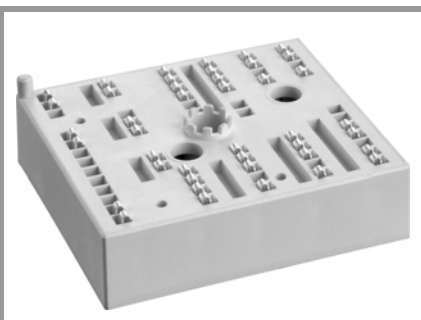


SKiiP 24ACC12T4V1



MiniSKiiP® 2

Twin 6-pack

SKiiP 24ACC12T4V1

Features*

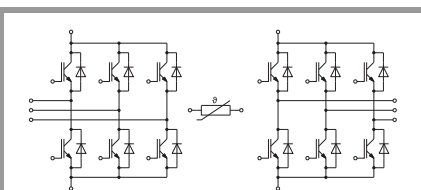
- Trench 4 IGBTs
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532

Typical Applications

- 4Q inverters

Remarks

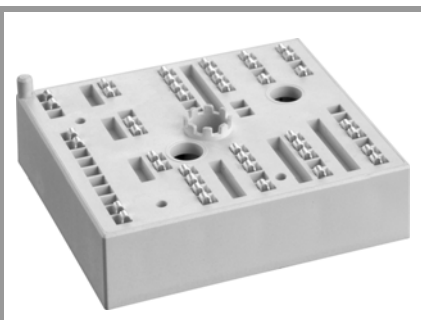
- Max. case temperature limited to $T_C=125^\circ\text{C}$
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- Terminal distances sufficient for basic insulation in 3-phase 480VAC TN systems
- DC-link voltage $V_{DC} \leq 800\text{V}$
- Temperature sensor: no basic insulation to main circuit, signal processing with reference to -DC potential
- Please refer to MiniSKiiP "Technical Explanations" and "Mounting Instructions" for further information
- Inverter - IGBT=T1-T12
- Inverse - Diode=D1-D12



ACC

Absolute Maximum Ratings			
Symbol	Conditions	Values	Unit
IGBT 1 - 6			
V_{CES}			V
I_C	$\lambda_{paste}=0.8 \text{ W/(mK)}$ $T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	A
		$T_s = 70^\circ\text{C}$	A
I_C	$\lambda_{paste}=2.5 \text{ W/(mK)}$		A
		$T_s = 70^\circ\text{C}$	A
I_{Chom}			A
I_{CRM}			A
V_{GES}			V
t_{psc}	$V_{GE} \leq V$ $V_{CES} \leq V$	n.c.	μs
T_j			$^\circ\text{C}$
IGBT 7 - 12			
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V
I_C	$\lambda_{paste}=0.8 \text{ W/(mK)}$ $T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	38
		$T_s = 70^\circ\text{C}$	31
I_C	$\lambda_{paste}=2.5 \text{ W/(mK)}$ $T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	42
		$T_s = 70^\circ\text{C}$	35
I_{Chom}		25	A
I_{CRM}		75	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 800 \text{ V}$ $V_{GE} \leq 15 \text{ V}$ $V_{CES} \leq 1200 \text{ V}$	$T_j = 150^\circ\text{C}$	10
T_j		-40 ... 175	$^\circ\text{C}$
Diode 1 - 6			
V_{RRM}			V
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	A
		$T_s = 70^\circ\text{C}$	A
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	A
		$T_s = 70^\circ\text{C}$	A
I_{FRM}			A
I_{FSM}			A
T_j		175	$^\circ\text{C}$
Diode 7 - 12			
V_{RRM}	$T_j = 25^\circ\text{C}$	1200	V
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$ $T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	31
		$T_s = 70^\circ\text{C}$	25
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$ $T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	34
		$T_s = 70^\circ\text{C}$	27
I_{FRM}		50	A
I_{FSM}	10 ms, sin 180°, $T_j = 150^\circ\text{C}$	100	A
T_j		-40 ... 175	$^\circ\text{C}$
Module			
$I_{t(RMS)}$	20 A per spring	40	A
T_{stg}	module without TIM	-40 ... 125	$^\circ\text{C}$
V_{isol}	AC sinus 50 Hz, 1 min	2500	V

