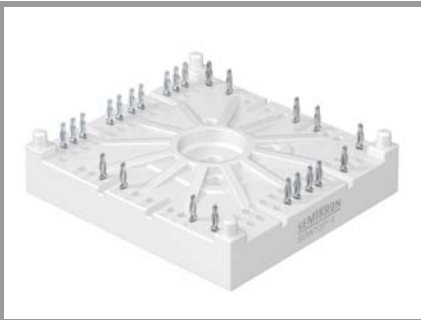


# SK35DGD12T4Tp



SEMISTOP® 4 Press-Fit

3-phase bridge rectifier +  
3-phase bridge inverter

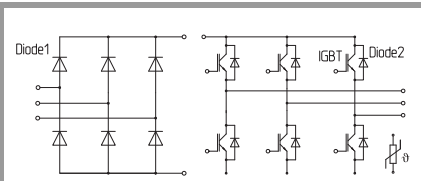
## SK35DGD12T4Tp

### Features

- One screw mounting module
- Solder free mounting with Press-Fit terminals
- Fully compatible with other SEMISTOP® 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

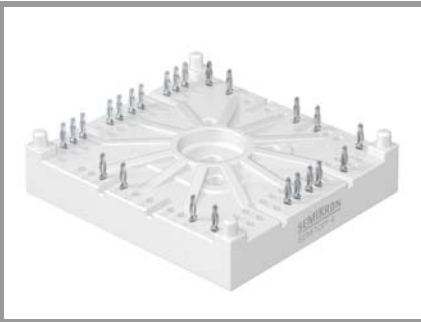
Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
<b>IGBT 1</b>			
$V_{CES}$	$T_j = 25\text{ °C}$	1200	V
$I_C$	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	46
		$T_s = 70\text{ °C}$	35
$I_C$	$T_j = 175\text{ °C}$	$T_s = 25\text{ °C}$	51
		$T_s = 70\text{ °C}$	41
$I_{Cnom}$		35	A
$I_{CRM}$	$I_{CRM} = 3 \times I_{Cnom}$	105	A
$V_{GES}$		-20 ... 20	V
$t_{psc}$	$V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 150\text{ °C}$	10
$T_j$		-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
<b>Diode 1</b>			
$V_{RRM}$	$T_j = 25\text{ °C}$	1600	V
$I_F$	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	52
		$T_s = 70\text{ °C}$	39
$I_F$	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	52
		$T_s = 70\text{ °C}$	39
$I_{Fnom}$		35	A
$I_{FSM}$	10 ms sin 180°	$T_j = 25\text{ °C}$	370
		$T_j = 150\text{ °C}$	270
$i^2t$	10 ms, sin 180°, $T_j = 150\text{ °C}$	364	A <sup>2</sup> s
$T_j$		-40 ... 150	°C

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
<b>Diode 2</b>			
$V_{RRM}$	$T_j = 25\text{ °C}$	1200	V
$I_F$	$T_j = 150\text{ °C}$	$T_s = 25\text{ °C}$	39
		$T_s = 70\text{ °C}$	30
$I_F$	$T_j = 175\text{ °C}$	$T_s = 25\text{ °C}$	44
		$T_s = 70\text{ °C}$	35
$I_{Fnom}$		35	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	70	A
$I_{FSM}$	10 ms, sin 180°, $T_j = 150\text{ °C}$	170	A
$T_j$		-40 ... 175	°C

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
<b>Module</b>			
$I_{t(RMS)}$	$T_{terminal} = 100\text{ °C}$ , $T_s = 60\text{ °C}$ , per pin	40	A
$T_{stg}$		-40 ... 125	°C
$V_{isol}$	AC, sinusoidal, t = 1 min	2500	V

