MiniSKiiP® 2

SKiiP 25AC12T4V1

Features

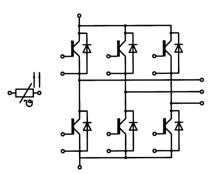
- Trench 4 IGBT´s
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

Typical Applications*

- Inverter up to 26 kVA
- Typical motor power 15 kW

Remarks

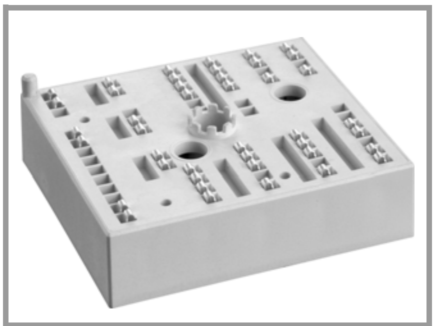
- V_{CEsat} , V_F= chip level value
- Case temp. limited to T_C = 125°C max. (for baseplateless modules $T_C = T_S$)
- product rel. results valid for $T_j \leq 150$ (recomm. T_{op} = -40 … +150°C)



AC

Absolute Maximum Ratings				
Symbol	**Conditions**		**Values**	**Unit**
Inverter - IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 175 °C	T_s = 25 °C	69	A
		T_s = 70 °C	56	A
I_{Cnom}			50	A
I_{CRM}	I_{CRM} = 3 x I_{Cnom}		150	A
V_{GES}			-20 ... 20	V
t_{psc}	V_{CC} = 800 V $V_{GE} \leq 15$ V $V_{CES} \leq 1200$ V	T_j = 150 °C	10	µs
T_j			-40 ... 175	°C
Inverse - Diode				
I_F	T_j = 175 °C	T_s = 25 °C	60	A
		T_s = 70 °C	48	A
I_{Fnom}			50	A
I_{FRM}	I_{FRM} = 3 x I_{Fnom}		150	A
I_{FSM}	10 ms, sin 180°, T_j = 150 °C		270	A
T_j			-40 ... 175	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20A per spring		100	A
T_{stg}			-40 ... 125	°C
V_{isol}	AC sinus 50Hz, t = 1 min		2500	V

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Inverter - IGBT						
$V_{CE(sat)}$	I_C = 50 A V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.10	V
		T_j = 150 °C		2.20	2.40	V
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		21	24	mΩ
		T_j = 150 °C		30	32	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE}$, I_C = 2 mA		5	5.8	6.5	V
I_{CES}	V_{GE} = 0 V V_{CE} = 1200 V	T_j = 25 °C		0.1	0.3	mA
						mA
C_{ies}	V_{CE} = 25 V V_{GE} = 0 V	f = 1 MHz		2.77		nF
C_{oes}		f = 1 MHz		0.20		nF
C_{res}		f = 1 MHz		0.16		nF
Q_G	- 8 V...+ 15 V			283		nC
R_{Gint}	T_j = 25 °C			4.00		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 50 A $R_{G\,on}$ = 12 Ω $R_{G\,off}$ = 12 Ω di/dt_{on} = 1300 A/µs di/dt_{off} = 640 A/µs V_{GE} = +15/-15 V	T_j = 150 °C		54		ns
t_r		T_j = 150 °C		36		ns
E_{on}		T_j = 150 °C		6		mJ
$t_{d(off)}$		T_j = 150 °C		340		ns
t_f		T_j = 150 °C		70		ns
E_{off}		T_j = 150 °C		4.5		mJ
$R_{th(j-s)}$	per IGBT			0.71		K/W



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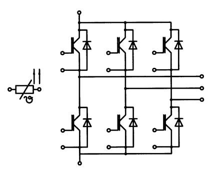


AC

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Inverse - Diode						
$V_F = V_{EC}$	I_F = 50 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.2	2.5	V
		T_j = 150 °C		2.2	2.5	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		18	21	mΩ
		T_j = 150 °C		26	28	mΩ
I_{RRM}	I_F = 50 A di/dt$_{off}$ = 1400 A/µs V_{GE} = -15 V V_{CC} = 600 V	T_j = 150 °C		51		A
Q_{rr}		T_j = 150 °C		8		µC
E_{rr}		T_j = 150 °C		3.2		mJ
$R_{th(j-s)}$	per Diode			0.95		K/W
Module						
M_s	to heat sink		2		2.5	Nm
w				65		g
Temperatur Sensor						
R_{100}	T_C=100°C (R_{25}=1000Ω)			1670 ± 3%		Ω
R(T)	$R(T)=1000\Omega[1+A(T-25°C)+B(T-25°C)^2]$, $A = 7.635 \cdot 10^{-3}$ °C^{-1}, $B = 1.731 \cdot 10^{-5}$ °C^{-2}					

