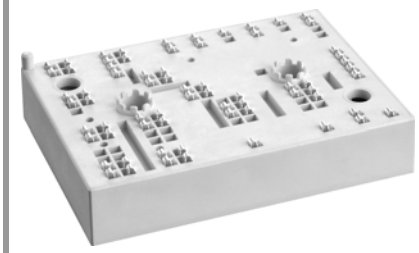
SKiiP 37AC12T7V1



MiniSKiiP® 3

Sixpack

SKiiP 37AC12T7V1

Features*

- 1200V Generation 7 IGBTs (T7)
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Remarks

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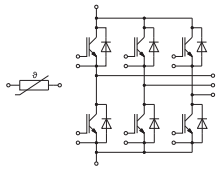


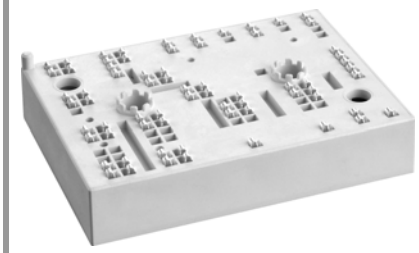
AC

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}			1200	V
I_C	P12 (reference) $T_j = 175$ °C	$T_s = 70$ °C	79	A
		$T_s = 100$ °C	64	A
I_C	HPTP $T_j = 175$ °C	$T_s = 70$ °C	93	A
		$T_s = 100$ °C	75	A
I_{Cnom}			75	A
I_{CRM}			150	A
V_{GES}			-20 ... 20	V
t_{psc}	$V_{CC} = 800$ V $V_{GE} \leq 15$ V $V_{CES} \leq 1200$ V	$T_j = 175$ °C	7	µs
T_j			-40 ... 175	°C
Inverse - Diode				
V_{RRM}	$T_j = 25$ °C		1200	V
I_F	P12 (reference) $T_j = 175$ °C	$T_s = 70$ °C	65	A
		$T_s = 100$ °C	52	A
I_F	HPTP $T_j = 175$ °C	$T_s = 70$ °C	75	A
		$T_s = 100$ °C	60	A
I_{FRM}			150	A
I_{FSM}	$t_p = 10$ ms, sin 180°, $T_j = 150$ °C		430	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal} = 80$ °C, 20 A per spring		160	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
Inverter - IGBT						
$V_{CE(sat)}$	$I_C = 75$ A $V_{GE} = 15$ V chiplevel	$T_j = 25$ °C		1.55	1.70	V
		$T_j = 150$ °C		1.69	1.84	V
		$T_j = 175$ °C		1.72	1.87	V
V_{CE0}	chiplevel	$T_j = 25$ °C		1.00	1.08	V
		$T_j = 150$ °C		0.85	0.93	V
		$T_j = 175$ °C		0.75	0.83	V
r_{CE}	$V_{GE} = 15$ V chiplevel	$T_j = 25$ °C		7.3	8.3	mΩ
		$T_j = 150$ °C		11	12	mΩ
		$T_j = 175$ °C		13	14	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 1.7$ mA		5.15	5.8	6.45	V
I_{CES}	$V_{GE} = 0$ V, $V_{CE} = 1200$ V, $T_j = 25$ °C				1	mA
C_{ies}	$V_{CE} = 25$ V $V_{GE} = 0$ V	f = 1 MHz		15.10		nF
C_{oes}		f = 1 MHz		0.19		nF
C_{res}		f = 1 MHz		0.54		nF
Q_G	$V_{GE} = -8$ V ... + 15 V			1050		nC
R_{Gint}	$T_j = 25$ °C			2.0		Ω



MiniSKiiP® 3

Sixpack

SKiiP 37AC12T7V1

Features*

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- Robust and soft switching freewheeling diodes in CAL technology
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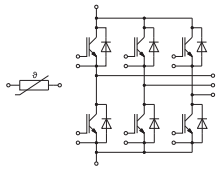