# SK35DGD12T4Tp



SEMISTOP® 4 Press-Fit

## 3-phase bridge rectifier + 3-phase bridge inverter

### SK35DGD12T4Tp

#### Features

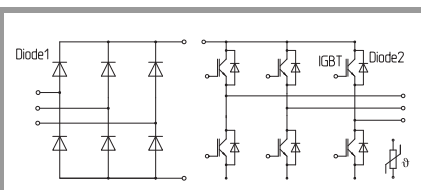
- One screw mounting module
- Solder free mounting with Press-Fit terminals
- Fully compatible with other SEMISTOP® Press-Fit types
- Improved thermal performances by aluminium oxide substrate
- Trench4 IGBT technology
- CAL4F technology FWD
- Integrated NTC temperature sensor
- UL recognized, file no. E 63 532

#### Typical Applications\*

- Motor drives

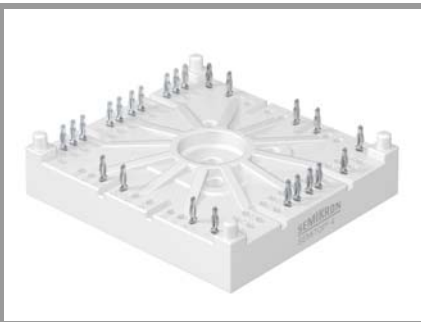
Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
<b>IGBT 1</b>						
$V_{CE(sat)}$	$I_C = 35\text{ A}$ $V_{GE} = 15\text{ V}$ chiplevel	$T_j = 25\text{ °C}$		1.85	2.10	V
		$T_j = 150\text{ °C}$		2.25	2.45	V
$V_{CE0}$	chiplevel	$T_j = 25\text{ °C}$		0.80	0.90	V
		$T_j = 150\text{ °C}$		0.70	0.80	V
$r_{CE}$	$V_{GE} = 15\text{ V}$ chiplevel	$T_j = 25\text{ °C}$		30	34	mΩ
		$T_j = 150\text{ °C}$		44	47	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1.2\text{ mA}$		5	5.8	6.5	V
$I_{CES}$	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$	$T_j = 25\text{ °C}$		-	1	mA
				-		mA
$C_{ies}$	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		1.95		nF
$C_{oes}$		$f = 1\text{ MHz}$		0.155		nF
$C_{res}$		$f = 1\text{ MHz}$		0.115		nF
$Q_G$	$V_{GE} = -8V...+15V$			200		nC
$R_{Gint}$	$T_j = 25\text{ °C}$			0		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150\text{ °C}$		28		ns
$t_r$	$I_C = 35\text{ A}$	$T_j = 150\text{ °C}$		25		ns
$E_{on}$	$R_{G\ on} = 22\text{ Ω}$ $R_{G\ off} = 22\text{ Ω}$	$T_j = 150\text{ °C}$		3.27		mJ
$t_{d(off)}$	$di/dt_{on} = 2900\text{ A/μs}$	$T_j = 150\text{ °C}$		303		ns
$t_f$	$di/dt_{off} = 2900\text{ A/μs}$	$T_j = 150\text{ °C}$		70		ns
$E_{off}$	$V_{GE\ neg} = -15\text{ V}$ $V_{GE\ pos} = 15\text{ V}$	$T_j = 150\text{ °C}$		3.3		mJ
$R_{th(j-s)}$	per IGBT			0.9		K/W

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



DGD-T

# SK35DGD12T4Tp



SEMITOP® 4 Press-Fit

3-phase bridge rectifier +  
3-phase bridge inverter

## SK35DGD12T4Tp

### 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

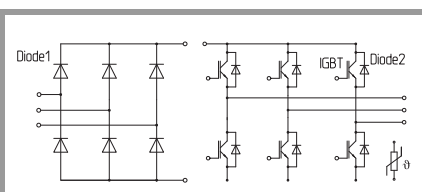
### Typical Applications\*

- Motor drives

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

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
<b>Module</b>						
$M_s$	to heatsink		2.5		2.75	Nm
w	weight			60		g

