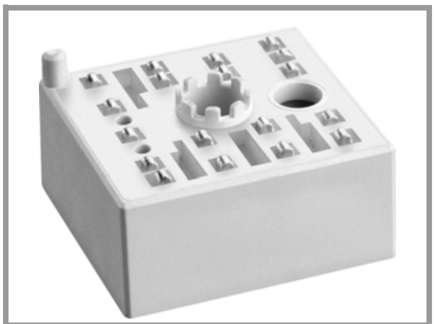


MiniSKiiP® 0

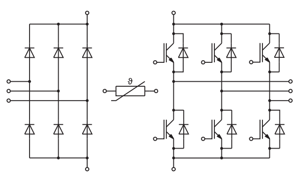
SKiiP 03NAC12T4V1

Features*

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

Remarks

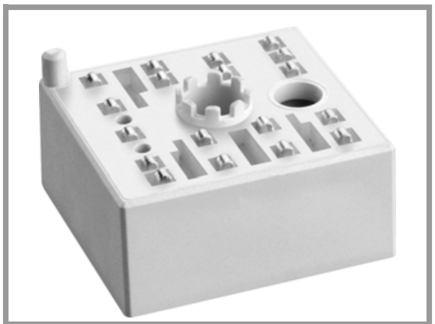
- Max. case temperature limited to T_C=125°C
- Product reliability results valid for T_j≤150°C (recommended $T_{j,op}$=-40...+150°C)
- Temperature sensor: No basic insulation to main circuit, max. potential difference 850V to -DC



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}			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_{FRM}			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_{FSM}	t_p = 10 ms sin 180°	T_j = 25 °C	220	A
		T_j = 150 °C	200	A
i^2t	t_p = 10 ms sin 180°	T_j = 25 °C	242	A^2s
		T_j = 150 °C	200	A^2s
T_j			-40 ... 150	°C
Module				
$I_{t(RMS)}$	$T_{terminal}$ = 80 °C, 20 A per spring		t.b.d.	A
T_{stg}	module without TIM		-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 V_{GE} = 15 V chiplevel	T_j = 25 °C		1.85	2.10	V
		T_j = 150 °C		2.25	2.45	V
V_{CE0}	chiplevel	T_j = 25 °C		0.80	0.90	V
		T_j = 150 °C		0.70	0.80	V
r_{CE}	V_{GE} = 15 V chiplevel	T_j = 25 °C		131	150	mΩ
		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 V_{CE} = 1200 V	T_j = 25 °C			1	mA
				-		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



MiniSKiiP® 0

SKiiP 03NAC12T4V1

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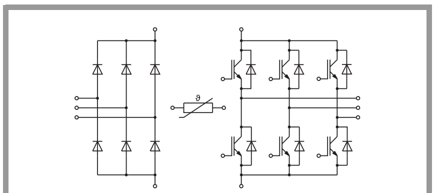


NAC

Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
Inverter - IGBT						
Q_G	V_{GE} = - 8 V...+ 15 V			45		nC
R_{Gint}	T_j = 25 °C			0		Ω
$t_{d(on)}$	V_{CC} = 600 V I_C = 8 A $R_{G\ on}$ = 47 Ω $R_{G\ off}$ = 47 Ω	T_j = 150 °C		32		ns
t_r		T_j = 150 °C		34		ns
E_{on}		T_j = 150 °C		0.9		mJ
$t_{d(off)}$		T_j = 150 °C		295		ns
t_f		T_j = 150 °C		68		ns
E_{off}	V_{GE} = +15/-15 V	T_j = 150 °C		0.7		mJ
$R_{th(j-s)}$	per IGBT, λ_{paste}=0.8 W/(K*m)			1.84		K/W
Inverse - Diode						
$V_F = V_{EC}$	I_F = 8 A V_{GE} = 0 V chiplevel	T_j = 25 °C		2.33	2.65	V
		T_j = 150 °C		2.35	2.68	V
V_{F0}	chiplevel	T_j = 25 °C		1.30	1.50	V
		T_j = 150 °C		0.90	1.10	V
r_F	chiplevel	T_j = 25 °C		129	144	mΩ
		T_j = 150 °C		181	198	mΩ
I_{RRM}	I_F = 8 A V_{GE} = -15 V V_{CC} = 600 V di/dt_{off} = 335 A/µs	T_j = 150 °C		7.7		A
Q_{rr}		T_j = 150 °C		1.23		µC
E_{rr}		T_j = 150 °C		0.5		mJ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(K*m)			2.53		K/W
Rectifier - Diode						
$V_F = V_{EC}$	I_F = 8 A chiplevel	T_j = 25 °C		1.00	1.21	V
		T_j = 125 °C		0.90	1.10	V
V_{F0}	chiplevel	T_j = 25 °C		0.88	0.98	V
		T_j = 125 °C		0.73	0.83	V
r_F	chiplevel	T_j = 25 °C		15	29	mΩ
		T_j = 125 °C		21	34	mΩ
$R_{th(j-s)}$	per Diode, λ_{paste}=0.8 W/(K*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 °C, tolerance = 3 %			1670 ± 3%		Ω
$R_{(T)}$	$R_{(T)}=1000\Omega[1+A(T-25°C)+B(T-25°C)^2]$, $A = 7.635*10^{-3}°C^{-1}$ °C^{-1}, $B = 1.731*10^{-5}°C^{-2}$ °C^{-2}					

