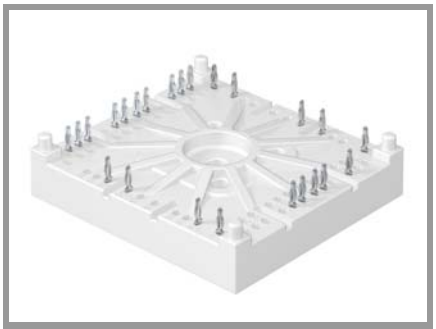
SK100DGM07S5Tp



SEMITOP® 4 Press-Fit

IGBT module

SK100DGM07S5Tp

Features*

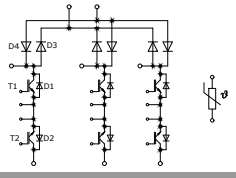
- One screw mounting module
- Solder free mounting with Press-Fit terminals
- Fully compatible with other SEMITOP® Press-Fit types
- Improved thermal performances by aluminium oxide substrate
- 650V Trench 5 IGBT (S5)
- CAL4F technology FWD
- Low inductive design
- Integrated NTC temperature sensor
- UL recognized, file no. E 63 532

Typical Applications

- UPS
- Switched mode power supplies

Remarks

- Recommended $T_{j,op}$=-40 ...+150 °C
- Diode 2: Diodes D1 & D2
- Diode 1: Diodes D3 & D4
- C_{DCs}= Capacitance of DC-Link snubber



DGM-T

Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
IGBT 1				
V_{CES}	T_j = 25 °C		650	V
I_C	P12 (reference)	T_s = 25 °C	104	A
	T_j = 175 °C	T_s = 70 °C	82	A
I_C	HPTP	T_s = 25 °C	121	A
	T_j = 175 °C	T_s = 70 °C	96	A
I_{Cnom}			100	A
I_{CRM}			200	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 360 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 650 V	T_j = 150 °C	not capable	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	P12 (reference)	T_s = 25 °C	77	A
	T_j = 175 °C	T_s = 70 °C	61	A
I_F	HPTP	T_s = 25 °C	89	A
	T_j = 175 °C	T_s = 70 °C	70	A
I_{FRM}			150	A
I_{FSM}	t_p = 10 ms	T_j = 25 °C	450	A
	sin 180°	T_j = 150 °C	380	A
T_j			-40 ... 175	°C

Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
Diode 2				
V_{RRM}	T_j = 25 °C		1200	V
I_F	P12 (reference)	T_s = 25 °C	105	A
	T_j = 175 °C	T_s = 70 °C	84	A
I_F	HPTP	T_s = 25 °C	111	A
	T_j = 175 °C	T_s = 70 °C	89	A
I_{FRM}			200	A
I_{FSM}	t_p = 10 ms	T_j = 25 °C	550	A
	sin 180°	T_j = 150 °C	550	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}	module without TIM	-40 ... 125	°C
V_{isol}	AC, sinusoidal, t = 1 min	2500	V

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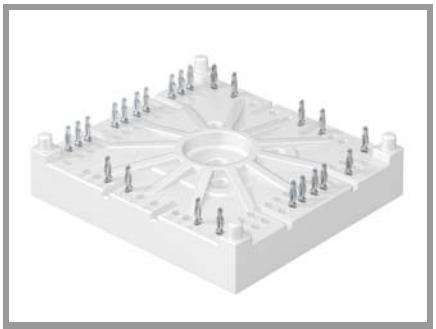

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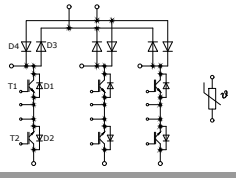

