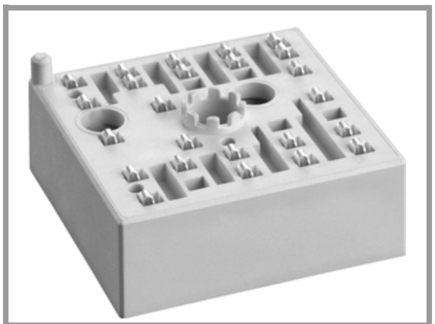

MiniSKiiP® 1

Sixpack

SKiiP 13AC12T7V1

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 TC=TS=125 °C
- Product reliability results valid for Tj≤150 °C; Tj,op >150°C during overload (Details see AN19-002)
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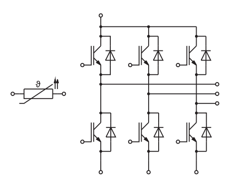


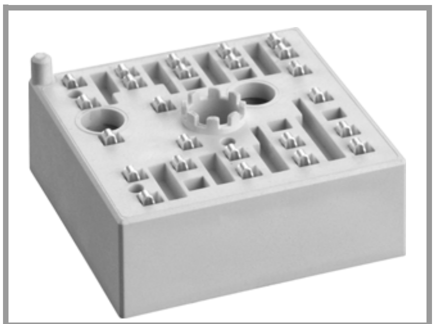
AC

Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	λ_{paste}=0.8 W/(mK) T_j = 175 °C	T_s = 70 °C	38	A
		T_s = 100 °C	31	A
I_C	λ_{paste}=2.5 W/(mK) T_j = 175 °C	T_s = 70 °C	42	A
		T_s = 100 °C	34	A
I_{Cnom}			25	A
I_{CRM}			50	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 800 V V_{GE} ≤ 15 V V_{CES} ≤ 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	λ_{paste}=0.8 W/(mK) T_j = 175 °C	T_s = 70 °C	27	A
		T_s = 100 °C	22	A
I_F	λ_{paste}=2.5 W/(mK) T_j = 175 °C	T_s = 70 °C	30	A
		T_s = 100 °C	24	A
I_{FRM}			50	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 150 °C		100	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20 A per spring		40	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 = 25 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		0.75	0.80	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		24	28	mΩ
		T_j = 150 °C		39	43	mΩ
		T_j = 175 °C		43	47	mΩ
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 0.53 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		4.80		nF
C_{oes}		f = 1 MHz		0.06		nF
C_{res}		f = 1 MHz		0.02		nF
Q_G	V_{GE} = - 8V ... + 15 V			350		nC
R_{Gint}	T_j = 25 °C			0		Ω



MiniSKiiP® 1

Sixpack

SKiiP 13AC12T7V1

Features*

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- 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 TC=TS=125 °C
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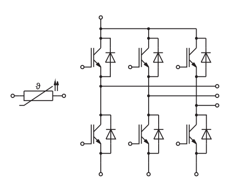


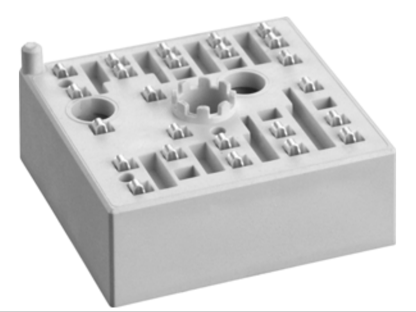
AC

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverter - IGBT						
$t_{d(on)}$	V_{CC} = 600 V I_C = 25 A $R_{G\,on}$ = 12.8 Ω $R_{G\,off}$ = 12.8 Ω V_{GE} = +15/-15 V @ T_j = 150 °C: di/dt$_{on}$ = 590 A/µs di/dt$_{off}$ = 280 A/µs dv/dt = 3600 V/µs	T_j = 25 °C		40		ns
		T_j = 150 °C		42		ns
		T_j = 175 °C		43		ns
t_r		T_j = 25 °C		38		ns
		T_j = 150 °C		44		ns
		T_j = 175 °C		47		ns
E_{on}		T_j = 25 °C		2.2		mJ
		T_j = 150 °C		3.1		mJ
		T_j = 175 °C		3.3		mJ
$t_{d(off)}$		T_j = 25 °C		218		ns
		T_j = 150 °C		308		ns
		T_j = 175 °C		333		ns
t_f		T_j = 25 °C		46		ns
		T_j = 150 °C		71		ns
		T_j = 175 °C		87		ns
E_{off}		T_j = 25 °C		1.6		mJ
		T_j = 150 °C		2.8		mJ
		T_j = 175 °C		3		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			1.08		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			0.91		K/W

