Technical Information

PrimeSTACK™

2PS13512E43W39689

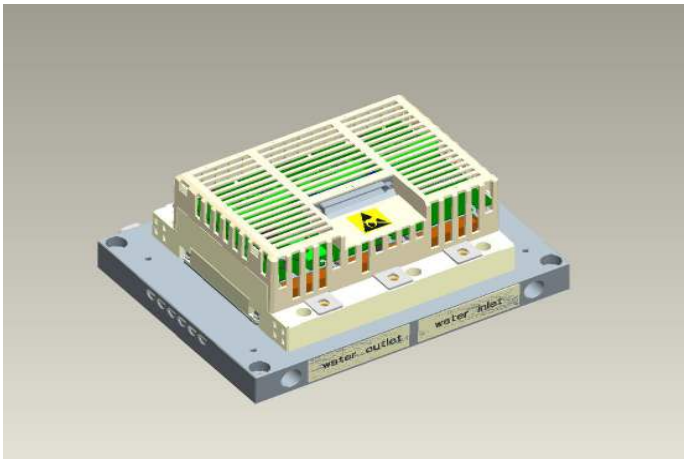
Preliminary data

General information

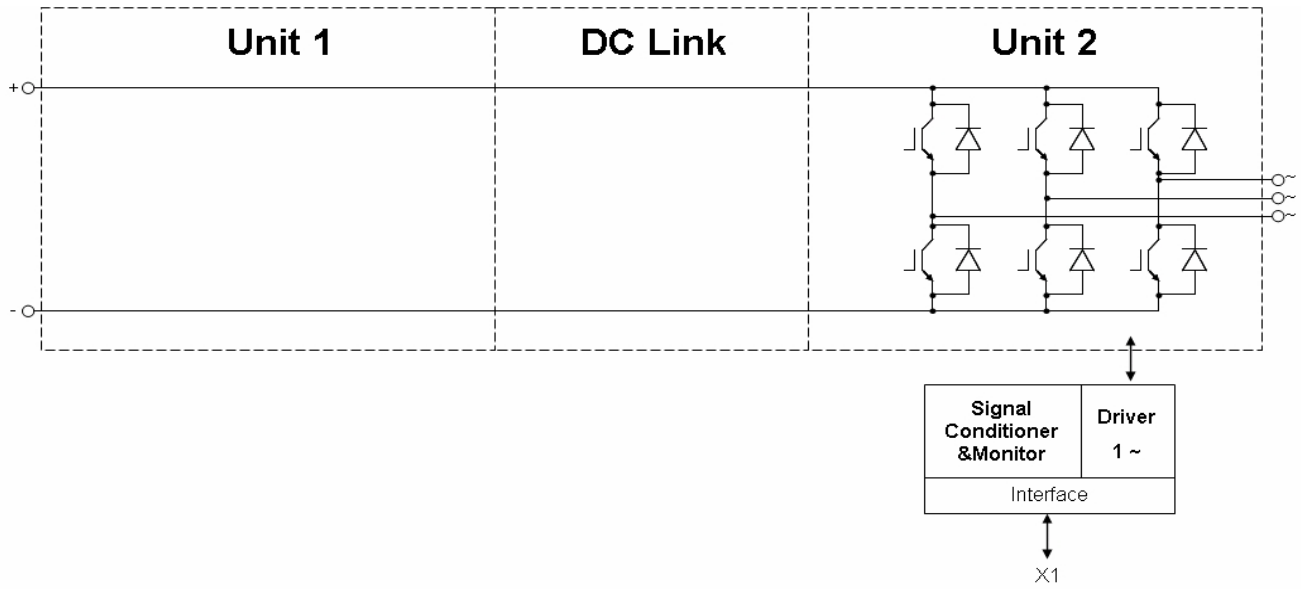
IGBT Stack for typical voltages of up to 400 V_{RMS}
Rated output current 900 A_{RMS}