SKiiP 24ACC12T4V1



MiniSKiiP® 2

Twin 6-pack

SKiiP 24ACC12T4V1

Features*

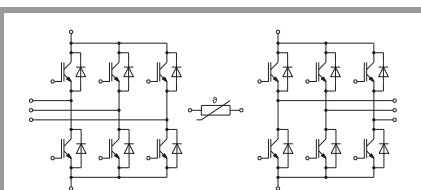
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- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532

Typical Applications

- 4Q inverters

Remarks

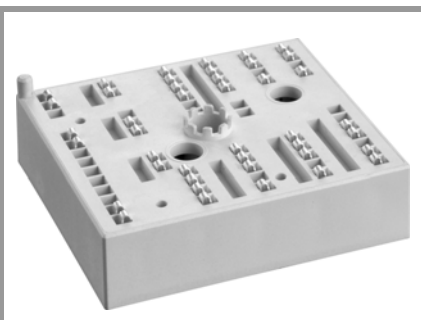
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- Terminal distances sufficient for basic insulation in 3-phase 480VAC TN systems
- DC-link voltage $V_{DC} \leq 800\text{V}$
- Temperature sensor: no basic insulation to main circuit, signal processing with reference to $-DC$ potential
- Please refer to MiniSKiiP "Technical Explanations" and "Mounting Instructions" for further information
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- Inverse - Diode=D1-D12



ACC

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

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

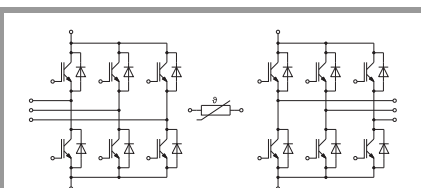
Typical Applications

- 4Q inverters

Remarks

- Max. case temperature limited to $T_C=125^{\circ}\text{C}$
- Product reliability results valid for $T_j \leq 150^{\circ}\text{C}$ (recommended $T_{j,op} = -40 \dots +150^{\circ}\text{C}$)
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- Inverter - IGBT=T1-T12
- Inverse - Diode=D1-D12

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Diode 1 - 6					
$V_F = V_{EC}$	$I_F = 25\text{ A}$				V
	$V_{GE} = 0\text{ V}$				V
V_{F0}	chipllevel	$T_j = 25^{\circ}\text{C}$			V
					V
r_F	chipllevel	$T_j = 25^{\circ}\text{C}$	0.00	0.00	mΩ
			0.00	0.00	mΩ
I_{RRM}			t.b.d.		A
Q_{rr}	$V_{GE} = -15\text{ V}$	$T_j = 150^{\circ}\text{C}$	t.b.d.		μC
E_{rr}		$T_j = 150^{\circ}\text{C}$	t.b.d.		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8\text{ W/(mK)}$				K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=2.5\text{ W/(mK)}$				K/W
Diode 7 - 12					
$V_F = V_{EC}$	$I_F = 25\text{ A}$	$T_j = 25^{\circ}\text{C}$	2.41	2.74	V
	$V_{GE} = 0\text{ V}$	$T_j = 150^{\circ}\text{C}$	2.45	2.79	V
V_{F0}	chipllevel	$T_j = 25^{\circ}\text{C}$	1.30	1.50	V
		$T_j = 150^{\circ}\text{C}$	0.90	1.10	V
r_F	chipllevel	$T_j = 25^{\circ}\text{C}$	44	50	mΩ
		$T_j = 150^{\circ}\text{C}$	62	68	mΩ
I_{RRM}	$I_F = 25\text{ A}$	$T_j = 150^{\circ}\text{C}$	23		A
Q_{rr}	$di/dt_{off} = 732\text{ A/}\mu\text{s}$	$T_j = 150^{\circ}\text{C}$	3.8		μC
E_{rr}	$V_{GE} = -15\text{ V}$	$T_j = 150^{\circ}\text{C}$	1.4		mJ
	$V_{CC} = 600\text{ V}$				
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8\text{ W/(mK)}$				K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=2.5\text{ W/(mK)}$				K/W
Module					
L_{CE}			-		nH
M_s	to heat sink	2		2.5	Nm
w			55		g
Temperature Sensor					
R_{100}	$T_r=100^{\circ}\text{C}$ ($R_{25}=1000\Omega$)		$1670 \pm 3\%$		Ω
$R_{(T)}$	$R_{(T)}=1000\Omega[1+A(T-25^{\circ}\text{C})+B(T-25^{\circ}\text{C})^2]$ $A = 7.635 \cdot 10^{-3} \text{ }^{\circ}\text{C}^{-1}$ $B = 1.731 \cdot 10^{-5} \text{ }^{\circ}\text{C}^{-2}$				



