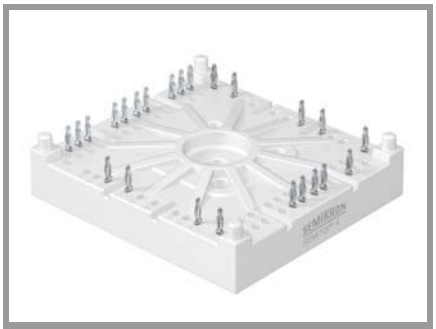
SK 50 GD 12T4 Tp



SEMITOP® 4 Press-Fit

IGBT module

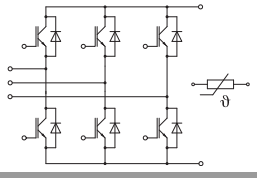
SK 50 GD 12T4 Tp

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 26kVA
- Typical motor power 15kW



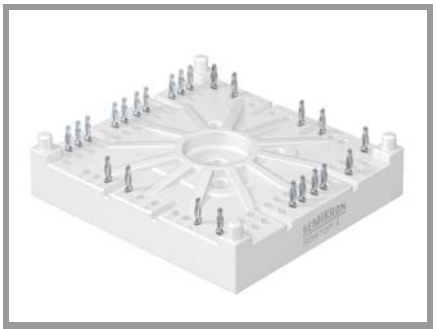
GD-T

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	65	A
		T_s = 70 °C	50	A
I_C	T_j = 175 °C	T_s = 25 °C	72	A
		T_s = 70 °C	59	A
I_{Cnom}			50	A
I_{CRM}	I_{CRM} = 3 x I_{Cnom}		150	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	53	A
		T_s = 70 °C	40	A
I_F	T_j = 175 °C	T_s = 25 °C	60	A
		T_s = 70 °C	48	A
I_{Fnom}			50	A
I_{FRM}	I_{FRM} = 2 x I_{Fnom}		100	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		270	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

SK 50 GD 12T4 Tp



SEMITOP® 4 Press-Fit

IGBT module

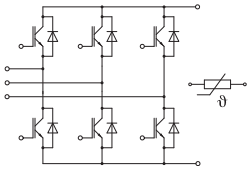
SK 50 GD 12T4 Tp

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 26kVA
- Typical motor power 15kW



GD-T

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
IGBT 1						
$V_{CE(sat)}$	I_C = 50 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.10	V
		T_j = 150 °C		2.20	2.40	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		21	24	mΩ
		T_j = 150 °C		30	32	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 1.7 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 1200 V	T_j = 25 °C			0.67	mA
				-		mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		2.77		nF
C_{oes}		f = 1 MHz		0.205		nF
C_{res}		f = 1 MHz		0.16		nF
Q_G	V_{GE} = -7V...+15V			375		nC
R_{Gint}	T_j = 25 °C			4.0		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 50 A $R_{G\ on}$ = 32 Ω $R_{G\ off}$ = 32 Ω di/dt_{on} = 920 A/µs di/dt_{off} = 920 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		8.3		mJ
$t_{d(off)}$		T_j = 150 °C		521		ns
t_f		T_j = 150 °C		80		ns
E_{off}		T_j = 150 °C		5		mJ
$R_{th(j-s)}$	per IGBT			0.65		K/W

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode 1						
V_F	I_F = 50 A	T_j = 25 °C		2.22	2.54	V
	chiplevel	T_j = 150 °C		2.18	2.50	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		18	21	mΩ
		T_j = 150 °C		26	28	mΩ
I_{RRM}	I_F = 50 A di/dt_{off} = 920 A/µs V_{GE} = -7 V V_{CC} = 600 V	T_j = 150 °C		30		A
Q_{rr}		T_j = 150 °C		7.2		µC
E_{rr}		T_j = 150 °C		2.15		mJ
$R_{th(j-s)}$	per diode			0.97		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

