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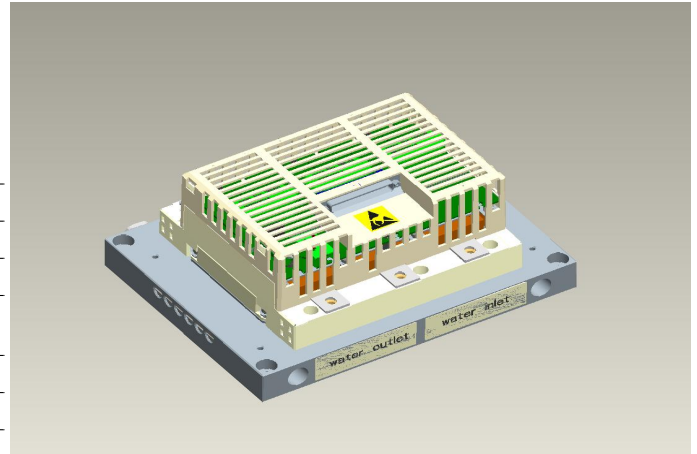
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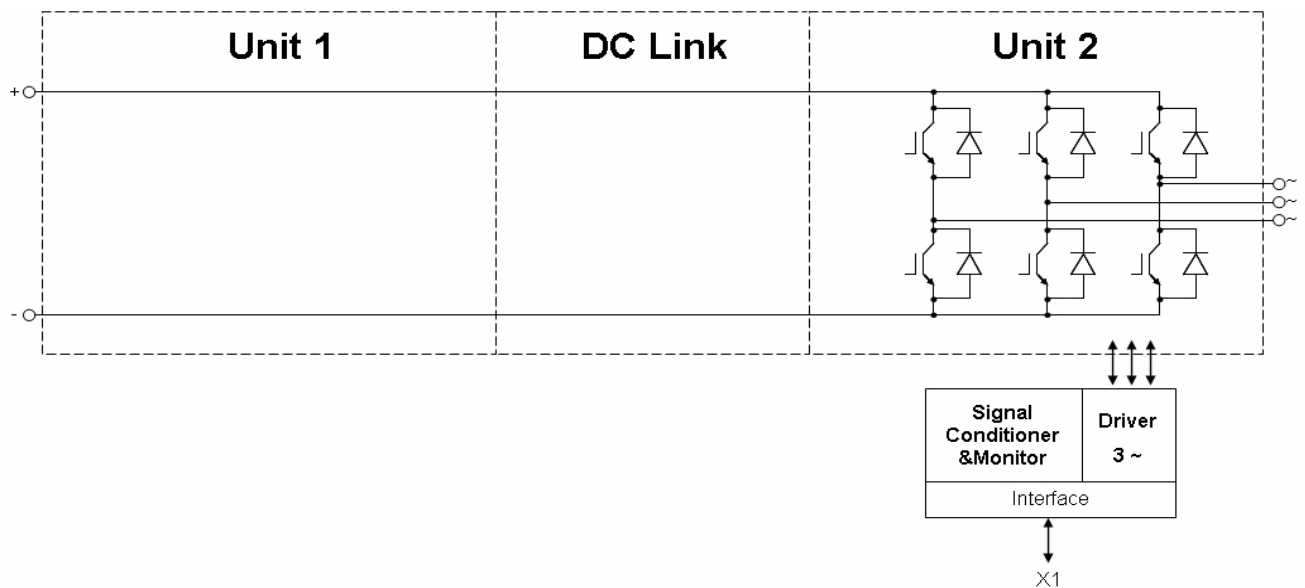
## General information