DGM-T

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT 1						
$V_{CE(sat)}$	I_C = 100 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.45	1.80	V
		T_j = 150 °C		1.58		V
V_{CE0}	chiplevel	T_j = 25 °C		0.90	1.05	V
		T_j = 150 °C		0.78		V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		5.5	7.5	mΩ
		T_j = 150 °C		8.0		mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 1 mA		3.25	4	4.75	V
I_{CES}	V_{GE} = 0 V, V_{CE} = 650 V, T_j = 25 °C				1	mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		5.7		nF
C_{oes}		f = 1 MHz		0.16		nF
C_{res}		f = 1 MHz		0.02		nF
Q_G	V_{GE} = -15V...+15V			420		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 400 V I_C = 100 A V_{GE} = +15/-15 V $R_{G\ on}$ = 13.5 Ω $R_{G\ off}$ = 13.5 Ω di/dt$_{on}$ = 3125 A/µs di/dt$_{off}$ = 2537 A/µs dv/dt = 8823 V/µs L_s = 32 nH C_{GE} = - C_{DCs} = 150 nF nH	T_j = 150 °C		28.7		ns
t_r		T_j = 150 °C		37		ns
E_{on}		T_j = 150 °C		1.76		mJ
$t_{d(off)}$		T_j = 150 °C		281		ns
t_f		T_j = 150 °C		49		ns
E_{off}		T_j = 150 °C		2.69		mJ
$R_{th(j-s)}$	per IGBT, P12 (reference)			0.72		K/W
$R_{th(j-s)}$	per IGBT , HPTP			0.57		K/W

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Diode 1						
V_F	I_F = 75 A	T_j = 25 °C		1.35	1.92	V
	chiplevel	T_j = 150 °C		1.30		V
V_{F0}	chiplevel	T_j = 25 °C		0.90	1.10	V
		T_j = 150 °C		0.71		V
r_F	chiplevel	T_j = 25 °C		6.0	11	mΩ
		T_j = 150 °C		7.9		mΩ
I_{RRM}	I_F = 75 A	T_j = 150 °C		-		A
Q_{rr}	V_{GE} = -15 V V_{CC} = 400 V	T_j = 150 °C		-		µC
E_{rr}		T_j = 150 °C		-		mJ
$R_{th(j-s)}$	per Diode, P12 (reference)			1.02		K/W
$R_{th(j-s)}$	per Diode, HPTP			0.82		K/W

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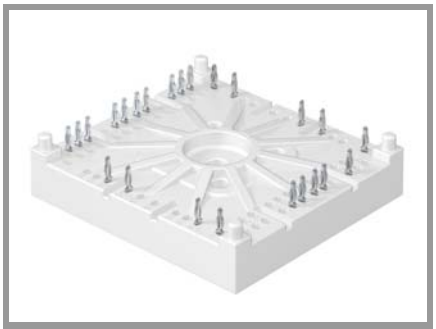

SEMITOP® 4 Press-Fit

IGBT module

SK100DGM07S5Tp

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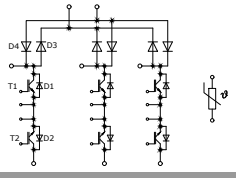

DGM-T

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode 2						
V_F	I_F = 100 A	T_j = 25 °C		2.20	2.52	V
	chiplevel	T_j = 150 °C		2.15		V
V_{F0}	chiplevel	T_j = 25 °C		1.30	1.50	V
		T_j = 150 °C		0.90		V
r_F	chiplevel	T_j = 25 °C		9.0	10	mΩ
		T_j = 150 °C		13		mΩ
I_{RRM}	I_F = 100 A di/dt_{off} = 3125 A/µs V_{GE} = -15 V V_{CC} = 400 V	T_j = 150 °C		138		A
Q_{rr}		T_j = 150 °C		20.82		µC
E_{rr}		T_j = 150 °C		6.89		mJ
$R_{th(j-s)}$	per Diode, P12 (reference)			0.6		K/W
$R_{th(j-s)}$	per Diode, HPTP			0.55		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

