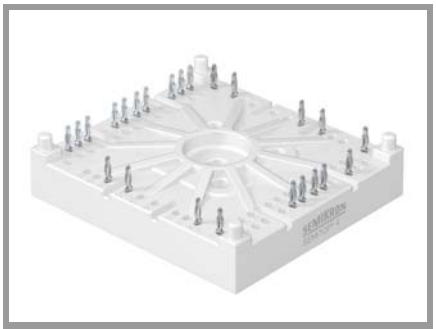
SK 75 GD 12T4 Tp



SEMITOP® 4 Press-Fit

IGBT module

Engineering Sample

SK 75 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 36kVA
- Typical motor power 22kW

Absolute Maximum Ratings

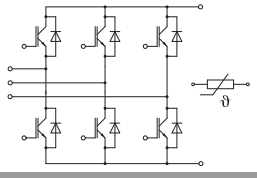
Symbol	Conditions		Values	Unit
IGBT 1				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_s = 25 °C	87	A
		T_s = 70 °C	67	A
I_C	T_j = 175 °C	T_s = 25 °C	97	A
		T_s = 70 °C	79	A
I_{Cnom}			75	A
I_{CRM}	I_{CRM} = 3 x I_{Cnom}		225	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 800 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 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		1200	V
I_F	T_j = 150 °C	T_s = 25 °C	74	A
		T_s = 70 °C	55	A
I_F	T_j = 175 °C	T_s = 25 °C	83	A
		T_s = 70 °C	66	A
I_{Fnom}			75	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		150	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		430	A
T_j			-40 ... 175	°C

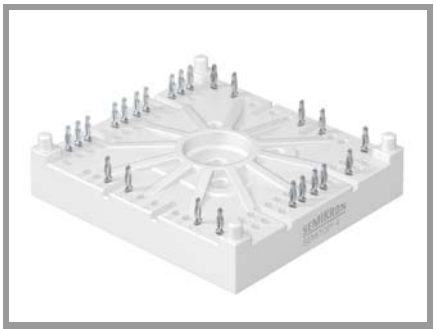
Absolute Maximum Ratings

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



GD-T

SK 75 GD 12T4 Tp



SEMITOP® 4 Press-Fit

IGBT module

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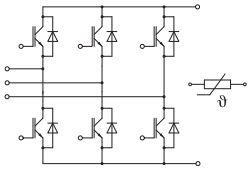


GD-T

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
IGBT 1						
$V_{CE(sat)}$	I_C = 75 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		14	16	mΩ
		T_j = 150 °C		21	22	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 3 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 1200 V	T_j = 25 °C			0.87	mA
				-		mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		4.4		nF
C_{oes}		f = 1 MHz		0.29		nF
C_{res}		f = 1 MHz		0.235		nF
Q_G	V_{GE} = -7V...+15V			425		nC
R_{Gint}	T_j = 25 °C			10		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 75 A $R_{G\ on}$ = 24 Ω $R_{G\ off}$ = 24 Ω di/dt_{on} = 1360 A/µs di/dt_{off} = 1360 A/µs $V_{GE\ neg}$ = -7 V $V_{GE\ pos}$ = 15 V	T_j = 150 °C		63		ns
t_r		T_j = 150 °C		65		ns
E_{on}		T_j = 150 °C		13.6		mJ
$t_{d(off)}$		T_j = 150 °C		521		ns
t_f		T_j = 150 °C		80		ns
E_{off}		T_j = 150 °C		8.2		mJ
$R_{th(j-s)}$	per IGBT			0.51		K/W

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode 1						
V_F	I_F = 75 A	T_j = 25 °C		2.17	2.49	V
	chiplevel	T_j = 150 °C		2.11	2.42	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		12	13	mΩ
		T_j = 150 °C		16	18	mΩ
I_{RRM}	I_F = 75 A di/dt_{off} = 1360 A/µs V_{GE} = -7 V V_{CC} = 600 V	T_j = 150 °C		41		A
Q_{rr}		T_j = 150 °C		10.6		µC
E_{rr}		T_j = 150 °C		3.38		mJ
$R_{th(j-s)}$	per diode			0.75		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

