

IGD-1-424-P1N4-DL-FA



IGBT Module stack

SEMIKUBE - Size T0.5

3-phase inverter

Ordering No. 08800445

Description IGD-1-424-P1N4-DL-FA

Option 0C 0N 0P K - 0X - 1F2

Features

- Designed in regards to EN50178 recommendations
- RoHS compliant
- Fast mounting and dismounting
- Very high life-time expectancy
- Integrated voltage, current and temperature sensors
- Air cooled power stacks

Typical Applications

- Industrial applications
- Solar Inverters

Footnotes

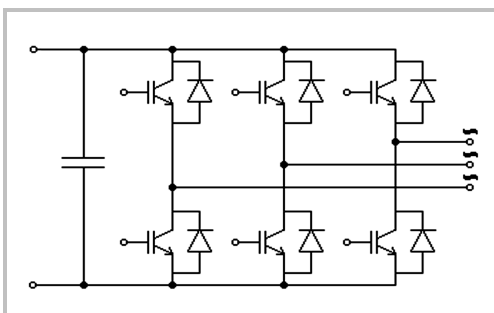
1) the user shall ensure that the ambient air shall be ventilated in order not to create temperature hot spots.

REMARKS

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee, expressed or implied is made regarding delivery, performance or suitability.

Absolute maximum ratings		$T_{AMBIENT} = T_{AIR COOLING} = 40^{\circ}C$ unless otherwise specified	
Symbol	Conditions	Values	Unit
$I_{OUT MAX}$	Maximum continuous output current	200	ARMS
$V_{OUT MAX}$	Maximum output voltage	500	VAC
$V_{BUS MAX}$	Maximum DC Bus voltage in operation	900	VDC
F_{OUT}	Inverter Output frequency	500	Hz
F_{SW}	Maximum switching frequency	25	kHz

Electrical characteristics		$T_{AMBIENT} = T_{AIR\ COOLING} = 40^{\circ}C$ unless otherwise specified			
Symbol	Conditions	min	typ	max	Unit
AC phase					
I _{OUT RATED}	Rated output current	V _{BUS} =750V _{dc} , No overload, T _j <150°C, Power factor PF = 1, Cabinet airflow in operation at 400m ³ /h Fan airflow through heatsink at 900 m ³ /h	200	ARMS	
V _{OUT}	Output voltage		400	VAC	
P _{OUT}	Rated output power		140	kW	
F _{SW}	Inverter switching frequency		3	kHz	
F _{OUT}	Output frequency		50	Hz	
DC Bus					
V _{BUS}	Rated DC voltage		750		V _{DC}
Efficiency					
P _{LOSS INV}	Total power losses		1 915		W
η	Inverter efficiency		>98		%
Filtering characteristics					
V _{BUS}	Rated DC voltage applied to the caps bank without switching		1 100		V _{DC}
V _{DC CAPACITOR}	Max DC voltage applied to the caps bank (max 30% of LTE) without switching		1 100		V _{DC}
τ _{d5%}	Discharge time of the capacitors (5%)		285		s
C _{DC}	Capacitor bank capacity	1,43	1,68		mF
LTE	Calculated LTE of the caps with forced air cooling		> 100		kH
Stack Insulation					
V _{ISOL}	Frame / Power stage AC/DC (insulation test voltage DC, 60s)		3 200		V



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Environmental conditions					
Characteristics	Conditions	min	typ	max	Unit
Climatic					
Ambient temperature 1)	IEC 60721-3-3, class 3K3 extended In operation	-25		55	°C
Humidity	IEC 60721-3-3, class 3K3 no condensation no icing	5		85	%
Mechanical					
Installation altitude	without derating			1 000	m
Protection index	IEC 60529		IP00		-
Pollution degree	EN 50178		2		-
Weight total	3-phase inverter including heatsink fan		25		kg
Thermal data					
V _{SUPPLY}	Heatsink fan AC voltage supply		230		V _{AC}
P _{FAN}	at 50Hz Rated power at V _{SUPPLY}		300		W

