

MiniSKiiP<sup>®</sup> 3

3-phase bridge rectifier + brake chopper + 3-phase bridge inverter SKiiP 35NAB126V1

#### Features

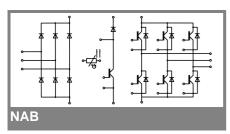
- Fast Trench IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised file no. E63532

### **Typical Applications\***

- Inverter up to 28 kVA
- Typical motor power 15 kW

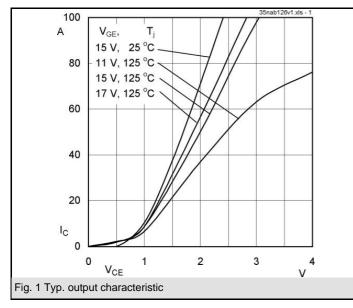
#### Remarks

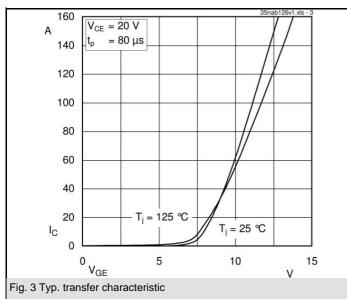
•  $V_{CEsat}$ ,  $V_{F}$ = chip level value

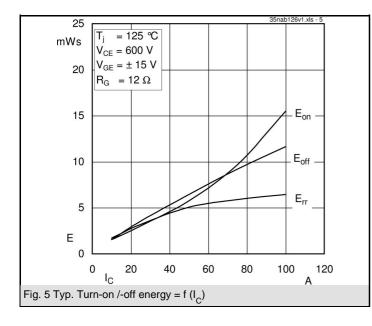


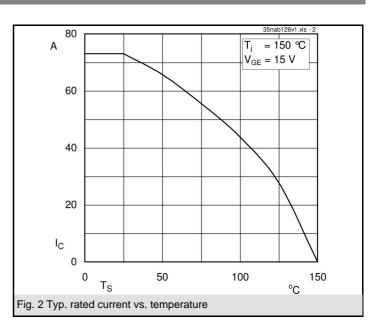
Absolute Maximum Ratings T <sub>s</sub> = 25 °C, unless otherwise speci								
Symbol	Conditions	Values	Units					
IGBT - Inverter, Chopper								
V <sub>CES</sub>		1200	V					
Ι <sub>C</sub>	T <sub>s</sub> = 25 (70) °C	73 (55)	А					
I <sub>CRM</sub>		100	А					
V <sub>GES</sub>		± 20	V					
Т <sub>ј</sub>		- 40 + 150	°C					
Diode - Inverter, Chopper								
I <sub>F</sub>	T <sub>s</sub> = 25 (70) °C	62 (46)	А					
I <sub>FRM</sub>		100	А					
Т <sub>ј</sub>		- 40 + 150	°C					
Diode - Rectifier								
V <sub>RRM</sub>		1600	V					
I <sub>F</sub>	T <sub>s</sub> = 70 °C	61	А					
I <sub>FSM</sub>	t <sub>p</sub> = 10 ms, sin 180 °, T <sub>i</sub> = 25 °C	700	А					
i²t	t <sub>p</sub> = 10 ms, sin 180 °, T <sub>i</sub> = 25 °C	2400	A²s					
Т <sub>ј</sub>		- 40 + 150	°C					
Module								
I <sub>tRMS</sub>	per power terminal (20 A / spring)	80	А					
T <sub>stg</sub>		- 40 + 125	°C					
V <sub>isol</sub>	AC, 1 min.	2500	V					