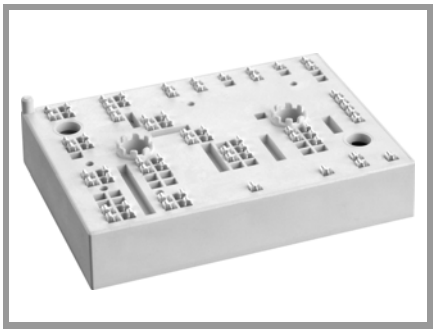
AC

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverter - IGBT						
$t_{d(on)}$	V_{CC} = 600 V I_C = 75 A $R_{G\ on}$ = 2.3 Ω $R_{G\ off}$ = 2.3 Ω V_{GE} = +15/-15 V @ T_j = 150 °C: di/dt_{on} = 1940 A/µs di/dt_{off} = 780 A/µs dv/dt = 3650 V/µs	T_j = 25 °C		137		ns
		T_j = 150 °C		142		ns
		T_j = 175 °C		142		ns
t_r		T_j = 25 °C		35		ns
		T_j = 150 °C		41		ns
		T_j = 175 °C		44		ns
E_{on}		T_j = 25 °C		6.6		mJ
		T_j = 150 °C		9.3		mJ
		T_j = 175 °C		9.9		mJ
$t_{d(off)}$		T_j = 25 °C		250		ns
		T_j = 150 °C		340		ns
		T_j = 175 °C		365		ns
t_f		T_j = 25 °C		56		ns
		T_j = 150 °C		86		ns
		T_j = 175 °C		103		ns
E_{off}		T_j = 25 °C		4.7		mJ
		T_j = 150 °C		8.1		mJ
		T_j = 175 °C		8.8		mJ
$R_{th(j-s)}$	per IGBT, P12 (reference)			0.68		K/W
$R_{th(j-s)}$	per IGBT, HPTP			0.53		K/W

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	I_F = 75 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.17	2.49	V
		T_j = 150 °C		2.11	2.42	V
		T_j = 175 °C		1.96	2.27	V
V_{F0}	chiplevel	T_j = 25 °C		1.30	1.50	V
		T_j = 150 °C		0.90	1.10	V
		T_j = 175 °C		0.82	0.98	V
r_F	chiplevel	T_j = 25 °C		12	13	mΩ
		T_j = 150 °C		16	18	mΩ
		T_j = 175 °C		15	17	mΩ
I_{RRM}	I_F = 75 A V_{GE} = +15/-15 V V_{CC} = 600 V @ T_j = 150 °C: di/dt_{off} = 1930 A/µs	T_j = 25 °C		50		A
		T_j = 150 °C		67		A
		T_j = 175 °C		80		A
Q_{rr}		T_j = 25 °C		4		µC
		T_j = 150 °C		11.6		µC
		T_j = 175 °C		12.2		µC
E_{rr}		T_j = 25 °C		1.3		mJ
		T_j = 150 °C		4.3		mJ
		T_j = 175 °C		5.7		mJ
$R_{th(j-s)}$	per Diode, P12 (reference)			0.77		K/W
$R_{th(j-s)}$	per Diode, HPTP			0.62		K/W
Module						
L_{CE}				-		nH
M_s	to heat sink		2		2.5	Nm
w				82		g



MiniSKiiP® 3

Sixpack

SKiiP 37AC12T7V1

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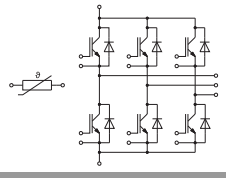
Characteristics					
Symbol	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
Temperature Sensor					
R_{100}	T_r=100°C (R_{25}=1000Ω)		1670 ± 3%		Ω
$R_{(T)}$	$R_{(T)}=1000\Omega[1+A(T-25°C)+B(T-25°C)^2]$, A = $7.635*10^{-3}{}^{o}C^{-1}$, B = $1.731*10^{-5}{}^{o}C^{-2}$				



