



MiniSKiiP® 0

3-phase bridge inverter

SKiiP 04AC066V1

Features

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

Typical Applications

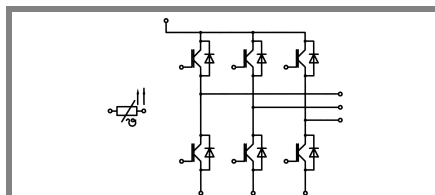
- Inverter up to 6,3 kVA
- Typical motor power 4,0 kW

Remarks

- Case temperature limited to $T_C = 125^\circ\text{C}$ max.
- Product reliability results are valid for $T_j = 150^\circ\text{C}$
- SC data: $t_p \leq 6 \mu\text{s}$; $V_{GE} \leq 15 \text{ V}$; $T_j = 150^\circ\text{C}$; $V_{CC} = 360 \text{ V}$
- V_{CEsat} , V_F = chip level value

Absolute Maximum Ratings		$T_S = 25^\circ\text{C}$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT - Inverter			
V_{CES}		600	V
I_C	$T_S = 25 (70)^\circ\text{C}$, $T_j = 150^\circ\text{C}$	30 (21)	A
I_C	$T_S = 25 (70)^\circ\text{C}$, $T_j = 175^\circ\text{C}$	33 (25)	A
I_{CRM}	$t_p = 1 \text{ ms}$	40	A
V_{GES}		± 20	V
T_j		$-40 \dots +175$	$^\circ\text{C}$
Diode - Inverter			
I_F	$T_S = 25 (70)^\circ\text{C}$, $T_j = 150^\circ\text{C}$	24 (16)	A
I_F	$T_S = 25 (70)^\circ\text{C}$, $T_j = 175^\circ\text{C}$	31 (23)	A
I_{FRM}	$t_p = 1 \text{ ms}$	40	A
T_j		$-40 \dots +175$	$^\circ\text{C}$
I_{RMS}	per power terminal (20 A / spring)	20	A
T_{stg}	$T_{op} \leq T_{stg}$	$-40 \dots +125$	$^\circ\text{C}$
V_{isol}	AC, 1 min.	2500	V

Characteristics		$T_S = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT - Inverter					
V_{CEsat}	$I_{Cnom} = 20 \text{ A}$, $T_j = 25 (150)^\circ\text{C}$	1,1	1,45 (1,65)	1,85 (2,05)	V
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 1 \text{ mA}$		5,8		V
$V_{CE(TO)}$	$T_j = 25 (150)^\circ\text{C}$		0,9 (0,85)	1 (0,9)	V
r_T	$T_j = 25 (150)^\circ\text{C}$		30 (42,5)	45 (60)	m Ω
C_{ies}	$V_{CE} = 25 \text{ V}$, $V_{GE} = 0 \text{ V}$, $f = 1 \text{ MHz}$		1,13		nF
C_{oes}	$V_{CE} = 25 \text{ V}$, $V_{GE} = 0 \text{ V}$, $f = 1 \text{ MHz}$		0,25		nF
C_{res}	$V_{CE} = 25 \text{ V}$, $V_{GE} = 0 \text{ V}$, $f = 1 \text{ MHz}$		0,18		nF
$R_{CC'+EE'}$	spring contact-chip $T_S = 25 (150)^\circ\text{C}$				m Ω
$R_{th(j-s)}$	per IGBT		1,6		K/W
$t_{d(on)}$	under following conditions		15		ns
t_r	$V_{CC} = 300 \text{ V}$, $V_{GE} = \pm 15 \text{ V}$		30		ns
$t_{d(off)}$	$I_{Cnom} = 20 \text{ A}$, $T_j = 150^\circ\text{C}$		175		ns
t_f	$R_{Gon} = R_{Goff} = 15 \Omega$		45		ns
$E_{on}(E_{off})$	inductive load		0,8 (0,7)		mJ
Diode - Inverter					
$V_F = V_{EC}$	$I_{Fnom} = 20 \text{ A}$, $T_j = 25 (150)^\circ\text{C}$		1,6 (1,65)	1,9 (1,95)	V
$V_{(TO)}$	$T_j = 25 (150)^\circ\text{C}$		1 (0,9)	1,1 (1)	V
r_T	$T_j = 25 (150)^\circ\text{C}$		30 (37,5)	40 (47,5)	m Ω
$R_{th(j-s)}$	per diode		2,5		K/W
I_{RRM}	under following conditions		27		A
Q_{rr}	$I_{Fnom} = 20 \text{ A}$, $V_R = 300 \text{ V}$		2,25		μC
E_{rr}	$V_{GE} = 0 \text{ V}$, $T_j = 150^\circ\text{C}$		0,55		mJ
	$di_F/dt = 1280 \text{ A}/\mu\text{s}$				
Temperature Sensor					
R_{ts}	3 %, $T_f = 25 (100)^\circ\text{C}$		1000(1670)		Ω
Mechanical Data					
m			21,5		g
M_s	Mounting torque	2		2,5	Nm



