

MiniSKiiP® 3

SKiiP 38AC12T4V1

Features

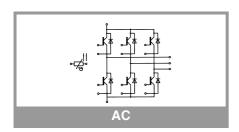
- Trench 4 IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532

Typical Applications*

- Inverter up to 41 kVA
- Typical motor power 22 kW

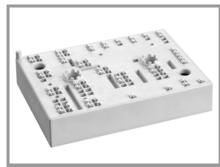
Remarks

- Max. case temperature limited to T_C=125°C
- Product reliability results valid for T_j≤150°C (recommended T_{j,op}=-40...+150°C)
- For short circuit: Soft R_{Goff} recommended
- MiniSKiiP "Technical Explanations" and "Mounting Instructions" are part of the data sheet. Please refer to both documents for further information.



Absolute	Maximum Ratings	3		
Symbol	Conditions		Values	Unit
Inverter -	IGBT			
V _{CES}	T _j = 25 °C		1200	V
Ic	$\begin{array}{c} \text{Ic} & \lambda_{\text{paste}} = 0.8 \text{ W/(mK)} \\ \text{T}_{\text{j}} = 175 \text{ °C} \end{array}$	T _s = 25 °C	115	Α
		T _s = 70 °C	93	Α
I _C	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	140	Α
T _j = 175 °C	T _j = 175 °C	T _s = 70 °C	114	Α
I _{Cnom}			100	Α
I _{CRM}	$I_{CRM} = 3 \times I_{Cnom}$		300	Α
V_{GES}			-20 20	V
t _{psc}	$V_{CC} = 800 \text{ V}$ $V_{GE} \le 15 \text{ V}$ $V_{CES} \le 1200 \text{ V}$	T _j = 150 °C	10	μѕ
T _j			-40 175	°C
Inverse - I	Diode			
I_F $\lambda_{paste}=0.8 \text{ W/(}$ $T_j=175 \text{ °C}$	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	100	Α
	T _j = 175 °C	T _s = 70 °C	79	Α
	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	116	Α
	T _j = 175 °C	T _s = 70 °C	93	Α
I _{Fnom}			100	Α
I _{FRM}	I _{FRM} = 3 x I _{Fnom}		300	Α
I _{FSM}	10 ms, sin 180°, T _j = 150 °C		550	Α
Tj			-40 175	°C
Module				•
I _{t(RMS)}	T _{terminal} = 80 °C, 20 A per spring		160	Α
T _{stg}			-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 = 100 A	T _j = 25 °C		1.80	2.05	V			
	V _{GE} = 15 V chiplevel	T _j = 150 °C		2.20	2.40	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	V _{GE} = 15 V	T _j = 25 °C		10	12	mΩ			
	chiplevel	T _j = 150 °C		15	16	mΩ			
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 4 \text{ m/s}$	Ā	5	5.8	6.5	V			
I _{CES}	$V_{GE} = 0 \text{ V}, V_{CE} = 12$	00 V, T _j = 25 °C		0.1	0.3	mA			
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		6.15		nF			
Coes		f = 1 MHz		0.41		nF			
C _{res}		f = 1 MHz		0.35		nF			
Q_{G}	- 8 V+ 15 V			565		nC			
R _{Gint}	T _j = 25 °C			7.5		Ω			
t _{d(on)}	V _{CC} = 600 V	T _j = 150 °C		160		ns			
t _r	$\begin{aligned} &I_C = 100 \text{ A} \\ &R_{G \text{ on}} = 1 \Omega \\ &R_{G \text{ off}} = 1 \Omega \\ &\text{di/dt}_{on} = 2080 \text{ A/}\mu\text{s} \\ &\text{di/dt}_{off} = 1240 \text{ A/}\mu\text{s} \end{aligned}$	T _j = 150 °C		45		ns			
Eon		T _j = 150 °C		13.7		mJ			
t _{d(off)}		T _j = 150 °C		395		ns			
t _f		T _j = 150 °C		73		ns			
E _{off}	V _{GE} = +15/-15 V	T _j = 150 °C		9.7		mJ			
R _{th(j-s)}	per IGBT, λ _{paste} =0.8 W/(mK)			0.48		K/W			
R _{th(j-s)}	per IGBT, λ _{paste} =2.5 W/(mK)			0.34		K/W			



