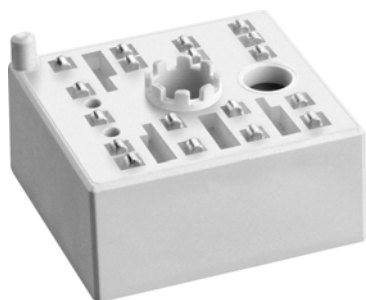


SKiiP 03NAC12T4V1



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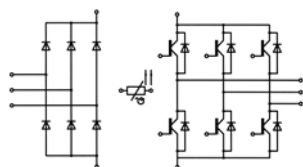
SKiiP 03NAC12T4V1

Features

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

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 $T_{J,op} = -40 \dots +150^\circ\text{C}$)
- Temperature sensor: No basic insulation to main circuit, max. potential difference 850V to -DC

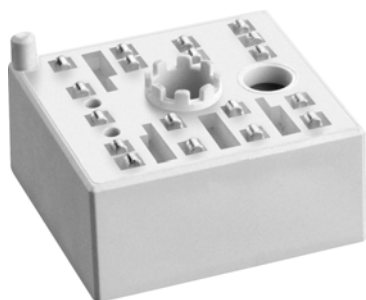


NAC

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	7.5	A
		T _s = 70 °C	7.5	A
I _C	T _j = 175 °C	T _s = 25 °C	7.5	A
		T _s = 70 °C	7.5	A
I _{Cnom}			8	A
I _{CRM}	I _{CRM} = 3 x I _{Cnom}		24	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	9	A
		T _s = 70 °C	9	A
I _F	T _j = 175 °C	T _s = 25 °C	9	A
		T _s = 70 °C	9	A
I _{Fnom}			8	A
I _{FRM}	I _{FRM} = 3 x I _{Fnom}		24	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 150 °C		36	A
T _j			-40 ... 175	°C
Rectifier - Diode				
V _{RRM}	T _j = 25 °C		1600	V
I _F	T _s = 25 °C, T _j = 150 °C		39	A
I _{Fnom}			8	A
I _{FSM}	t _p = 10 ms sin 180°	T _j = 25 °C	220	A
		T _j = 150 °C	200	A
I ² t	t _p = 10 ms sin 180°	T _j = 25 °C	242	A ² s
		T _j = 150 °C	200	A ² s
T _j			-40 ... 150	°C
Module				
I _{t(RMS)}	T _{terminal} = 80 °C, 20 A per spring			A
T _{stg}			-40 ... 125	°C
V _{isol}	AC sinus 50 Hz, 1 min		2500	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverter - IGBT						
V _{CE(sat)}	I _C = 8 A	T _j = 25 °C		1.85	2.10	V
	V _{GE} = 15 V chipelevel	T _j = 150 °C		2.25	2.45	V
V _{CE0}	chipelevel	T _j = 25 °C		0.8	0.9	V
		T _j = 150 °C		0.7	0.8	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C		131	150	mΩ
	chipelevel	T _j = 150 °C		194	206	mΩ
V _{GE(th)}	V _{GE} = V _{CE} V, I _C = 1 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V	T _j = 25 °C		0.1	0.3	mA
	V _{CE} = 1200 V					mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		0.49		nF
C _{oes}		f = 1 MHz		0.05		nF
C _{res}		f = 1 MHz		0.03		nF

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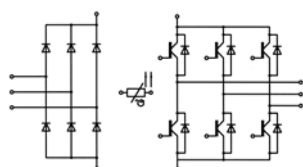
Features

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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 $T_{J,op} = -40 \dots +150^\circ\text{C}$)
- Temperature sensor: No basic insulation to main circuit, max. potential difference 850V to -DC