**IGBT Stack for typical voltages of up to 500 V<sub>RMS</sub>**  
**Rated output current 300 A<sub>RMS</sub>**

- High power converter
- Solar power
- Motor drives
- 62mm power module



Topology	B6I
Application	Inverter
Load type	Resistive, inductive
Semiconductor (Inverter Section)	3x FF450R12KE4
Heatsink	Water cooled
Implemented sensors	Current, voltage, temperature
Driver signals IGBT	Electrical
Design standards	UL 94, prepared for UL 508C
Sales - name	6PS04512E43W39693
SP - No.	SP001129256



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approved by: AR	revision: 2.0

# Technical Information

PrimeSTACK™

# 6PS04512E43W39693



## Preliminary data

### Characteristic values

#### DC Link

			min.	typ.	max.	
Rated voltage		V <sub>DC</sub>		650		V

#### Notes

The voltage sensor VM110 is only used for measurement. It is realized no over-voltage shutdown.

#### Inverter Section

			min.	typ.	max.	
Rated continuous current	V <sub>DC</sub> = 800 V, V <sub>AC</sub> = 500 V <sub>RMS</sub> , cos(φ) = 0.85, f <sub>AC sine</sub> = 5 Hz, f <sub>sw</sub> = 2500 Hz, T <sub>inlet</sub> = 40 °C, T <sub>j</sub> ≤ 125 °C	I <sub>AC</sub>			300	A <sub>RMS</sub>
Continuous current at low frequency	V <sub>DC</sub> = 800 V, V <sub>AC</sub> = 500 V <sub>RMS</sub> , f <sub>AC sine</sub> = 0 Hz, f <sub>sw</sub> = 2500 Hz, T <sub>inlet</sub> = 40 °C, T <sub>j</sub> ≤ 125 °C	I <sub>AC low</sub>			220	A <sub>RMS</sub>
Rated continuous current for 150% overload capability	I <sub>AC 150%</sub> = 330 A <sub>RMS</sub> , t <sub>on over</sub> = 60 s, t <sub>recovery</sub> = 600 s, T <sub>j</sub> ≤ 125 °C	I <sub>AC over1</sub>			220	A <sub>RMS</sub>
Over current shutdown	within 15 μs	I <sub>AC OC</sub>		625		A <sub>peak</sub>
Power losses	I <sub>AC</sub> = 500 A, V <sub>DC</sub> = 800 V, cos(φ) = 0.85, f <sub>AC sine</sub> = 5 Hz, f <sub>sw</sub> = 2500 Hz, T <sub>inlet</sub> = 40 °C, T <sub>j</sub> ≤ 125 °C	P <sub>loss</sub>		2400		W

#### Controller interface

Driver and interface board	ref. to separate Application Note		DR210			
			min.	typ.	max.	
Auxiliary voltage		V <sub>aux</sub>	18	24	30	V
Auxiliary power requirement	V <sub>aux</sub> = 24 V	P <sub>aux</sub>			40	W
Digital input level	resistor to GND 10 kΩ, capacitor to GND 1 nF, logic high = on	V <sub>in low</sub>	0		1.5	V
		V <sub>in high</sub>	11		15	V
Digital output level	open collector, logic low = no fault, max. 15 mA	V <sub>out low</sub>	0		1.5	V
		V <sub>out high</sub>		15		V
Analog current sensor output inverter section	load max 5 mA, @ 300 A <sub>RMS</sub>	V <sub>IU ana2</sub> V <sub>IV ana2</sub> V <sub>IW ana2</sub>	4.7	4.9	5	V
Analog DC link voltage sensor output	load max 5 mA, @ 900 V	V <sub>DC ana</sub>	6.4	6.5	6.6	V
Analog temperature sensor output unit 1 (NTC)	load max 5 mA, corresponds to T <sub>j</sub> = 125 °C at rated conditions	V <sub>Theta NTC1</sub>		4.9		V
Analog temperature sensor output inverter section (NTC)	load max 5 mA, @ T <sub>NTC</sub> = 82 °C	V <sub>Theta NTC2</sub>		10		V

#### Notes

Over temperature shut down must be realized by customer.

