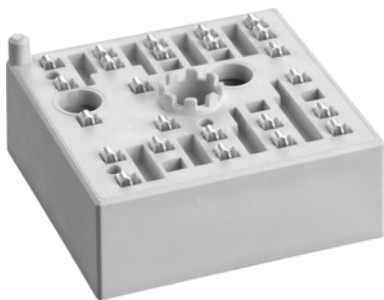


SKiIP 10NAB12T4V1



MiniSKiIP® 1

SKiIP 10NAB12T4V1

Features

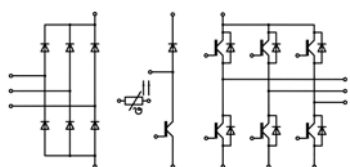
- Trench 4 IGBT's
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Remarks

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

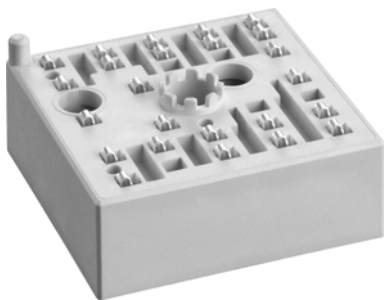
Absolute Maximum Ratings

Symbol	Conditions	Values	Unit	
Inverter - IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V	
I_C	$T_j = 150^\circ\text{C}$	$T_s = 25^\circ\text{C}$	6	A
		$T_s = 70^\circ\text{C}$	6	A
I_C	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	6	A
		$T_s = 70^\circ\text{C}$	6	A
I_{Cnom}		4	A	
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	12	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 150^\circ\text{C}$	10	μs
T_j		-40 ... 175	$^\circ\text{C}$	
Chopper - IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V	
I_C	$T_j = 150^\circ\text{C}$	$T_s = 25^\circ\text{C}$	6	A
		$T_s = 70^\circ\text{C}$	6	A
I_C	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	6	A
		$T_s = 70^\circ\text{C}$	6	A
I_{Cnom}		4	A	
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	12	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 800\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 150^\circ\text{C}$	10	μs
T_j		-40 ... 175	$^\circ\text{C}$	
Inverse - Diode				
V_{RRM}	$T_j = 25^\circ\text{C}$	1200	V	
I_F	$T_j = 150^\circ\text{C}$	$T_s = 25^\circ\text{C}$	7.5	A
		$T_s = 70^\circ\text{C}$	7.5	A
I_F	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	7.5	A
		$T_s = 70^\circ\text{C}$	7.5	A
I_{Fnom}		4	A	
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	12	A	
I_{FSM}	$t_p = 10\text{ ms}$, $\sin 180^\circ$, $T_j = 150^\circ\text{C}$	36	A	
T_j		-40 ... 175	$^\circ\text{C}$	
Freewheeling - Diode				
V_{RRM}	$T_j = 25^\circ\text{C}$	1200	V	
I_F	$T_j = 150^\circ\text{C}$	$T_s = 25^\circ\text{C}$	7.5	A
		$T_s = 70^\circ\text{C}$	7.5	A
I_F	$T_j = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$	7.5	A
		$T_s = 70^\circ\text{C}$	7.5	A
I_{Fnom}		4	A	
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	12	A	
I_{FSM}	$t_p = 10\text{ ms}$, $\sin 180^\circ$, $T_j = 150^\circ\text{C}$	36	A	
T_j		-40 ... 175	$^\circ\text{C}$	



NAB

SKiiP 10NAB12T4V1



MiniSKiiP® 1

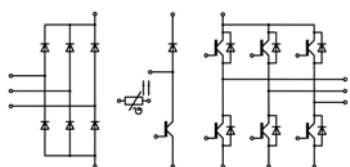
SKiiP 10NAB12T4V1

Features

- Trench 4 IGBT's
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Remarks

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



NAB

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit	
Rectifier - Diode				
V_{RRM}	$T_j = 25^\circ\text{C}$	1600	V	
I_F	$T_s = 25^\circ\text{C}, T_j = 150^\circ\text{C}$	39	A	
I_{Fnom}		8	A	
I_{FSM}	10 ms	$T_j = 25^\circ\text{C}$	220	A
	sin 180°	$T_j = 150^\circ\text{C}$	200	A
I^2t	10 ms	$T_j = 25^\circ\text{C}$	242	A ² s
	sin 180°	$T_j = 150^\circ\text{C}$	200	A ² s
T_j		-40 ... 150	°C	
Module				
$I_{t(RMS)}$	$T_{terminal} = 80^\circ\text{C}, 20\text{A per spring}$	20	A	
T_{stg}		-40 ... 125	°C	
V_{isol}	AC sinus 50Hz, 1 min	2500	V	

