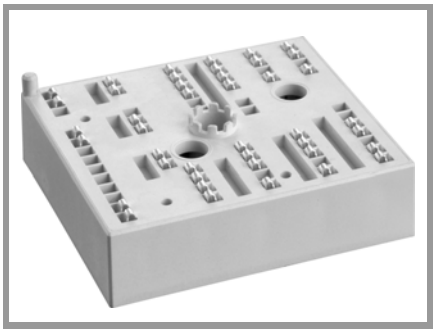
SKiiP 22ACC12T7V22



MiniSKiiP® 2

Twelvepack Open Emitter

SKiiP 22ACC12T7V22

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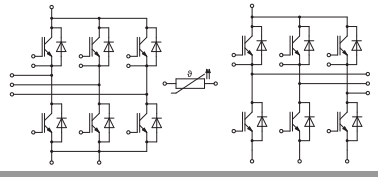

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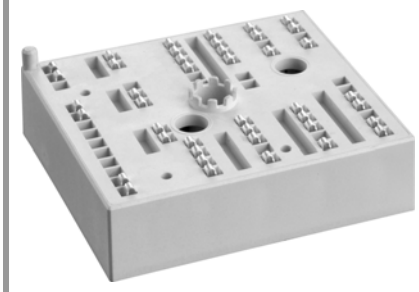
Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
IGBT 1 - 6				
V_{CES}	T_j = 25 °C		1200	V
I_C	λ_{paste}=0.8 W/(mK)	T_s = 70 °C	23	A
	T_j = 175 °C	T_s = 100 °C	19	A
I_C	λ_{paste}=2.5 W/(mK)	T_s = 70 °C	26	A
	T_j = 175 °C	T_s = 100 °C	21	A
I_{Cnom}			15	A
I_{CRM}			30	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
IGBT 7 - 12				
V_{CES}	T_j = 25 °C		1200	V
I_C	λ_{paste}=0.8 W/(mK)	T_s = 70 °C	56	A
	T_j = 175 °C	T_s = 100 °C	46	A
I_C	λ_{paste}=2.5 W/(mK)	T_s = 70 °C	64	A
	T_j = 175 °C	T_s = 100 °C	52	A
I_{Cnom}			50	A
I_{CRM}			100	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
Diode 1 - 6				
V_{RRM}	T_j = 25 °C		1600	V
I_F	λ_{paste}=0.8 W/(mK)	T_s = 70 °C	44	A
	T_j = 175 °C	T_s = 100 °C	35	A
I_F	λ_{paste}=2.5 W/(mK)	T_s = 70 °C	49	A
	T_j = 175 °C	T_s = 100 °C	39	A
I_{FRM}				A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		200	A
T_j			-40 ... 175	°C
Diode 7 - 12				
V_{RRM}	T_j = 25 °C		1200	V
I_F	λ_{paste}=0.8 W/(mK)	T_s = 70 °C	24	A
	T_j = 175 °C	T_s = 100 °C	20	A
I_F	λ_{paste}=2.5 W/(mK)	T_s = 70 °C	27	A
	T_j = 175 °C	T_s = 100 °C	22	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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SKiiP 22ACC12T7V22

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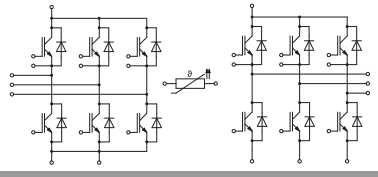

