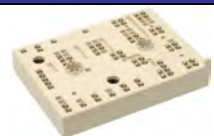
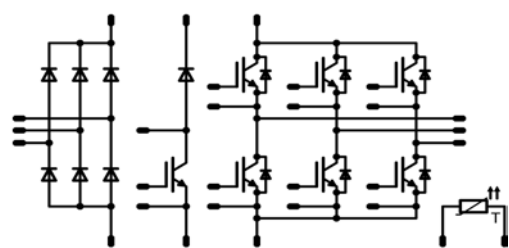


MiniSKiiP® 3 PIM	1200V/100A
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #000080; color: white; margin: 0;">Features</p> <ul style="list-style-type: none"> Solderless interconnection Mitsubishi Generation 6.1 technology </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #000080; color: white; margin: 0;">Target Applications</p> <ul style="list-style-type: none"> Industrial Motor Drives </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #000080; color: white; margin: 0;">Types</p> <ul style="list-style-type: none"> V23990-K420-A60-PM </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <p style="text-align: center; background-color: #000080; color: white; margin: 0;">MiniSKiiP® 3 housing</p>  </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #000080; color: white; margin: 0;">Schematic</p>  </div>

Maximum Ratings

$T_j=25^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Input Rectifier Diode				
Repetitive peak reverse voltage	V_{RRM}		1600	V
DC forward current	I_{FAV}	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	91	A
Surge forward current	I_{FSM}	$t_p=10\text{ms}$ $T_j=25^{\circ}\text{C}$	500	A
I2t-value	I^2t		1250	A^2s
Power dissipation per Diode	P_{tot}	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	99	W
Maximum Junction Temperature	T_{jmax}		150	$^{\circ}\text{C}$
Inverter Transistor				
Collector-emitter break down voltage	V_{CE}		1200	V
DC collector current	I_C	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	105	A
Repetitive peak collector current	I_{Cpulse}	t_p limited by T_{jmax}	200	A
Power dissipation per IGBT	P_{tot}	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	183	W
Gate-emitter peak voltage	V_{GE}		± 20	V
Short circuit ratings	t_{SC} V_{CC}	$T_j \leq 150^{\circ}\text{C}$ $V_{GE} = 15\text{V}$	10 850	μs V
Maximum Junction Temperature	T_{jmax}		175	$^{\circ}\text{C}$

Maximum Ratings

 $T_j=25^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
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Inverter Diode

Peak Repetitive Reverse Voltage	V_{RRM}	$T_j=25^{\circ}\text{C}$	1200	V
DC forward current	I_F	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	85	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	200	A
Power dissipation per Diode	P_{tot}	$T_j=T_{jmax}$ $T_h=80^{\circ}\text{C}$ $T_c=80^{\circ}\text{C}$	144	W
Maximum Junction Temperature	T_{jmax}		175	$^{\circ}\text{C}$

Thermal Properties

Storage temperature	T_{stg}		-40...+125	$^{\circ}\text{C}$
Operation temperature under switching condition	T_{op}		-40...+($T_{jmax} - 25$)	$^{\circ}\text{C}$

Insulation Properties

Insulation voltage	V_{is}	$t=2\text{s}$ DC voltage	4000	V
Creepage distance			min 12,7	mm
Clearance			min 12,7	mm
Comparative tracking index	CTI		>200	

