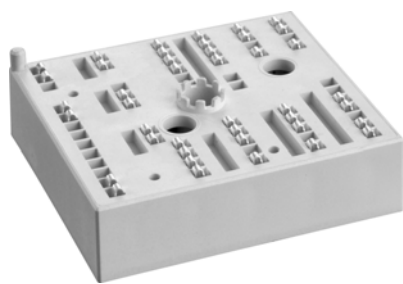


SKiiP 23NAB12T4V1



MiniSKiiP® 2

SKiiP 23NAB12T4V1

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

Typical Applications*

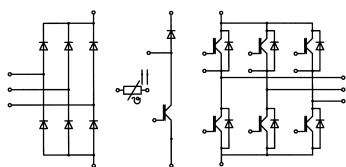
- Inverter up to 14 kVA
- Typical motor power 7,5 kW

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 = $-40 \dots +150^\circ\text{C}$)

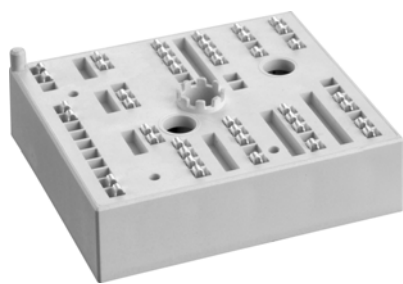
Absolute Maximum Ratings

Symbol	Conditions		Values	Unit
Inverter - IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 150 °C	T _s = 25 °C	33	A
		T _s = 70 °C	26	A
I _C	T _j = 175 °C	T _s = 25 °C	37	A
		T _s = 70 °C	30	A
I _{Cnom}			25	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		75	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
Chopper - IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 150 °C	T _s = 25 °C	33	A
		T _s = 70 °C	26	A
I _C	T _j = 175 °C	T _s = 25 °C	37	A
		T _s = 70 °C	30	A
I _{Cnom}			25	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		75	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				
V _{RRM}	T _j = 25 °C		1200	V
I _F	T _j = 150 °C	T _s = 25 °C	29	A
		T _s = 70 °C	22	A
I _F	T _j = 175 °C	T _s = 25 °C	32	A
		T _s = 70 °C	26	A
I _{Fnom}			25	A
I _{FRM}	I _{FRM} = 3xI _{Fnom}		75	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 150 °C		100	A
T _j			-40 ... 175	°C
Freewheeling - Diode				
V _{RRM}	T _j = 25 °C		1200	V
I _F	T _j = 150 °C	T _s = 25 °C	29	A
		T _s = 70 °C	22	A
I _F	T _j = 175 °C	T _s = 25 °C	32	A
		T _s = 70 °C	26	A
I _{Fnom}			25	A
I _{FRM}	I _{FRM} = 3xI _{Fnom}		75	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 150 °C		100	A
T _i			-40 ... 175	°C



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SKiiP 23NAB12T4V1



MiniSKiiP® 2

SKiiP 23NAB12T4V1

Features

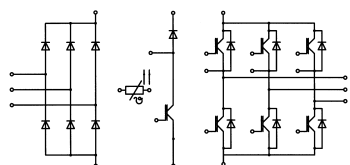
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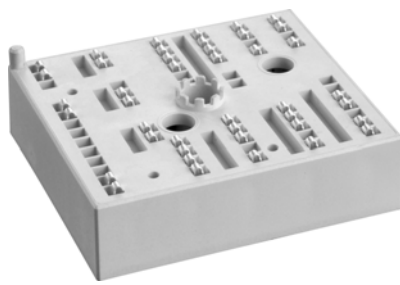
Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Rectifier - Diode			
V_{RRM}	$T_j = 25^\circ\text{C}$	1600	V
I_F	$T_s = 25^\circ\text{C}, T_j = 150^\circ\text{C}$	52	A
I_{Fnom}		13	A
I_{FSM}	10 ms	$T_j = 25^\circ\text{C}$	A
	sin 180°	$T_j = 150^\circ\text{C}$	A
I^2t	10 ms	$T_j = 25^\circ\text{C}$	A ² s
	sin 180°	$T_j = 150^\circ\text{C}$	A ² s
T_j		-40 ... 150	°C
Module			
$I_{t(RMS)}$	$T_{terminal} = 80^\circ\text{C}, 20\text{A per spring}$	40	A
T_{stg}		-40 ... 125	°C
V_{isol}	AC sinus 50Hz, 1 min	2500	V