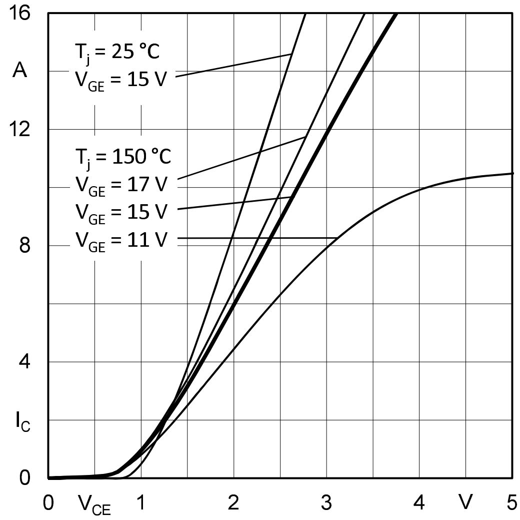


Fig. 1: Typ. output characteristic

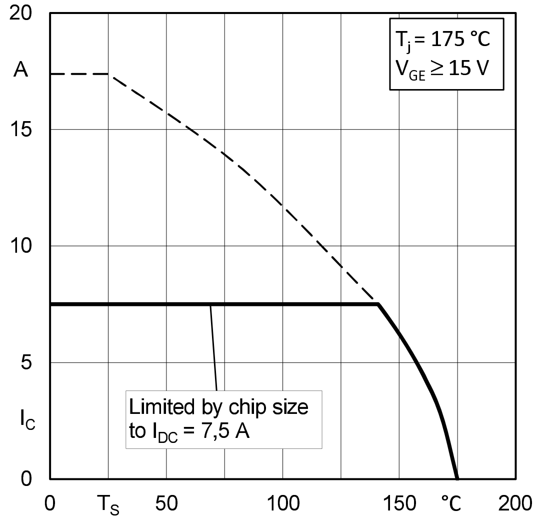


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_S)$

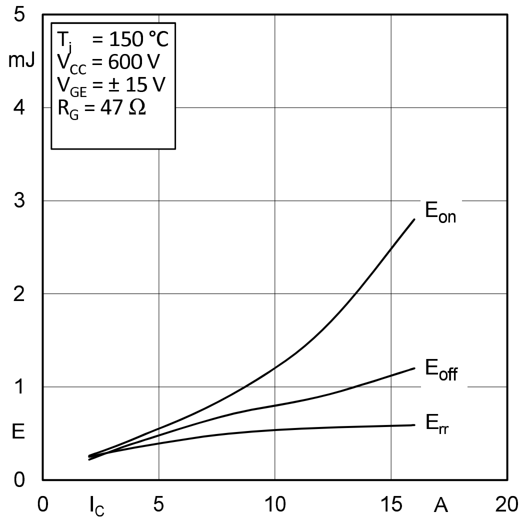


Fig. 3: Typ. turn-on /-off energy = f (I_C)

