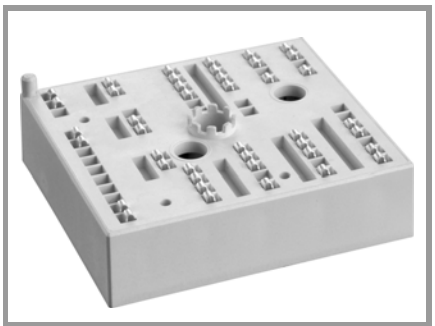
SKiiP 24ACC12T4V1



MiniSKiiP® 2

Twin 6-pack

SKiiP 24ACC12T4V1

Features*

- Trench 4 IGBTs
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532

Typical Applications

- 4Q inverters

Remarks

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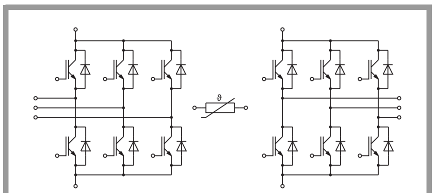
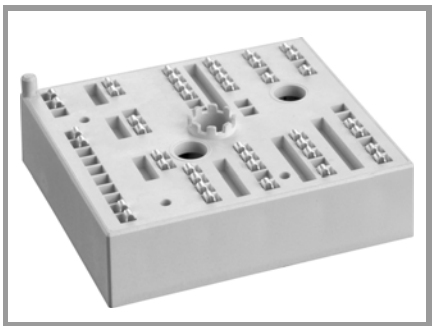


ACC

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
IGBT 1 - 6				
V_{CES}				V
I_C	λ_{paste}=0.8 W/(mK)	T_s = 25 °C		A
	T_j = 175 °C	T_s = 70 °C		A
I_C	λ_{paste}=2.5 W/(mK)			A
		T_s = 70 °C		A
I_{Cnom}				A
I_{CRM}				A
V_{GES}				V
t_{psc}	V_{GE} ≤ V V_{CES} ≤ V		n.c.	µs
T_j				°C
IGBT 7 - 12				
V_{CES}	T_j = 25 °C		1200	V
I_C	λ_{paste}=0.8 W/(mK)	T_s = 25 °C	38	A
	T_j = 175 °C	T_s = 70 °C	31	A
I_C	λ_{paste}=2.5 W/(mK)	T_s = 25 °C	42	A
	T_j = 175 °C	T_s = 70 °C	35	A
I_{Cnom}			25	A
I_{CRM}			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
Diode 1 - 6				
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}				A
I_{FSM}	, ,			A
T_j			175	°C
Diode 7 - 12				
V_{RRM}	T_j = 25 °C		1200	V
I_F	λ_{paste}=0.8 W/(mK)	T_s = 25 °C	31	A
	T_j = 175 °C	T_s = 70 °C	25	A
I_F	λ_{paste}=2.5 W/(mK)	T_s = 25 °C	34	A
	T_j = 175 °C	T_s = 70 °C	27	A
I_{FRM}			50	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		100	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	20 A per spring		40	A
T_{stg}	module without TIM		-40 ... 125	°C
V_{isol}	AC sinus 50 Hz, 1 min		2500	V



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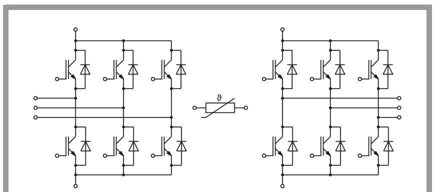

