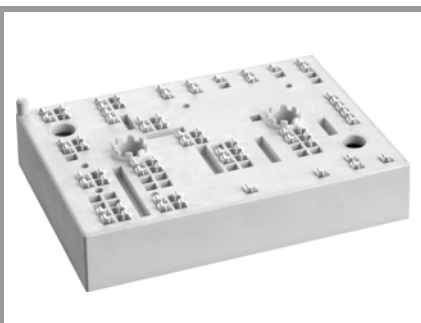


SKiiP 37NAB12T4V1



MiniSKiiP® 3

SKiiP 37NAB12T4V1

Features

- Trench 4 IGBTs
- Robust and soft freewheeling diodes in CAL technology
- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532

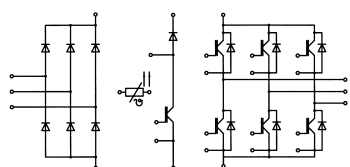
Typical Applications*

- Inverter up to 36 kVA
- Typical motor power 22 kW

Remarks

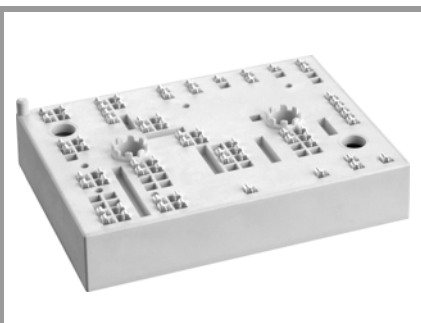
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- MiniSKiiP "Technical Explanations" and "Mounting Instructions" are part of the data sheet. Please refer to both documents for further information.

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
Inverter - IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$		1200	V
I_C	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	90	A
		$T_j = 175^\circ\text{C}$	73	A
I_C	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	106	A
		$T_j = 175^\circ\text{C}$	86	A
I_{Cnom}			75	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$		225	A
V_{GES}			-20 ... 20	V
t_{psc}	$V_{CC} = 800 \text{ V}$	$T_j = 150^\circ\text{C}$	10	μs
	$V_{GE} \leq 15 \text{ V}$			
	$V_{CES} \leq 1200 \text{ V}$			
T_j			-40 ... 175	$^\circ\text{C}$
Chopper - IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$		1200	V
I_C	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	90	A
		$T_j = 175^\circ\text{C}$	73	A
I_C	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	106	A
		$T_j = 175^\circ\text{C}$	86	A
I_{Cnom}			75	A
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	$V_{GE} \leq 15 \text{ V}$			
	$V_{CES} \leq 1200 \text{ V}$			
T_j			-40 ... 175	$^\circ\text{C}$
Inverse - Diode				
V_{RRM}	$T_j = 25^\circ\text{C}$		1200	V
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	83	A
		$T_j = 175^\circ\text{C}$	66	A
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	95	A
		$T_j = 175^\circ\text{C}$	76	A
I_{Fnom}			75	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$		225	A
I_{FSM}	$t_p = 10 \text{ ms, sin } 180^\circ, T_j = 150^\circ\text{C}$		430	A
T_j			-40 ... 175	$^\circ\text{C}$
Freewheeling - Diode				
V_{RRM}	$T_j = 25^\circ\text{C}$		1200	V
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	83	A
		$T_j = 175^\circ\text{C}$	66	A
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	95	A
		$T_j = 175^\circ\text{C}$	76	A
I_{Fnom}			75	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$		225	A
I_{FSM}	$t_p = 10 \text{ ms, sin } 180^\circ, T_j = 150^\circ\text{C}$		430	A
T_j			-40 ... 175	$^\circ\text{C}$



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SKiIP 37NAB12T4V1



MiniSKiIP® 3

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Remarks

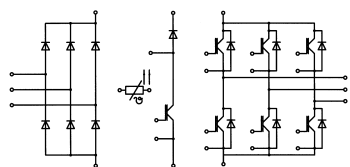
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- MiniSKiIP "Technical Explanations" and "Mounting Instructions" are part of the data sheet. Please refer to both documents for further information.

