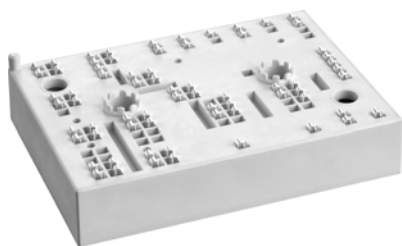


SKiiP 38NAB12T4V1



MiniSKiiP® 3

SKiiP 38NAB12T4V1

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*

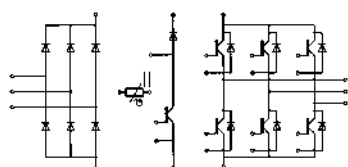
- Inverter up to 41 kVA
- Typical motor power 22 kW

Remarks

- Max. case temperature limited to $T_C=125^\circ\text{C}$
- Product reliability results valid for $T_J \leq 150^\circ\text{C}$ (recommended $T_{J,op} = -40 \dots +150^\circ\text{C}$)
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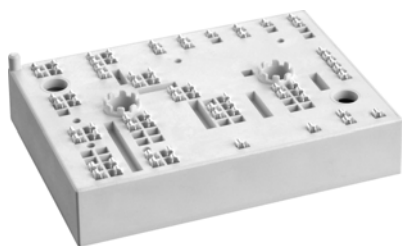
Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Inverter - IGBT			
V_{CES}	$T_J = 25^\circ\text{C}$	1200	V
I_C	$\lambda_{paste}=0.8 \text{ W/(mK)}$ $T_J = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$ 115	A
		$T_s = 70^\circ\text{C}$ 93	A
I_C	$\lambda_{paste}=2.5 \text{ W/(mK)}$ $T_J = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$ 140	A
		$T_s = 70^\circ\text{C}$ 114	A
I_{Cnom}		100	A
I_{CRM}	$I_{CRM} = 3 \times I_{Cnom}$	300	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 800 \text{ V}$ $V_{GE} \leq 15 \text{ V}$ $V_{CES} \leq 1200 \text{ V}$ $T_J = 150^\circ\text{C}$	10	μs
T_J		-40 ... 175	$^\circ\text{C}$
Chopper - IGBT			
V_{CES}	$T_J = 25^\circ\text{C}$	1200	V
I_C	$\lambda_{paste}=0.8 \text{ W/(mK)}$ $T_J = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$ 115	A
		$T_s = 70^\circ\text{C}$ 93	A
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T_J		-40 ... 175	$^\circ\text{C}$
Inverse - Diode			
V_{RRM}	$T_J = 25^\circ\text{C}$	1200	V
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$ $T_J = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$ 99	A
		$T_s = 70^\circ\text{C}$ 79	A
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$ $T_J = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$ 116	A
		$T_s = 70^\circ\text{C}$ 93	A
I_{Fnom}		100	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	300	A
I_{FSM}	$t_p = 10 \text{ ms, sin } 180^\circ, T_J = 150^\circ\text{C}$	550	A
T_J		-40 ... 175	$^\circ\text{C}$
Freewheeling - Diode			
V_{RRM}	$T_J = 25^\circ\text{C}$	1200	V
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$ $T_J = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$ 100	A
		$T_s = 70^\circ\text{C}$ 79	A
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$ $T_J = 175^\circ\text{C}$	$T_s = 25^\circ\text{C}$ 116	A
		$T_s = 70^\circ\text{C}$ 93	A
I_{Fnom}		100	A
I_{FRM}	$I_{FRM} = 3 \times I_{Fnom}$	300	A
I_{FSM}	$t_p = 10 \text{ ms, sin } 180^\circ, T_J = 150^\circ\text{C}$	550	A
T_J		-40 ... 175	$^\circ\text{C}$



