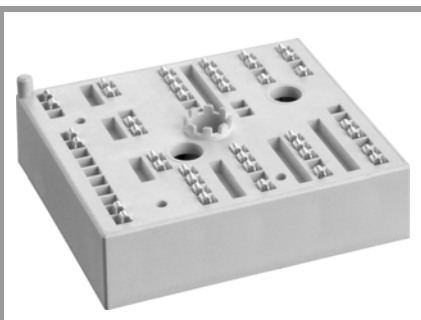


SKiiP 23AC12T7V1



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Features*

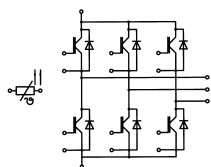
- 1200V Generation 7 IGBTs (T7)
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- Highly reliable spring technology for electrical connections
- UL recognized: File no. E63532

Remarks

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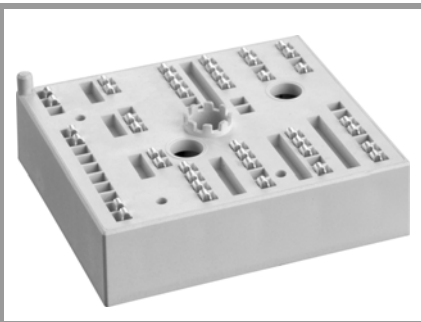
Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}	$T_j = 25\text{ °C}$		1200	V
I_C	$\lambda_{paste}=0.8\text{ W/(mK)}$	$T_s = 70\text{ °C}$	33	A
		$T_j = 175\text{ °C}$	27	A
I_C	$\lambda_{paste}=2.5\text{ W/(mK)}$	$T_s = 70\text{ °C}$	37	A
		$T_j = 175\text{ °C}$	30	A
I_{Chom}			25	A
I_{CRM}			50	A
V_{GES}			-20 ... 20	V
t_{psc}	$V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 175\text{ °C}$	7	μs
T_j			-40 ... 175	$^{\circ}\text{C}$
Inverse - Diode				
I_F	$\lambda_{paste}=0.8\text{ W/(mK)}$	$T_s = 70\text{ °C}$	24	A
		$T_j = 175\text{ °C}$	20	A
I_F	$\lambda_{paste}=2.5\text{ W/(mK)}$	$T_s = 70\text{ °C}$	27	A
		$T_j = 175\text{ °C}$	22	A
I_{FRM}			50	A
I_{FSM}	$t_p = 10\text{ ms, sin } 180^{\circ}, T_j = 150\text{ °C}$		100	A
T_j			-40 ... 175	$^{\circ}\text{C}$
Module				
$I_{t(RMS)}$	$T_{terminal} = 80\text{ °C}, 20\text{ A per spring}$		100	A
T_{stg}	module without TIM		-40 ... 125	$^{\circ}\text{C}$
V_{isol}	AC sinus 50 Hz, $t = 1\text{ min}$		2500	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverter - IGBT						
$V_{CE(sat)}$	$I_C = 25\text{ A}$	$T_j = 25\text{ °C}$	1.60	1.75		V
		$T_j = 150\text{ °C}$	1.82	1.96		V
		chiplevel $T_j = 175\text{ °C}$	1.86	2.00		V
V_{CE0}	chiplevel	$T_j = 25\text{ °C}$	0.90	1.00		V
		$T_j = 150\text{ °C}$	0.75	0.83		V
		$T_j = 175\text{ °C}$	0.72	0.80		V
r_{CE}	$V_{GE} = 15\text{ V}$ chiplevel	$T_j = 25\text{ °C}$	28	30		$\text{m}\Omega$
		$T_j = 150\text{ °C}$	43	45		$\text{m}\Omega$
		$T_j = 175\text{ °C}$	46	48		$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 0.53\text{ mA}$		5.15	5.8	6.45	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = 1200\text{ V}, T_j = 25\text{ °C}$				1	mA
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	4.80			nF
C_{oes}		$f = 1\text{ MHz}$	0.06			nF
C_{res}		$f = 1\text{ MHz}$	0.02			nF
Q_G	$V_{GE} = -8\text{ V} \dots +15\text{ V}$		350			nC
R_{Gint}	$T_j = 25\text{ °C}$		0			Ω



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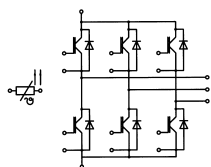
SKiiP 23AC12T7V1

Features*

- 1200V Generation 7 IGBTs (T7)
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
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Remarks

