

SK25DGD12T4Tp



SEMITOP® 4 Press-Fit

**3-phase bridge rectifier +
3-phase bridge inverter**

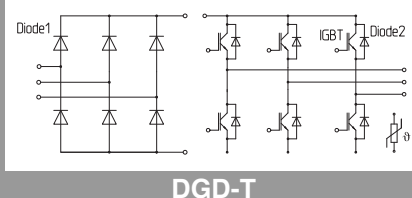
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Features

- 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



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	35	A
		T _s = 70 °C	27	A
I _C	T _j = 175 °C	T _s = 25 °C	39	A
		T _s = 70 °C	32	A
I _{Cnom}			25	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		75	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 800 V V _{GE} ≤ 15 V V _{CES} ≤ 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	T _j = 25 °C	370	A
	sin 180°	T _j = 150 °C	270	A
i²t	10 ms, sin 180°, T _j = 150 °C		364	A²s
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	29	A
		T _s = 70 °C	22	A
I _F	T _j = 175 °C	T _s = 25 °C	32	A
		T _s = 70 °C	26	A
I _{Fnom}			25	A
I _{FRM}	I _{FRM} = 2 x I _{Fnom}		50	A
I _{FSM}	10 ms, sin 180°, T _j = 150 °C		100	A
T _j			-40 ... 175	°C

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

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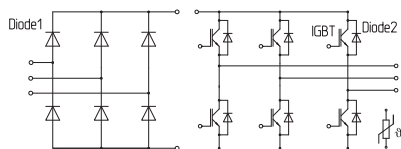
- Motor drives

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
IGBT 1					
$V_{CE(sat)}$	$I_C = 25\text{ A}$ $V_{GE} = 15\text{ V}$ chipllevel	$T_j = 25\text{ °C}$	1.85	2.10	V
		$T_j = 150\text{ °C}$	2.25	2.45	V
V_{CE0}	chipllevel	$T_j = 25\text{ °C}$	0.80	0.90	V
		$T_j = 150\text{ °C}$	0.70	0.80	V
r_{CE}	$V_{GE} = 15\text{ V}$ chipllevel	$T_j = 25\text{ °C}$	42	48	mΩ
		$T_j = 150\text{ °C}$	62	66	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 0.85\text{ mA}$	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}	$V_{CE} = 25\text{ V}$	$f = 1\text{ MHz}$	1.43		nF
C_{oes}	$V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	0.115		nF
C_{res}		$f = 1\text{ MHz}$	0.085		nF
Q_G	$V_{GE} = -8\text{ V...} + 15\text{ V}$		138		nC
R_{Gint}	$T_j = 25\text{ °C}$		0		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150\text{ °C}$	22		ns
t_r	$I_C = 25\text{ A}$	$T_j = 150\text{ °C}$	19.5		ns
E_{on}	$R_{G on} = 19\text{ Ω}$	$T_j = 150\text{ °C}$	2.27		mJ
$t_{d(off)}$	$R_{G off} = 19\text{ Ω}$	$T_j = 150\text{ °C}$	288		ns
t_f	$di/dt_{on} = 2825\text{ A/μs}$	$T_j = 150\text{ °C}$	77.5		ns
E_{off}	$V_{GE neg} = -15\text{ V}$	$T_j = 150\text{ °C}$	2.7		mJ
	$V_{GE pos} = 15\text{ V}$				
$R_{th(j-s)}$	per IGBT		1.1		K/W

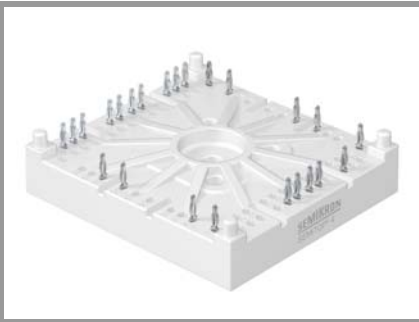
Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Diode 1					
V_F	$I_F = 35\text{ A}$	$T_j = 25\text{ °C}$	1.20	1.60	V
	chipllevel	$T_j = 125\text{ °C}$	1.19	1.56	V
V_{F0}	chipllevel	$T_j = 25\text{ °C}$	0.88	0.98	V
		$T_j = 125\text{ °C}$	0.73	0.83	V
r_F	chipllevel	$T_j = 25\text{ °C}$	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