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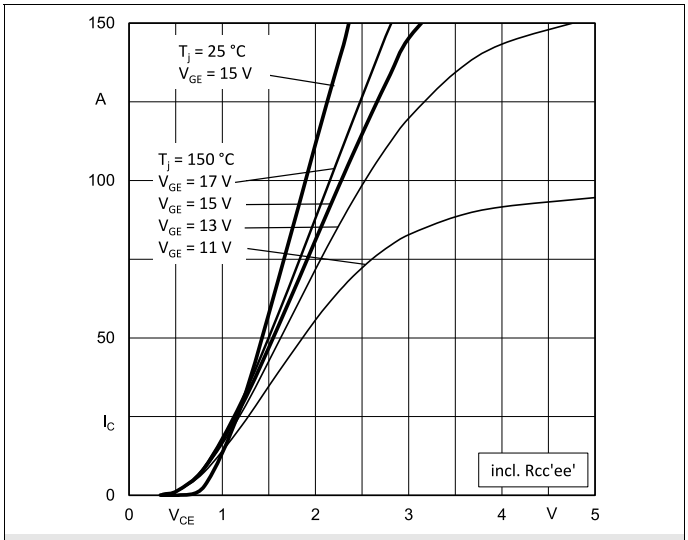


Fig. 1: Typ. output characteristic

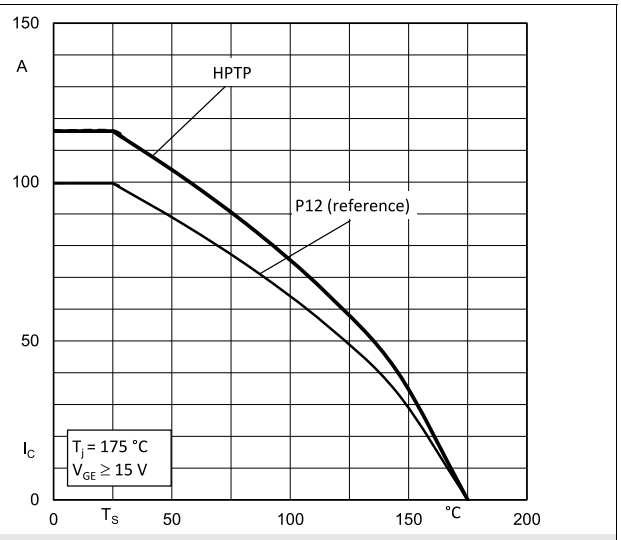


Fig. 2: Rated current vs. temperature $I_c = f(T_s)$

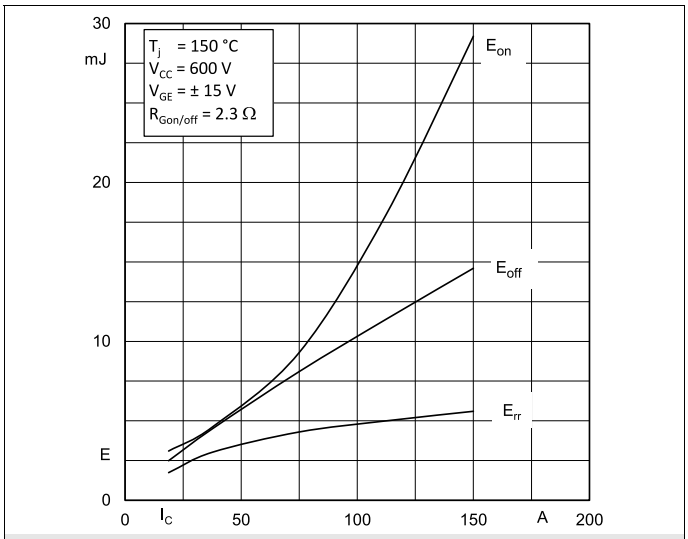


Fig. 3: Typ. turn-on /-off energy = f (I_C)

