



MiniSKiiP® 3

## 3-phase bridge inverter

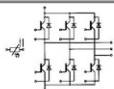
SKiiP 39AC066V4

### Features

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

### Remarks

- Case temperature limited to  $T_C = 125^\circ\text{C}$
- 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



AC

Absolute Maximum Ratings		$T_S = 25^\circ\text{C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT - Inverter</b>			
$V_{CES}$		600	V
$I_C$	$T_s = 25 (70)^\circ\text{C}$ , $T_J = 150^\circ\text{C}$	131 (87)	A
$I_C$	$T_s = 25 (70)^\circ\text{C}$ , $T_J = 175^\circ\text{C}$	146 (107)	A
$I_{CRM}$	$t_p = 1 \text{ ms}$	300	A
$V_{GES}$		$\geq 20$	V
$T_J$		$-40 \dots +175$	$^\circ\text{C}$
<b>Diode - Inverter</b>			
$I_F$	$T_s = 25 (70)^\circ\text{C}$ , $T_J = 150^\circ\text{C}$	151 (98)	A
$I_F$	$T_s = 25 (70)^\circ\text{C}$ , $T_J = 175^\circ\text{C}$	164 (119)	A
$I_{FRM}$	$t_p = 1 \text{ ms}$	300	A
$T_J$		$-40 \dots +175$	$^\circ\text{C}$
$I_{RMS}$	per power terminal (20 A / spring)	160	A
$T_{stg}$	$T_{op} \leq T_{stg}$	$-40 \dots +125$	$^\circ\text{C}$
$V_{bid}$	AC, 1 min.	2500	V

Characteristics		$T_S = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT - Inverter</b>					
$V_{CESat}$	$I_{Cnom} = 150 \text{ A}$ , $T_J = 25 (150)^\circ\text{C}$	1,05	1,45 (1,65)	1,85 (2,05)	V
$V_{GE(Th)}$	$V_{GE} = V_{CE}$ , $I_C = 3 \text{ mA}$		5,8		V
$V_{GE(TC)}$	$T_J = 25 (150)^\circ\text{C}$		0,85 (0,7)	1,1 (1)	V
$r_T$	$T_J = 25 (150)^\circ\text{C}$		4 (6,3)	5 (7)	m $\Omega$
$C_{iss}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		9		nF
$C_{oss}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		1,7		nF
$C_{res}$	$V_{CE} = 25 \text{ V}$ , $V_{GE} = 0 \text{ V}$ , $f = 1 \text{ MHz}$		1,4		nF
$R_{CC+EE}$	spring contact-chip $T_s = 25 (150)^\circ\text{C}$				m $\Omega$
$R_{\theta(j-s)}$	per IGBT		0,5		K/W
$t_{i(on)}$	under following conditions		135		ns
$t_r$	$V_{CC} = 300 \text{ V}$ , $V_{GE} = -8\text{V}/+15\text{V}$		55		ns
$t_{i(off)}$	$I_{Cnom} = 150 \text{ A}$ , $T_J = 150^\circ\text{C}$		450		ns
$t_f$	$R_{Gon} = R_{Goff} = 4,3 \Omega$		50		ns
$E_{on}(E_{off})$	inductive load		7,9 (5,6)		mJ
<b>Diode - Inverter</b>					
$V_F = V_{EC}$	$I_{FRom} = 150 \text{ A}$ , $T_J = 25 (150)^\circ\text{C}$		1,3 (1,3)	1,5 (1,5)	V
$V_{(TC)}$	$T_J = 25 (150)^\circ\text{C}$		0,9 (0,8)	1 (0,9)	V
$r_T$	$T_J = 25 (150)^\circ\text{C}$		2,7 (3,3)	3,3 (4)	m $\Omega$
$R_{\theta(j-s)}$	per diode		0,55		K/W
$I_{FRM}$	under following conditions		150		A
$O_{rr}$	$I_{FRom} = 150 \text{ A}$ , $V_R = 300 \text{ V}$		17		$\mu\text{C}$
$E_{rr}$	$V_{GE} = 0 \text{ V}$ , $T_J = 150^\circ\text{C}$		3,5		mJ
	$di_F/dt = 3000 \text{ A}/\mu\text{s}$				
<b>Temperature Sensor</b>					
$R_{ts}$	3 %, $T_f = 25 (100)^\circ\text{C}$		1000(1670)		$\Omega$
<b>Mechanical Data</b>					
m			97		g
$M_b$	Mounting torque	2		2,5	Nm

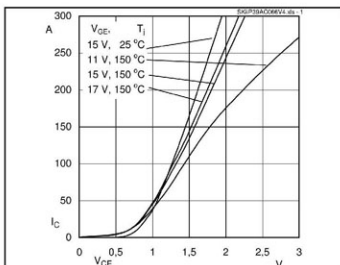


Fig. 1 Output characteristic

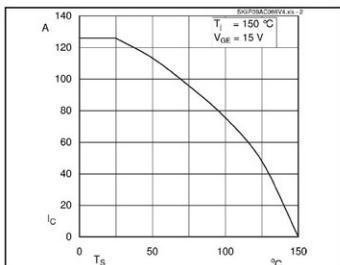


Fig. 2 Rated current vs. temperature

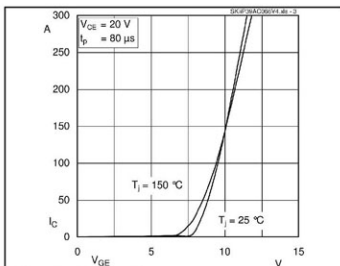


Fig. 3 Typ. transfer characteristic

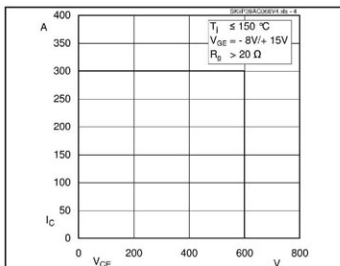


Fig. 4 Reverse bias safe operating area

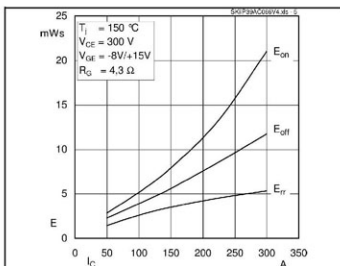


Fig. 5 Turn-on /-off energy =  $f(I_C)$

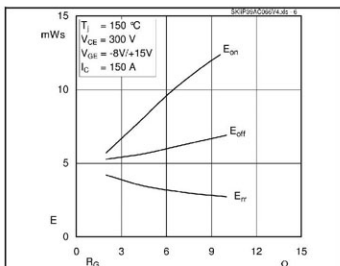


Fig. 6 Turn-on /-off energy =  $f(R_G)$