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SKiiP 38NAB12T4V1



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Typical Applications*

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Remarks

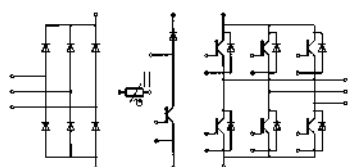
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Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
Rectifier - Diode			
V_{RRM}	$T_J = 25^\circ\text{C}$	1600	V
I_F	$\lambda_{paste}=0.8 \text{ W/(mK)}$ $T_J = 150^\circ\text{C}$	117	A
	$T_s = 25^\circ\text{C}$ $T_s = 70^\circ\text{C}$	86	A
I_F	$\lambda_{paste}=2.5 \text{ W/(mK)}$ $T_J = 150^\circ\text{C}$	136	A
	$T_s = 25^\circ\text{C}$ $T_s = 70^\circ\text{C}$	101	A
I_{Fnom}		45	A
I_{FSM}	10 ms $\sin 180^\circ$	1000	A
	$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$	890	A
I^2t	10 ms $\sin 180^\circ$	5000	A^2s
	$T_J = 25^\circ\text{C}$ $T_J = 150^\circ\text{C}$	4000	A^2s
T_J		-40 ... 150	$^\circ\text{C}$
Module			
$I_{t(RMS)}$	$T_{terminal} = 80^\circ\text{C}$, 20 A per spring	80	A
T_{stg}		-40 ... 125	$^\circ\text{C}$
V_{isol}	AC sinus 50 Hz, 1 min	2500	V

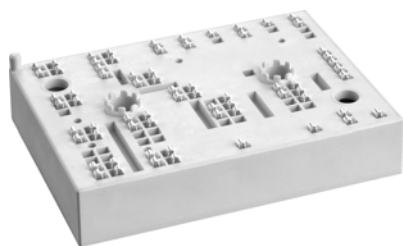
Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
Inverter - IGBT					
$V_{CE(sat)}$	$I_C = 100 \text{ A}$ $V_{GE} = 15 \text{ V}$ chipelevel	$T_J = 25^\circ\text{C}$	1.80	2.05	V
		$T_J = 150^\circ\text{C}$	2.20	2.40	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	$T_J = 25^\circ\text{C}$	10	12	$\text{m}\Omega$
		$T_J = 150^\circ\text{C}$	15	16	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE} = V_{CE} \text{ V}$, $I_C = 4 \text{ mA}$	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}	$V_{CE} = 25 \text{ V}$ $V_{GE} = 0 \text{ V}$	$f = 1 \text{ MHz}$	6.15		nF
C_{oes}		$f = 1 \text{ MHz}$	0.41		nF
C_{res}		$f = 1 \text{ MHz}$	0.35		nF
Q_G	$V_{GE} = -8 \text{ V} \dots +15 \text{ V}$		565		nC
R_{Gint}	$T_J = 25^\circ\text{C}$		7.5		Ω
$t_{d(on)}$	$V_{CC} = 600 \text{ V}$ $I_C = 100 \text{ A}$	$T_J = 150^\circ\text{C}$	160		ns
t_r	$R_{G on} = 1 \Omega$ $R_{G off} = 1 \Omega$	$T_J = 150^\circ\text{C}$	35		ns
E_{on}		$T_J = 150^\circ\text{C}$	11.2		mJ
$t_{d(off)}$		$T_J = 150^\circ\text{C}$	390		ns
t_f	$V_{GE} = +15/-15 \text{ V}$	$T_J = 150^\circ\text{C}$	75		ns
E_{off}		$T_J = 150^\circ\text{C}$	10		mJ
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=0.8 \text{ W/(mK)}$		0.48		K/W
$R_{th(j-s)}$	per IGBT, $\lambda_{paste}=2.5 \text{ W/(mK)}$		0.34		K/W



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SKiiP 38NAB12T4V1



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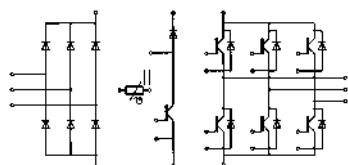
Typical Applications*