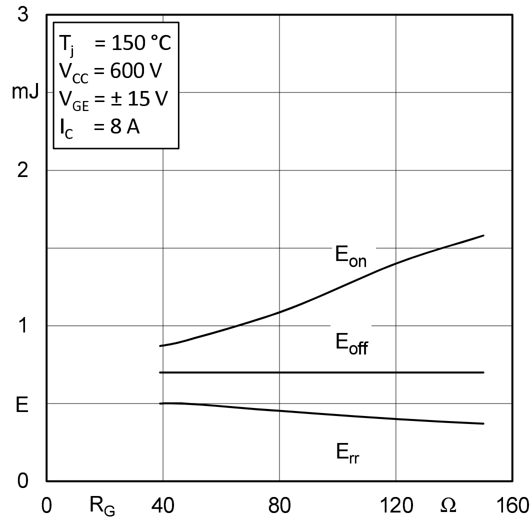


Fig. 4: Typ. turn-on /-off energy = f (R_G)

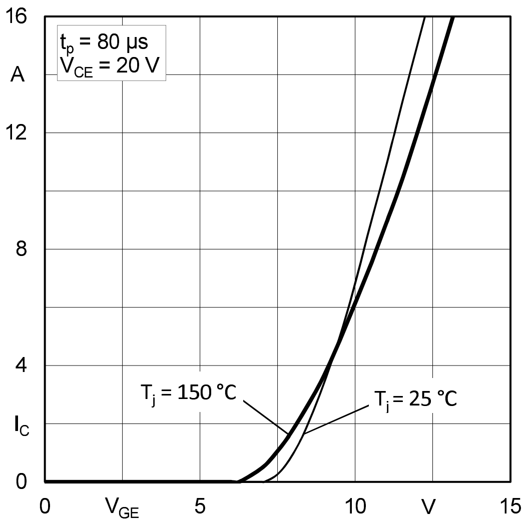


Fig. 5: Typ. transfer characteristic

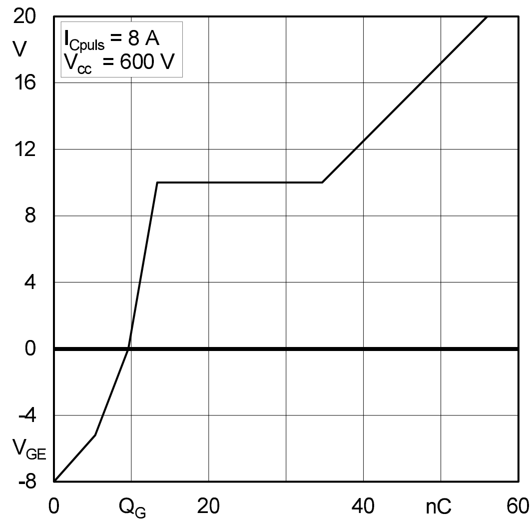


Fig. 6: Typ. gate charge characteristic

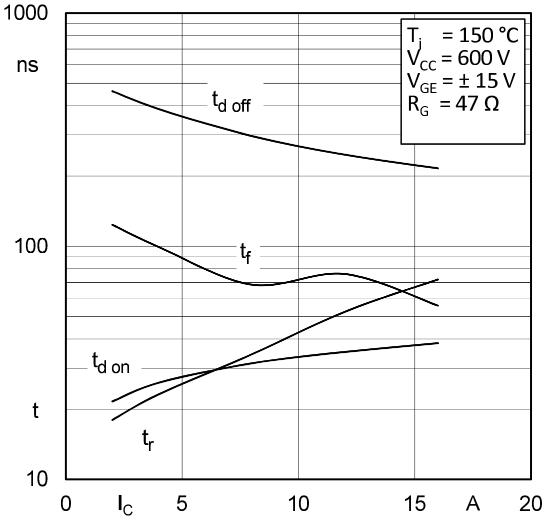


Fig. 7: Typ. switching times vs. I_C

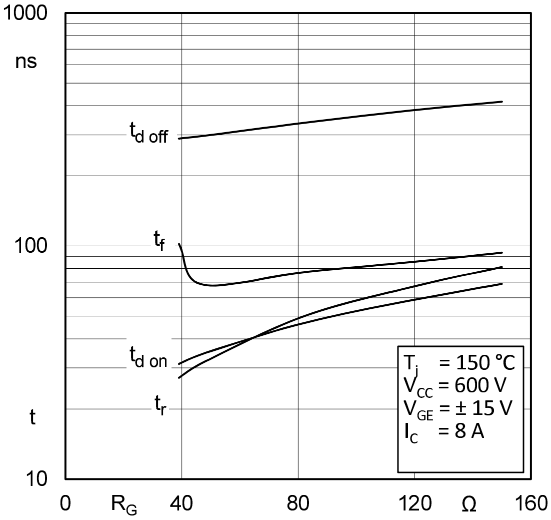


Fig. 8: Typ. switching times vs. gate resistor R_G

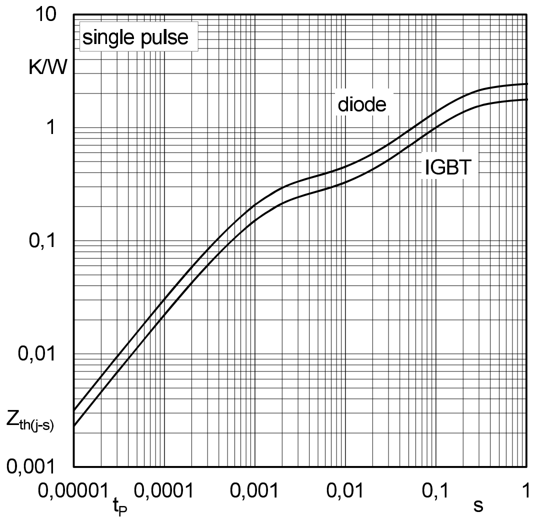