AC

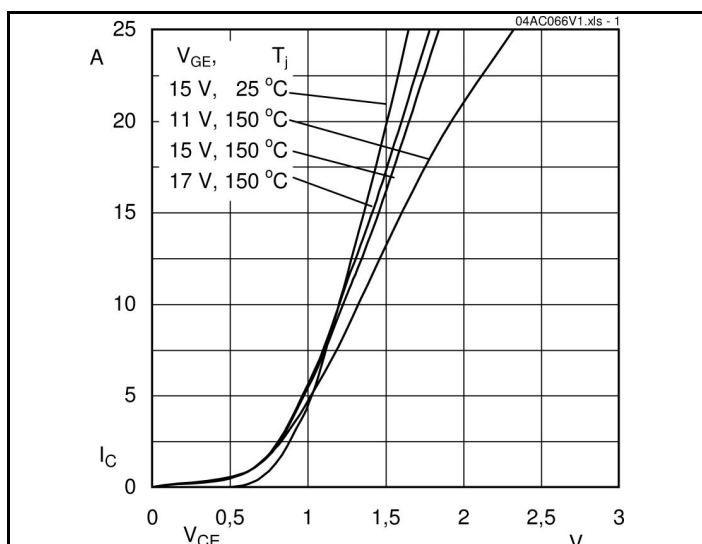


Fig. 1 Output characteristic

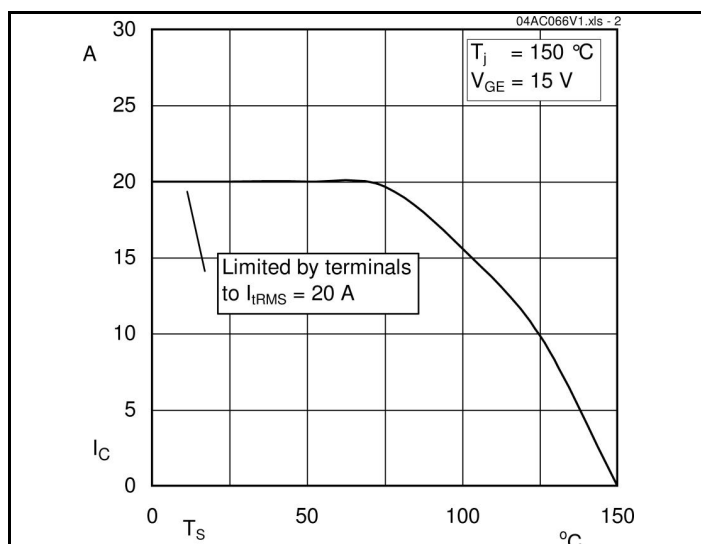


Fig. 2 Rated current vs. temperature

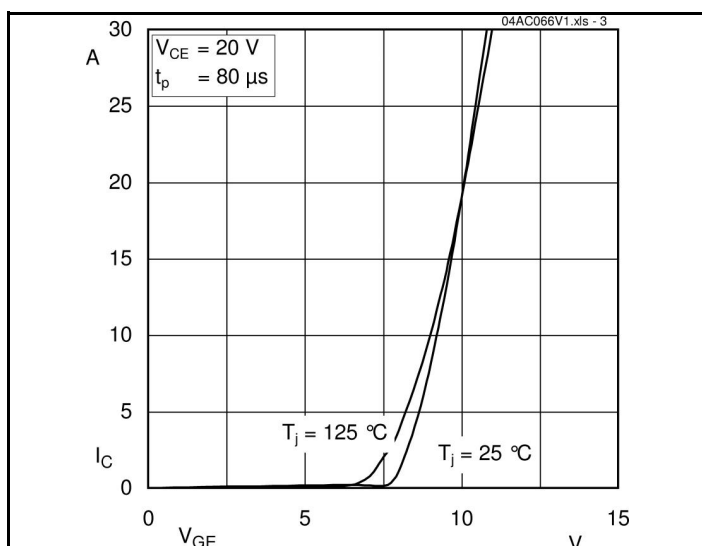