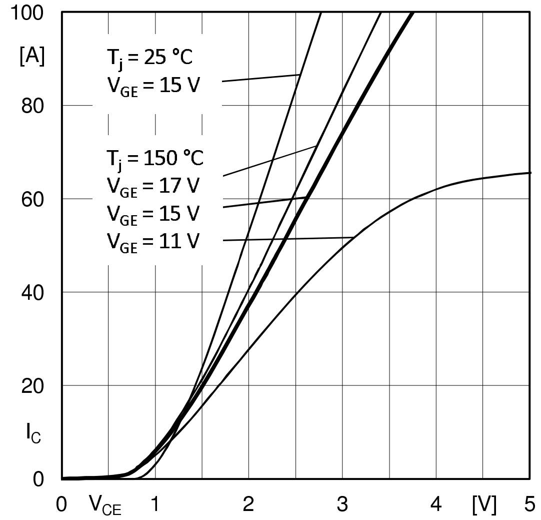


Fig. 1: Typ. output characteristic, inclusive $R_{CC'+EE'}$

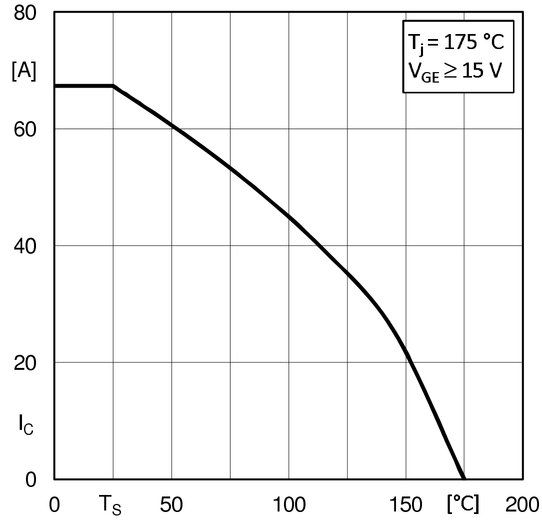


Fig. 2: Rated current vs. temperature $I_C = f(T_S)$

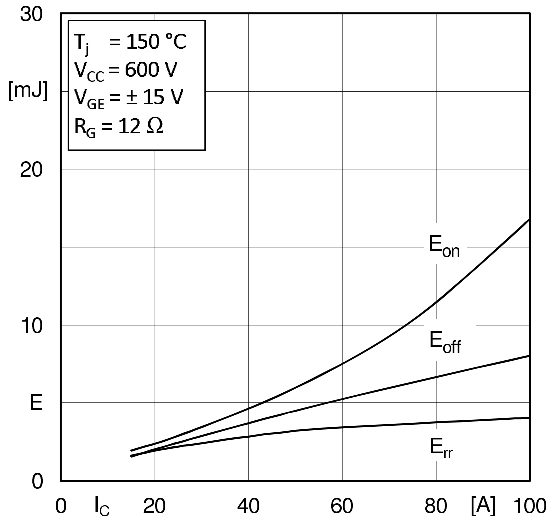


Fig. 3: Typ. turn-on /-off energy = f (I_C)

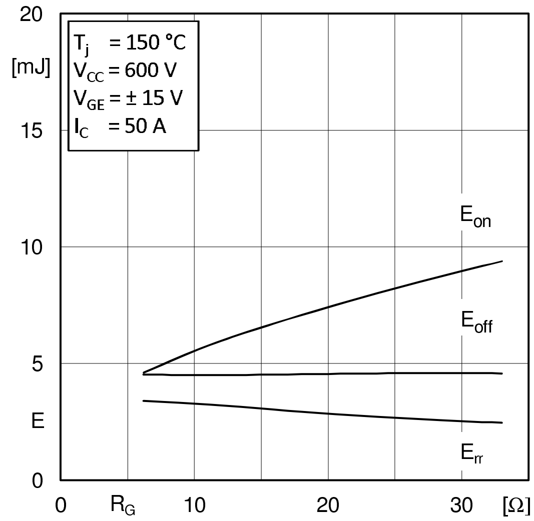


Fig. 4: Typ. turn-on /-off energy = f (R_G)