ACC

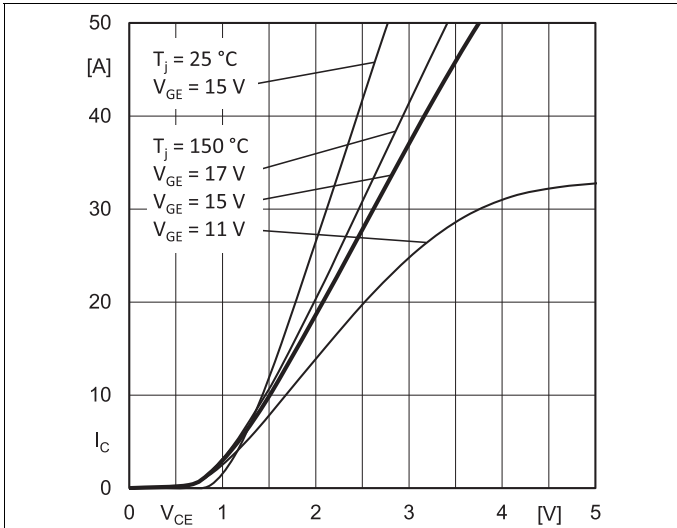


Fig. 1: Typ. output characteristic

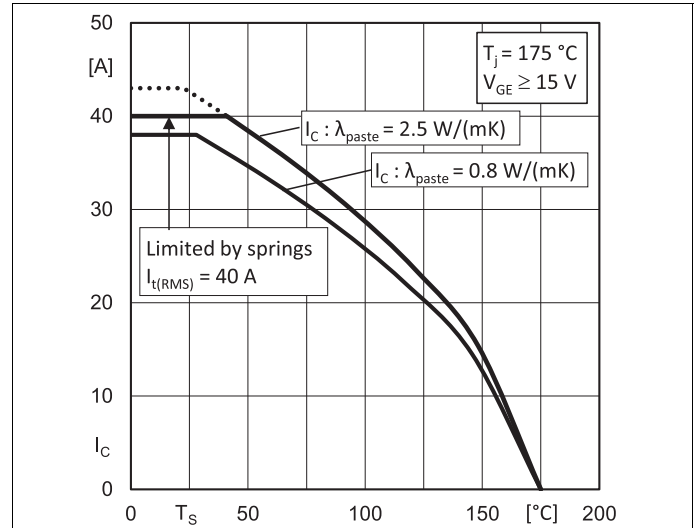


Fig. 2: Rated current vs. temperature $I_c = f(T_s)$

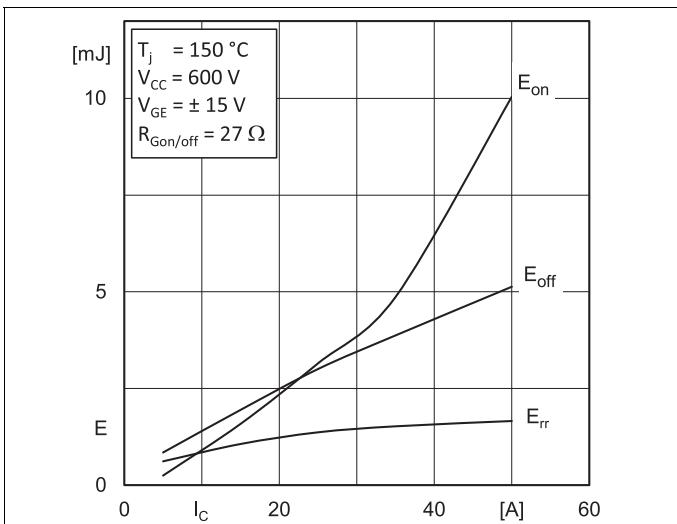


Fig. 3: Typ. turn-on /-off energy = $f(I_c)$

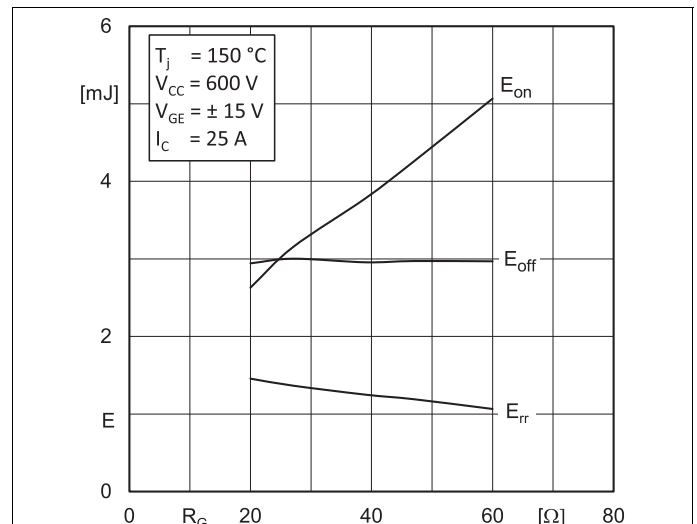