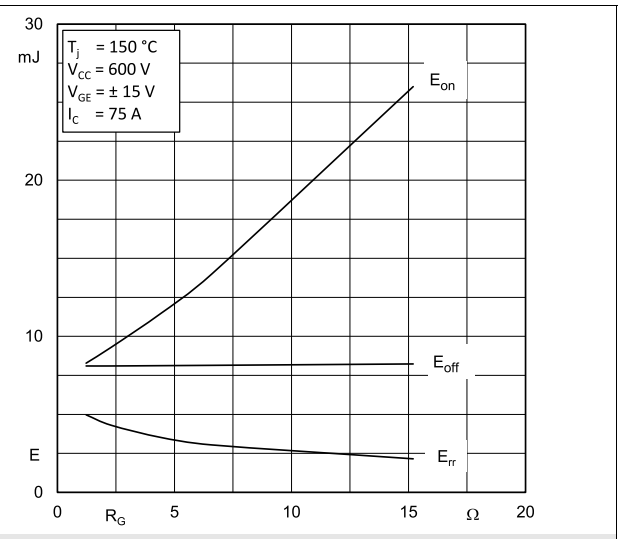


Fig. 4: Typ. turn-on /-off energy = f (R_G)

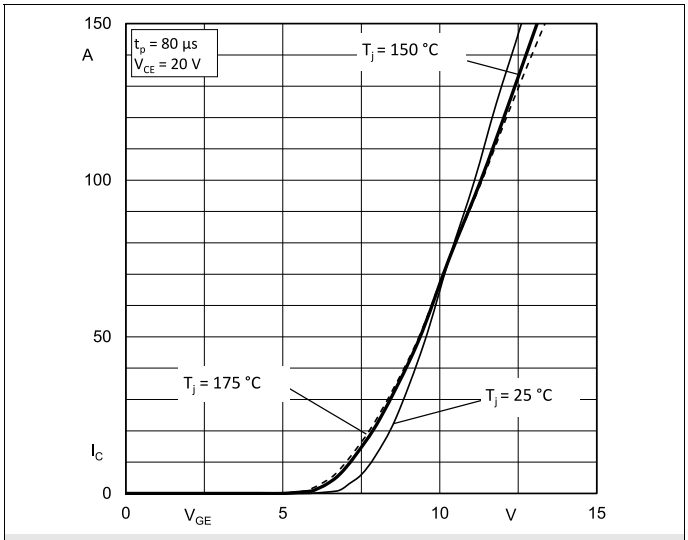


Fig. 5: Typ. transfer characteristic

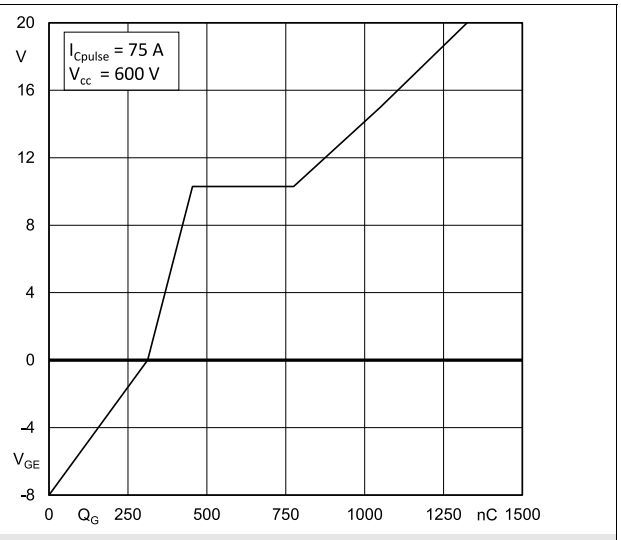