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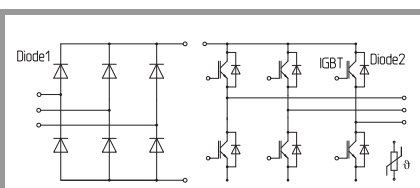
Typical Applications*

- Motor drives

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Diode 2						
V _F	I _F = 25 A	T _j = 25 °C		2.41	2.74	V
	chiplevel	T _j = 150 °C		2.45	2.79	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		44	50	mΩ
		T _j = 150 °C		62	68	mΩ
I _{RRM}	I _F = 25 A	T _j = 150 °C		31.5		A
Q _{rr}	di/dt _{off} = 2825 A/μs	T _j = 150 °C		1.15		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 150 °C		1.28		mJ
R _{th(j-s)}	per Diode			1.5		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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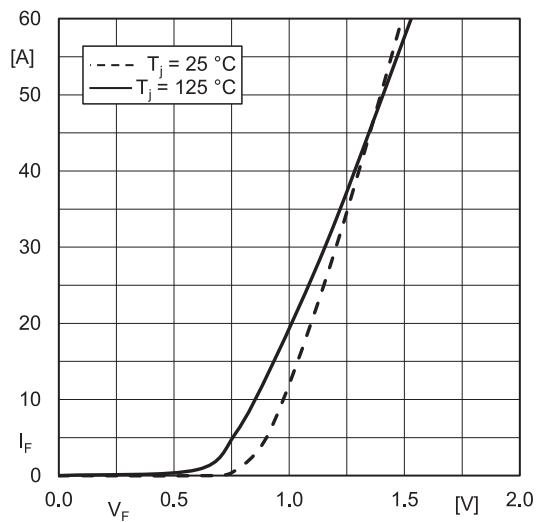