- Inverter up to 41 kVA
- Typical motor power 22 kW

Remarks

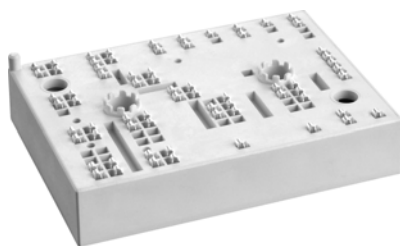
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Chopper - IGBT						
V _{CE(sat)}	I _C = 100 A	T _j = 25 °C		1.80	2.05	V
	V _{GE} = 15 V chiplevel	T _j = 150 °C		2.20	2.40	V
V _{CE0}	chiplevel	T _j = 25 °C		0.80	0.90	V
		T _j = 150 °C		0.70	0.80	V
r _{CE}	V _{GE} = 15 V	T _j = 25 °C		10	12	mΩ
	chiplevel	T _j = 150 °C		15	16	mΩ
V _{GE(th)}	V _{GE} = V _{CE} V, I _C = 4 mA		5	5.8	6.5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 1200 V, T _j = 25 °C			0.1	0.3	mA
Q _G	V _{GE} = - 8 V...+ 15 V			565		nC
R _{Gint}	T _j = 25 °C			7.5		Ω
t _{d(on)}	V _{CC} = 600 V	T _j = 150 °C		160		ns
t _r	I _C = 100 A	T _j = 150 °C		35		ns
E _{on}	R _{G on} = 1 Ω	T _j = 150 °C		11.2		mJ
t _{d(off)}	R _{G off} = 1 Ω	T _j = 150 °C		390		ns
t _f		T _j = 150 °C		75		ns
E _{off}	V _{GE} = +15/-15 V	T _j = 150 °C		10		mJ
R _{th(j-s)}	per IGBT, λ _{paste} =0.8 W/(mK)			0.48		K/W
R _{th(j-s)}	per IGBT, λ _{paste} =2.5 W/(mK)			0.34		K/W
Inverse - Diode						
V _F = V _{EC}	I _F = 100 A	T _j = 25 °C		2.20	2.52	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.15	2.47	V
V _{F0}	chiplevel	T _j = 25 °C		1.30	1.50	V
		T _j = 150 °C		0.90	1.10	V
r _F	chiplevel	T _j = 25 °C		9.0	10	mΩ
		T _j = 150 °C		13	14	mΩ
I _{RRM}	I _F = 100 A	T _j = 150 °C		82		A
Q _{rr}	di/dt _{off} = 2400 A/μs	T _j = 150 °C		16.4		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 150 °C		6.5		mJ
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/(mK)			0.66		K/W
R _{th(j-s)}	per Diode, λ _{paste} =2.5 W/(mK)			0.52		K/W
Freewheeling - Diode						
V _F = V _{EC}	I _F = 100 A	T _j = 25 °C		2.20	2.52	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.15	2.47	V
V _{F0}	chiplevel	T _j = 25 °C		1.30	1.50	V
		T _j = 150 °C		0.90	1.10	V
r _F	chiplevel	T _j = 25 °C		9.0	10	mΩ
		T _j = 150 °C		13	14	mΩ
I _{RRM}	I _F = 100 A	T _j = 150 °C		82		A
Q _{rr}	di/dt _{off} = 2400 A/μs	T _j = 150 °C		16.4		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 150 °C		6.5		mJ
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/(mK)			0.66		K/W
R _{th(j-s)}	per Diode, λ _{paste} =2.5 W/(mK)			0.52		K/W