Fig. 6: Typ. gate charge characteristic

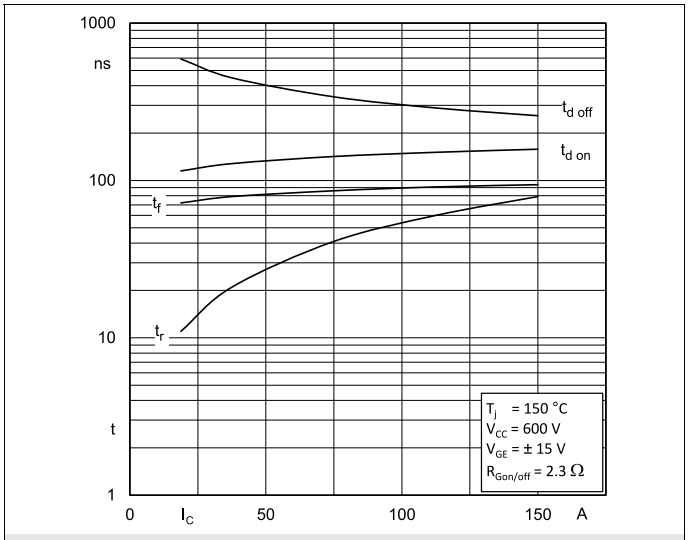


Fig. 7: Typ. switching times vs. I_C

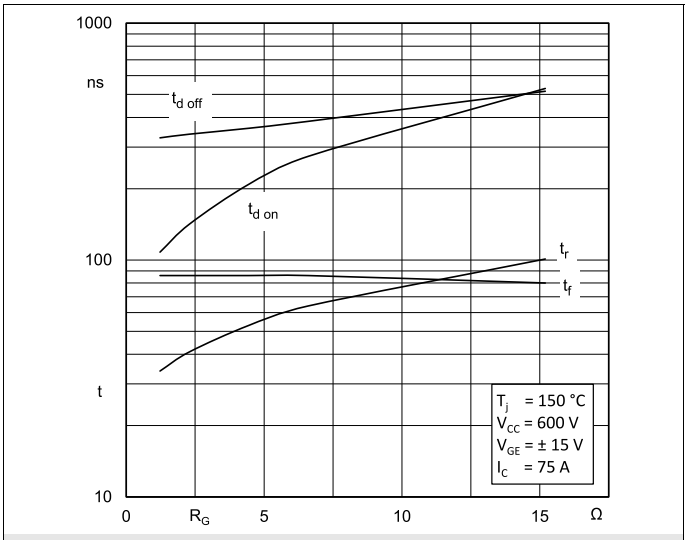