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
Q_G	$-8 \text{ V} \dots +15 \text{ V}$		45		nC
R_{Gint}	$T_J = 25^\circ\text{C}$		0		Ω
$t_{d(on)}$	$V_{CC} = 600 \text{ V}$ $I_C = 8 \text{ A}$	$T_J = 150^\circ\text{C}$	32		ns
t_r	$R_{G on} = 47 \Omega$	$T_J = 150^\circ\text{C}$	34		ns
E_{on}	$R_{G off} = 47 \Omega$	$T_J = 150^\circ\text{C}$	0.9		mJ
$t_{d(off)}$		$T_J = 150^\circ\text{C}$	295		ns
t_f		$T_J = 150^\circ\text{C}$	68		ns
E_{off}	$V_{GE} = +15/-15 \text{ V}$	$T_J = 150^\circ\text{C}$	0.7		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8 \text{ W/K}\cdot\text{m}$		1.84		K/W
Inverse - Diode					
$V_F = V_{EC}$	$I_F = 8 \text{ A}$ $V_{GE} = 0 \text{ V}$ chipelevel	$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$	2.3 2.4	2.7 2.7	V
V_{F0}	chipelevel	$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$	1.3 0.9	1.5 1.1	V
r_F	chipelevel	$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$	129 181	144 198	m Ω
I_{RRM}	$I_F = 8 \text{ A}$	$T_J = 150^\circ\text{C}$	7.7		A
Q_{rr}	$V_{GE} = -15 \text{ V}$ $V_{CC} = 600 \text{ V}$	$T_J = 150^\circ\text{C}$	1.23		μC
E_{rr}	$di/dt_{off} = 335 \text{ A}/\mu\text{s}$	$T_J = 150^\circ\text{C}$	0.5		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8 \text{ W/K}\cdot\text{m}$		2.53		K/W
Rectifier - Diode					
$V_F = V_{EC}$	$I_F = 8 \text{ A}$ chipelevel	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	1 0.9	1.2 1.1	V
V_{F0}	chipelevel	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	0.9 0.7	1 0.8	V
r_F	chipelevel	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	15 21	29 34	m Ω
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8 \text{ W/K}\cdot\text{m}$		1.5		K/W
Module					
M_s	to heat sink	2		2.5	Nm
W			20		g
Temperature Sensor					
R_{100}	$T_r = 100^\circ\text{C}$, tolerance = 3 %		1670 $\pm$ 3%		Ω
$R(T)$	$R(T)=1000\Omega[1+A(T-25^\circ\text{C})+B(T-25^\circ\text{C})^2]$, $A = 7.635 \cdot 10^{-3} \text{ }^\circ\text{C}^{-1}$, $B = 1.731 \cdot 10^{-5} \text{ }^\circ\text{C}^{-2}$				



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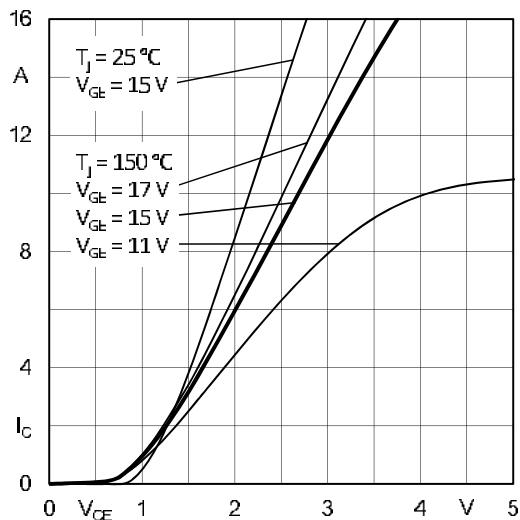