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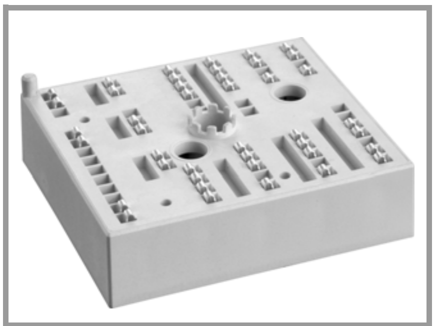
Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
IGBT 1 - 6						
$V_{CE(sat)}$						V
						V
V_{CE0}	chiplevel					V
						V
r_{CE}						mΩ
						mΩ
$V_{GE(th)}$	,					V
I_{CES}					0.3	mA
						mA
C_{ies}						nF
C_{oes}						nF
C_{res}						nF
Q_G						nC
R_{Gint}				0		Ω
$t_{d(on)}$						ns
t_r						ns
E_{on}						mJ
$t_{d(off)}$						ns
t_f						ns
E_{off}	V_{GE} = +15/-15 V					mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)					K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)					K/W
IGBT 7 - 12						
$V_{CE(sat)}$	I_C = 25 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.10	V
		T_j = 150 °C		2.25	2.45	V
V_{CE0}	chiplevel	T_j = 25 °C		0.80	0.90	V
		T_j = 150 °C		0.70	0.80	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		42	48	mΩ
		T_j = 150 °C		62	66	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE} V, I_C = 1 mA		5.3	5.8	6.3	V
I_{CES}	V_{GE} = 0 V V_{CE} = 1200 V	T_j = 25 °C			1	mA
				-		mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		1.45		nF
C_{oes}		f = 1 MHz		0.12		nF
C_{res}		f = 1 MHz		0.05		nF
Q_G	V_{GE} = - 8 V...+ 15 V			142		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 25 A $R_{G\,on}$ = 27 Ω $R_{G\,off}$ = 27 Ω di/dt_{on} = 780 A/µs di/dt_{off} = 360 A/µs dv/dt = 3400 V/µs V_{GE} = +15/-15 V L_s = 21 nH	T_j = 150 °C		39		ns
t_r		T_j = 150 °C		32		ns
E_{on}		T_j = 150 °C		3.2		mJ
$t_{d(off)}$		T_j = 150 °C		333		ns
t_f		T_j = 150 °C		91		ns
E_{off}		T_j = 150 °C		3		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			1.13		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			0.94		K/W



MiniSKiiP® 2

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SKiiP 24ACC12T4V1

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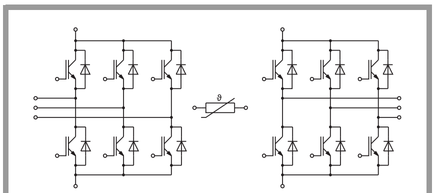


ACC

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Diode 1 - 6						
$V_F = V_{EC}$	I_F = 25 A V_{GE} = 0 V	T_j = 25 °C				V
						V
V_{F0}	chiplevel	T_j = 25 °C				V
						V
r_F	chiplevel	T_j = 25 °C		0.00	0.00	mΩ
				0.00	0.00	mΩ
I_{RRM}	V_{GE} = -15 V	T_j = 150 °C		t.b.d.		A
Q_{rr}		T_j = 150 °C		t.b.d.		µC
E_{rr}		T_j = 150 °C		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)					K/W
Diode 7 - 12						
$V_F = V_{EC}$	I_F = 25 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.41	2.74	V
		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 di/dt_{off} = 732 A/µs V_{GE} = -15 V V_{CC} = 600 V	T_j = 150 °C		23		A
Q_{rr}		T_j = 150 °C		3.8		µC
E_{rr}		T_j = 150 °C		1.4		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			1.6		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			1.37		K/W
Module						
L_{CE}				-		nH
M_s	to heat sink		2		2.5	Nm
w				55		g
Temperature Sensor						
R_{100}	T_r=100°C (R_{25}=1000Ω)			1670 ± 3%		Ω
$R_{(T)}$	$R_{(T)}=1000\Omega[1+A(T-25°C)+B(T-25°C)^2]$, $A = 7.635 \cdot 10^{-3}$°C^{-1} °C^{-1}, $B = 1.731 \cdot 10^{-5}$°C^{-2} °C^{-2}					