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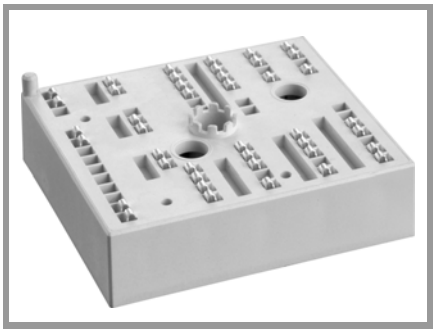
Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT 1 - 6						
$V_{CE(sat)}$	I_C = 15 A, V_{GE} = 15 V, chiplevel	T_j = 25 °C		1.60	1.75	V
		T_j = 150 °C		1.78	1.93	V
		T_j = 175 °C		1.82	1.97	V
V_{CE0}	chiplevel	T_j = 25 °C		1.00	1.05	V
		T_j = 150 °C		0.80	0.85	V
		T_j = 175 °C		0.76	0.81	V
r_{CE}	V_{GE} = 15 V, chiplevel	T_j = 25 °C		40	47	mΩ
		T_j = 150 °C		65	72	mΩ
		T_j = 175 °C		70	77	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE} V, I_C = 0.33 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		2.80		nF
C_{oes}		f = 1 MHz		0.04		nF
C_{res}		f = 1 MHz		0.01		nF
Q_G	V_{GE} = - 8V ... + 15 V			210		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 600 V, I_C = 15 A, V_{GE} = +15/-15 V, @ T_j = 150 °C:	T_j = 25 °C		-		ns
		T_j = 150 °C		-		ns
		T_j = 175 °C		-		ns
t_r		T_j = 25 °C		-		ns
		T_j = 150 °C		-		ns
		T_j = 175 °C		-		ns
E_{on}		T_j = 25 °C		-		mJ
		T_j = 150 °C		-		mJ
		T_j = 175 °C		-		mJ
$t_{d(off)}$		T_j = 25 °C		-		ns
		T_j = 150 °C		-		ns
		T_j = 175 °C		-		ns
t_f		T_j = 25 °C		-		ns
		T_j = 150 °C		-		ns
		T_j = 175 °C		-		ns
E_{off}		T_j = 25 °C		-		mJ
		T_j = 150 °C		-		mJ
		T_j = 175 °C		-		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			1.71		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			1.46		K/W
IGBT 7 - 12						
$V_{CE(sat)}$	I_C = 50 A, V_{GE} = 15 V, chiplevel	T_j = 25 °C		1.55	1.70	V
		T_j = 150 °C		1.73	1.88	V
		T_j = 175		1.77	1.92	V
V_{CE0}	chiplevel	T_j = 25 °C		1.00	1.05	V
		T_j = 150 °C		0.80	0.85	V
		T_j = 175 °C		0.75	0.80	V
r_{CE}	V_{GE} = 15 V, chiplevel	T_j = 25 °C		11	13	mΩ
		T_j = 150 °C		19	21	mΩ
		T_j = 175 °C		20	22	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE} V, I_C = 1.27 mA		5.15	5.8	6.45	V
I_{CES}	V_{GE} = 0 V, V_{CE} = 1200 V, 25				1	mA
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V	f = 1 MHz		10.00		nF
C_{oes}		f = 1 MHz		0.13		nF
C_{res}		f = 1 MHz		0.04		nF



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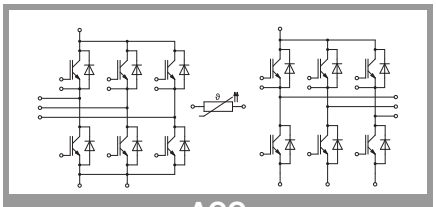
Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
IGBT 7 - 12						
Q_G	V_{GE} = - 8V ... + 15 V			700		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 50 A $R_{G\ on}$ = 6.2 Ω $R_{G\ off}$ = 6.2 Ω V_{GE} = +15/-15 V @ T_j = 150 °C: di/dt_{on} = 1020 A/µs di/dt_{off} = 460 A/µs	T_j = 25 °C		31		ns
		T_j = 150 °C		39		ns
		T_j = 175 °C		38		ns
t_r		T_j = 25 °C		36		ns
		T_j = 150 °C		41		ns
		T_j = 175 °C		43		ns
E_{on}		T_j = 25 °C		4.1		mJ
		T_j = 150 °C		5.3		mJ
		T_j = 175 °C		5.51		mJ
$t_{d(off)}$		T_j = 25 °C		243		ns
		T_j = 150 °C		355		ns
		T_j = 175 °C		349		ns
t_f		T_j = 25 °C		52		ns
		T_j = 150 °C		93		ns
		T_j = 175 °C		91		ns
E_{off}		T_j = 25 °C		3		mJ
		T_j = 150 °C		5.63		mJ
		T_j = 175		6.18		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			0.91		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			0.74		K/W
Diode 1 - 6						
$V_F = V_{EC}$	I_F = 8 A V_{GE} = 0 V chiplevel	T_j = 25 °C		0.97	1.20	V
		T_j = 150 °C		0.84	1.07	V
		T_j = 175 °C		0.82	1.05	V
V_{F0}	chiplevel	T_j = 25 °C		0.89	1.09	V
		T_j = 150 °C		0.73	0.92	V
		T_j = 175 °C		0.69	0.88	V
r_F	chiplevel	T_j = 25 °C		10	14	mΩ
		T_j = 150 °C		14	19	mΩ
		T_j = 175 °C		16	21	mΩ
I_{RRM}	I_F = 8 A V_{GE} = -15 V V_{CC} = 600 V @ T_j = 150 °C:	T_j = 25 °C		-		A
		T_j = 150 °C		-		A
		T_j = 175 °C		-		A
Q_{rr}		T_j = 25 °C		-		µC
		T_j = 150 °C		-		µC
		T_j = 175 °C		-		µC
E_{rr}		T_j = 25 °C		-		mJ
		T_j = 150 °C		-		mJ
		T_j = 175 °C		-		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			1.31		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			1.11		K/W