Characteristics

Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	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
		T_j = 175 °C		2.30	2.62	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		44	50	mΩ
		T_j = 150 °C		62	68	mΩ
		T_j = 175 °C		59	66	mΩ
I_{RRM}	I_F = 25 A V_{GE} = +15/-15 V V_{CC} = 600 V @ T_j = 150 °C: di/dt$_{off}$ = 610 A/µs	T_j = 25 °C		15		A
		T_j = 150 °C		20		A
		T_j = 175 °C		23		A
Q_{rr}		T_j = 25 °C		1.5		µC
		T_j = 150 °C		3.7		µC
		T_j = 175 °C		4.1		µC
E_{rr}		T_j = 25 °C		0.45		mJ
		T_j = 150 °C		1.4		mJ
		T_j = 175 °C		1.8		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			1.38		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			1.18		K/W
Module						
L_{CE}				-		nH
M_s	to heat sink		2		2.5	Nm
w				30		g



MiniSKiiP® 1

Sixpack

SKiiP 13AC12T7V1

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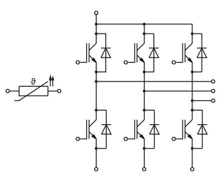


AC

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

Creepage distance (spring to spring) between temperature sensor and phase W = 2.9mm (CTI 600)

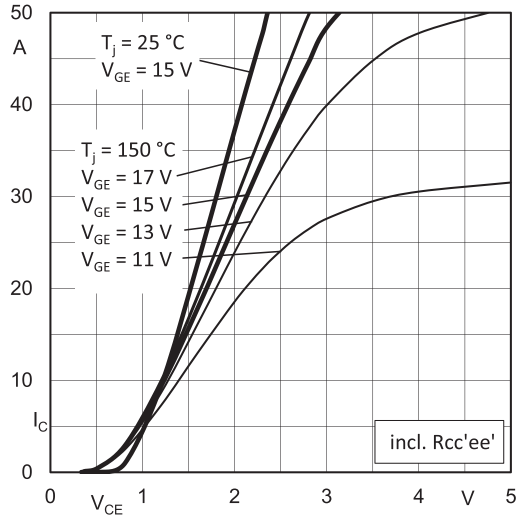


Fig. 1: Typ. output characteristic

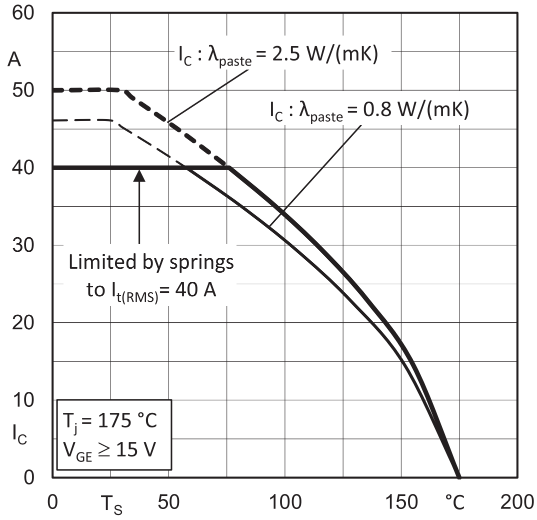


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

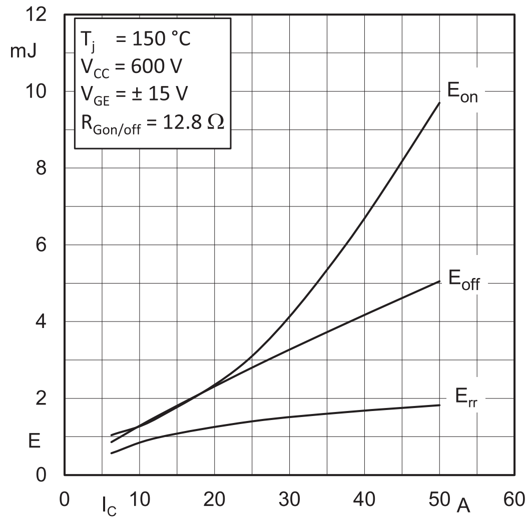


Fig. 3: Typ. turn-on /-off energy = f (I_C)