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 25\text{ A}$				
	$V_{GE} = 15\text{ V}$ 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}	$V_{GE} = 15\text{ V}$				
	$T_j = 25^\circ\text{C}$	42	48		mΩ
	$T_j = 150^\circ\text{C}$	62	66		mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}\text{ V}, I_C = 1\text{ mA}$	5	5.8	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$				
	$T_j = 25^\circ\text{C}$	0.1	0.3		mA
	$V_{CE} = 1200\text{ V}$				mA
C_{ies}	$V_{CE} = 25\text{ V}$		1.43		nF
C_{oes}	$V_{GE} = 0\text{ V}$		0.12		nF
C_{res}			0.09		nF
Q_G	- 8 V...+ 15 V		142		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		0.00		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$		28		ns
t_r	$I_C = 25\text{ A}$		40		ns
E_{on}	$R_{G on} = 24\text{ Ω}$		2.65		mJ
$t_{d(off)}$	$R_{G off} = 24\text{ Ω}$		295		ns
t_f			68		ns
E_{off}	$V_{GE} = +15/-15\text{ V}$		2.3		mJ
$R_{th(j-s)}$	per IGBT		1.2		K/W
Chopper - IGBT					
$V_{CE(sat)}$	$I_C = 25\text{ A}$				
	$V_{GE} = 15\text{ V}$ 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}	$V_{GE} = 15\text{ V}$				
	$T_j = 25^\circ\text{C}$	42	48		mΩ
	$T_j = 150^\circ\text{C}$	62	66		mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}\text{ V}, I_C = 1\text{ mA}$	5	5.8	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$				
	$T_j = 25^\circ\text{C}$	0.1	0.3		mA
	$V_{CE} = 1200\text{ V}$				mA
Q_G	- 8 V...+ 15 V		142		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		0.00		Ω

SKiiP 23NAB12T4V1



MiniSKiiP® 2

SKiiP 23NAB12T4V1

Features

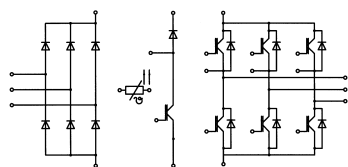
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Typical Applications*

- Inverter up to 14 kVA
- Typical motor power 7,5 kW

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 = $-40 \dots +150^\circ\text{C}$)



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Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Chopper - IGBT					
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ $T_j = 150^\circ\text{C}$		28		ns
t_r	$I_C = 25\text{ A}$ $T_j = 150^\circ\text{C}$		40		ns
E_{on}	$R_{G\ on} = 24\ \Omega$ $R_{G\ off} = 24\ \Omega$ $T_j = 150^\circ\text{C}$		2.65		mJ
$t_{d(off)}$	$T_j = 150^\circ\text{C}$		295		ns
t_f	$T_j = 150^\circ\text{C}$		68		ns
E_{off}	$V_{GE} = +15/-15\text{ V}$ $T_j = 150^\circ\text{C}$		2.3		mJ
$R_{th(j-s)}$	per IGBT		1.2		K/W
Inverse - Diode					
$V_F = V_{EC}$	$I_F = 25\text{ A}$ $V_{GE} = 0\text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$	2.40	2.7	V
		$T_j = 150^\circ\text{C}$	2.5	2.8	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		$T_j = 25^\circ\text{C}$	44	50	m Ω
		$T_j = 150^\circ\text{C}$	62	68	m Ω
I_{RRM}	$I_F = 25\text{ A}$ $di/dt_{off} = 850\text{ A}/\mu\text{s}$ $T_j = 150^\circ\text{C}$		24		A
Q_{rr}	$V_{GE} = -15\text{ V}$ $V_{CC} = 600\text{ V}$ $T_j = 150^\circ\text{C}$		3.7		μC
E_{rr}	$T_j = 150^\circ\text{C}$		1.6		mJ
$R_{th(j-s)}$	per Diode		1.52		K/W
Freewheeling - Diode					
$V_F = V_{EC}$	$I_F = 25\text{ A}$ $V_{GE} = 0\text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$	2.4	2.7	V
		$T_j = 150^\circ\text{C}$	2.5	2.8	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		$T_j = 25^\circ\text{C}$	44	50	m Ω
		$T_j = 150^\circ\text{C}$	62	68	m Ω
I_{RRM}	$I_F = 25\text{ A}$ $di/dt_{off} = 850\text{ A}/\mu\text{s}$ $T_j = 150^\circ\text{C}$		24		A
Q_{rr}	$V_{GE} = -15\text{ V}$ $V_{CC} = 600\text{ V}$ $T_j = 150^\circ\text{C}$		3.7		μC
E_{rr}	$T_j = 150^\circ\text{C}$		1.6		mJ
$R_{th(j-s)}$	per Diode		1.52		K/W
Rectifier - Diode					
$V_F = V_{EC}$	$I_F = 13\text{ A}$ $V_{GE} = 0\text{ V}$ chiplevel	$T_j = 25^\circ\text{C}$	1	1.21	V
		$T_j = 125^\circ\text{C}$		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		$T_j = 25^\circ\text{C}$	9.2	18	m Ω
		$T_j = 125^\circ\text{C}$		21	m Ω
$R_{th(j-s)}$	per Diode		1.25		K/W
Module					
M_s	to heat sink	2		2.5	Nm
w			65		g
Temperatur Sensor					
R_{100}	$T_r = 100^\circ\text{C}$, tolerance = 3 %		1670 $\pm$ 3%		Ω
$R(T)$	$R(T) = 1000\ \Omega [1 + A(T - 25^\circ\text{C}) + B(T - 25^\circ\text{C})^2]$], $A = 7.635 \cdot 10^{-3}\ ^\circ\text{C}^{-1}$, $B = 1.731 \cdot 10^{-5}\ ^\circ\text{C}^{-2}$				

