

SKiiP 12NAB12T4V1



MiniSKiiP® 1

SKiiP 12NAB12T4V1

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*

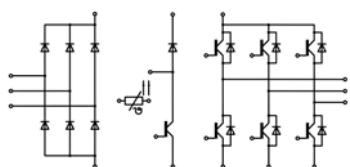
- Inverter up to 12 kVA
- Typical motor power 5,5 kW

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	18	A
		T _s = 70 °C	18	A
I _C	T _j = 175 °C	T _s = 25 °C	18	A
		T _s = 70 °C	18	A
I _{Cnom}			15	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		45	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	18	A
		T _s = 70 °C	18	A
I _C	T _j = 175 °C	T _s = 25 °C	18	A
		T _s = 70 °C	18	A
I _{Cnom}			15	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		45	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	21	A
		T _s = 70 °C	16	A
I _F	T _j = 175 °C	T _s = 25 °C	23	A
		T _s = 70 °C	18	A
I _{Fnom}			15	A
I _{FRM}	I _{FRM} = 3 x I _{Fnom}		45	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 150 °C		65	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	22	A
		T _s = 70 °C	16	A
I _F	T _j = 175 °C	T _s = 25 °C	22	A
		T _s = 70 °C	22	A
I _{Fnom}			15	A
I _{FRM}	I _{FRM} = 3 x I _{Fnom}		45	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 150 °C		65	A
T _i			-40 ... 175	°C



NAB

SKiiP 12NAB12T4V1



MiniSKiiP® 1

SKiiP 12NAB12T4V1

Features

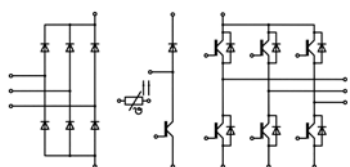
- Trench 4 IGBT's
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Typical Applications*

- Inverter up to 12 kVA
- Typical motor power 5,5 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 = $-40 \dots +150^\circ\text{C}$)



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	$T_j = 25^\circ\text{C}$	A
	sin 180°	$T_j = 150^\circ\text{C}$	A
I^2t	10 ms	$T_j = 25^\circ\text{C}$	A^2s
	sin 180°	$T_j = 150^\circ\text{C}$	A^2s
T_j		-40 ... 150	$^\circ\text{C}$
Module			
$I_{t(RMS)}$	$T_{terminal} = 80^\circ\text{C}$, 20A per spring	20	A
T_{stg}		-40 ... 125	$^\circ\text{C}$
V_{isol}	AC sinus 50Hz, 1 min	2500	V

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 15\text{ A}$ $V_{GE} = 15\text{ V}$ 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}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	70	80	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	103	110	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}\text{ V}$, $I_C = 1\text{ mA}$	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
					mA
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	0.90		nF
C_{oes}		$f = 1\text{ MHz}$	0.08		nF
C_{res}		$f = 1\text{ MHz}$	0.06		nF
Q_G	- 8 V...+ 15 V		85		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		0.00		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 150^\circ\text{C}$	15		ns
t_r	$I_C = 15\text{ A}$	$T_j = 150^\circ\text{C}$	25		ns
E_{on}	$R_{G on} = 16\ \Omega$	$T_j = 150^\circ\text{C}$	1.4		mJ
$t_{d(off)}$	$R_{G off} = 16\ \Omega$	$T_j = 150^\circ\text{C}$	260		ns
t_f		$T_j = 150^\circ\text{C}$	75		ns
E_{off}	$V_{GE} = +15/-15\text{ V}$	$T_j = 150^\circ\text{C}$	1.3		mJ
$R_{th(j-s)}$	per IGBT		1.3		K/W
Chopper - IGBT					
$V_{CE(sat)}$	$I_C = 15\text{ A}$ $V_{GE} = 15\text{ V}$ 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}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	70	80	$\text{m}\Omega$
		$T_j = 150^\circ\text{C}$	103	110	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE}\text{ V}$, $I_C = 1\text{ mA}$	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		85		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		0.00		Ω

SKiiP 12NAB12T4V1



MiniSKiiP® 1

SKiiP 12NAB12T4V1

Features

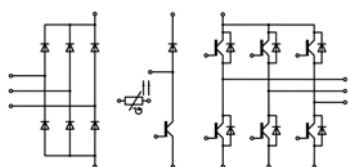
- Trench 4 IGBT's
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Typical Applications*

- Inverter up to 12 kVA
- Typical motor power 5,5 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 = $-40 \dots +150^\circ\text{C}$)