Fig. 1: Typ. output characteristic

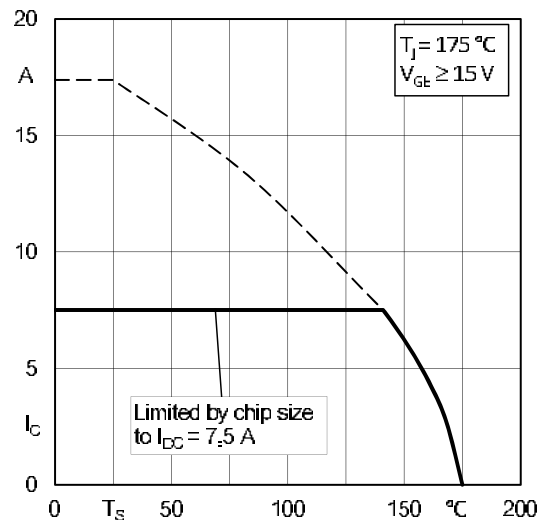


Fig. 2: Typ. rated current vs. temperature $I_D = f(T_S)$

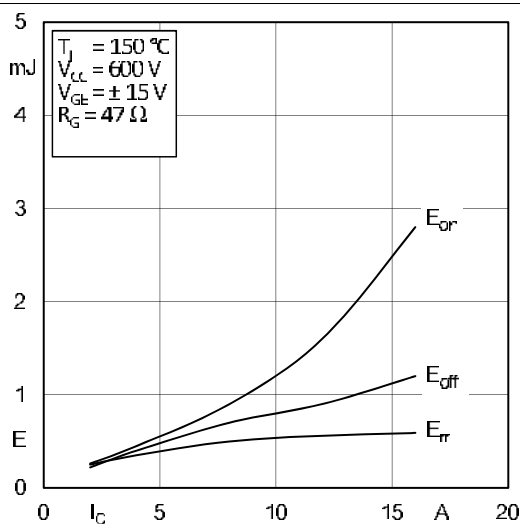


Fig. 3: Typ. turn-on /-off energy = $f(I_D)$

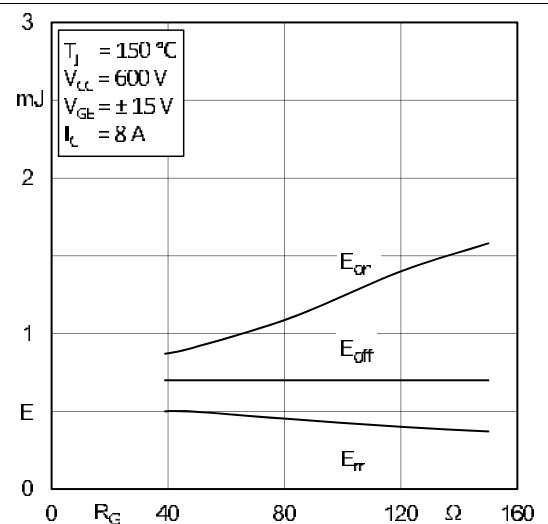