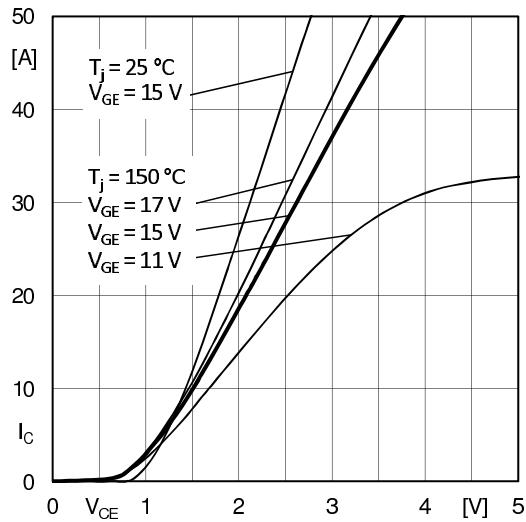


Fig. 1: Typ. output characteristic

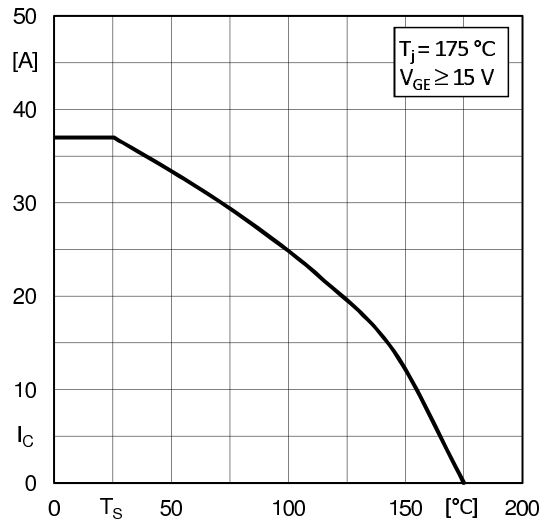


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_S)$

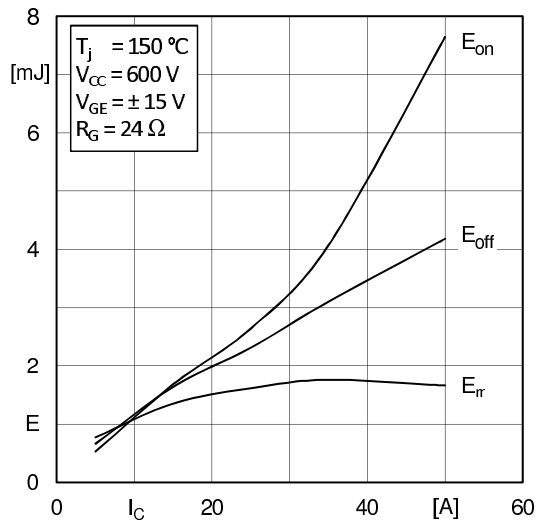


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