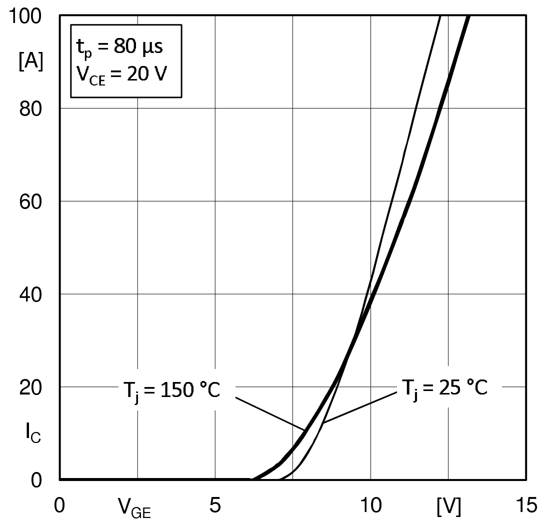


Fig. 5: Typ. transfer characteristic

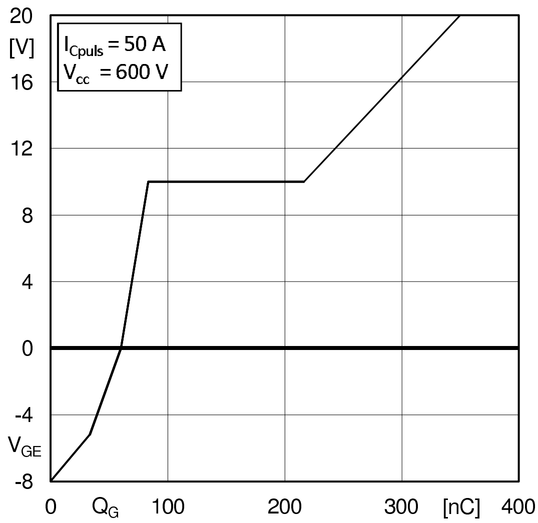


Fig. 6: Typ. gate charge characteristic

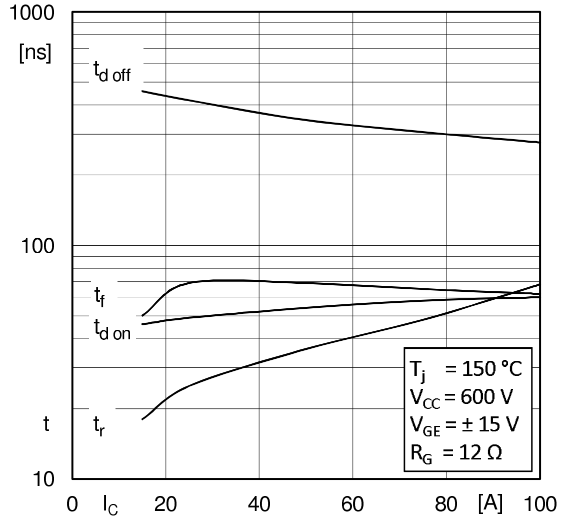


Fig. 7: Typ. switching times vs. I_C

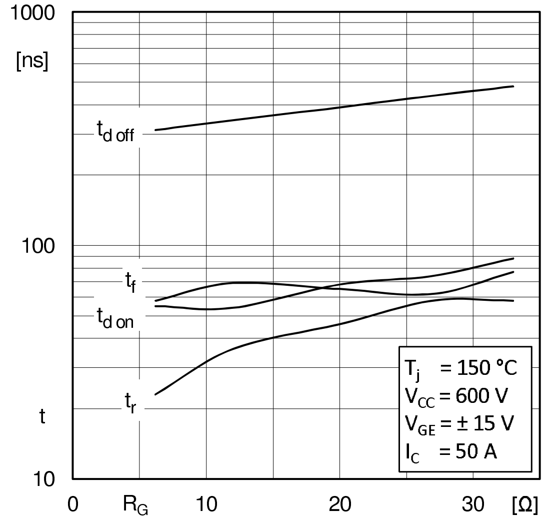