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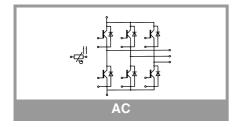
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Characteristics									
Symbol	Conditions	min.	typ.	max.	Unit				
Inverse - Diode									
$V_F = V_{EC}$	I _F = 100 A	T _j = 25 °C		2.20	2.52	V			
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.15	2.47	V			
V_{F0}	chiplevel	T _j = 25 °C		1.30	1.50	V			
	Chipievei	T _j = 150 °C		0.90	1.10	V			
r _F	- chiplevel	T _j = 25 °C		9.0	10	$m\Omega$			
		T _j = 150 °C		13	14	$m\Omega$			
I _{RRM}	di/dt _{off} = 2680 A/μs +15/-15	T _j = 150 °C		112		Α			
Q _{rr}		T _j = 150 °C		16		μC			
E _{rr}		T _j = 150 °C		6.5		mJ			
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/(mK)			0.66		K/W			
R _{th(j-s)}	per Diode, λ _{paste} =2.5 W/(mK)			0.52		K/W			
Module									
L _{CE}						nH			
Ms	to heat sink		2		2.5	Nm			
w				82		g			
Temperat	ture Sensor								
R ₁₀₀	T _r =100°C (R ₂₅ =1000Ω)			1670 ± 3%		Ω			
R(T)	R(T)= $1000\Omega[1+A(T-25^{\circ}C)+B(T-25^{\circ}C)^{2}]$, A = $7.635^{*}10^{-3} {^{\circ}C^{-1}}$, B = $1.731^{*}10^{-5} {^{\circ}C^{-2}}$								