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SKiiP 38NAB12T4V1



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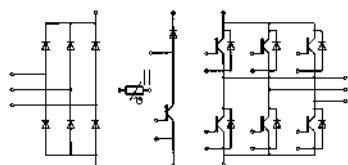
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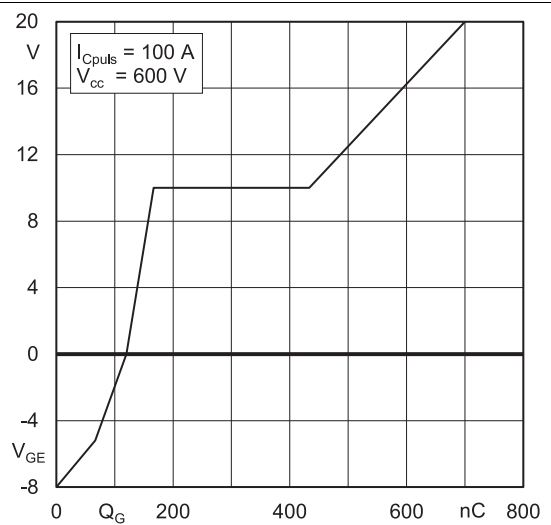
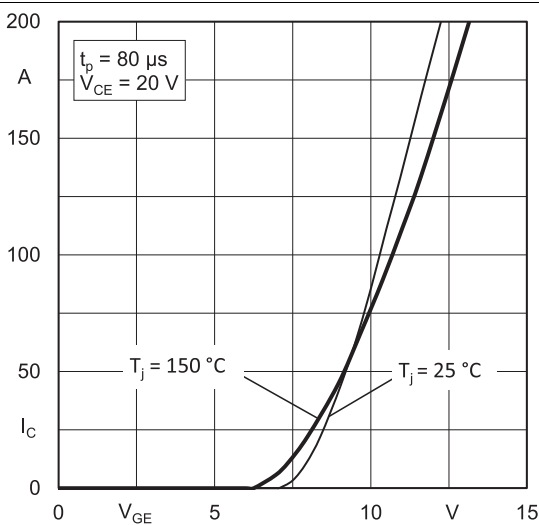
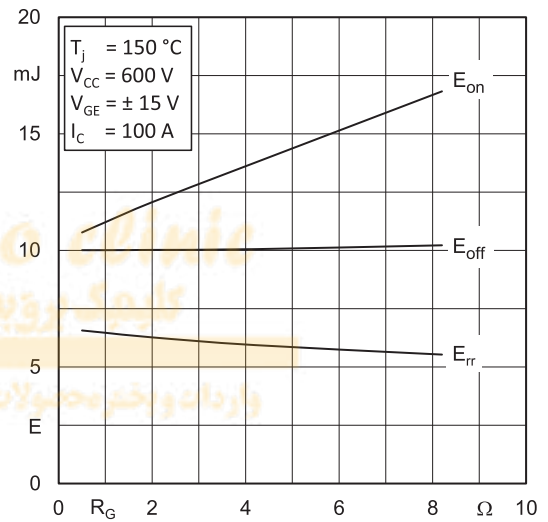
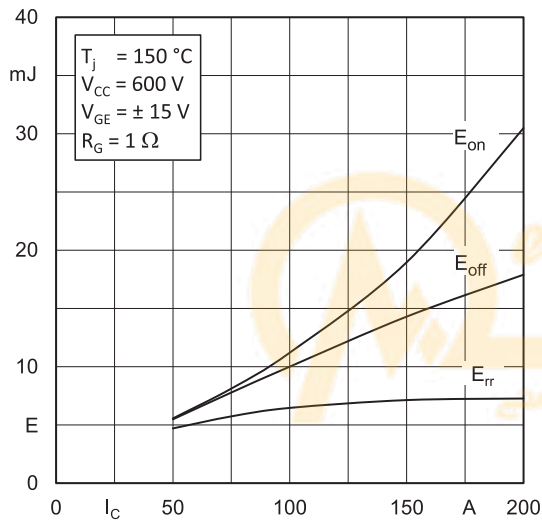
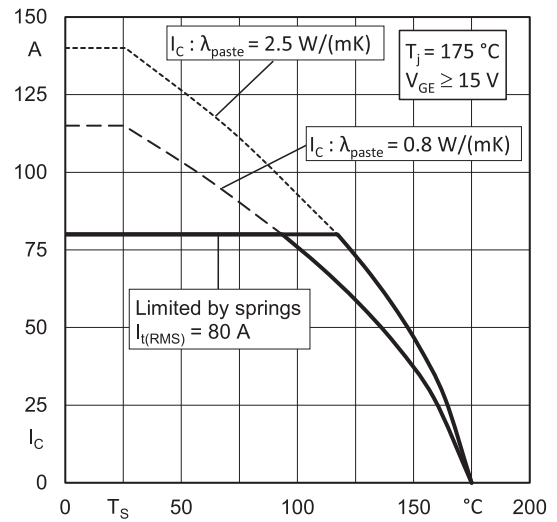
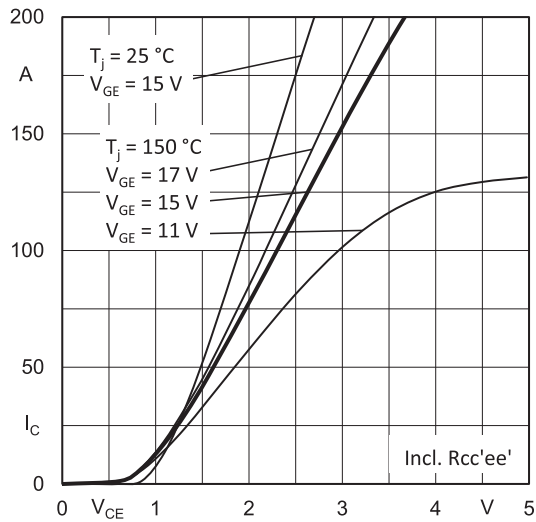
Remarks

