

SEMITOP® 4

IGBT module

SK100GD07F3TD1

Features

- Compact design
- One screw mounting module
- Improved thermal performances by aluminium oxide substrate
- 650V Fast Trench3 IGBT technology
- Rapid switching 650V diode technology
- Integrated NTC temperature sensor
- UL recognized, file no. E63 532

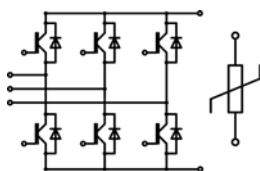
Typical Applications*

- Switching (not for linear use)
- Inverter
- Switched mode power supplies
- UPS

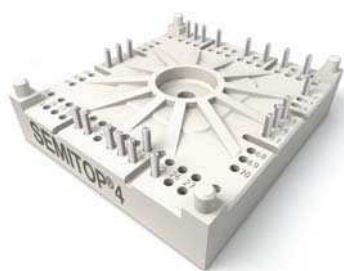
Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT 1				
V _{CES}	T _j = 25 °C		650	V
I _C	T _j = 150 °C	T _s = 25 °C	93	A
		T _s = 70 °C	69	A
I _C	T _j = 175 °C	T _s = 25 °C	104	A
		T _s = 70 °C	83	A
I _{Cnom}			100	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		300	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 400 V V _{GE} ≤ 15 V V _{CES} ≤ 650 V	T _j = 150 °C	5	μs
T _j			-40 ... 175	°C

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
Diode 1				
V _{RRM}	T _j = 25 °C		650	V
I _F	T _j = 150 °C	T _s = 25 °C	84	A
		T _s = 70 °C	62	A
I _F	T _j = 175 °C	T _s = 25 °C	95	A
		T _s = 70 °C	75	A
I _{Fnom}			80	A
I _{FRM}	I _{FRM} = 2 x I _{Fnom}		160	A
I _{FSM}	10 ms, sin 180°,			A
T _j			-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
Module			
$I_{t(RMS)}$	,		A
T_{stg}		-40 ... 125	°C
V_{isol}	AC, sinusoidal, t = 1 min	2500	V



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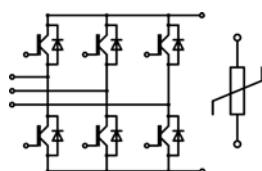
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT 1						
V _{CE(sat)}	I _C = 100 A	T _j = 25 °C		1.85	2.22	V
	V _{GE} = 15 V chiplevel	T _j = 150 °C		2.18	2.55	V
V _{CE0}	chiplevel	T _j = 25 °C		1.10	1.20	V
		T _j = 150 °C		1.00	1.10	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C		7.5	10	mΩ
	chiplevel	T _j = 150 °C		12	15	mΩ
V _{GE(th)}	V _{GE} = V _{CE} V, I _C = 1.6 mA		4.2	5.1	5.6	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C			1.5	mA
	V _{CE} = 650 V					mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		6.2		nF
C _{oes}		f = 1 MHz		0.232		nF
C _{res}		f = 1 MHz		0.18		nF
Q _G	- 8 V...+ 15 V			367		nC
R _{Gint}	T _j = 25 °C			2.4		Ω
t _{d(on)}	V _{CC} = 300 V	T _j = 150 °C		137		ns
t _r	I _C = 100 A	T _j = 150 °C		79		ns
E _{on}	R _{G on} = 6.2 Ω	T _j = 150 °C		3.92		mJ
t _{d(off)}	R _{G off} = 6.2 Ω	T _j = 150 °C		480		ns
t _f	di/dt _{on} = 1050 A/μs	T _j = 150 °C		32		ns
E _{off}	di/dt _{off} = 2570 A/μs	T _j = 150 °C				
	V _{GE neg} = -7 V	T _j = 150 °C		2.1		mJ
	V _{GE pos} = 15 V					
R _{th(j-s)}	per IGBT			0.54		K/W