Fig. 8: Typ. switching times vs. gate resistor R_G

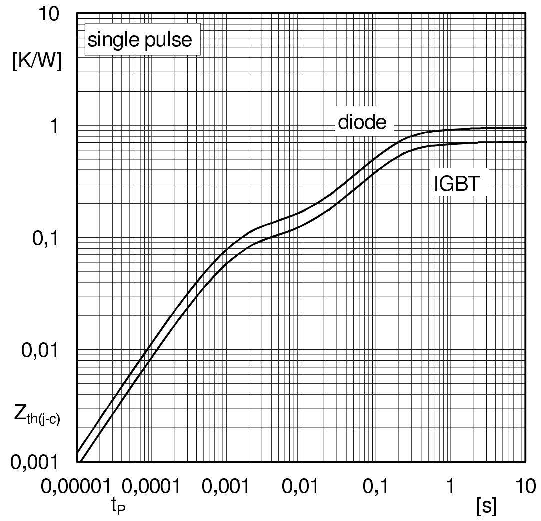


Fig. 9: Transient thermal impedance of IGBT and Diode

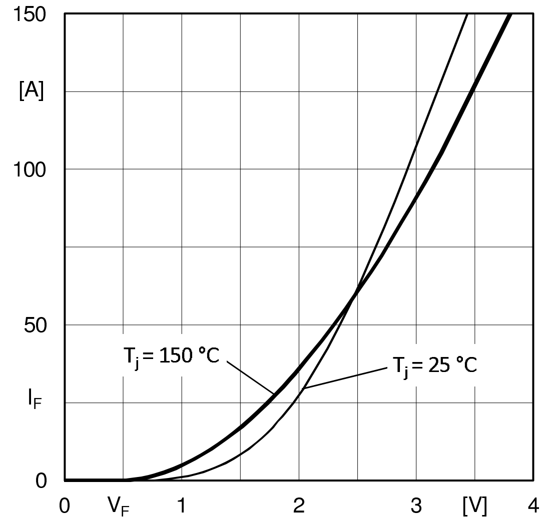


Fig. 10: CAL diode forward characteristic

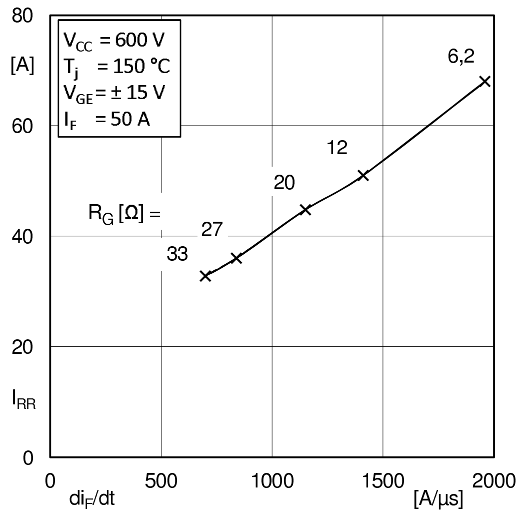


