

## SKiiP 31 NAB 06

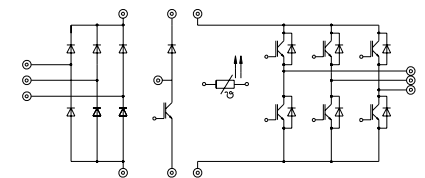
Absolute Maximum Ratings			
Symbol	Conditions <sup>1)</sup>	Values	Units
Inverter			
$V_{CES}$		600	V
$V_{GES}$		$\pm 20$	V
$I_C$	$T_{\text{heatsink}} = 25 / 80 \text{ }^\circ\text{C}$	50 / 35	A
$I_{CM}$	$t_p < 1 \text{ ms}; T_{\text{heatsink}} = 25 / 80 \text{ }^\circ\text{C}$	100 / 70	A
$I_F = -I_C$	$T_{\text{heatsink}} = 25 / 80 \text{ }^\circ\text{C}$	57 / 38	A
$I_{FM} = -I_{CM}$	$t_p < 1 \text{ ms}; T_{\text{heatsink}} = 25 / 80 \text{ }^\circ\text{C}$	114 / 76	A
Bridge Rectifier			
$V_{RRM}$		800	V
$I_D$	$T_{\text{heatsink}} = 80 \text{ }^\circ\text{C}$	25	A
$I_{FSM}$	$t_p = 10 \text{ ms}; \sin. 180^\circ, T_j = 25 \text{ }^\circ\text{C}$	370	A
$I^2t$	$t_p = 10 \text{ ms}; \sin. 180^\circ, T_j = 25 \text{ }^\circ\text{C}$	680	A <sup>2</sup> s
$T_j$		- 40 ... + 150	$^\circ\text{C}$
$T_{stg}$		- 40 ... + 125	$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	2500	V

## MiniSKiiP 3 SEMIKRON integrated intelligent Power SKiiP 31 NAB 06 3-phase bridge rectifier + braking chopper + 3-phase bridge inverter

Case M3



Characteristics					
Symbol	Conditions <sup>1)</sup>	min.	typ.	max.	Units
IGBT - Inverter					
$V_{CEsat}$	$I_C = 50 \text{ A}$ $T_j = 25 (125) \text{ }^\circ\text{C}$	-	2,1(2,2)	2,7(2,8)	V
$t_{d(on)}$	$V_{CC} = 300 \text{ V}; V_{GE} = \pm 15 \text{ V}$ $I_C = 50 \text{ A}; T_j = 125 \text{ }^\circ\text{C}$ $R_{gon} = R_{goff} = 22 \text{ } \Omega$ inductive load	-	60	120	ns
$t_r$		-	80	160	ns
$t_{d(off)}$		-	330	500	ns
$t_f$		-	550	830	ns
$E_{on} + E_{off}$		-	7,3	-	mJ
$C_{ies}$	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}, 1 \text{ MHz}$	-	2,8	-	nF
$R_{thjh}$	per IGBT	-	-	1,0	K/W
IGBT - Chopper *					
$V_{CEsat}$	$I_C = 30 \text{ A}$ $T_j = 25 (125) \text{ }^\circ\text{C}$	-	2,1(2,2)	2,7(2,8)	V
$t_{d(on)}$	$V_{CC} = 300 \text{ V}; V_{GE} = \pm 15 \text{ V}$ $I_C = 30 \text{ A}; T_j = 125 \text{ }^\circ\text{C}$ $R_{gon} = R_{goff} = 33 \text{ } \Omega$ inductive load	-	50	100	ns
$t_r$		-	80	160	ns
$t_{d(off)}$		-	250	370	ns
$t_f$		-	500	750	ns
$E_{on} + E_{off}$		-	4,0	-	mJ
$C_{ies}$	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}, 1 \text{ MHz}$	-	1,6	-	nF
$R_{thjh}$	per IGBT	-	-	1,4	K/W
Diode <sup>2)</sup> - Inverter & Chopper					
$V_F = V_{EC}$	$I_F = 50 \text{ A}$ $T_j = 25 (125) \text{ }^\circ\text{C}$	-	1,45(1,4)	1,7(1,7)	V
$V_{TO}$	$T_j = 125 \text{ }^\circ\text{C}$	-	0,85	0,9	V
$r_T$	$T_j = 125 \text{ }^\circ\text{C}$	-	11	16	m $\Omega$
$I_{RRM}$	$I_F = 50 \text{ A}, V_R = - 300 \text{ V}$ $di_F/dt = - 800 \text{ A}/\mu\text{s}$ $V_{GE} = 0 \text{ V}, T_j = 125 \text{ }^\circ\text{C}$	-	50	-	A
$Q_{rr}$		-	5,0	-	$\mu\text{C}$
$E_{off}$		-	1,5	-	mJ
$R_{thjh}$		per diode	-	-	1,2
Diode - Rectifier					
$V_F$	$I_F = 25 \text{ A}, T_j = 25 \text{ }^\circ\text{C}$	-	1,2	-	V
$R_{thjh}$	per diode	-	-	2,6	K/W
Temperature Sensor					
$R_{TS}$	$T = 25 / 100 \text{ }^\circ\text{C}$		1000 / 1670		$\Omega$
Mechanical Data					
$M_1$	case to heatsink, SI Units	2	-	2,5	Nm
Case	mechanical outline see page B 16 - 9		M3		