- Max. case temperature limited to $T_C=T_S=125\text{ °C}$
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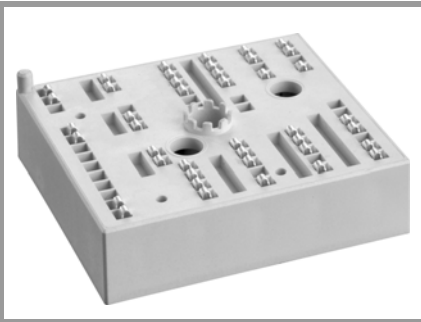


AC

Characteristics						
Symbol	Conditions	min.	typ.	max.	Unit	
Inverter - IGBT						
$t_{d(on)}$		$T_j = 25\text{ °C}$	40		ns	
		$T_j = 150\text{ °C}$	42		ns	
		$T_j = 175\text{ °C}$	43		ns	
t_r	$V_{CC} = 600\text{ V}$ $I_C = 25\text{ A}$	$T_j = 25\text{ °C}$	38		ns	
		$T_j = 150\text{ °C}$	44		ns	
		$T_j = 175\text{ °C}$	47		ns	
E_{on}	$R_{G, on} = 12.8\ \Omega$ $R_{G, off} = 12.8\ \Omega$ $V_{GE} = +15/-15\text{ V}$	$T_j = 25\text{ °C}$	2.2		mJ	
		$T_j = 150\text{ °C}$	3.1		mJ	
		$T_j = 175\text{ °C}$	3.3		mJ	
$t_{d(off)}$		$T_j = 25\text{ °C}$	218		ns	
		@ $T_j = 150\text{ °C}$: $di/dt_{on} = 590\text{ A}/\mu\text{s}$	$T_j = 150\text{ °C}$	308		ns
		$T_j = 175\text{ °C}$	333		ns	
t_f	$di/dt_{off} = 280\text{ A}/\mu\text{s}$ $dv/dt = 3600\text{ V}/\mu\text{s}$	$T_j = 25\text{ °C}$	46		ns	
		$T_j = 150\text{ °C}$	71		ns	
		$T_j = 175\text{ °C}$	87		ns	
E_{off}		$T_j = 25\text{ °C}$	1.6		mJ	
		$T_j = 150\text{ °C}$	2.8		mJ	
		$T_j = 175\text{ °C}$	3		mJ	
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 0.8\text{ W}/(\text{mK})$		1.32		K/W	
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 2.5\text{ W}/(\text{mK})$		1.11		K/W	

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverse - Diode					
$V_F = V_{EC}$	$I_F = 25\text{ A}$ $V_{GE} = 0\text{ V}$ chiplevel	$T_j = 25\text{ °C}$	2.41	2.74	V
		$T_j = 150\text{ °C}$	2.45	2.79	V
		$T_j = 175\text{ °C}$	2.30	2.62	V
V_{F0}	chiplevel	$T_j = 25\text{ °C}$	1.30	1.50	V
		$T_j = 150\text{ °C}$	0.90	1.10	V
		$T_j = 175\text{ °C}$	0.82	0.98	V
r_F	chiplevel	$T_j = 25\text{ °C}$	44	50	m Ω
		$T_j = 150\text{ °C}$	62	68	m Ω
		$T_j = 175\text{ °C}$	59	66	m Ω
I_{RRM}	$I_F = 25\text{ A}$ $V_{GE} = +15/-15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_j = 25\text{ °C}$	15		A
		$T_j = 150\text{ °C}$	20		A
		$T_j = 175\text{ °C}$	23		A
Q_{rr}	@ $T_j = 150\text{ °C}$: $di/dt_{off} = 610\text{ A}/\mu\text{s}$	$T_j = 25\text{ °C}$	1.5		μC
		$T_j = 150\text{ °C}$	3.7		μC
		$T_j = 175\text{ °C}$	4.1		μC
E_{rr}		$T_j = 25\text{ °C}$	0.45		mJ
		$T_j = 150\text{ °C}$	1.4		mJ
		$T_j = 175\text{ °C}$	1.8		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 0.8\text{ W}/(\text{mK})$		1.68		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 2.5\text{ W}/(\text{mK})$		1.44		K/W
Module					
L_{CE}			-		nH
M_s	to heat sink	2		2.5	Nm
w			55		g