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

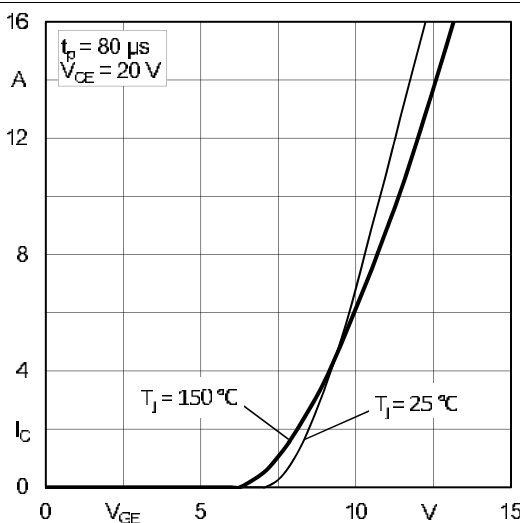


Fig. 5: Typ. transfer characteristic

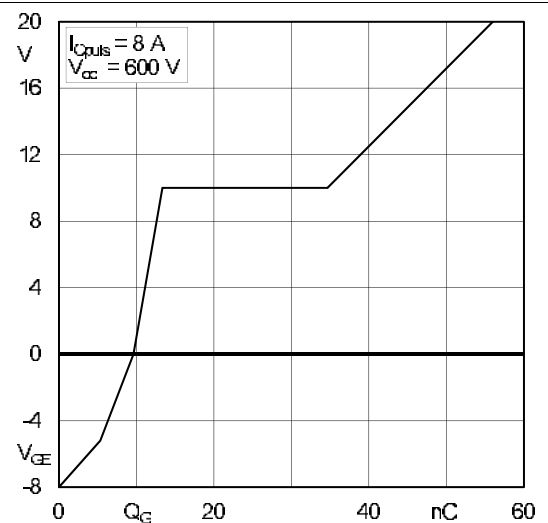
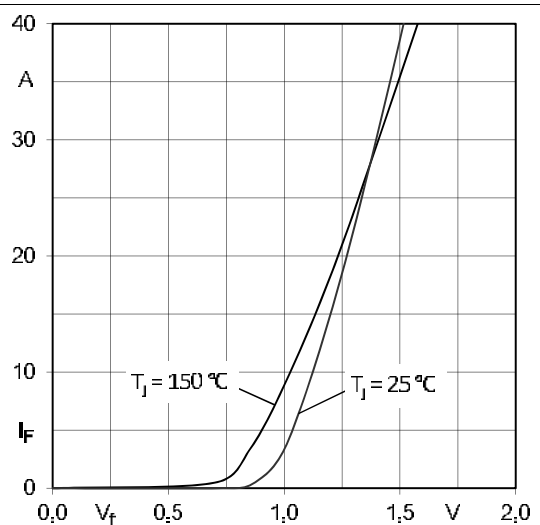
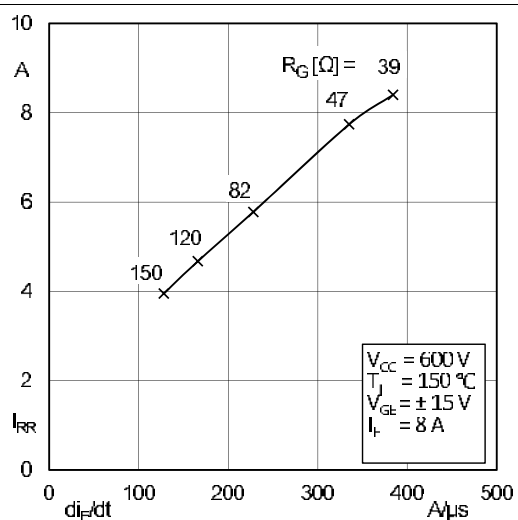
