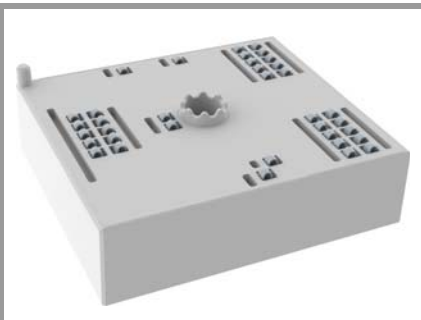


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MiniSKiiP® 2 Dual

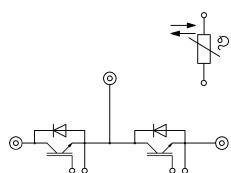
SKiiP26GB12F4V1

Features

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

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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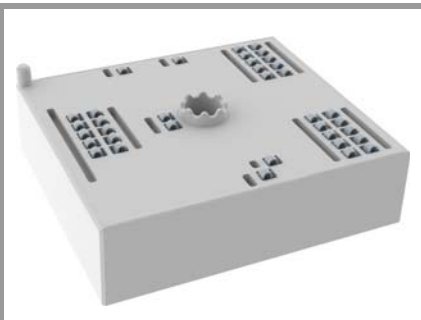
Absolute Maximum Ratings

Symbol	Conditions	Values	Unit	
Inverter - IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V	
I_C	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	202	A
		$T_s = 70^\circ\text{C}$	164	A
I_{Cnom}		200	A	
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	400	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 800\text{ V}$	$T_j = 150^\circ\text{C}$	10	μs
	$V_{GE} \leq 15\text{ V}$			
	$V_{CES} \leq 1200\text{ V}$			
T_j		-40 ... 175	$^\circ\text{C}$	
Inverse - Diode				
I_F	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	194	A
		$T_s = 70^\circ\text{C}$	154	A
I_{Fnom}		200	A	
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	600	A	
I_{FSM}	10 ms, sin 180°, $T_j = 150^\circ\text{C}$	990	A	
T_j		-40 ... 175	$^\circ\text{C}$	
Module				
$I_{t(RMS)}$	$T_{terminal} = 80^\circ\text{C}$, 20 A per spring	200	A	
T_{stg}		-40 ... 125	$^\circ\text{C}$	
V_{isol}	AC sinus 50 Hz, t = 1 min	2500	V	

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 200\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	2.05	2.40	V
		$T_j = 150^\circ\text{C}$	2.50	2.85	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	$T_j = 25^\circ\text{C}$	6.3	7.5	m Ω
		$T_j = 150^\circ\text{C}$	9.0	10	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 7.6\text{ mA}$	5.2	5.8	6.4	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$	$T_j = 25^\circ\text{C}$	0.1	0.3	mA
			-	-	mA
C_{ies}	$V_{CE} = 25\text{ V}$		12.30		nF
C_{oes}	$V_{GE} = 0\text{ V}$				nF
C_{res}			0.69		nF
Q_G	- 8 V...+ 15 V		1130		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		3.8		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ $I_C = 200\text{ A}$	$T_j = 150^\circ\text{C}$	167		ns
t_r	$R_{Gon} = 2\ \Omega$	$T_j = 150^\circ\text{C}$	52		ns
E_{on}	$R_{Goff} = 2\ \Omega$	$T_j = 150^\circ\text{C}$	16.8		mJ
$t_{d(off)}$	$di/dt_{on} = 4100\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$	414		ns
t_f	$di/dt_{off} = 2500\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$	52		ns
E_{off}	$V_{GE} = +15/-15\text{ V}$	$T_j = 150^\circ\text{C}$	16.3		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste} = 0.8\text{ W}/(\text{Km})$		0.25		K/W

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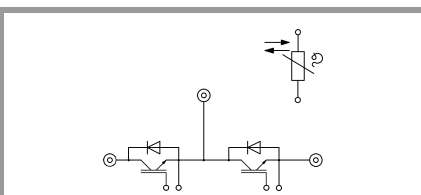
Features

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- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532
- NTC T-Sensor

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)
 $T_{j,op} = -40 \dots +150^\circ\text{C}$