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### System data

			min.	typ.	max.	
EMC robustness	according to IEC 61800-3 at named interfaces	power	$V_{Burst}$	2		kV
		control	$V_{Burst}$	1		kV
		aux (24V)	$V_{surge}$	1		kV
Storage temperature		$T_{stor}$	-40		85	°C
Operational ambient temperature	PCB, DC link capacitor, bus bar, excluding cooling medium	$T_{op\ amb}$	-25		55	°C
Cooling air velocity	PCB, DC link capacitor, bus bar, standard atmosphere	$V_{air}$	0.3			m/s
Humidity	no condensation	Rel. F	5		85	%
Vibration	according to IEC60721				5	m/s <sup>2</sup>
Shock	according to IEC60721				40	m/s <sup>2</sup>
Protection degree			IP00			
Pollution degree			2			
Dimensions	width x depth x height		215	280	120	mm
Weight			7.7			kg

### Heatsink water cooled

			min.	typ.	max.	
Water flow	according to coolant specification from Infineon	$\Delta V/\Delta t$	10			dm <sup>3</sup> /min
Water pressure					8	bar
Water pressure drop		$\Delta p$		50		mbar
Coolant inlet temperature		$T_{inlet}$	-40		40	°C

### Overview of optional components

	Unit 1	Inverter Section	Unit 3
Parallel interface board			
Optical interface board			
Voltage sensor		x	
Current sensor		x	
Temperature sensor		x	
Temperature simulation			
DC link capacitors			
Collector-emitter Active Clamping			

#### Notes

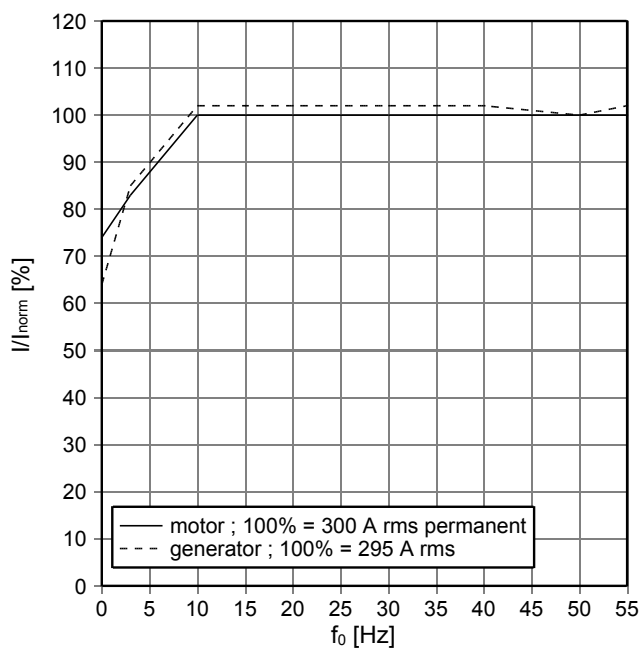
Setting of Active Clamping TVS-Diodes:  $V_z = 824\text{ V}$

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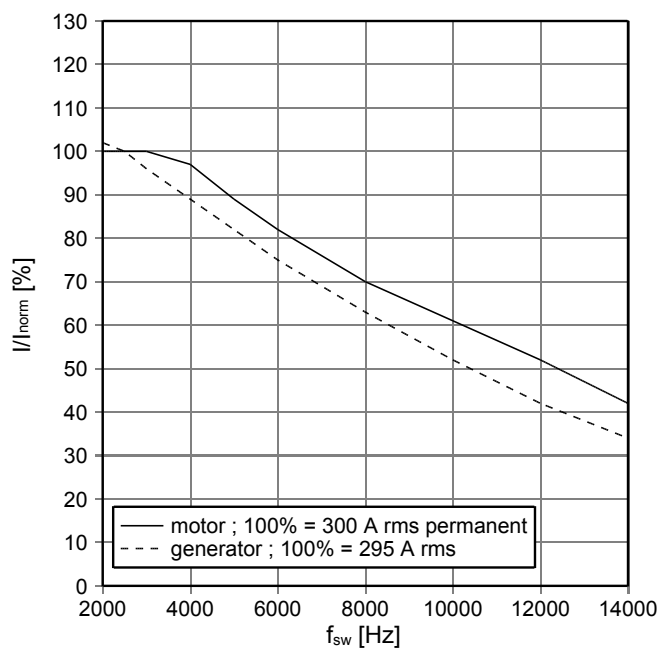


