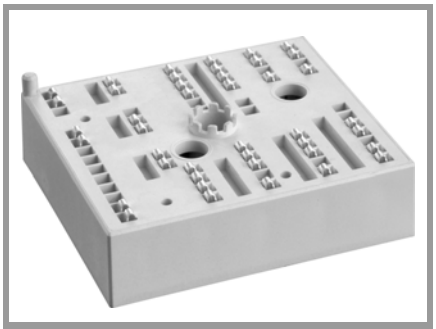
SKiiP 26MLI07E3V1



MiniSKiiP® 2

3-Level NPC IGBT-Module

SKiiP 26MLI07E3V1

Features*

- 650V Trench IGBTs
- Robust and soft diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532
- NTC T-Sensor

Typical Applications

- Uninterruptible power supplies (UPS)
- Solar inverters

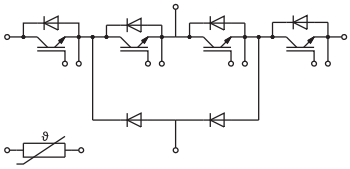
Remarks*

- Max. case temperature limited to T_C= 125°C
- Product reliability results valid for T_j≤150°C (recommended $T_{j,op}$=-40...+150°C)

Footnotes

[1)] Please find further technical information on the SEMIKRON website.

Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
IGBT1				
V_{CES}	T_j = 25 °C		650	V
I_C	λ_{paste}=0.8 W/(mK) T_j = 175 °C	T_s = 25 °C	98	A
		T_s = 70 °C	79	A
I_C	λ_{paste}=2.5 W/(mK) T_j = 175 °C	T_s = 25 °C	t.b.d.	A
		T_s = 70 °C	t.b.d.	A
I_{Cnom}			75	A
I_{CRM}			150	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 360 V, V_{GE} ≤ 15 V, T_j = 150 °C, V_{CES} ≤ 650 V		6	µs
T_j			-40 ... 175	°C
IGBT2				
V_{CES}	T_j = 25 °C		650	V
I_C	λ_{paste}=0.8 W/(mK) T_j = 175 °C	T_s = 25 °C	98	A
		T_s = 70 °C	79	A
I_C	λ_{paste}=2.5 W/(mK) T_j = 175 °C	T_s = 25 °C	t.b.d.	A
		T_s = 70 °C	t.b.d.	A
I_{Cnom}			75	A
I_{CRM}			225	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 360 V, V_{GE} ≤ 15 V, T_j = 150 °C, V_{CES} ≤ 650 V		6	µs
T_j			-40 ... 175	°C
Diode1				
V_{RRM}	T_j = 25 °C		650	V
I_F	λ_{paste}=0.8 W/(mK) T_j = 175 °C	T_s = 25 °C	75	A
		T_s = 70 °C	59	A
I_F	λ_{paste}=2.5 W/(mK) T_j = 175 °C	T_s = 25 °C	t.b.d.	A
		T_s = 70 °C	t.b.d.	A
I_{FRM}			150	A
I_{FSM}	10 ms, sin 180°, T_j = 25 °C		550	A
T_j			-40 ... 175	°C
Diode2				
V_{RRM}	T_j = 25 °C		650	V
I_F	λ_{paste}=0.8 W/(mK) T_j = 175 °C	T_s = 25 °C	75	A
		T_s = 70 °C	59	A
I_F	λ_{paste}=2.5 W/(mK) T_j = 175 °C	T_s = 25 °C	t.b.d.	A
		T_s = 70 °C	t.b.d.	A
I_{FRM}			150	A
I_{FSM}	10 ms, sin 180°, T_j = 25 °C		550	A
T_j			-40 ... 175	°C



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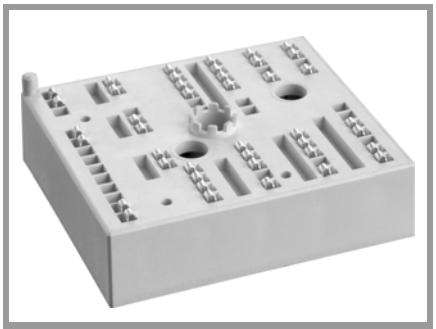

