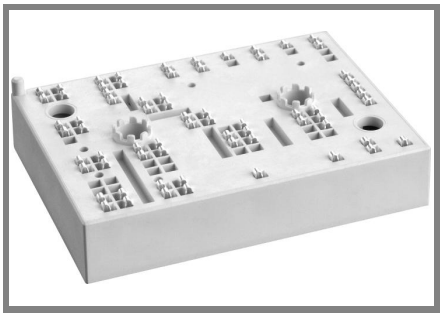
SKiiP 39AC12T4V1



MiniSKiiP®3

3-phase bridge inverter

SKiiP 39AC12T4V1

Features

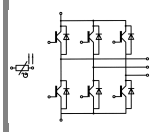
- Trench 4 IGBT´s
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Typical Applications*

- Inverter up to 50 kVA
- Typical motor power 30 kW

Remarks

- V_{CEsat} , V_F= chip level value
- Case temp. limited to T_C = 125°C max. (for baseplateless modules $T_C = T_S$)
- product rel. results valid for $T_j \leq 150$ (recomm. T_{op} = -40 ... +150°C)
- For short circuit: Soft R_{Goff} recommended



AC

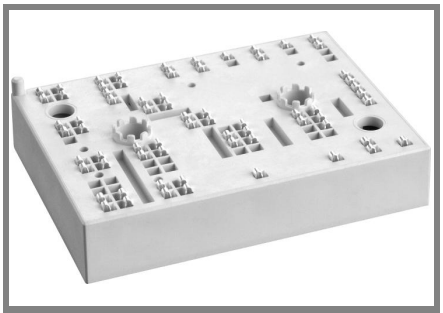
Absolute Maximum Ratings T_s = 25 °C, unless otherwise specified

Symbol	Conditions		Values	Units
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 175 °C	T_c = 25 °C	167	A
		T_c = 70 °C	135	A
I_{CRM}	I_{CRM} = 3xI_{Cnom}		450	A
V_{GES}			±20	V
t_{psc}	V_{CC} = 800 V; $V_{GE} \leq$ 15 V; V_{CES} < 1200 V	T_j = 150 °C	10	µs
Inverse Diode				
I_F	T_j = 175 °C	T_c = 25 °C	136	A
		T_c = 70 °C	107	A
I_{FRM}	I_{FRM} = 3xI_{Fnom}		450	A
I_{FSM}	t_p = 10 ms; sin	T_j = 150 °C	900	A
Module				
$I_{t(RMS)}$			160	A
T_{vj}			-40...+175	°C
T_{stg}			-40...+125	°C
V_{isol}	AC, 1 min.		2500	V

Characteristics T_s = 25 °C, unless otherwise specified

Symbol	Conditions		min.	typ.	max.	Units
IGBT						
$V_{GE(th)}$	V_{GE} = V_{CE}, I_C = 6 mA		5	5,8	6,5	V
I_{CES}	V_{GE} = V, V_{CE} = V_{CES}	T_j = °C				mA
V_{CE0}		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		6,7	7,3	mΩ
		T_j = 150°C		10	10,7	mΩ
$V_{CE(sat)}$	I_{Cnom} = 150 A, V_{GE} = 15 V	T_j = 25°C$_{chiplev.}$		1,85	2,05	V
		T_j = 150°C$_{chiplev.}$		2,25	2,45	V
C_{ies}	V_{CE} = 25, V_{GE} = 0 V	f = 1 MHz		8,8		nF
C_{oes}				0,58		nF
C_{res}				0,47		nF
Q_G	V_{GE} = -8 ... +15V			850		nC
R_{Gint}	T_j = 25 °C			5		Ω
$t_{d(on)}$	R_{Gon} = 1 Ω di/dt = 2840 A/µs	V_{CC} = 600V I_C= 150A T_j = 150 °C V_{GE} = ±15V		165		ns
t_r				50		ns
E_{on}				22,5		mJ
$t_{d(off)}$	R_{Goff} = 1 Ω di/dt = 1880 A/µs			390		ns
t_f				80		ns
E_{off}				14		mJ
$R_{th(j-s)}$	per IGBT			0,33		K/W

SKiiP 39AC12T4V1



MiniSKiiP®3

3-phase bridge inverter

SKiiP 39AC12T4V1

Features

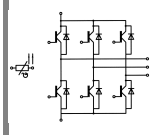
- Trench 4 IGBT´s
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Typical Applications*