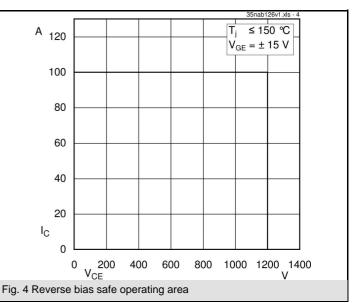
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Characteristics T <sub>s</sub> = 25 °C, unless otherwise specir										
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Symbol	Conditions	min.	typ.	max.	Units					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	IGBT - Inverter, Chopper										
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	V <sub>CEsat</sub>	I <sub>Cnom</sub> = 50 A, T <sub>i</sub> = 25 (125) °C		1,7 (2)	2,1 (2,4)	V					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	V <sub>GE(th)</sub>	$V_{GE} = V_{CE}, I_C = 2 \text{ mA}$	5	5,8	6,5	V					
$ \begin{array}{c} C_{ies} & V_{CE} = 25 \ V, \ V_{GE} = 0 \ V, \ f = 1 \ MHz & 3,7 & nF \\ C_{oes} & V_{CE} = 25 \ V, \ V_{GE} = 0 \ V, \ f = 1 \ MHz & 0,8 & nF \\ C_{res} & V_{CE} = 25 \ V, \ V_{GE} = 0 \ V, \ f = 1 \ MHz & 0,7 & nF \\ R_{th(j:s)} & per \ IGBT & 0.55 & K/W \\ \hline f_{d(on)} & under \ following \ conditions & 85 & ns \\ t_r & V_{CC} = 600 \ V, \ V_{GE} = \pm 15 \ V & 30 & ns \\ t_{(doff)} & l_{cnom} = 50 \ A, \ T_j = 125^{\circ}C & 430 & ns \\ t_{(aff)} & l_{cnom} = 50 \ A, \ T_j = 125^{\circ}C & 1.6 \ (1.6) & 1.8 \ (1.8) & V \\ V_{(TO)} & T_j = 25 \ (125)^{\circ}C & 1.6 \ (1.6) & 1.8 \ (1.8) & V \\ V_{(TO)} & T_j = 25 \ (125)^{\circ}C & 122 \ (16) & 14 \ (18) & m\Omega \\ R_{th(j:s)} & per \ diode & 1 & K/W \\ R_{RM} & under \ following \ conditions & 71 & A \\ Q_{rr} & l_{Fnom} = 50 \ A, \ T_j = 25^{\circ}C & 11.5 & \muC \\ R_{rr} & V_{GE} = 0 \ V, \ T_j = 125^{\circ}C & 11.5 & \muC \\ R_{rr} & V_{GE} = 0 \ A, \ T_j = 25^{\circ}C & 11.1 & V \\ V_{(TO)} & T_j = 150^{\circ}C & 11.1 & M \\ R_{th(j:s)} & per \ diode & 1 & K/W \\ R_{rr} & V_{GE} = 0 \ V, \ T_j = 125^{\circ}C & 1.1 & V \\ V_{(TO)} & T_j = 150^{\circ}C & 1.1 & M \\ R_{th(j:s)} & per \ diode & 0.9 & K/W \\ \hline Temperature \ Sensor \\ R_{ts} & 3^{\circ}, \ T_r = 25 \ (100)^{\circ}C & 1000(1670) & \Omega \\ \hline Mechanical \ Data \\ w & 95 & g \end{array}$				1 (0,9)	1,2 (1,1)	V					
$\begin{array}{c cccc} C_{oes} & V_{CE} = 25 \ V, V_{GE} = 0 \ V, f = 1 \ MHz & 0,8 & nF \\ C_{res} & V_{CE} = 25 \ V, V_{GE} = 0 \ V, f = 1 \ MHz & 0,7 & nF \\ \hline R_{th(j:s)} & per \ IGBT & 0.55 & KW \\ \hline t_{d(on)} & under \ following \ conditions & 85 & ns \\ t_r & V_{CC} = 600 \ V, V_{GE} = \pm 15 \ V & 30 & ns \\ t_{(doff)} & l_{Cnom} = 50 \ A, T_j = 125^{\circ}C & 430 & ns \\ \hline t_{f} & R_{Gon} = R_{Goff} = 12 \ \Omega & 90 & ns \\ \hline e_{on} & inductive \ load & 6.5 & mJ \\ \hline Diode - Inverter, \ Chopper \\ V_F = V_{EC} & l_{Fnom} = 50 \ A, T_j = 25 \ (125)^{\circ}C & 1.6 \ (1.6) \ 1.8 \ (1.8) & V \\ V_{(TO)} & T_j = 25 \ (125)^{\circ}C & 122 \ (16) \ 14 \ (18) & m\Omega \\ \hline R_{th(j:s)} & per \ diode & 1 & KW \\ \hline l_{RRM} & under \ following \ conditions & 71 & A \\ Q_{rr} & l_{Fnom} = 50 \ A, V_R = 600 \ V & 11.5 & \muC \\ \hline R_{rr} & V_{GE} = 0 \ V, T_j = 125^{\circ}C & 1.1 & V \\ V_{(TO)} & T_j = 150 \ A, T_j = 25^{\circ}C & 1.1 & V \\ V_{(TO)} & T_j = 150^{\circ}C & 1.1 & M \\ \hline Diode - Rectifier \\ V_F & l_{Iroom} = 35 \ A, T_j = 25^{\circ}C & 1.1 & M \\ \hline M_{th(j:s)} & per \ diode & 0.9 & KW \\ \hline Temperature \ Sensor \\ \hline R_{ts} & 3^{\circ}, T_r = 25 \ (100)^{\circ}C & 1000(1670) & \Omega \\ \hline Mechanical \ Data \\ \hline w & 95 & g \end{array}$				14 (22)	18 (26)	mΩ					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		V <sub>CE</sub> = 25 V, V <sub>GE</sub> = 0 V, f = 1 MHz		,							
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	C <sub>oes</sub>										
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	C <sub>res</sub>	V <sub>CE</sub> = 25 V, V <sub>GE</sub> = 0 V, f = 1 MHz		0,7		nF					