Fig. 1 : Typ. Diode1 forward characteristic, incl. $R_{CC'} + EE'$

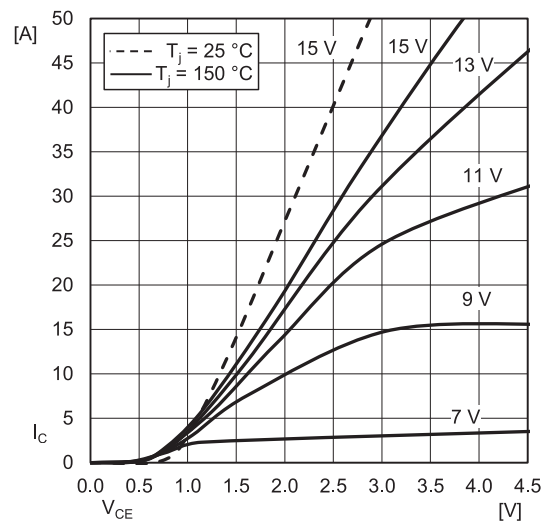


Fig. 2: Typ. IGBT output characteristic, incl. $R_{CC'} + EE'$

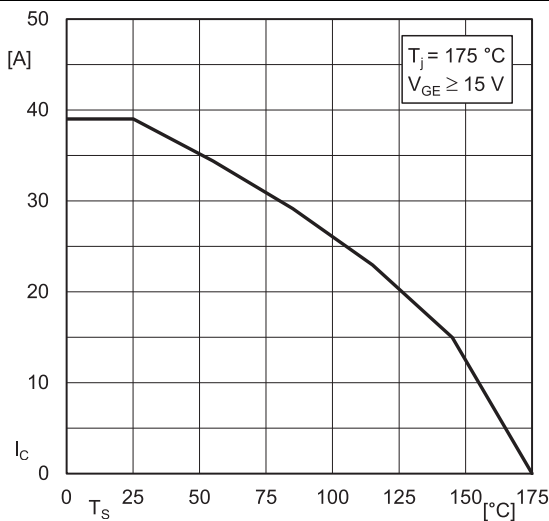


Fig. 3: Rated IGBT current vs. temperature $I_C = f(T_S)$

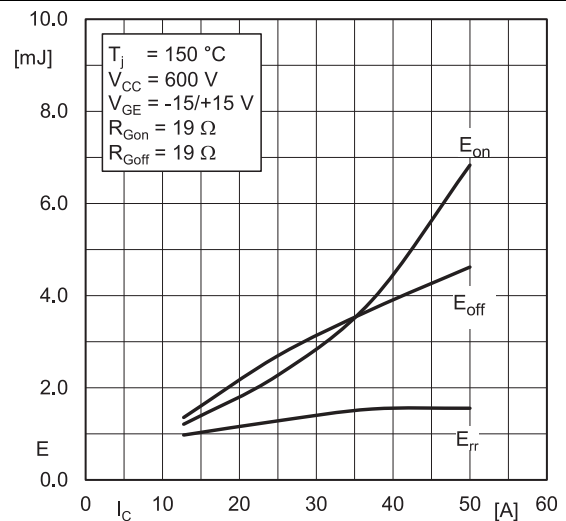


Fig. 4: Typ. turn-on /-off energy = $f(I_C)$

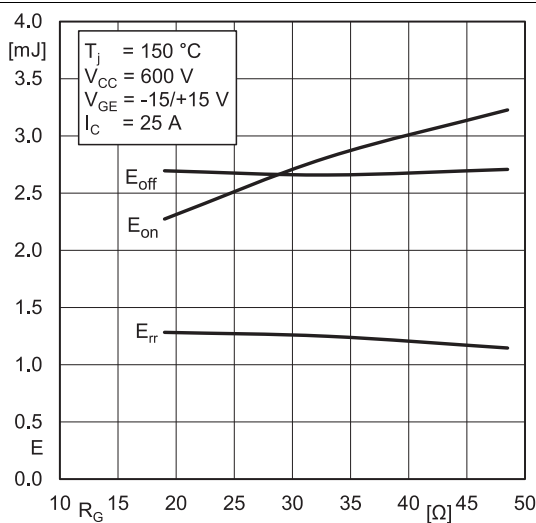


Fig. 5: Typ. turn-on /-off energy = $f(R_G)$