Fig. 11: Typ. CAL diode peak reverse recovery current

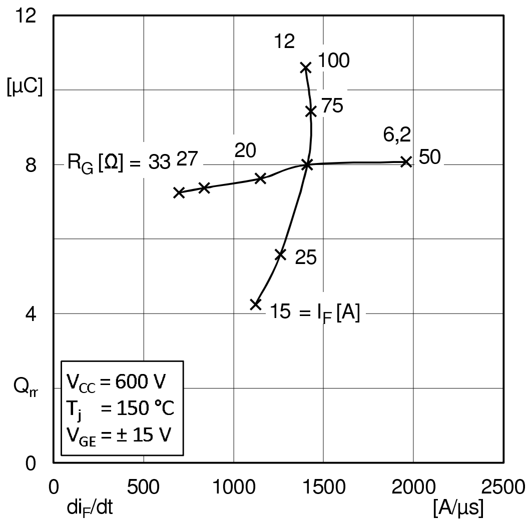
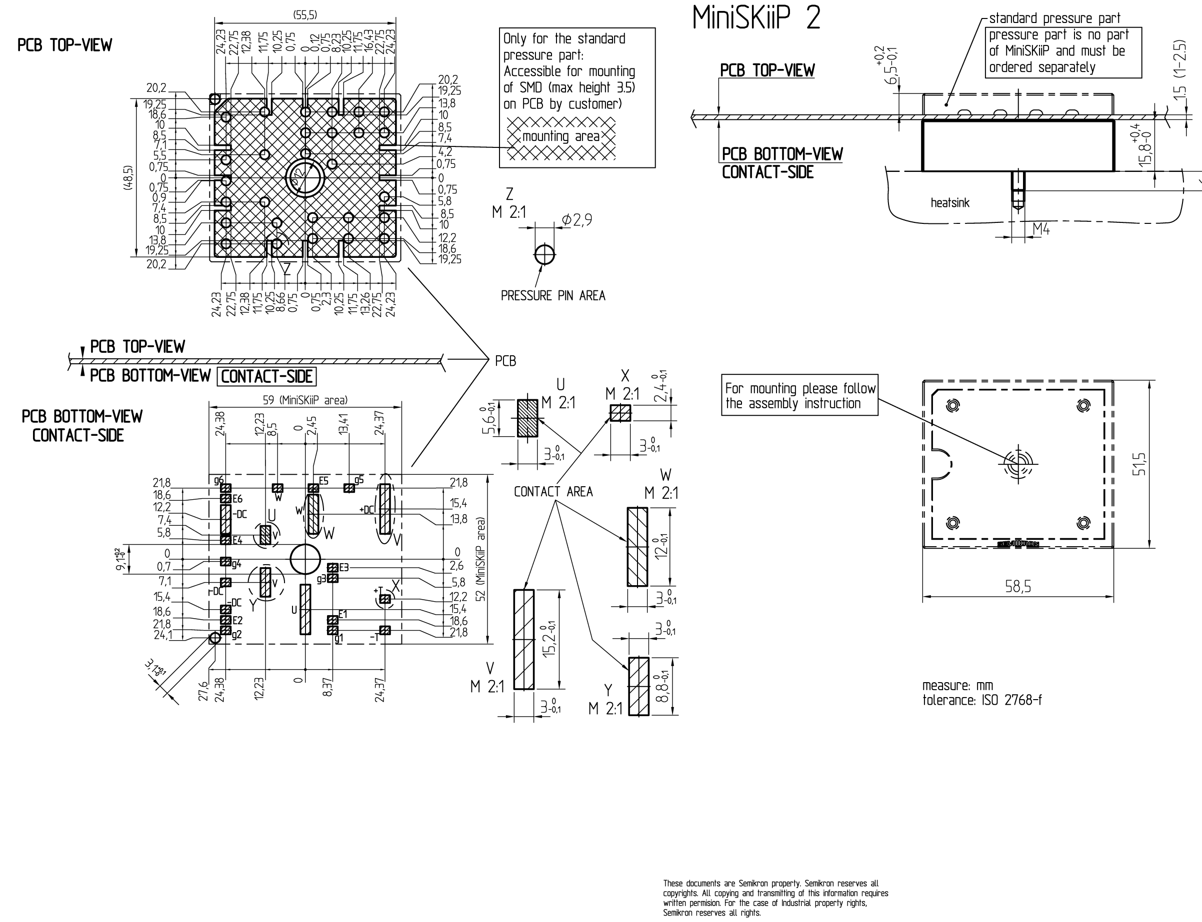
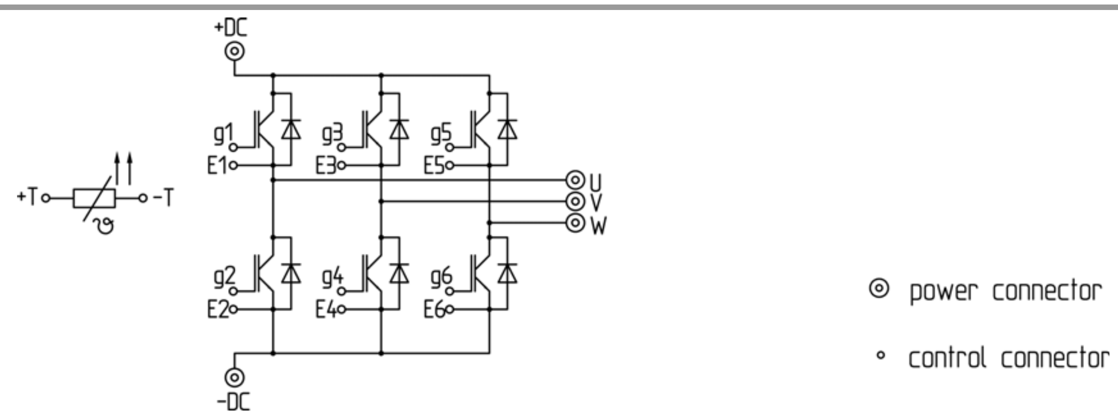


Fig. 12: Typ. CAL diode recovery charge



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.