- Inverter up to 50 kVA
- Typical motor power 30 kW

Remarks

- V_{CEsat} , V_F= chip level value
- Case temp. limited to T_C = 125°C max. (for baseplateless modules $T_C = T_S$)
- product rel. results valid for $T_j \leq 150$ (recomm. T_{op} = -40 ... +150°C)
- For short circuit: Soft R_{Goff} recommended



AC

Characteristics

Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 150 A; V_{GE} = 15 V	T_j = 25 °$C_{chiplev.}$		2,15	2,45	V
		T_j = 150 °$C_{chiplev.}$		2,05	2,4	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		5,7	6,3	mΩ
		T_j = 150 °C		7,7	8,7	mΩ
I_{RRM}	I_F = 150 A	T_j = 150 °C		188		A
Q_{rr}	di/dt = 4020 A/µs			27		µC
E_{rr}	V_{GE} = ±15V			11,4		mJ
$R_{th(j-s)}$	per diode			0,52		K/W
M_s	to heat sink		2		2,5	Nm
w				97		g
Temperature sensor						
R_{ts}	3%, Tr = 25°C			1000		Ω
R_{ts}	3%, Tr = 100°C			1670		Ω

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 personal.

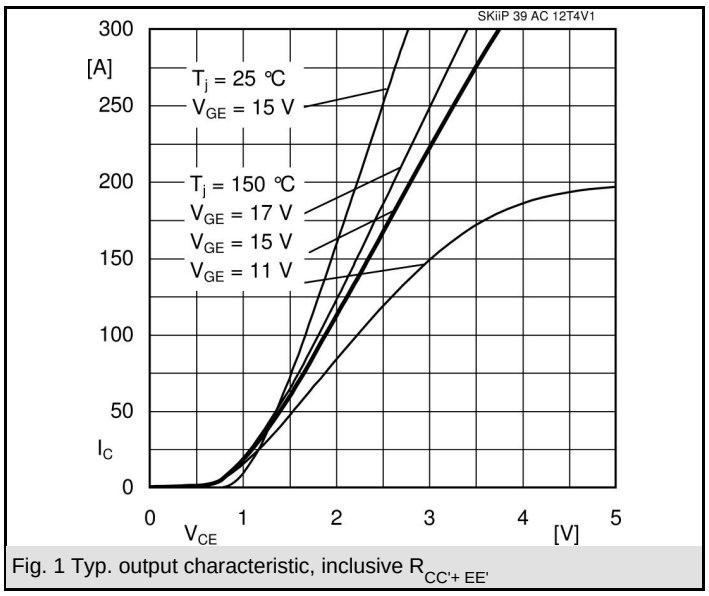


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

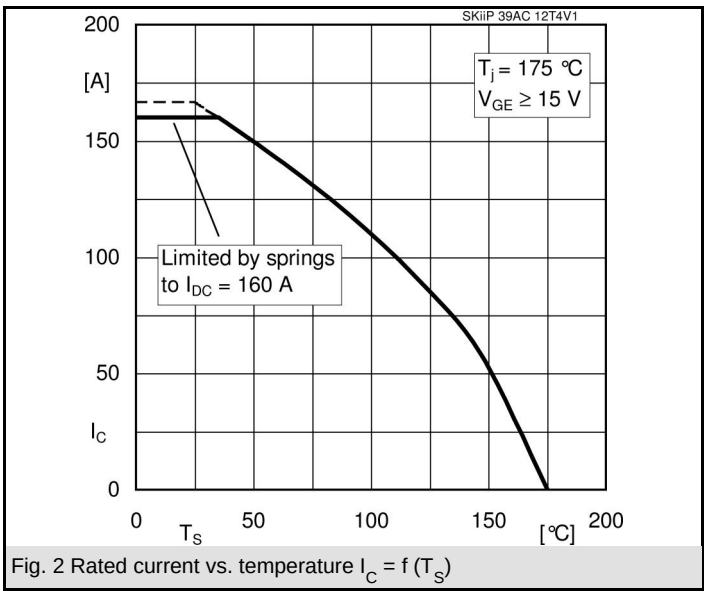


Fig. 2 Rated current vs. temperature $I_C = f(T_S)$

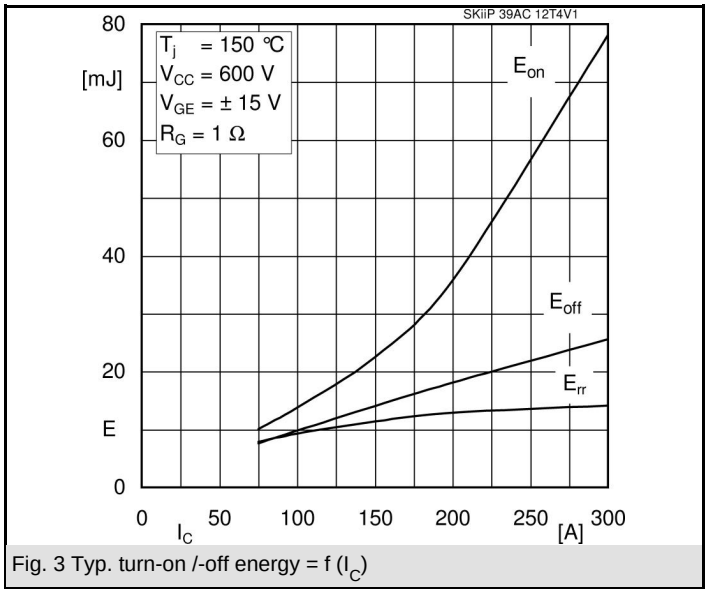


Fig. 3 Typ. turn-on /-off energy = f (I_C)

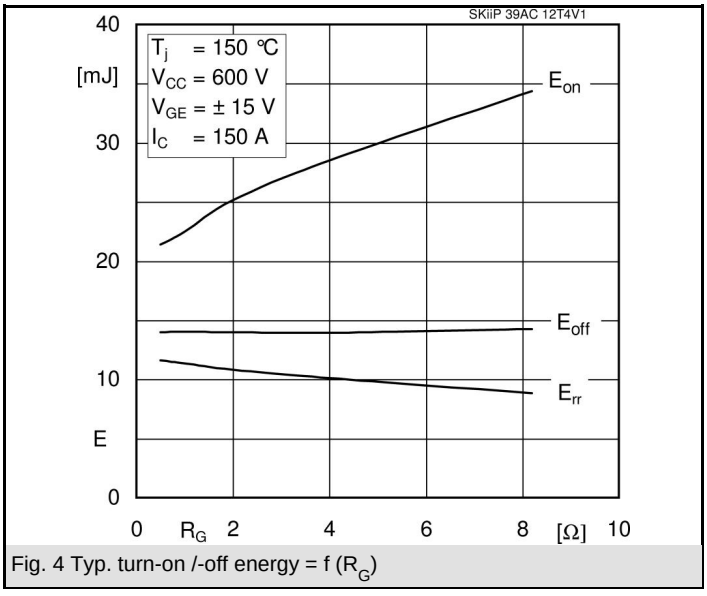


Fig. 4 Typ. turn-on /-off energy = f (R_G)