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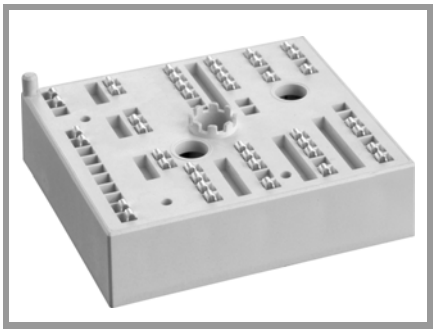

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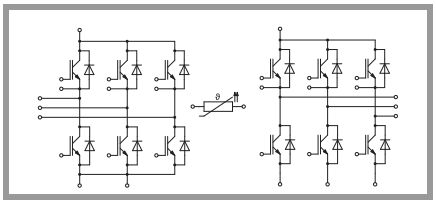
Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Diode 7 - 12						
$V_F = V_{EC}$	I_F = 25 A	T_j = 25 °C		2.41	2.74	V
	V_{GE} = 0 V	T_j = 150 °C		2.45	2.79	V
	chiplevel	T_j = 175 °C		2.30	2.62	V
V_{F0}		T_j = 25 °C		1.30	1.50	V
	chiplevel	T_j = 150 °C		0.90	1.10	V
		T_j = 175 °C		0.82	0.98	V
r_F		T_j = 25 °C		44	50	mΩ
	chiplevel	T_j = 150 °C		62	68	mΩ
		T_j = 175 °C		59	66	mΩ
I_{RRM}		T_j = 25 °C		20		A
		T_j = 150 °C		26		A
	I_F = 50 A	T_j = 175 °C		42		A
Q_{rr}	V_{GE} = -15 V	T_j = 25 °C		3		µC
	V_{CC} = 600 V	T_j = 150 °C		6.85		µC
	@ T_j = 150 °C:	T_j = 175 °C		7.23		µC
E_{rr}	di/dt_{off} = 1030 A/µs	T_j = 25 °C		0.78		mJ
		T_j = 150 °C		3		mJ
		T_j = 175 °C		3.45		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			1.68		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			1.44		K/W
Module						
L_{CE}				-		nH
M_s	to heat sink		2		2.5	Nm
w					55	g
Temperature Sensor						
R_{100}	T_c=100°C (R_{25}=5 kΩ)			493 ± 5%		Ω
$B_{100/125}$	$R_2=R_1*\exp[B(1/T_1-1/T_2)]$, T(K), ,					K

Creepage and clearance distance (spring to spring) between temperature sensor and phase DC- = 1mm (CTI 600)



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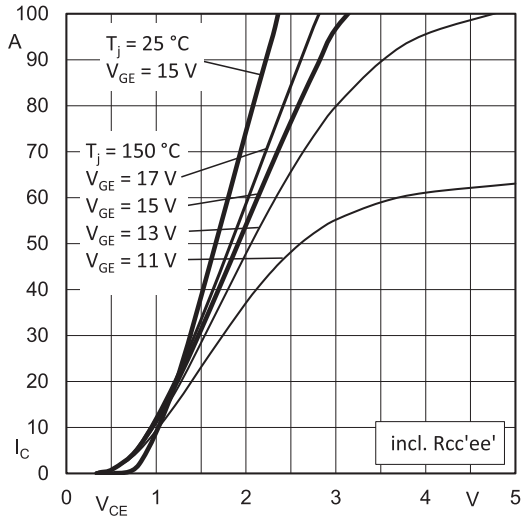