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
<b>Temperature Sensor</b>						
$R_{100}$	$T_r = 100\text{ °C}$			$493 \pm 5\%$		Ω
$B_{100/125}$	$R_{(T)} = R_{100} \exp[B_{100/125}(1/T - 1/T_{100})]$ ; T[K];			$3550 \pm 2\%$		K



DGD-T

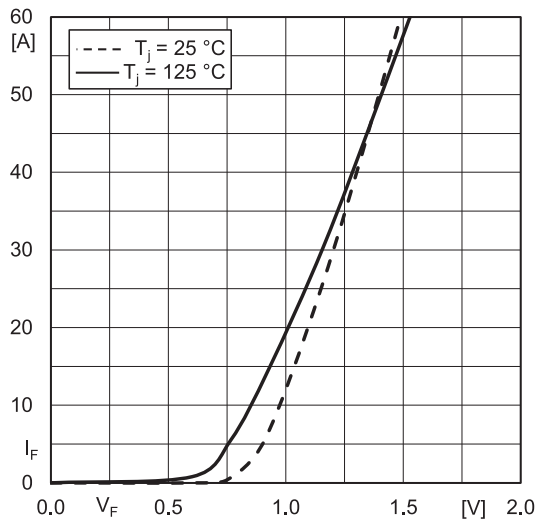


Fig. 1 : Typ. Diode1 forward characteristic, incl.  $R_{CC'+EE'}$

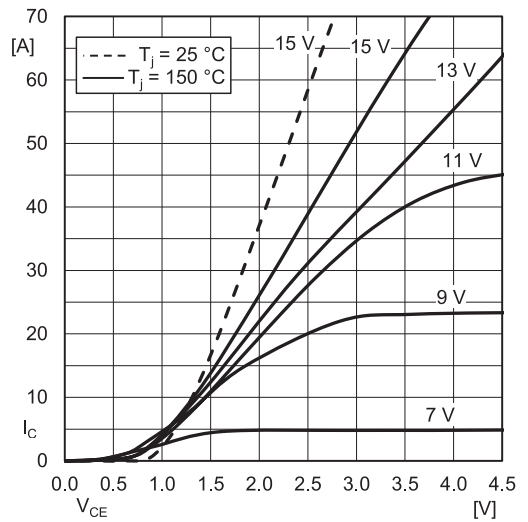


Fig. 2: Typ. IGBT output characteristic, incl.  $R_{CC'+EE'}$

