MiniSKiiP® 2

Sixpack

SKiiP 26AC12T4V1

Features*

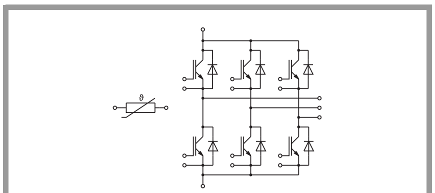
- Trench 4 IGBTs
- Robust and soft switching freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognized: File no. E63532

Typical Applications

- Inverter up to 29 kVA
- Typical motor power 18,5 kW

Remarks

- V_{CEsat} , V_F= chip level value
- Case temp. limited to T_C = 125°C max. (for baseplateless modules $T_C = T_S$)
- product rel. results valid for $T_j \leq 150$ (recomm. T_{op} = -40 ... +150°C)



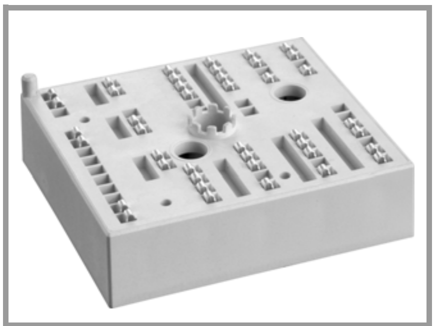
AC

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 = 25 °C	90	A
		T_s = 70 °C	73	A
I_C	λ_{paste}=2.5 W/(mK) T_j = 175 °C	T_s = 25 °C	105	A
		T_s = 70 °C	86	A
I_{Cnom}			70	A
I_{CRM}			210	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 800 V $V_{GE} \leq$ 15 V $V_{CES} \leq$ 1200 V	T_j = 150 °C	10	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 = 25 °C	83	A
		T_s = 70 °C	66	A
I_F	λ_{paste}=2.5 W/(mK) T_j = 175 °C	T_s = 25 °C	96	A
		T_s = 70 °C	77	A
I_{FRM}			225	A
I_{FSM}	t_p = 10 ms, sin 180°, T_j = 150 °C		430	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20 A per spring		100	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 = 70 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		15	17	mΩ
		T_j = 150 °C		22	24	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}$, I_C = 2 mA		5	5.8	6.5	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		3.90		nF
C_{oes}		f = 1 MHz		0.31		nF
C_{res}		f = 1 MHz		0.23		nF
Q_G	V_{GE} = - 8 V...+ 15 V			400		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 75 A $R_{G\,on}$ = 9.1 Ω $R_{G\,off}$ = 9.1 Ω di/dt_{on} = 1820 A/µs di/dt_{off} = 900 A/µs V_{GE} = +15/-15 V	T_j = 150 °C		26		ns
t_r		T_j = 150 °C		36		ns
E_{on}		T_j = 150 °C		9.5		mJ
$t_{d(off)}$		T_j = 150 °C		320		ns
t_f		T_j = 150 °C		175		ns
E_{off}		T_j = 150 °C		7.1		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(mK)			0.55		K/W
$R_{th(j-s)}$	per IGBT, λ_{paste}=2.5 W/(mK)			0.42		K/W



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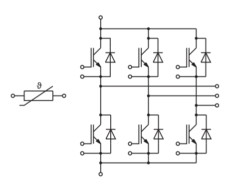


AC

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Inverse - Diode						
$V_F = V_{EC}$	I_F = 75 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.17	2.49	V
		T_j = 150 °C		2.11	2.42	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		12	13	mΩ
		T_j = 150 °C		16	18	mΩ
I_{RRM}	I_F = 75 A di/dt_{off} = 2120 A/µs V_{GE} = +15/-15 V V_{CC} = 600 V	T_j = 150 °C		80		A
Q_{rr}		T_j = 150 °C		13.3		µC
E_{rr}		T_j = 150 °C		5.6		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(mK)			0.75		K/W
$R_{th(j-s)}$	per Diode, λ_{paste}=2.5 W/(mK)			0.6		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
$R_{(T)}$	$R_{(T)}$=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}					