MiniSKiiP® 2

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SKiiP 26MLI07E3V1

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Remarks*

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Footnotes

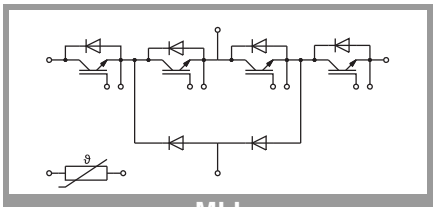
[1)] Please find further technical information on the SEMIKRON website.

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Diode5				
V_{RRM}				V
I_F	λ_{paste}=0.8 W/(mK)	T_s = 25 °C		A
		T_s = 70 °C		A
I_F	λ_{paste}=2.5 W/(mK)	T_s = 25 °C		A
		T_s = 70 °C		A
I_{FRM}			t.b.d.	A
I_{FSM}	, ,		t.b.d.	A
T_j				°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80°C, 20A per spring		120	A
T_{stg}	module without TIM		-40 ... 125	°C
V_{isol}	AC sinus 50 Hz, t = 1 min		2500	V

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT1						
$V_{CE(sat)}$	I_C = 75 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.45	1.77	V
		T_j = 150 °C		1.70	2.10	V
V_{CE0}	chiplevel	T_j = 25 °C		0.90	1.00	V
		T_j = 150 °C		0.82	0.90	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		7.3	10	mΩ
		T_j = 150 °C		12	16	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 1.2 mA		5.1	5.8	6.4	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		4.62		nF
C_{oes}		f = 1 MHz		0.30		nF
C_{res}		f = 1 MHz		0.14		nF
Q_G	V_{GE} = - 8 V...+ 15 V			680		nC
R_{Gint}	T_j = 25 °C			4.0		Ω
$t_{d(on)}$	V_{CE} = 300 V I_C = 75 A V_{GE} = +15/-15 V $R_{G\ on}$ = 4.1 Ω $R_{G\ off}$ = 3 Ω di/dt_{on} = 1330 A/µs di/dt_{off} = 1140 A/µs	T_j = 150 °C		119		ns
t_r		T_j = 150 °C		45		ns
E_{on}		T_j = 150 °C		2.8		mJ
$t_{d(off)}$		T_j = 150 °C		250		ns
t_f		T_j = 150 °C		56		ns
E_{off}		T_j = 150 °C		2.8		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			0.6		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			t.b.d.		K/W



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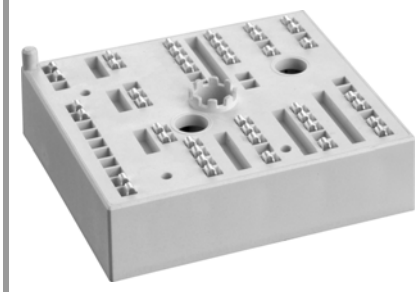

MiniSKiiP® 2

3-Level NPC IGBT-Module

SKiiP 26MLI07E3V1

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- Max. case temperature limited to T_C= 125°C
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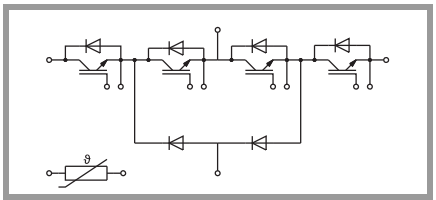