Absolute Maximum Ratings

Symbol	Conditions	Values	Unit	
Rectifier - Diode				
V_{RRM}	$T_j = 25^\circ\text{C}$	1600	V	
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	81	A
	$T_j = 150^\circ\text{C}$	$T_s = 70^\circ\text{C}$	60	A
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$	$T_s = 25^\circ\text{C}$	92	A
	$T_j = 150^\circ\text{C}$	$T_s = 70^\circ\text{C}$	68	A
I_{Fnom}		25	A	
I_{FSM}	10 ms	$T_j = 25^\circ\text{C}$	700	A
	sin 180°	$T_j = 150^\circ\text{C}$	490	A
I^2t	10 ms	$T_j = 25^\circ\text{C}$	2400	A ² s
	sin 180°	$T_j = 150^\circ\text{C}$	1200	A ² s
T_j		-40 ... 150	°C	
Module				
$I_{t(RMS)}$	$T_{terminal} = 80^\circ\text{C}$, 20 A per spring	80	A	
T_{stg}		-40 ... 125	°C	
V_{isol}	AC sinus 50 Hz, 1 min	2500	V	

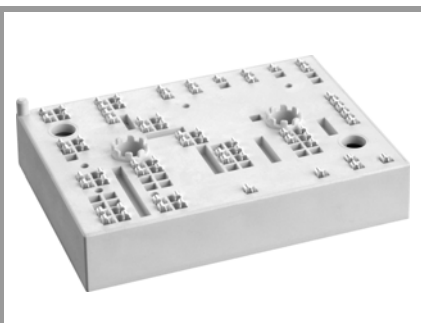
Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 75 \text{ A}$ $V_{GE} = 15 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	1.85	2.10	V
		$T_j = 150^\circ\text{C}$	2.25	2.45	V
V_{CE0}	chipelevel	$T_j = 25^\circ\text{C}$	0.80	0.90	V
		$T_j = 150^\circ\text{C}$	0.70	0.80	V
r_{CE}	$V_{GE} = 15 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$	14	16	mΩ
		$T_j = 150^\circ\text{C}$	21	22	mΩ
$V_{GE(th)}$	$V_{GE} = V_{CE} \text{ V}$, $I_C = 3 \text{ mA}$	5	5.8	6.5	V
I_{CES}	$V_{GE} = 0 \text{ V}$, $V_{CE} = 1200 \text{ V}$, $T_j = 25^\circ\text{C}$		0.1	0.3	mA
C_{ies}	$V_{CE} = 25 \text{ V}$ $V_{GE} = 0 \text{ V}$	$f = 1 \text{ MHz}$	4.40		nF
C_{oes}		$f = 1 \text{ MHz}$	0.29		nF
C_{res}		$f = 1 \text{ MHz}$	0.24		nF
Q_G	- 8 V...+ 15 V		425		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		10		Ω
$t_{d(on)}$	$V_{CC} = 600 \text{ V}$ $I_C = 75 \text{ A}$	$T_j = 150^\circ\text{C}$	150		ns
t_r		$T_j = 150^\circ\text{C}$	35		ns
E_{on}	$R_{G on} = 2 \Omega$ $R_{G off} = 2 \Omega$	$T_j = 150^\circ\text{C}$	9.7		mJ
$t_{d(off)}$		$T_j = 150^\circ\text{C}$	355		ns
t_f		$T_j = 150^\circ\text{C}$	60		ns
E_{off}	$V_{GE} = +15/-15 \text{ V}$	$T_j = 150^\circ\text{C}$	6.8		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8 \text{ W/(mK)}$		0.58		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=2.5 \text{ W/(mK)}$		0.44		K/W



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SKiIP 37NAB12T4V1



MiniSKiIP® 3

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- Highly reliable spring contacts for electrical connections
- UL recognised: File no. E63532