UL recognized file no. E63532

- specification of temperature sensor see part A
- common characteristics see page B16-3

### Options

- also available with faster IGBTs (type ... 063), data sheet on request

- <sup>1)</sup>  $T_{\text{heatsink}} = 25 \text{ }^\circ\text{C}$ , unless otherwise specified
- <sup>2)</sup> CAL = Controlled Axial Lifetime Technology (soft and fast recovery)

\* For diagrams of the Chopper IGBT please refer to SKiiP 22 NAB 06

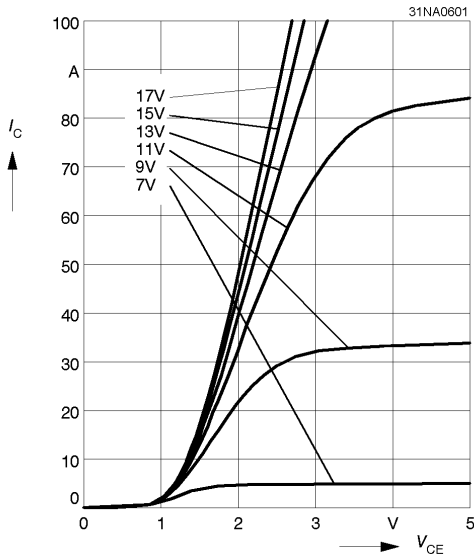


Fig. 1 Typ. output characteristic,  $t_p = 80 \mu s$ ;  $25 \text{ }^\circ\text{C}$

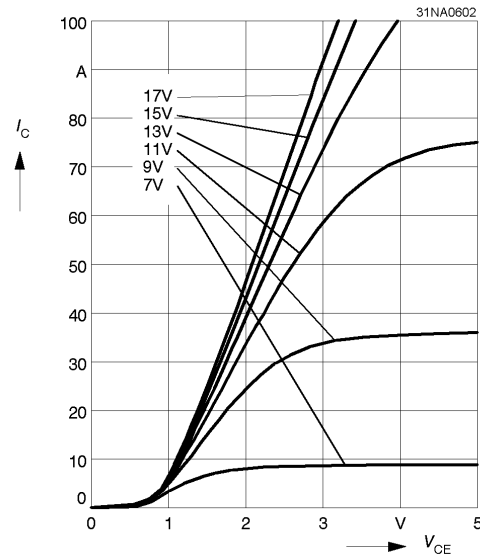


Fig. 2 Typ. output characteristic,  $t_p = 80 \mu s$ ;  $125 \text{ }^\circ\text{C}$