Preliminary data

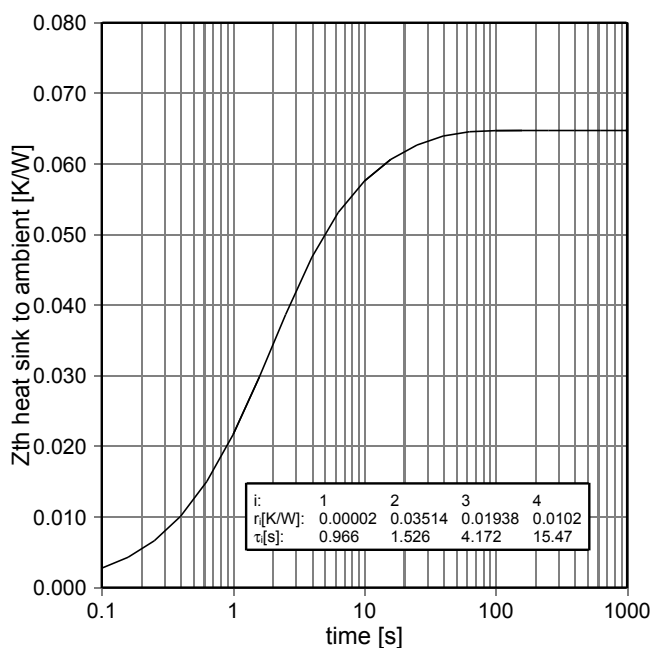
fo - derating curve IGBT (motor), Diode (generator)  
 cos(phi) = ±0,85  
 T<sub>cool medium</sub> = 40°C



fsw - derating curve IGBT (motor), Diode (generator)  
 cos(phi) = ±0,85  
 T<sub>cool medium</sub> = 40°C