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

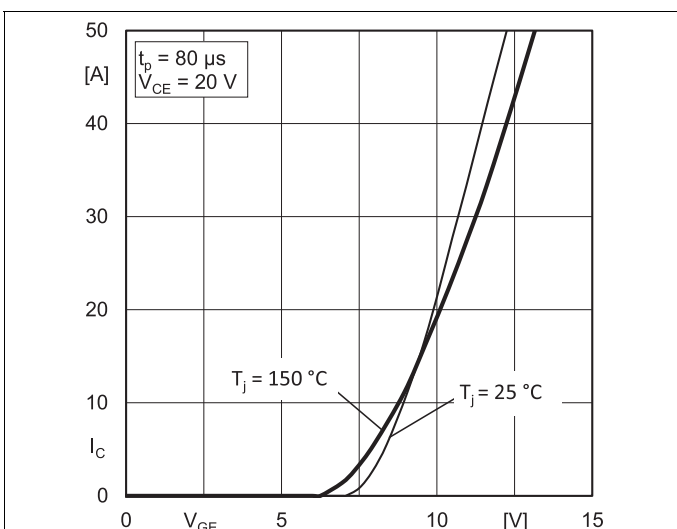


Fig. 5: Typ. transfer characteristic

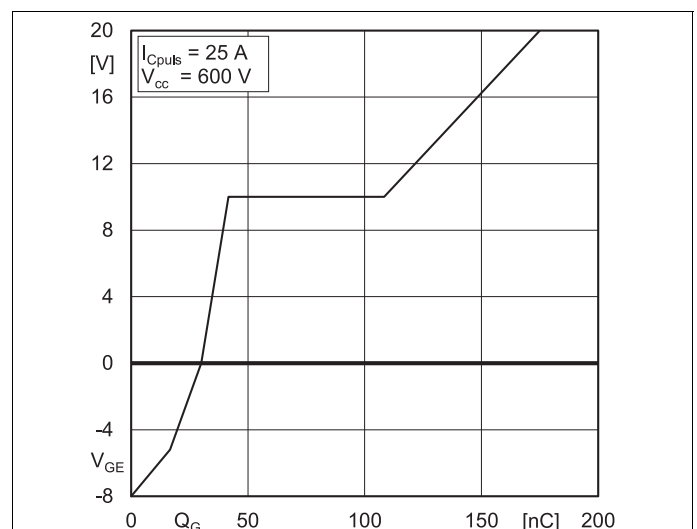


Fig. 6: Typ. gate charge characteristic

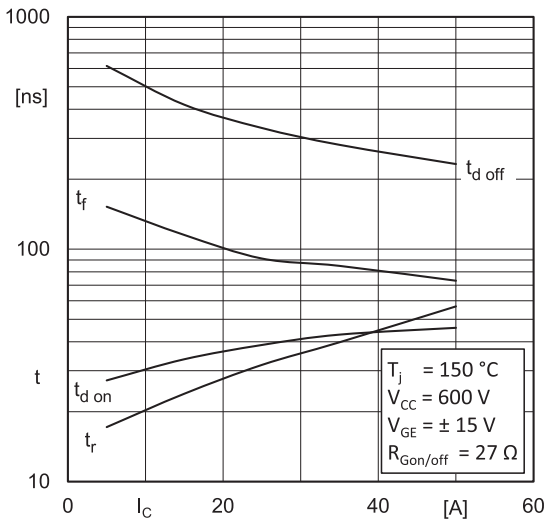


Fig. 7: Typ. switching times vs. I_C

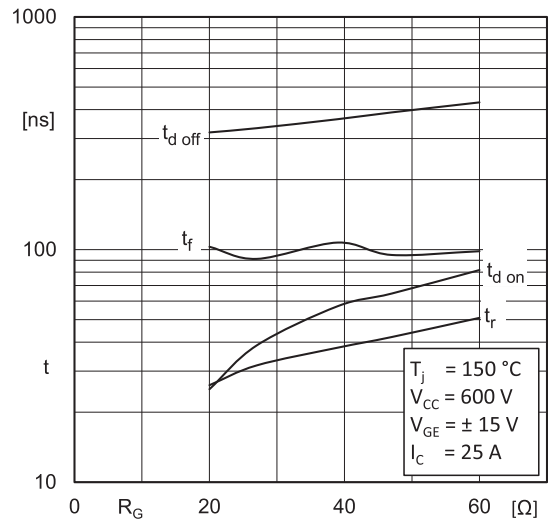