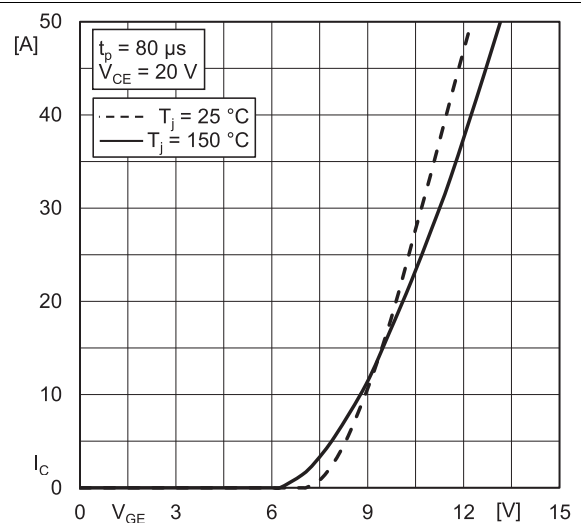


Fig. 6: Typ. transfer characteristic

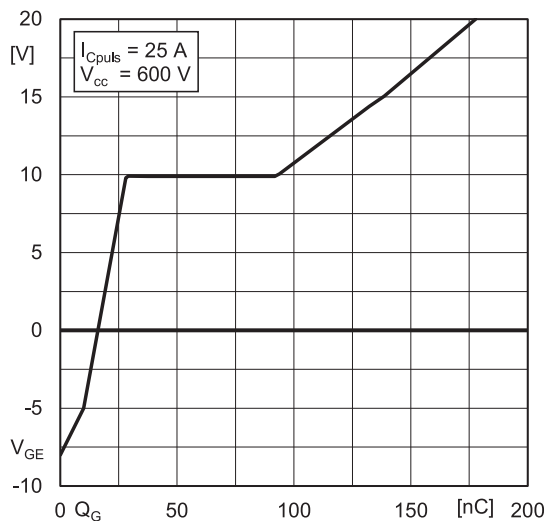


Fig. 7: Typ. IGBT gate charge characteristic

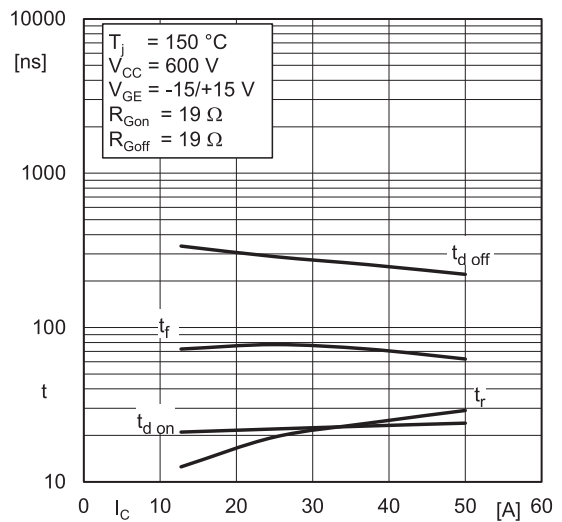


Fig. 8: Typ. switching times vs. I_C

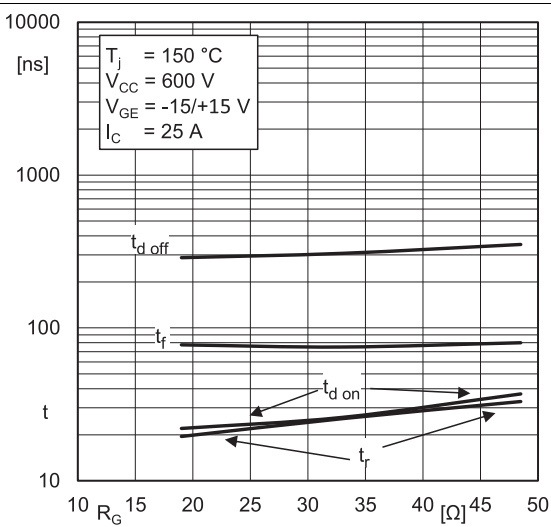


Fig. 9: Typ. switching times vs. gate resistor R_G

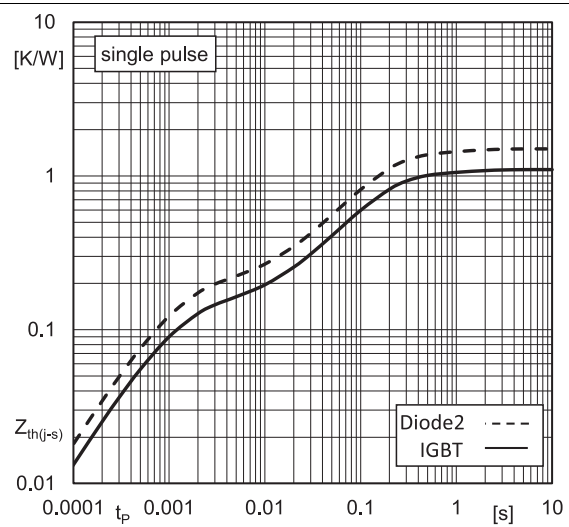


Fig. 10: Transient thermal impedance vs. time

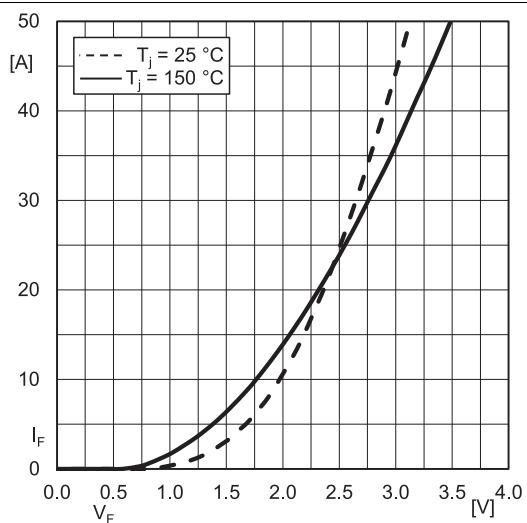