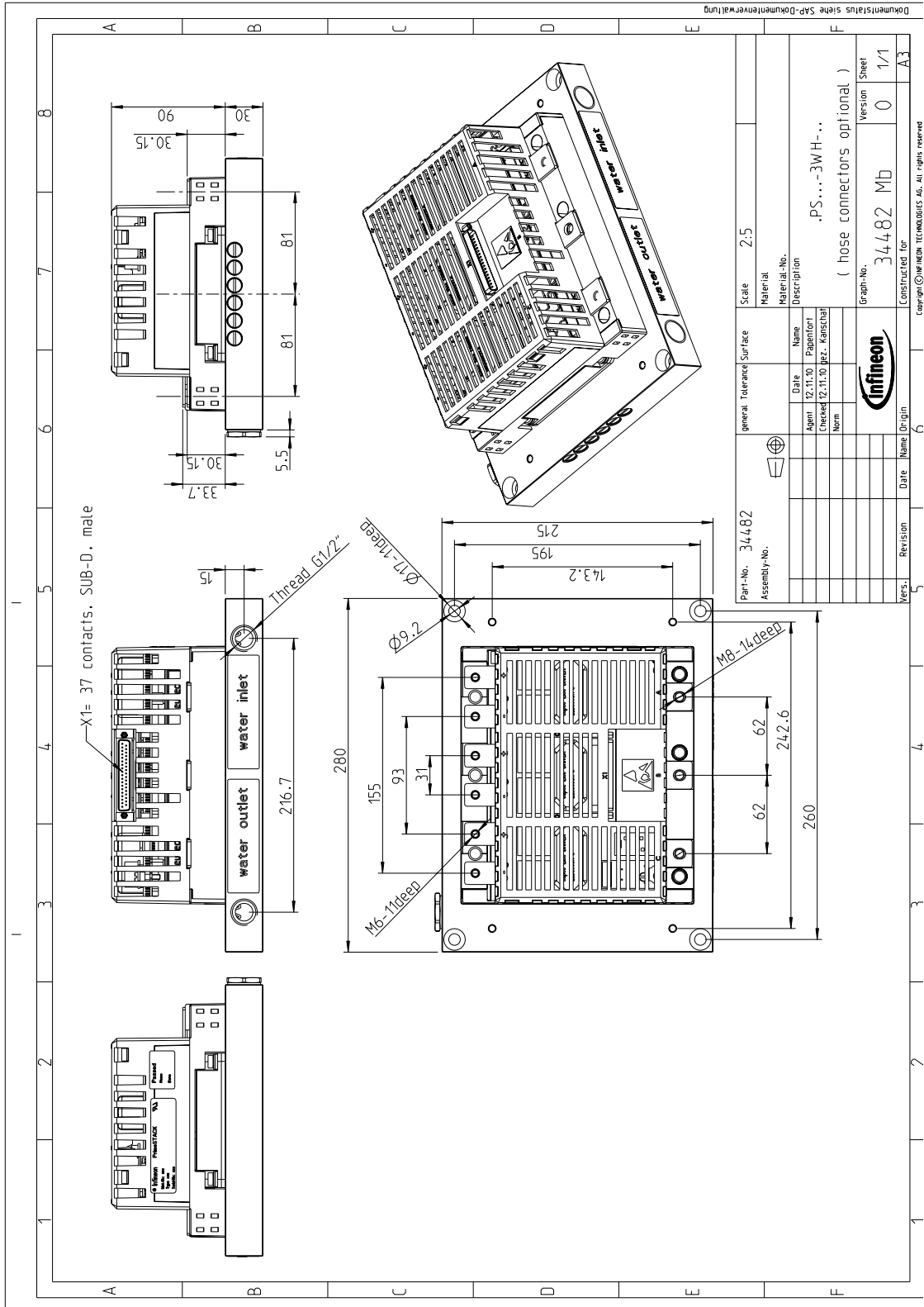
Zth heat sink to ambient per switch  
 T<sub>cool medium</sub> = 40°C



i:	1	2	3	4
r <sub>i</sub> [KW]:	0.00002	0.03514	0.01938	0.0102
τ <sub>i</sub> [s]:	0.966	1.526	4.172	15.47