Fig. 1: Typ. output characteristic

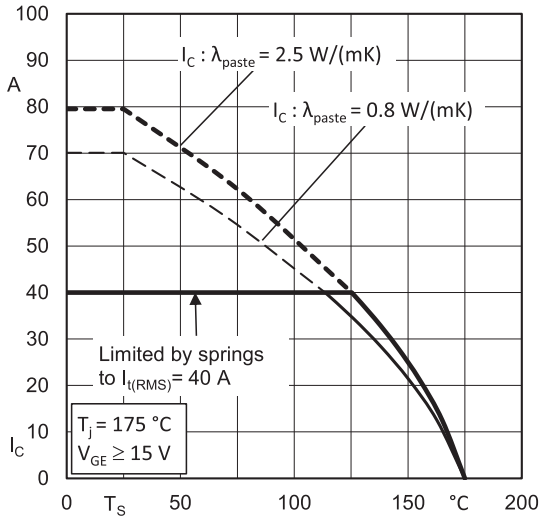


Fig. 2: Rated current vs. temperature Ic = f (Ts)

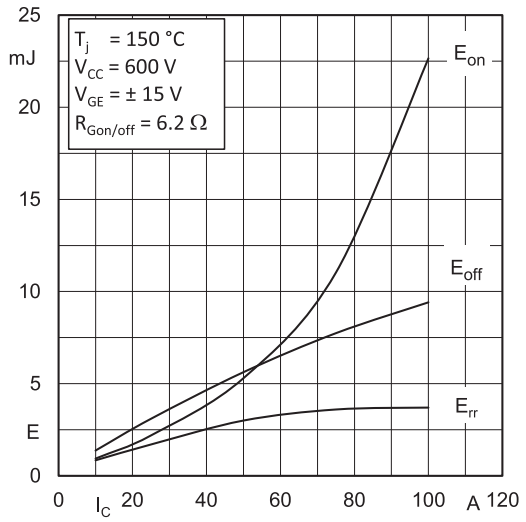


Fig. 3: Typ. turn-on /-off energy = f (I_C)

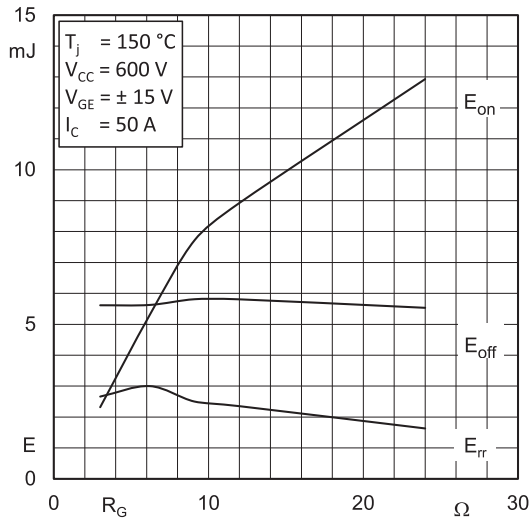


Fig. 4: Typ. turn-on /-off energy = f (R_G)