Fig. 3 Typ. transfer characteristic

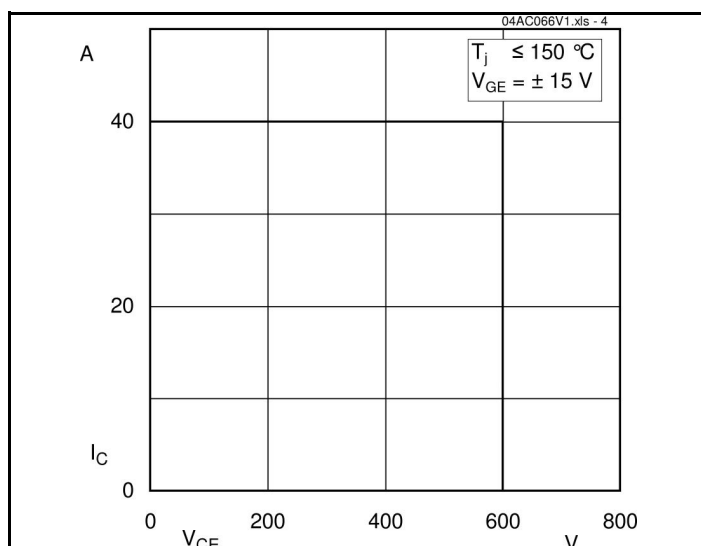


Fig. 4 Reverse bias safe operating area

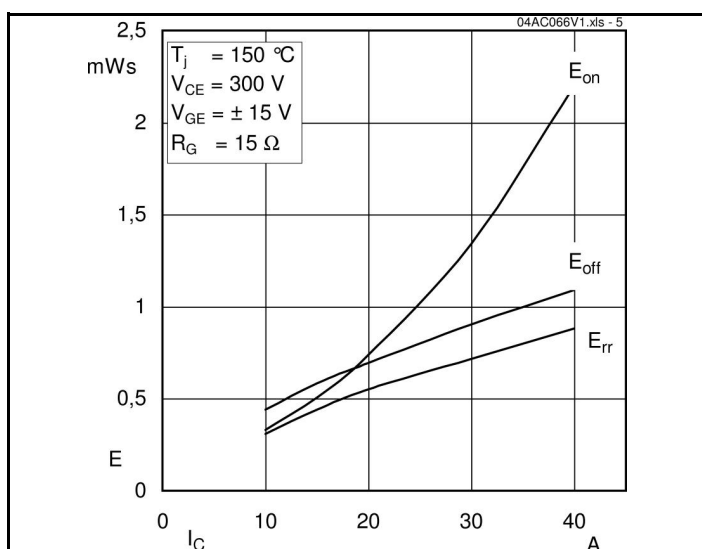


Fig. 5 Turn-on /-off energy = $f(I_C)$

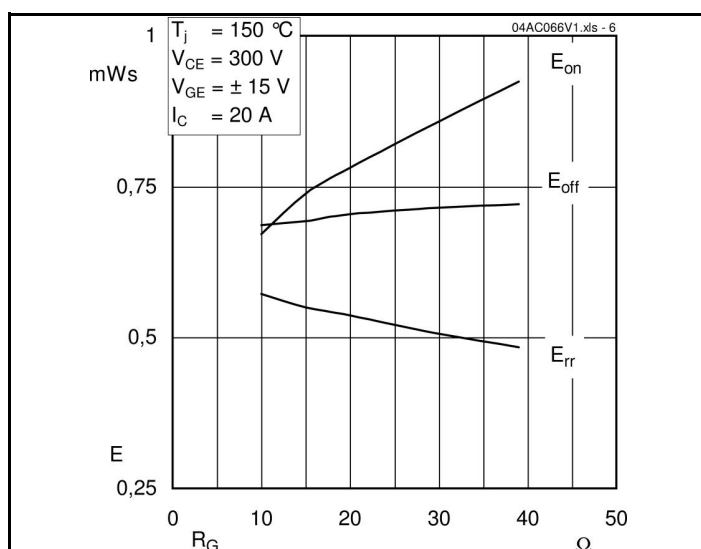