NAB

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Chopper - IGBT						
t _{d(on)}	V _{CC} = 600 V	T _j = 150 °C		15		ns
t _r	I _C = 15 A	T _j = 150 °C		25		ns
E _{on}	R _{G on} = 16 Ω	T _j = 150 °C		1.4		mJ
t _{d(off)}	R _{G off} = 16 Ω	T _j = 150 °C		260		ns
t _f		T _j = 150 °C		75		ns
E _{off}	V _{GE} = +15/-15 V	T _j = 150 °C		1.3		mJ
R _{th(j-s)}	per IGBT			1.3		K/W
Inverse - Diode						
V _F = V _{EC}	I _F = 15 A	T _j = 25 °C		2.40	2.7	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.4	2.8	V
V _{F0}		T _j = 25 °C		1.3	1.5	V
		T _j = 150 °C		0.9	1.1	V
r _F		T _j = 25 °C		72	81	mΩ
		T _j = 150 °C		103	111	mΩ
I _{RRM}	I _F = 15 A	T _j = 150 °C		28		A
Q _{rr}	di/dt _{off} = 1180 A/μs	T _j = 150 °C		2.6		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 150 °C		1.1		mJ
R _{th(j-s)}	per Diode			1.92		K/W
Freewheeling - Diode						
V _F = V _{EC}	I _F = 15 A	T _j = 25 °C		2.4	2.7	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.4	2.8	V
V _{F0}		T _j = 25 °C		1.3	1.5	V
		T _j = 150 °C		0.9	1.1	V
r _F		T _j = 25 °C		72	81	mΩ
		T _j = 150 °C		103	111	mΩ
I _{RRM}	I _F = 15 A	T _j = 150 °C		28		A
Q _{rr}	di/dt _{off} = 1180 A/μs	T _j = 150 °C		2.6		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 150 °C		1.1		mJ
R _{th(j-s)}	per Diode			1.92		K/W
Rectifier - Diode						
V _F = V _{EC}	I _F = 8 A	T _j = 25 °C		1	1.21	V
	V _{GE} = 0 V chiplevel	T _j = 125 °C			1.1	V
V _{F0}		T _j = 25 °C			1.0	V
		T _j = 125 °C			0.8	V
r _F		T _j = 25 °C		15	29	mΩ
		T _j = 125 °C			34	mΩ
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 °C, tolerance = 3 %			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					