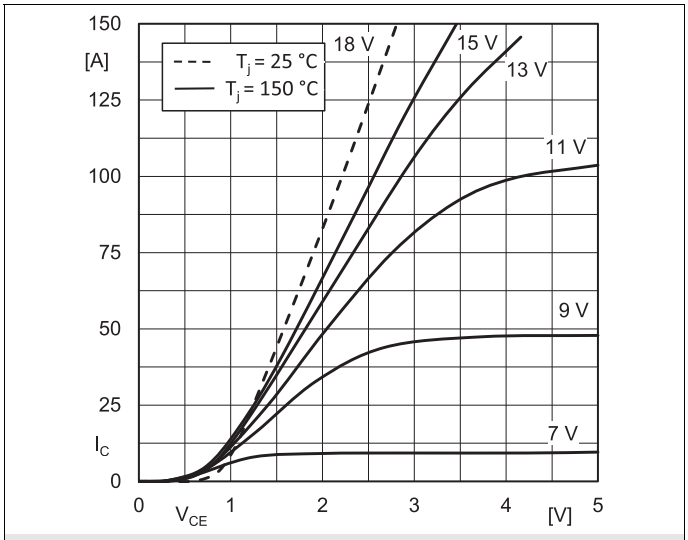


Fig. 1: Typ. IGBT1 output characteristic, incl. $R_{CC'+EE'}$

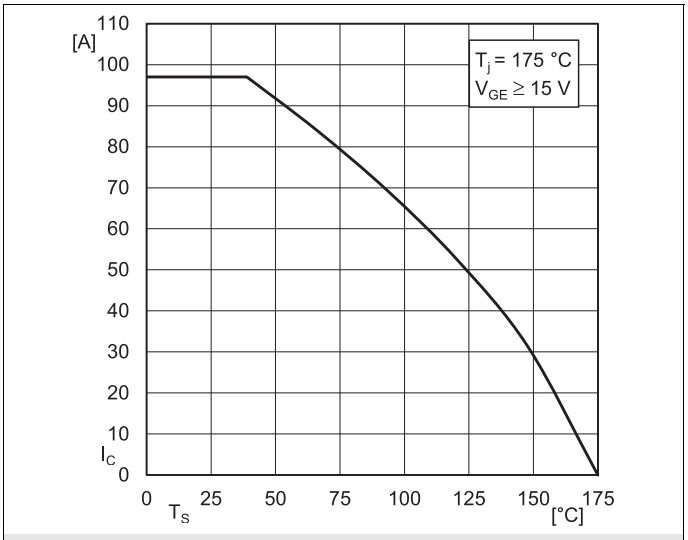


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_S)$

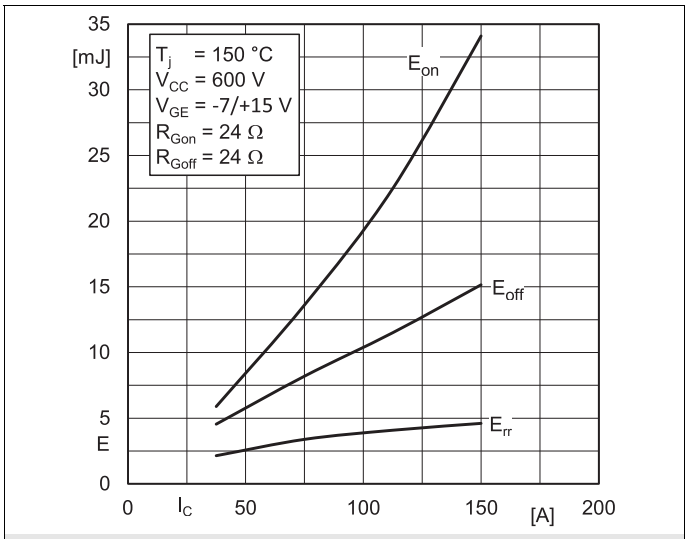


Fig. 3: Typ. turn-on /-off energy = f (I_C)

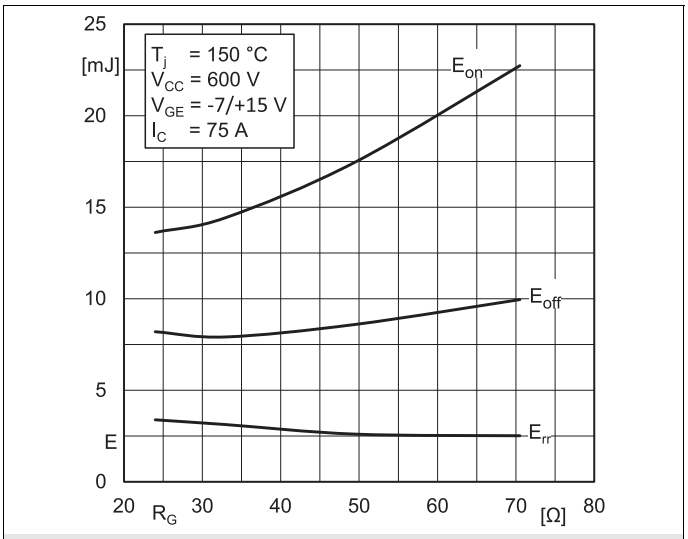


Fig. 4: Typ. turn-on /-off energy = f (R_G)