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Diode 1						
V _F = V _{EC}	I _F = 80 A	T _j = 25 °C		1.35	1.77	V
	chiplevel	T _j = 150 °C		1.30	1.72	V
V _{F0}	chiplevel	T _j = 25 °C		0.95	1.15	V
		T _j = 150 °C		0.75	0.95	V
r _F	chiplevel	T _j = 25 °C		5.0	7.8	mΩ
		T _j = 150 °C		6.9	9.6	mΩ
I _{RRM}	I _F = 100 A	T _j = 150 °C		38.9		A
Q _{rr}	di/dt _{off} = 1050 A/μs	T _j = 150 °C		4.47		μC
E _{rr}	V _{GE} = -7 V V _{CC} = 300 V	T _j = 150 °C		0.92		mJ
R _{th(l-s)}	per Diode			0.85		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 ₂ =R ₁ *exp[B(1/T ₁ -1/T ₂)], T(K), ,		3550 ±2%		K

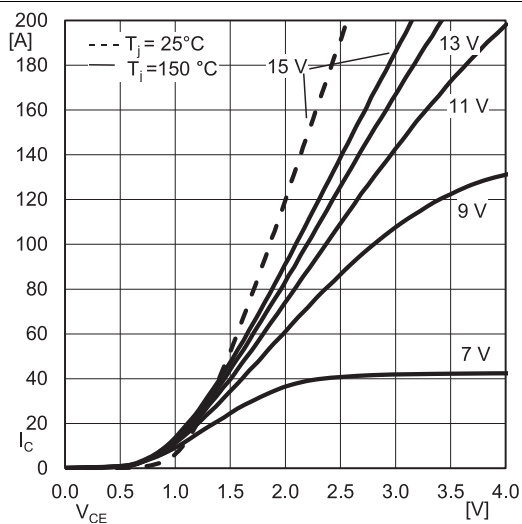


