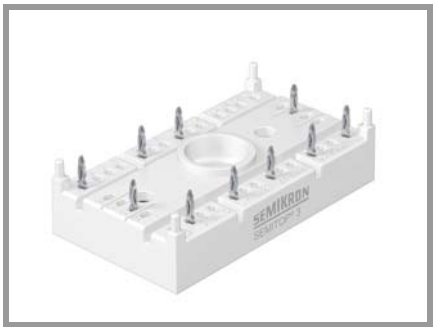


SEMITOP® 3 Press-Fit

IGBT module

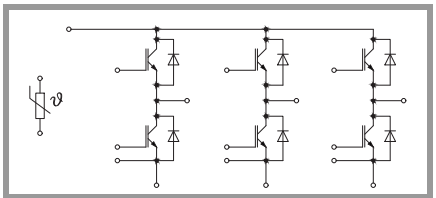
SK35GD12T4ETp

Features*

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

Typical Applications

- Motor Drives
- Servo Drives
- Air Conditioning
- Auxiliary Inverters
- UPS

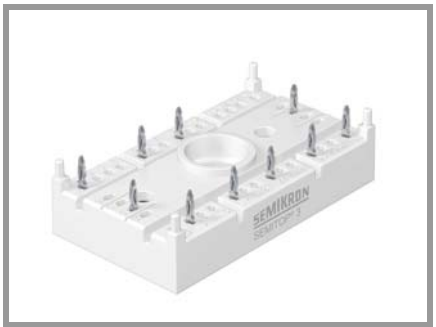


GD-ET

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	38	A
		T_s = 70 °C	29	A
I_C	T_j = 175 °C	T_s = 25 °C	43	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

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	34	A
		T_s = 70 °C	25	A
I_F	T_j = 175 °C	T_s = 25 °C	38	A
		T_s = 70 °C	30	A
I_{Fnom}			35	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		70	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		170	A
T_j			-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	**Conditions**	**Values**	**Unit**
Module			
$I_{t(RMS)}$	$\Delta T_{terminal}$ at PCB joint = 30 K, per pin	35	A
T_{stg}		-40 ... 125	°C
V_{isol}	AC, sinusoidal, t = 1 min	2500	V



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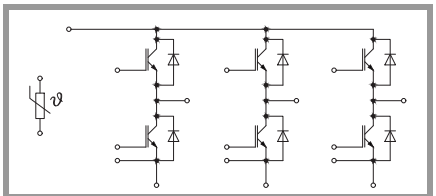

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Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
IGBT 1						
$V_{CE(sat)}$	I_C = 35 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.10	V
		T_j = 150 °C		2.25	2.45	V
V_{CE0}	chiplevel	T_j = 25 °C		0.80	0.90	V
		T_j = 150 °C		0.70	0.80	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		30	34	mΩ
		T_j = 150 °C		44	47	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 V_{CE} = 1200 V	T_j = 25 °C		-	1	mA
				-		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	V_{GE} = -7 V...+15 V			190		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 35 A $V_{GE\,neg}$ = -7 V $V_{GE\,pos}$ = 15 V $R_{G\,on}$ = 22 Ω $R_{G\,off}$ = 22 Ω di/dt_{on} = 2500 A/µs di/dt_{off} = 1500 A/µs dv/dt = 2900 V/µs	T_j = 150 °C		28		ns
t_r		T_j = 150 °C		25		ns
E_{on}		T_j = 150 °C		3.2		mJ
$t_{d(off)}$		T_j = 150 °C		303		ns
t_f		T_j = 150 °C		70		ns
E_{off}		T_j = 150 °C		3.3		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			1.21		K/W

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode 1						
V_F	I_F = 35 A chiplevel	T_j = 25 °C		2.30	2.62	V
		T_j = 150 °C		2.29	2.62	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		29	32	mΩ
		T_j = 150 °C		40	43	mΩ
I_{RRM}	I_F = 35 A di/dt_{off} = 2500 A/µs V_{GE} = -7 V V_{CC} = 600 V	T_j = 150 °C		30		A
Q_{rr}		T_j = 150 °C		2		µC
E_{rr}		T_j = 150 °C		1.4		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			1.55		K/W

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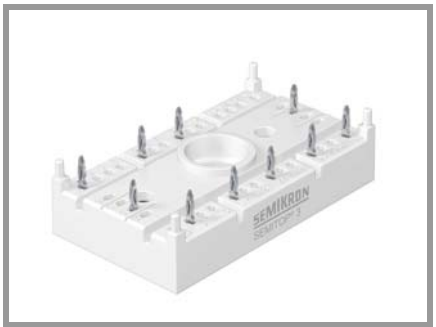