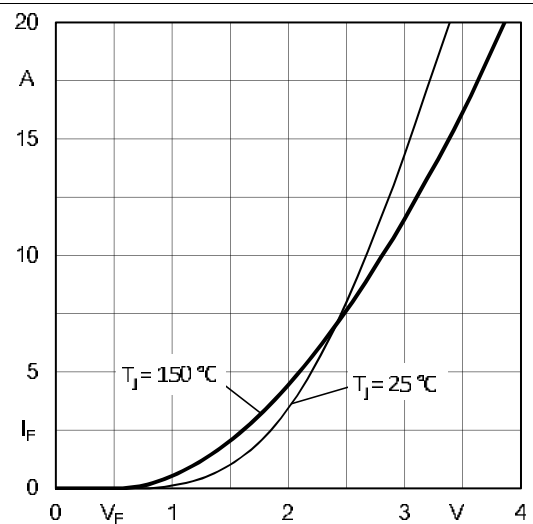
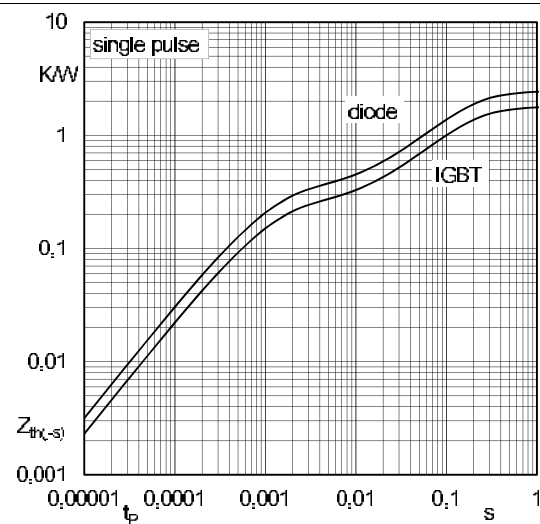
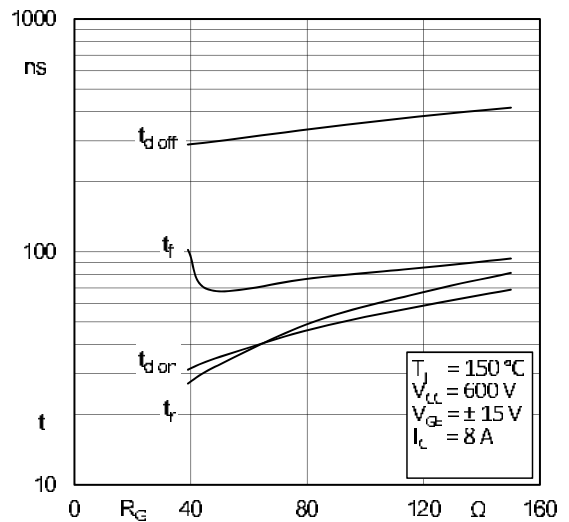
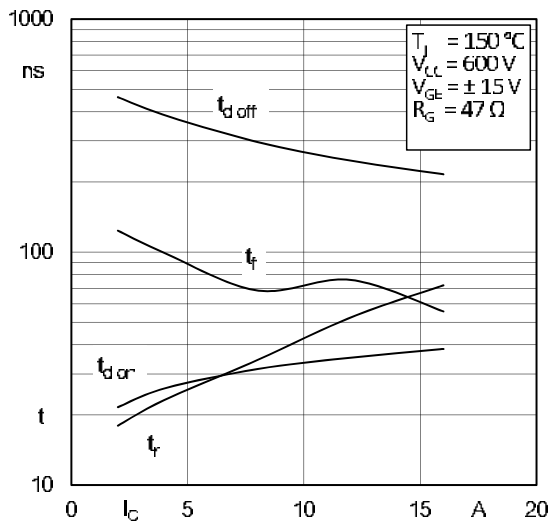
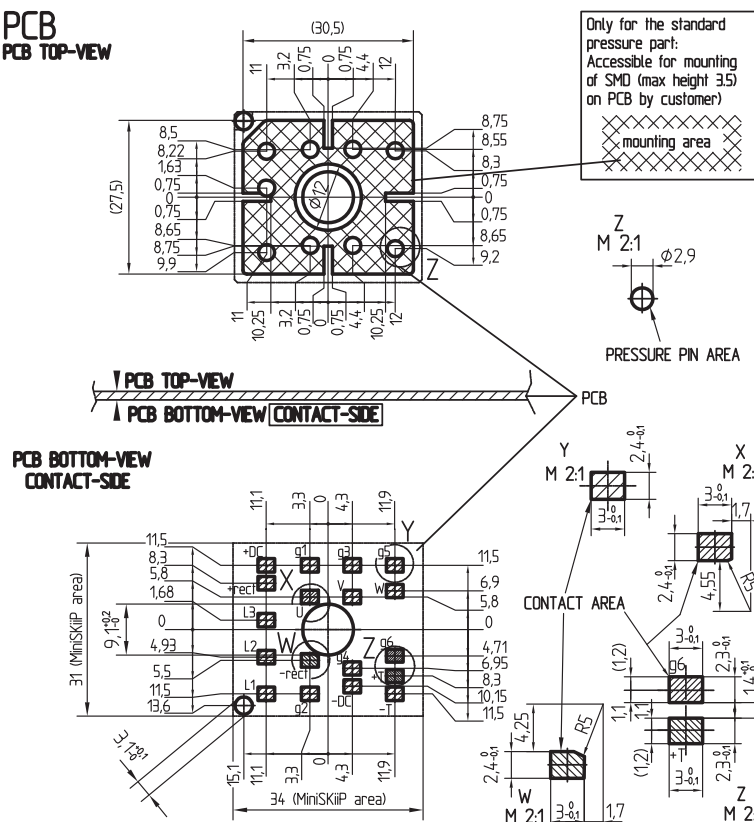
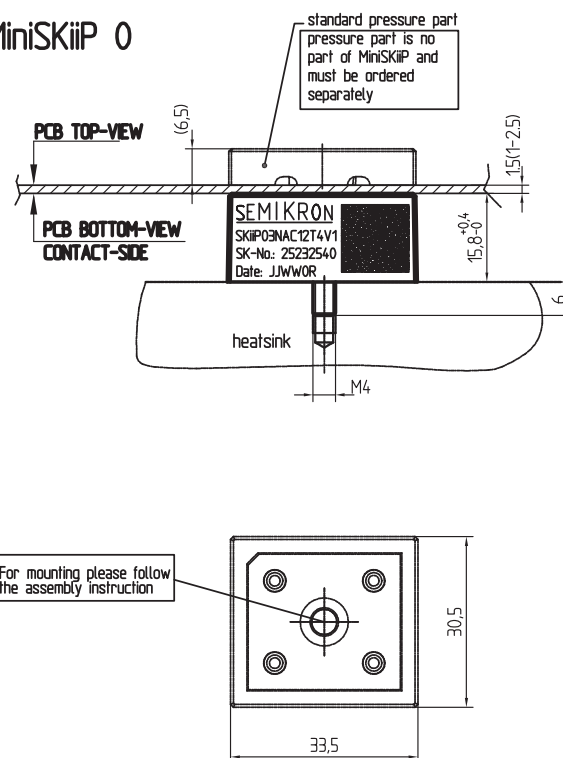


