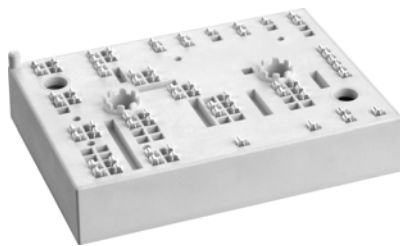


SKiiP 39AC12T4V10



MiniSKiiP® 3

SKiiP 39AC12T4V10

Features

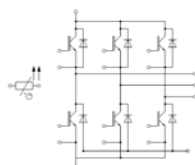
- Trench 4 IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532

Typical Applications*

- Inverter up to 50 kVA
- Typical motor power 30 kW

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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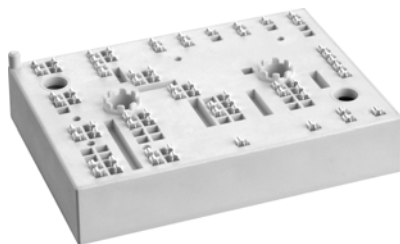
Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	167	A
	T _j = 175 °C	T _s = 70 °C	135	A
I _C	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	217	A
	T _j = 175 °C	T _s = 70 °C	177	A
I _{Cnom}			150	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		450	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 800 V V _{GE} ≤ 15 V V _{CES} ≤ 1200 V	T _j = 150 °C	10	μs
T _j			-40 ... 175	°C
Inverse - Diode				
I _F	λ _{paste} =0.8 W/(mK)	T _s = 25 °C	136	A
	T _j = 175 °C	T _s = 70 °C	107	A
I _F	λ _{paste} =2.5 W/(mK)	T _s = 25 °C	163	A
	T _j = 175 °C	T _s = 70 °C	130	A
I _{Fnom}			150	A
I _{FRM}	I _{FRM} = 3 x I _{Fnom}		450	A
I _{FSM}	10 ms, sin 180°, T _j = 150 °C		900	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}	T _{terminal} = 80 °C, 20 A per spring		160	A
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					
$V_{CE(sat)}$	$I_C = 150 \text{ A}$ $V_{GE} = 15 \text{ V}$ chipelevel	$T_J = 25^\circ\text{C}$	1.85	2.10	V
		$T_J = 150^\circ\text{C}$	2.25	2.45	V
V_{CE0}	chipelevel	$T_J = 25^\circ\text{C}$	0.80	0.90	V
		$T_J = 150^\circ\text{C}$	0.70	0.80	V
r_{CE}	$V_{GE} = 15 \text{ V}$ chipelevel	$T_J = 25^\circ\text{C}$	7.0	8.0	m Ω
		$T_J = 150^\circ\text{C}$	10	11	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 6 \text{ mA}$	5	5.8	6.5	V
I_{CES}	$V_{GE} = 0 \text{ V}$, $V_{CE} = 1200 \text{ V}$, $T_J = 25^\circ\text{C}$		0.1	0.3	mA
C_{ies}	$V_{CE} = 25 \text{ V}$	$f = 1 \text{ MHz}$	8.80		nF
C_{oes}	$V_{GE} = 0 \text{ V}$	$f = 1 \text{ MHz}$	0.58		nF
C_{res}		$f = 1 \text{ MHz}$	0.47		nF
Q_G	- 8 V...+ 15 V		850		nC
R_{Gint}	$T_J = 25^\circ\text{C}$		5.0		Ω
$t_{d(on)}$	$V_{CC} = 600 \text{ V}$	$T_J = 150^\circ\text{C}$	165		ns
t_r	$I_C = 150 \text{ A}$ $R_{G on} = 1 \Omega$	$T_J = 150^\circ\text{C}$	50		ns
		$T_J = 150^\circ\text{C}$	22.5		mJ
E_{on}	$R_{G off} = 1 \Omega$	$T_J = 150^\circ\text{C}$			
$t_{d(off)}$	$di/dt_{on} = 2840 \text{ A}/\mu\text{s}$	$T_J = 150^\circ\text{C}$	390		ns
t_f	$di/dt_{off} = 1880 \text{ A}/\mu\text{s}$	$T_J = 150^\circ\text{C}$	80		ns
E_{off}	$V_{GE} = +15/-15 \text{ V}$	$T_J = 150^\circ\text{C}$	14		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8 \text{ W/(mK)}$		0.33		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=2.5 \text{ W/(mK)}$		0.21		K/W