Fig. 8: Typ. switching times vs. gate resistor R_G

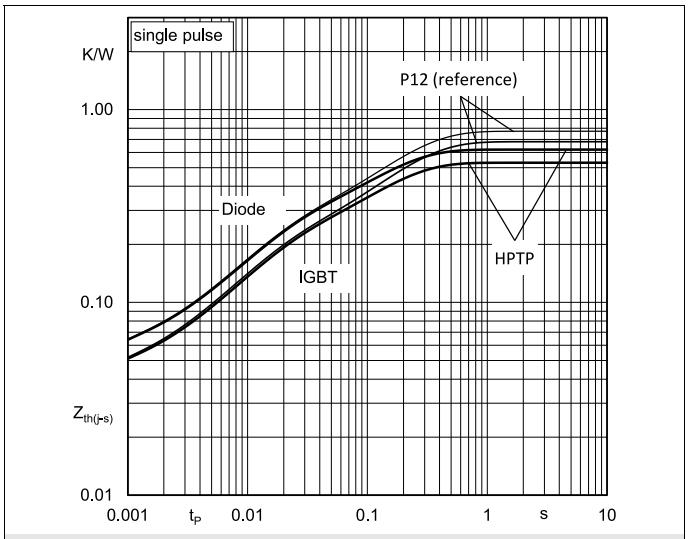


Fig. 9: Typ. transient thermal impedance

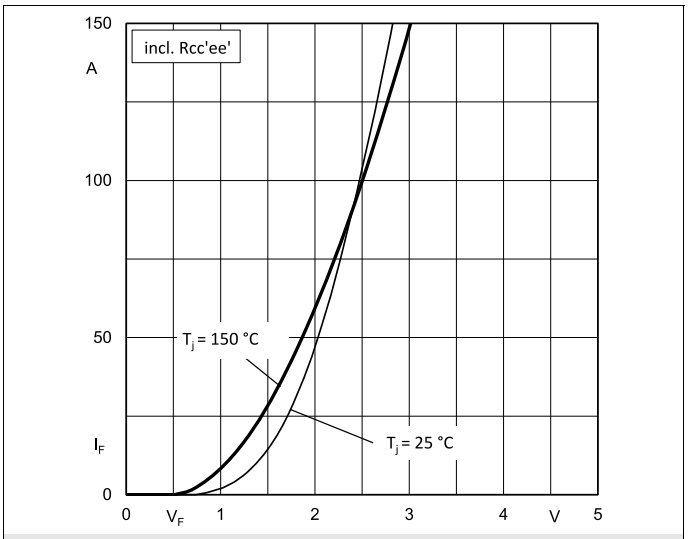


Fig. 10: Typ. CAL diode forward characteristic