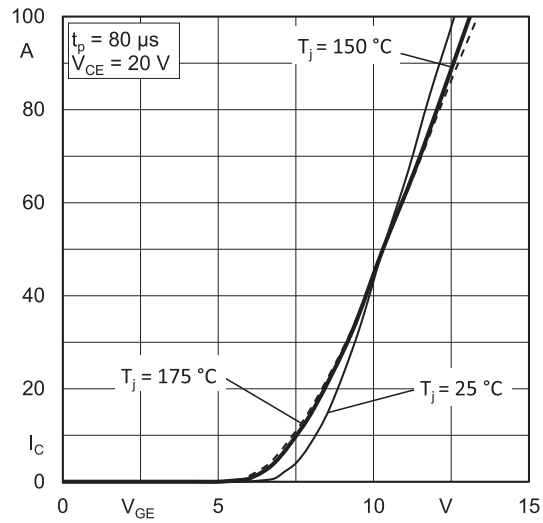


Fig. 5: Typ. transfer characteristic

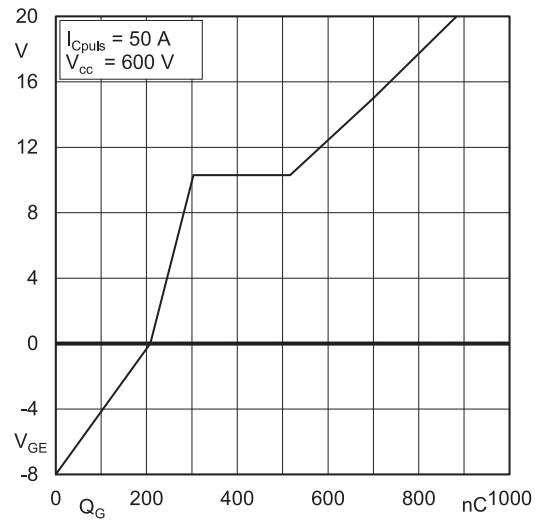


Fig. 6: Typ. gate charge characteristic

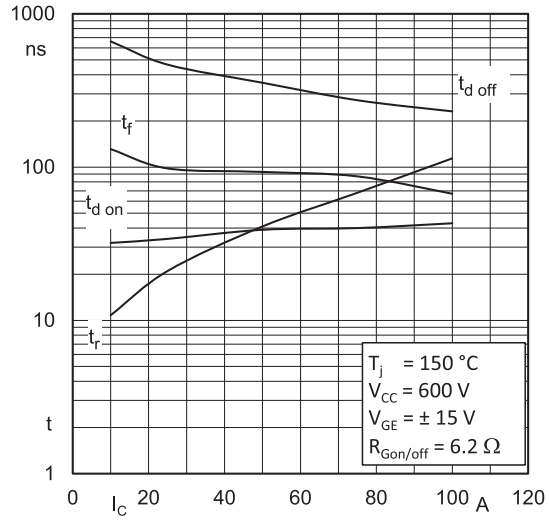


Fig. 7: Typ. switching times vs. I_C

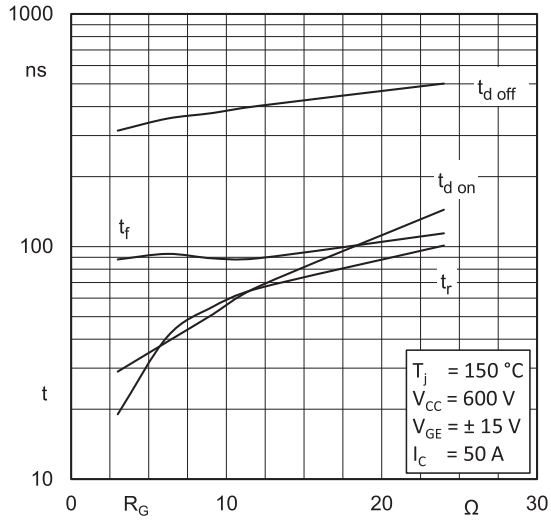


Fig. 8: Typ. switching times vs. gate resistor R_G