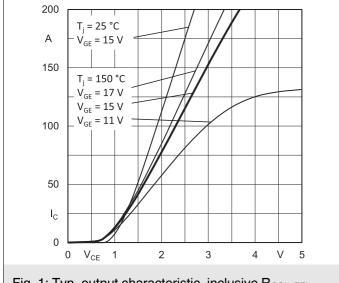


Fig. 1: Typ. output characteristic, inclusive $R_{\text{CC}'\text{+ EE'}}$

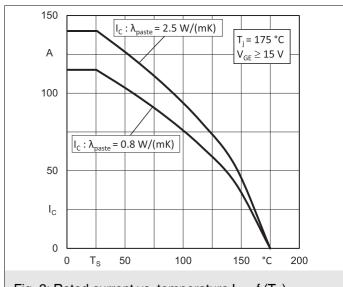


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

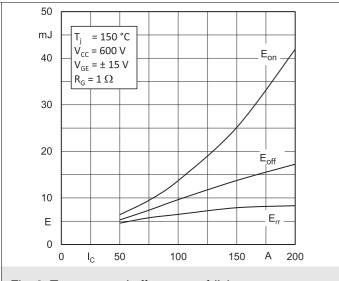


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

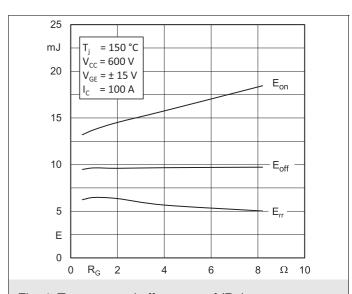


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

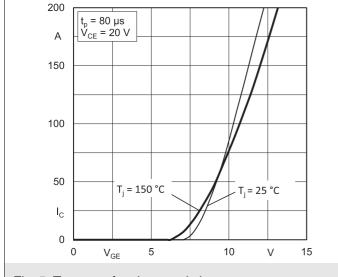


Fig. 5: Typ. transfer characteristic

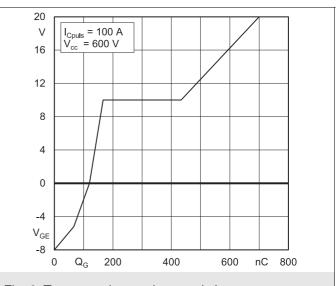
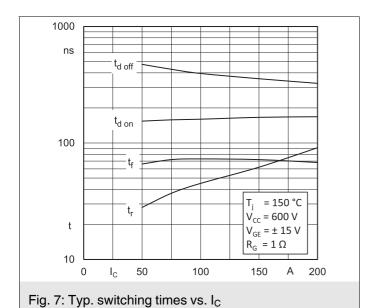
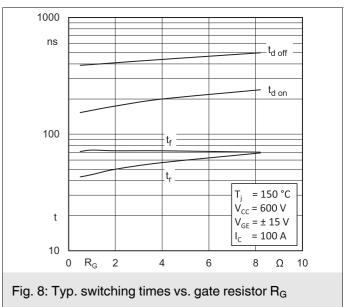
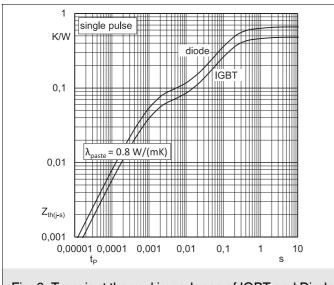


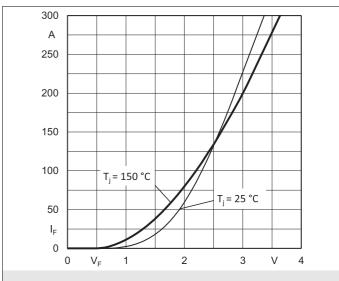
Fig. 6: Typ. gate charge characteristic

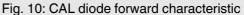












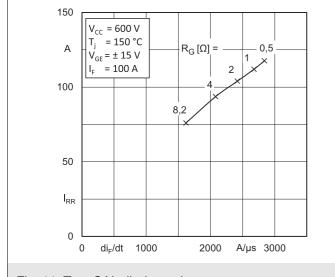


Fig. 11: Typ. CAL diode peak reverse recovery current

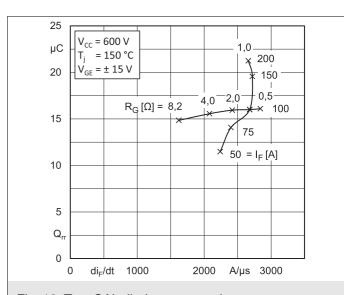
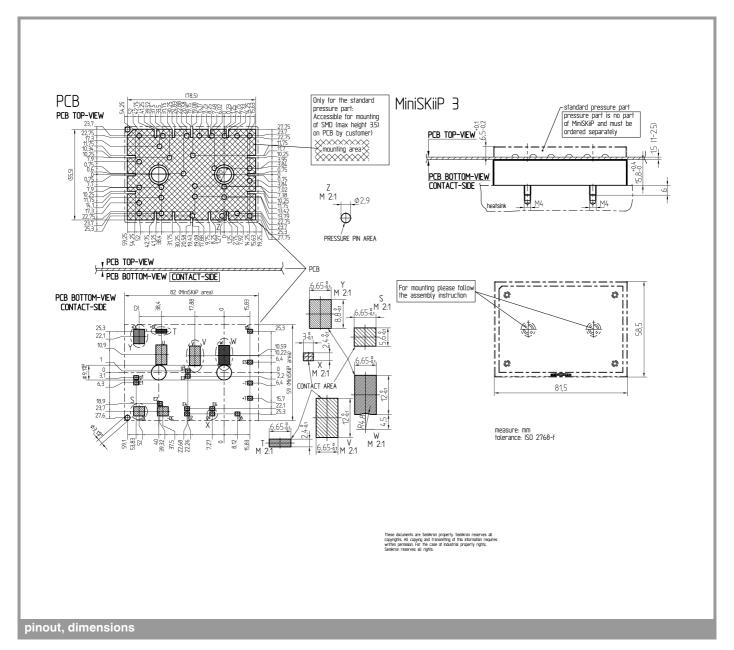
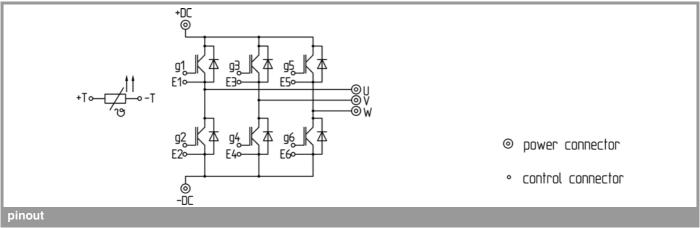


Fig. 12: Typ. CAL diode recovery charge





This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

*IMPORTANT INFORMATION AND WARNINGS

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