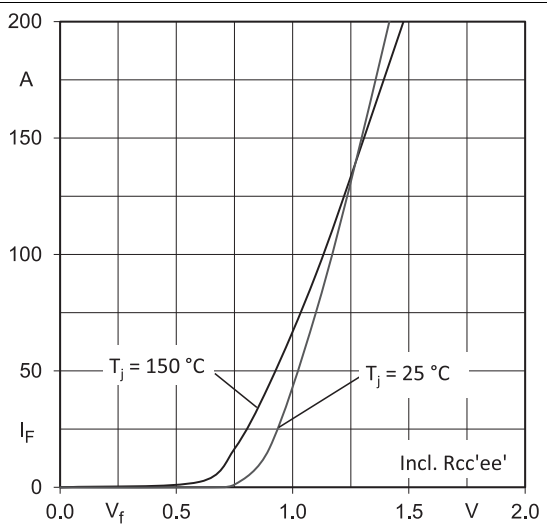
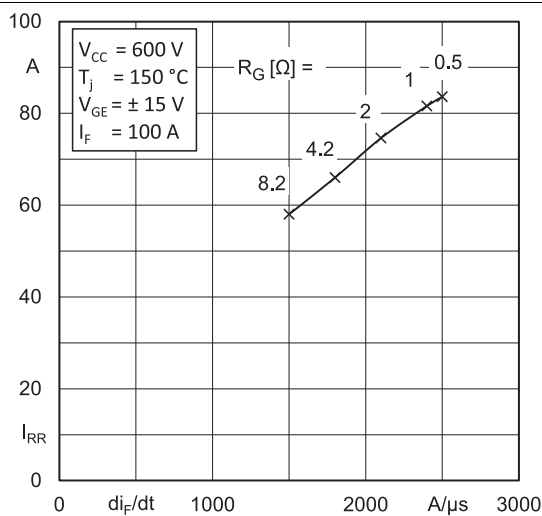
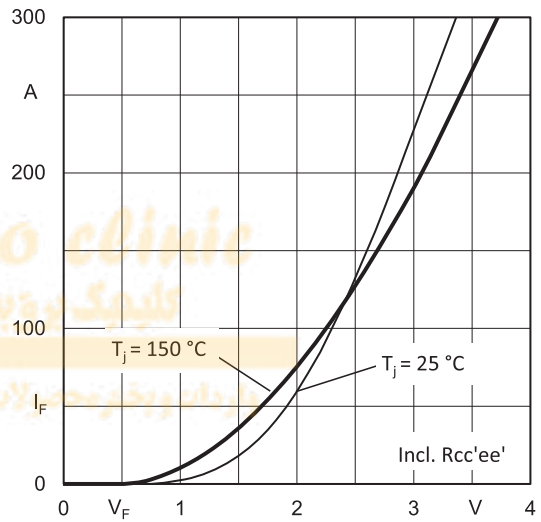
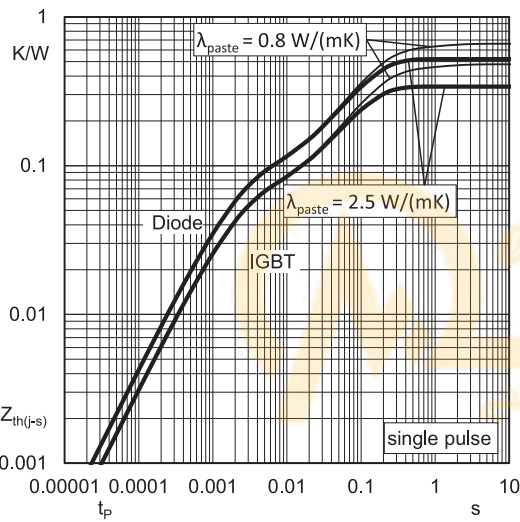
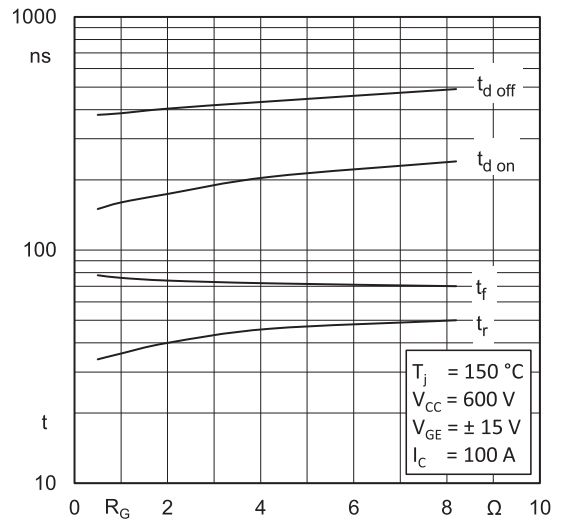
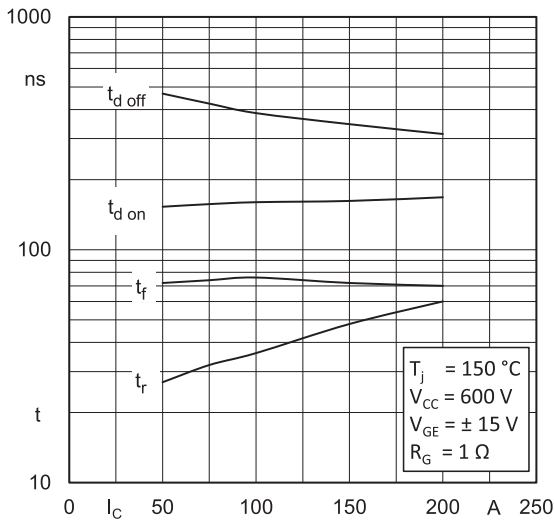
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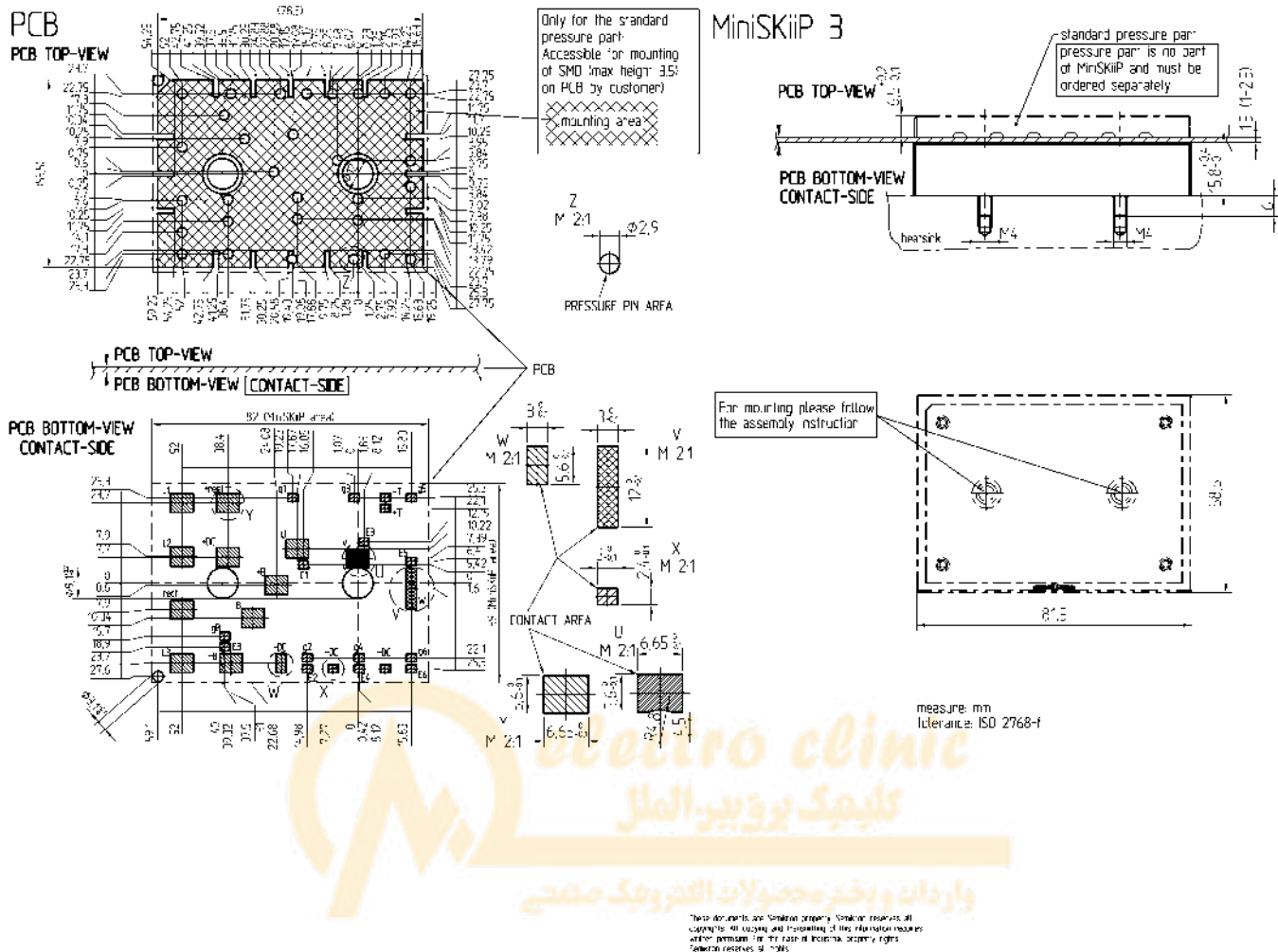
Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Rectifier - Diode						
V _F = V _{EC}	I _F = 45 A	T _j = 25 °C		1.00	1.21	V
	V _{GE} = 0 V chiplevel	T _j = 125 °C		0.90	1.10	V
V _{F0}	chiplevel	T _j = 25 °C		0.88	0.98	V
		T _j = 125 °C		0.73	0.83	V
r _F	chiplevel	T _j = 25 °C		2.7	5.1	mΩ
		T _j = 125 °C		3.8	6.0	mΩ
R _{th(j-s)}	per Diode, λ _{paste} =0.8 W/(mK)			0.7		K/W
R _{th(j-s)}	per Diode, λ _{paste} =2.5 W/(mK)			0.56		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 °C			1670 ± 3%		Ω
R(T)	R(T)=1000Ω[1+A(T-25°C)+B(T-25°C) ²], A = 7.635*10 ⁻³ °C ⁻¹ , B = 1.731*10 ⁻⁵ °C ⁻²					