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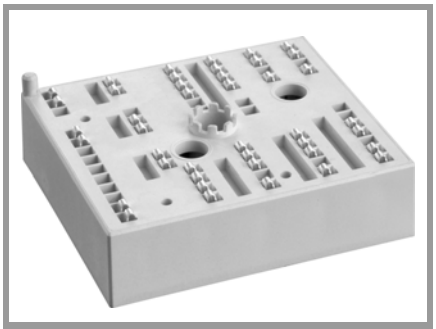
Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT2						
$V_{CE(sat)}$	I_C = 75 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.45	1.77	V
		T_j = 150 °C		1.70	2.10	V
V_{CE0}	chiplevel	T_j = 25 °C		0.90	1.00	V
		T_j = 150 °C		0.82	0.90	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		7.3	10	mΩ
		T_j = 150 °C		12	16	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 1.2 mA		5.1	5.8	6.4	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		4.62		nF
C_{oes}		f = 1 MHz		0.30		nF
C_{res}		f = 1 MHz		0.14		nF
Q_G	V_{GE} = - 8 V...+ 15 V			680		nC
R_{Gint}	T_j = 25 °C			4.0		Ω
$t_{d(on)}$	V_{CC} = 300 V I_C = 75 A V_{GE} = +15/-15 V $R_{G\ on}$ = 4.1 Ω $R_{G\ off}$ = 3 Ω di/dt_{on} = 1550 A/µs di/dt_{off} = 1100 A/µs	T_j = 150 °C		113		ns
t_r		T_j = 150 °C		52		ns
E_{on}		T_j = 150 °C		1.6		mJ
$t_{d(off)}$		T_j = 150 °C		247		ns
t_f		T_j = 150 °C		76		ns
E_{off}		T_j = 150 °C		2.7		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			0.6		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			t.b.d.		K/W
Diode1						
$V_F = V_{EC}$	I_F = 75 A V_{GE} = 0 V chiplevel	T_j = 25 °C		1.54	1.97	V
		T_j = 150 °C		1.60	2.09	V
V_{F0}	chiplevel	T_j = 25 °C		1.04	1.24	V
		T_j = 150 °C		0.85	0.99	V
r_F	chiplevel	T_j = 25 °C		6.7	9.8	mΩ
		T_j = 150 °C		10	15	mΩ
I_{RRM}	I_F = 75 A di/dt_{off} = 1500 A/µs V_R = 300 V V_{GE} = +15/-15 V	T_j = 150 °C		56		A
Q_{rr}		T_j = 150 °C		6.3		µC
E_{rr}		T_j = 150 °C		1.4		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			1		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			t.b.d.		K/W
Diode2						
$V_F = V_{EC}$	I_F = 75 A V_{GE} = 0 V chiplevel	T_j = 25 °C		1.54	1.97	V
		T_j = 150 °C		1.60	2.09	V
V_{F0}	chiplevel	T_j = 25 °C		1.04	1.24	V
		T_j = 150 °C		0.85	0.99	V
r_F	chiplevel	T_j = 25 °C		6.7	9.8	mΩ
		T_j = 150 °C		10	15	mΩ
I_{RRM}	I_F = 75 A di/dt_{off} = 1350 A/µs V_R = 300 V V_{GE} = +15/-15 V	T_j = 150 °C		56		A
Q_{rr}		T_j = 150 °C		7.1		µC
E_{rr} [1]		T_j = 150 °C		1.4		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			1		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			t.b.d.		K/W

SKiiP 26MLI07E3V1



MiniSKiiP® 2

3-Level NPC IGBT-Module

SKiiP 26MLI07E3V1

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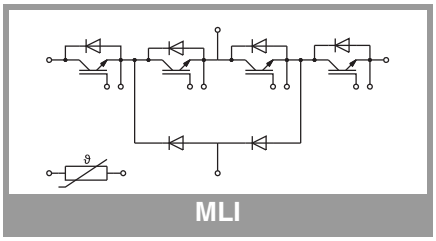
Footnotes

[1)] Please find further technical information on the SEMIKRON website.