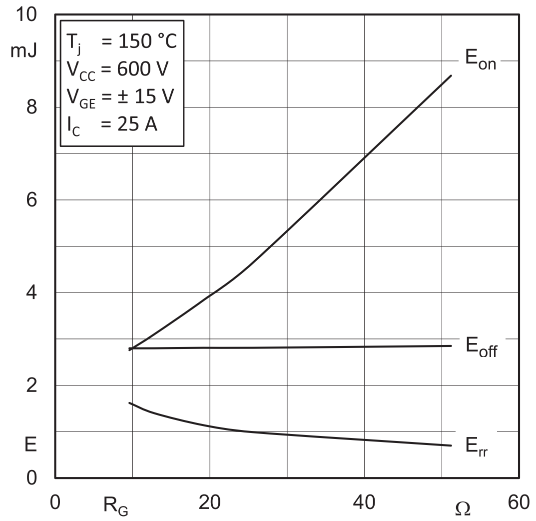


Fig. 4: Typ. turn-on /-off energy = f (R_G)

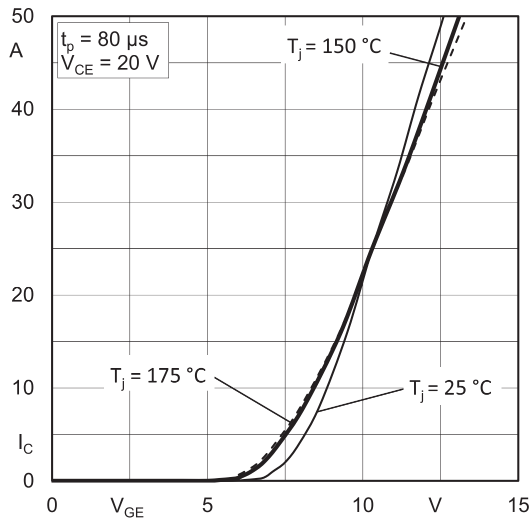


Fig. 5: Typ. transfer characteristic

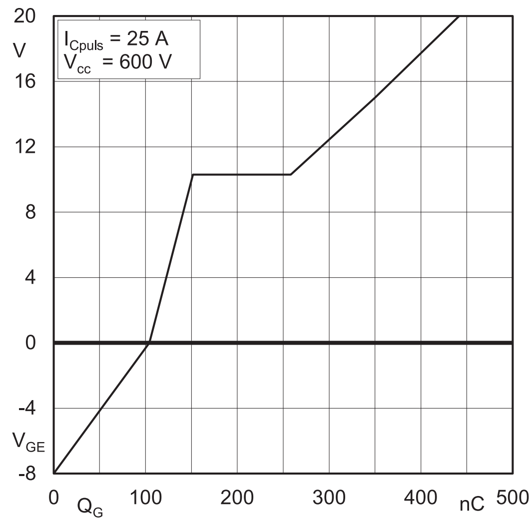


Fig. 6: Typ. gate charge characteristic

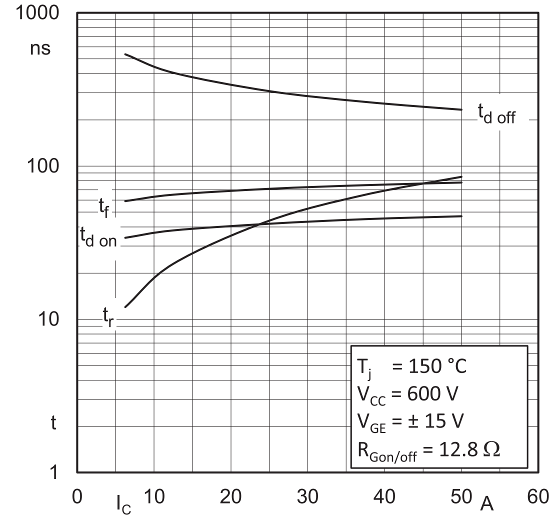


Fig. 7: Typ. switching times vs. I_C

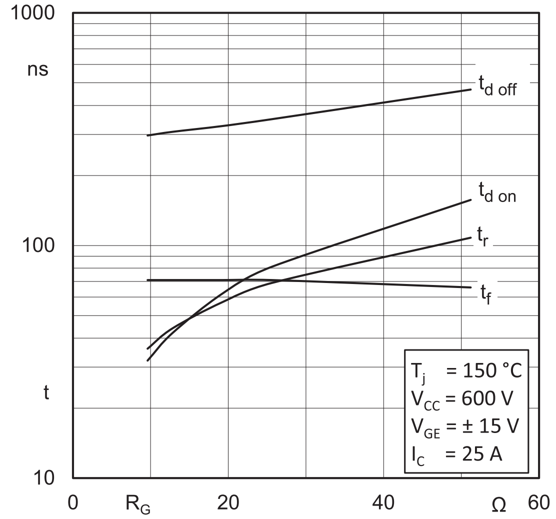


Fig. 8: Typ. switching times vs. gate resistor R_G

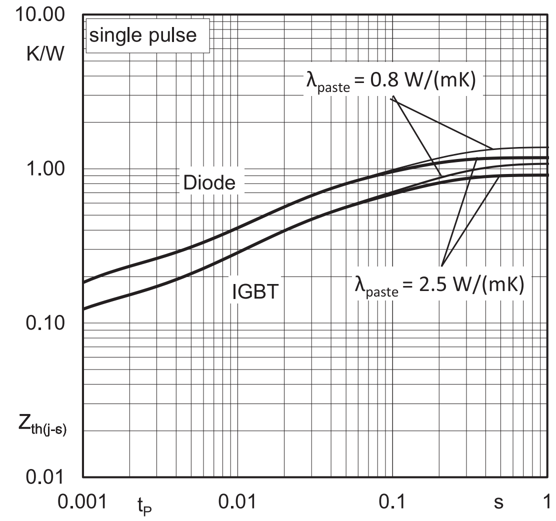