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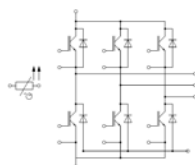
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
V _F = V _{EC}	I _F = 150 A	T _j = 25 °C		2.14	2.46	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.07	2.38	V
V _{F0}	chiplevel	T _j = 25 °C		1.30	1.50	V
		T _j = 150 °C		0.90	1.10	V
r _F	chiplevel	T _j = 25 °C		5.6	6.4	mΩ
		T _j = 150 °C		7.8	8.5	mΩ
I _{RRM}	I _F = 150 A	T _j = 150 °C		188		A
Q _{rr}	di/dt _{off} = 4020 A/μs	T _j = 150 °C		27		μC
	+15/-15	T _j = 150 °C		11.4		mJ
E _{rr}	V _{CC} = 600 V					
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/(mK)			0.52		K/W
R _{th(j-s)}	per Diode, λ _{paste} =2.5 W/(mK)			0.39		K/W
Module						
L _{CE}						nH
M _s	to heat sink		2		2.5	Nm
w				82		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					



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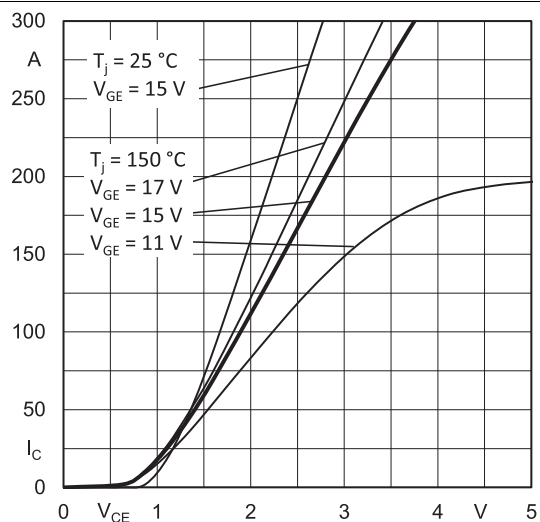


