SK35DGD12T4Tp

SEMITOP® 4 Press-Fit

3-phase bridge rectifier +
3-phase bridge inverter

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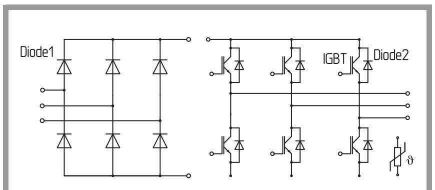
Features

- 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*

- Motor drives



DGD-T

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	46	A
		T_s = 70 °C	35	A
I_C	T_j = 175 °C	T_s = 25 °C	51	A
		T_s = 70 °C	41	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 $V_{GE} \leq$ 15 V $V_{CES} \leq$ 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		1600	V
I_F	T_j = 150 °C	T_s = 25 °C	52	A
		T_s = 70 °C	39	A
I_F	T_j = 150 °C	T_s = 25 °C	52	A
		T_s = 70 °C	39	A
I_{Fnom}			35	A
I_{FSM}	10 ms sin 180°	T_j = 25 °C	370	A
		T_j = 150 °C	270	A
i^2t	10 ms, sin 180°, T_j = 150 °C		364	A^2s
T_j			-40 ... 150	°C

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Diode 2				
V_{RRM}	T_j = 25 °C		1200	V
I_F	T_j = 150 °C	T_s = 25 °C	39	A
		T_s = 70 °C	30	A
I_F	T_j = 175 °C	T_s = 25 °C	44	A
		T_s = 70 °C	35	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			
$I_{t(RMS)}$	$T_{terminal}$ = 100 °C, T_S = 60°C, per pin	40	A
T_{stg}		-40 ... 125	°C
V_{isol}	AC, sinusoidal, t = 1 min	2500	V

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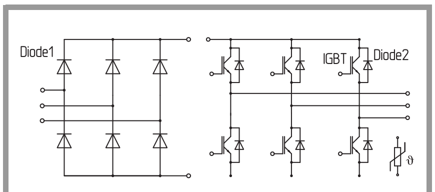

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Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
IGBT 1						
$V_{CE(sat)}$	I_C = 35 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.10	V
		T_j = 150 °C		2.25	2.45	V
V_{CE0}	chiplevel	T_j = 25 °C		0.80	0.90	V
		T_j = 150 °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} = -8V...+15V			200		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 35 A $R_{G\ on}$ = 22 Ω $R_{G\ off}$ = 22 Ω di/dt_{on} = 2900 A/µs di/dt_{off} = 2900 A/µs $V_{GE\ neg}$ = -15 V $V_{GE\ pos}$ = 15 V	T_j = 150 °C		28		ns
t_r		T_j = 150 °C		25		ns
E_{on}		T_j = 150 °C		3.27		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			0.9		K/W

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode 1						
V_F	I_F = 35 A chiplevel	T_j = 25 °C		1.20	1.60	V
		T_j = 125 °C		1.19	1.56	V
V_{F0}	chiplevel	T_j = 25 °C		0.88	0.98	V
		T_j = 125 °C		0.73	0.83	V
r_F	chiplevel	T_j = 25 °C		9.2	18	mΩ
		T_j = 125 °C		13	21	mΩ
I_{RRM}	I_F = 35 A			-		A
Q_{rr}				-		µC
E_{rr}				-		mJ
$R_{th(j-s)}$	per Diode			1.25		K/W

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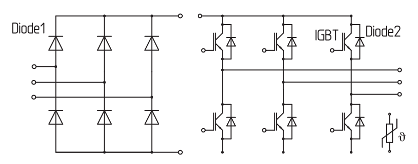
Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode 2						
V_F	I_F = 35 A	T_j = 25 °C		2.30	2.62	V
	chiplevel	T_j = 150 °C		2.29	2.62	V
V_{F0}	chiplevel	T_j = 25 °C		1.30	1.50	V
		T_j = 150 °C		0.90	1.10	V
r_F	chiplevel	T_j = 25 °C		29	32	mΩ
		T_j = 150 °C		40	43	mΩ
I_{RRM}	I_F = 35 A	T_j = 150 °C		30		A
Q_{rr}	di/dt_{off} = 2900 A/µs V_{GE} = -15 V	T_j = 150 °C		2		µC
E_{rr}	V_{CC} = 600 V	T_j = 150 °C		1.46		mJ
$R_{th(j-s)}$	per Diode			1.2		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