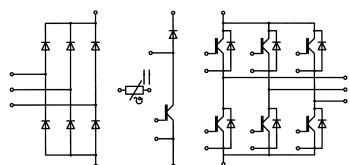
Typical Applications*

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- Typical motor power 22 kW

Remarks

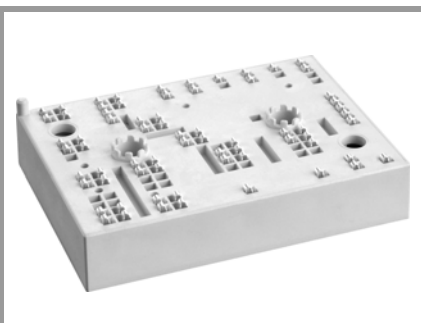
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Chopper - IGBT						
$V_{CE(sat)}$	$I_C = 75 \text{ A}$ $V_{GE} = 15 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		1.85	2.10	V
		$T_j = 150^\circ\text{C}$		2.25	2.45	V
V_{CE0}	chipelevel	$T_j = 25^\circ\text{C}$		0.80	0.90	V
		$T_j = 150^\circ\text{C}$		0.70	0.80	V
r_{CE}	$V_{GE} = 15 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		14	16	m Ω
		$T_j = 150^\circ\text{C}$		21	22	m Ω
$V_{GE(th)}$	$V_{GE} = V_{CE} \text{ V}, I_C = 3 \text{ mA}$		5	5.8	6.5	V
I_{CES}	$V_{GE} = 0 \text{ V}, V_{CE} = 1200 \text{ V}, T_j = 25^\circ\text{C}$			0.1	0.3	mA
Q_G	$-8 \text{ V} \dots +15 \text{ V}$			425		nC
R_{Gint}	$T_j = 25^\circ\text{C}$			10.0		Ω
$t_{d(on)}$	$V_{CC} = 600 \text{ V}$	$T_j = 150^\circ\text{C}$		150		ns
t_r	$I_C = 75 \text{ A}$ $R_{G on} = 2 \Omega$	$T_j = 150^\circ\text{C}$		35		ns
		$T_j = 150^\circ\text{C}$		9.7		mJ
E_{on}	$R_{G off} = 2 \Omega$	$T_j = 150^\circ\text{C}$		355		ns
$t_{d(off)}$		$T_j = 150^\circ\text{C}$		60		ns
t_f		$T_j = 150^\circ\text{C}$				
E_{off}	$V_{GE} = +15/-15 \text{ V}$	$T_j = 150^\circ\text{C}$		6.8		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8 \text{ W}/(\text{mK})$			0.58		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=2.5 \text{ W}/(\text{mK})$			0.44		K/W
Inverse - Diode						
$V_F = V_{EC}$	$I_F = 75 \text{ A}$ $V_{GE} = 0 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		2.17	2.49	V
		$T_j = 150^\circ\text{C}$		2.11	2.42	V
V_{F0}	chipelevel	$T_j = 25^\circ\text{C}$		1.30	1.50	V
		$T_j = 150^\circ\text{C}$		0.90	1.10	V
r_F	chipelevel	$T_j = 25^\circ\text{C}$		12	13	m Ω
		$T_j = 150^\circ\text{C}$		16	18	m Ω
I_{RRM}	$I_F = 75 \text{ A}$	$T_j = 150^\circ\text{C}$		62		A
Q_{rr}	$di/dt_{off} = 1940 \text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		12.6		μC
E_{rr}	$V_{GE} = -15 \text{ V}$ $V_{CC} = 600 \text{ V}$	$T_j = 150^\circ\text{C}$		4.9		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8 \text{ W}/(\text{mK})$			0.75		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=2.5 \text{ W}/(\text{mK})$			0.61		K/W
Freewheeling - Diode						
$V_F = V_{EC}$	$I_F = 75 \text{ A}$ $V_{GE} = 0 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		2.17	2.49	V
		$T_j = 150^\circ\text{C}$		2.11	2.42	V
V_{F0}	chipelevel	$T_j = 25^\circ\text{C}$		1.30	1.50	V
		$T_j = 150^\circ\text{C}$		0.90	1.10	V
r_F	chipelevel	$T_j = 25^\circ\text{C}$		12	13	m Ω
		$T_j = 150^\circ\text{C}$		16	18	m Ω
I_{RRM}	$I_F = 75 \text{ A}$	$T_j = 150^\circ\text{C}$		62		A
Q_{rr}	$di/dt_{off} = 1940 \text{ A}/\mu\text{s}$	$T_j = 150^\circ\text{C}$		12.6		μC
E_{rr}	$V_{GE} = -15 \text{ V}$ $V_{CC} = 600 \text{ V}$	$T_j = 150^\circ\text{C}$		4.9		mJ
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8 \text{ W}/(\text{mK})$			0.75		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=2.5 \text{ W}/(\text{mK})$			0.61		K/W



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SKiiP 37NAB12T4V1



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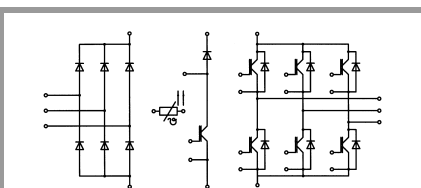
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Remarks

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- MiniSKiiP "Technical Explanations" and "Mounting Instructions" are part of the data sheet. Please refer to both documents for further information.