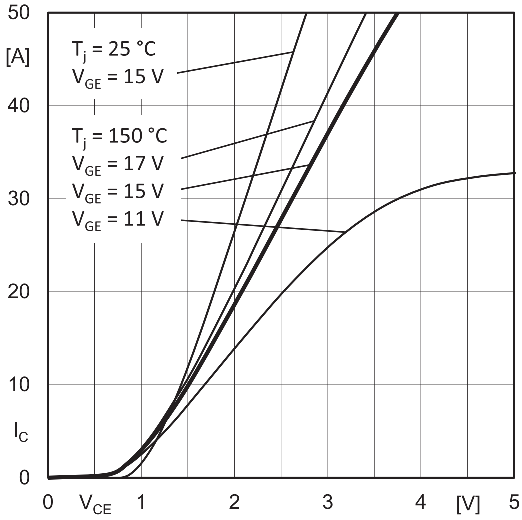


Fig. 1: Typ. output characteristic

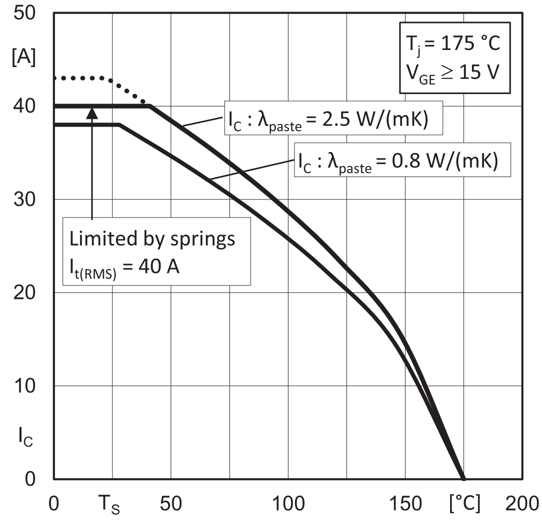


Fig. 2: Rated current vs. temperature Ic = f (Ts)

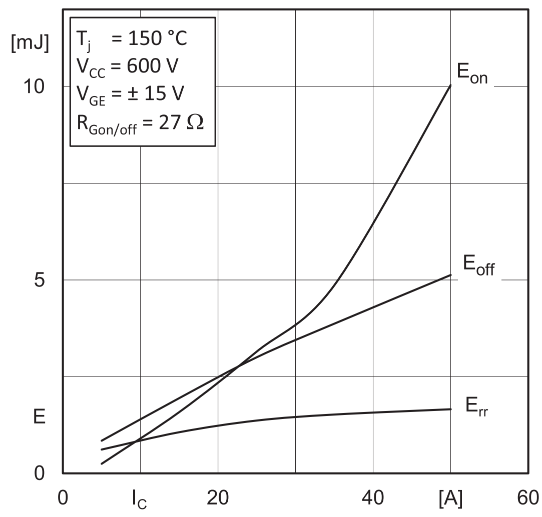


Fig. 3: Typ. turn-on /-off energy = f (I_C)

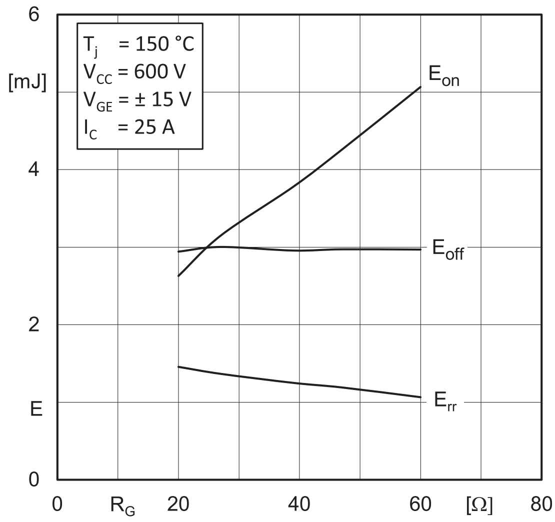


Fig. 4: Typ. turn-on /-off energy = f (R_G)