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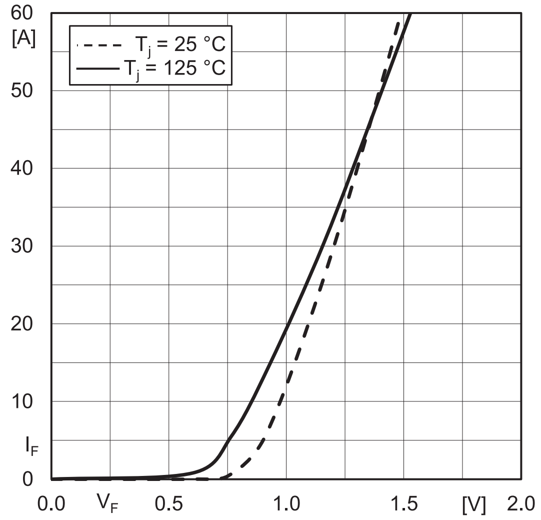


Fig.1 : Typ. Diode1 forward characteristic, incl. $R_{CC' + EE'}$

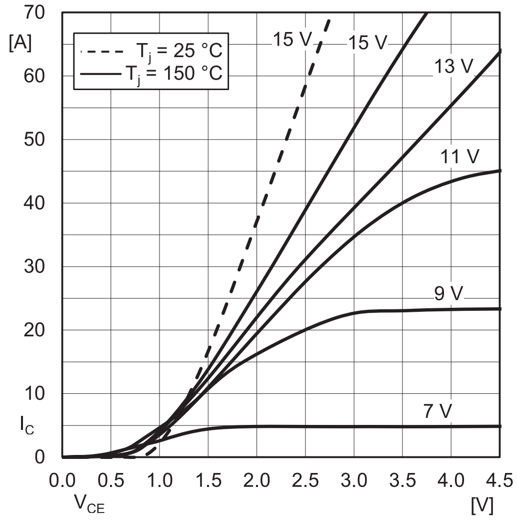


Fig. 2: Typ. IGBT output characteristic, incl. $R_{CC'+ EE'}$

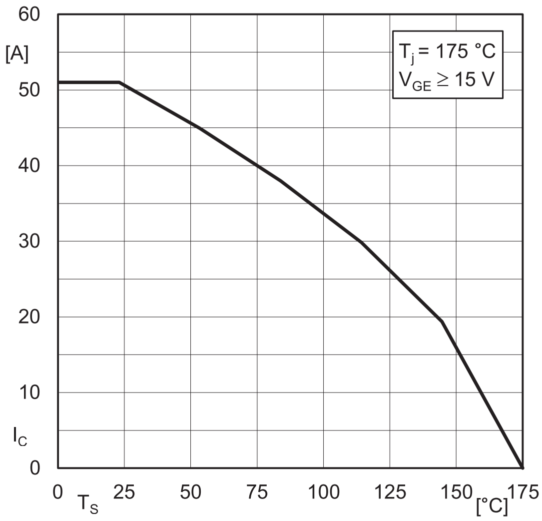


Fig. 3: Rated IGBT current vs. temperature $I_C = f\ (T_S)$

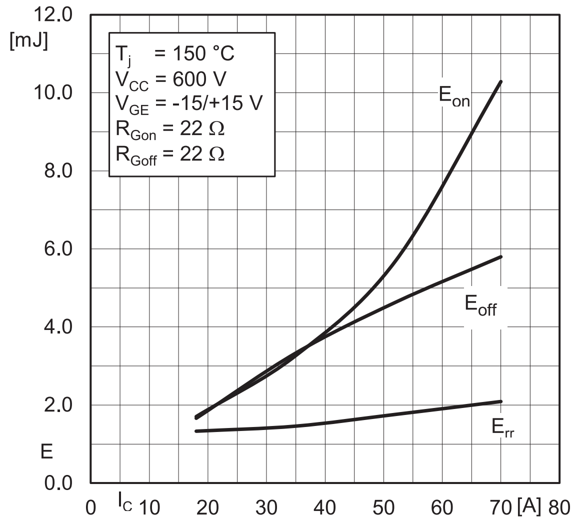


Fig. 4: Typ. turn-on /-off energy = f (I_C)

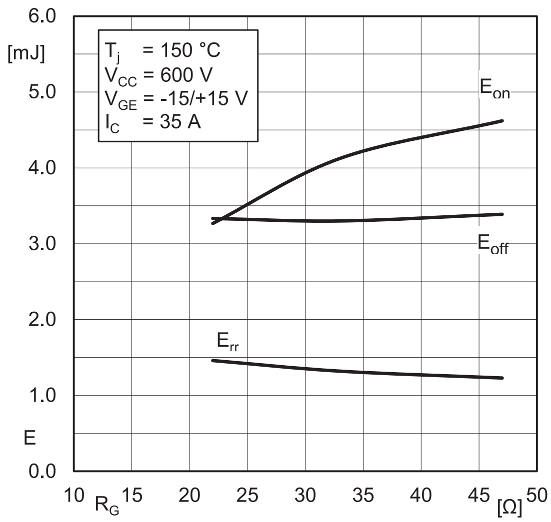


Fig. 5: Typ. turn-on /-off energy = f (R_G)