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 4\text{ A}$ $V_{GE} = 15\text{ V}$ 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}		$T_j = 25^\circ\text{C}$	0.8	0.9	V
		$T_j = 150^\circ\text{C}$	0.7	0.8	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	263	300	mΩ
		$T_j = 150^\circ\text{C}$	388	413	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}\text{ V}, I_C = 1\text{ mA}$	5	5.8	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = V_{CES}\text{ V}$	$T_j = 25^\circ\text{C}$	0.1	0.3	mA
					mA
C_{ies}	$V_{CE} = 25\text{ V}$		0.25		nF
C_{oes}	$V_{GE} = 0\text{ V}$		0.03		nF
C_{res}			0.01		nF
Q_G	- 8 V...+ 15 V		23		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		0.00		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$	65		ns
t_r	$I_C = 4\text{ A}$	$T_j = 150^\circ\text{C}$	45		ns
E_{on}	$R_{Gon} = 150\ \Omega$	$T_j = 150^\circ\text{C}$	0.66		mJ
$t_{d(off)}$	$R_{Goff} = 150\ \Omega$	$T_j = 150^\circ\text{C}$	300		ns
t_f		$T_j = 150^\circ\text{C}$	110		ns
E_{off}	$V_{GE} = +15/-15\text{ V}$	$T_j = 150^\circ\text{C}$	0.37		mJ
$R_{th(j-s)}$	per IGBT		2.49		K/W
Chopper - IGBT					
$V_{CE(sat)}$	$I_C = 4\text{ A}$ $V_{GE} = 15\text{ V}$ 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}		$T_j = 25^\circ\text{C}$	0.8	0.9	V
		$T_j = 150^\circ\text{C}$	0.7	0.8	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	263	300	mΩ
		$T_j = 150^\circ\text{C}$	388	413	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}\text{ V}, I_C = 1\text{ mA}$	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
		$T_j = 150^\circ\text{C}$			mA
Q_G	- 8 V...+ 15 V		23		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		0.00		Ω