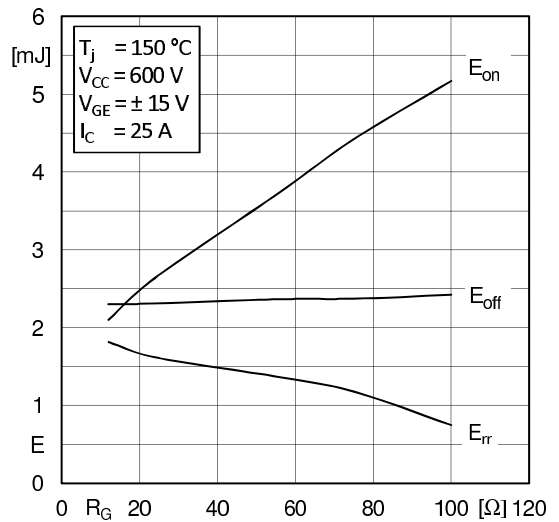


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

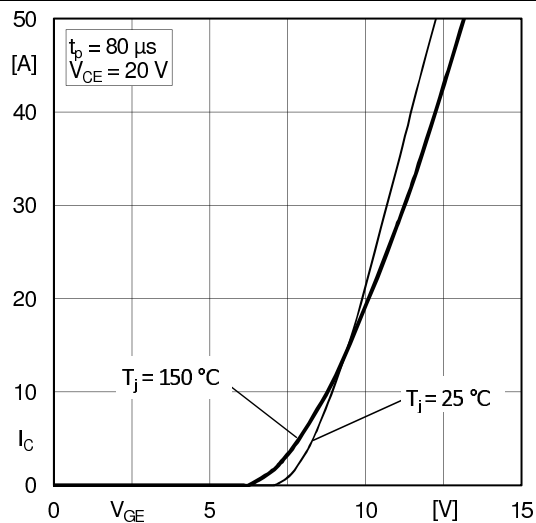


Fig. 5: Typ. transfer characteristic

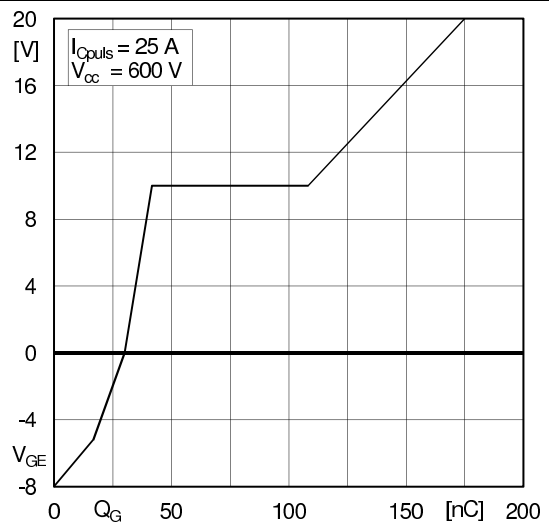
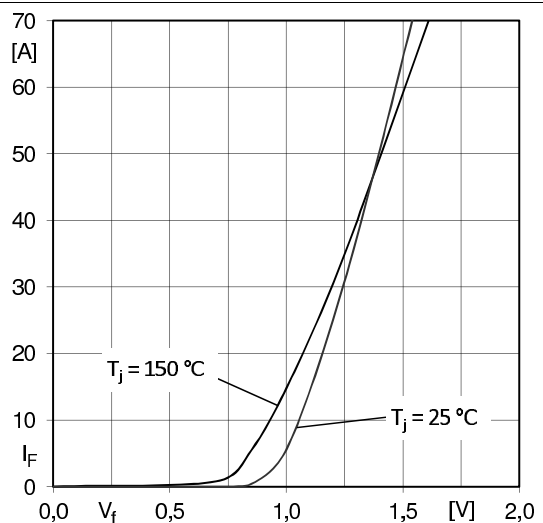