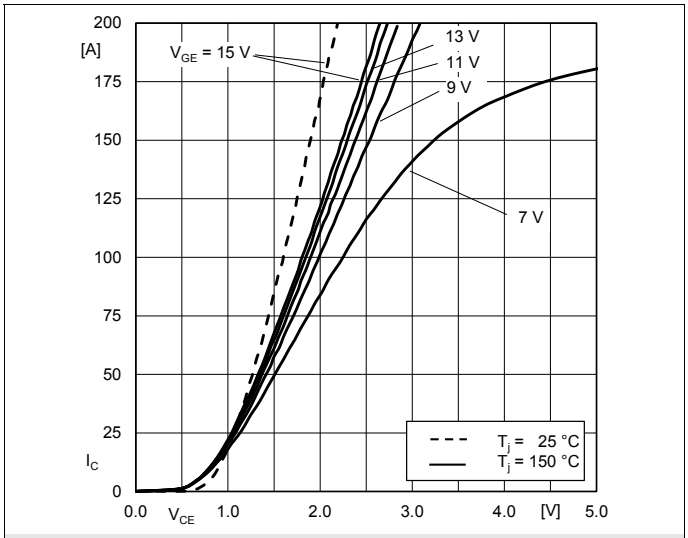

Fig. 1: Typ. IGBT output characteristic, incl. $R_{CC+ EE'}$

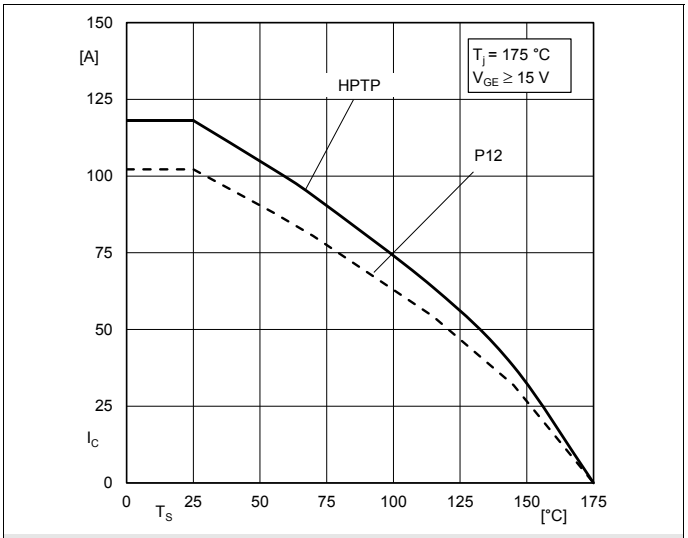

Fig. 2: IGBT rated current vs. temperature $I_c=f(T_s)$

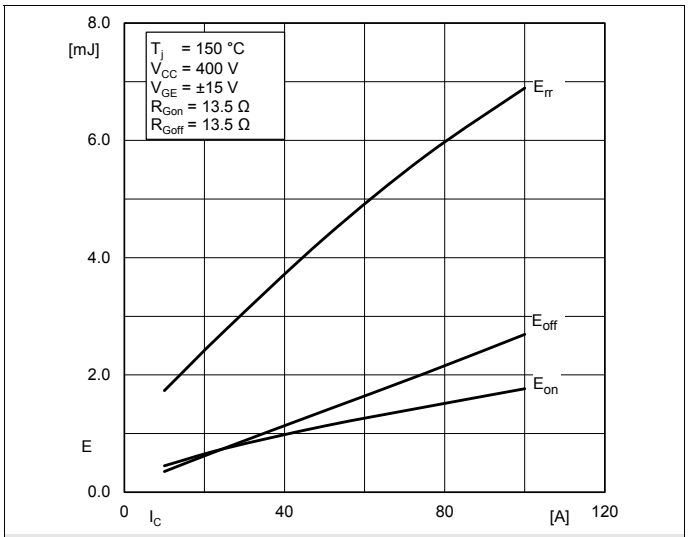

Fig. 3: Typ. turn-on /-off energy = f (I_C)