· Solar power
· Motor drives
· High power converter

· 62mm power module
· Trenchstop™ IGBT4



Topology	1/2 B2I
Application	Inverter
Load type	resitive, indutive
Semiconductor (Inverter Section)	3x FF450R12KE4
Heatsink	water cooled
Implemented sensors	current, voltage, temperature
Driver signals IGBT	Electrical
Design standards	EN 50178
Approvals	UL 508C
Sales - name	2PS13512E43W39689
SP - No.	SP001132612



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Absolute maximum rated values

Collector-emitter voltage	IGBT; T_{vj} = 25°C	V_{CES}		1200	V
Repetitive peak reverse voltage	Diode; T_{vj} = 25°C	V_{RRM}		1200	V
Insulation management	according to installation height of 2000 m	V_{line}		500	V_{RMS}
Insulation test voltage	according to EN50178, f = 50 Hz, t = 1 s	V_{ISOL}		2.5	kV_{RMS}
Switching frequency inverter section		f_{sw2}		8	kHz

Notes
Further maximum ratings are specified in the following dedicated sections

Characteristic values

DC Link

			min.	typ.	max.	
Rated voltage		V_{DC}		650	850	V

Notes
The over voltage shutdown level is above the max.rated DC voltage. Therefore this function can not be used

Inverter Section

			min.	typ.	max.	
Rated continuous current	V_{DC} = 650 V, V_{AC} = 400 V_{RMS}, cos(φ) = 0.85, $f_{AC\ sine}$ = 50 Hz, f_{sw} = 5000 Hz, T_{inlet} = 40°C, $T_j \leq$ 125 °C	I_{AC}			900	A_{RMS}
Continuous current at low frequency	V_{DC} = 650 V, cos(φ) = 0.85, $f_{AC\ sine}$ = 0 Hz, f_{sw} = 5000 Hz, T_{inlet} = 40 °C, $T_j \leq$ 125 °C	$I_{AC\ low}$			540	A_{RMS}
Rated continuous current for 150% overload capability	$I_{AC\ 150\%}$ = 1080 A_{RMS}, $t_{on\ over}$ = 60 s, $t_{recovery}$ = 600 s, $T_j \leq$ 125 °C	$I_{AC\ over1}$			720	A_{RMS}
Over current shutdown	within 15 µs	$I_{AC\ OC}$			1860	A_{peak}
Power losses	I_{AC} = 900 A, V_{DC} = 650 V, V_{AC} = 400 V_{RMS}, cos(φ) = 0.85, $f_{AC\ sine}$ = 50 Hz, f_{sw} = 5000 Hz, T_{inlet} = 40 °C, $T_j \leq$ 125 °C	P_{loss}			2940	W

Notes
Maximum junction temperature limited to 125°C under all operating conditions

Controller interface

Driver and interface board	ref. to separate Application Note			DR240		
			min.	typ.	max.	
Auxiliary voltage		V_{aux}	18	24	40	V
Auxiliary power requirement	V_{aux} = 24 V	P_{aux}			40	W
Digital input level	resistor to GND 10 kΩ, capacitor to GND 1 nF	$V_{in\ low}$	0		4	V
		$V_{in\ high}$	11		15	V
Digital output level	open collector, logic low = no fault, max. 15 mA	$V_{out\ low}$	0		1.5	V
		$V_{out\ high}$		15		V
Analog current sensor output inverter section	load max 5 mA, @ 900 A_{RMS}	$V_{IU\ ana2}$ $V_{IV\ ana2}$ $V_{IW\ ana2}$	4.8	4.9	5	V
Analog DC link voltage sensor output	load max 5 mA, @ 800 V	$V_{DC\ ana}$	5.5	5.7	5.8	V
Analog temperature sensor output inverter section (Simulated)	load max 5 mA, @T_{NTC} = 55 °C, corresponds to T_j = 125 °C at rated conditions	$V_{Theta\ sim2}$		4.5		V
Over temperature shutdown inverter section	@T_{NTC} = 81 °C	$V_{Error\ OT2}$		10		V

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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		80	°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	0		85	%
Vibration	according to IEC 60721					5	m/s²
Shock	according to IEC 60721					40	m/s²
Protection degree					IP00		
Pollution degree					2		
Dimensions	width x depth x height			260	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			dm³/min
Water pressure				30		bar
Water pressure drop		Δp			8	mbar
Coolant inlet temperature		T_{inlet}	-40		70	°C
Cooling channel material				Aluminium		

Notes
Conditions are standard Infineon characterization for heatsinks.