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode5						
$V_F = V_{EC}$		T_j = 25 °C				V
						V
V_{F0}		T_j = 25 °C				V
						V
r_F		T_j = 25 °C			0.00	mΩ
				0.00	0.00	mΩ
I_{RRM}	I_F = t.b.d. A			t.b.d.		A
Q_{rr}	V_R = 300 V			t.b.d.		µC
E_{rr}	V_{GE} = +15/-15 V			t.b.d.		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)					K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			t.b.d.		K/W
Module						
L_{sCE1}				-		nH
L_{sCE2}				-		nH
$R_{CC'+EE'}$		T_s = 25 °C		-		mΩ
		T_s = 125 °C		-		mΩ
M_s	to heat sink		2		2.5	Nm
M_t				-		Nm
				-		Nm
w				55		g
Temperature Sensor						
R_{100}	T_c=100°C (R_{25}=5 kΩ)			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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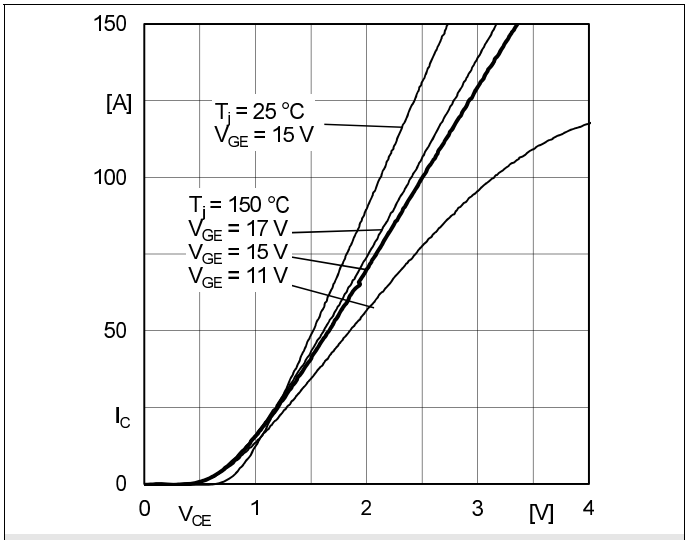


Fig. 1: Typ. IGBT1 output characteristic, incl. $R_{CC'+EE'}$

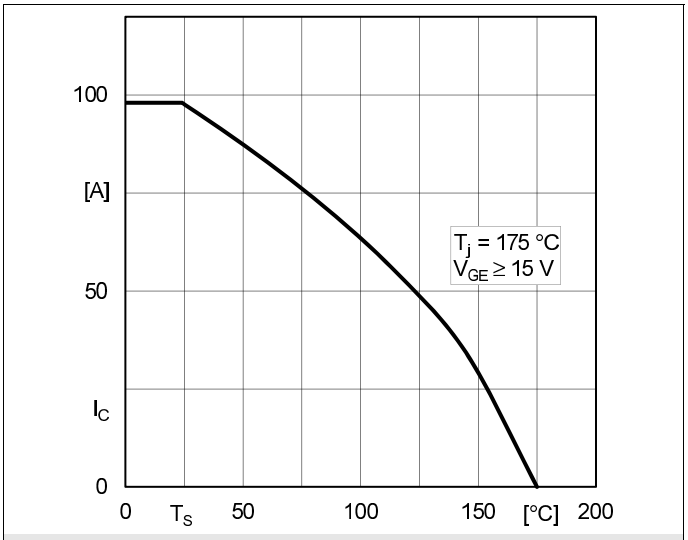


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

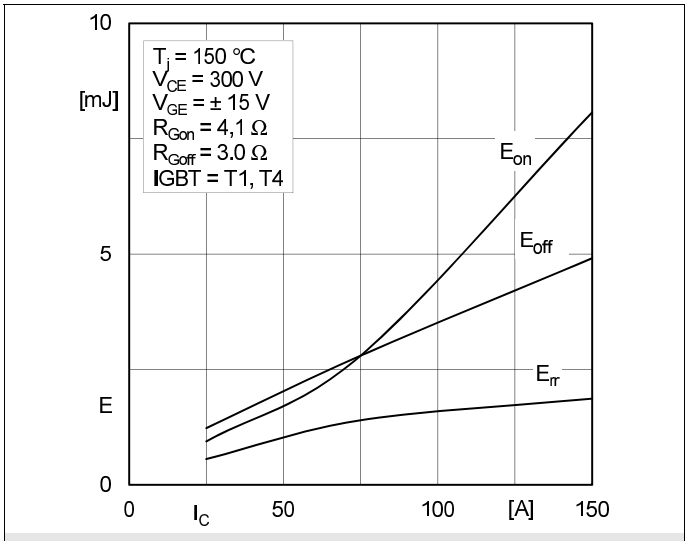


Fig. 3: Typ. IGBT1 & Diode5 turn-on /-off energy = f (I_C)

