.3 Ω	T _j = 150 °C		345		ns
t _f	R _{G off} = 3.3 Ω	T _j = 150 °C		42		ns
E _{off}	di/dt _{on} = 2300 A/μs di/dt _{off} = 2200 A/μs	T _j = 150 °C		5		mJ
R _{th(j-s)}	per IGBT, λ _{paste} =0.8 W/(mK)			0.51		K/W

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Diode 1						
V _F	I _F = 100 A	T _j = 25 °C		2.20	2.52	V
	chiplevel	T _j = 150 °C		2.15	2.47	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		9.0	10	mΩ
		T _j = 150 °C		13	14	mΩ
I _{RRM}	I _F = 80 A	T _j = 150 °C		41		A
Q _{rr}	di/dt _{off} = 2300 A/μs	T _j = 150 °C		11		μC
E _{rr}	V _{GE} = -15 V	T _j = 150 °C		6.5		mJ
	V _{CC} = 600 V					
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/(mK)			0.65		K/W



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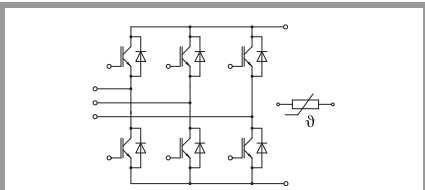
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Module					
M _s	to heatsink	2.5		2.75	Nm
w	weight		60		g

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



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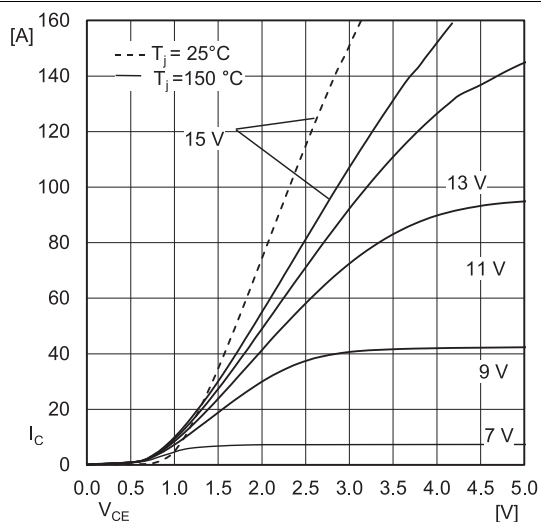