Overview of optional components

	Unit 1	Inverter Section	Unit 3
Parallel interface board			
Optical interface board			
Chopper controller			
Voltage sensor		×	
Current sensor		×	
Temperature sensor		×	
DC link capacitors			

Notes
Setting of Active Clamping TVS-Diodes: V_Z = 824 V

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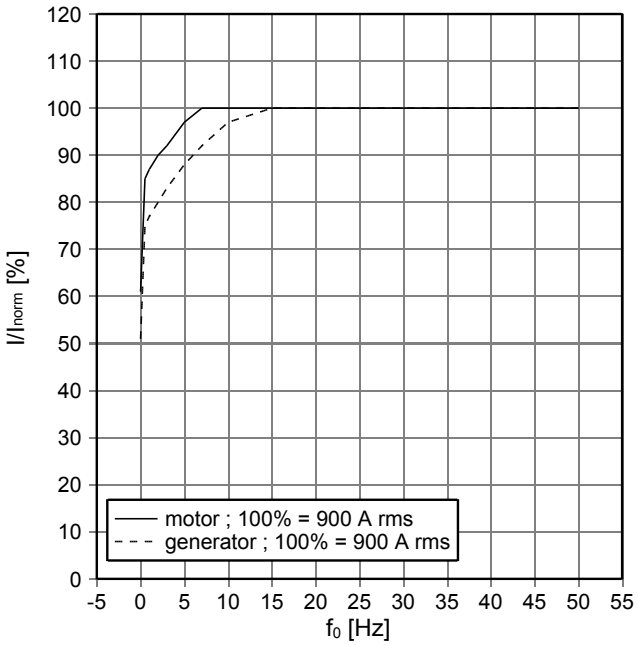
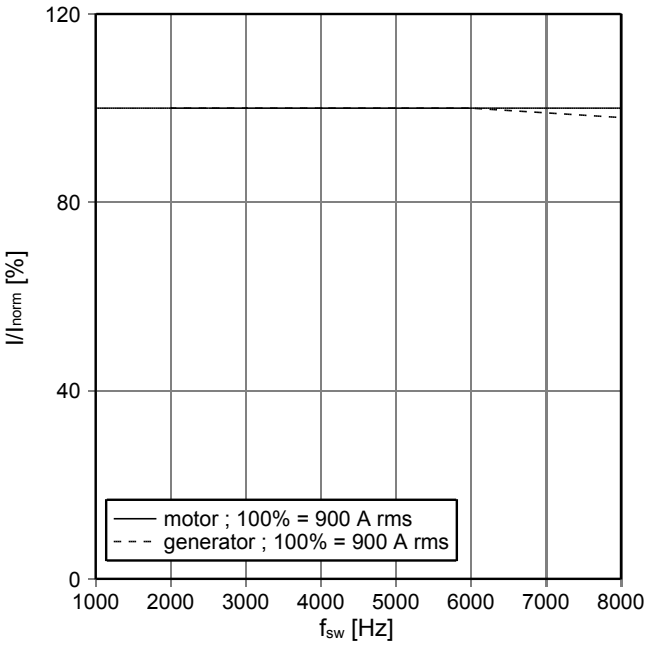
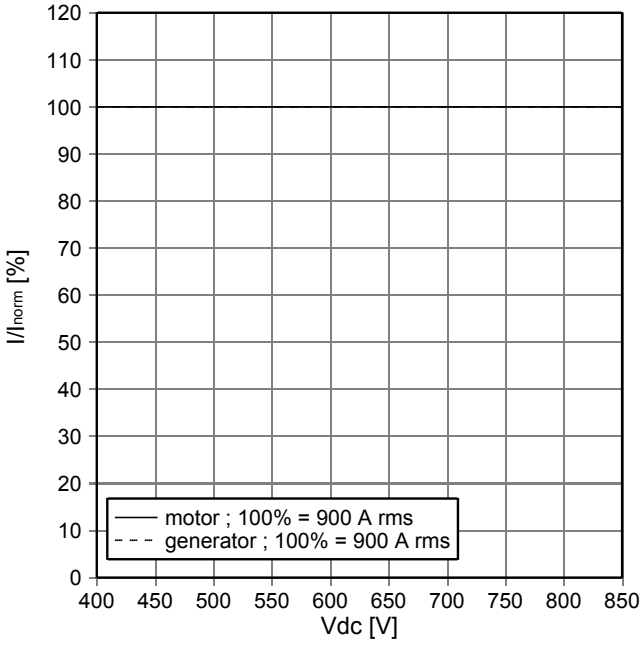
fo - derating curve IGBT (motor), Diode (generator)
cos(phi) = ± 0,85
$T_{cool\ medium}$ = 40°C