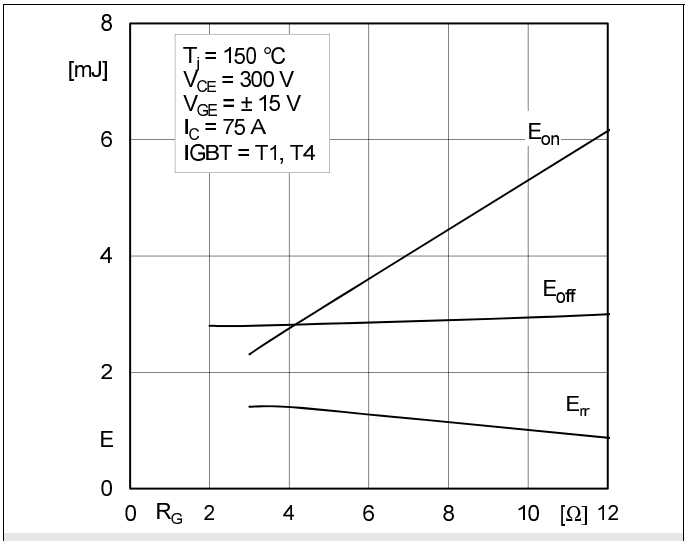


Fig. 4: Typ. IGBT1 & Diode5 turn-on /-off energy = f(R_G)