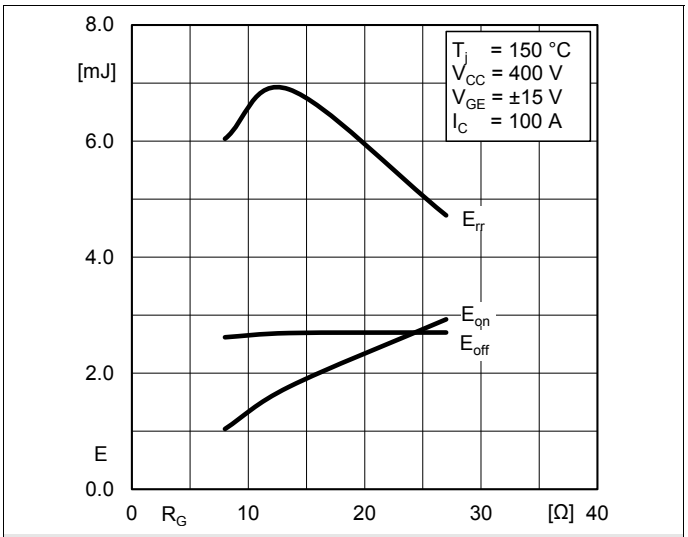

Fig. 4: Typ. turn-on /-off energy = f (R_G)