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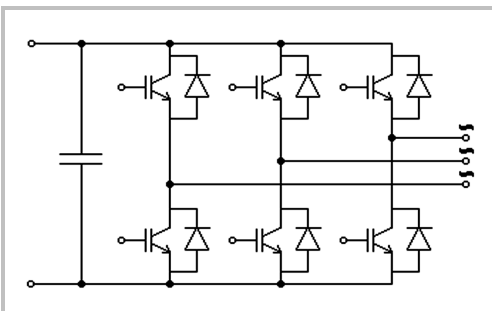
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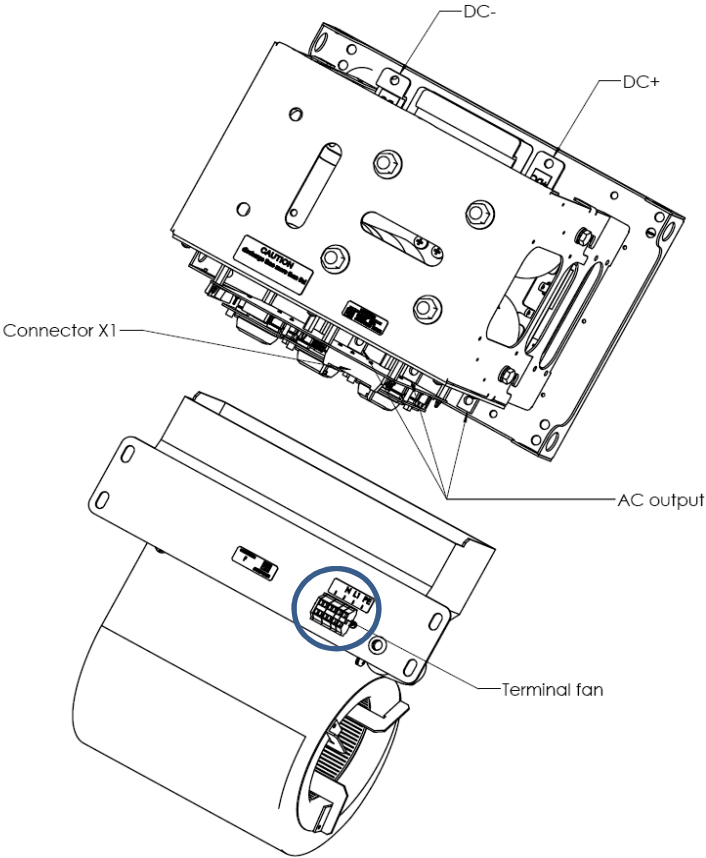
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Gate Driver Characteristics		<i>T_{AMBIENT} = 25°C unless otherwise specified</i>			
Symbol	Conditions	min	typ	max	Unit
Gate Driver / controller data					
V _S	supply voltage	21,6	24	26,4	V _{DC}
I _{SO}	Supply primary current No load	360			mA
	Max. Supply primary current			1 500	mA
V _{IT+}	input threshold voltage HIGH			0.7 x V _S	V _{DC}
V _{IT-}	input threshold voltage LOW	0.3 x V _S			V _{DC}
R _{IN}	Input resistance		17		kΩ
C _{IN}	Input capacitance		1		nF
Measurement & protection					
DC link voltage sensing U _{DC} analogue OUT	Scaling		10		mV.V ⁻¹
	Accuracy of analogue signal @ T _a =25°C	-2		+2	%
	Temperature coefficient			0,03	%.K ⁻¹
	max. load current			5	mA
	Max. voltage range			15	V _{DC}
	Max measurable DC Link Voltage			1 200	V _{DC}
Current sensing I _{analogue OUT} per phase	Scaling		24		mV.A ⁻¹
	Accuracy of analogue signal	-4		+4	%
	Temperature coefficient			0,07	%.K ⁻¹
	Max. output current			5	mA
	Max. voltage range			15	V _{DC}
I _{TRIPSC}	Over current trip level		450		A _{PEAK}
Temperature sensing T _{analogue OUT}	Scaling		10		mV.°C ⁻¹
	Minimum measurable temperature	25			°C
	Max. output current			5	mA
	Max. voltage range			15	V _{DC}
T _{IP}	Over temperature protection	95	100	105	°C
T _{th}	Threshold level for reset after failure event	70			°C