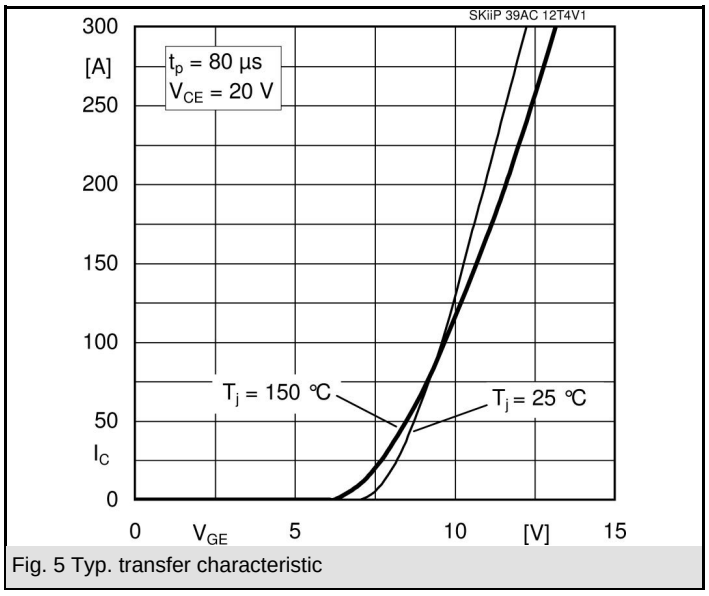


Fig. 5 Typ. transfer characteristic

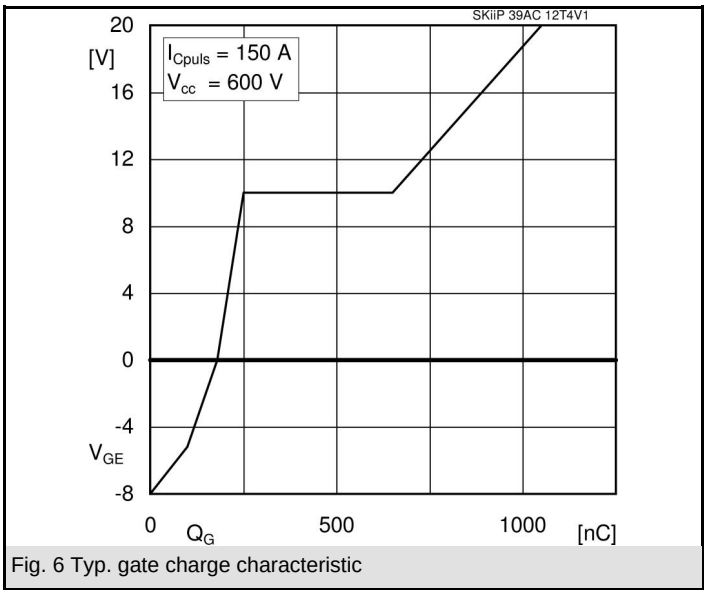


Fig. 6 Typ. gate charge characteristic

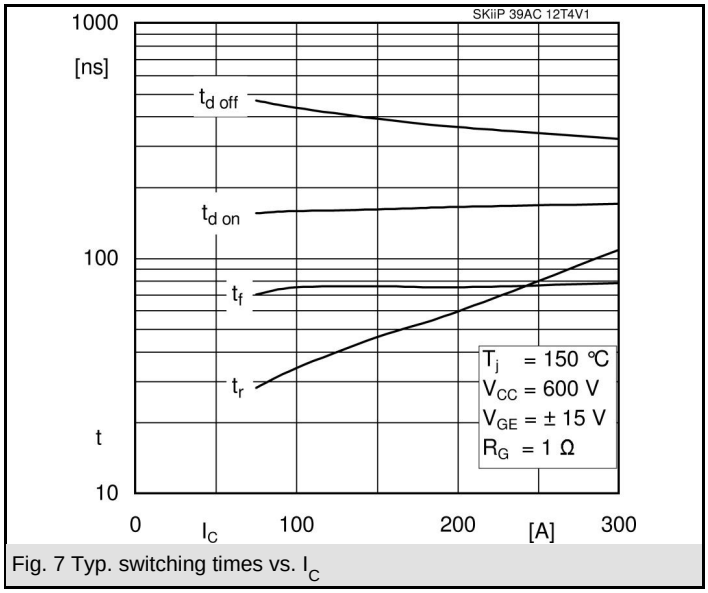


Fig. 7 Typ. switching times vs. I_C

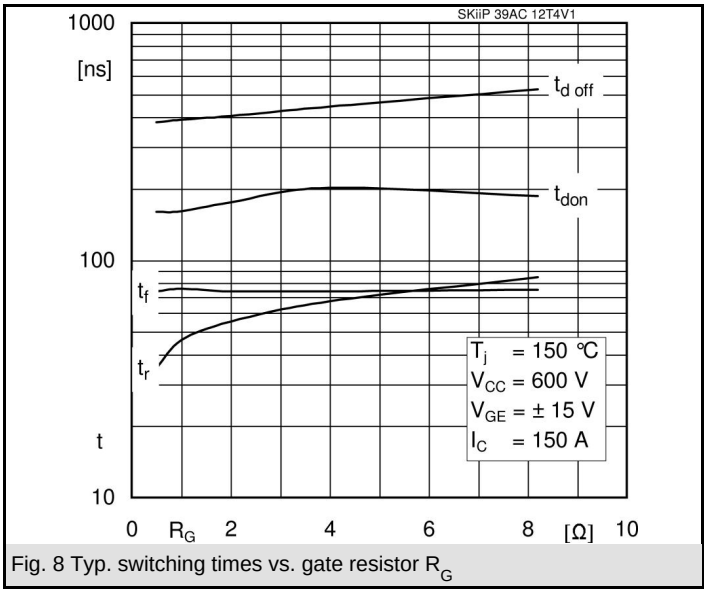