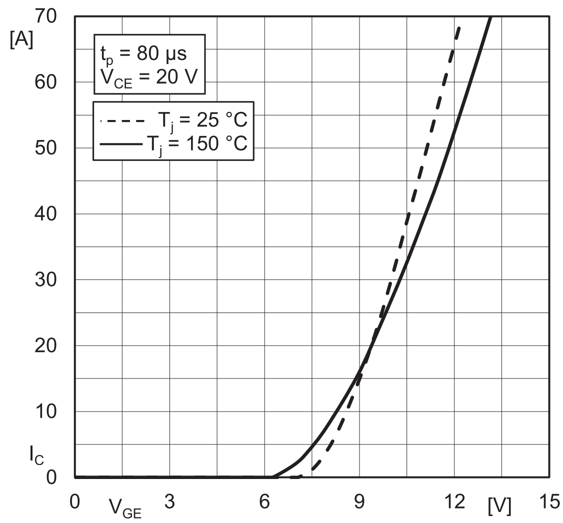


Fig.6:Typ.transfer characteristic

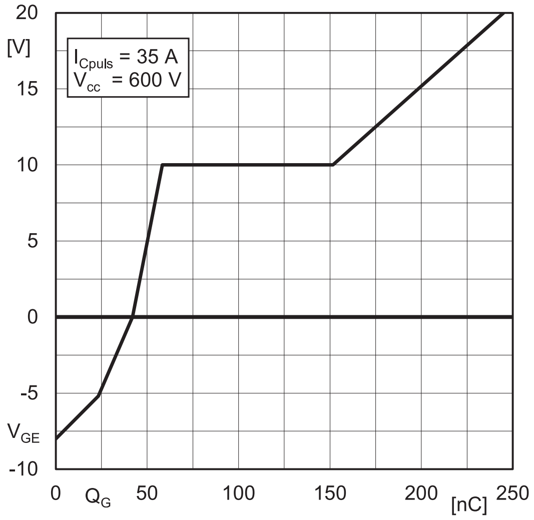


Fig. 7: Typ. IGBT gate charge characteristic

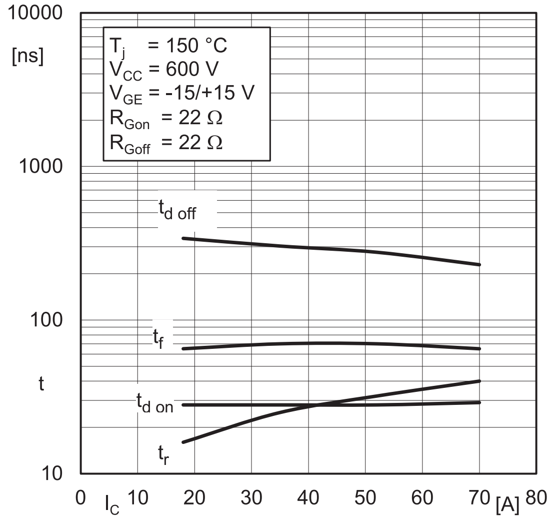


Fig. 8: Typ. switching times vs. I_C

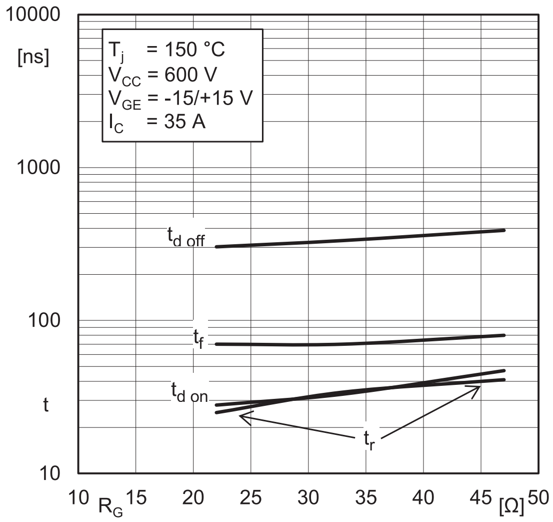