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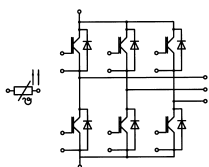
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Temperature Sensor					
R_{100}	$T_r=100\text{ °C}$ ($R_{25}=1000\Omega$)		$1670 \pm 3\%$		Ω
$R_{(T)}$	$R_{(T)}=1000\Omega[1+A(T-25\text{ °C})+B(T-25\text{ °C})^2]$ $A = 7.635 \cdot 10^{-3}\text{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



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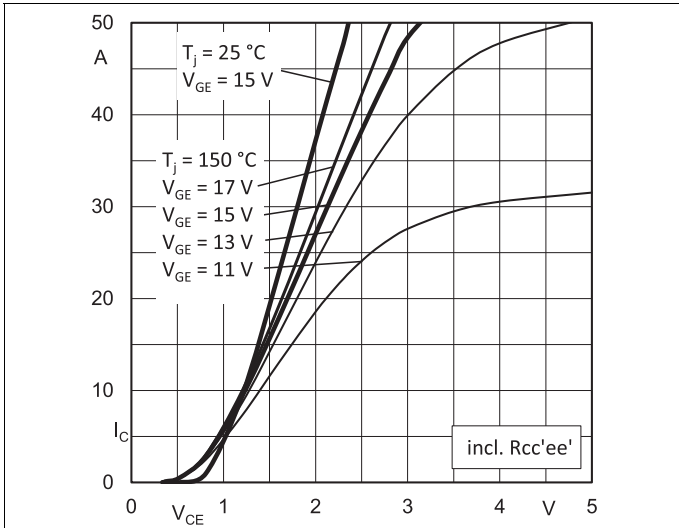


