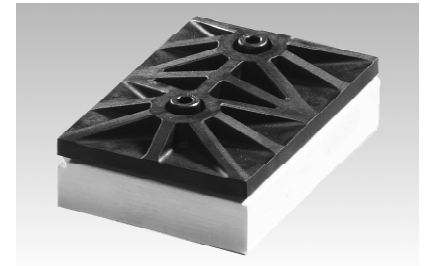


## SKiiP 32 NAB 12

Absolute Maximum Ratings		Values	Units
Symbol	Conditions <sup>1)</sup>		
<b>Inverter</b>			
$V_{CES}$		1200	V
$V_{GES}$		$\pm 20$	V
$I_C$	$T_{\text{heatsink}} = 25 / 80 \text{ }^\circ\text{C}$	65 / 45	A
$I_{CM}$	$t_p < 1 \text{ ms}; T_{\text{heatsink}} = 25 / 80 \text{ }^\circ\text{C}$	130 / 90	A
$I_F = -I_C$	$T_{\text{heatsink}} = 25 / 80 \text{ }^\circ\text{C}$	60 / 40	A
$I_{FM} = -I_{CM}$	$t_p < 1 \text{ ms}; T_{\text{heatsink}} = 25 / 80 \text{ }^\circ\text{C}$	120 / 80	A
<b>Bridge Rectifier</b>			
$V_{RRM}$		1500	V
$I_D$	$T_{\text{heatsink}} = 80 \text{ }^\circ\text{C}$	35	A
$I_{FSM}$	$t_p = 10 \text{ ms}; \sin. 180^\circ; T_j = 25 \text{ }^\circ\text{C}$	700	A
$I^2t$	$t_p = 10 \text{ ms}; \sin. 180^\circ; T_j = 25 \text{ }^\circ\text{C}$	2400	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

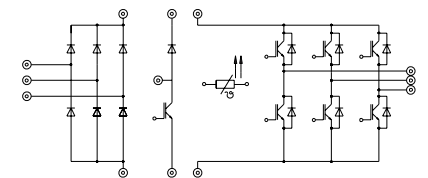
## MiniSKIIP 3 SEMIKRON integrated intelligent Power SKiiP 32 NAB 12 3-phase bridge rectifier + braking chopper + 3-phase bridge inverter

Case M3



Characteristics		min.	typ.	max.	Units
Symbol	Conditions <sup>1)</sup>				
<b>IGBT - Inverter</b>					
$V_{CEsat}$	$I_C = 50 \text{ A}; T_j = 25 (125) \text{ }^\circ\text{C}$	-	2,5(3,1)	3,0(3,7)	V
$t_{d(on)}$	$V_{CC} = 600 \text{ V}; V_{GE} = \pm 15 \text{ V}$ $I_C = 50 \text{ A}; T_j = 125 \text{ }^\circ\text{C}$ $R_{gon} = R_{goff} = 22 \text{ } \Omega$ inductive load	-	44	100	ns
$t_r$		-	56	100	ns
$t_{d(off)}$		-	380	500	ns
$t_f$		-	70	100	ns
$E_{on} + E_{off}$		-	13	-	mJ
$C_{ies}$	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}, 1 \text{ MHz}$	-	3,3	-	nF
$R_{thjh}$	per IGBT	-	-	0,5	K/W
<b>IGBT - Chopper</b>					
$V_{CEsat}$	$I_C = 25 \text{ A}; T_j = 25 (125) \text{ }^\circ\text{C}$	-	2,5(3,1)	3,0(3,7)	V
$t_{d(on)}$	$V_{CC} = 600 \text{ V}; V_{GE} = \pm 15 \text{ V}$ $I_C = 25 \text{ A}; T_j = 125 \text{ }^\circ\text{C}$ $R_{gon} = R_{goff} = 47 \text{ } \Omega$ inductive load	-	75	150	ns
$t_r$		-	65	130	ns
$t_{d(off)}$		-	400	600	ns
$t_f$		-	50	100	ns
$E_{on} + E_{off}$		-	6,2	-	mJ
$C_{ies}$	$V_{CE} = 25 \text{ V}; V_{GE} = 0 \text{ V}, 1 \text{ MHz}$	-	1,65	-	nF
$R_{thjh}$	per IGBT	-	-	1,0	K/W
<b>Diode <sup>2)</sup> - Inverter &amp; Chopper</b>					
$V_F = V_{EC}$	$I_F = 50 \text{ A}; T_j = 25 (125) \text{ }^\circ\text{C}$	-	2,0(1,8)	2,5(2,3)	V
$V_{TO}$	$T_j = 125 \text{ }^\circ\text{C}$	-	1,0	1,2	V
$r_T$	$T_j = 125 \text{ }^\circ\text{C}$	-	16	22	m $\Omega$
$I_{RRM}$	$I_F = 50 \text{ A}, V_R = - 600 \text{ V}$ $di_F/dt = - 800 \text{ A}/\mu\text{s}$ $V_{GE} = 0 \text{ V}, T_j = 125 \text{ }^\circ\text{C}$	-	40	-	A
$Q_{rr}$		-	8,0	-	$\mu\text{C}$
$E_{off}$		-	2,0	-	mJ
$R_{thjh}$		per diode	-	-	1,0
<b>Diode - Rectifier</b>					
$V_F$	$I_F = 35 \text{ A}, T_j = 25 \text{ }^\circ\text{C}$	-	1,2	-	V
$R_{thjh}$	per diode	-	-	1,6	K/W
<b>Temperature Sensor</b>					
$R_{TS}$	$T = 25 / 100 \text{ }^\circ\text{C}$		1000 / 1670		$\Omega$
<b>Mechanical Data</b>					
$M_1$	case to heatsink, SI Units	2	-	2,5	Nm
Case	mechanical outline see page B 16 - 9		M3		