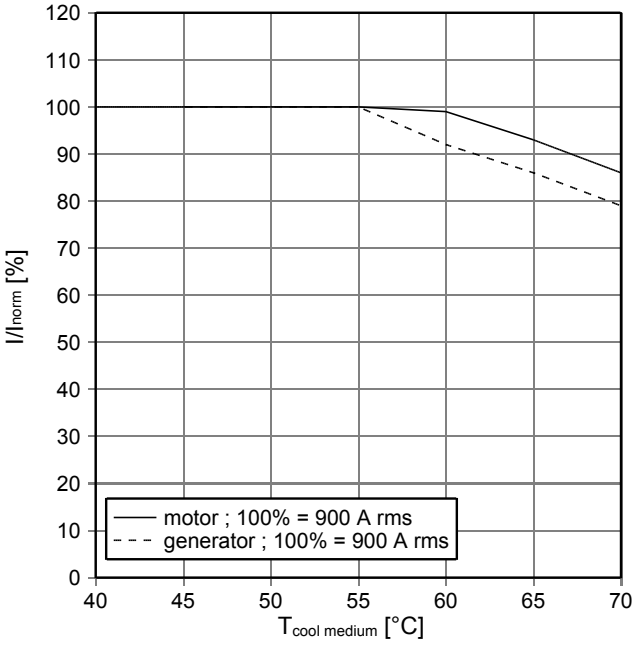
fsw - derating curve IGBT (motor), Diode (generator)
cos(phi) = ± 0,85
$T_{cool\ medium}$ = 40°C



Continuous current derating curves vs. dc link voltage
cos(phi) = ± 0,85
$T_{cool\ medium}$ = 40°C



Continuous current derating curves vs. Tcool medium
cos(phi) = ± 0,85



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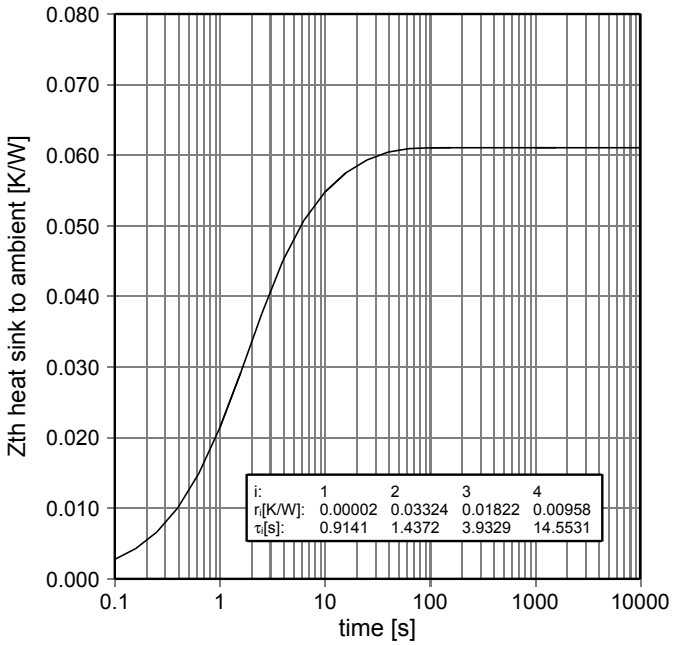
Zth heat sink to ambient per switch