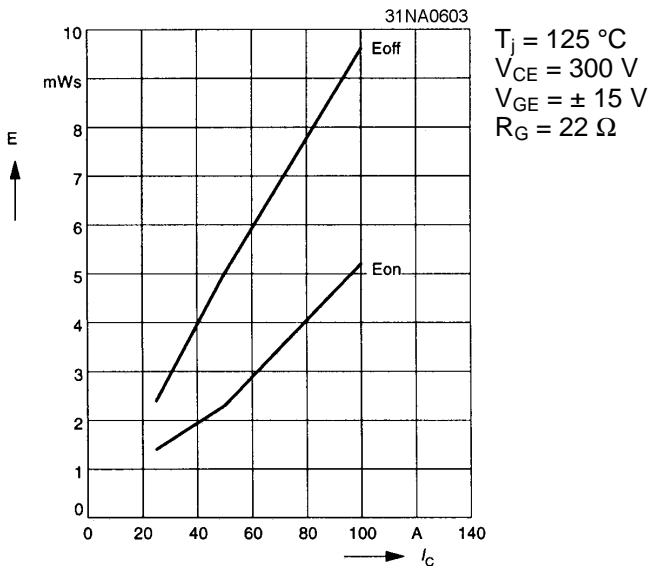


Fig. 3 Turn-on /-off energy =  $f(I_c)$

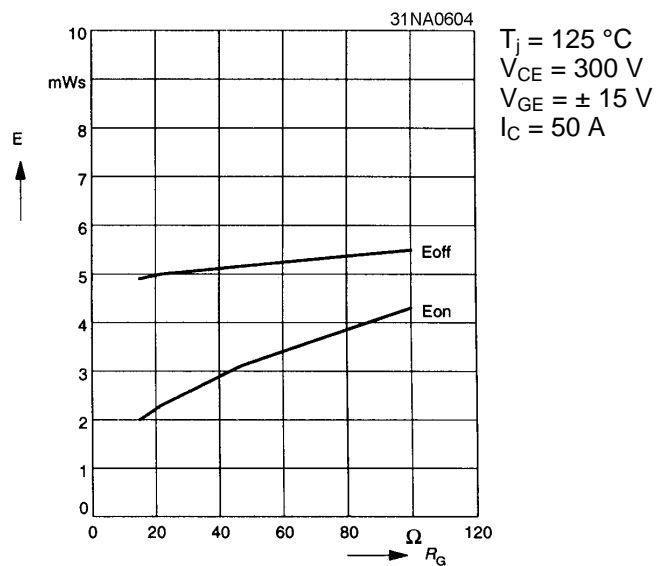


Fig. 4 Turn-on /-off energy =  $f(R_G)$

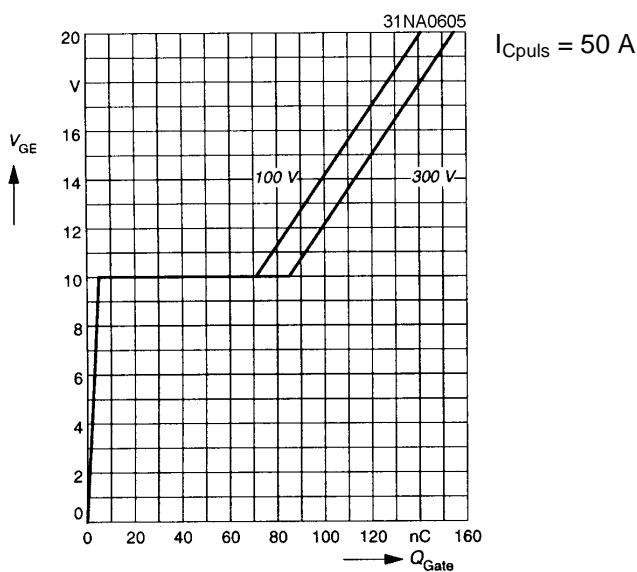


Fig. 5 Typ. gate charge characteristic

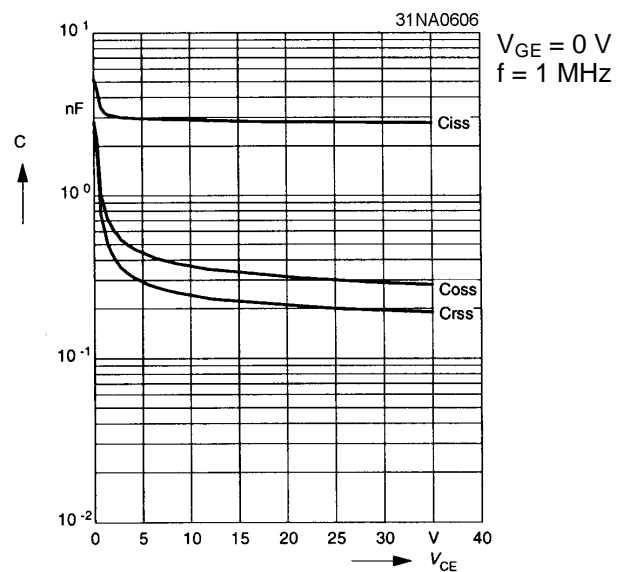


Fig. 6 Typ. capacitances vs.  $V_{CE}$