Fig. 9: Typ. transient thermal impedance

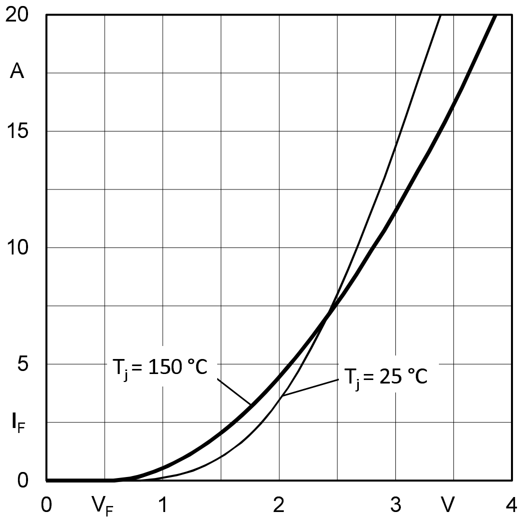


Fig. 10: Typ. CAL diode forward characteristic

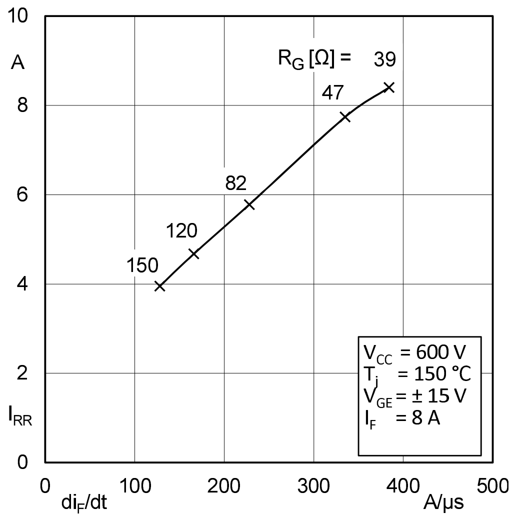


Fig. 11: Typ. CAL diode peak reverse recovery current

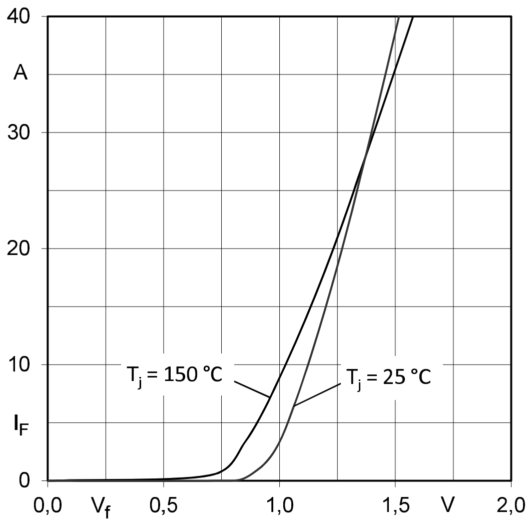
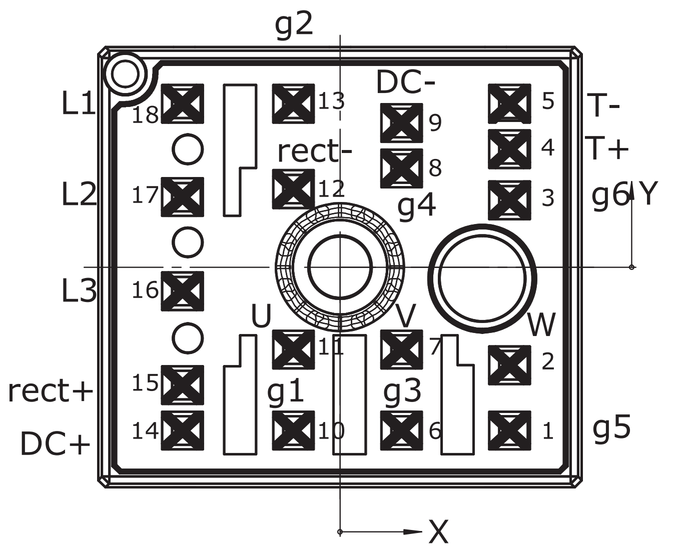


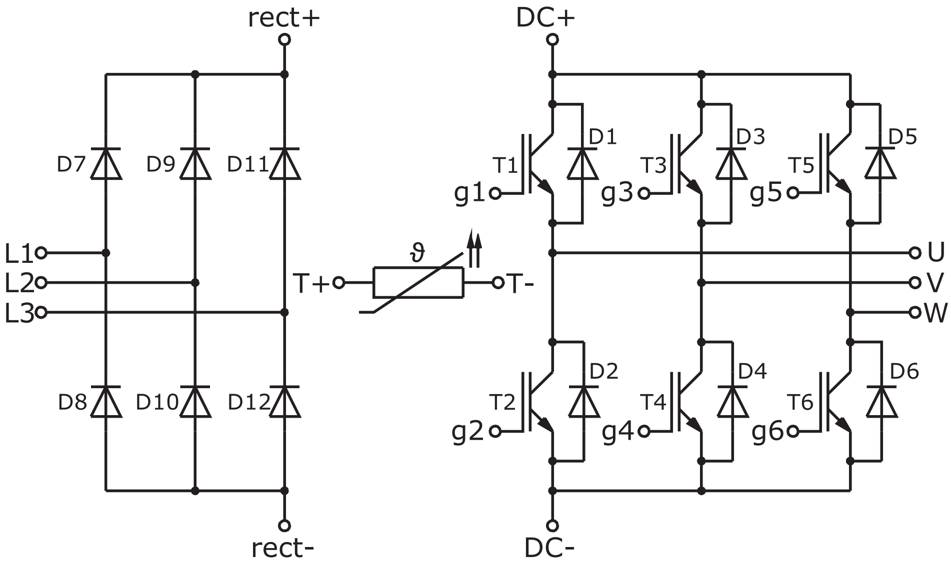
Fig. 12: Typ. input bridge forward characteristic

Pin out							
Pin	*X*	*Y*	*Function*	*Pin*	*X*	*Y*	*Function*
1	11,93	-11,50	g5	10	-3,28	-11,50	g1
2	11,93	-6,90	W	11	-3,28	-5,80	U
3	11,93	4,71	g6	12	-3,28	5,50	rect-
4	11,93	8,3	T+	13	-3,28	11,50	g2
5	11,93	11,50	T-	14	-11,08	-11,50	DC+
6	4,33	-11,50	g3	15	-11,08	-8,30	rect+
7	4,33	-5,80	V	16	-11,08	-1,68	L3
8	4,33	6,95	g4	17	-11,08	4,93	L2
9	4,33	10,15	DC-	18	-11,08	11,50	L1

all values in mm



Pinout and Dimensions



Pinout

This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

***IMPORTANT INFORMATION AND WARNINGS**