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	R <sub>th(j-s)</sub>	per IGBT		0,55		K/W					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		under following conditions		85		ns					
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	t,			30		ns					
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	t <sub>d(off)</sub>	I <sub>Cnom</sub> = 50 A, T <sub>j</sub> = 125°C		430		ns					
$\begin{tabular}{ c c c c c c } \hline E_{off} & & & & & & & & & & & & & & & & & & $	t <sub>f</sub>					ns					
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	E <sub>on</sub>	inductive load		6,5		mJ					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	E <sub>off</sub>			6,1		mJ					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Diode - Ir	verter, Chopper									
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	V <sub>F</sub> = V <sub>EC</sub>	I <sub>Enom</sub> = 50 A, T <sub>i</sub> = 25 (125) °C		1,6 (1,6)	1,8 (1,8)	V					
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	V <sub>(TO)</sub>	T <sub>i</sub> = 25 (125) °C		1 (0,8)	1,1 (0,9)	V					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	r <sub>T</sub>	T <sub>j</sub> = 25 (125) °C		12 (16)	14 (18)	mΩ					
$ \begin{array}{ c c c c c c } I_{RRM} & under following conditions & 71 & A \\ Q_{rr} & I_{Fnom} = 50 \text{ A}, \text{ V}_{R} = 600 \text{ V} & 11,5 & \mu\text{C} \\ \hline & & & & & & & & & & & & \\ I_{Fnom} = 50 \text{ A}, \text{ V}_{R} = 600 \text{ V} & 11,5 & & \mu\text{C} \\ \hline & & & & & & & & & & & & \\ \hline & & & &$	R <sub>th(j-s)</sub>	per diode		1		K/W					
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		under following conditions		71		А					
$\begin{tabular}{ c c c c c c c } \hline di_F/dt = 1900 \ A/\mu s & & & & & \\ \hline \textbf{Diode - Rectifier} & & & & & & \\ \hline V_F & & I_{Fnom} = 35 \ A, \ T_j = 25 \ ^\circ C & & & 1,1 & & V \\ \hline V_{(TO)} & & T_j = 150 \ ^\circ C & & & & 0,8 & & V \\ r_T & & T_j = 150 \ ^\circ C & & & 111 & & m\Omega \\ \hline R_{th(j-s)} & & & & & per \ diode & & & 0,9 & & K/W \\ \hline \textbf{Temperature Sensor} & & & \\ \hline R_{ts} & & 3 \ \%, \ T_r = 25 \ (100) \ ^\circ C & & & 1000(1670) & \Omega \\ \hline \textbf{Mechanical Data} & & & \\ w & & & & & 95 & g \\ \hline \end{tabular}$		I <sub>Fnom</sub> = 50 A, V <sub>R</sub> = 600 V		11,5		μC					
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	E <sub>rr</sub>	V <sub>GE</sub> = 0 V, T <sub>i</sub> = 125 °C		4,7		mJ					
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		di <sub>F</sub> /dt = 1900 A/µs									
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Diode - R	ectifier				•					
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	V <sub>F</sub>	I <sub>Enom</sub> = 35 A, T <sub>i</sub> = 25 °C		1,1		V					
$r_T$ $T_j = 150 \ ^{\circ}C$ 11       mΩ $R_{th(j-s)}$ per diode       0,9       K/M         Temperature Sensor       R <sub>ts</sub> 3 %, $T_r = 25 (100) \ ^{\circ}C$ 1000(1670)       Ω         Mechanical Data       95       g		T <sub>i</sub> = 150 °C		0,8		V					
$R_{th(j-s)}$ per diode         0,9         K/M           Temperature Sensor         R         3 %, T <sub>r</sub> = 25 (100) °C         1000(1670)         Ω           Mechanical Data         95         g	• •			11		mΩ					
Temperature Sensor         Π           R <sub>ts</sub> 3 %, T <sub>r</sub> = 25 (100) °C         1000(1670)         Ω           Mechanical Data         95         g	R <sub>th(i-s)</sub>	per diode		0,9		K/W					
R <sub>ts</sub> 3 %, T <sub>r</sub> = 25 (100) °C         1000(1670)         Ω           Mechanical Data w         95         g		ture Sensor	1								
w 95 g	-			1000(1670)		Ω					
w 95 g	Mechanical Data										
				95		g					
	M <sub>s</sub>	Mounting torque	2		2,5	Nm					