SKiIP 10NAB12T4V1



MiniSKiIP® 1

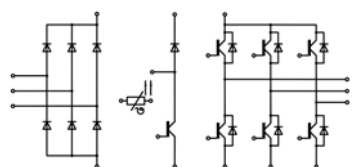
SKiIP 10NAB12T4V1

Features

- Trench 4 IGBT's
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Remarks

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



NAB

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Chopper - IGBT						
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$		65		ns
t_r	$I_C = 4\text{ A}$	$T_j = 150^\circ\text{C}$		45		ns
E_{on}	$R_{G\ on} = 150\ \Omega$	$T_j = 150^\circ\text{C}$		0.66		mJ
	$R_{G\ off} = 150\ \Omega$	$T_j = 150^\circ\text{C}$		300		ns
$t_{d(off)}$		$T_j = 150^\circ\text{C}$		110		ns
t_f		$T_j = 150^\circ\text{C}$		110		ns
E_{off}	$V_{GE} = +15/-15\text{ V}$	$T_j = 150^\circ\text{C}$		0.37		mJ
$R_{th(j-s)}$	per IGBT			2.49		K/W
Inverse - Diode						
$V_F = V_{EC}$	$I_F = 4\text{ A}$	$T_j = 25^\circ\text{C}$		1.8	2.1	V
	$V_{GE} = 0\text{ V}$ chiplevel	$T_j = 150^\circ\text{C}$		1.6	1.9	V
V_{F0}		$T_j = 25^\circ\text{C}$		1.3	1.5	V
		$T_j = 150^\circ\text{C}$		0.9	1.1	V
r_F		$T_j = 25^\circ\text{C}$		129	144	m Ω
		$T_j = 150^\circ\text{C}$		181	198	m Ω
I_{RRM}	$I_F = 4\text{ A}$	$T_j = 150^\circ\text{C}$		3.4		A
Q_{rr}	$di/dt_{off} = 110\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		0.95		μC
E_{rr}	$V_{GE} = -15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$		0.34		mJ
$R_{th(j-s)}$	per Diode			2.53		K/W
Freewheeling - Diode						
$V_F = V_{EC}$	$I_F = 4\text{ A}$	$T_j = 25^\circ\text{C}$		1.8	2.1	V
	$V_{GE} = 0\text{ V}$ chiplevel	$T_j = 150^\circ\text{C}$		1.6	1.9	V
V_{F0}		$T_j = 25^\circ\text{C}$		1.3	1.5	V
		$T_j = 150^\circ\text{C}$		0.9	1.1	V
r_F		$T_j = 25^\circ\text{C}$		129	144	m Ω
		$T_j = 150^\circ\text{C}$		181	198	m Ω
I_{RRM}	$I_F = 4\text{ A}$	$T_j = 150^\circ\text{C}$		3.4		A
Q_{rr}	$di/dt_{off} = 110\text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		0.95		μC
E_{rr}	$V_{GE} = -15\text{ V}$ $V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$		0.34		mJ
$R_{th(j-s)}$	per Diode			2.53		K/W
Rectifier - Diode						
$V_F = V_{EC}$	$I_F = 8\text{ A}$	$T_j = 25^\circ\text{C}$		1	1.21	V
	$V_{GE} = 0\text{ V}$ chiplevel	$T_j = 125^\circ\text{C}$			1.1	V
V_{F0}		$T_j = 25^\circ\text{C}$			1.0	V
		$T_j = 125^\circ\text{C}$			0.8	V
r_F		$T_j = 25^\circ\text{C}$		15	29	m Ω
		$T_j = 125^\circ\text{C}$			34	m Ω
$R_{th(j-s)}$	per Diode			1.5		K/W
Module						
M_s	to heat sink		2		2.5	Nm
w				35		g
Temperatur Sensor						
R_{100}	$T_r = 100^\circ\text{C}$, tolerance = 3 %			1670 \pm 3%		Ω
$R(T)$	$R(T) = 1000\ \Omega [1 + A(T - 25^\circ\text{C}) + B(T - 25^\circ\text{C})^2]$ $A = 7.635 \cdot 10^{-3}\ ^\circ\text{C}^{-1}$, $B = 1.731 \cdot 10^{-5}\ ^\circ\text{C}^{-2}$					