Fig. 1: Typ. output characteristic

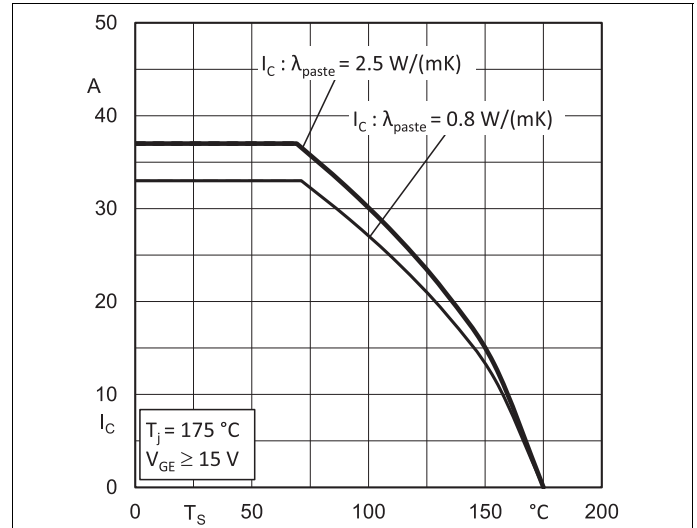


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

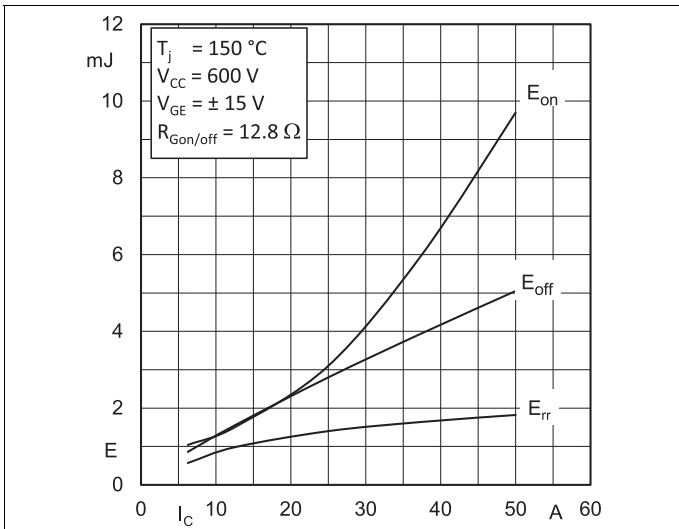


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

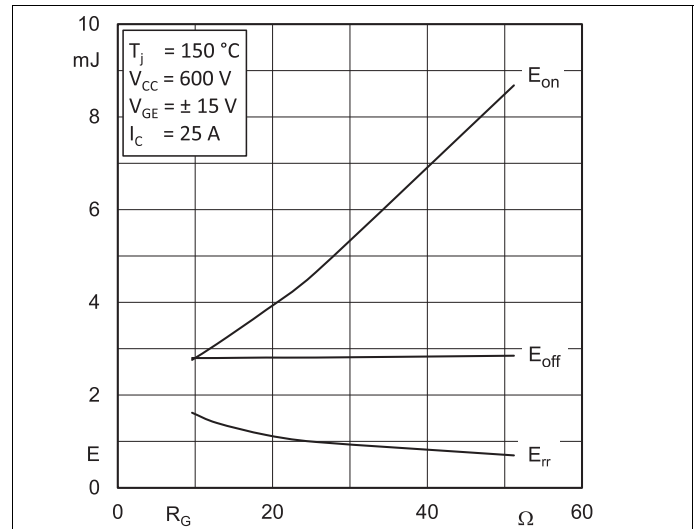


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

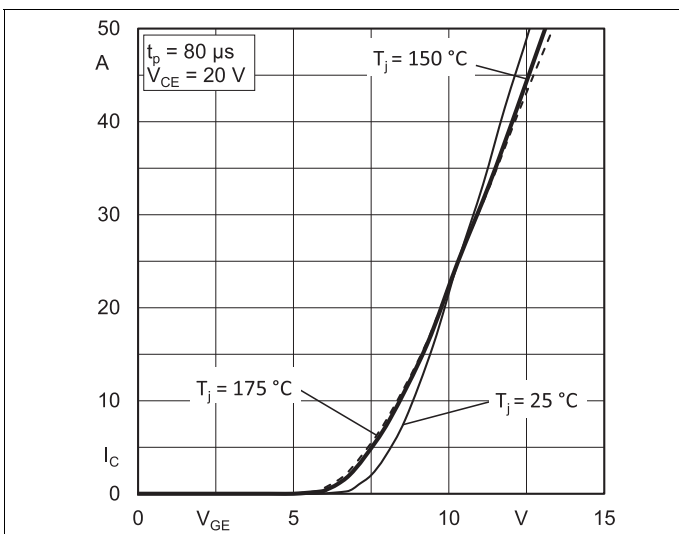


Fig. 5: Typ. transfer characteristic

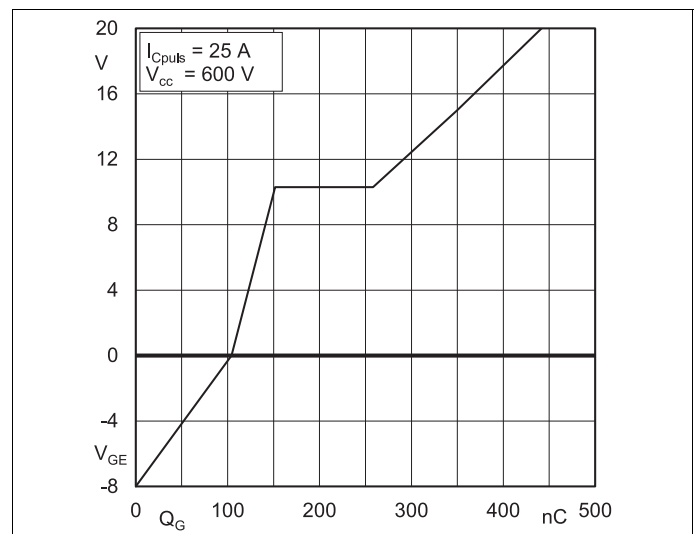


Fig. 6: Typ. gate charge characteristic

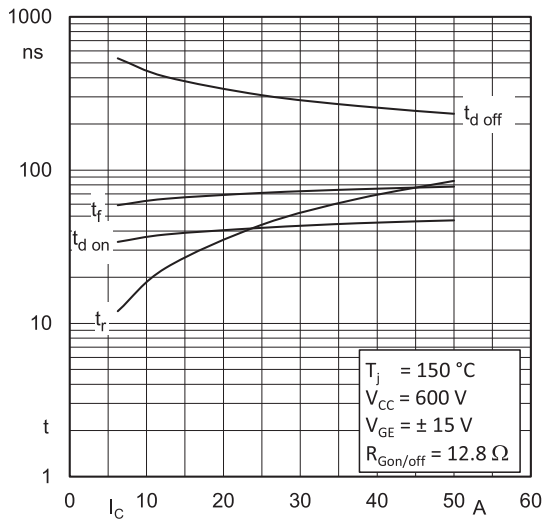


Fig. 7: Typ. switching times vs. I_C

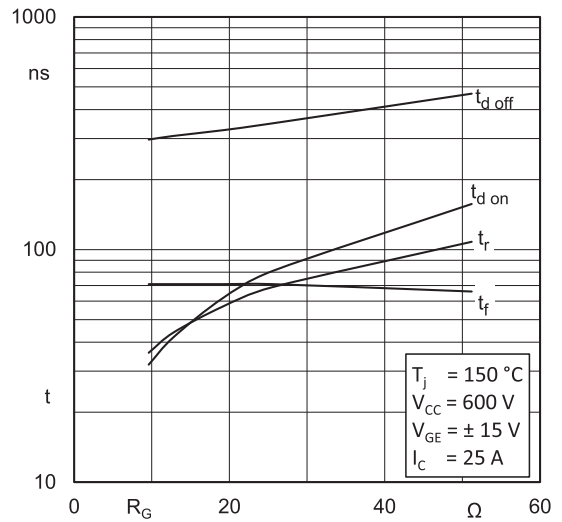


Fig. 8: Typ. switching times vs. gate resistor R_G

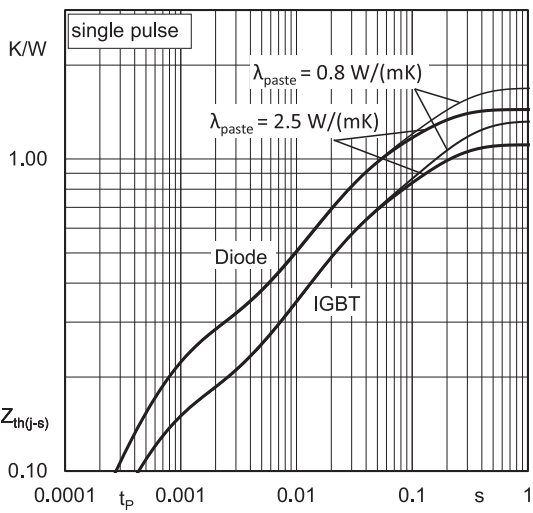