Fig. 1: Typ. output characteristic, inclusive $R_{CC'} + E_{E'}$

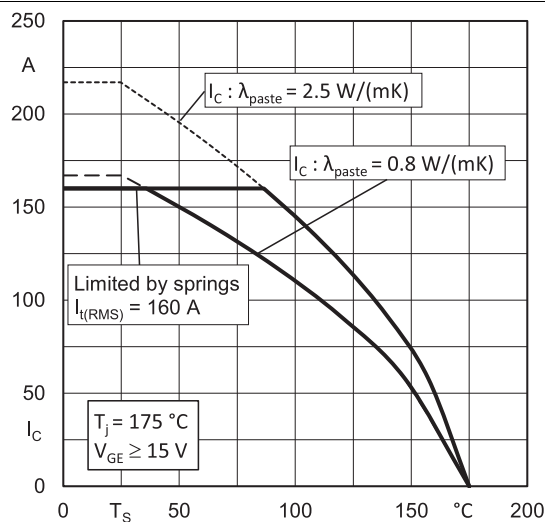


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

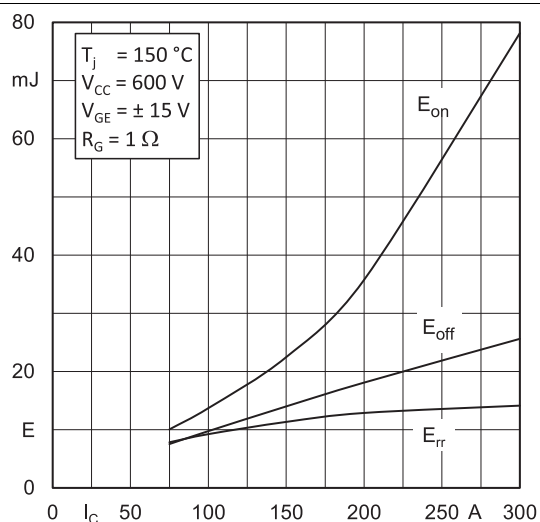


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

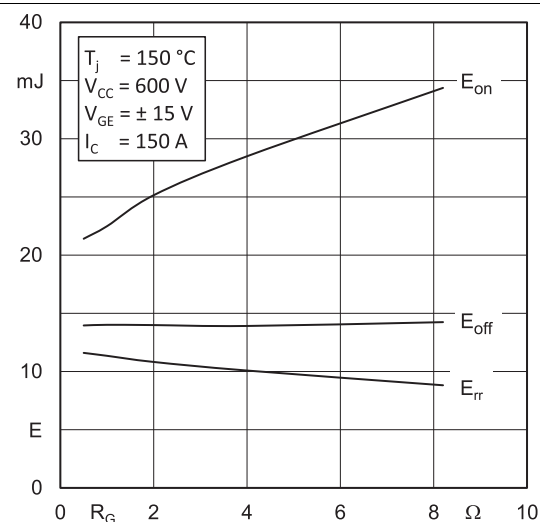


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