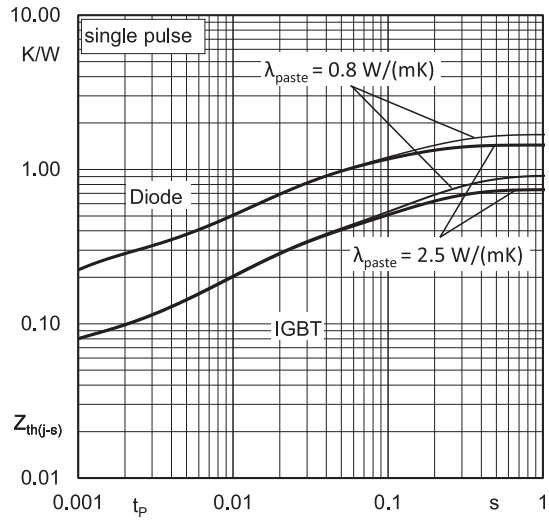


Fig. 9: Typ. transient thermal impedance

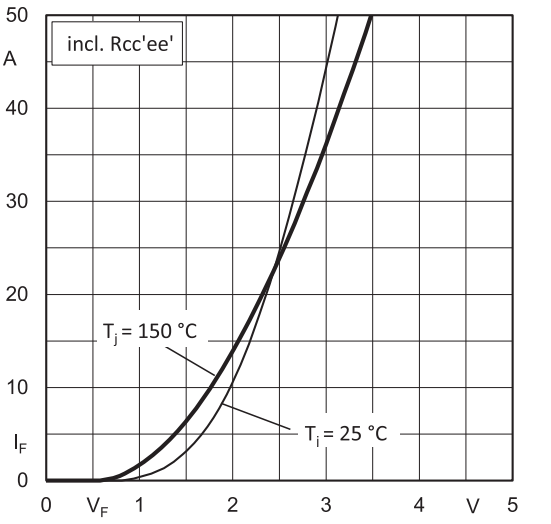


Fig. 10: Typ. CAL diode forward characteristic

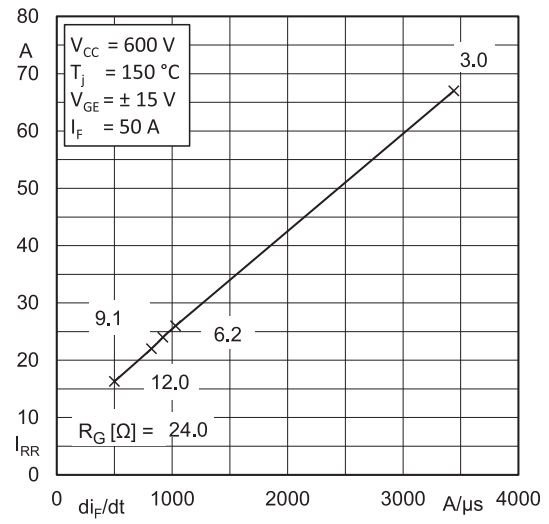


Fig. 11: Typ. CAL diode peak reverse recovery current

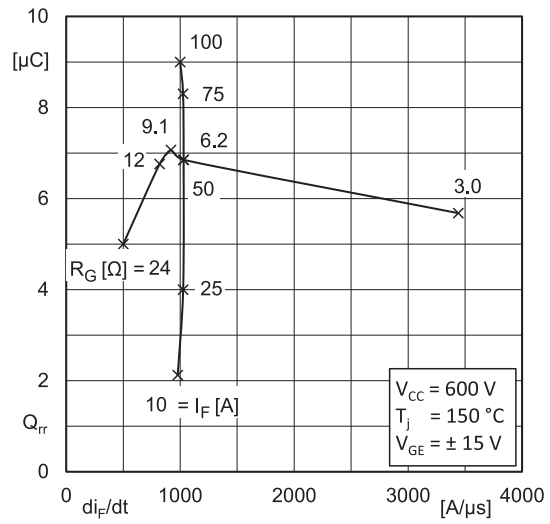
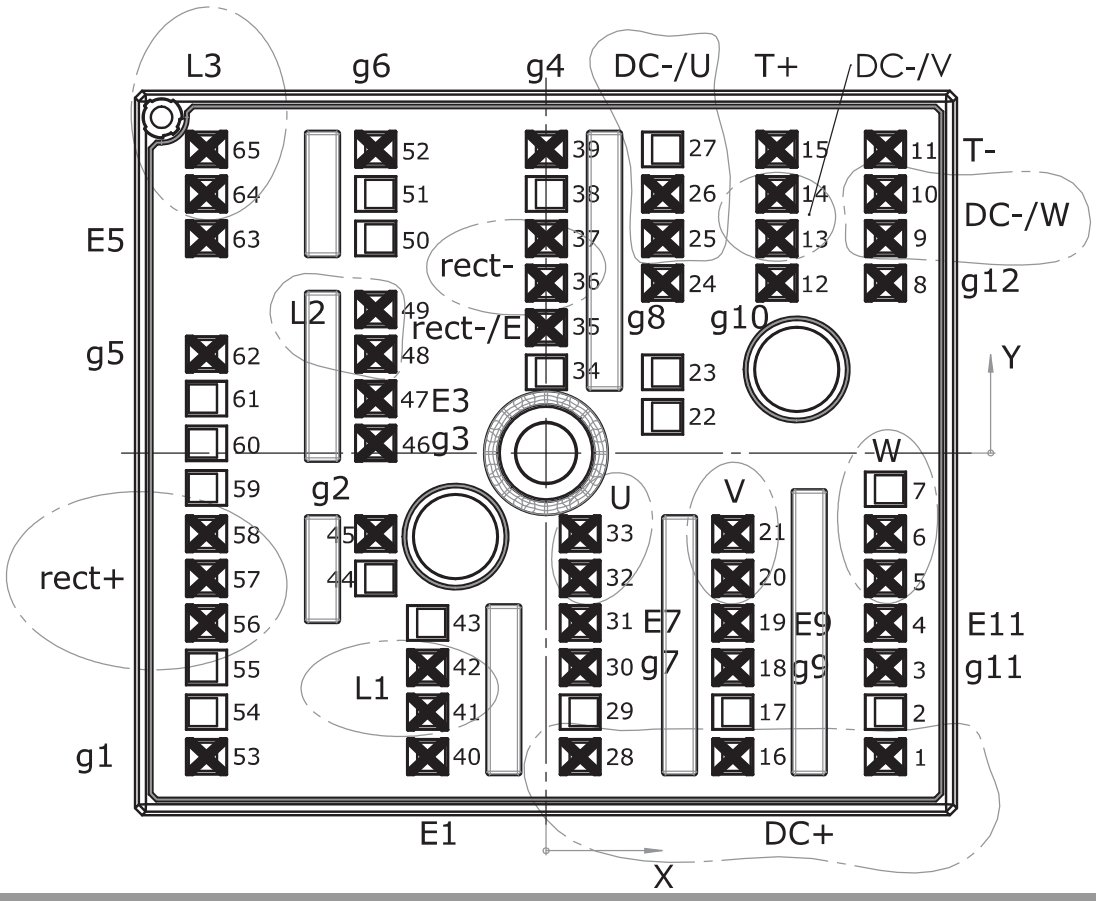