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Rectifier - Diode						
$V_F = V_{EC}$	$I_F = 25 \text{ A}$ $V_{GE} = 0 \text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		1.00	1.21	V
		$T_j = 125^\circ\text{C}$		0.90	1.10	V
V_{F0}	chipelevel	$T_j = 25^\circ\text{C}$		0.88	0.98	V
		$T_j = 125^\circ\text{C}$		0.73	0.83	V
r_F	chipelevel	$T_j = 25^\circ\text{C}$		4.8	9.2	m Ω
		$T_j = 125^\circ\text{C}$		6.8	11	m Ω
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=0.8 \text{ W/(mK)}$			0.9		K/W
$R_{th(j-s)}$	per Diode, $\lambda_{paste}=2.5 \text{ W/(mK)}$			0.75		K/W
Module						
M_s	to heat sink		2		2.5	Nm
w				82		g
L_{CE}						nH
Temperature Sensor						
R_{100}	$T_r = 100^\circ\text{C}$, tolerance = 3 %			1670 \pm 3%		Ω
$R(T)$	$R(T)=1000\Omega[1+A(T-25^\circ\text{C})+B(T-25^\circ\text{C})^2]$], $A = 7.635 \cdot 10^{-3} \text{ }^\circ\text{C}^{-1}$, $B = 1.731 \cdot 10^{-5} \text{ }^\circ\text{C}^{-2}$					



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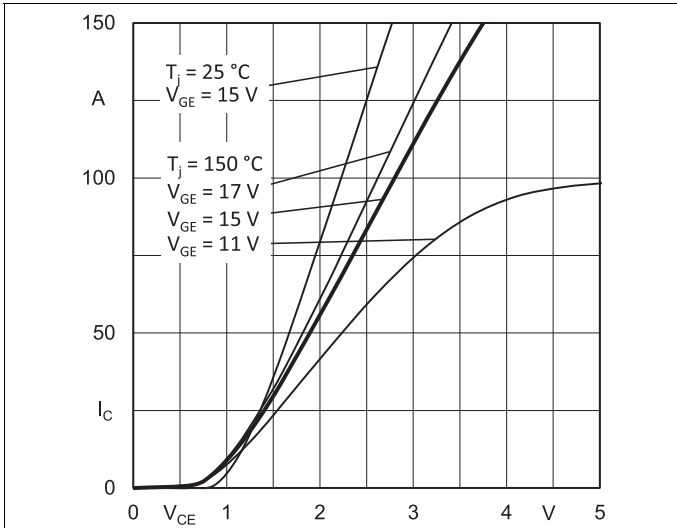