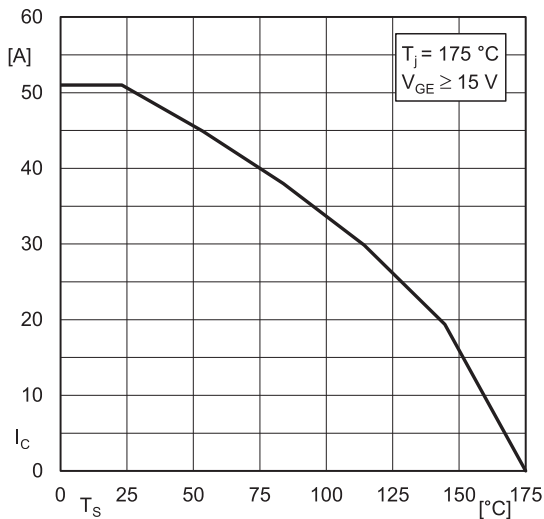


Fig. 3: Rated IGBT current vs. temperature  $I_c = f(T_s)$

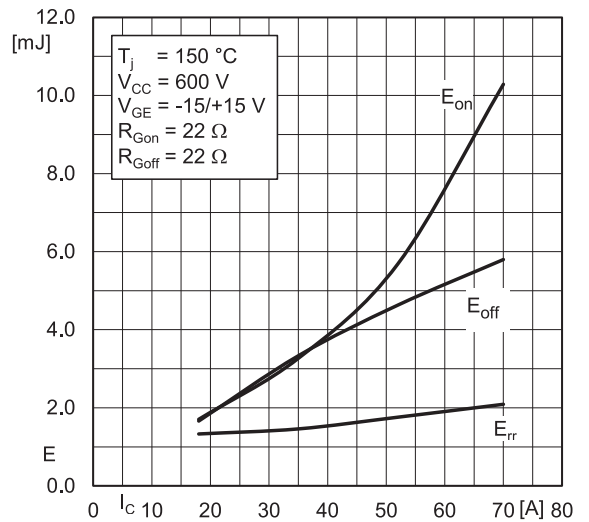


Fig. 4: Typ. turn-on /-off energy =  $f(I_c)$

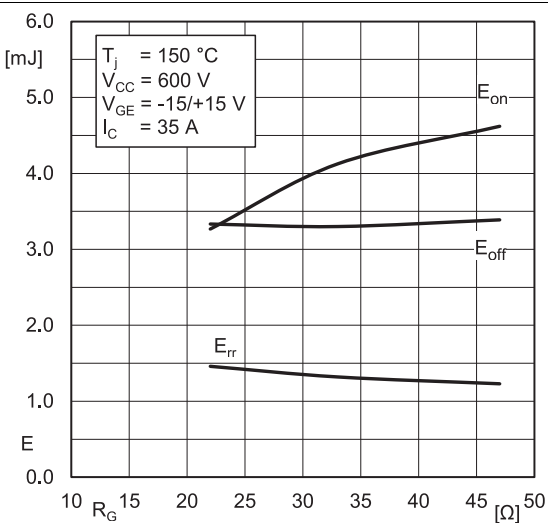


Fig. 5: Typ. turn-on /-off energy =  $f(R_G)$

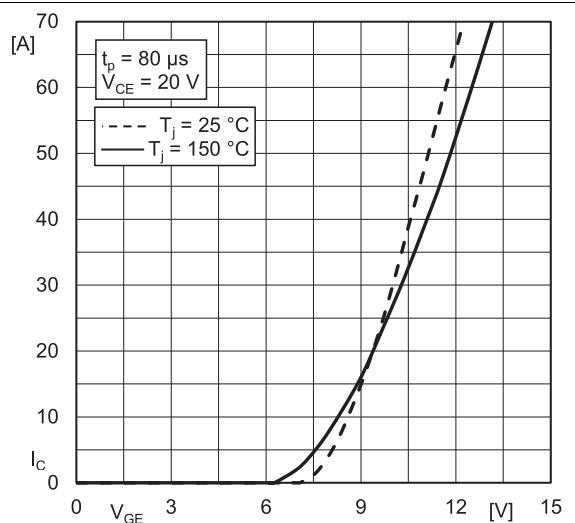


Fig. 6: Typ. transfer characteristic

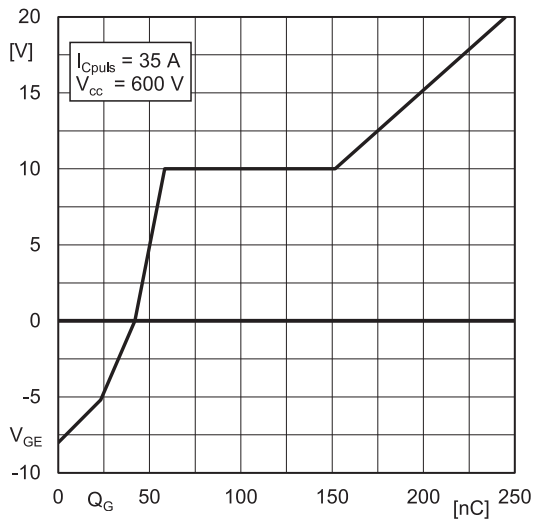