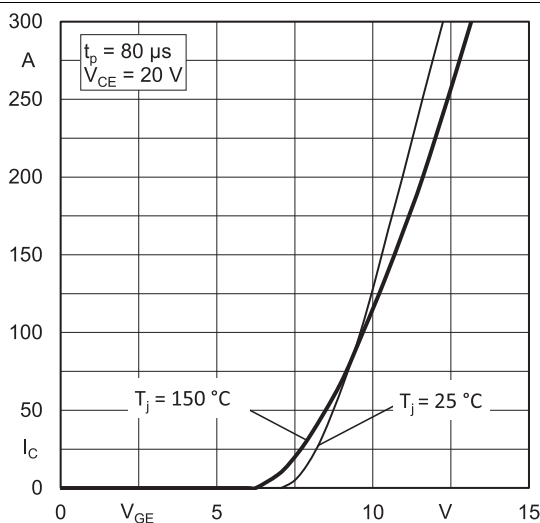


Fig. 5: Typ. transfer characteristic

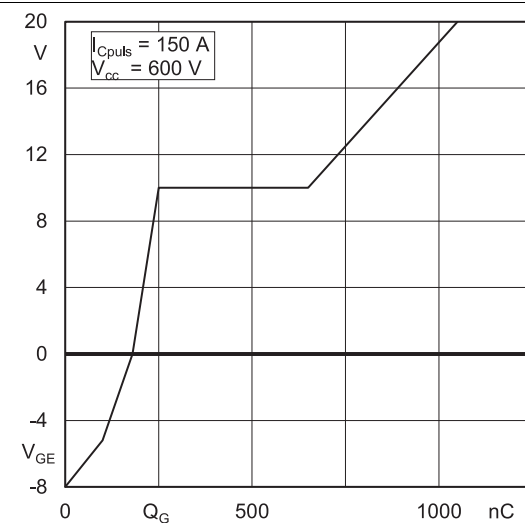
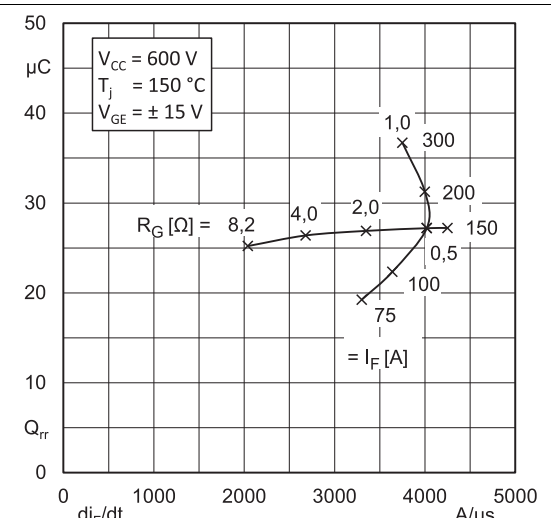
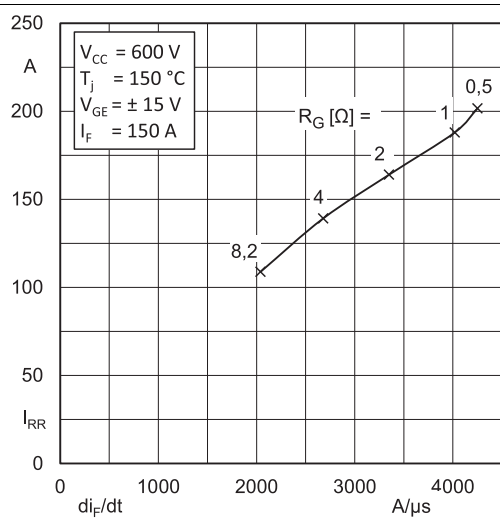
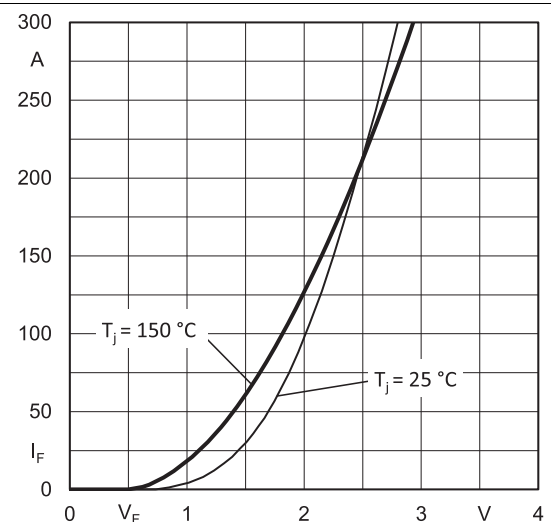
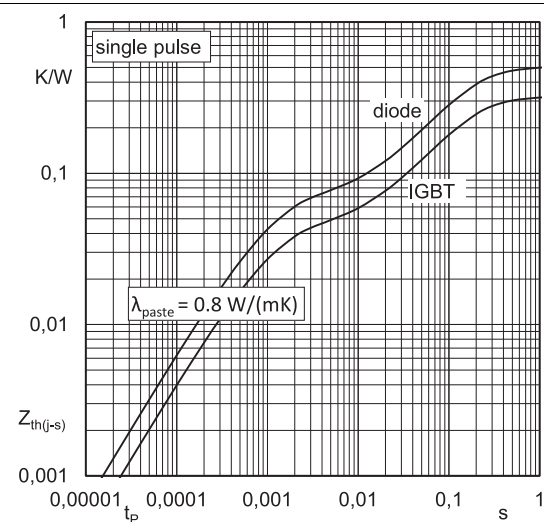
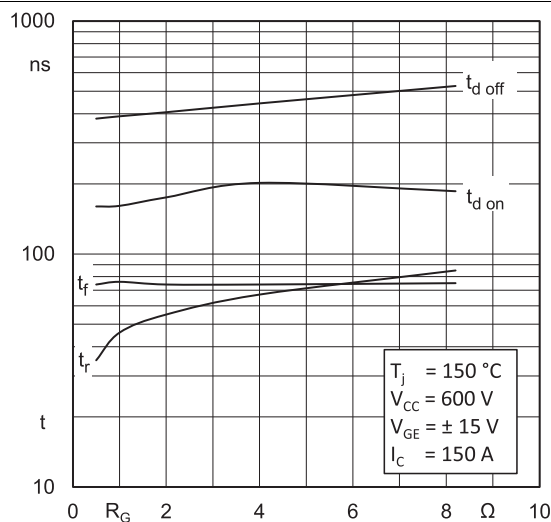