Fig. 6 Turn-on /-off energy = $f(R_G)$

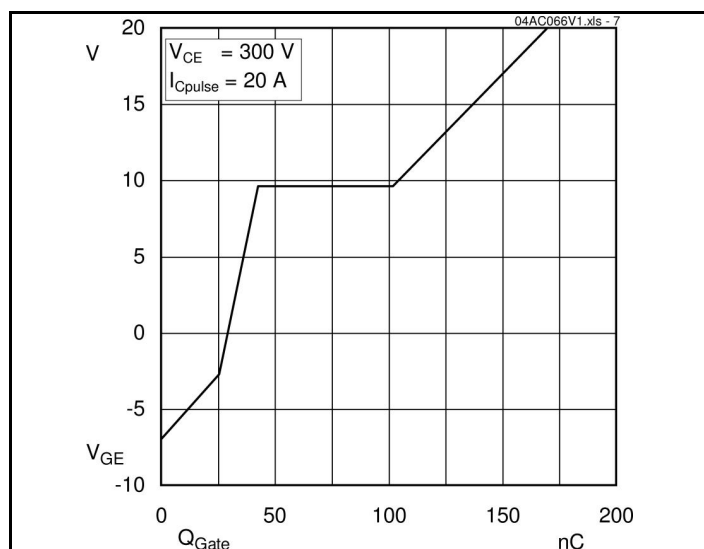


Fig. 7 Typ. Gate charge characteristic

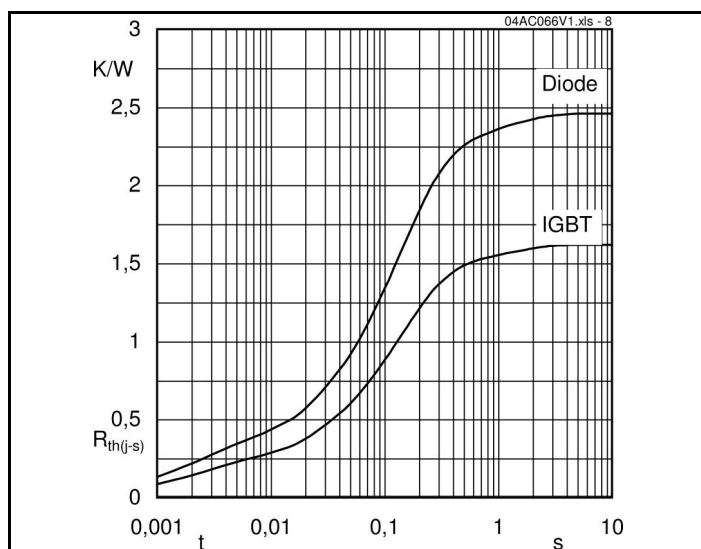


Fig. 8 Thermal impedance