Fig. 8: Typ. switching times vs. gate resistor R_G

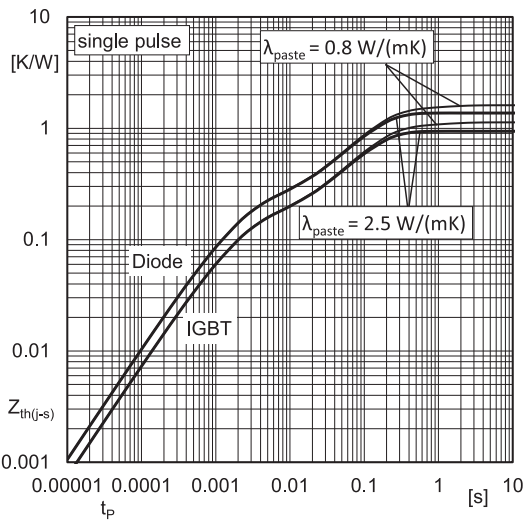


Fig. 9: Typ. transient thermal impedance

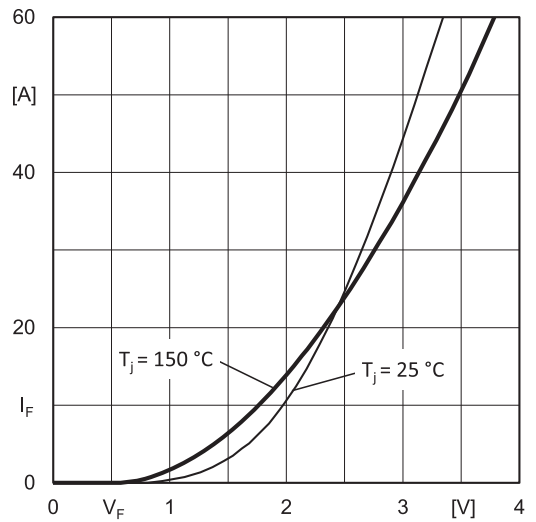


Fig. 10: Typ. CAL diode forward characteristic

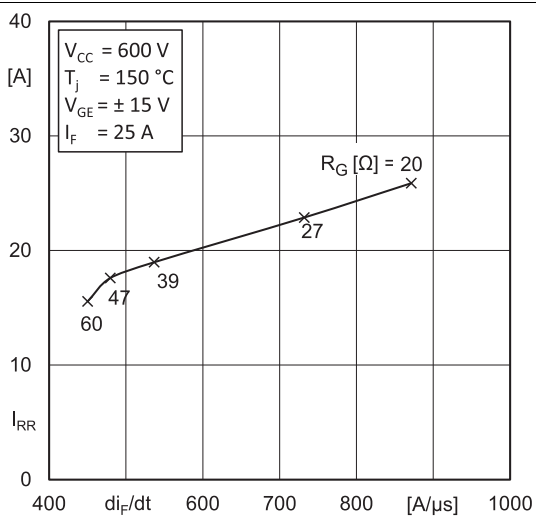


Fig. 11: Typ. CAL diode peak reverse recovery current