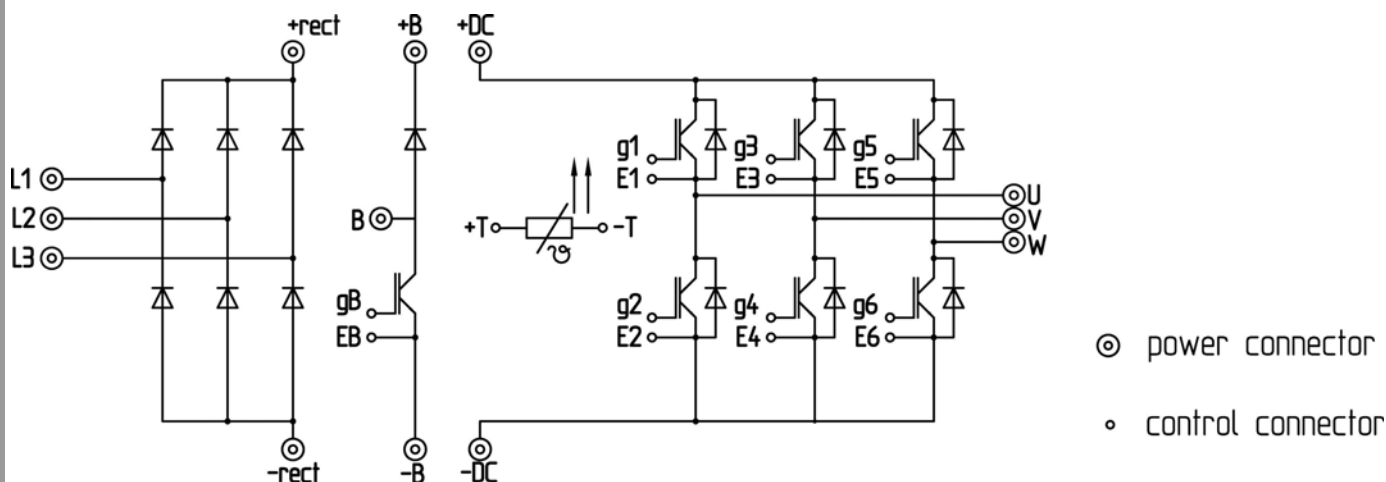
NAB







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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