Fig. 7: Typ. IGBT gate charge characteristic

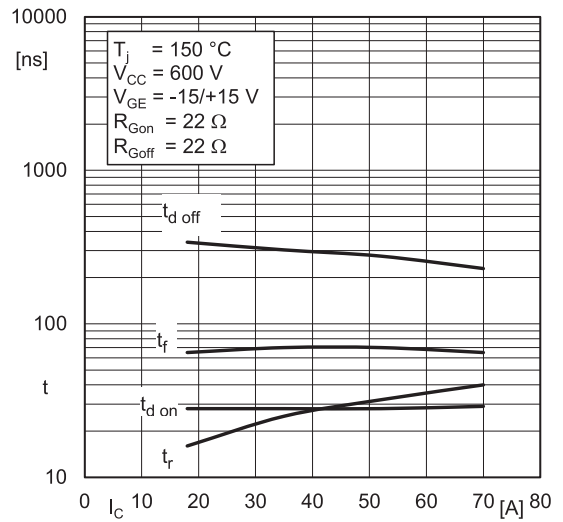


Fig. 8: Typ. switching times vs.  $I_C$

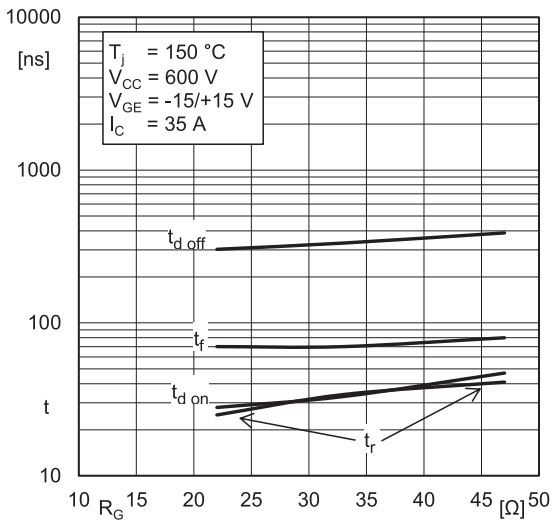


Fig. 9: Typ. switching times vs. gate resistor  $R_G$

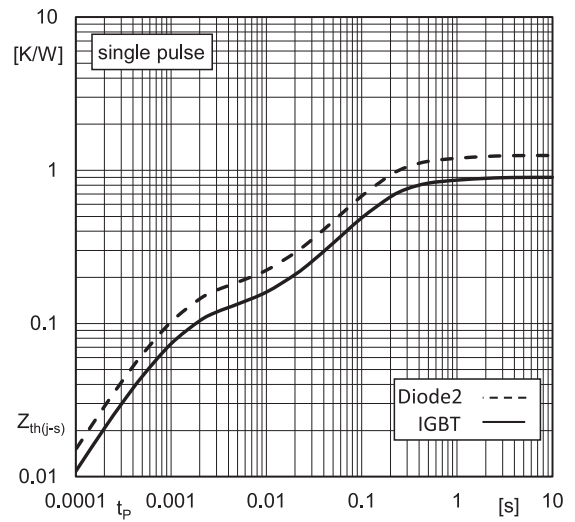


Fig. 10: Transient thermal impedance vs. time

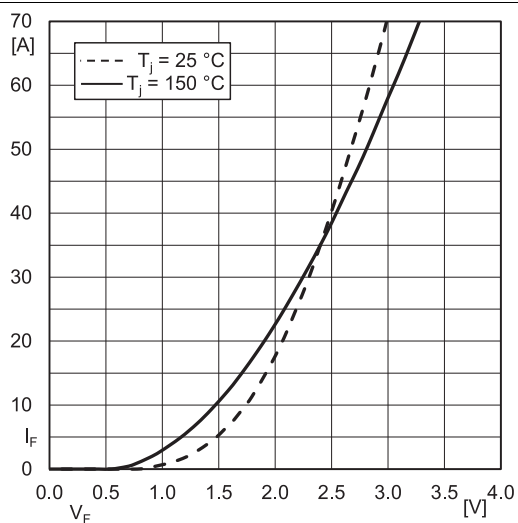
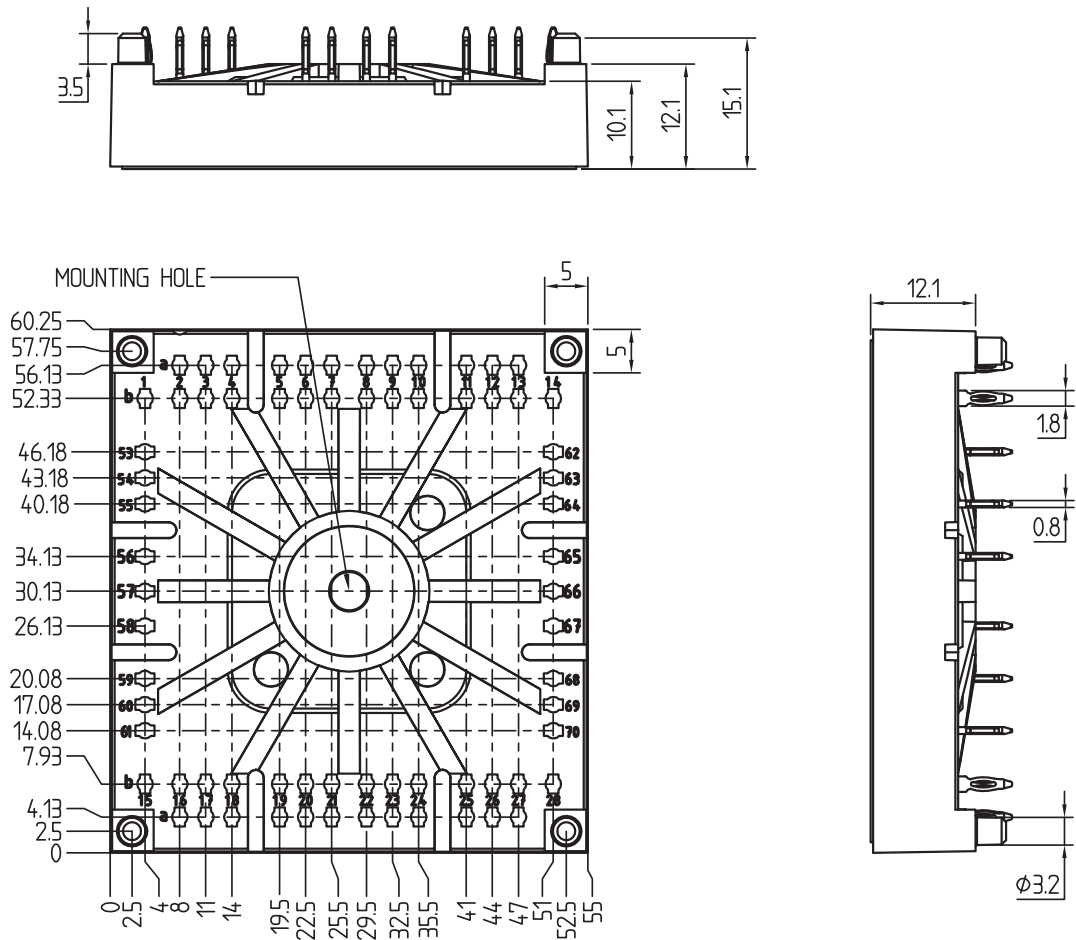


Fig. 11: Typ. CAL diode2 forward charact., incl.  $R_{CC+EE'}$

# SK35DGD12T4Tp

dimensions in mm  
tolerance system: ISO 2768-m



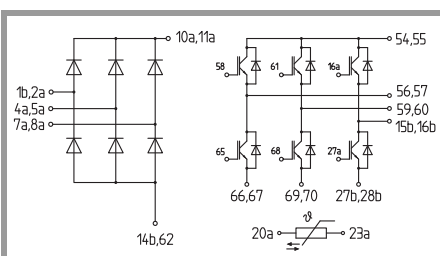
Suggested drilled hole diameter for terminal pins in the circuit board:

- 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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## SEMITOP 4 Press-Fit



## DGD-T

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

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