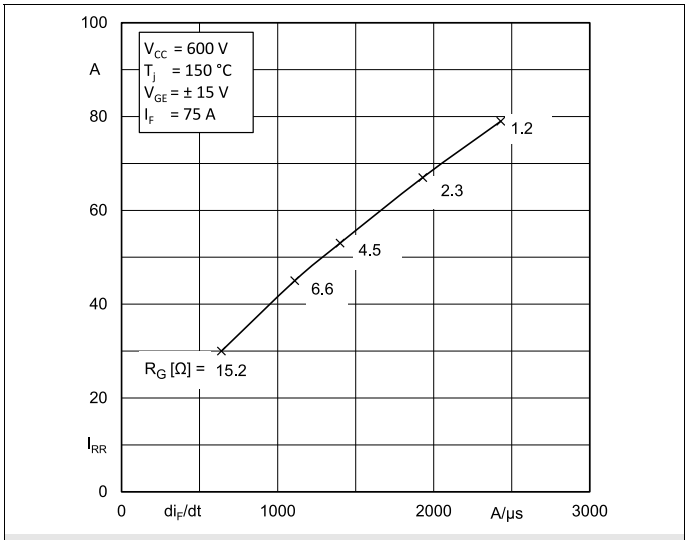


Fig. 11: Typ. CAL diode peak reverse recovery current

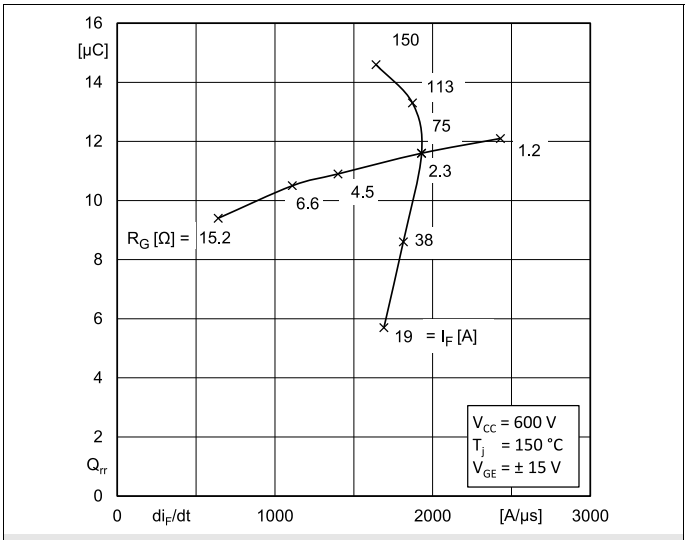
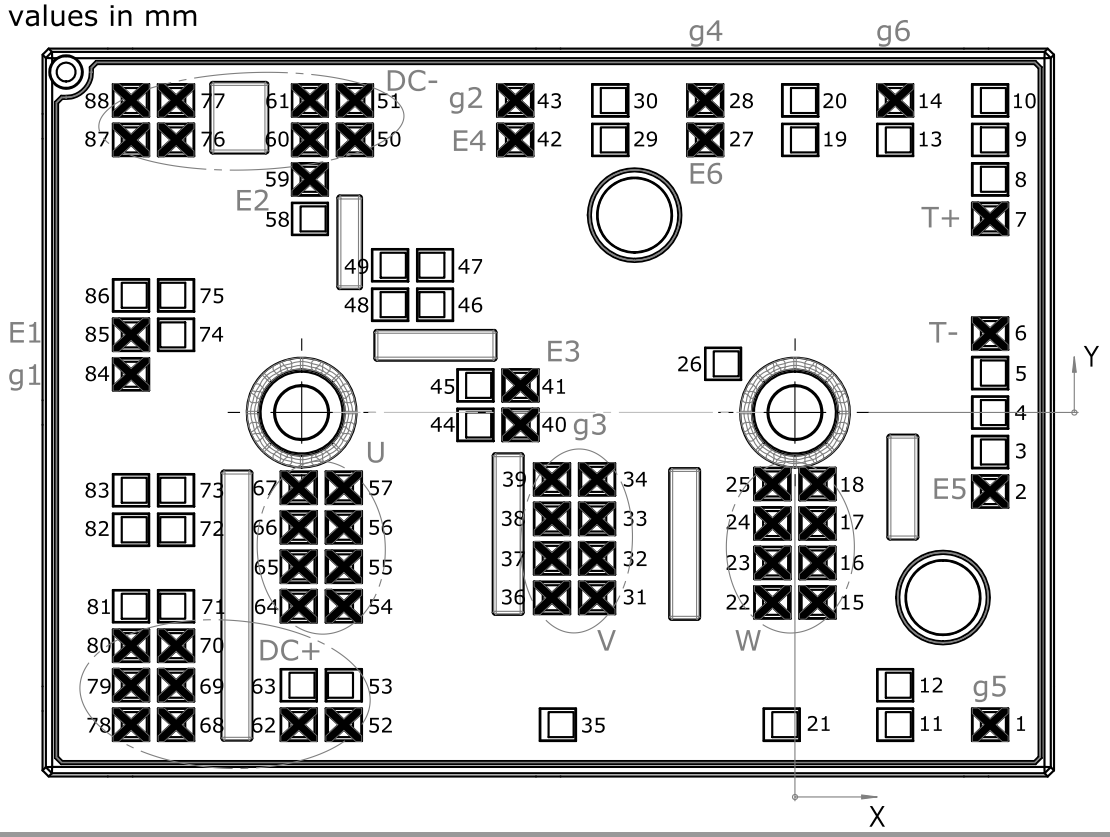