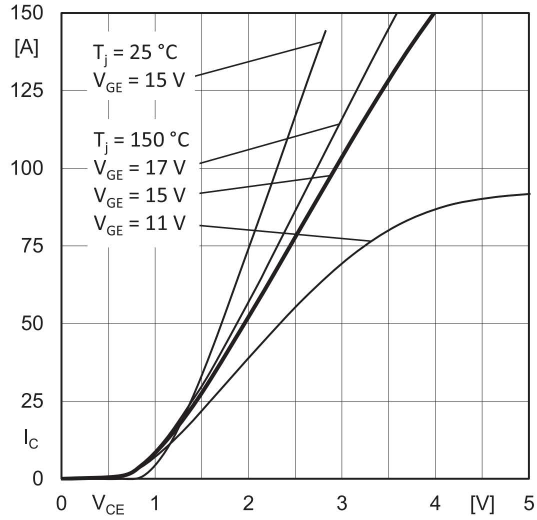


Fig. 1: Typ. output characteristic

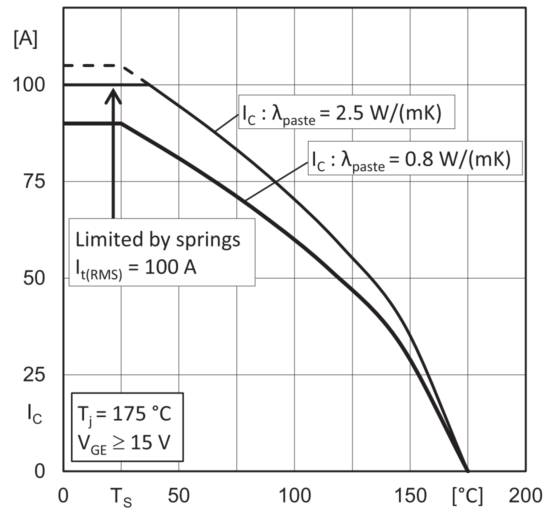


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

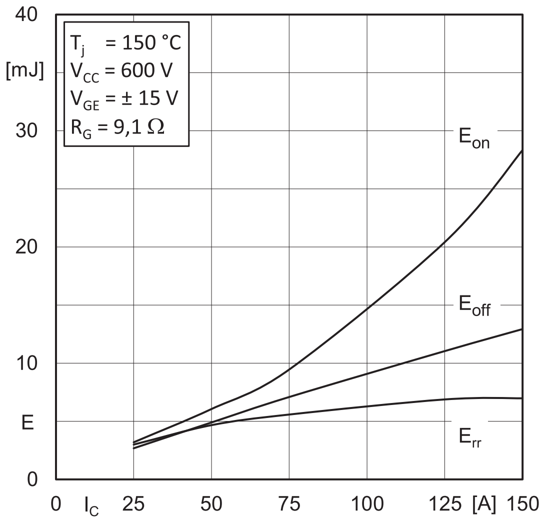


Fig. 3: Typ. turn-on /-off energy = f (I_C)

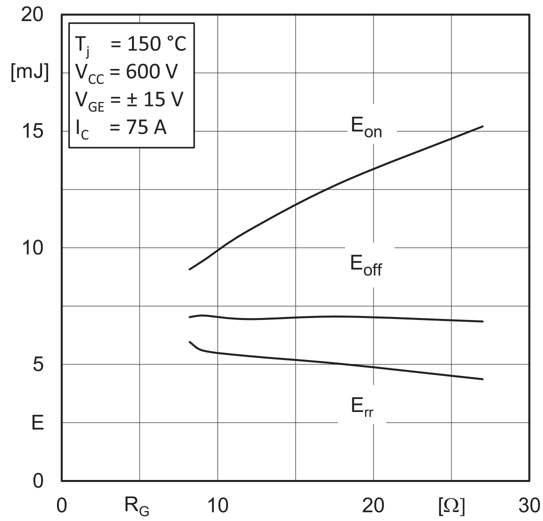


Fig. 4: Typ. turn-on /-off energy = f (R_G)