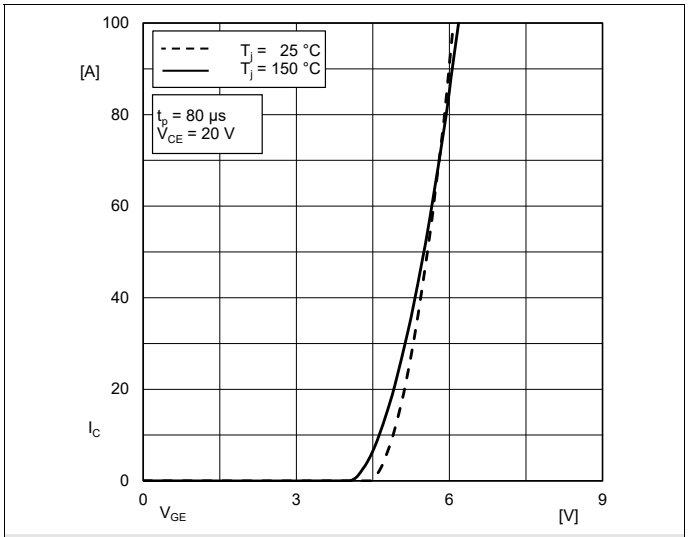

Fig. 5: Typ. IGBT transfer characteristic

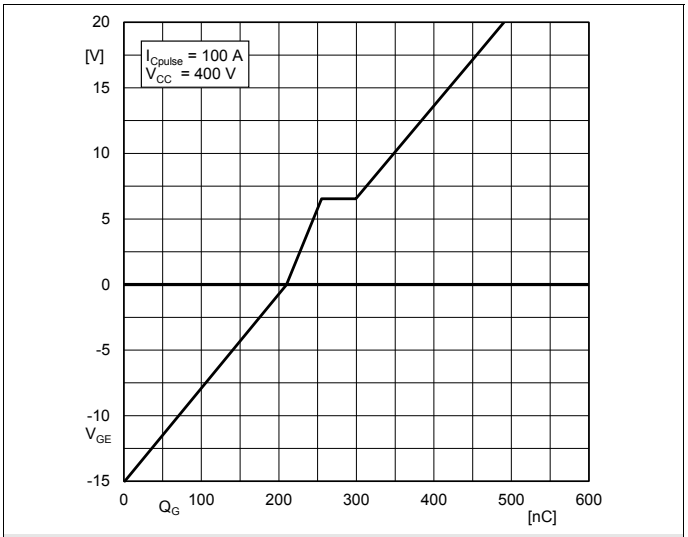

Fig. 6: Typ. IGBT gate charge characteristic

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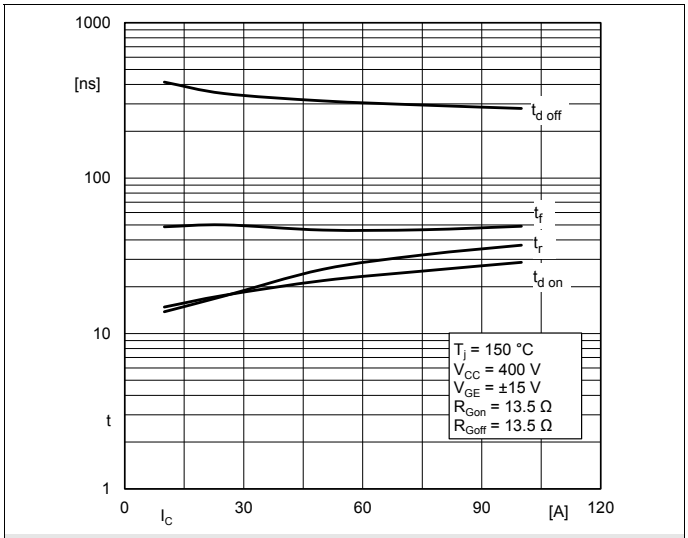


Fig. 7: Typ. switching times = f (I_C)

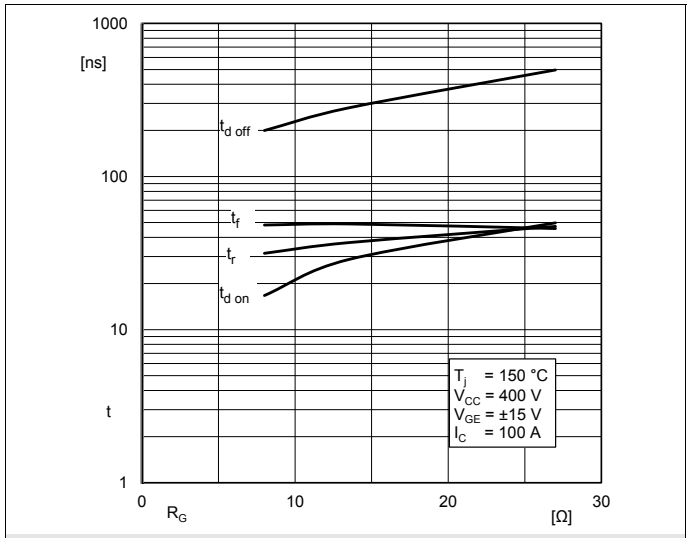


Fig. 8: Typ. switching times = f (R_G)