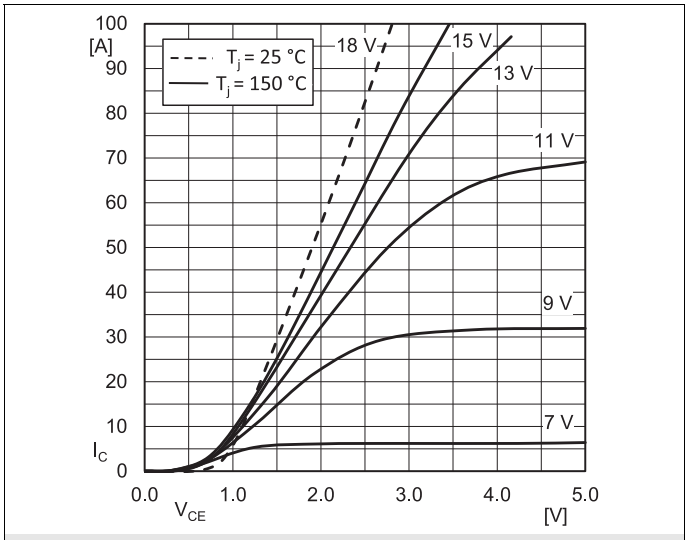


Fig. 1: Typ. IGBT1 output characteristic, incl. $R_{CC'+EE'}$

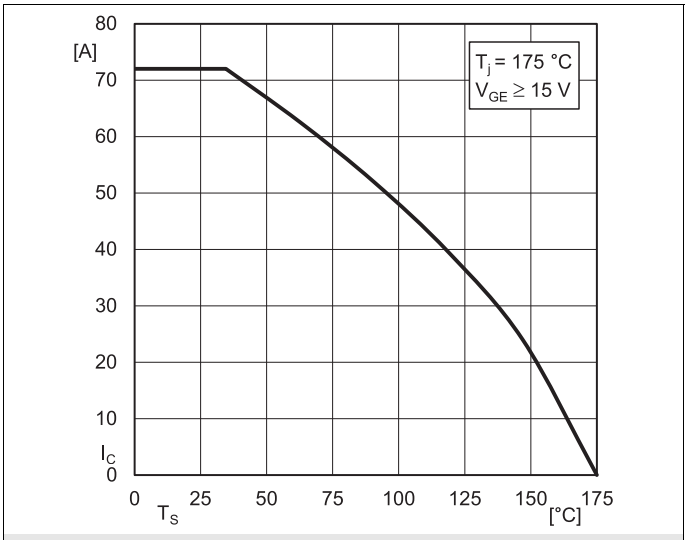


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_S)$

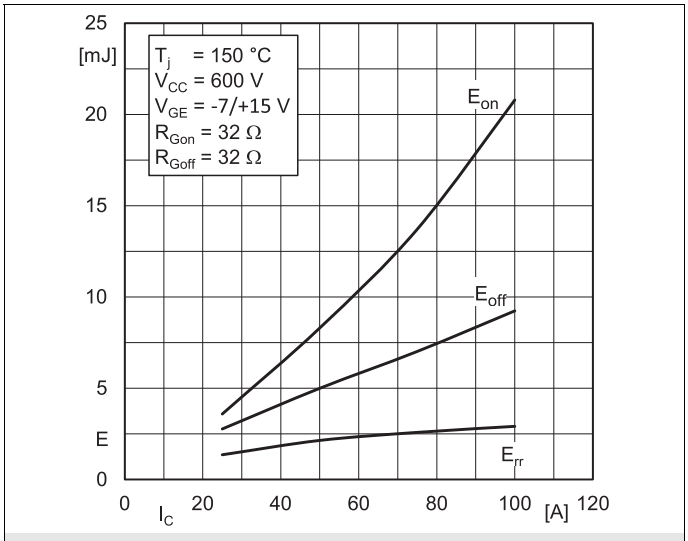


Fig. 3: Typ. turn-on /-off energy = f (I_C)