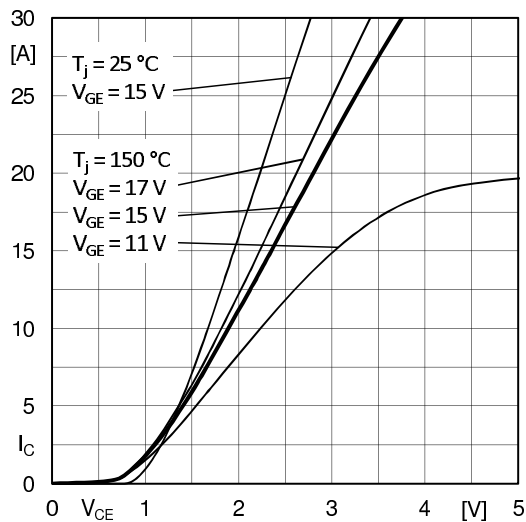


Fig. 1: Typ. output characteristic

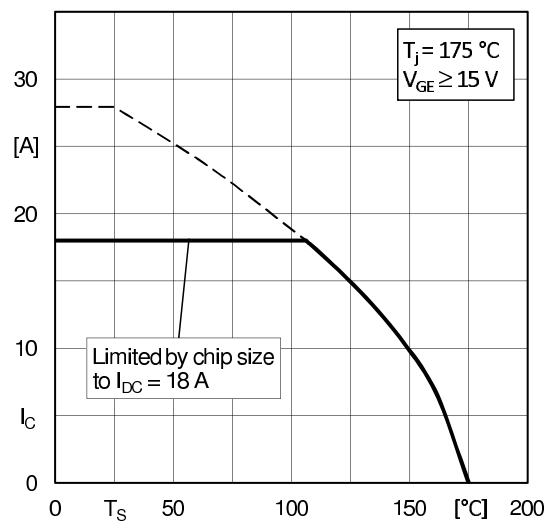


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_S)$

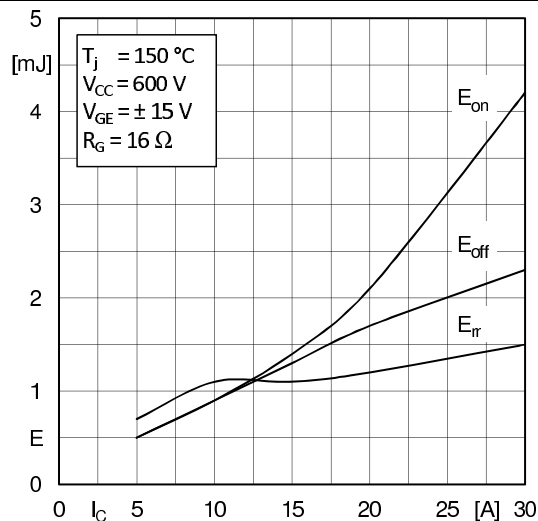


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

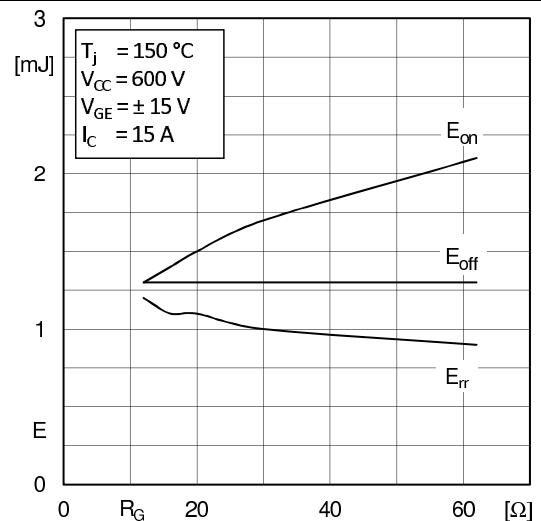


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

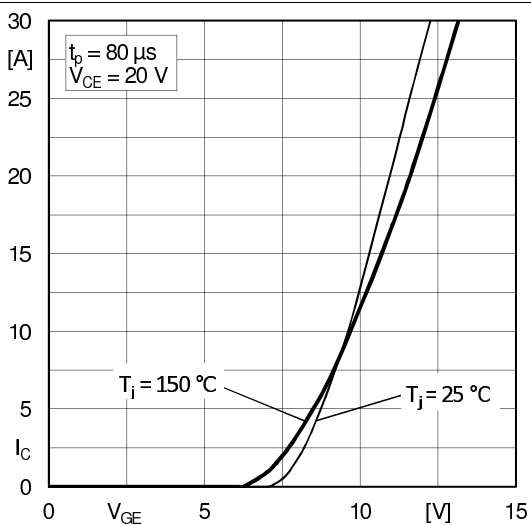