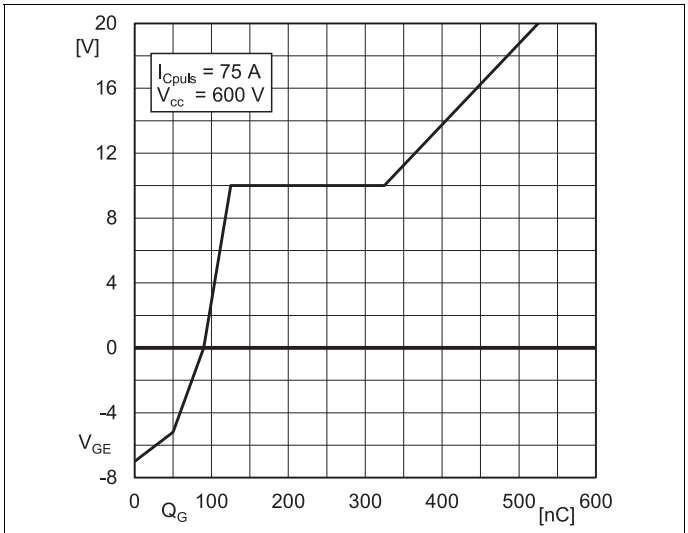


Fig. 6: Typ. gate charge characteristic

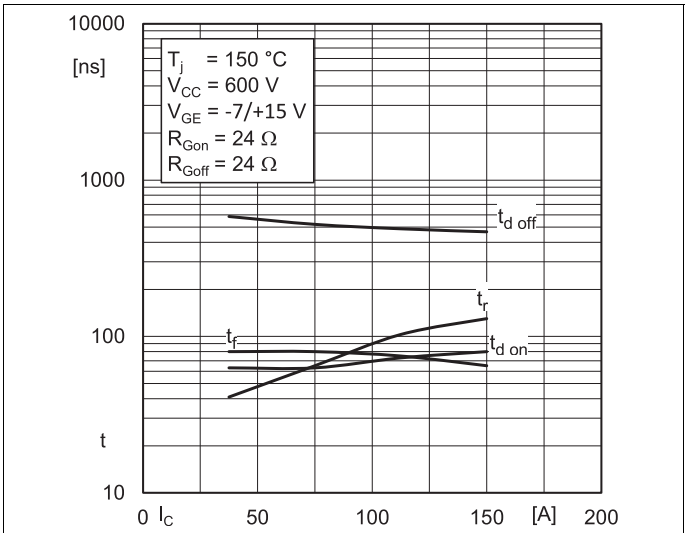


Fig. 7: Typ. switching times vs. I_C

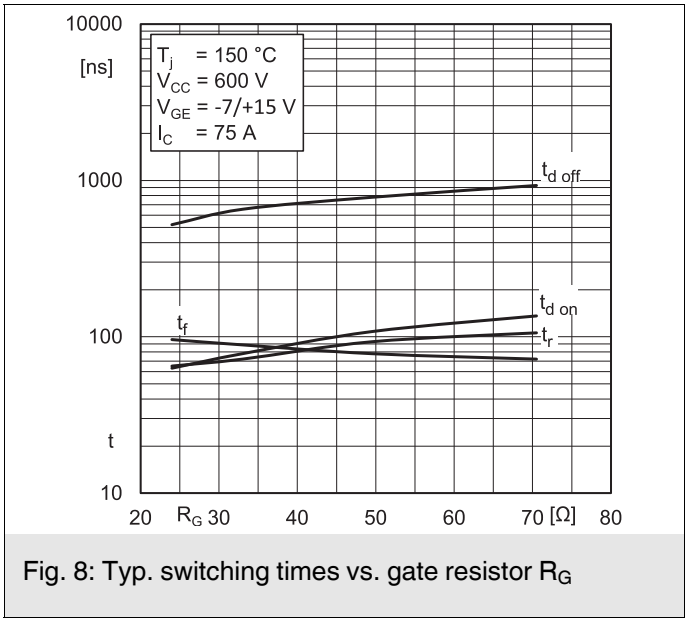


Fig. 8: Typ. switching times vs. gate resistor R_G

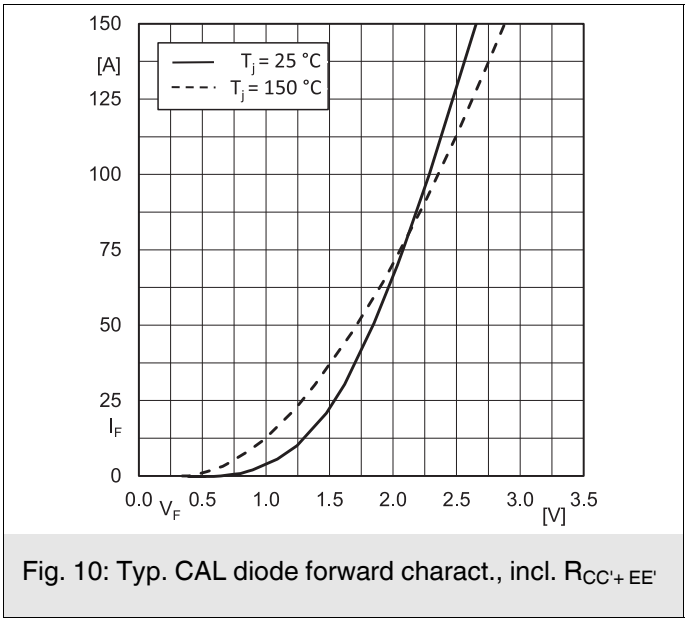
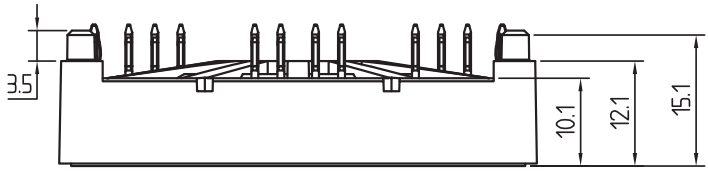
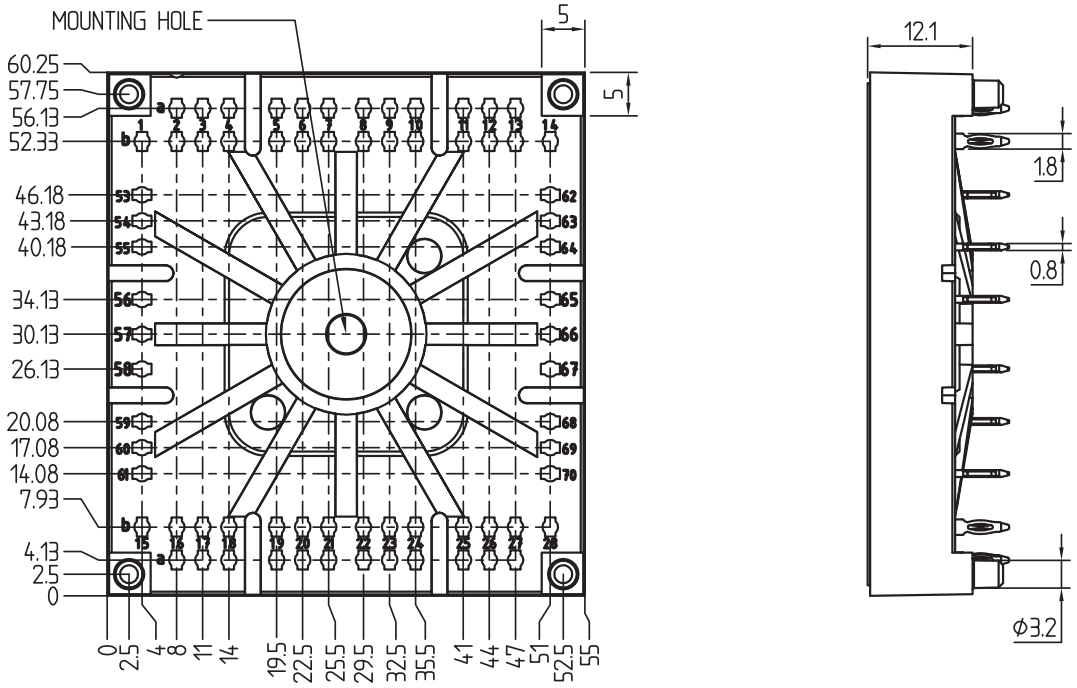


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

dimensions in mm
tolerance system: ISO 2768-m

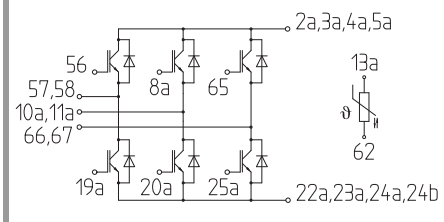




Suggested drilled hole diameter for terminal pins in the circuit board:
- minimum: 1.575mm
- typical: 1.6mm
- maximum: 1.625mm

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

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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