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

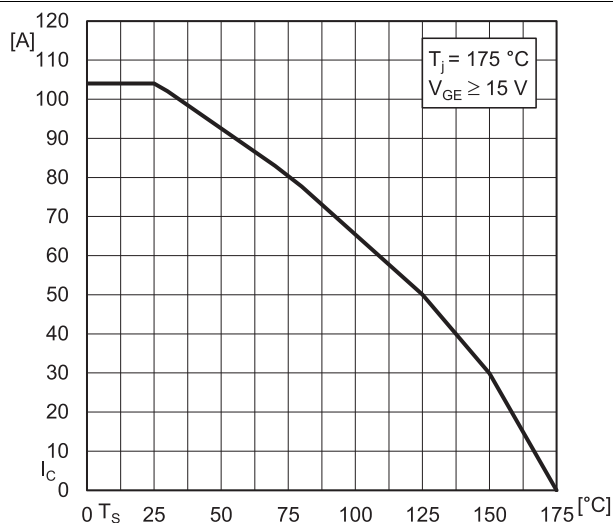


Fig. 2: Rated current vs. temperature $I_C = f(T_s)$

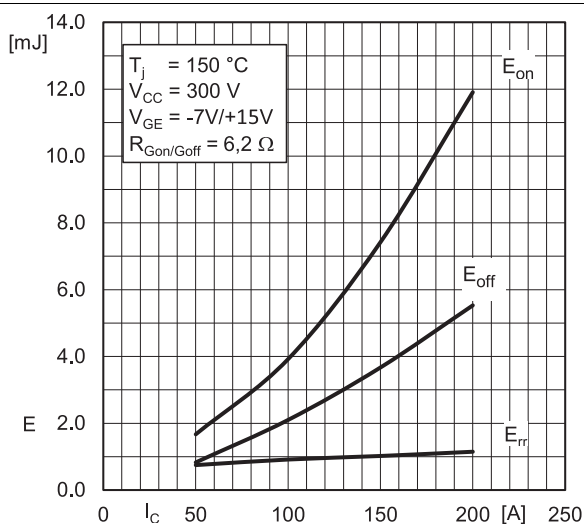


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

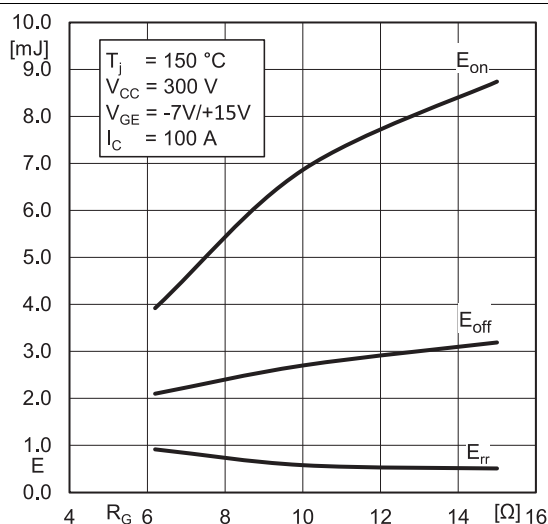


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

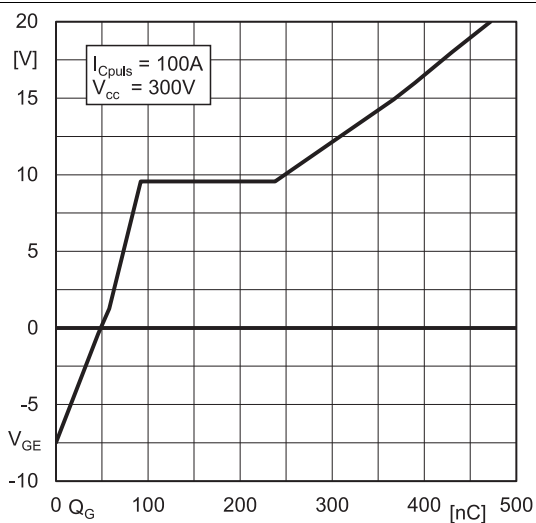


Fig. 6: Typ. gate charge characteristic

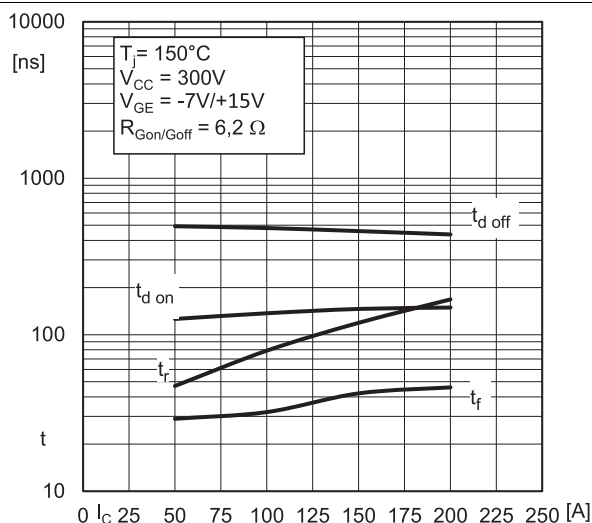


Fig. 7: Typ. switching times vs. I_C

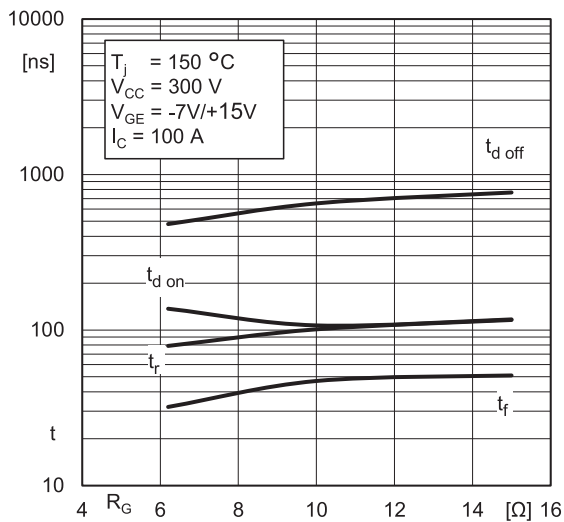


Fig. 8: Typ. switching times vs. gate resistor R_G

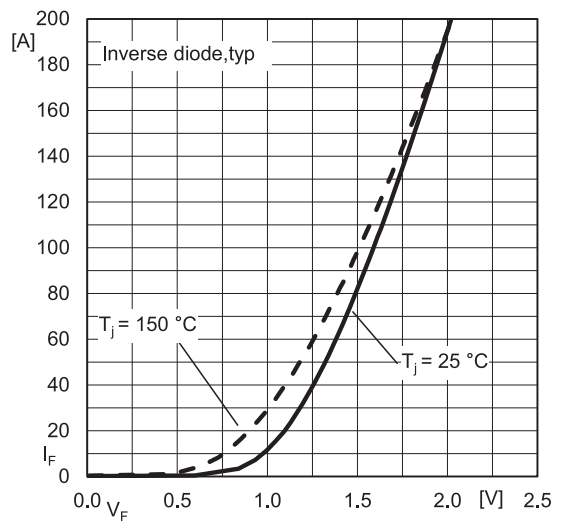