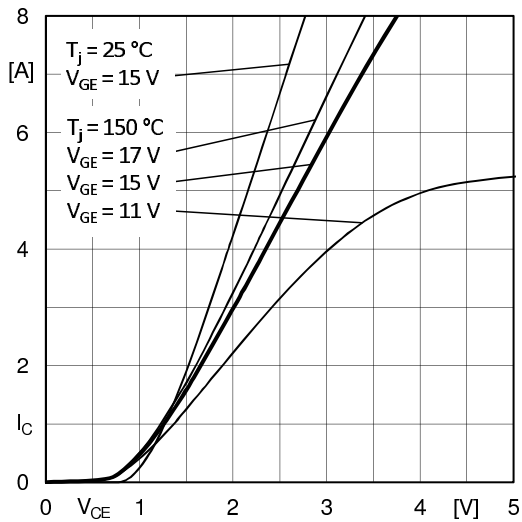


Fig. 1: Typ. output characteristic

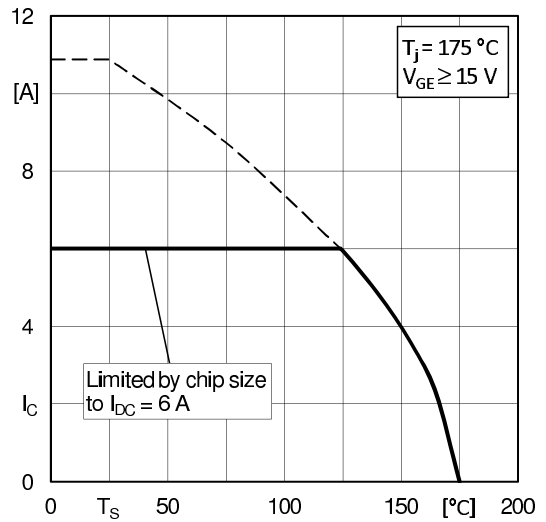


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_s)$

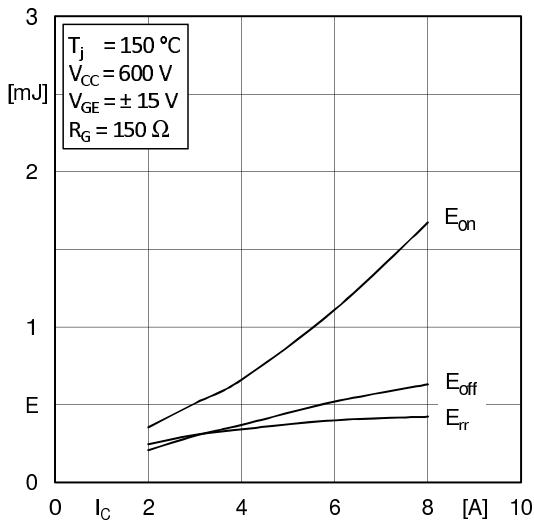


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

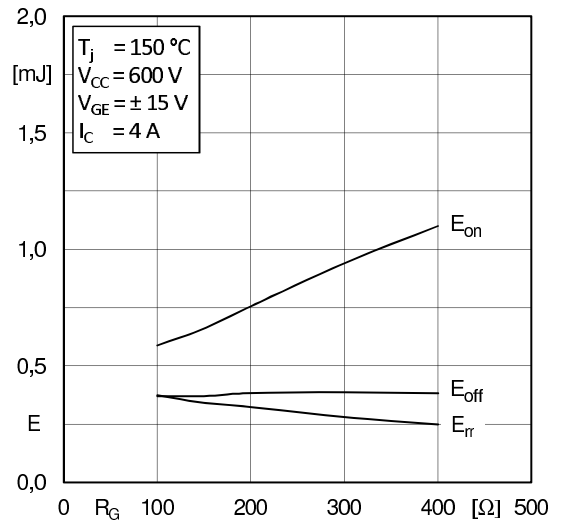


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

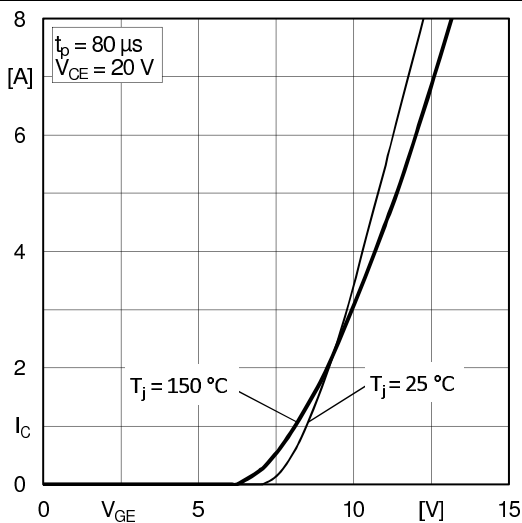


Fig. 5: Typ. transfer characteristic

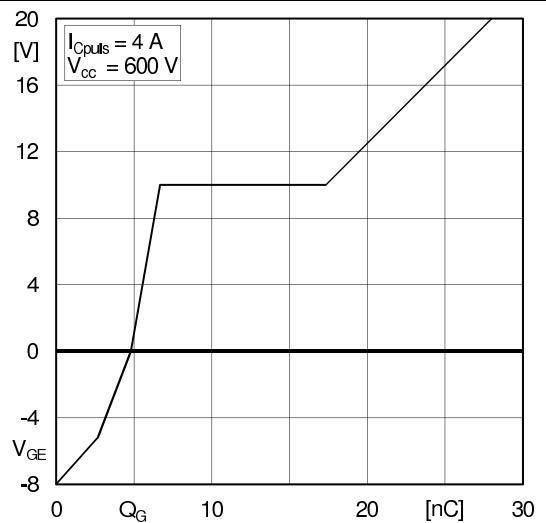


Fig. 6: Typ. gate charge characteristic

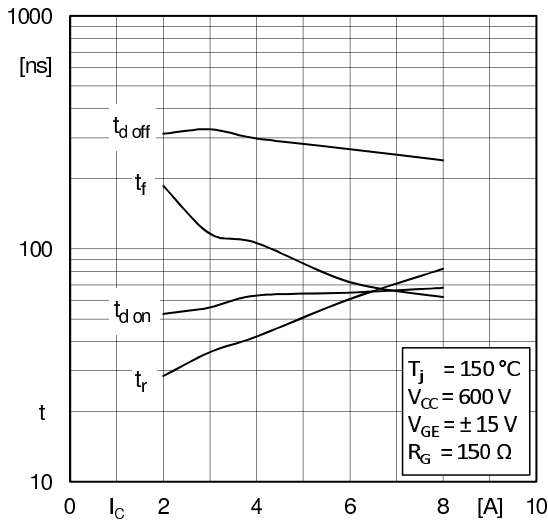


Fig. 7: Typ. switching times vs. I_c

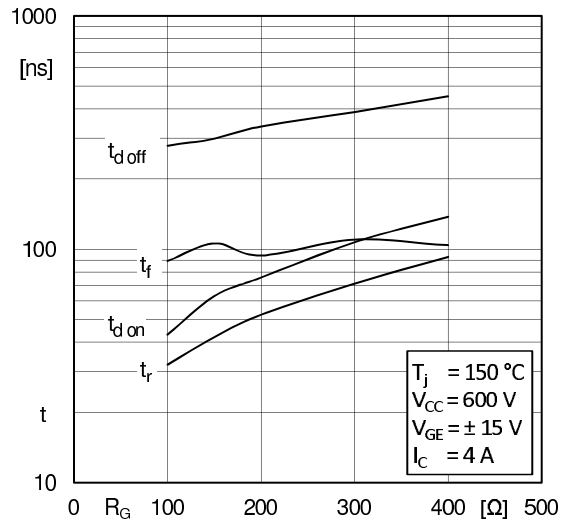