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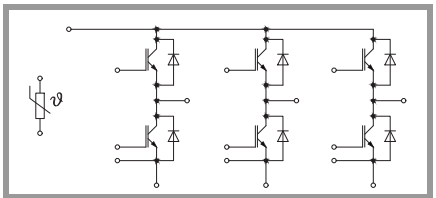

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Characteristics					
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
Module					
M_s	to heatsink	2.25		2.5	Nm
w	weight		30		g

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

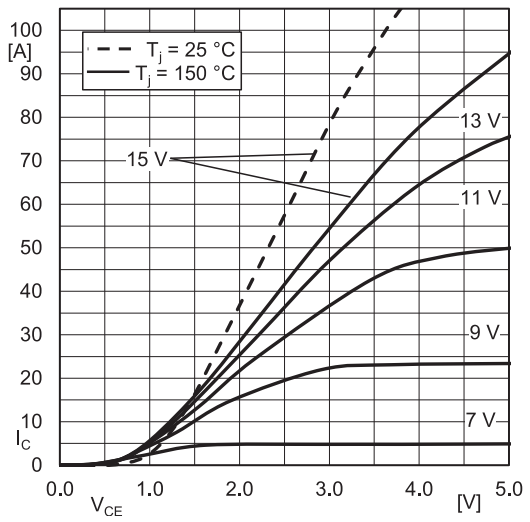

Fig. 1: Typ. IGBT1 output characteristic, incl. $R_{CC'+EE'}$

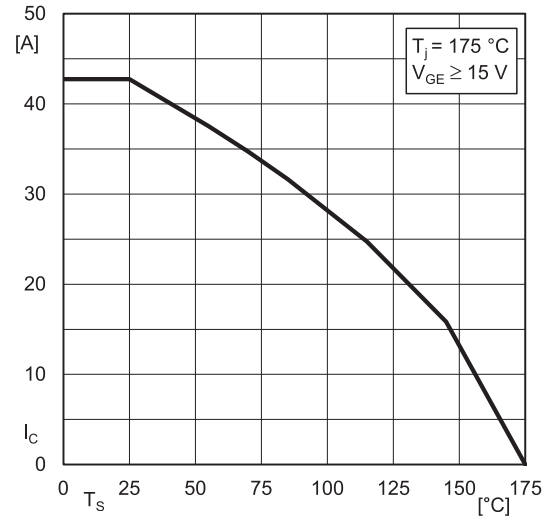

Fig. 2: Typ. rated current vs. temperature $I_C = f(T_S)$

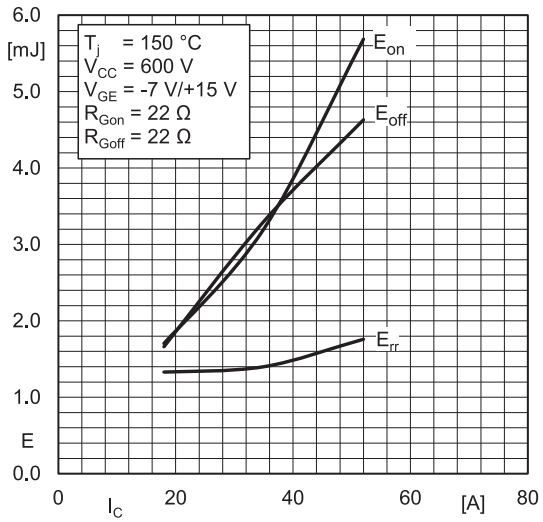

Fig. 3: Typ. turn-on /-off energy = f (I_C)

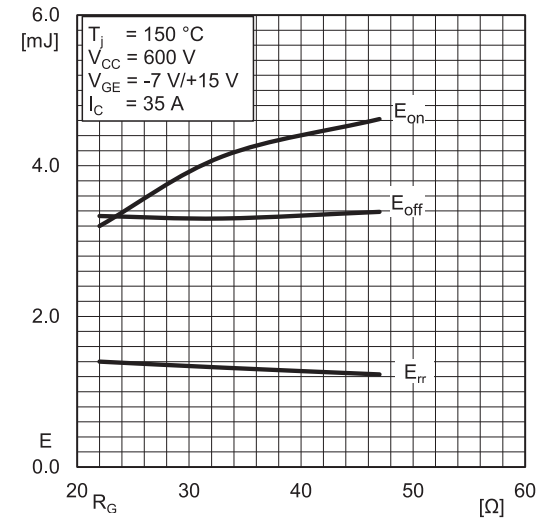

Fig. 4: Typ. turn-on /-off energy = f (R_G)