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse - Diode						
$V_F = V_{EC}$	$I_F = 200\text{ A}$ $V_{GE} = 0\text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$		2.20	2.52	V
		$T_j = 150^\circ\text{C}$		2.15	2.47	V
V_{F0}	chiplevel	$T_j = 25^\circ\text{C}$		1.30	1.50	V
		$T_j = 150^\circ\text{C}$		0.90	1.10	V
r_F	chiplevel	$T_j = 25^\circ\text{C}$		4.5	5.1	m Ω
		$T_j = 150^\circ\text{C}$		6.3	6.9	m Ω
I_{RRM}	$I_F = 200\text{ A}$	$T_j = 150^\circ\text{C}$		189		A
Q_{rr}	$di/dt_{off} = 3840\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		28.7		μC
E_{rr}	$V_{GE} = -15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$		11.7		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste} = 0.8\text{ W}/(\text{K}\cdot\text{m})$			0.34		K/W
Module						
L_{CE}				20		nH
M_s	to heat sink		2		2.5	Nm
w				50		g
Temperature Sensor						
R_{100}	$T_c = 100^\circ\text{C}$ ($R_{25} = 5\text{ k}\Omega$)			$493 \pm 5\%$		Ω
$B_{25/85}$	$R(T) = R_{25} \cdot \exp[B_{25/85} \cdot (1/T - 1/298)]$, [T]=K			3420		K



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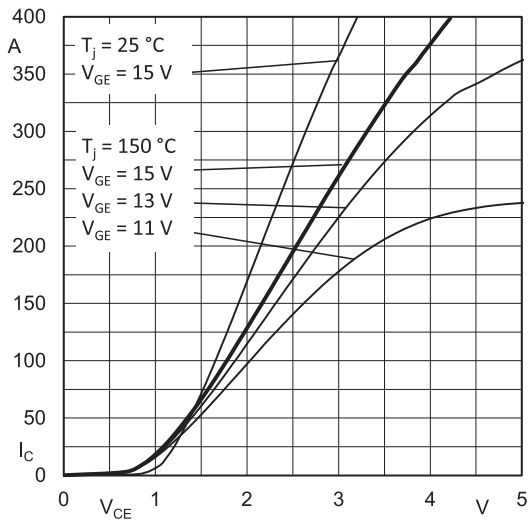