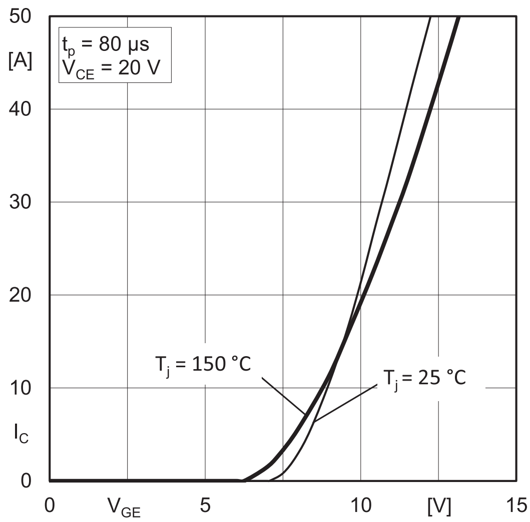


Fig. 5: Typ. transfer characteristic

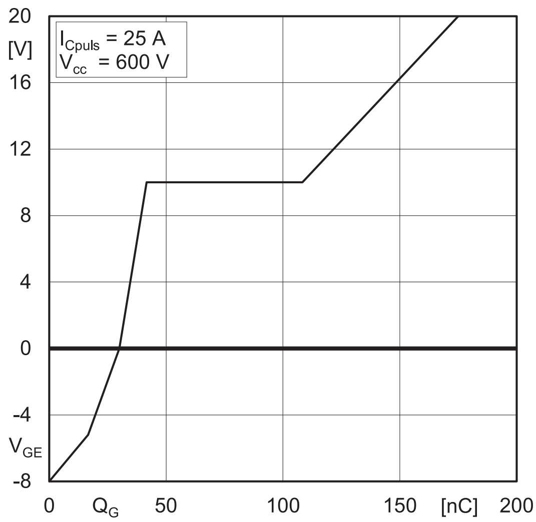


Fig. 6: Typ. gate charge characteristic

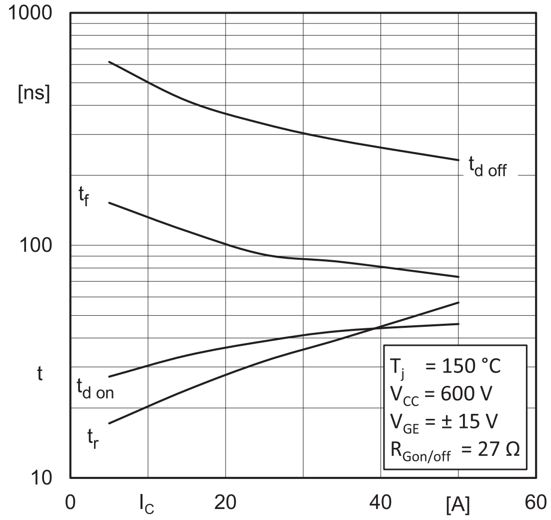


Fig. 7: Typ. switching times vs. I_C

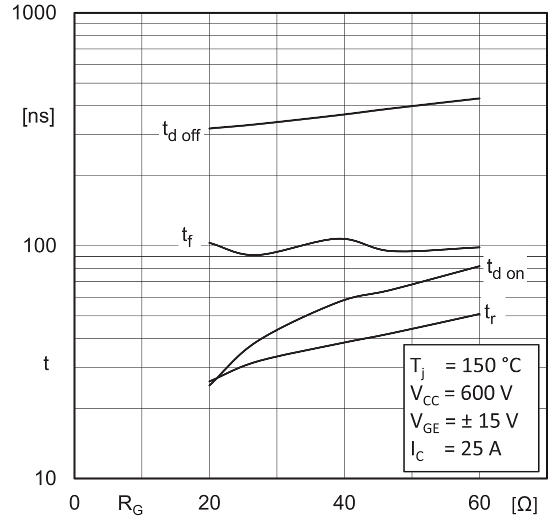


Fig. 8: Typ. switching times vs. gate resistor R_G