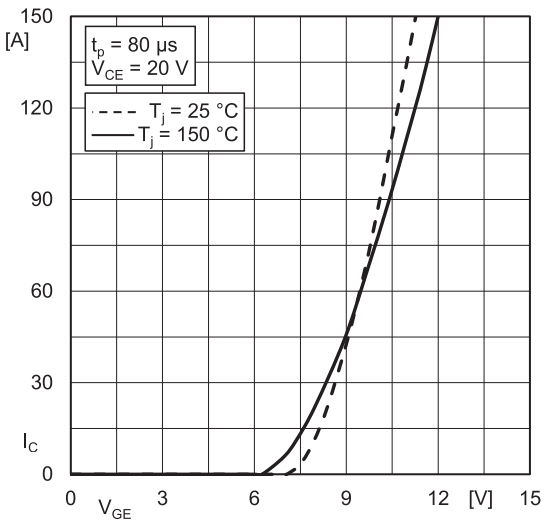

Fig. 5: Typ. IGBT1 transfer characteristic

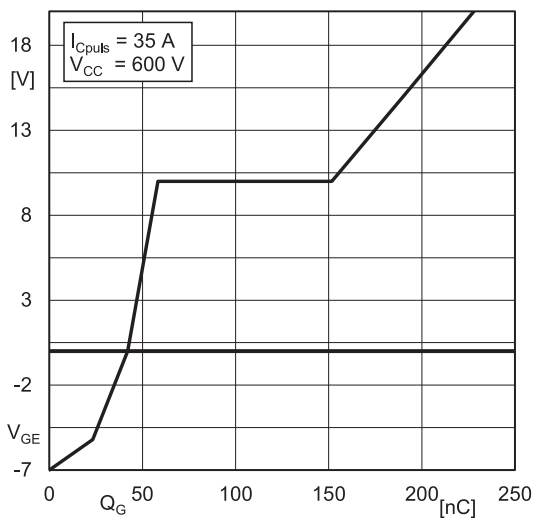

Fig. 6: Typ. gate charge characteristic

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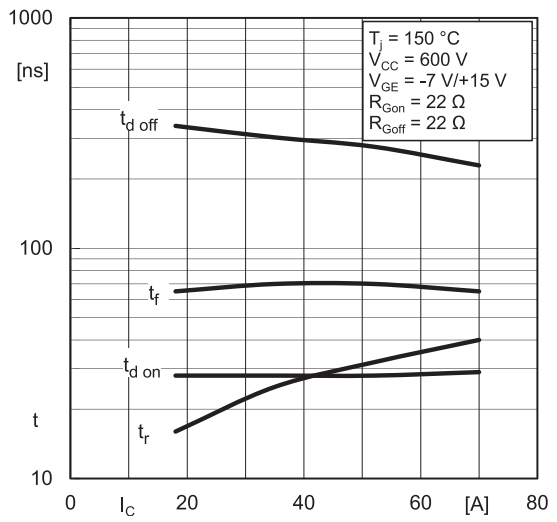