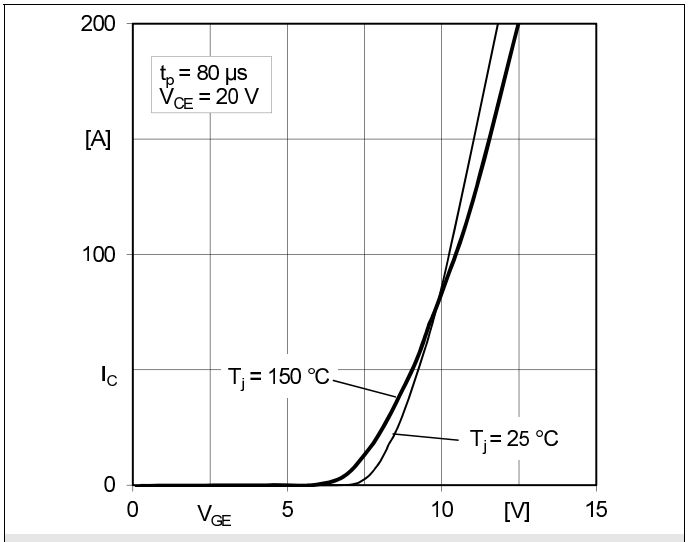


Fig. 5: Typ. IGBT1 transfer characteristic

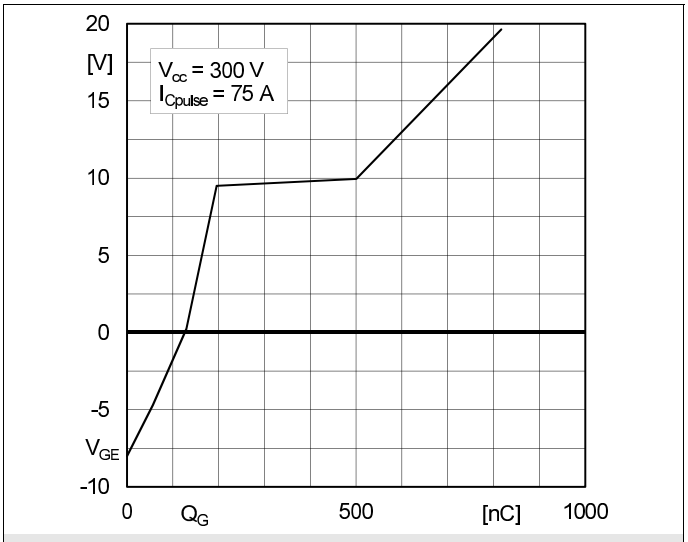


Fig. 6: Typ. IGBT1 gate charge characteristic

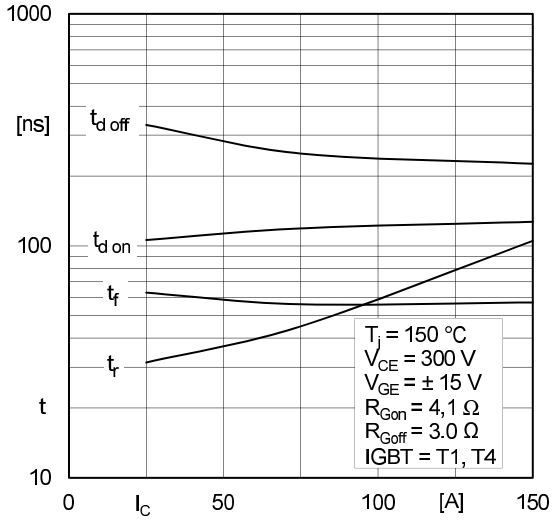


Fig. 7: Typ. IGBT1 switching times vs. I_C

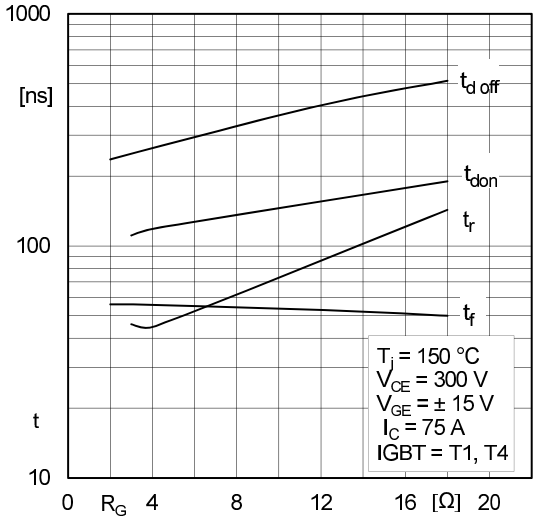


Fig. 8: Typ. IGBT1 switching times vs. gate resistor R_G