Fig. 6: Typ. gate charge characteristic

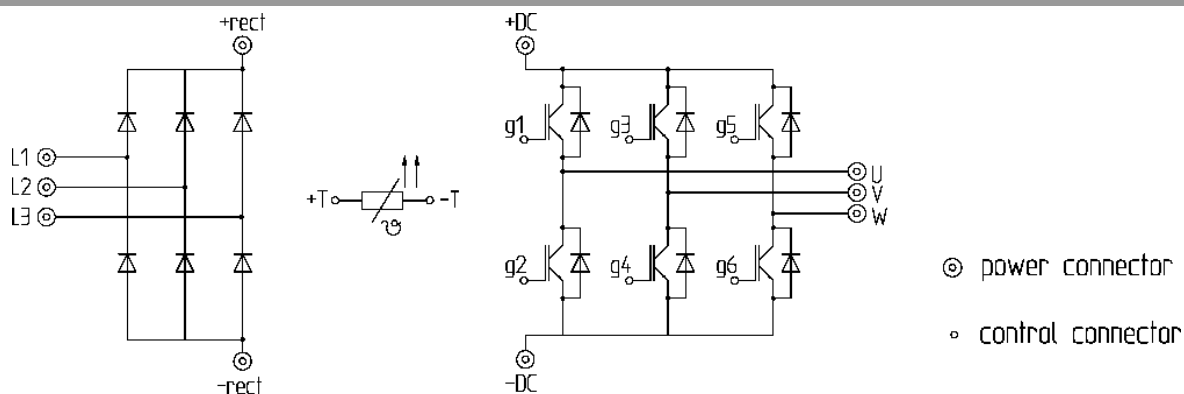


PCB
PCB TOP-VIEW

MiniSKiiP 0



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.