Fig. 1: Typ. output characteristic

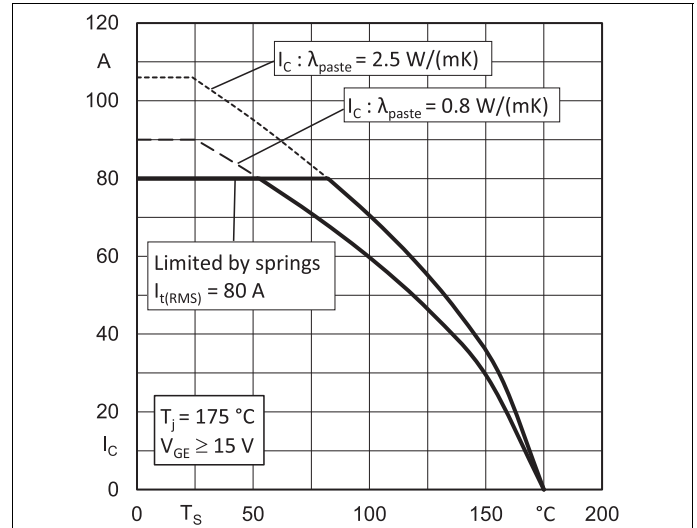


Fig. 2: Typ. rated current vs. temperature $I_C = f(T_s)$

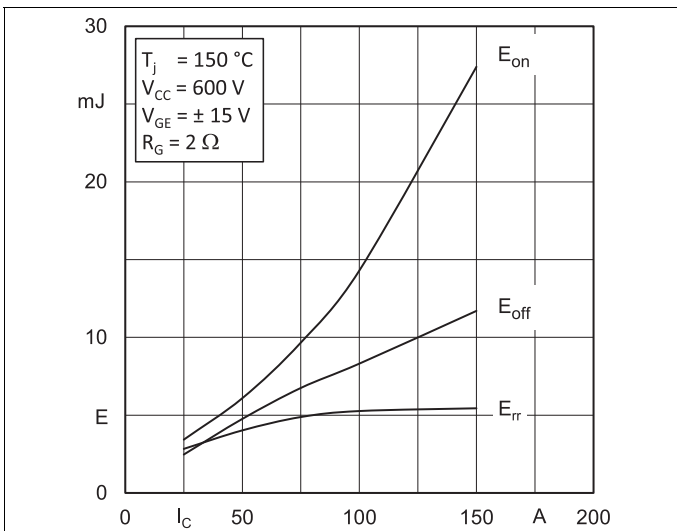


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