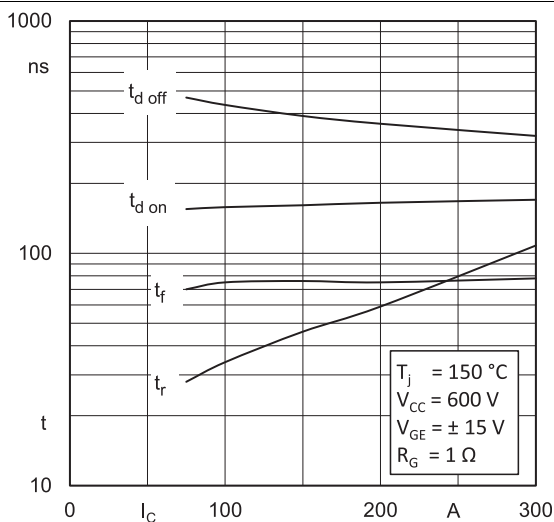
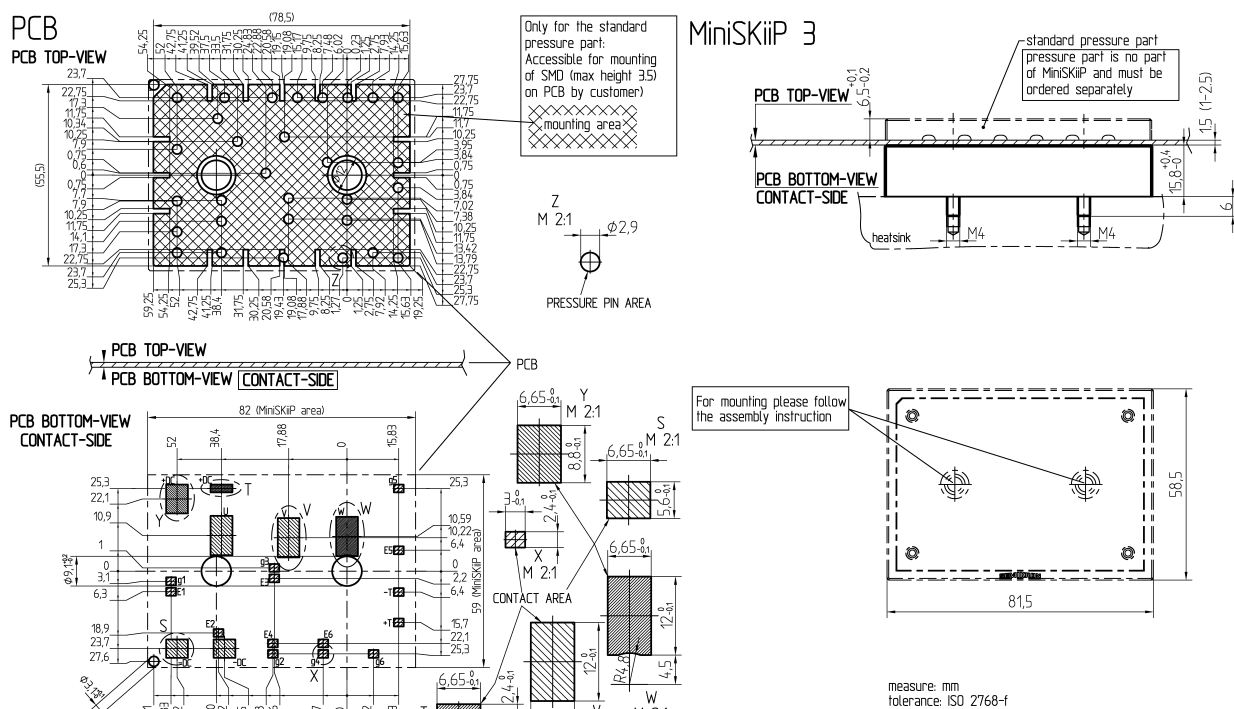
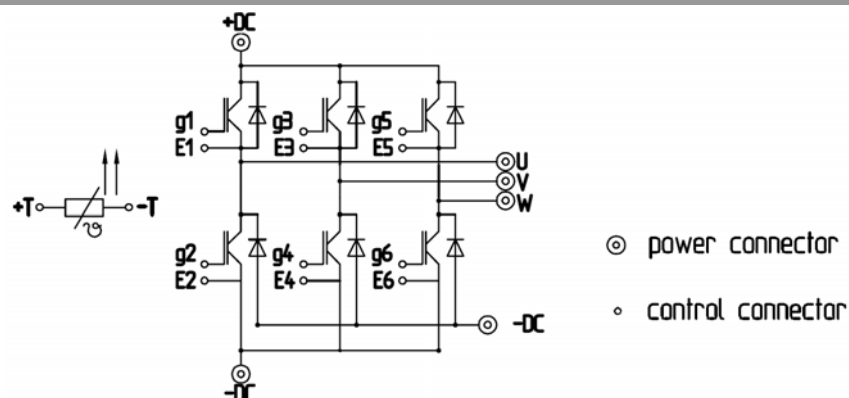


Fig. 6: Typ. gate charge characteristic





pinout, dimensions



pinout

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

*IMPORTANT INFORMATION AND WARNINGS

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