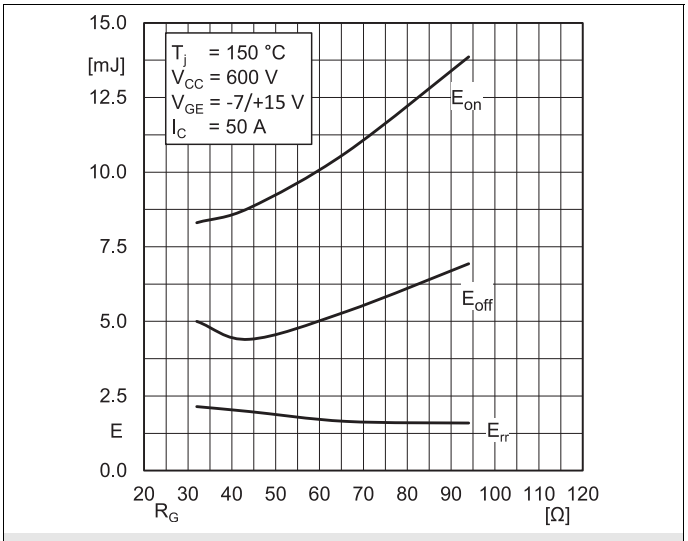


Fig. 4: Typ. turn-on /-off energy = f (R_G)