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

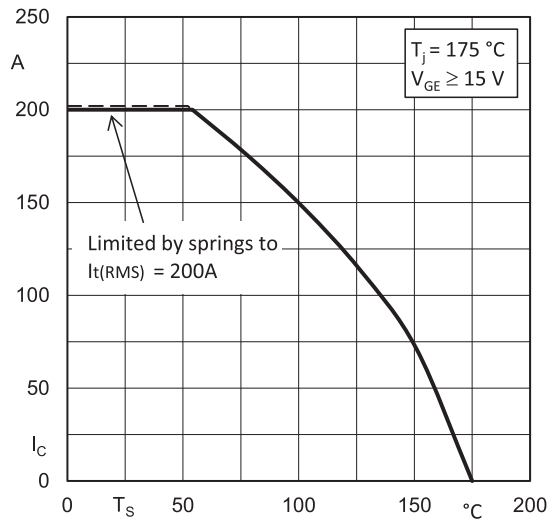


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

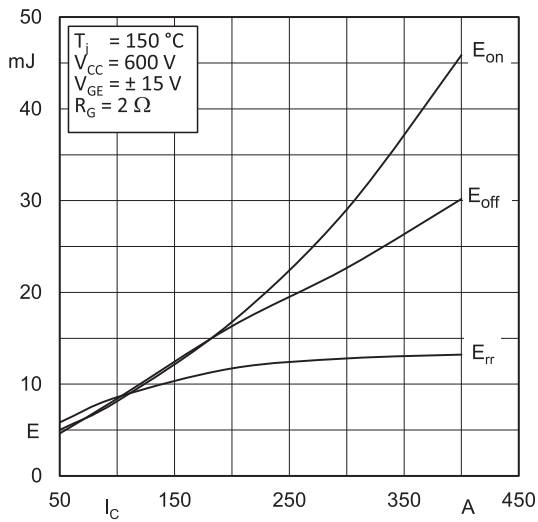


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

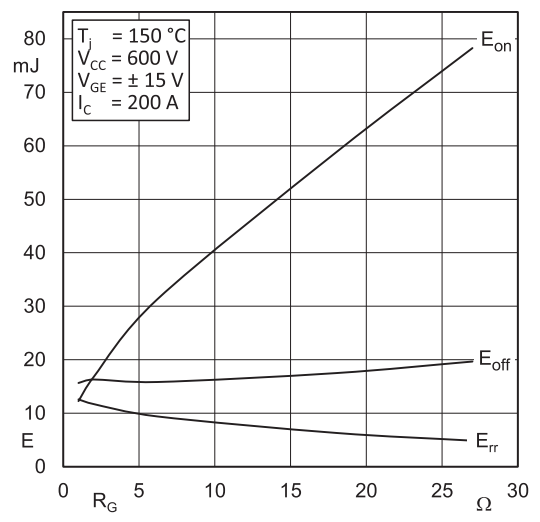


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

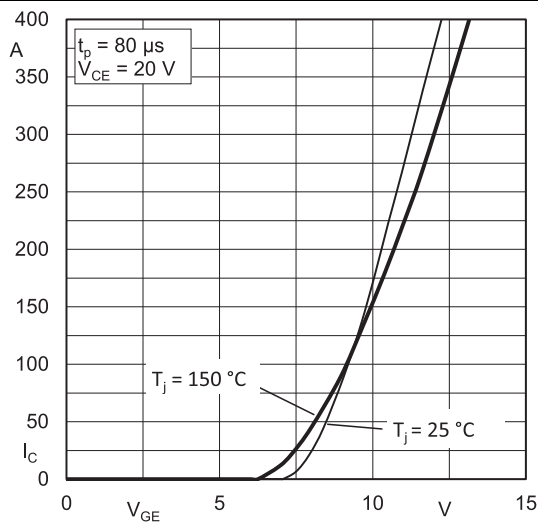


Fig. 5: Typ. transfer characteristic

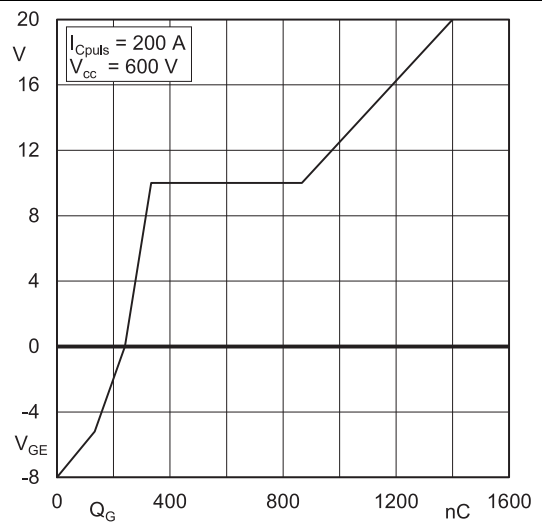


Fig. 6: Typ. gate charge characteristic

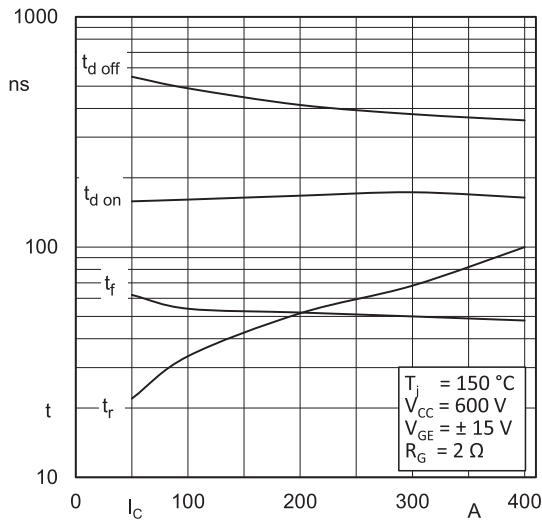


Fig. 7: Typ. switching times vs. I_C

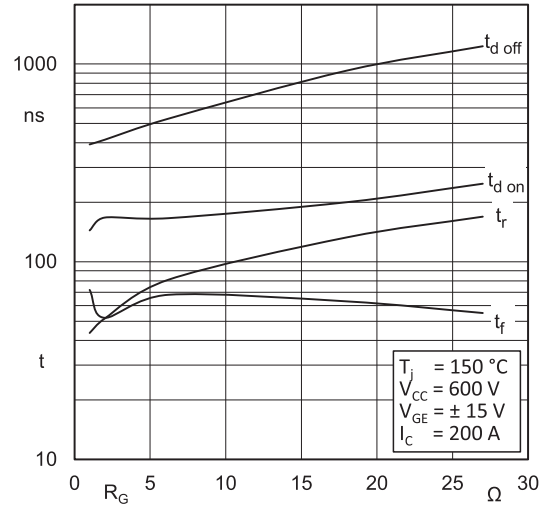


Fig. 8: Typ. switching times vs. gate resistor R_G

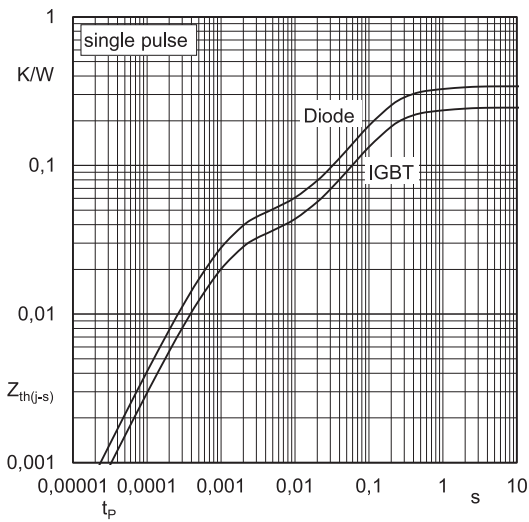