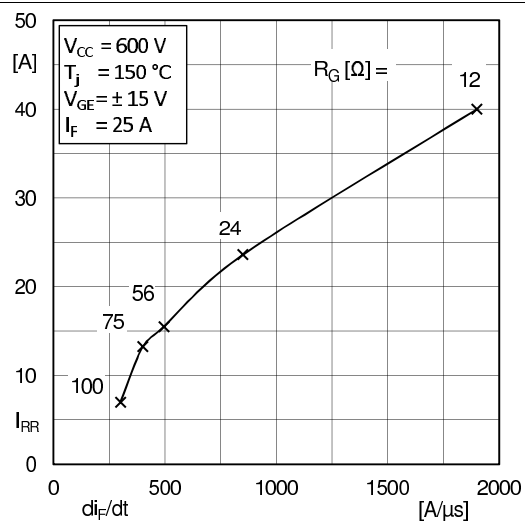
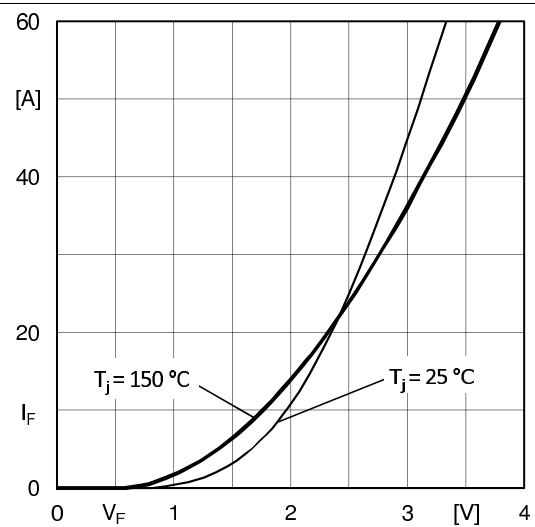
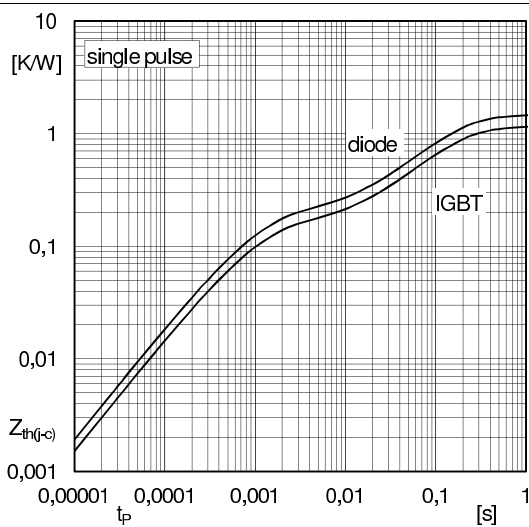
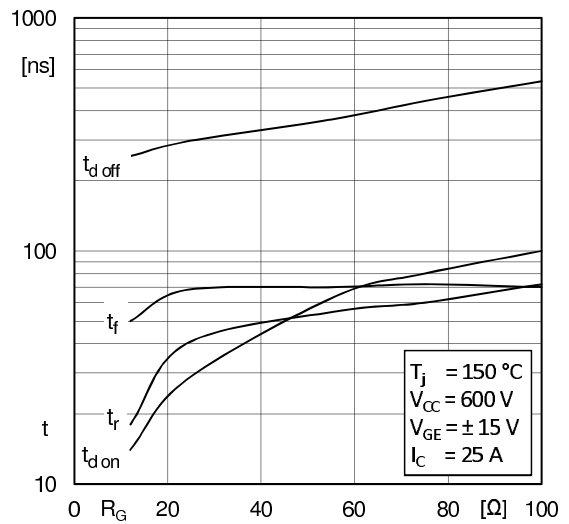
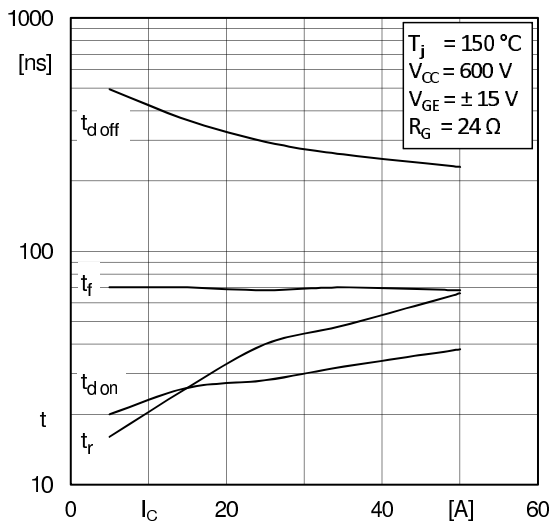
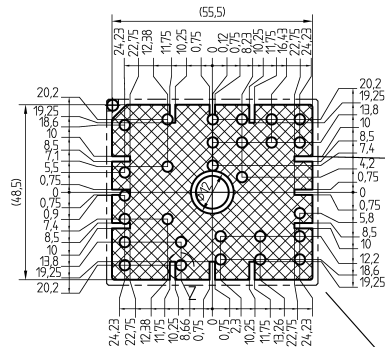