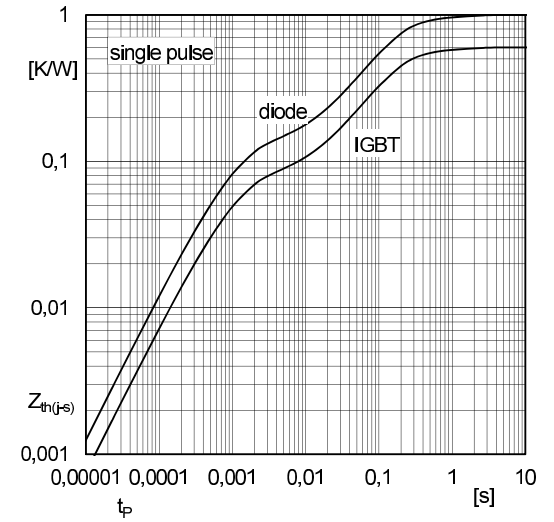


Fig. 9: Typ. transient thermal impedance of IGBT1 & Diode5

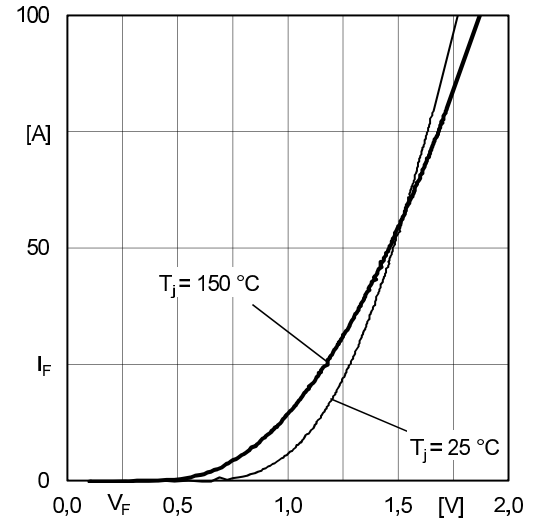


Fig. 10: Typ. Diode5 forward characteristic, incl. $R_{CC'+EE'}$

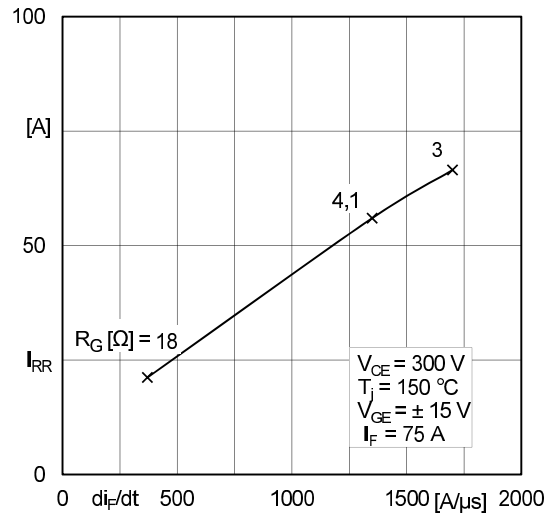


Fig. 11: Typ. Diode5 peak reverse recovery current

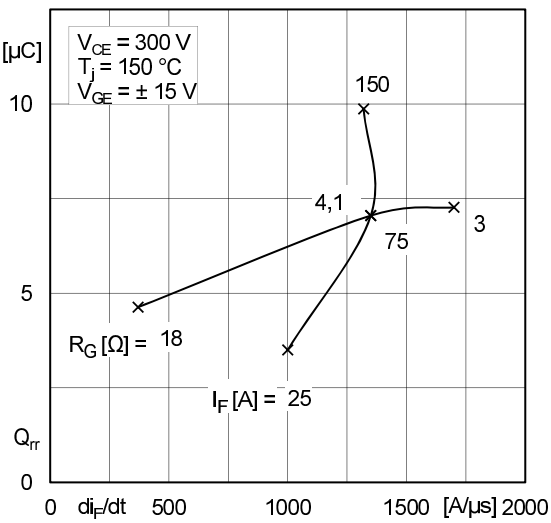
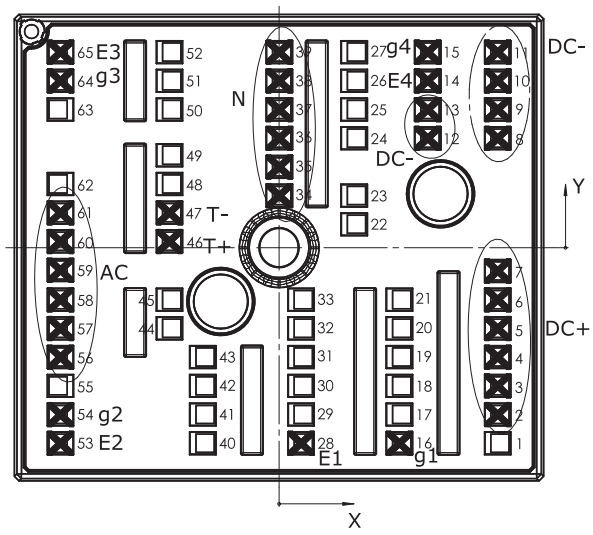