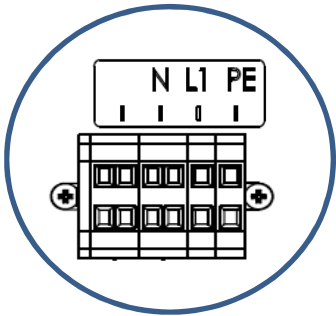


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Electrical connection

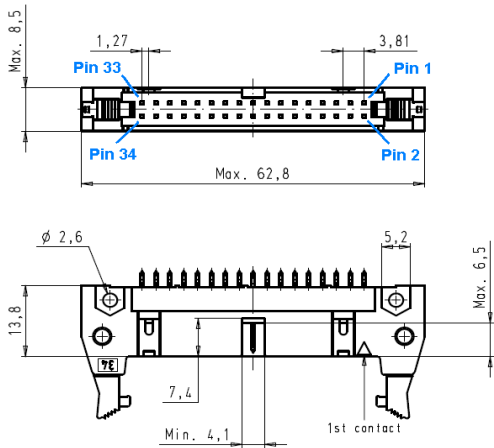


Terminal fan power supply connection



Driver connector type

Flat cable connector X1



Suitable female connector
Manufacturer: HARTING
Part number: 09 18 534 7 813

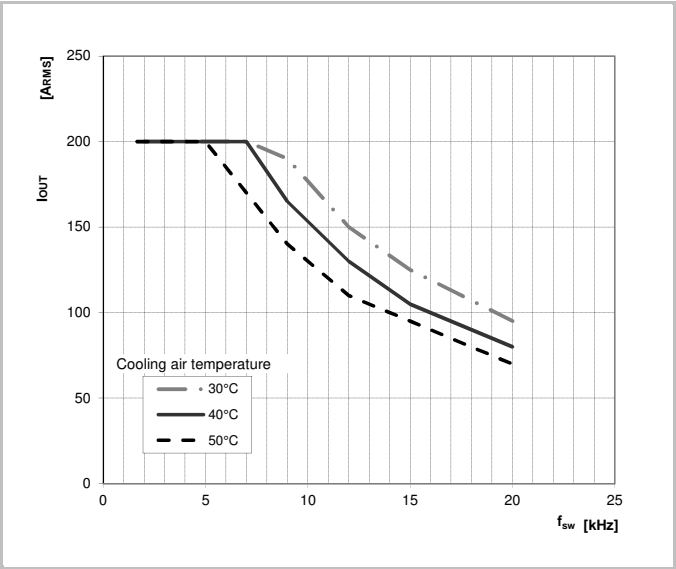
Driver X1 connector assignment

PIN	Signal	Specification
1,3,5	Vs IN	Supply voltage
2,4,6	GND	
7	[Reserved]	[dominant/recessive]
8	GND (Signal Status)	Ground for Signal Status OUT
9	Signal Status BIDIRECTIONAL	24VDC digital logic input, push pull LOW [dominant] = "Not ready to operate" HIGH [recessive] = "Ready to operate"
10	[Reserved]	[dominant/recessive]
11	Temperature Analogue OUT	Nominal voltage range: 0...10V
12	GND (Temperature Analogue)	Ground for Temperature Analogue OUT
13	UDC Analogue OUT	Nominal voltage range: 0...10V
14	GND (UDC Analogue)	Ground for UDC Analogue OUT
15	TOP phase U Switching Signal IN	24VDC digital logic input, push pull LOW = "Switch off" HIGH = "Switch on"
16	BOT Phase U Switching Signal IN	24VDC digital logic input, push pull LOW = "Switch off" HIGH = "Switch on"
17	[Reserved]	[dominant/recessive]
18	GND (TOP phase U, BOT phase U)	Ground for TOP & BOT phase U IN
19	I phase U Analogue OUT	Nominal voltage range: 0...10V
20	GND (I Analogue phase U)	Ground for I phase U Analogue OUT
21	TOP phase V Switching Signal IN	24VDC digital logic input, push pull LOW = "Switch off" HIGH = "Switch on"
22	BOT Phase V Switching Signal IN	24VDC digital logic input, push pull LOW = "Switch off" HIGH = "Switch on"
23	[Reserved]	[dominant/recessive]
24	GND (TOP phase V, BOT phase V)	Ground for TOP & BOT phase V IN
25	I phase V Analogue OUT	Nominal voltage range: 0...10V
26	GND (I Analogue phase V)	Ground for I phase V Analogue OUT
27	TOP phase W Switching Signal IN	24VDC digital logic input, push pull LOW = "Switch off" HIGH = "Switch on"
28	BOT phase W Switching Signal IN	24VDC digital logic input, push pull LOW = "Switch off" HIGH = "Switch on"
29	[Reserved]	[dominant/recessive]
30	GND (TOP phase W, BOT phase W)	Ground for TOP & BOT phase W IN
31	I phase W Analogue OUT	Nominal voltage range: 0...10V
32	GND (I Analogue phase W)	Ground for I phase W Analogue OUT
33,34	[Reserved]	