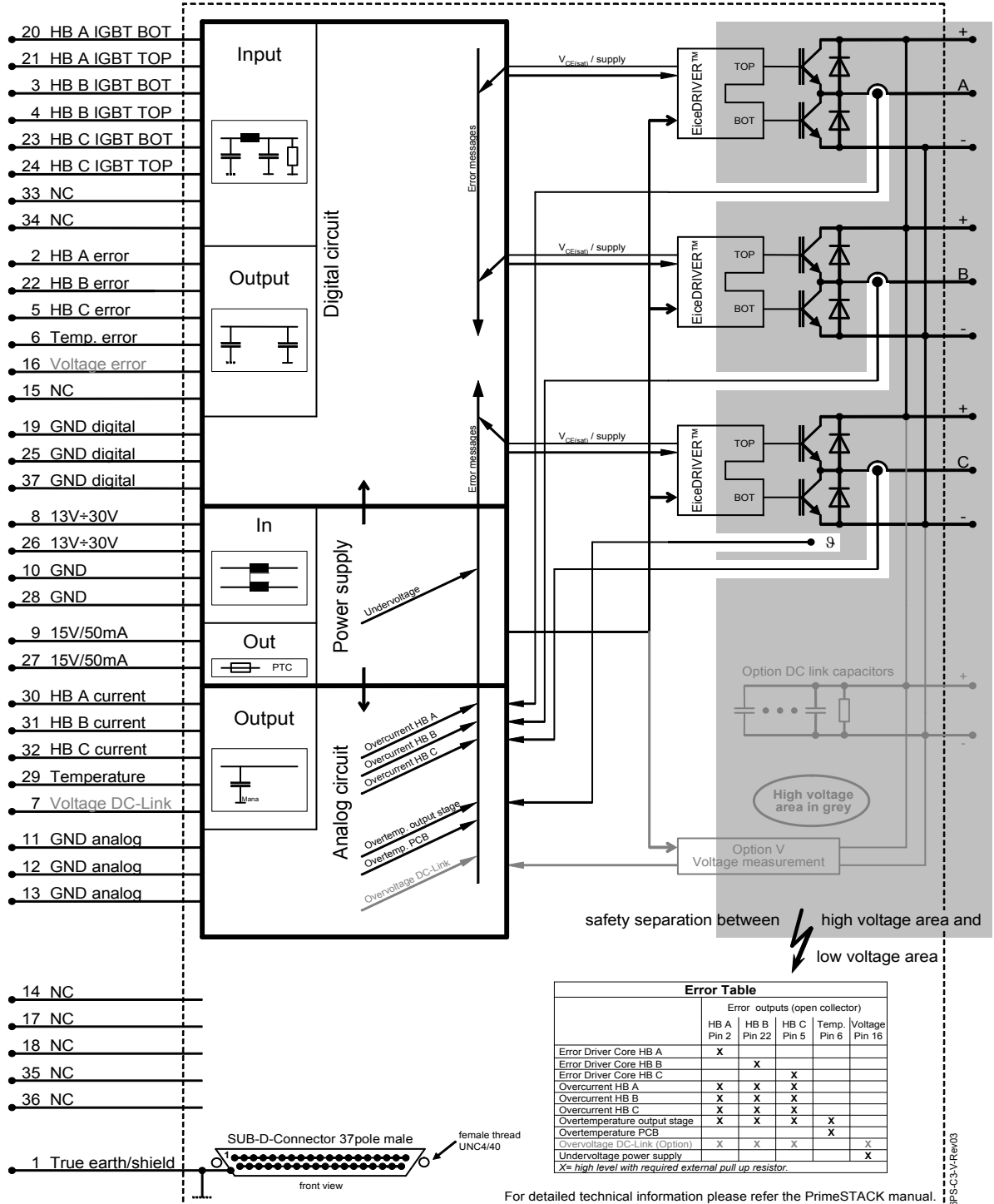
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Mechanical drawing



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Circuit diagram



	Error outputs (open collector)				
	HB A Pin 2	HB B Pin 22	HB C Pin 5	Temp. Pin 6	Voltage Pin 16
Error Driver Core HB A	X				
Error Driver Core HB B		X			
Error Driver Core HB C			X		
Overcurrent HB A	X	X	X		
Overcurrent HB B	X	X	X		
Overcurrent HB C	X	X	X		
Overtemperature output stage	X	X	X	X	
Overtemperature PCB				X	
Overvoltage DC-Link (Option)	X	X	X		X
Undervoltage power supply					X

X = high level with required external pull up resistor.

For detailed technical information please refer the PrimeSTACK manual.

6PS-C3-V-Rev03



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- the conclusion of Quality Agreements;
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Prior to installation and operation, all safety notices and warnings and all warning signs attached to the equipment have to be carefully read. Make sure that all warning signs remain in a legible condition and that missing or damaged signs are replaced. To installation and operation, all safety notices and warnings and all warning signs attached to the equipment have to be carefully read. Make sure that all warning signs remain in a legible condition and that missing or damaged signs are replaced.

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