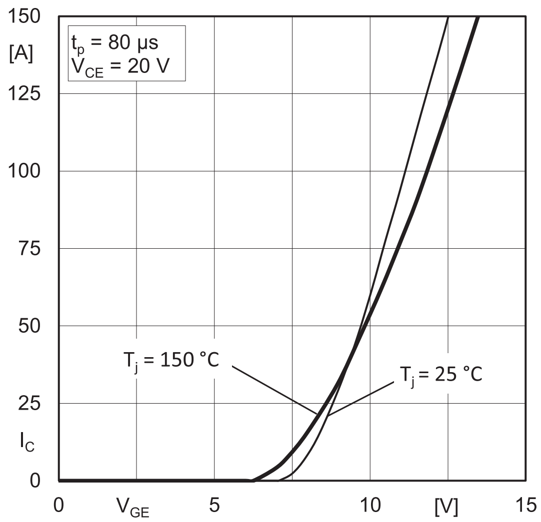


Fig. 5: Typ. transfer characteristic

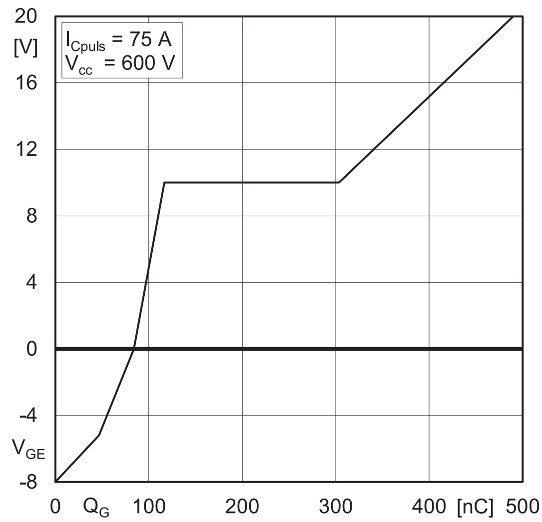


Fig. 6: Typ. gate charge characteristic

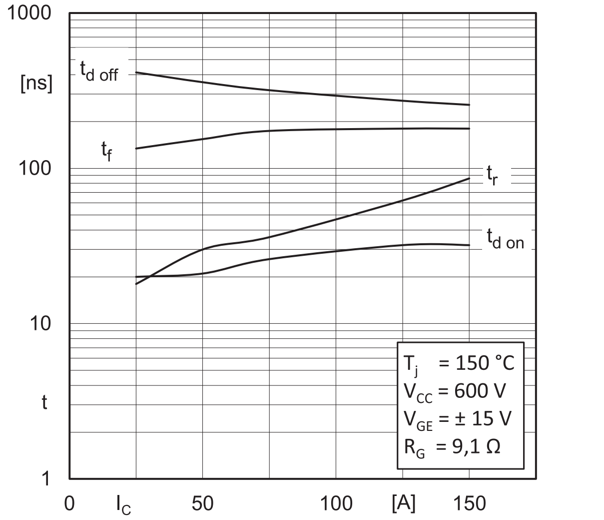


Fig. 7: Typ. switching times vs. I_C

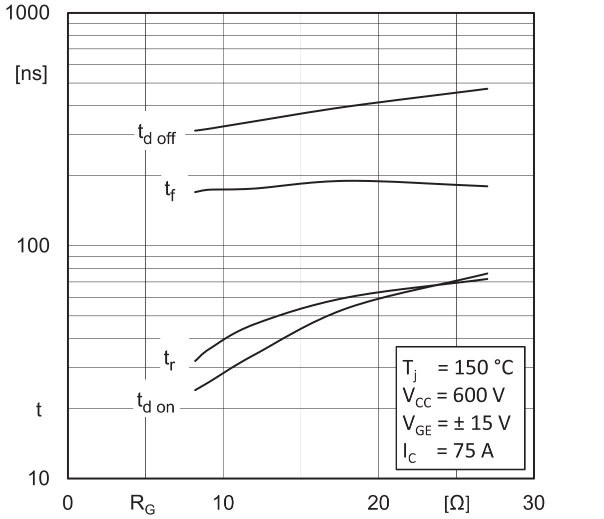


Fig. 8: Typ. switching times vs. gate resistor R_G