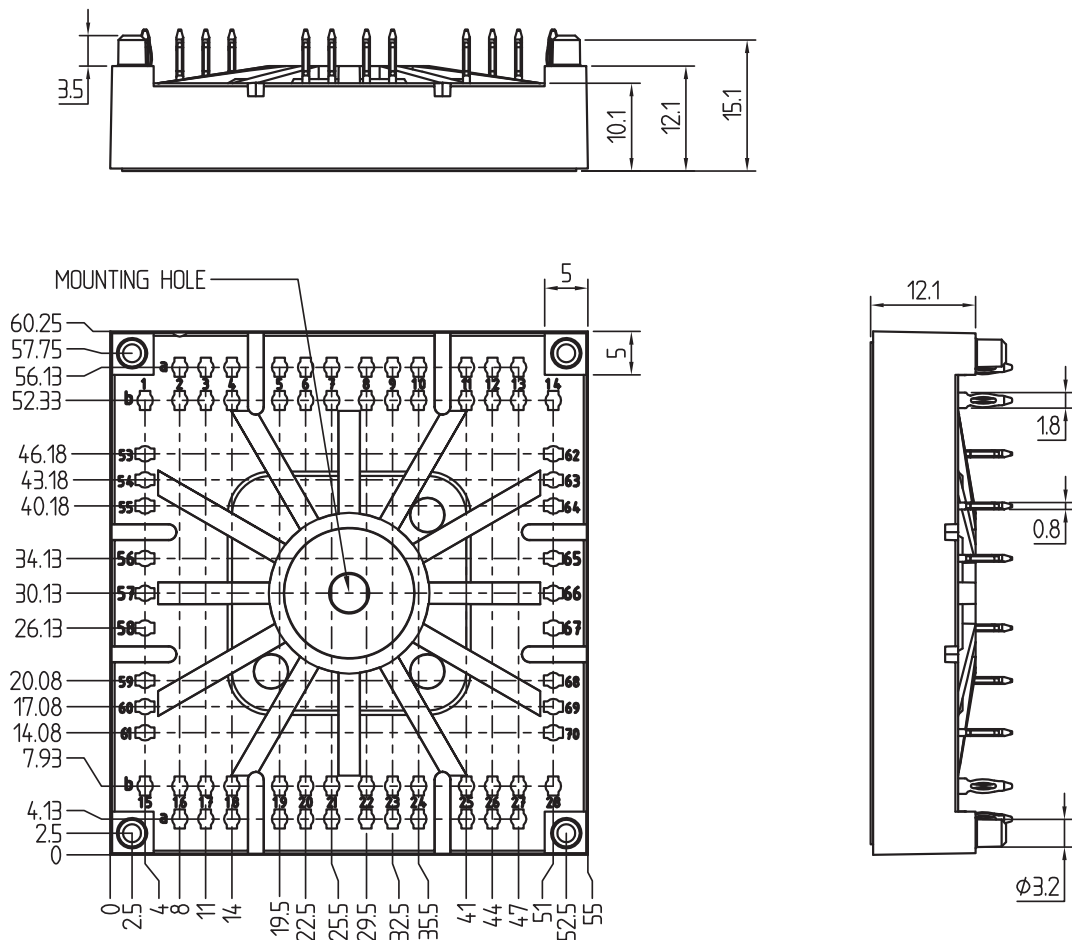


Fig. 11: Typ. CAL diode2 forward charact., incl. $R_{CC'+EE'}$

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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

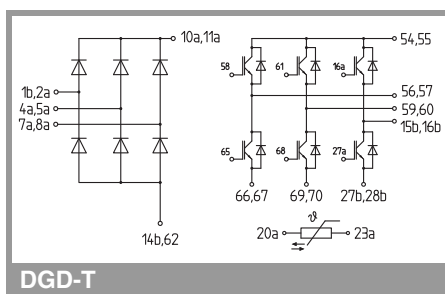
Suggested hole diameter for the mounting pins in the circuit board: 3.6mm

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

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