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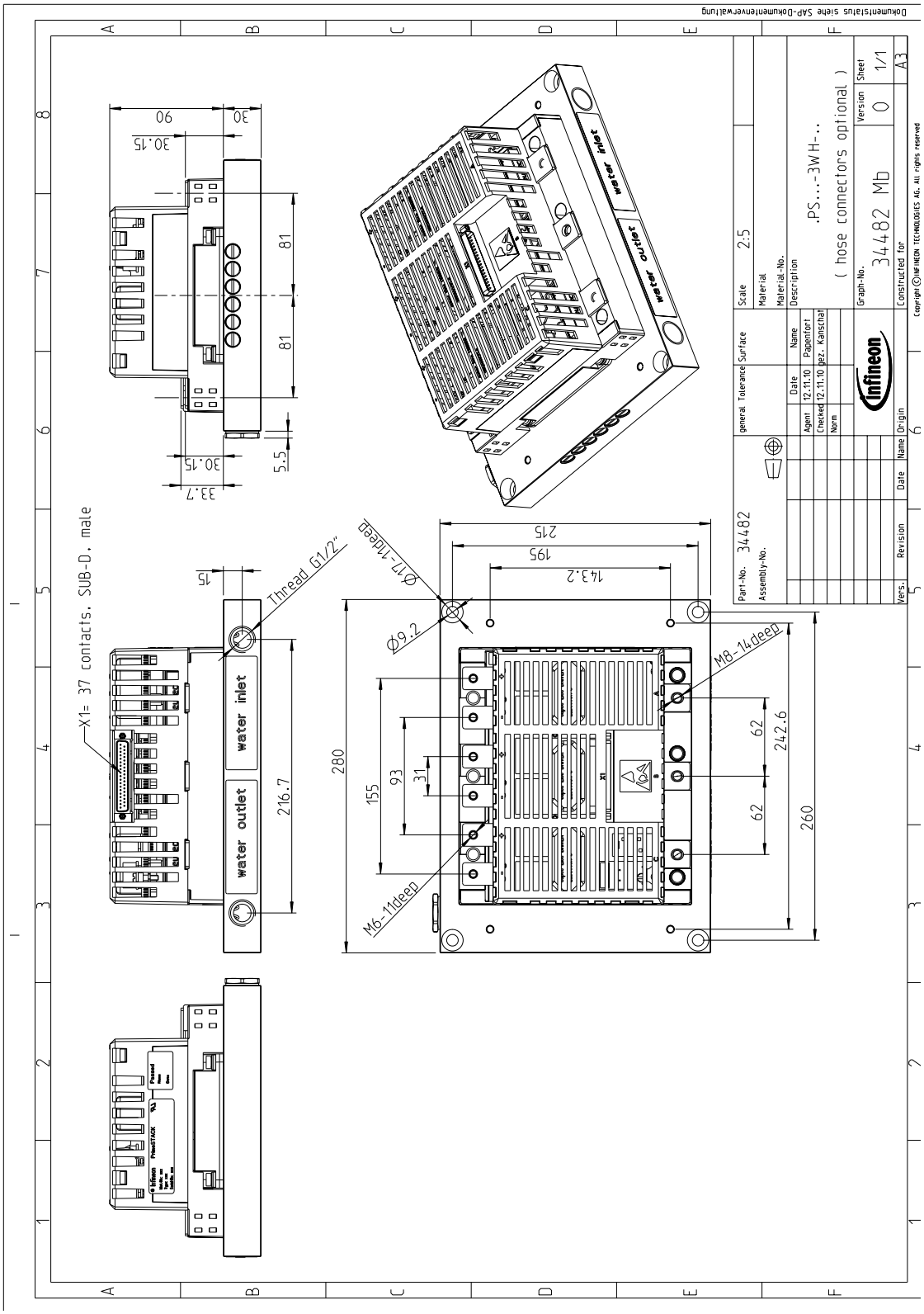
Mechanical drawing