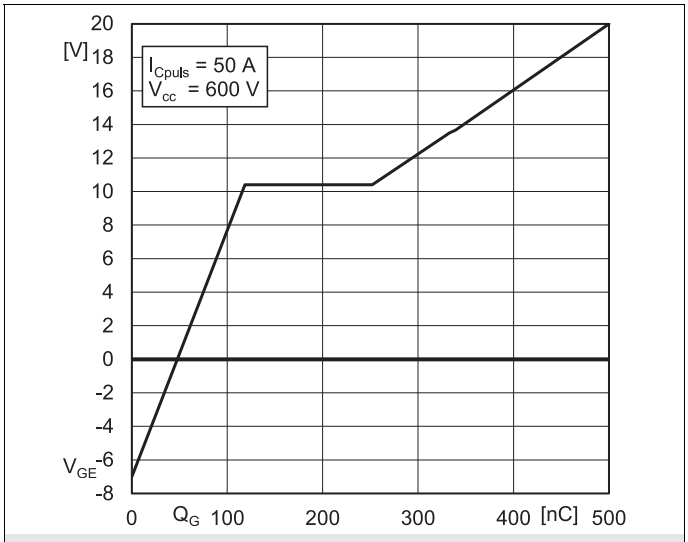


Fig. 6: Typ. gate charge characteristic

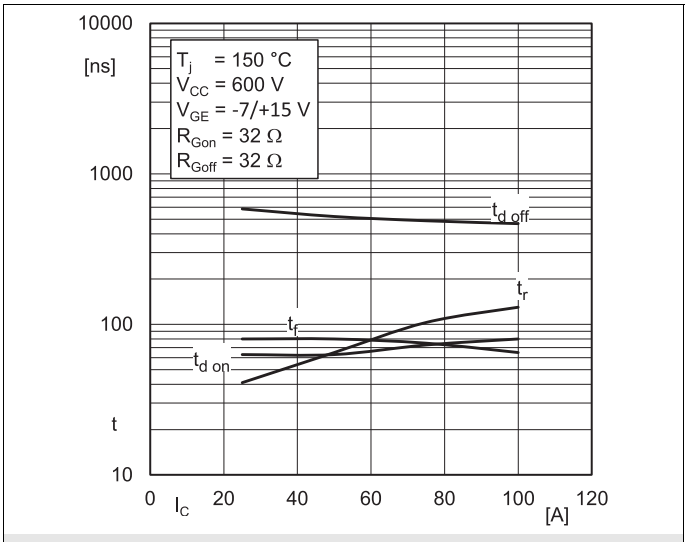


Fig. 7: Typ. switching times vs. I_C

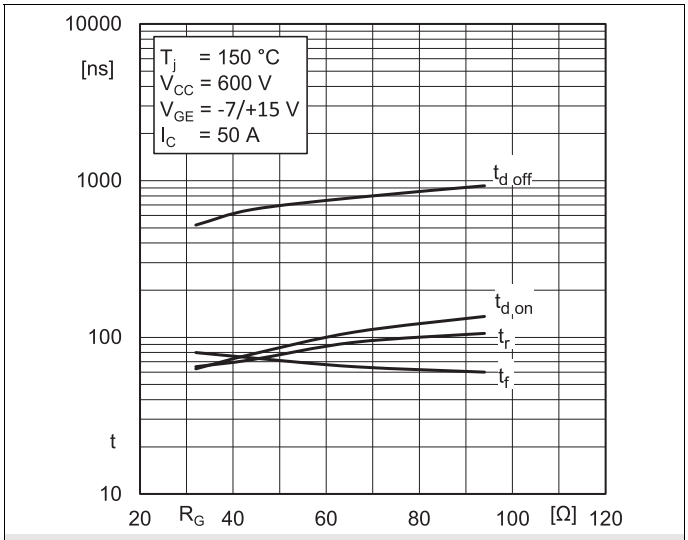


Fig. 8: Typ. switching times vs. gate resistor R_G

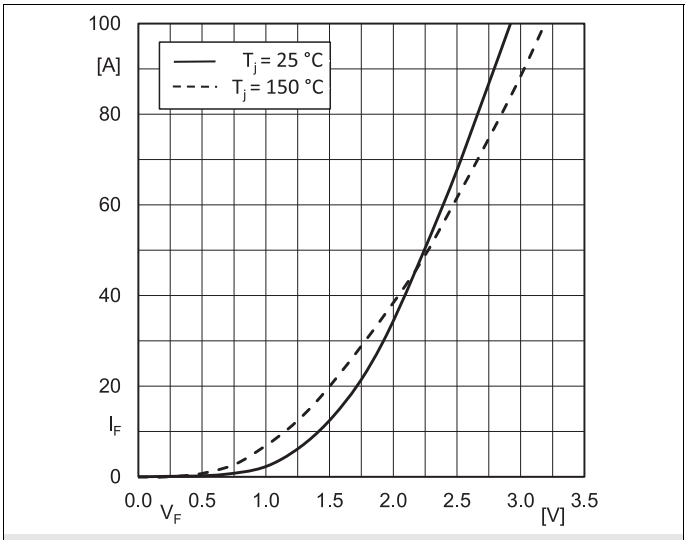
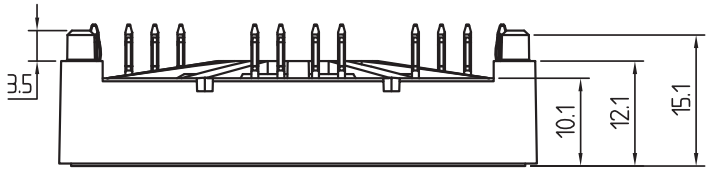
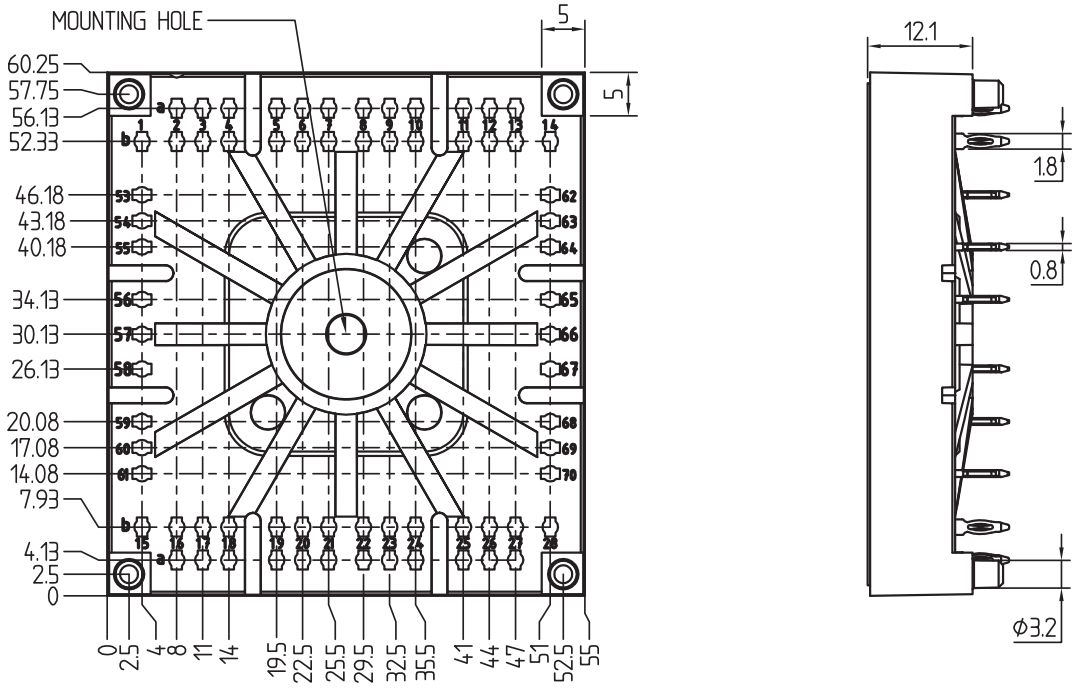