Fig. 9: Transient thermal impedance of IGBT and Diode

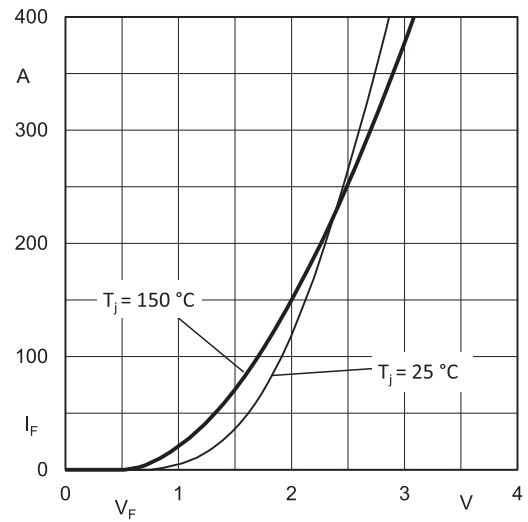


Fig. 10: Typ. CAL diode forward charact., incl. R_{CC+EE}

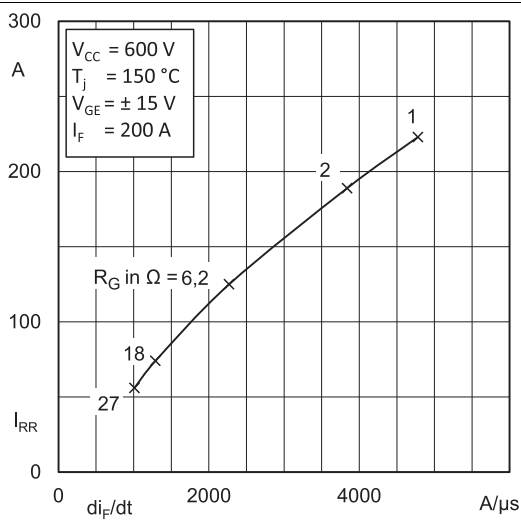


Fig. 11: Typ. CAL diode peak reverse recovery current

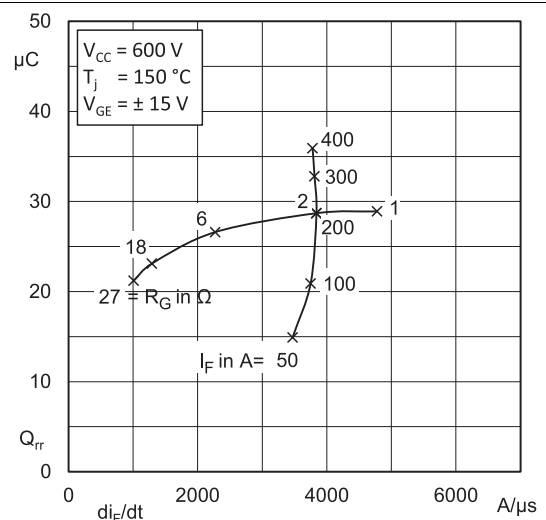
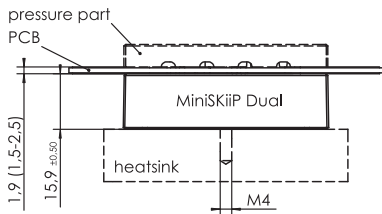


Fig. 12: Typ. CAL diode recovery charge

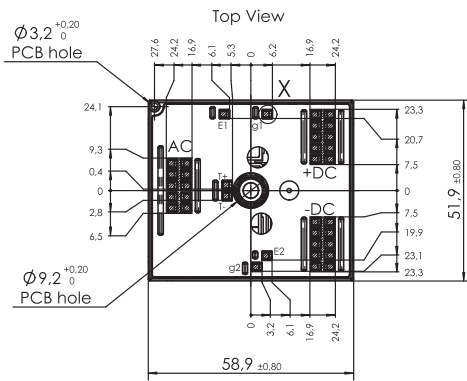
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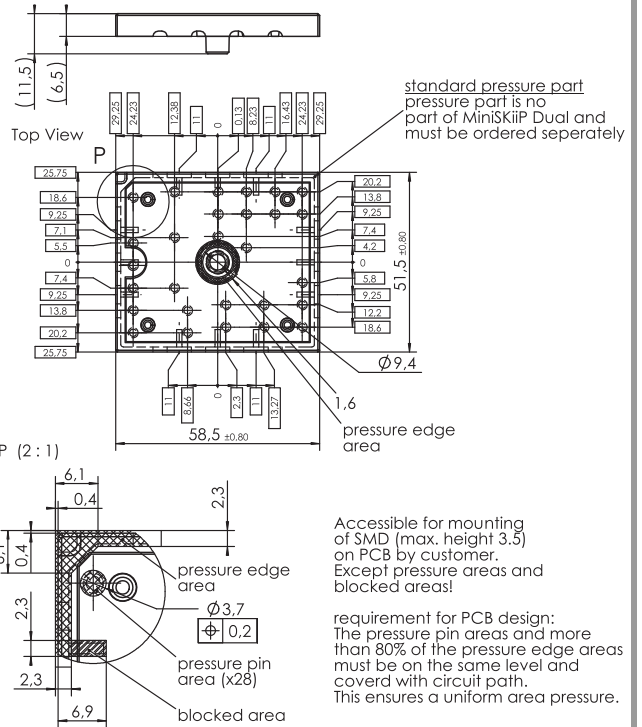
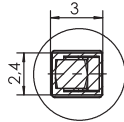
For mounting please follow the assembly instruction

requirement for PCB Design:
The MiniSKiIP area shall be covered with a maximum of circuit paths. This ensures a uniform area pressure

measure: mm
tolerance: +/- 0,2



X (5 : 1)
min. PCB pad size



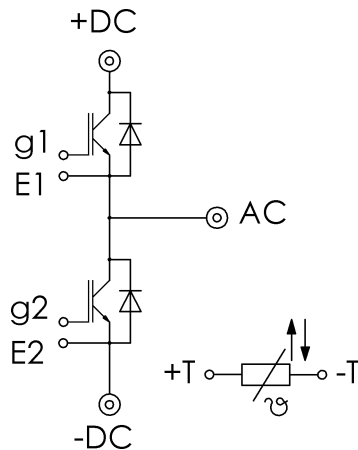
standard pressure part
pressure part is no part of MiniSKiIP Dual and must be ordered separately

Accessible for mounting of SMD (max. height 3.5) on PCB by customer. Except pressure areas and blocked areas!

requirement for PCB design:
The pressure pin areas and more than 80% of the pressure edge areas must be on the same level and covered with circuit path. This ensures a uniform area pressure.

measure: mm
tolerance: +/- 0,2

pinout, dimensions



- ⊙ power connector
- control connector

pinout

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

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