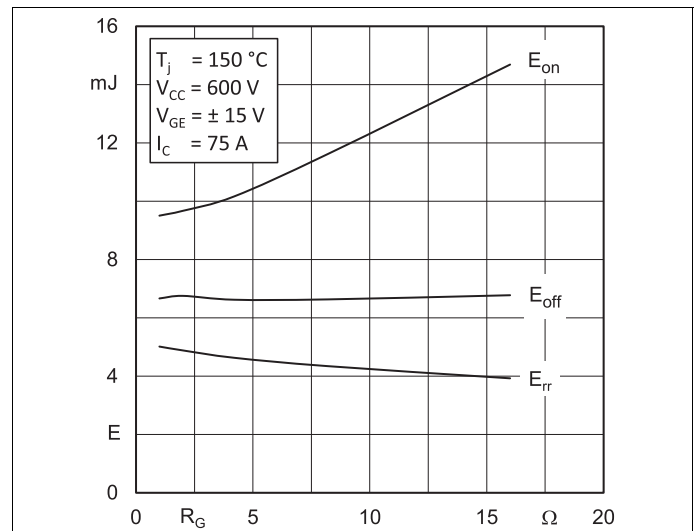


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

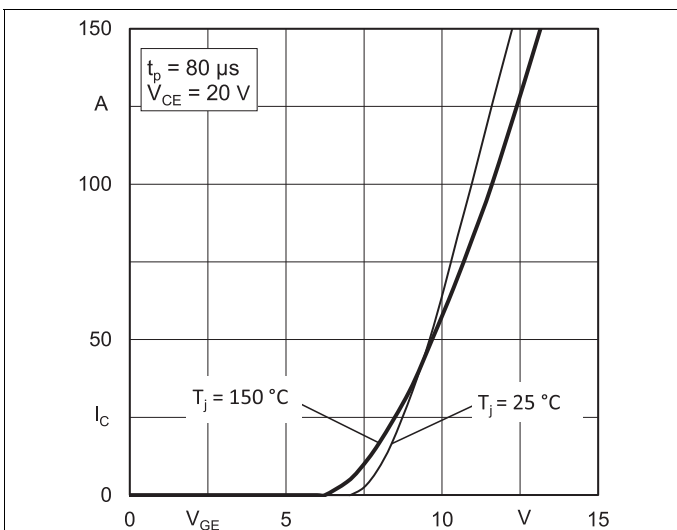


Fig. 5: Typ. transfer characteristic

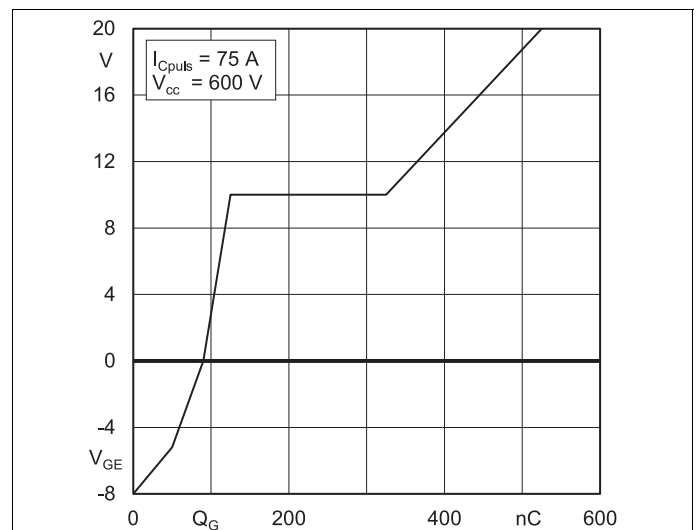
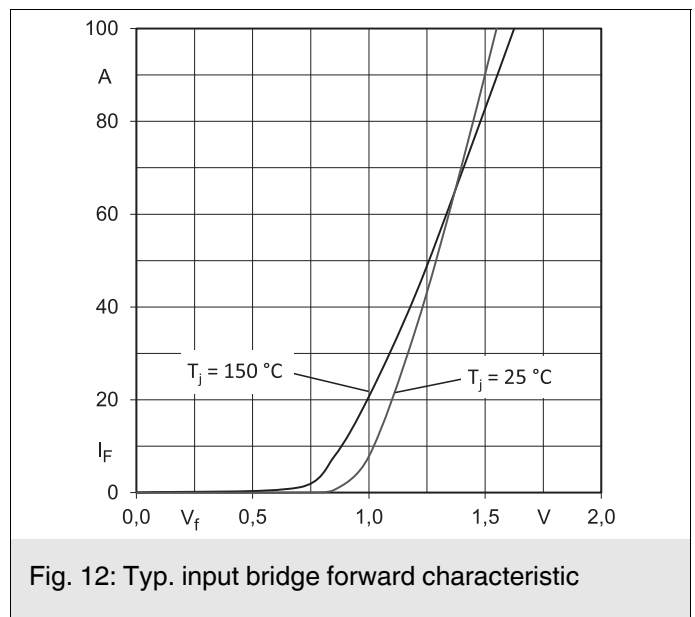