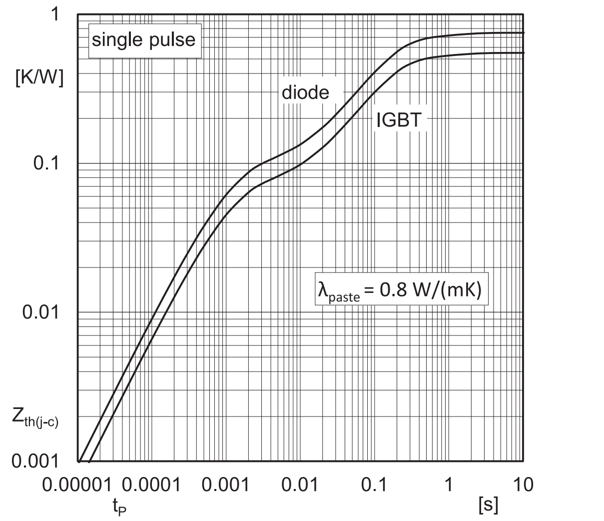


Fig. 9: Typ. transient thermal impedance

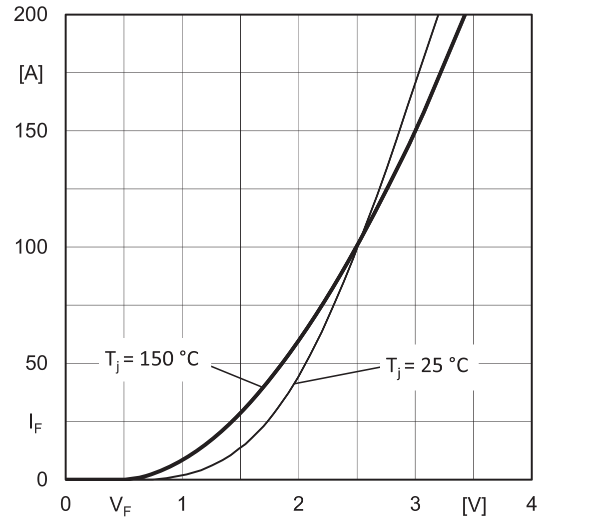


Fig. 10: Typ. CAL diode forward characteristic

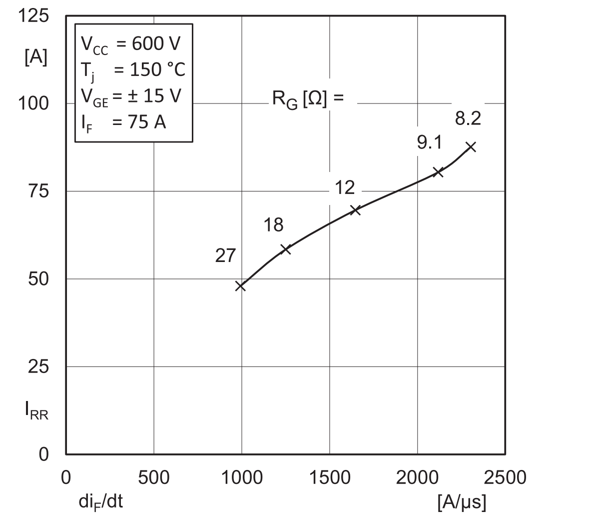


Fig. 11: Typ. CAL diode peak reverse recovery current

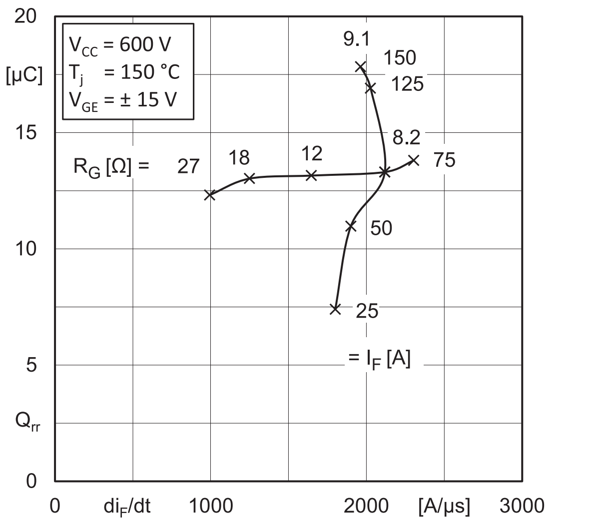
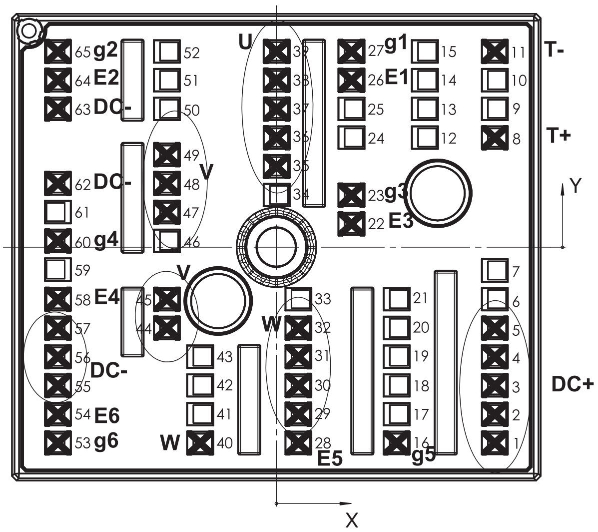