Fig. 9: Typ. transient thermal impedance

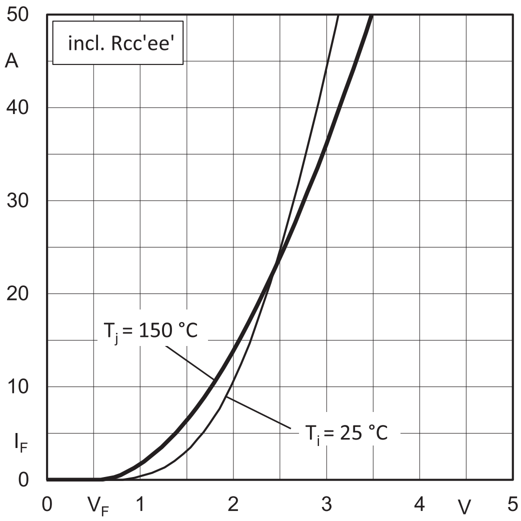


Fig. 10: Typ. CAL diode forward characteristic

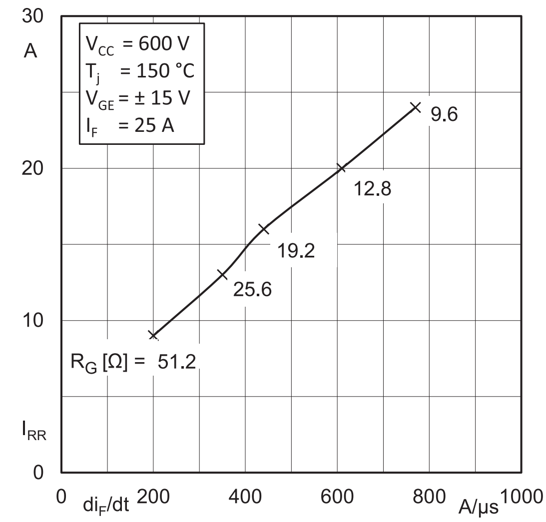


Fig. 11: Typ. CAL diode peak reverse recovery current

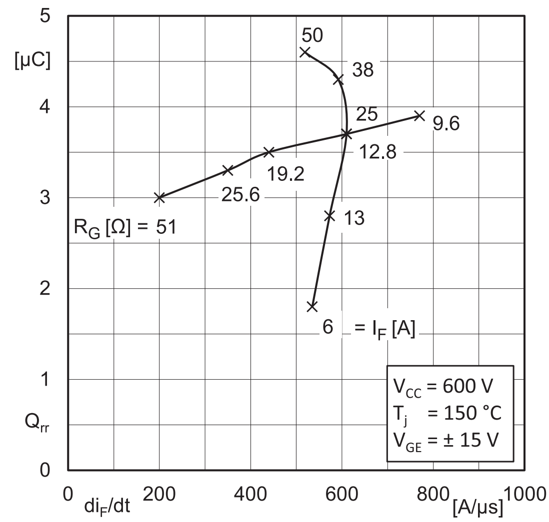
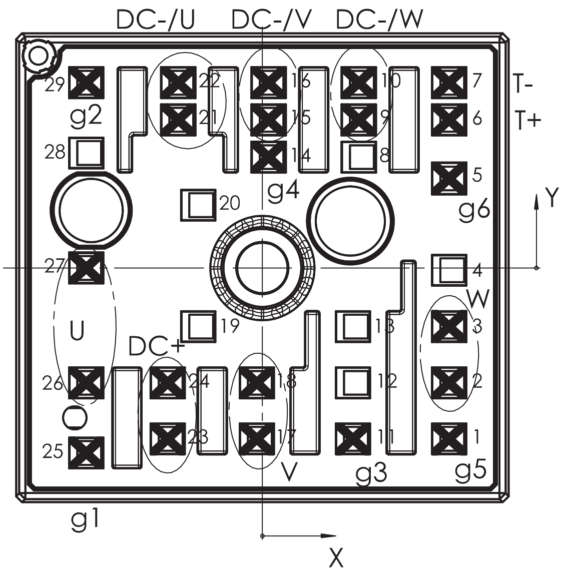


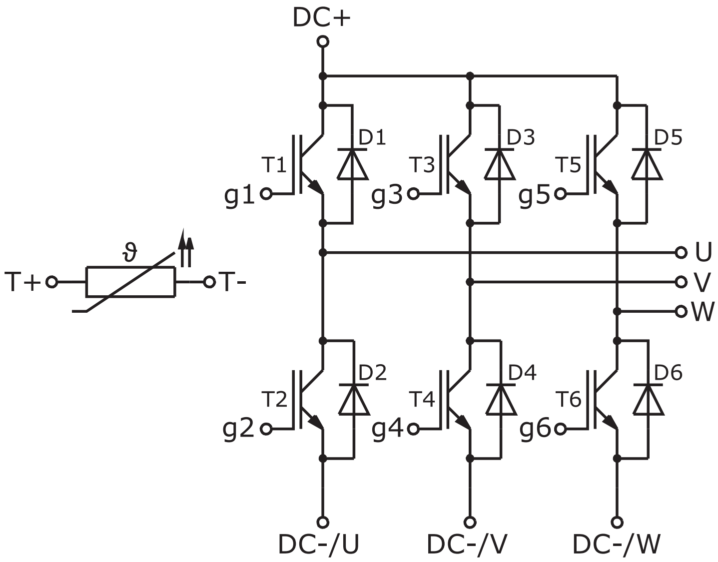
Fig. 12: Typ. CAL diode recovery charge

Pin out							
Pin	X	Y	*Function*	*Pin*	X	Y	*Function*
1	15,93	-14,6	g5	16	0,53	15,8	DC-/V
2	15,93	-9,8	W	17	-0,48	-14,6	V
3	15,93	-5	W	18	-0,48	-9,8	V
4				19			
5	15,93	7,63	g6	20			
6	15,93	12,63	T+	21	-7,18	12,63	DC-/U
7	15,93	15,8	T-	22	-7,18	15,8	DC-/U
8				23	-8,08	-14,6	DC+
9	8,23	12,63	DC-/W	24	-8,08	-9,8	DC+
10	8,23	15,8	DC-/W	25	-15,03	-15,8	g1
11	7,73	-14,6	g3	26	-15,03	-9,8	U
12	7,73	-9,8		27	-15,03	0	U
13				28			
14	0,53	9,45	g4	29	-15,03	15,8	g2
15	0,53	12,63	DC-/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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