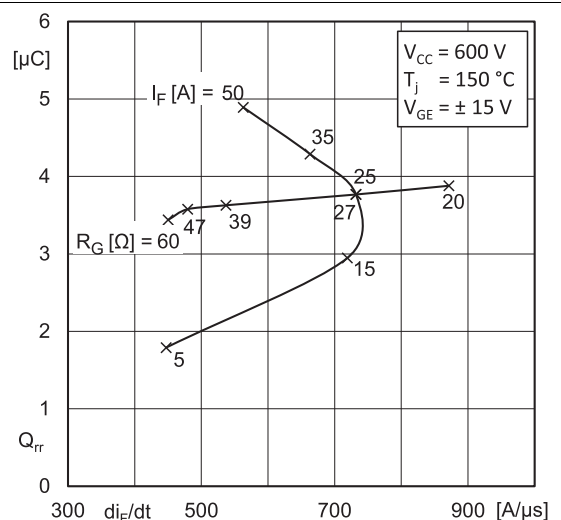
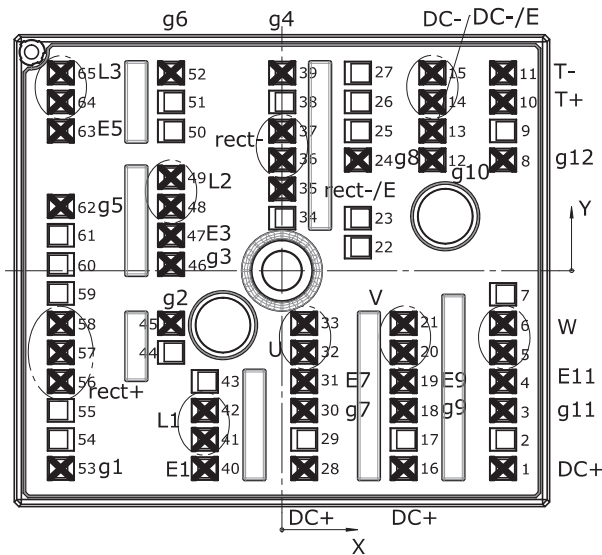


Fig. 12: Typ. CAL diode recovery charge

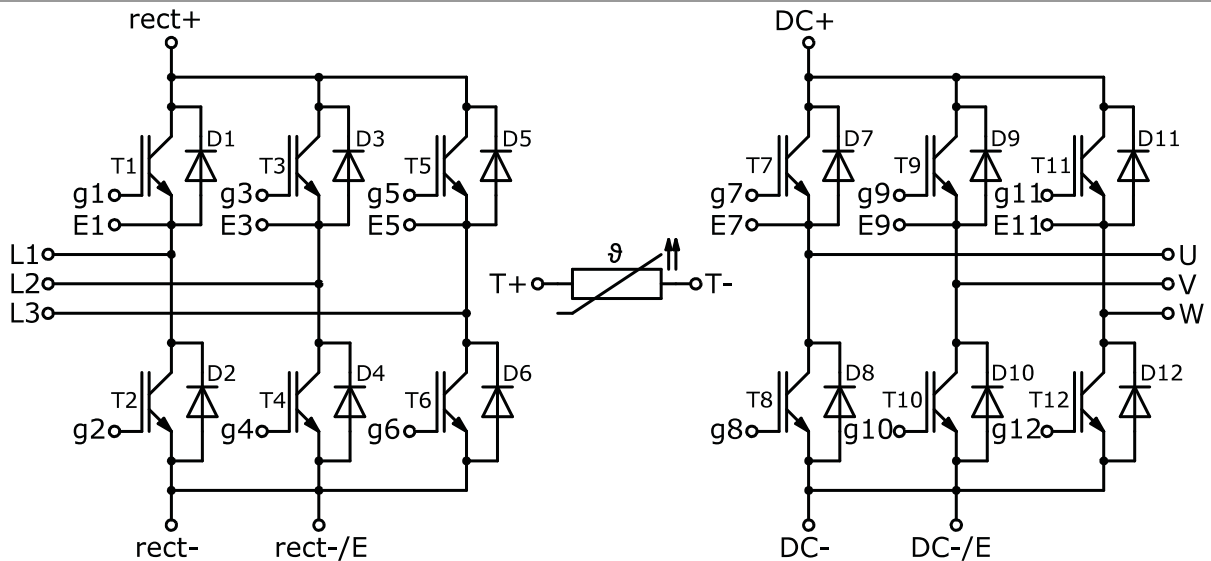
SKiiP 24ACC12T4V1

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.

***IMPORTANT INFORMATION AND WARNINGS**

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