Fig. 1: Typ. IGBT1 output characteristic, incl. $R_{CC'+EE'}$

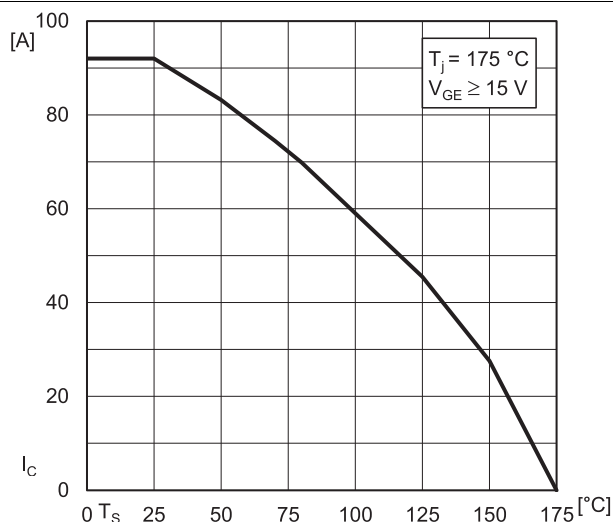


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_s)$

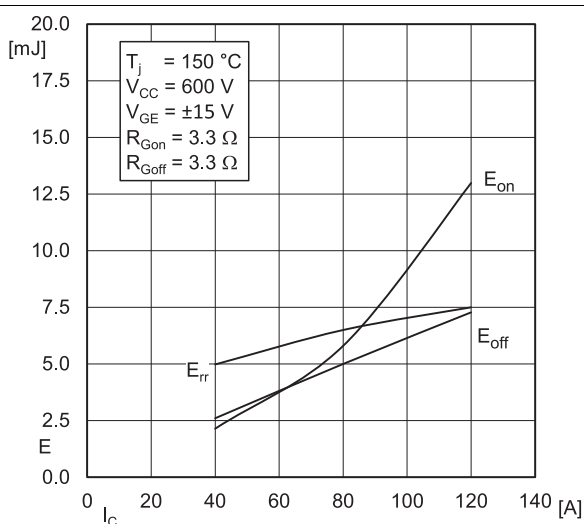


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

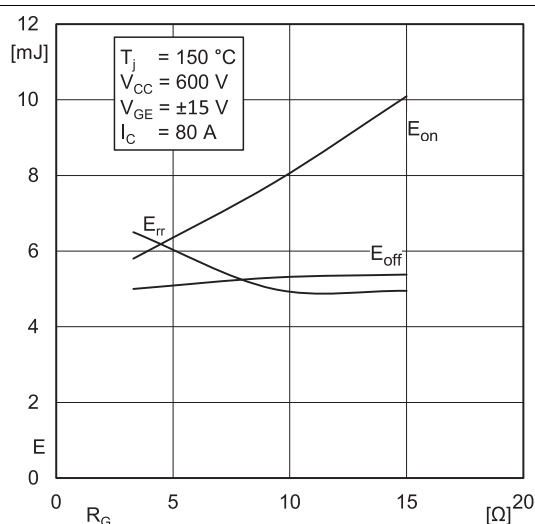


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

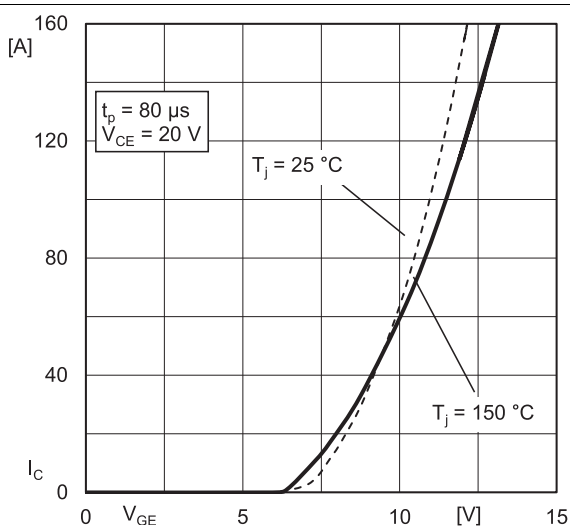


Fig. 5: Typ. transfer characteristic

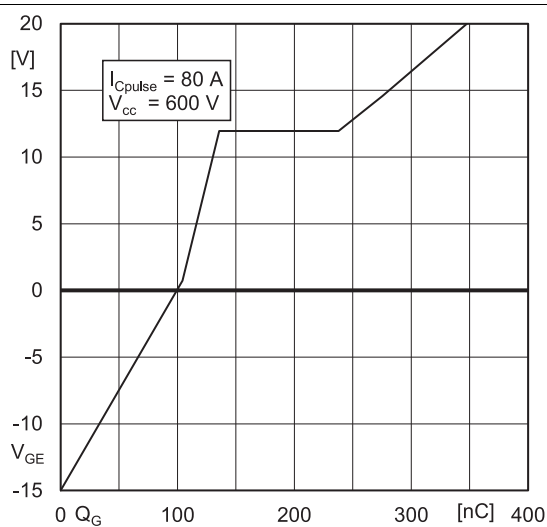