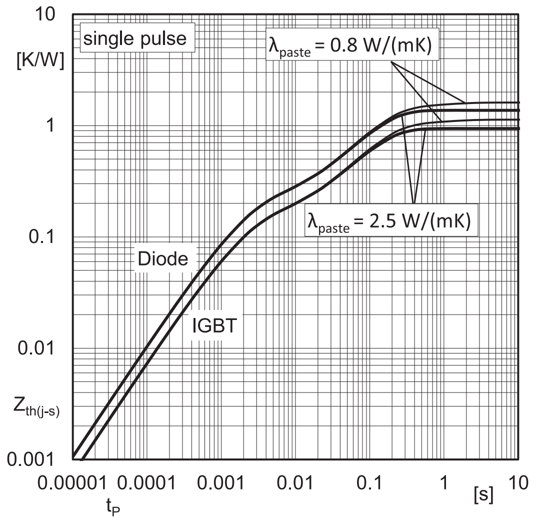


Fig. 9: Typ. transient thermal impedance

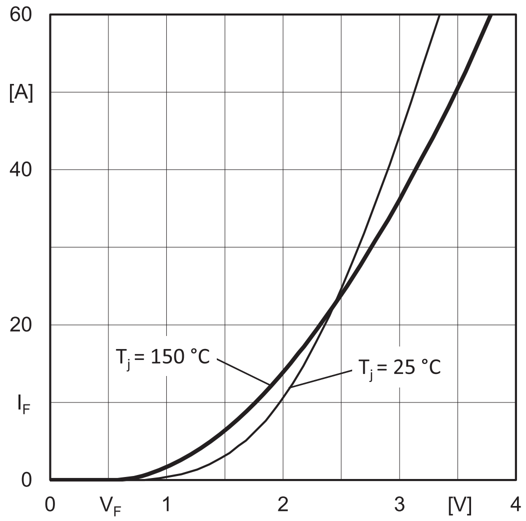


Fig. 10: Typ. CAL diode forward characteristic

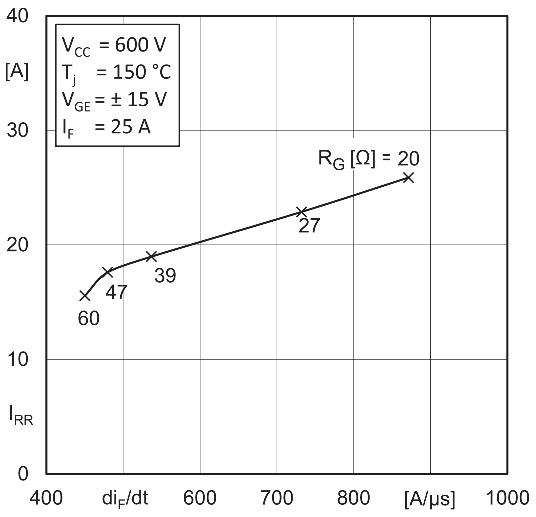


Fig. 11: Typ. CAL diode peak reverse recovery current

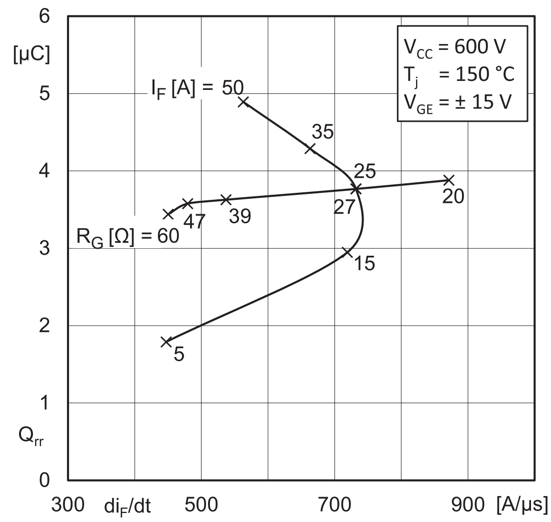
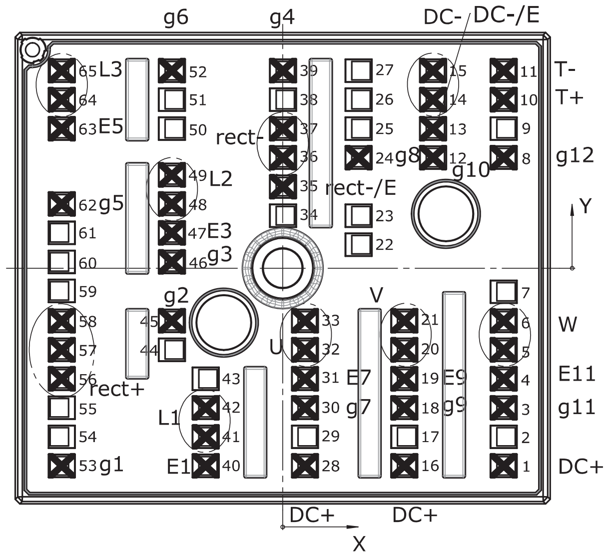