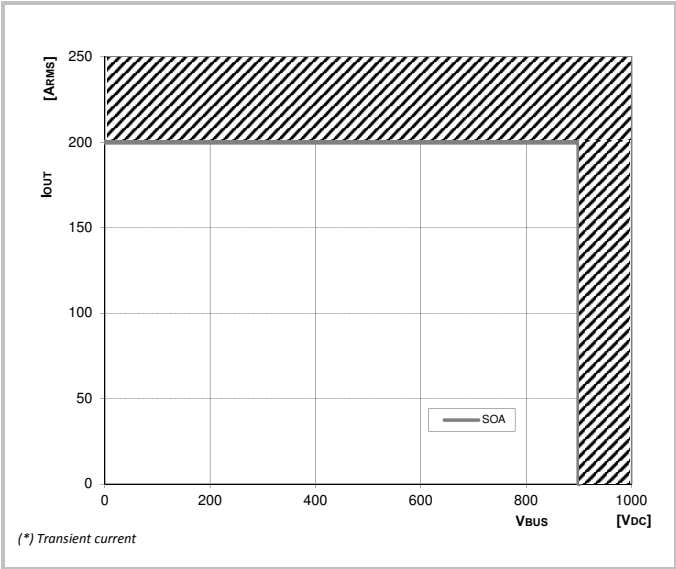


Dimensions

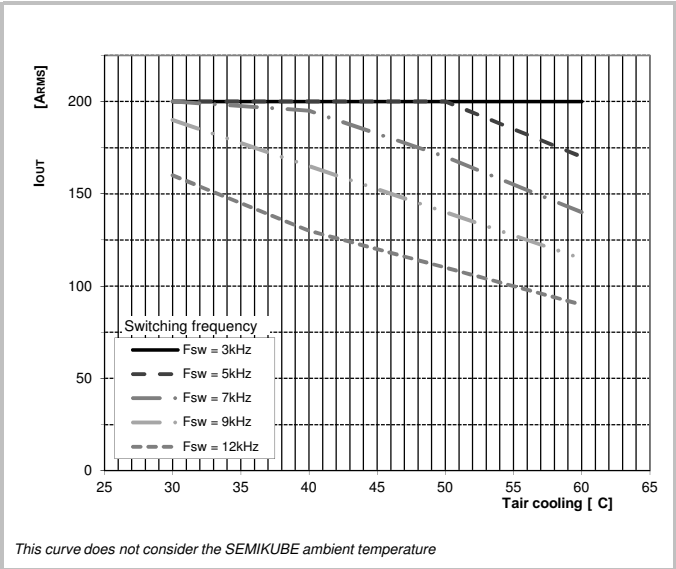
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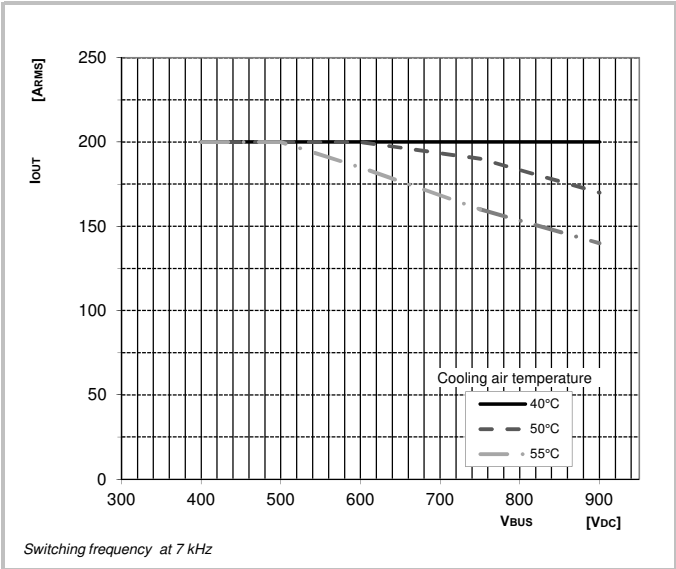