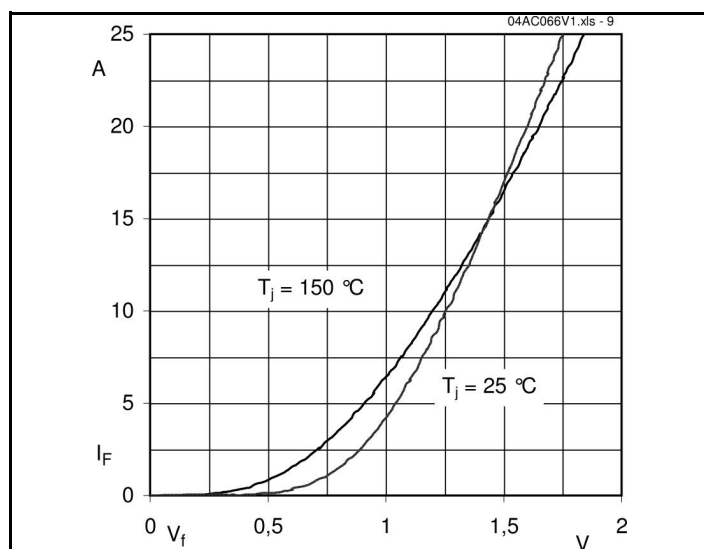
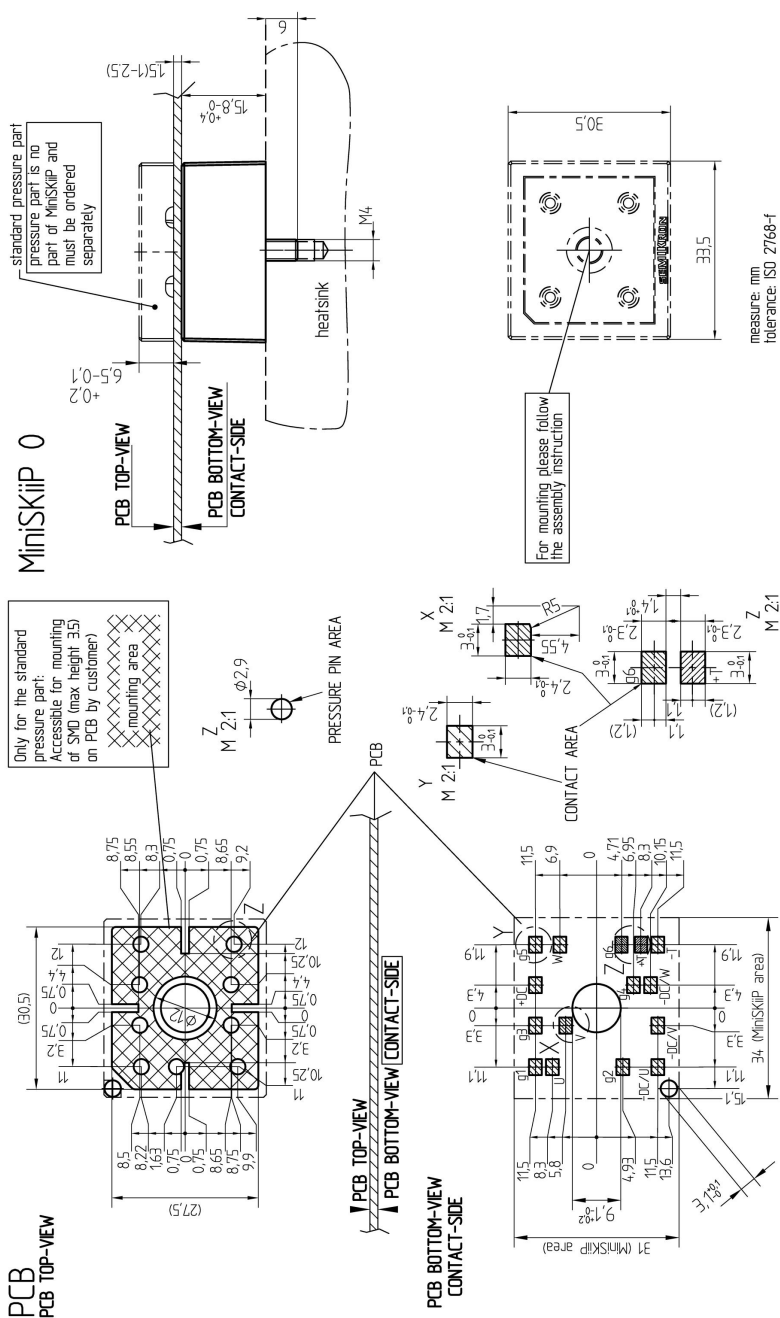
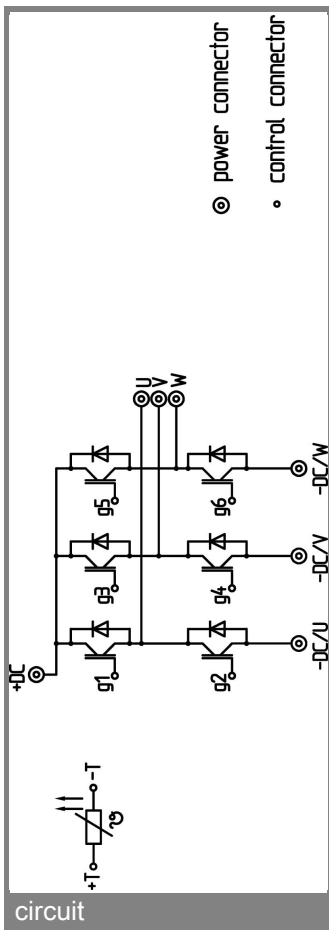


Fig. 9 Freewheeling diode forward characteristic



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