\* For diagrams of the Chopper IGBT please refer to SKiiP 30 NAB 12



UL recognized file no. E63532

- specification of temperature sensor see part A
- common characteristics B 16 - 4

### Options

- also available with powerful chopper. For characteristics please refer to Inverter IGBT

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

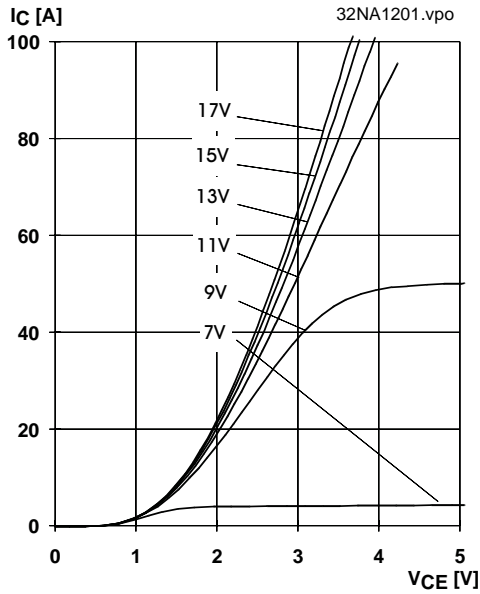


Fig. 1 Typ. output characteristic,  $t_p = 80 \mu s$ ;  $25 \text{ }^\circ\text{C}$

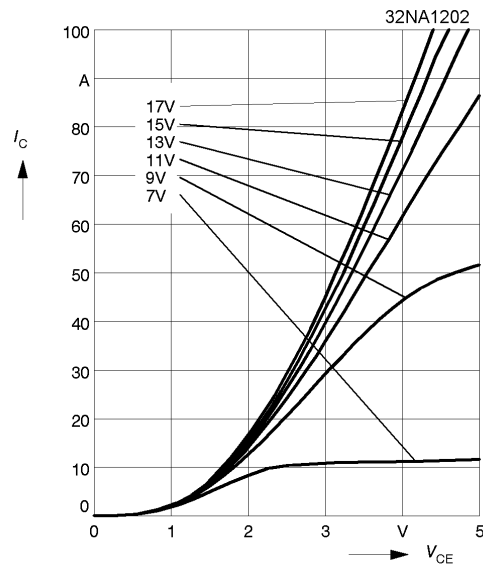


Fig. 2 Typ. output characteristic,  $t_p = 80 \mu s$ ;  $125 \text{ }^\circ\text{C}$