Max. Output current vs. Switching frequency



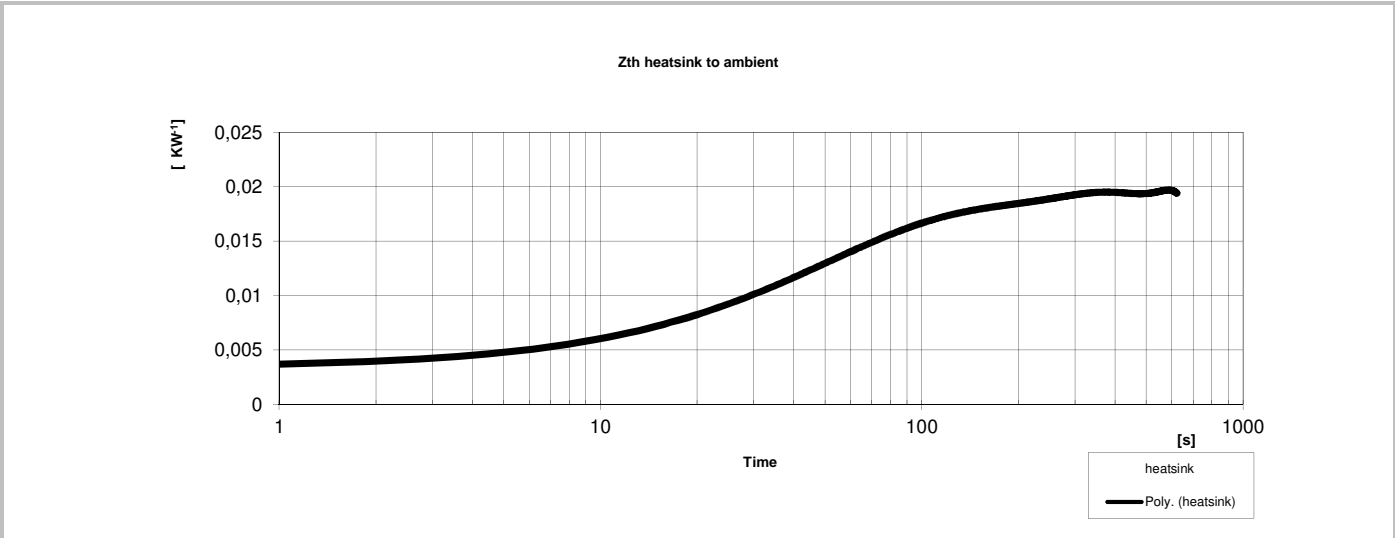
Safe Operating Area



Max. Output current vs. Ambient temperature



Max. Output current vs. DC bus voltage



Thermal characteristics