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'} + EE'$

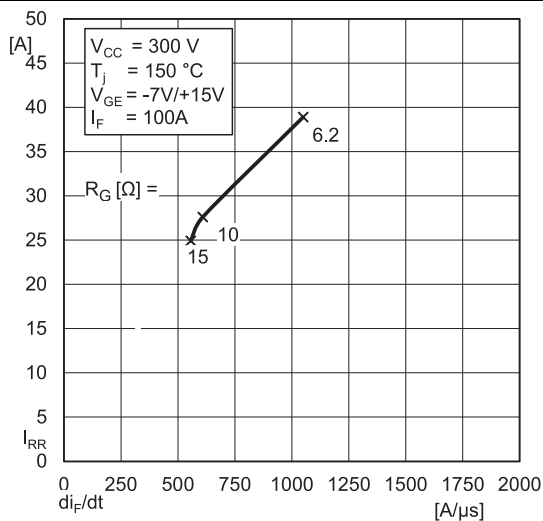


Fig. 11: Typ. CAL diode peak reverse recovery current

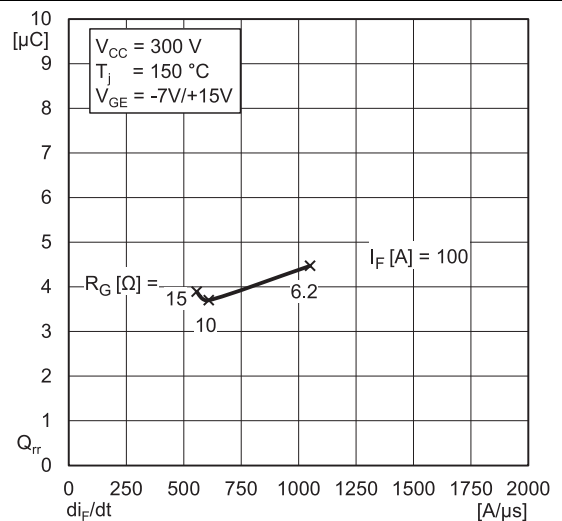
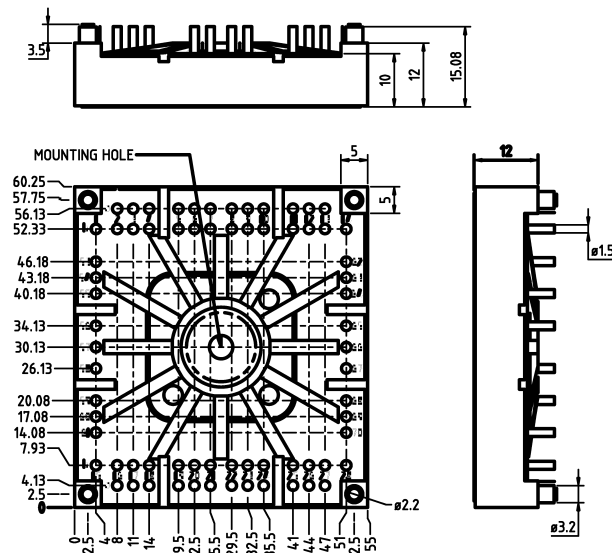


Fig. 12: Typ. CAL diode recovery charge

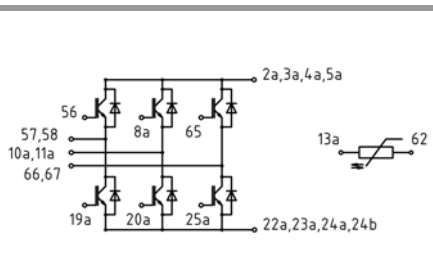
dimensions in mm
tolerance system: ISO 2768-m



Suggested hole diameter for solder pins in the circuit board: 2mm
Suggested hole diameter for the mounting pins in the circuit board: 3,6mm

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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.