Fig. 9: Transient thermal impedance

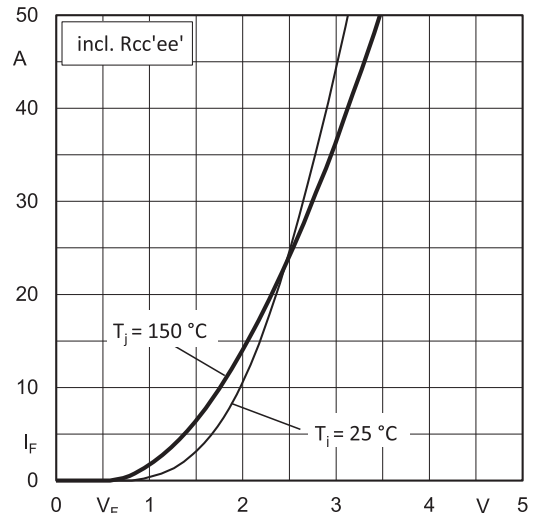


Fig. 10: Typ. CAL diode forward characteristic

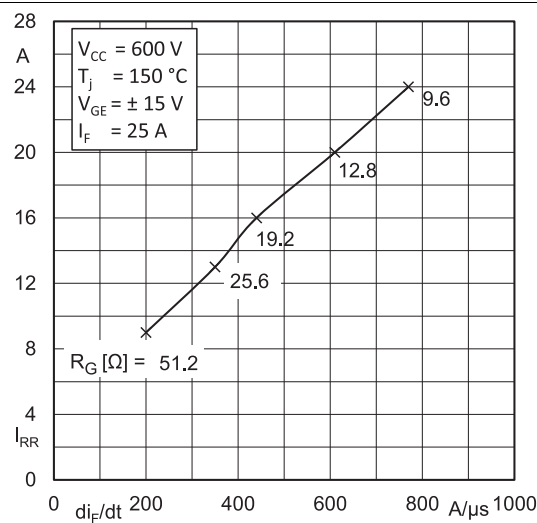


Fig. 11: Typ. CAL diode peak reverse recovery current

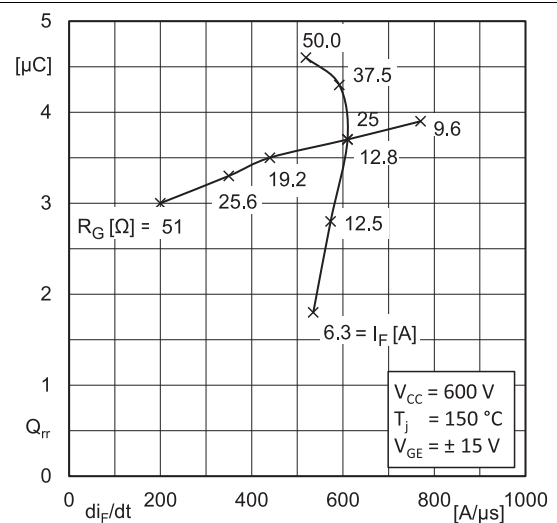
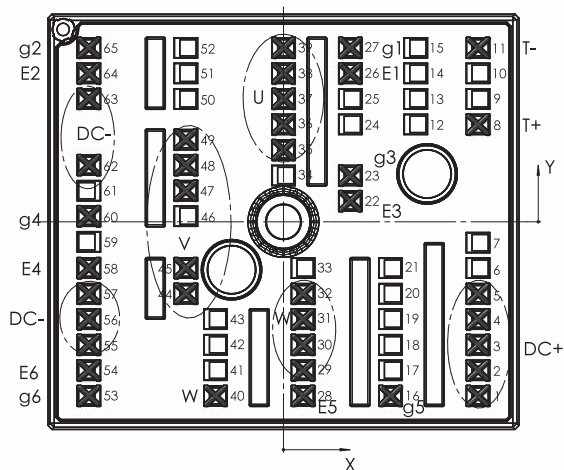


Fig. 12: Typ. CAL diode recovery charge

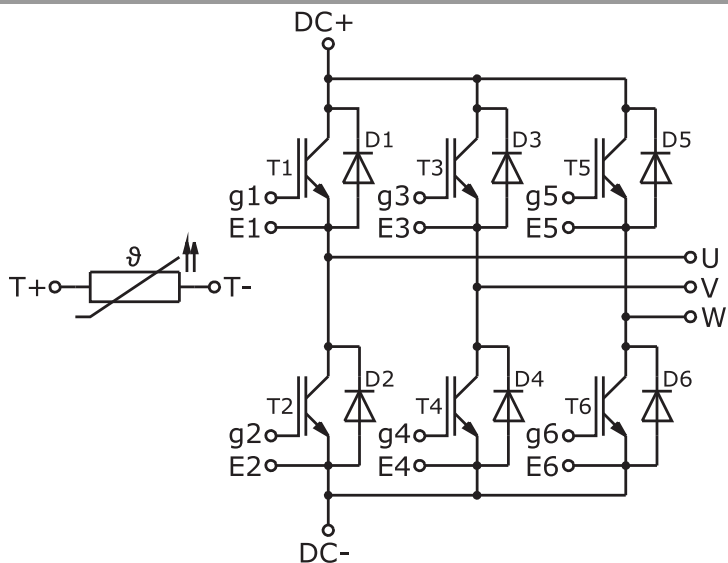
SKiiP 23AC12T7V1

Pin out											
Pin	X	Y	Function	Pin	X	Y	Function	Pin	X	Y	Function
1	24,38	-21,8	DC+	23	8,38	5,8	g3	45	-12,23	-5,8	V
2	24,38	-18,6	DC+	24				46			
3	24,38	-15,4	DC+	25				47	-12,23	3,9	V
4	24,38	-12,2	DC+	26	8,38	18,6	E1	48	-12,23	7,1	V
5	24,38	-9	DC+	27	8,38	21,8	g1	49	-12,23	10,3	V
6				28	2,46	-21,8	E5	50			
7				29	2,46	-18,6	W	51			
8	24,38	12,2	T+	30	2,46	-15,4	W	52			
9				31	2,46	-12,2	W	53	-24,38	-21,8	g6
10				32	2,46	-9	W	54	-24,38	-18,6	E6
11	24,38	21,8	T-	33				55	-24,38	-15,4	DC-
12				34				56	-24,38	-12,2	DC-
13				35	0,03	9	U	57	-24,38	-9	DC-
14				36	0,03	12,2	U	58	-24,38	-5,8	E4
15				37	0,03	15,4	U	59			
16	13,42	-21,8	g5	38	0,03	18,6	U	60	-24,38	0,7	g4
17				39	0,03	21,8	U	61			
18				40	-8,51	-21,8	W	62	-24,38	7,1	DC-
19				41				63	-24,38	15,4	DC-
20				42				64	-24,38	18,6	E2
21				43				65	-24,38	21,8	g2
22	8,38	2,6	E3	44	-12,23	-9	V				

all values in mm



Pinout and Dimensions



Pinout

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

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