Fig. 8: Typ. switching times vs. gate resistor R_G

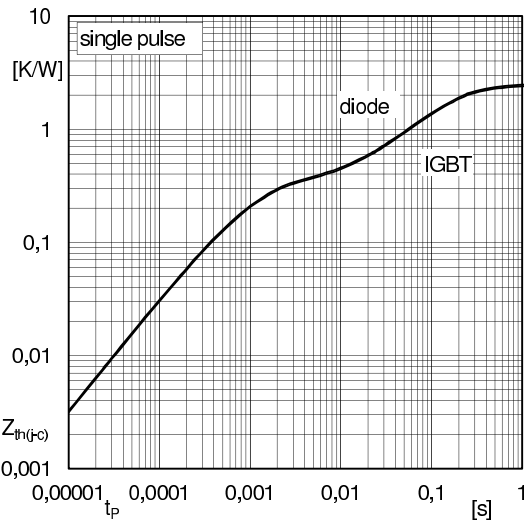


Fig. 9: Transient thermal impedance of IGBT and Diode

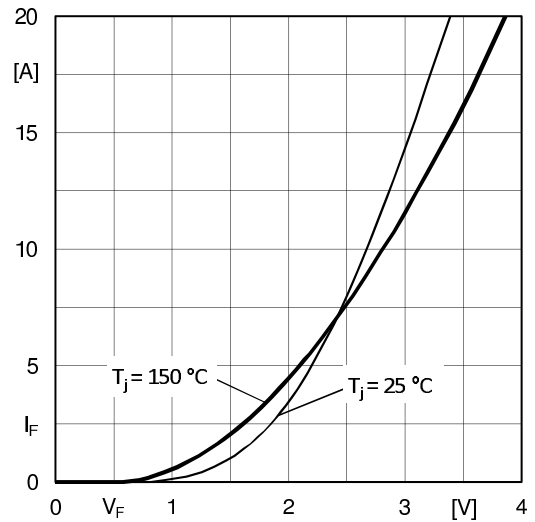


Fig. 10: CAL diode forward characteristic

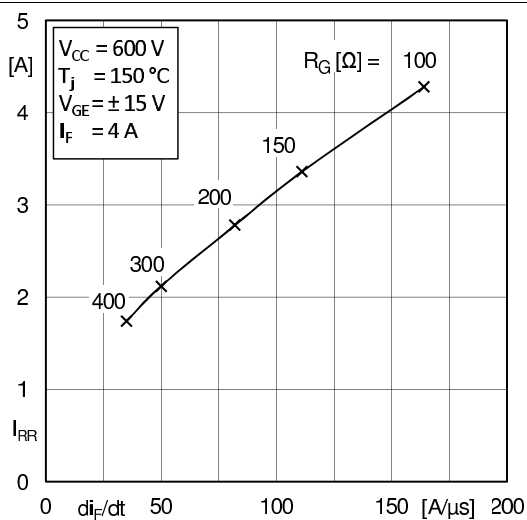


Fig. 11: Typ. CAL diode peak reverse recovery current

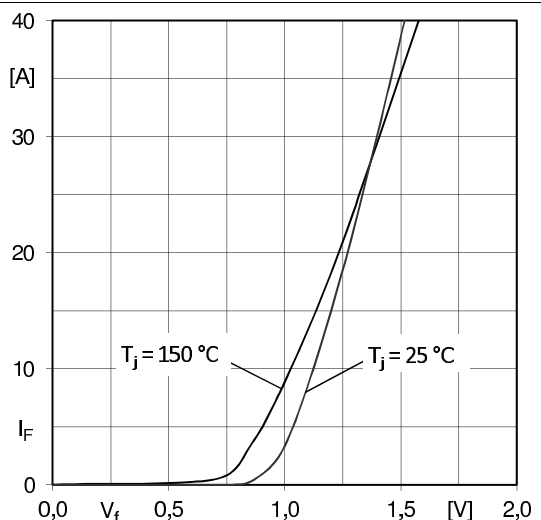
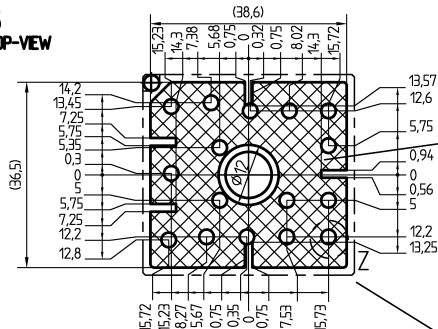


Fig. 12: Typ. input bridge forward characteristic

PCB PCB TOP-VIEW

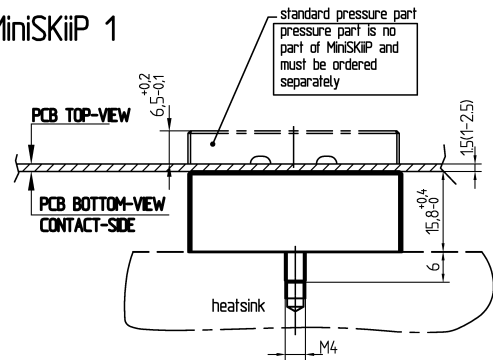


Only for the standard pressure part:
Accessible for mounting of SMD (max height 35) on PCB by customer

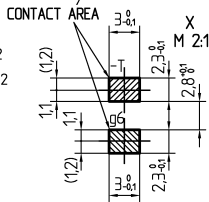