Characteristic Values

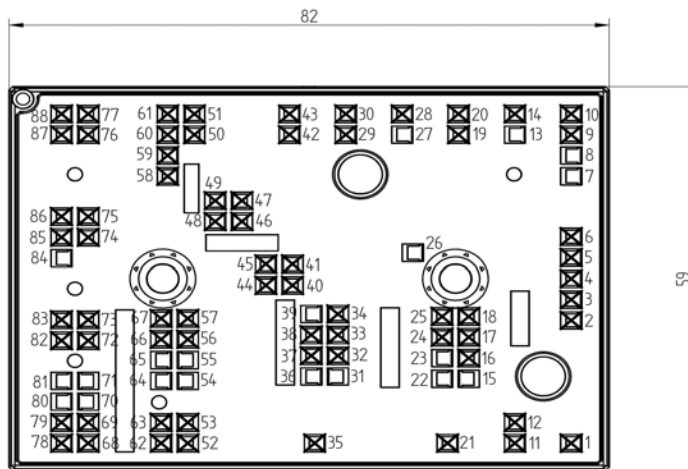
Parameter	Symbol	Conditions					Value			Unit
		V_{GE} [V] or V_{GS} [V]	V_r [V] or V_{CE} [V] or V_{DS} [V]	I_c [A] or I_F [A] or I_b [A]	T_j	Min	Typ	Max		
Input Rectifier Diode										
Forward voltage	V_F				35	$T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$	0,8	0,97 0,88	1,35	V
Threshold voltage (for power loss calc. only)	V_{to}					$T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$		0,85 0,71		V
Slope resistance (for power loss calc. only)	r_t					$T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$		3,5 4,7		m Ω
Reverse current	I_r			1500		$T_j=25^\circ\text{C}$ $T_j=125^\circ\text{C}$			0,1 1,1	mA
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness \leq 50 μ m $\lambda = 1$ W/mK						0,70		K/W
Inverter Transistor										
Gate emitter threshold voltage	$V_{GE(th)}$				0,01	$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$	5,4	6	6,6	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		100	$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		1,7 1,95	2,15	V
Collector-emitter cut-off current incl. Diode	I_{CES}		0	600		$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$			0,34	mA
Gate-emitter leakage current	I_{GES}		20	0		$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$			500	nA
Integrated Gate resistor	R_{gint}							-		Ω
Turn-on delay time	$t_{d(on)}$	$R_{goff}=6,2 \Omega$ $R_{gon}=6,2 \Omega$	± 15	600	100	$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd	300	ns
Rise time	t_r					$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd	200	
Turn-off delay time	$t_{d(off)}$					$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd	600	
Fall time	t_f					$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd	300	
Turn-on energy loss per pulse	E_{on}					$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd		
Turn-off energy loss per pulse	E_{off}	$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd						
Input capacitance	C_{ies}	f=1MHz	0	10		$T_j=25^\circ\text{C}$			10000	nF
Output capacitance	C_{oss}								1000	
Reverse transfer capacitance	C_{rss}								170	
Gate charge	Q_{Gate}		± 15			$T_j=25^\circ\text{C}$		tbd		nC
Thermal resistance chip to heatsink per chip	R_{thJH}	Thermal grease thickness \leq 50 μ m $\lambda = 1$ W/mK						0,52		K/W
Inverter Diode										
Diode forward voltage	V_F				100	$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		2,5 2	3,3	V
Peak reverse recovery current	I_{RRM}	$R_{gon}=tbd \Omega$				$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd		A
Reverse recovery time	t_{rr}					$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd		ns
Reverse recovered charge	Q_{rr}					$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd		μ C
Peak rate of fall of recovery current	$di(rec)max/dt$					$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd		A/ μ s
Reverse recovered energy	E_{rec}					$T_j=25^\circ\text{C}$ $T_j=150^\circ\text{C}$		tbd tbd		mWs
Thermal resistance chip to heatsink per chip	R_{thJH}					Thermal grease thickness \leq 50 μ m $\lambda = 1$ W/mK				
Thermistor										
Rated resistance	R					T=25 $^\circ$ C		1000		Ω
Deviation of R100	$\Delta R/R$	R100=1486 Ω				T=100 $^\circ$ C	-3		3	%
Power dissipation	P					T=25 $^\circ$ C		1670,313		mW
B-value	$B_{(25/50)}$	Tol. \pm 3%				T=25 $^\circ$ C		7,635*10-3		K
B-value	$B_{(25/100)}$	Tol. \pm 3%				T=25 $^\circ$ C		1,731*10-5		K
Vincotech NTC Reference									E	

Ordering Code and Marking - Outline - Pinout

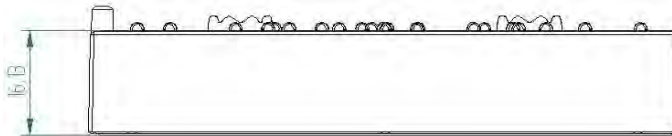
Ordering Code & Marking

Version	Ordering Code	in DataMatrix as	in packaging barcode as
with std lid (black V23990-K32-T-PM)	V23990-K420-A60-/0A/-PM	K420A60	K420A60-/0A/
with std lid (black V23990-K32-T-PM) and P12	V23990-K420-A60-/1A/-PM	K420A60	K420A60-/1A/
with thin lid (white V23990-K33-T-PM)	V23990-K420-A60-/0B/-PM	K420A60	K420A60-/0B/
with thin lid (white V23990-K33-T-PM) and P12	V23990-K420-A60-/1B/-PM	K420A60	K420A60-/1B/

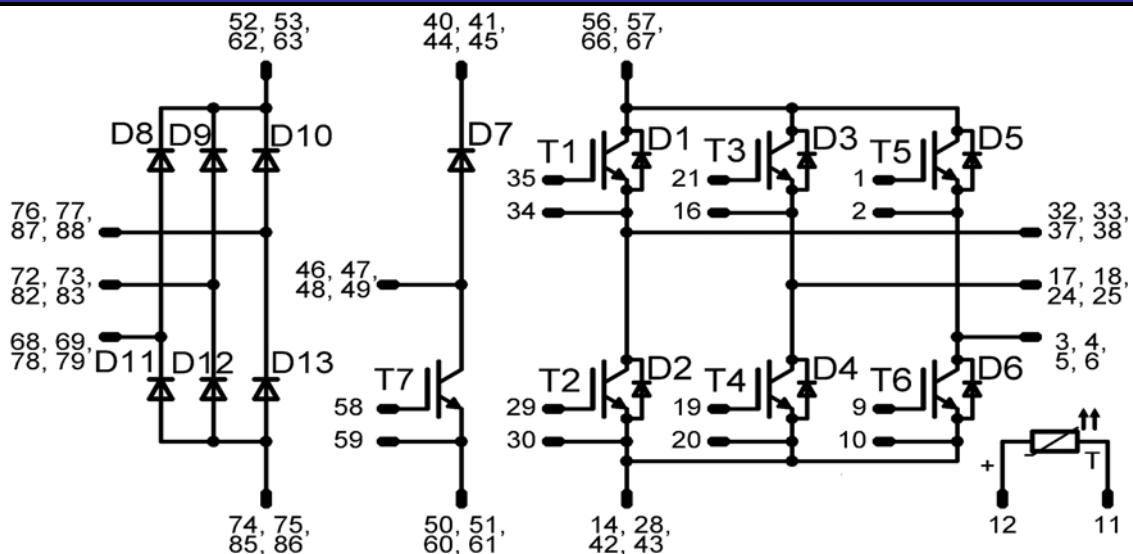
Outline



X = assembled pin position



Pinout



PRODUCT STATUS DEFINITIONS

Datasheet Status	Product Status	Definition
Target	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice. The data contained is exclusively intended for technically trained staff.

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