Fig. 7: Typ. switching times vs. I_C

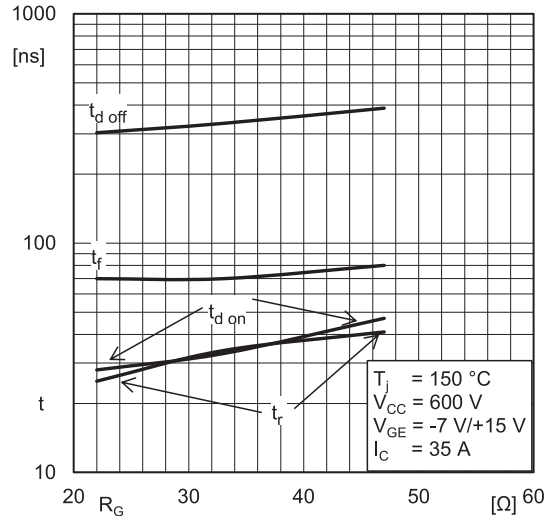


Fig. 8: Typ. switching times vs. gate resistor R_G

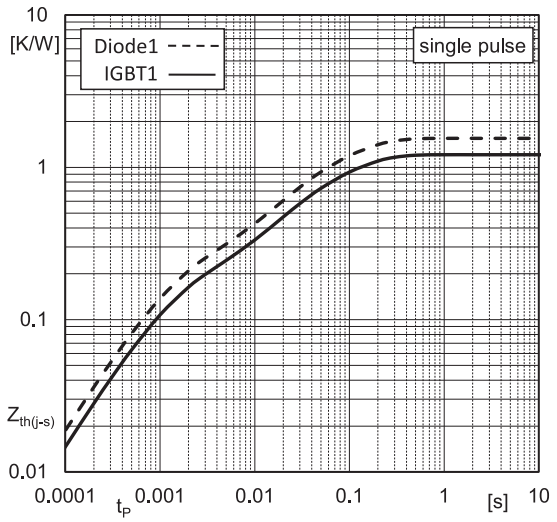


Fig. 9: Typ. transient thermal impedance

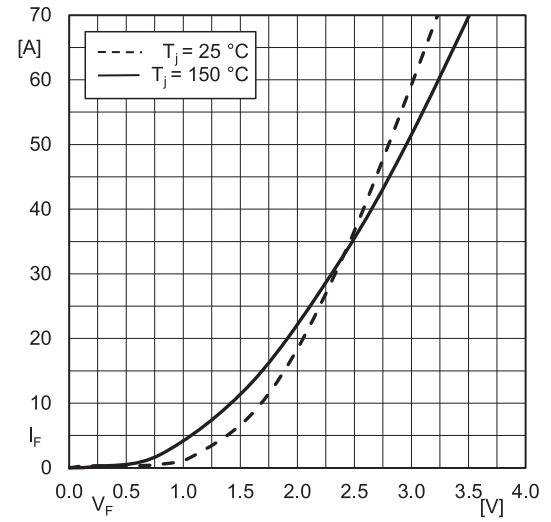
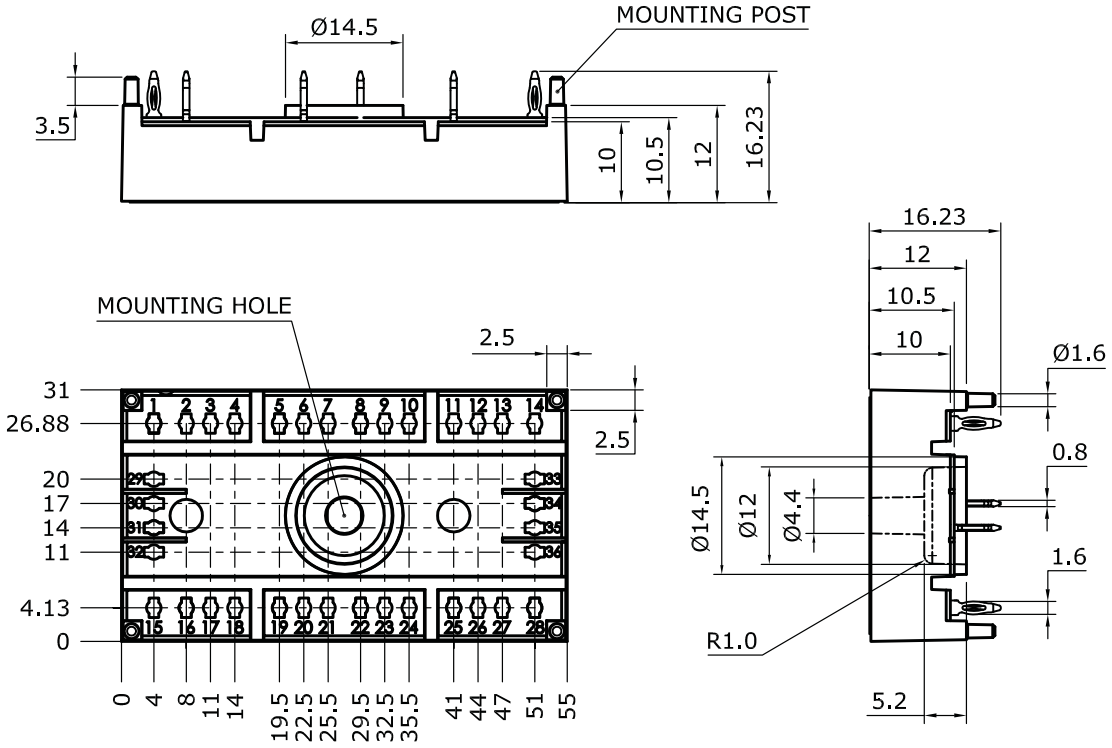


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

Dimensions: mm
Tolerance system: ISO 2768-m



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

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

Suggested hole diameter for the mounting post in the circuit board:

- 2 mm

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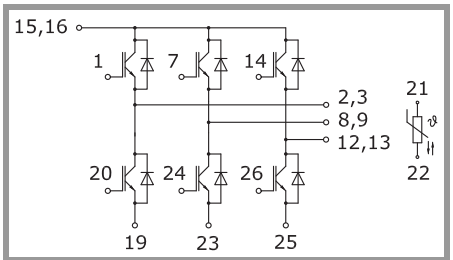
SEMITOP 3 Press-Fit



GD-ET

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

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