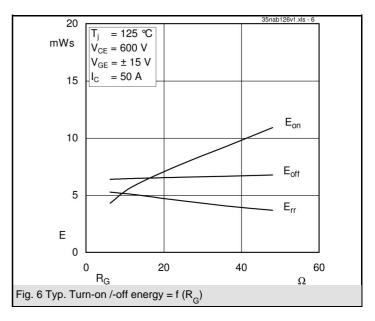


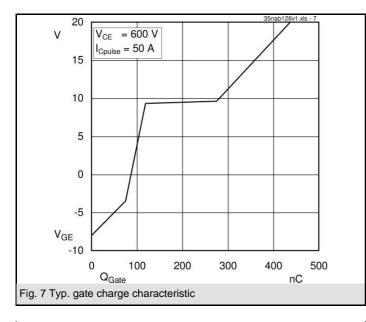


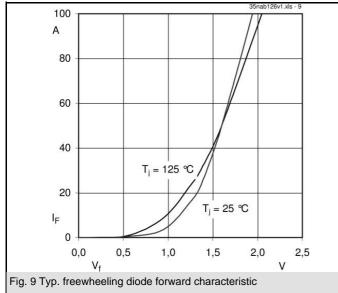


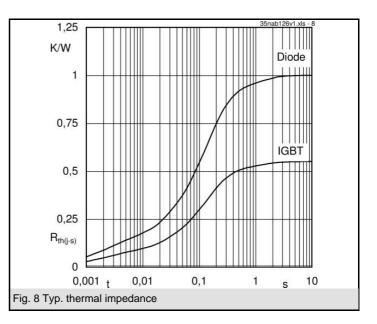


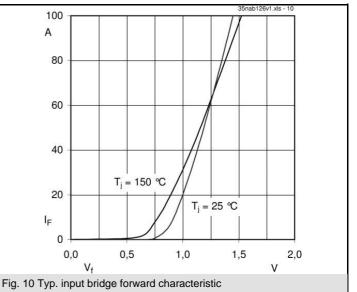


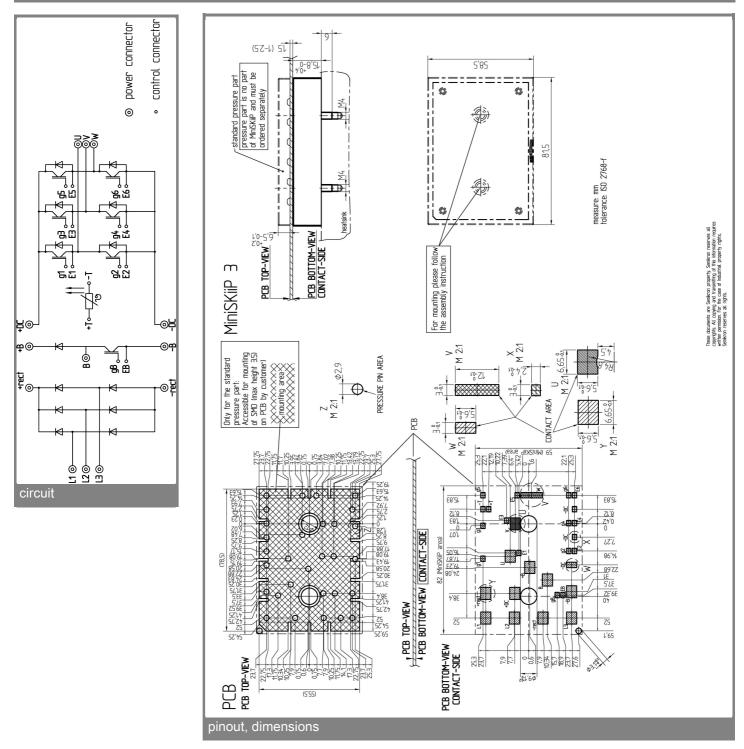












This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.