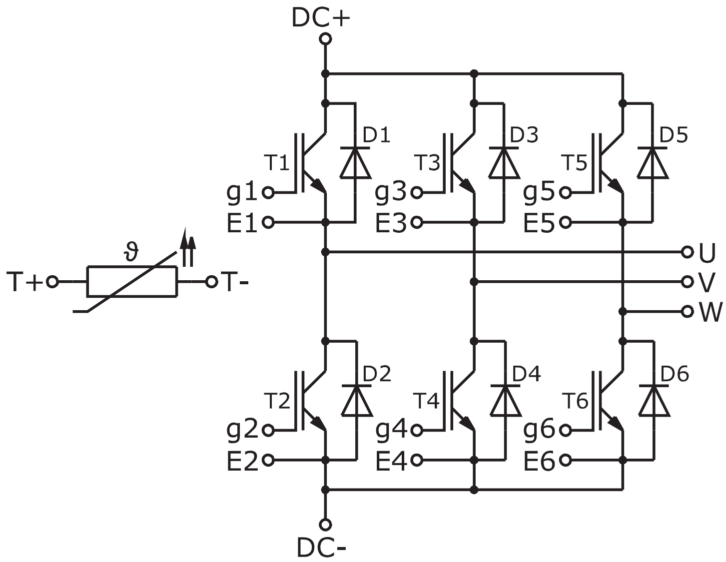
Fig. 12: Typ. CAL diode recovery charge

Pin out											
Pin	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*
1	24,38	-21,80	DC+	23	8,38	5,80	g3	45	-12,23	-5,80	V
2	24,38	-18,60	DC+	24	8,38	12,20		46	-12,23	0,70	
3	24,38	-15,40	DC+	25	8,38	15,40		47	-12,23	3,90	V
4	24,38	-12,20	DC+	26	8,38	18,60	E1	48	-12,23	7,10	V
5	24,38	-9,00	DC+	27	8,38	21,80	g1	49	-12,23	10,30	V
6	24,38	-5,80		28	2,46	-21,80	E5	50	-12,23	15,40	
7	24,38	-2,60		29	2,46	-18,60	W	51	-12,23	18,60	
8	24,38	12,20	T+	30	2,46	-15,40	W	52	-12,23	21,80	
9	24,38	15,40		31	2,46	-12,20	W	53	-24,38	-21,80	g6
10	24,38	18,60		32	2,46	-9,00	W	54	-24,38	-18,60	E6
11	24,38	21,80	T-	33	2,46	-5,80		55	-24,38	-15,40	DC-
12	16,58	12,20		34	0,03	5,80		56	-24,38	-12,20	DC-
13	16,58	15,40		35	0,03	9,00	U	57	-24,38	-9,00	DC-
14	16,58	18,60		36	0,03	12,20	U	58	-24,38	-5,80	E4
15	16,58	21,80		37	0,03	15,40	U	59	-24,38	-2,50	
16	13,42	-21,80	g5	38	0,03	18,60	U	60	-24,38	0,70	g4
17	13,42	-18,60		39	0,03	21,80	U	61	-24,38	3,90	
18	13,42	-15,40		40	-8,51	-21,80	W	62	-24,38	7,10	DC-
19	13,42	-12,20		41	-8,51	-18,60		63	-24,38	15,40	DC-
20	13,42	-9,00		42	-8,51	-15,40		64	-24,38	18,60	E2
21	13,42	-5,80		43	-8,51	-12,20		65	-24,38	21,80	g2
22	8,38	2,60	E3	44	-12,23	-9,00	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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