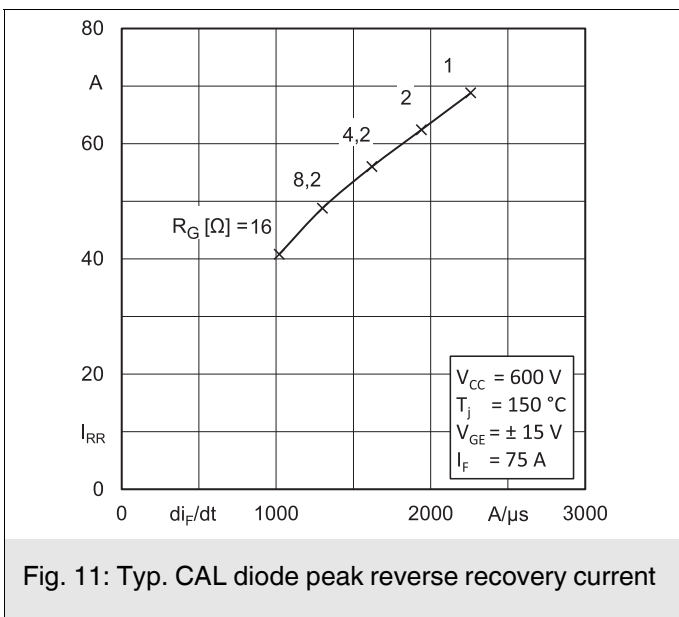
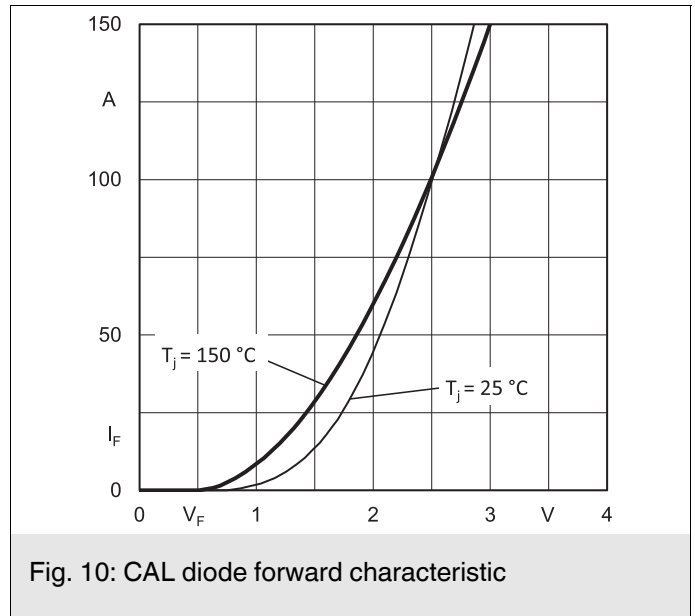
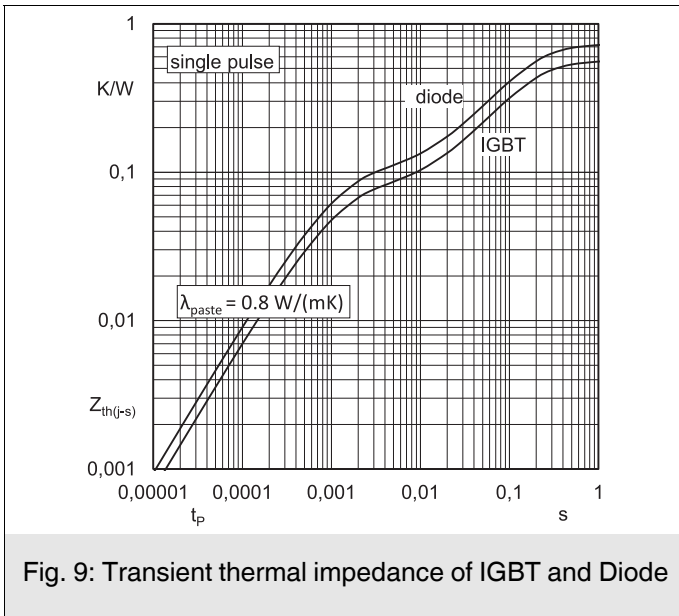
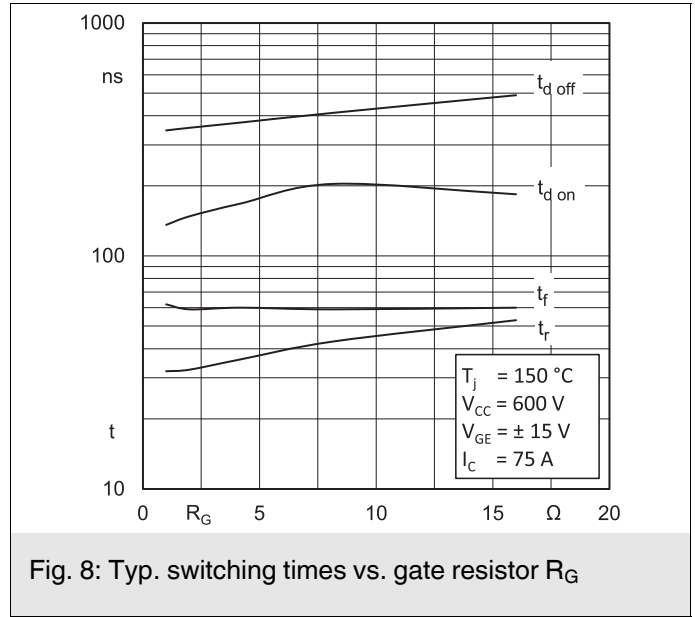
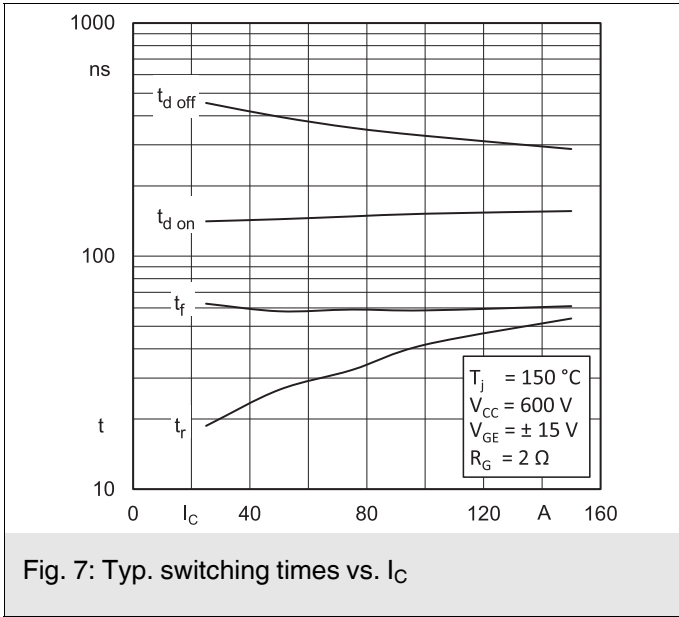
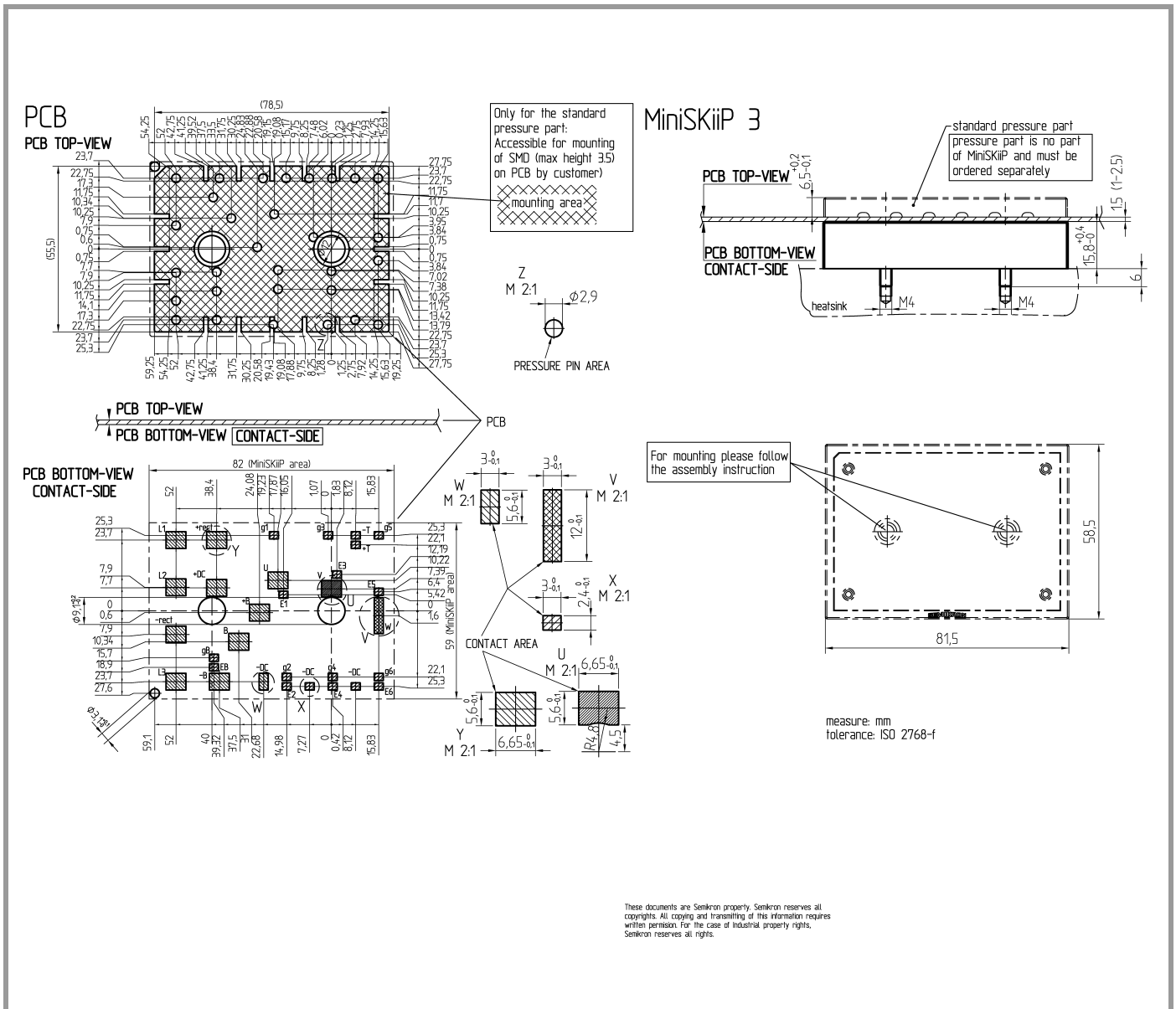