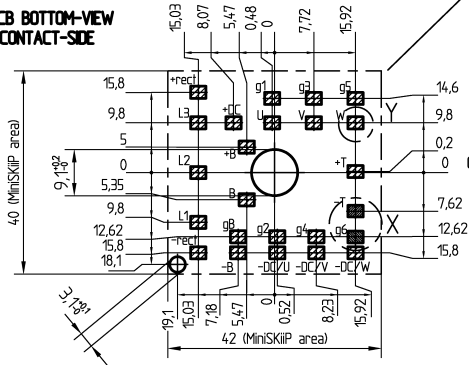
Z
M 2:1
φ 2,9

PRESSURE PIN AREA

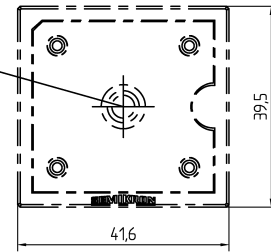
MiniSKiiP 1



PCB BOTTOM-VIEW CONTACT-SIDE



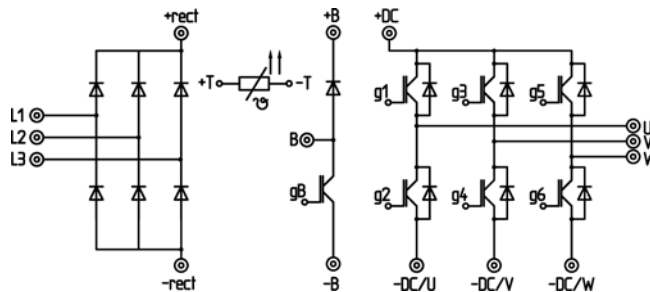
For mounting please follow the assembly instruction



measure: mm
tolerance: ISO 2768-f

These documents are Semikron property. Semikron reserves all copyrights. All copying and transmitting of this information requires written permission. For the case of industrial property rights, Semikron reserves all rights.

pinout, dimensions



pinout

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

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our staff.