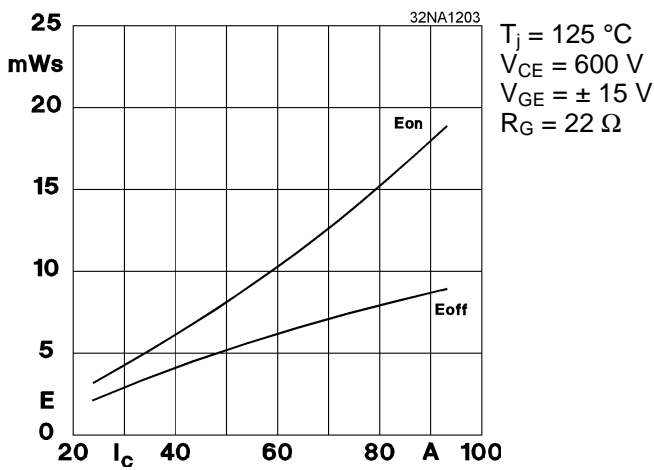


Fig. 3 Turn-on /-off energy =  $f(I_C)$

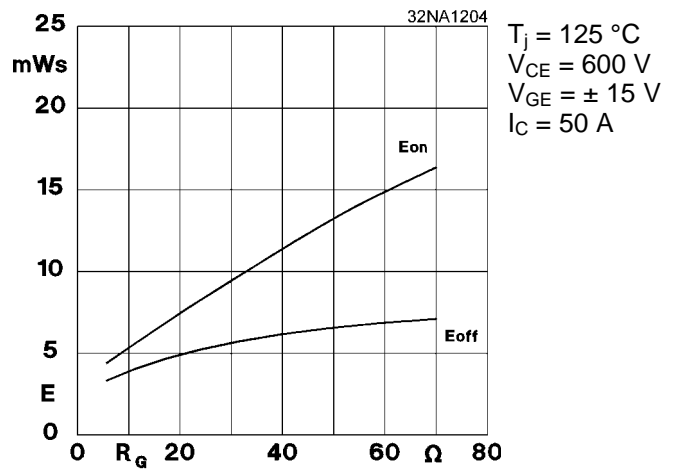


Fig. 4 Turn-on /-off energy =  $f(R_G)$

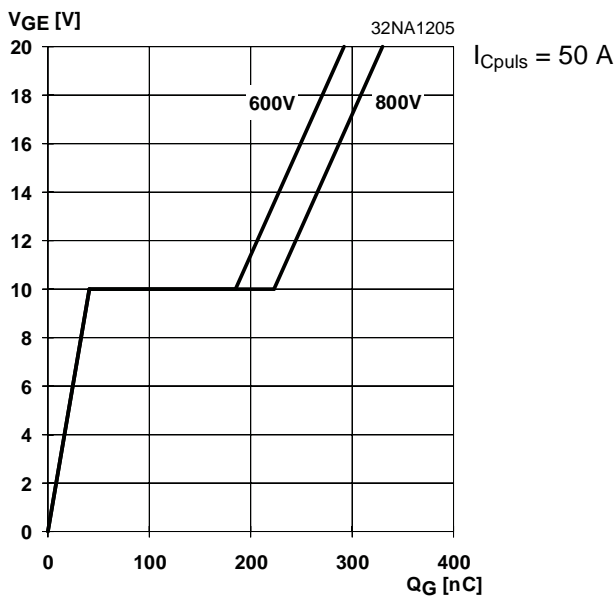


Fig. 5 Typ. gate charge characteristic

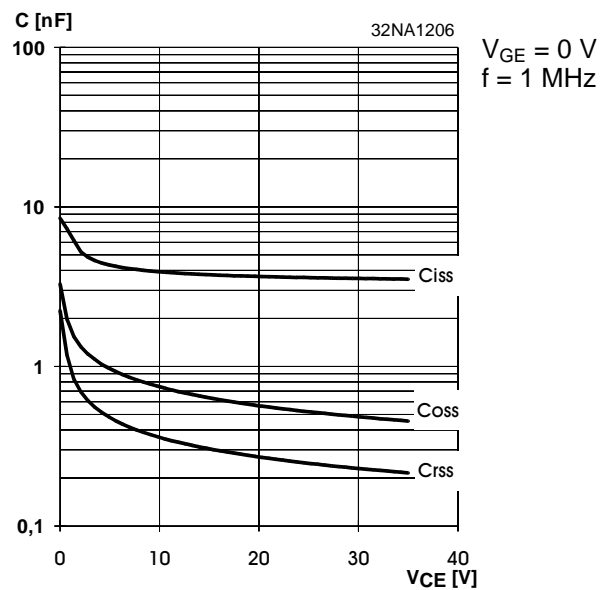


Fig. 6 Typ. capacitances vs.  $V_{CE}$

# MiniSKiiP 1200 V

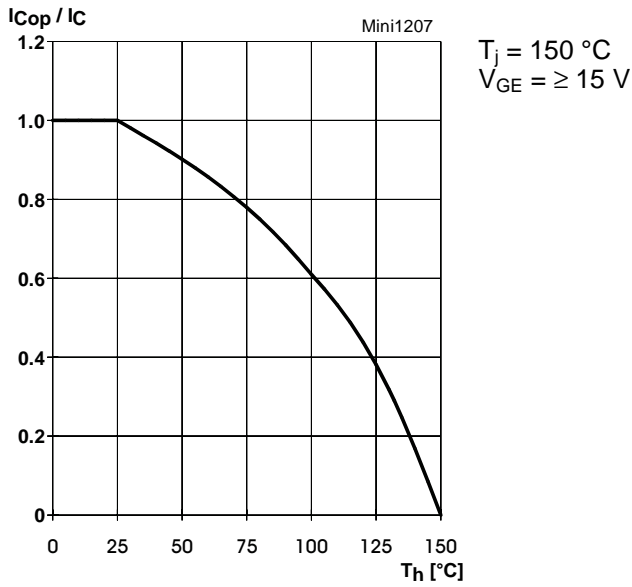


Fig. 7 Rated current of the IGBT  $I_{COp} / I_C = f(T_h)$