Fig. 5: Typ. transfer characteristic

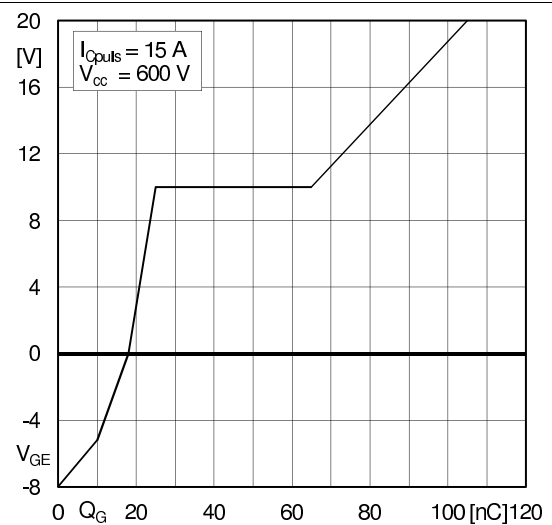


Fig. 6: Typ. gate charge characteristic

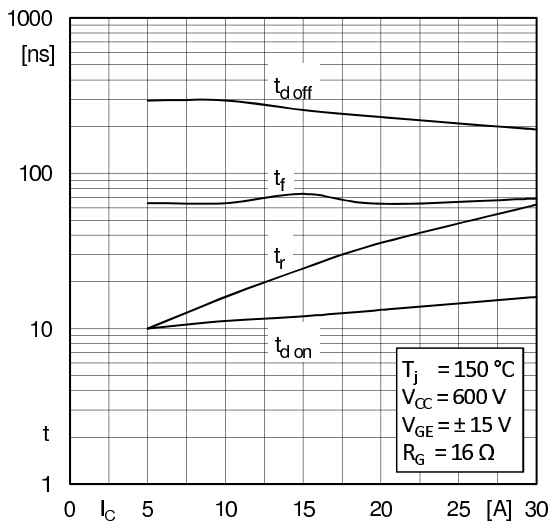


Fig. 7: Typ. switching times vs. I_C

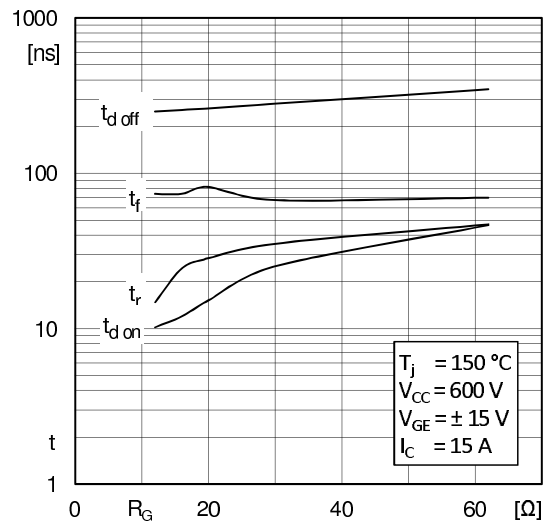


Fig. 8: Typ. switching times vs. gate resistor R_G

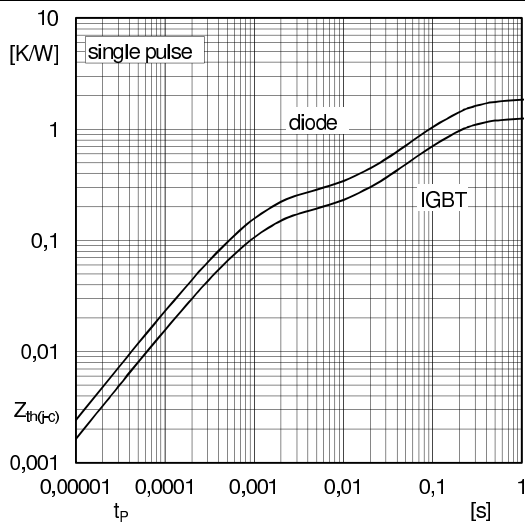


Fig. 9: Transient thermal impedance of IGBT and Diode

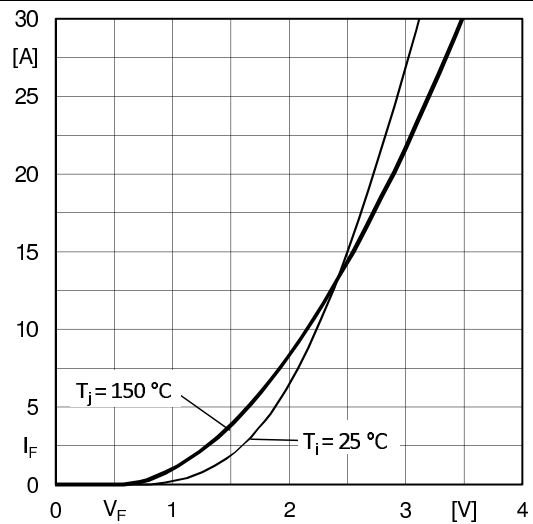