## 2. Common characteristics of MiniSKiiP

### MiniSKiiP 600 V

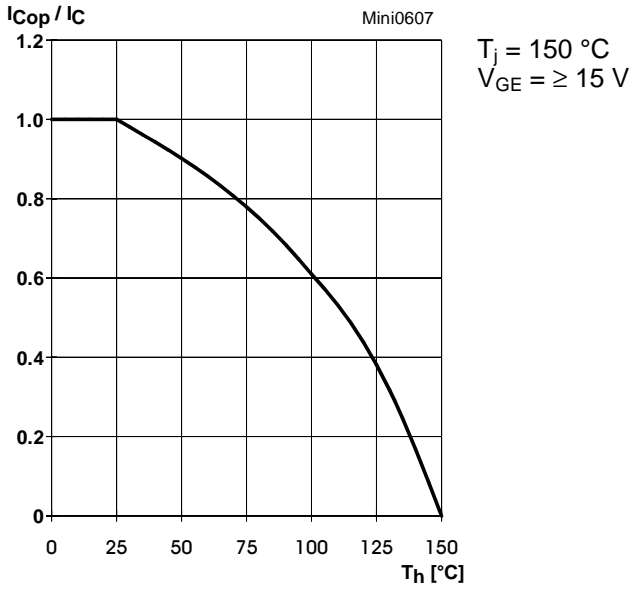


Fig. 7 Rated current of the IGBT  $I_{COP} / I_C = f(T_h)$

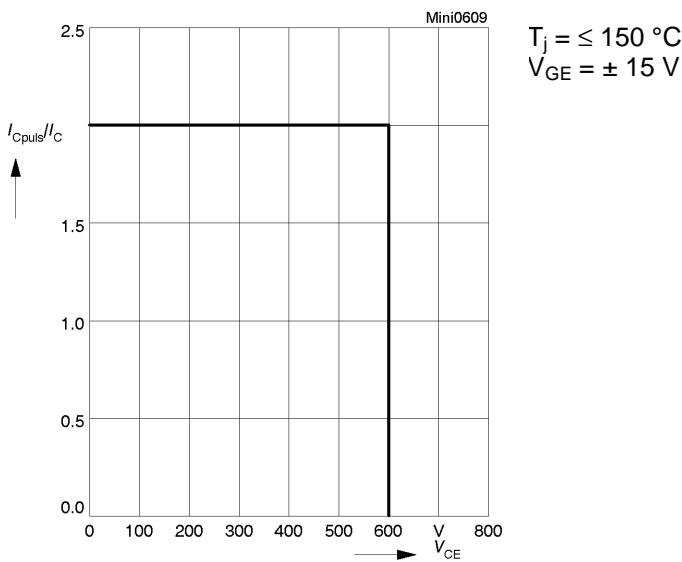


Fig. 9 Turn-off safe operating area (RBSOA) of the IGBT

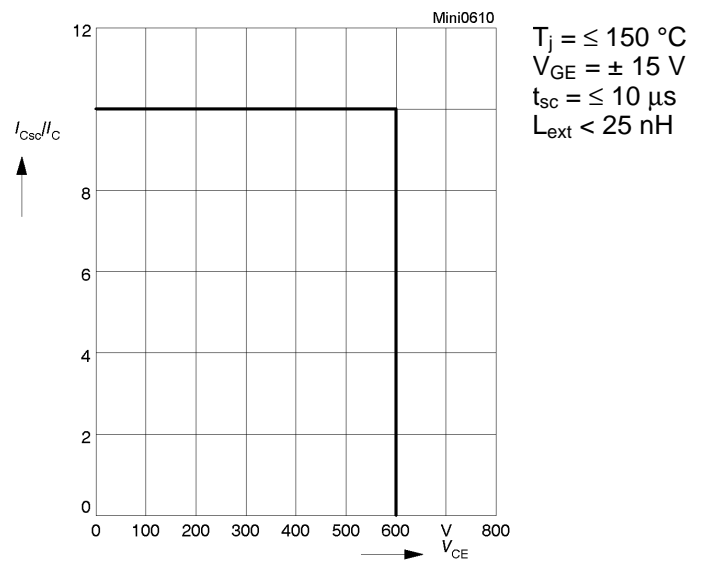


Fig. 10 Safe operating area at short circuit of the IGBT

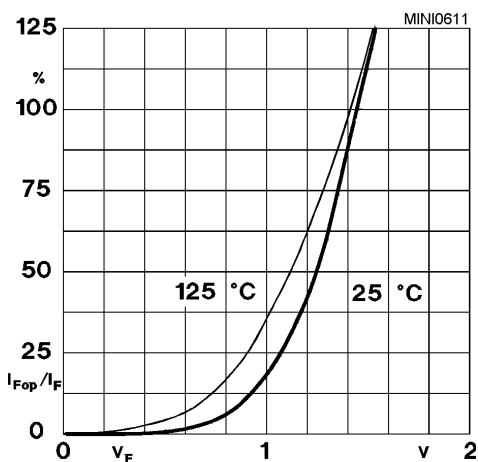


Fig. 11 Typ. freewheeling diode forward characteristic

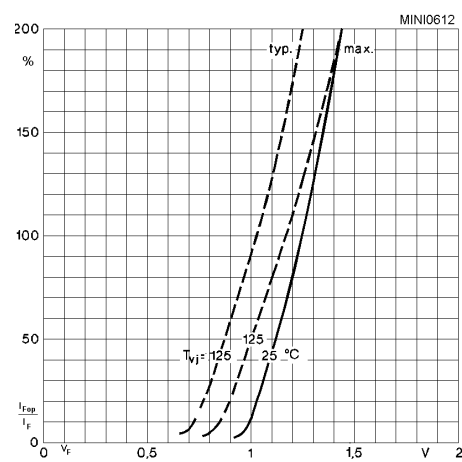


Fig. 12 Forward characteristic of the input bridge diode

### MiniSKiiP 3

SKiiP 30 NAB 06  
 SKiiP 31 NAB 06  
 SKiiP 32 NAB 06  
 SKiiP 30 NAB 12  
 SKiiP 31 NAB 12  
 SKiiP 32 NAB 12

Circuit  
 Case M3  
 Layout and connections for the  
 customer's printed circuit board