Fig. 6: Typ. gate charge characteristic

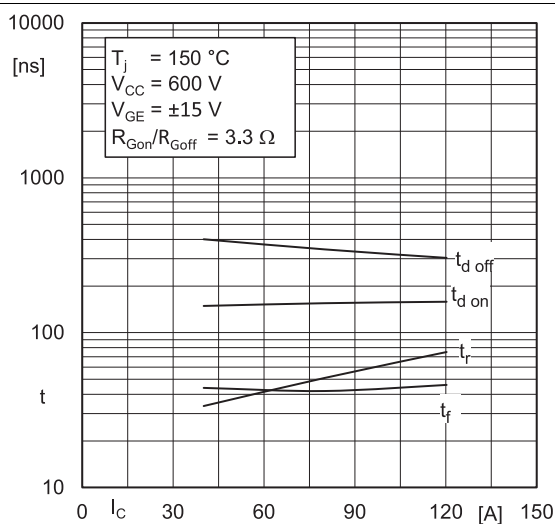


Fig. 7: Typ. switching times vs. I_C

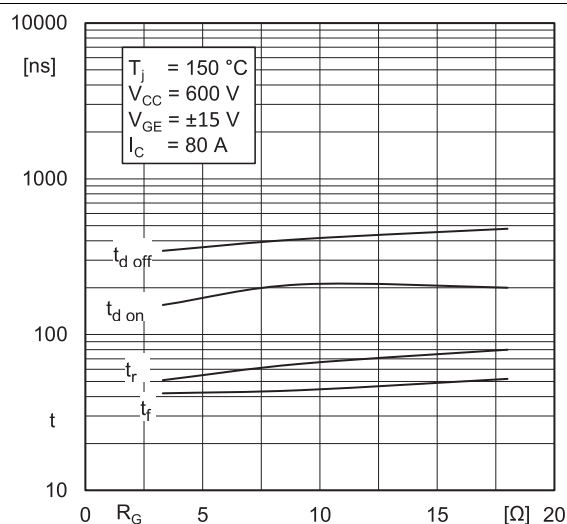


Fig. 8: Typ. switching times vs. gate resistor R_G

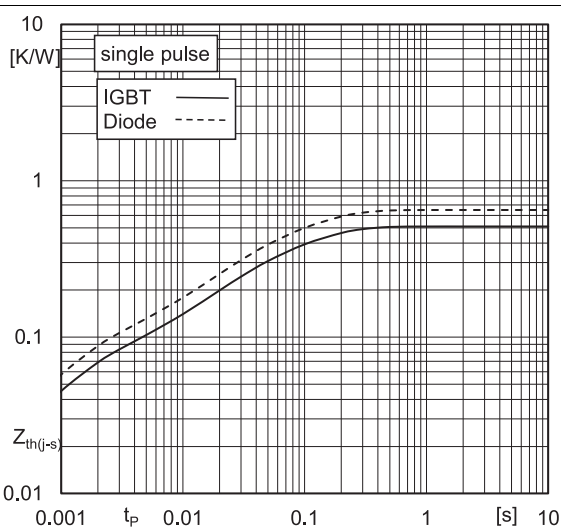


Fig. 9: Typ. transient thermal impedance

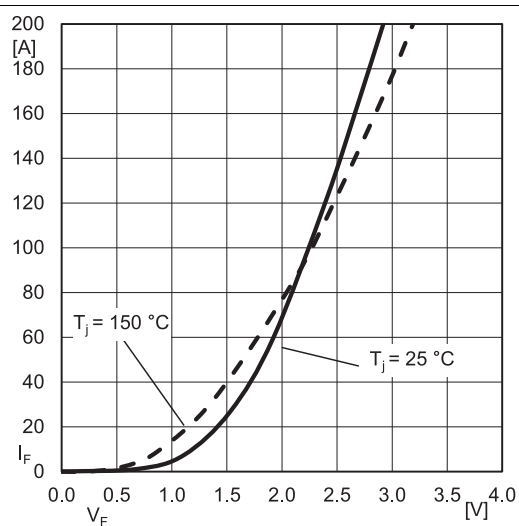
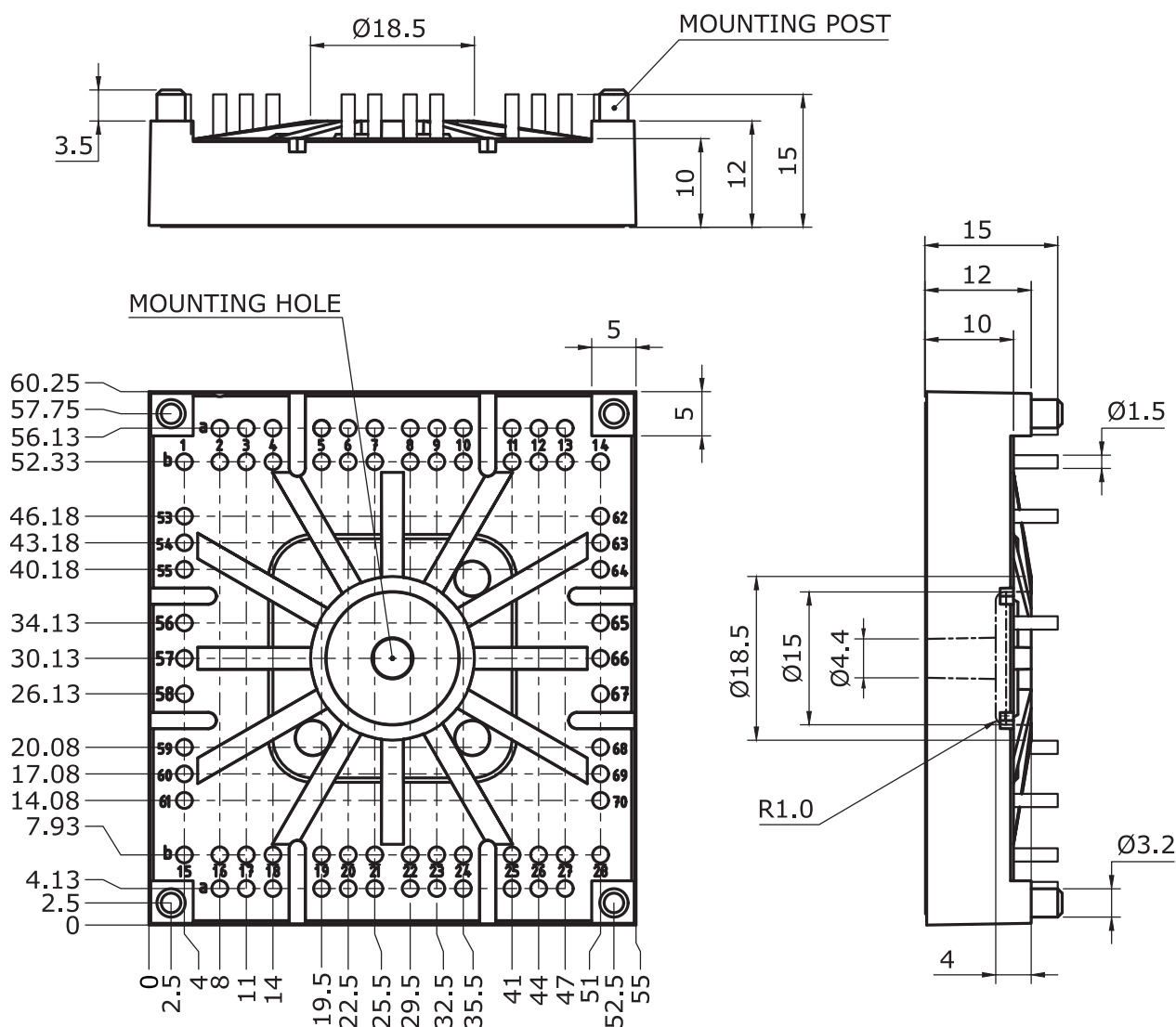


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'} + EE'$

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Dimensions: mm

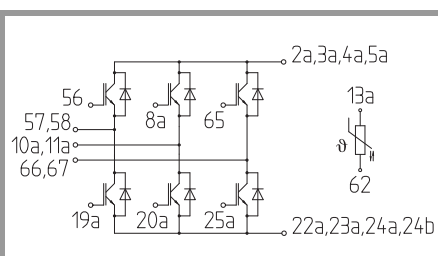
Tolerance system: ISO 2768-m



Suggested drilled hole diameter for terminal pins in the circuit board:
- refer to Mounting Instruction SEMITOP® Classic

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IMPORTANT INFORMATION AND WARNINGS

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

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