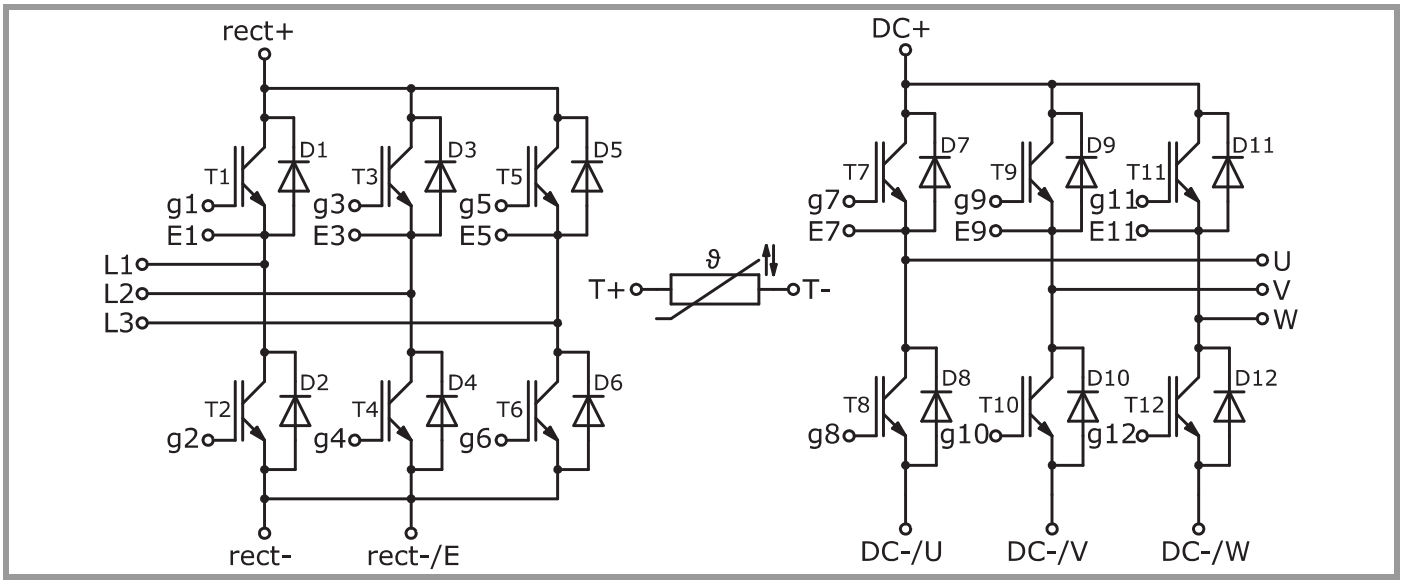
Fig. 12: Typ. CAL diode recovery charge

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	DC-/U	47	-12,23	3,90	E3
4	24,38	-12,20	E11	26	8,38	18,60	DC-/U	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	DC-/W	31	2,46	-12,20	E7	53	-24,38	-21,80	g1
10	24,38	18,60	DC-/W	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-/V	35	0,03	9,00	rect-/E	57	-24,38	-9,00	rect+
14	16,58	18,60	DC-/V	36	0,03	12,20	rect-	58	-24,38	-5,80	rect+
15	16,58	21,80	T+	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



Pinout

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

***IMPORTANT INFORMATION AND WARNINGS**

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