Fig. 8 Typ. switching times vs. gate resistor R_G

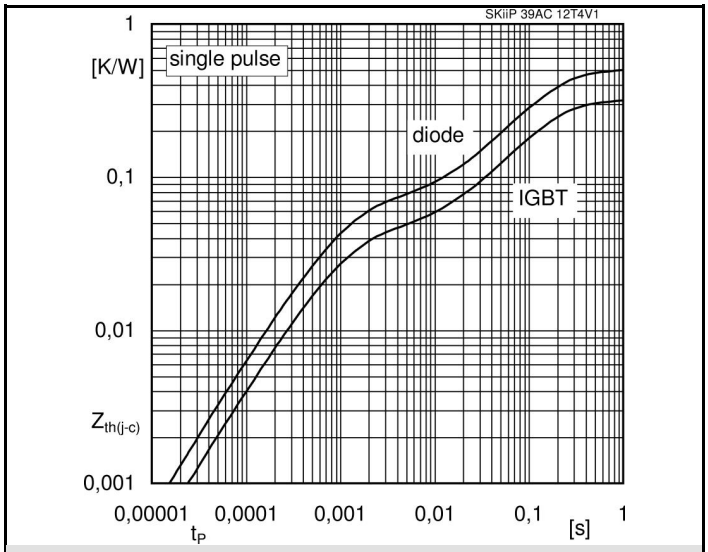


Fig. 9 Transient thermal impedance of IGBT and Diode

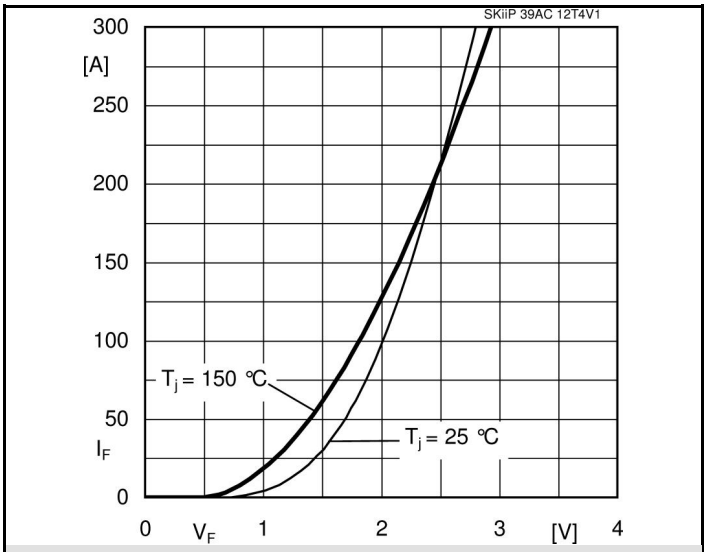


Fig. 10 CAL diode forward characteristic

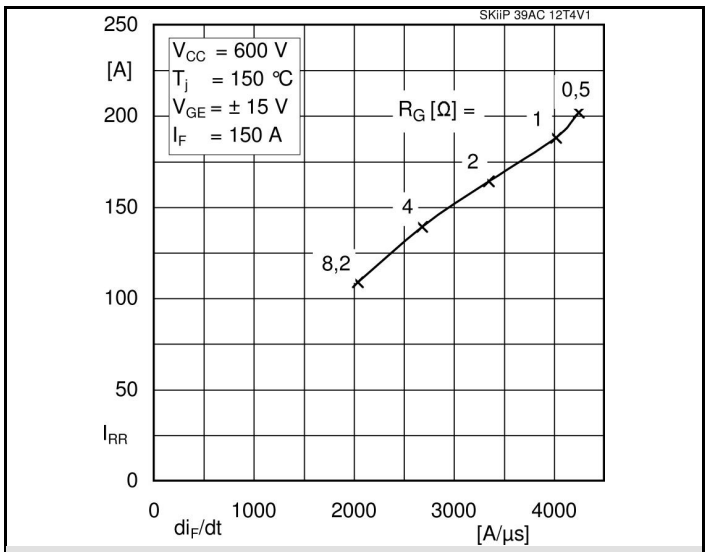