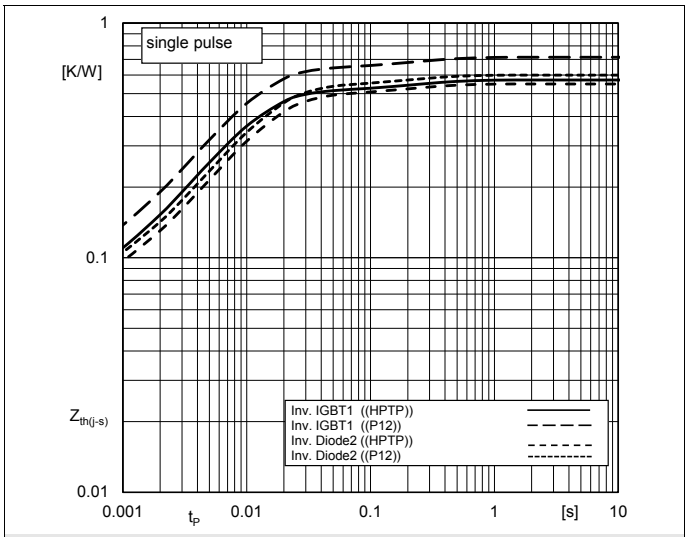


Fig. 9: Typ. transient thermal impedance of IGBT and Diode

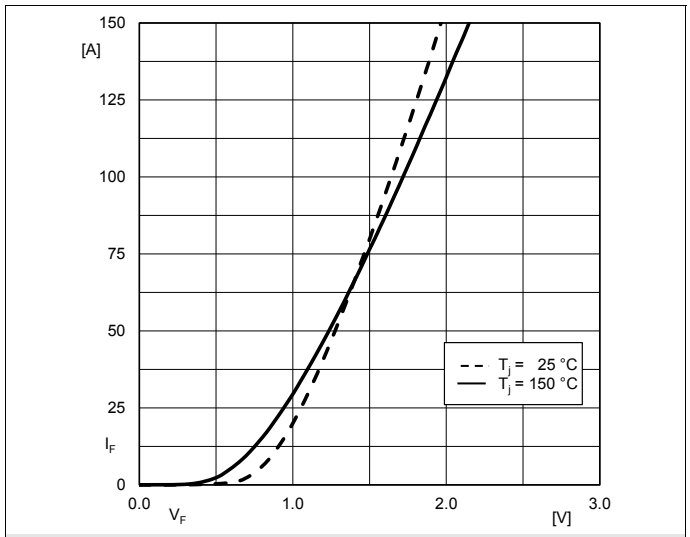


Fig. 10: Typ. Diode1 forward characteristic, incl. $R_{CC'+EE'}$

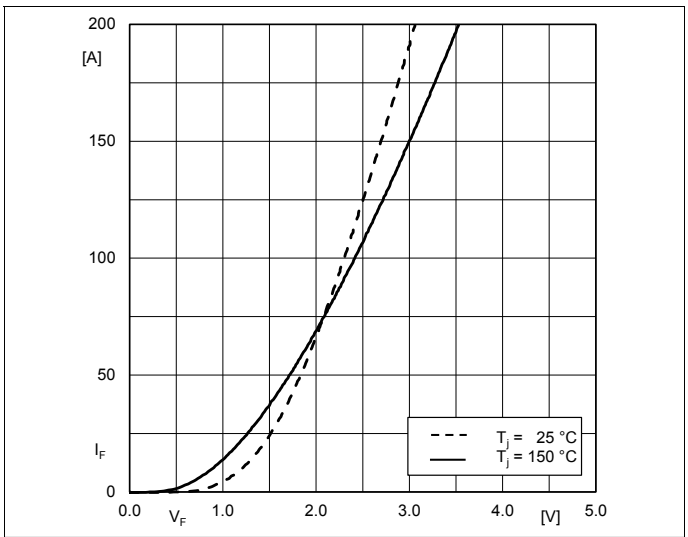
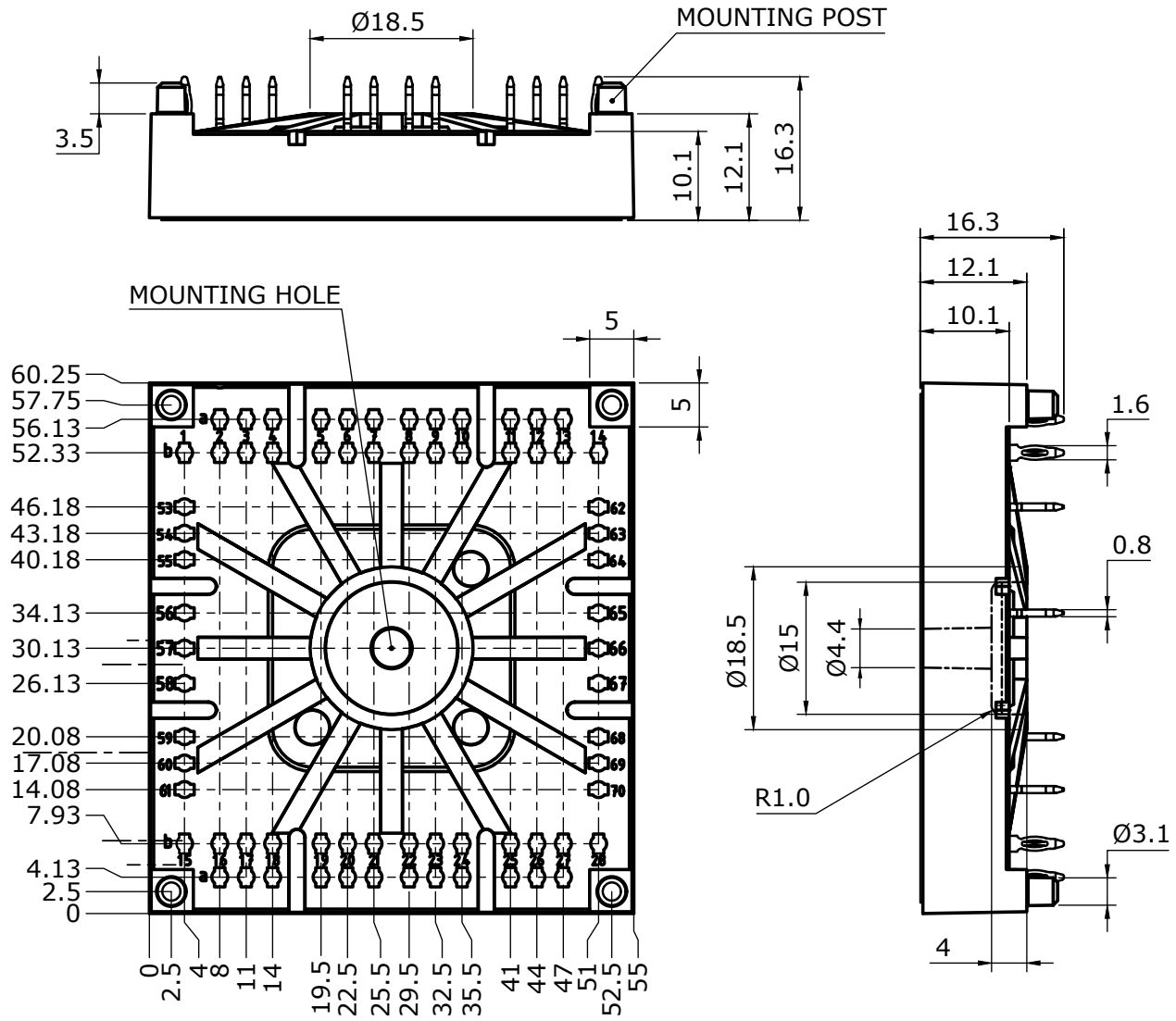


Fig. 14: Typ. Diode2 forward characteristic, incl. $R_{CC'+EE'}$

Dimensions: mm
Tolerance system: ISO 2768-m



Suggested drilled hole diameter for terminal pins in the circuit board:
- refer to Mounting Instruction SEMITOP® Classic

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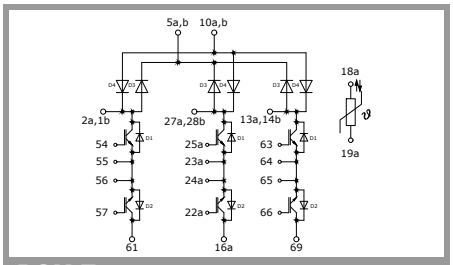
SEMITOP 4 Press-Fit



DGM-T

IMPORTANT INFORMATION AND WARNINGS

This is an electrostatic discharge sensitive device (ESDS) according to international standard IEC 61340.

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