Fig. 10: CAL diode forward characteristic

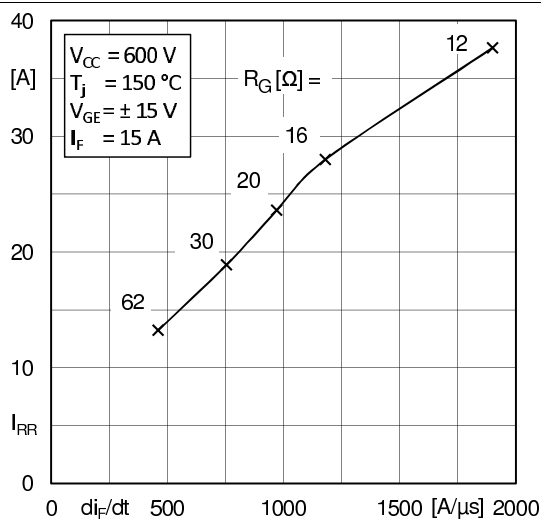


Fig. 11: Typ. CAL diode peak reverse recovery current

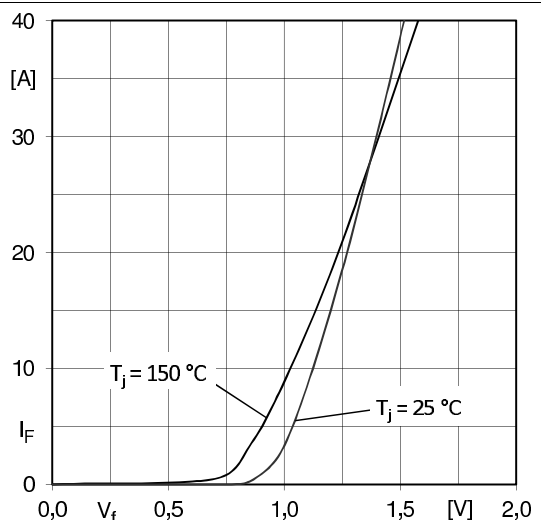
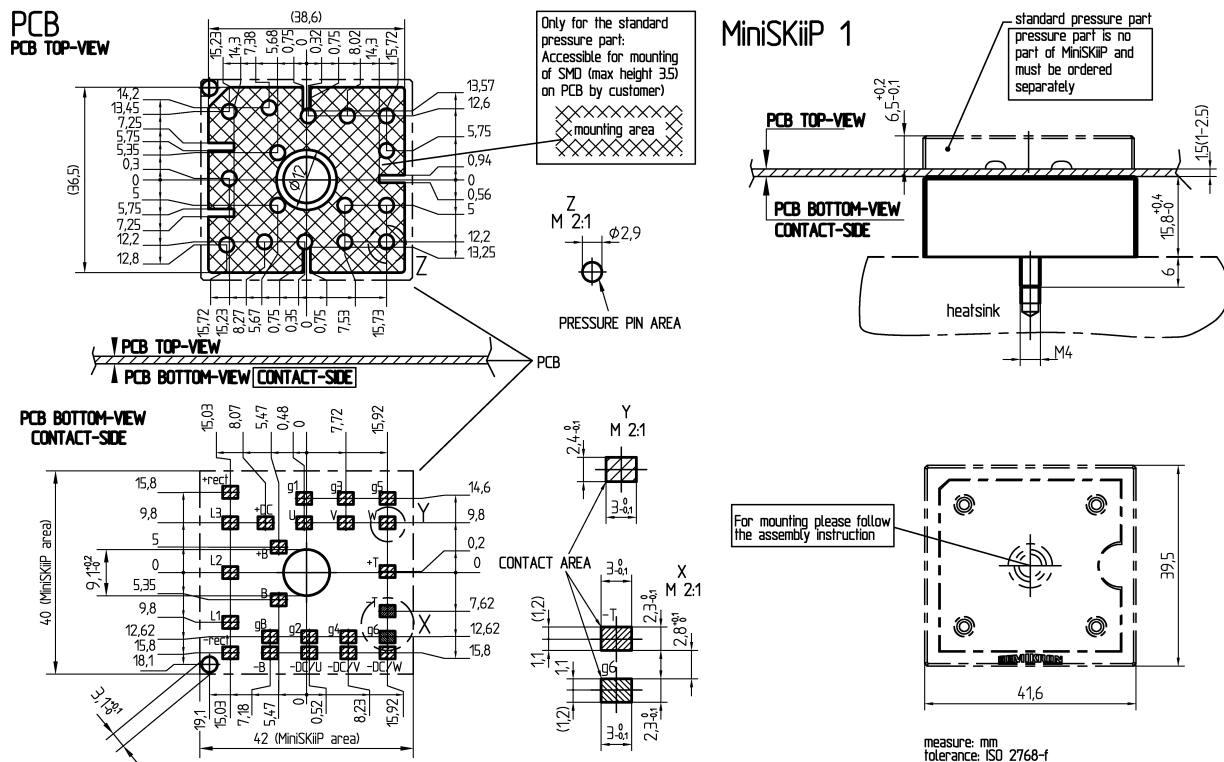


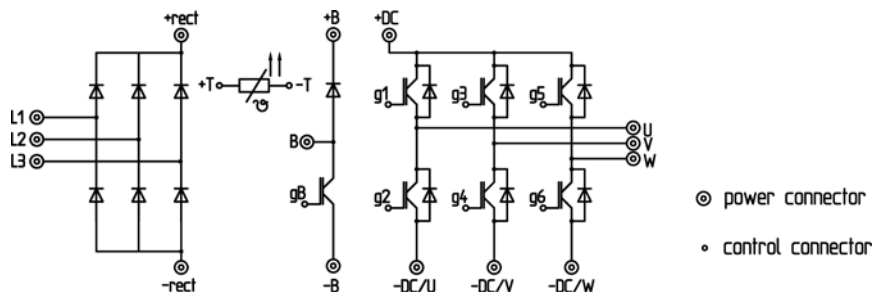
Fig. 12: Typ. input bridge forward characteristic

pinout, dimensions



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



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.