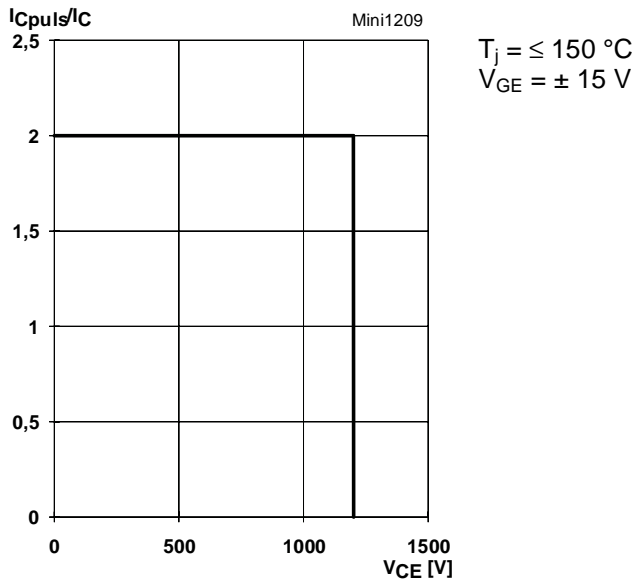


Fig. 9 Turn-off safe operating area (RBSOA) of the IGBT



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

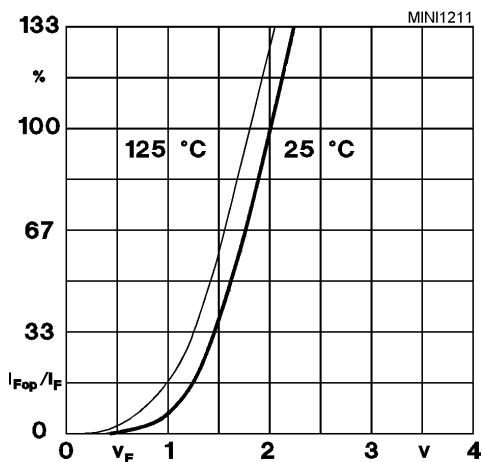


Fig. 11 Typ. freewheeling diode forward characteristic

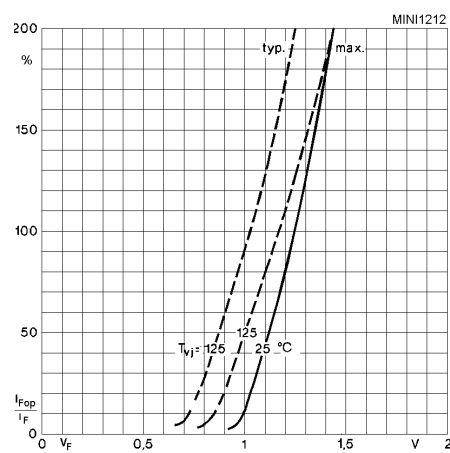


Fig. 12 Forward characteristic of the input bridge diode

### 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