Fig. 11 Typ. CAL diode peak reverse recovery current

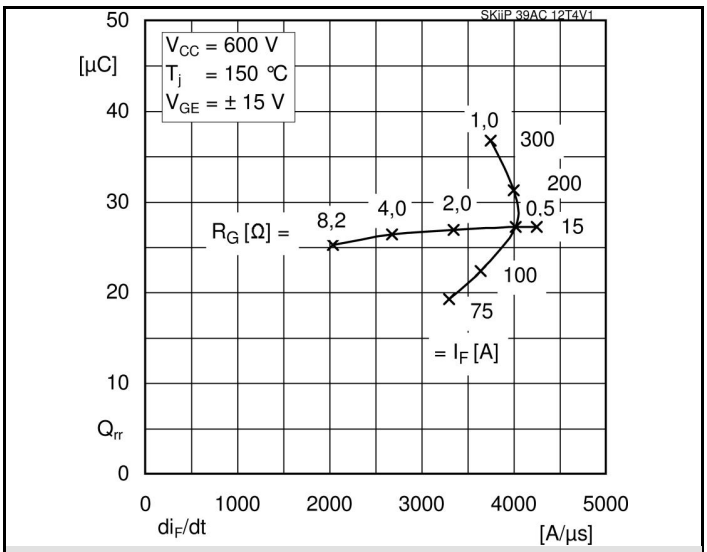
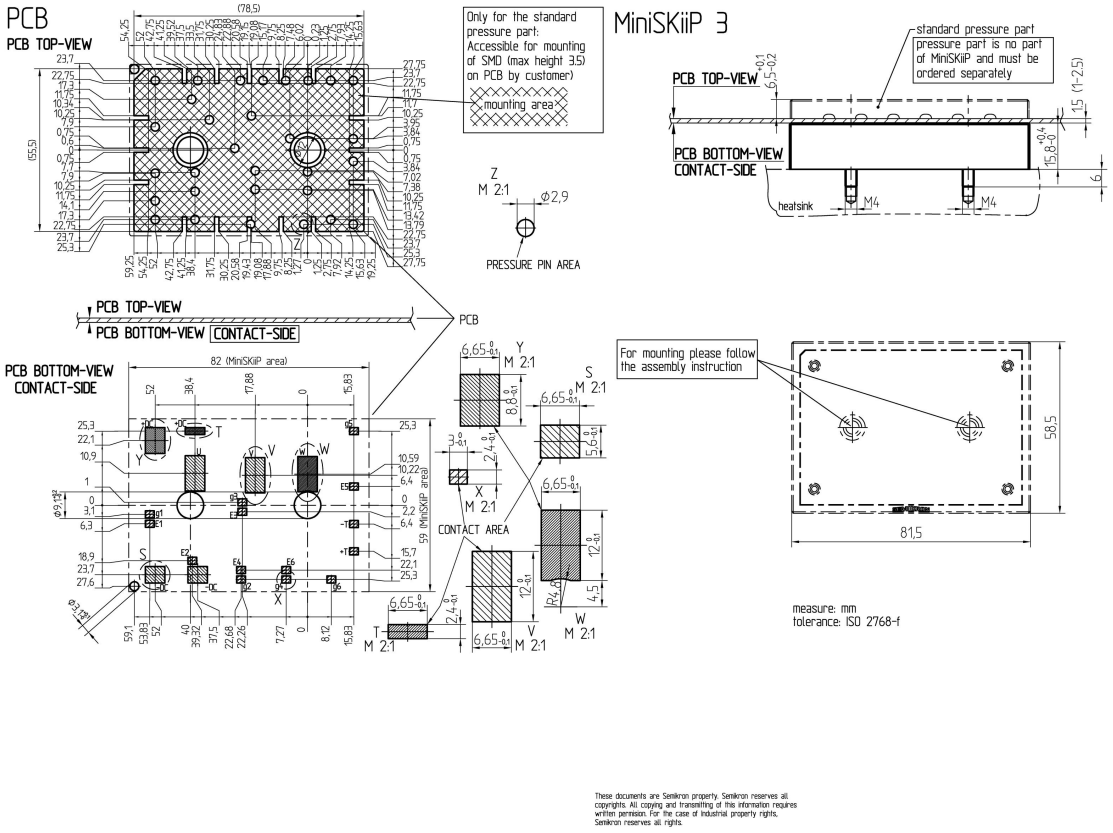
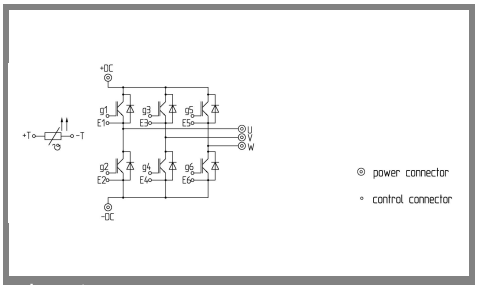


Fig. 12 Typ. CAL diode recovered charge

UL recognized file no. E 63 532



case



pinout