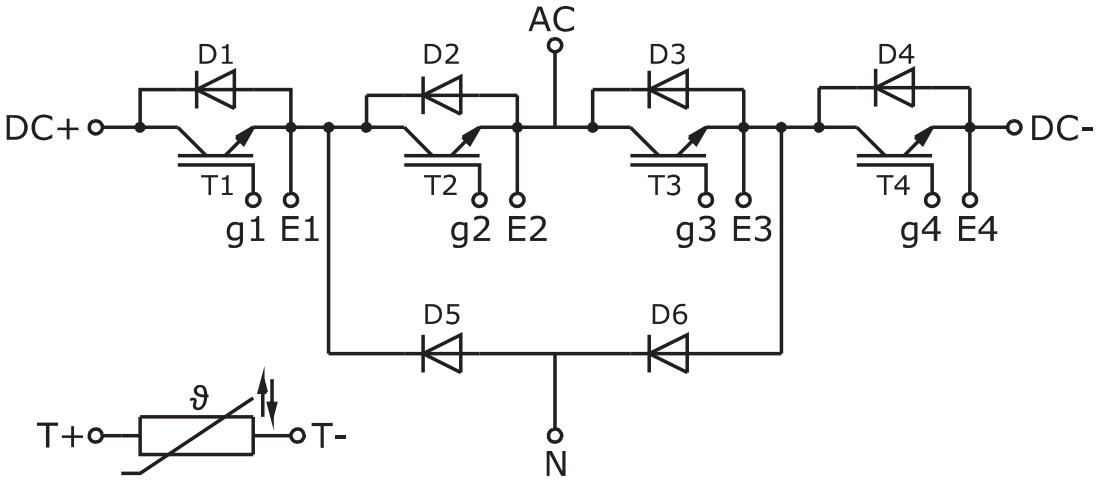
Fig. 12: Typ. Diode5 recovery charge

Pin out											
Pin	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*
1	24,38	-21,80		23	8,38	5,80		45	-12,23	-5,80	
2	24,38	-18,60	DC+	24	8,38	12,20		46	-12,23	0,70	T+
3	24,38	-15,40	DC+	25	8,38	15,40		47	-12,23	3,90	T-
4	24,38	-12,20	DC+	26	8,38	18,60		48	-12,23	7,10	
5	24,38	-9,00	DC+	27	8,38	21,80		49	-12,23	10,30	
6	24,38	-5,80	DC+	28	2,46	-21,80	E1	50	-12,23	15,40	
7	24,38	-2,60	DC+	29	2,46	-18,60		51	-12,23	18,60	
8	24,38	12,20	DC-	30	2,46	-15,40		52	-12,23	21,80	
9	24,38	15,40	DC-	31	2,46	-12,20		53	-24,38	-21,80	E2
10	24,38	18,60	DC-	32	2,46	-9,00		54	-24,38	-18,60	g2
11	24,38	21,80	DC-	33	2,46	-5,80		55	-24,38	-15,40	
12	16,58	12,20	DC-	34	0,03	5,80	N	56	-24,38	-12,20	AC
13	16,58	15,40	DC-	35	0,03	9,00	N	57	-24,38	-9,00	AC
14	16,58	18,60	E4	36	0,03	12,20	N	58	-24,38	-5,80	AC
15	16,58	21,80	g4	37	0,03	15,40	N	59	-24,38	-2,50	AC
16	13,42	-21,80	G1	38	0,03	18,60	N	60	-24,38	0,70	AC
17	13,42	-18,60		39	0,03	21,80	N	61	-24,38	3,90	AC
18	13,42	-15,40		40	-8,51	-21,80		62	-24,38	7,10	
19	13,42	-12,20		41	-8,51	-18,60		63	-24,38	15,40	
20	13,42	-9,00		42	-8,51	-15,40		64	-24,38	18,60	g3
21	13,42	-5,80		43	-8,51	-12,20		65	-24,38	21,80	E3
22	8,38	2,60		44	-12,23	-9,00					

all values in mm



Pinout and Dimensions



Pinout

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

***IMPORTANT INFORMATION AND WARNINGS**

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