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$

dimensions in mm
tolerance system: ISO 2768-m

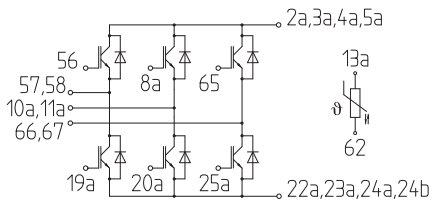




Suggested drilled hole diameter for terminal pins in the circuit board:
- minimum: 1.575mm
- typical: 1.6mm
- maximum: 1.625mm

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.

***IMPORTANT INFORMATION AND WARNINGS**

The specifications of SEMIKRON products may not be considered as guarantee or assurance of product characteristics ("Beschaffenheitsgarantie"). The specifications of SEMIKRON products describe only the usual characteristics of products to be expected in typical applications, which may still vary depending on the specific application. Therefore, products must be tested for the respective application in advance. Application adjustments may be necessary. The user of SEMIKRON products is responsible for the safety of their applications embedding SEMIKRON products and must take adequate safety measures to prevent the applications from causing a physical injury, fire or other problem if any of SEMIKRON products become faulty. The user is responsible to make sure that the application design is compliant with all applicable laws, regulations, norms and standards. Except as otherwise explicitly approved by SEMIKRON in a written document signed by authorized representatives of SEMIKRON, SEMIKRON products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury. No representation or warranty is given and no liability is assumed with respect to the accuracy, completeness and/or use of any information herein, including without limitation, warranties of non-infringement of intellectual property rights of any third party. SEMIKRON does not assume any liability arising out of the applications or use of any product; neither does it convey any license under its patent rights, copyrights, trade secrets or other intellectual property rights, nor the rights of others. SEMIKRON makes no representation or warranty of non-infringement or alleged non-infringement of intellectual property rights of any third party which may arise from applications. Due to technical requirements our products may contain dangerous substances. For information on the types in question please contact the nearest SEMIKRON sales office. This document supersedes and replaces all information previously supplied and may be superseded by updates. SEMIKRON reserves the right to make changes.