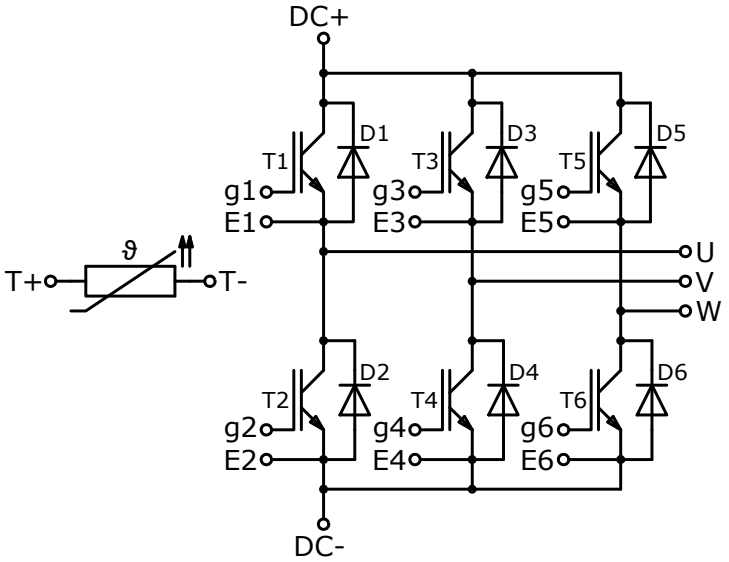
Fig. 12: Typ. CAL diode recovery charge

Pin out											
Pin	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*
1	15,83	-25,30	g5	31	-16,05	-15,02	V	61	-39,33	25,30	DC-
2	15,83	-6,40	E5	32	-16,05	-11,82	V	62	-40,23	-25,30	DC+
3	15,83	-3,20		33	-16,05	-8,62	V	63	-40,23	-22,10	
4	15,83	0		34	-16,05	-5,42	V	64	-40,23	-15,70	U
5	15,83	3,20		35	-19,23	-25,30		65	-40,23	-12,50	U
6	15,83	6,40	T-	36	-19,70	-15,02	V	66	-40,23	-9,30	U
7	15,83	15,70	T+	37	-19,70	-11,82	V	67	-40,23	-6,10	U
8	15,83	18,90		38	-19,70	-8,62	V	68	-50,18	-25,30	DC+
9	15,83	22,10		39	-19,70	-5,42	V	69	-50,18	-22,10	DC+
10	15,83	25,30		40	-22,26	-1,00	g3	70	-50,18	-18,90	DC+
11	8,13	-25,30		41	-22,26	2,20	E3	71	-50,18	-15,70	
12	8,13	-22,10		42	-22,68	22,10	E4	72	-50,18	-9,50	
13	8,13	22,10		43	-22,68	25,30	g2	73	-50,18	-6,30	
14	8,13	25,30	g6	44	-25,91	-1,00		74	-50,18	6,30	
15	1,83	-15,39	W	45	-25,91	2,20		75	-50,18	9,50	
16	1,83	-12,19	W	46	-29,18	8,74		76	-50,18	22,10	DC-
17	1,83	-8,99	W	47	-29,18	11,94		77	-50,18	25,30	DC-
18	1,83	-5,79	W	48	-32,83	8,74		78	-53,83	-25,30	DC+
19	0,43	22,10		49	-32,83	11,94		79	-53,83	-22,10	DC+
20	0,43	25,30		50	-35,68	22,10	DC-	80	-53,83	-18,90	DC+
21	-1,08	-25,30		51	-35,68	25,30	DC-	81	-53,83	-15,70	
22	-1,83	-15,39	W	52	-36,58	-25,30	DC+	82	-53,83	-9,50	
23	-1,83	-12,19	W	53	-36,58	-22,10		83	-53,83	-6,30	
24	-1,83	-8,99	W	54	-36,58	-15,70	U	84	-53,83	3,10	g1
25	-1,83	-5,79	W	55	-36,58	-12,50	U	85	-53,83	6,30	E1
26	-5,83	3,95		56	-36,58	-9,30	U	86	-53,83	9,50	
27	-7,28	22,10	E6	57	-36,58	-6,10	U	87	-53,83	22,10	DC-
28	-7,28	25,30	g4	58	-39,33	15,70		88	-53,83	25,30	DC-
29	-14,98	22,10		59	-39,33	18,90	E2				
30	-14,98	25,30		60	-39,33	22,10	DC-				

all values in mm



Pinout



Pinout

IMPORTANT INFORMATION AND WARNINGS

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

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