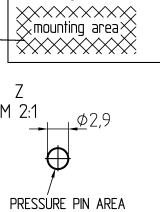
Fig. 6: Typ. gate charge characteristic



PCB
PCB TOP-VIEW

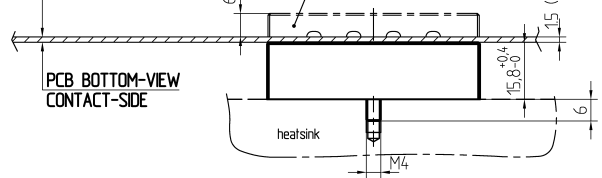


Only for the standard pressure part:
Accessible for mounting of SMD (max height 35) on PCB by customer



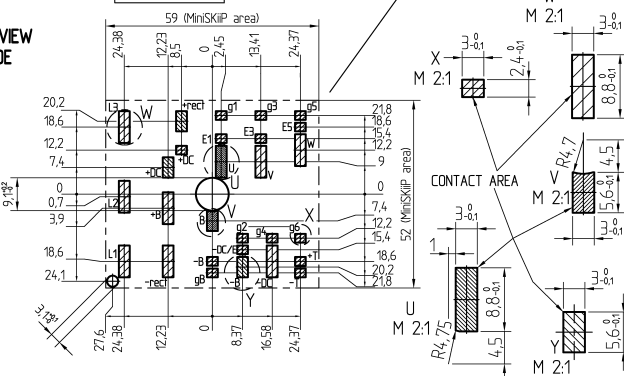
MiniSKiiP 2

PCB TOP-VIEW

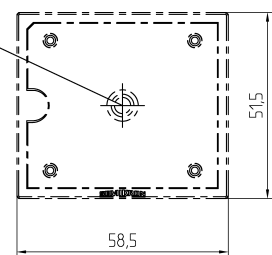


PCB TOP-VIEW
PCB BOTTOM-VIEW CONTACT-SIDE

PCB BOTTOM-VIEW CONTACT-SIDE



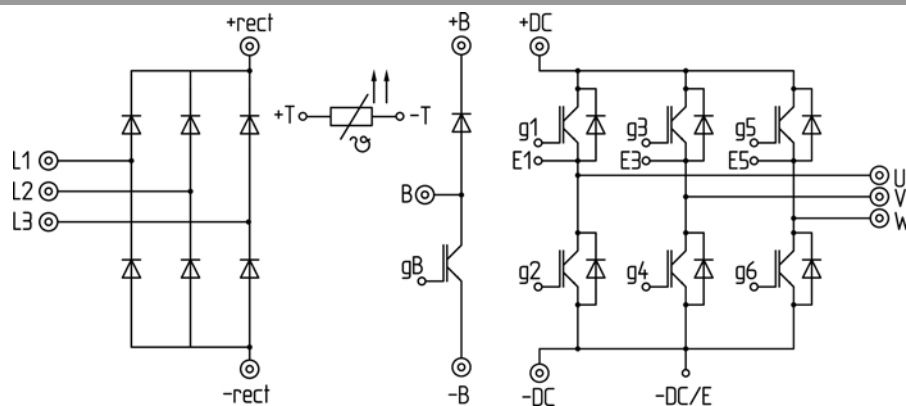
For mounting please follow the assembly instruction



measure: mm
tolerance: ISO 2768-f

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pinout, dimensions



⊙ power connector
• control connector

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.