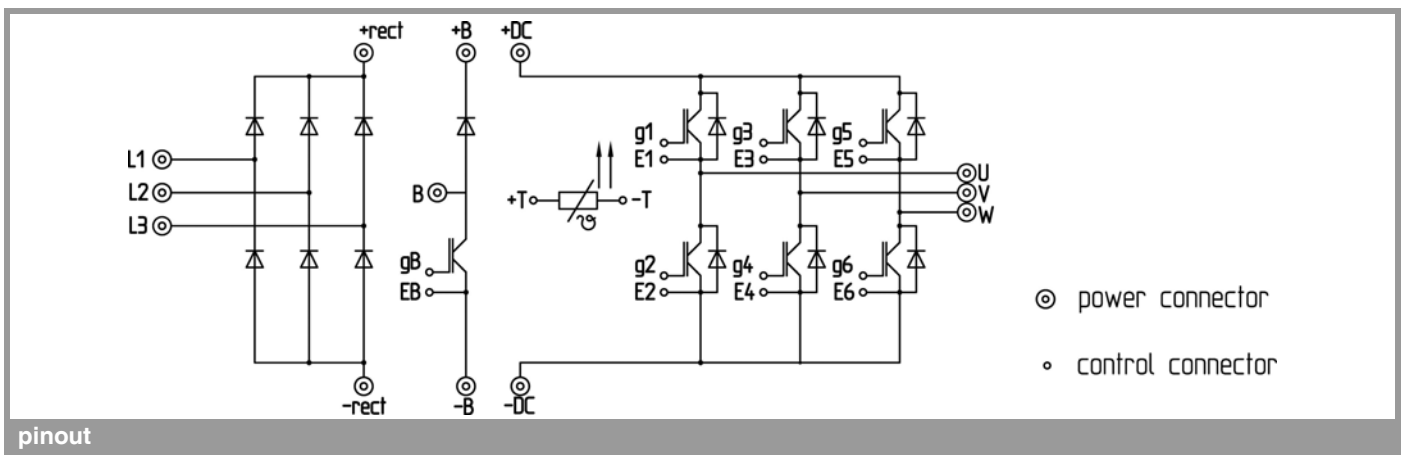
Fig. 6: Typ. gate charge characteristic



SKiIP 37NAB12T4V1



pinout, dimensions



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

*IMPORTANT INFORMATION AND WARNINGS

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