Fig. 9: Typ. switching times vs. gate resistor R_G

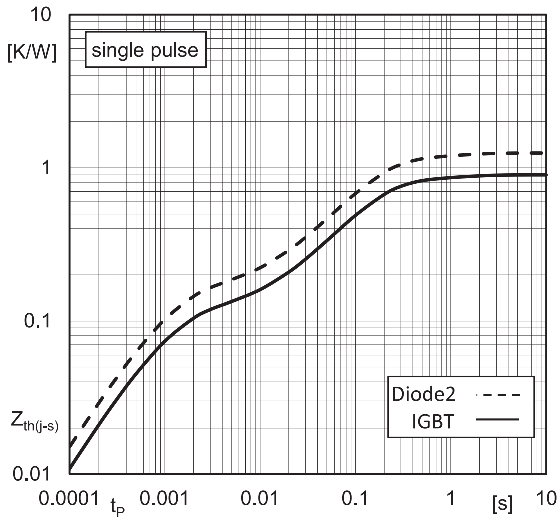


Fig. 10: Transient thermal impedance vs. time

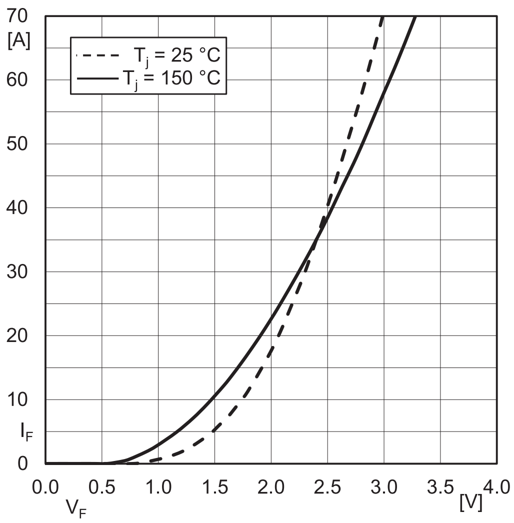
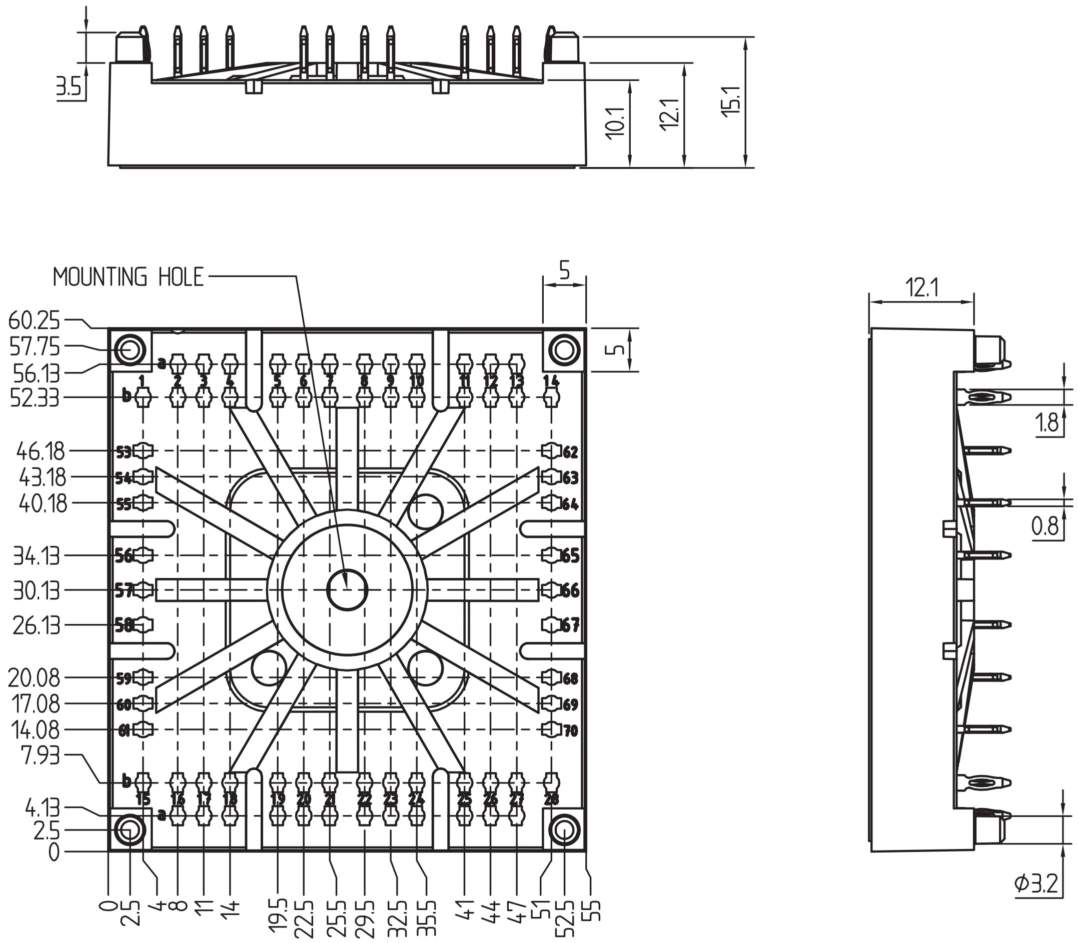


Fig. 11: Typ. CAL diode2 forward charact., incl. $R_{CC'+EE'}$

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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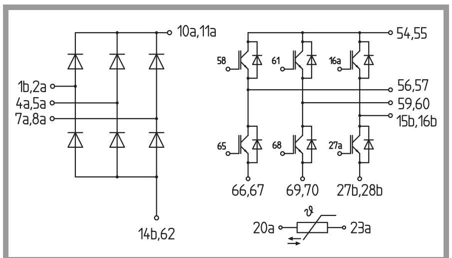

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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

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