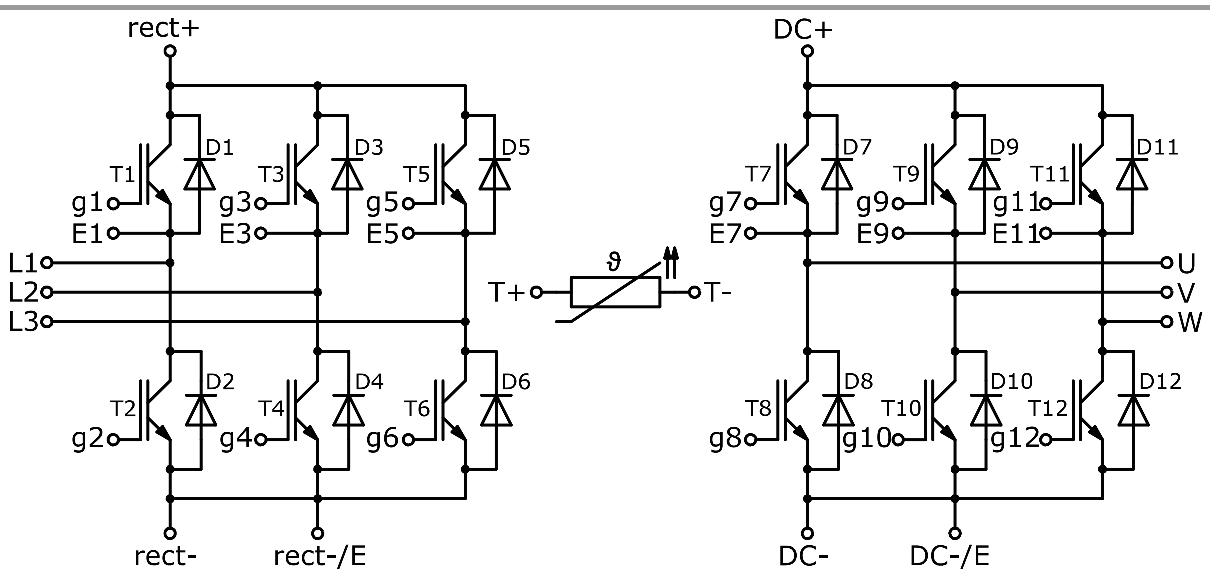
Fig. 12: Typ. CAL diode recovery charge

Pin out											
Pin	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*
1	24,38	-21,80	DC+	23	8,38	5,80		45	-12,23	-5,80	g2
2	24,38	-18,60		24	8,38	12,20	g8	46	-12,23	0,70	g3
3	24,38	-15,40	g11	25	8,38	15,40		47	-12,23	3,90	E3
4	24,38	-12,20	E11	26	8,38	18,60		48	-12,23	7,10	L2
5	24,38	-9,00	W	27	8,38	21,80		49	-12,23	10,30	L2
6	24,38	-5,80	W	28	2,46	-21,80	DC+	50	-12,23	15,40	
7	24,38	-2,60		29	2,46	-18,60		51	-12,23	18,60	
8	24,38	12,20	g12	30	2,46	-15,40	g7	52	-12,23	21,80	g6
9	24,38	15,40		31	2,46	-12,20	E7	53	-24,38	-21,80	g1
10	24,38	18,60	T+	32	2,46	-9,00	U	54	-24,38	-18,60	
11	24,38	21,80	T-	33	2,46	-5,80	U	55	-24,38	-15,40	
12	16,58	12,20	g10	34	0,03	5,80		56	-24,38	-12,20	rect+
13	16,58	15,40	DC-/E	35	0,03	9,00	rect-/E	57	-24,38	-9,00	rect+
14	16,58	18,60	DC-	36	0,03	12,20	rect-	58	-24,38	-5,80	rect+
15	16,58	21,80	DC-	37	0,03	15,40	rect-	59	-24,38	-2,50	
16	13,42	-21,80	DC+	38	0,03	18,60		60	-24,38	0,70	
17	13,42	-18,60		39	0,03	21,80	g4	61	-24,38	3,90	
18	13,42	-15,40	g9	40	-8,51	-21,80	E1	62	-24,38	7,10	g5
19	13,42	-12,20	E9	41	-8,51	-18,60	L1	63	-24,38	15,40	E5
20	13,42	-9,00	V	42	-8,51	-15,40	L1	64	-24,38	18,60	L3
21	13,42	-5,80	V	43	-8,51	-12,20		65	-24,38	21,80	L3
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.

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