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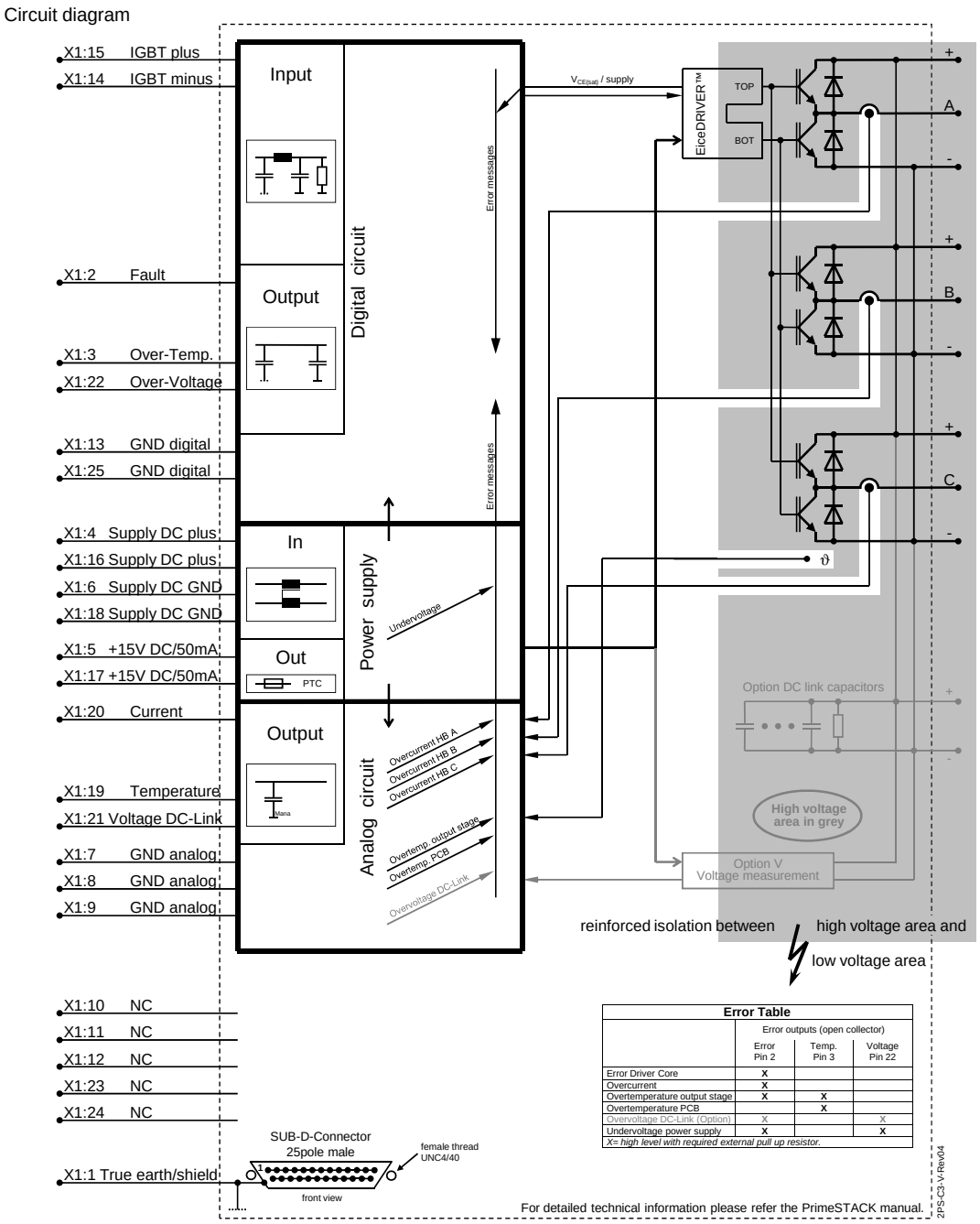
Circuit diagram



Error Table

	Error outputs (open collector)		
	Error Pin 2	Temp. Pin 3	Voltage Pin 22
Error Driver Core	X		
Overcurrent	X		
Overtemperature output stage	X	X	
Overtemperature PCB		X	
Overvoltage DC-Link (Option)	X		X
Undervoltage power supply	X		X

X= high level with required external pull up resistor.

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- **the conclusion of Quality Agreements;**
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Safety Instructions

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.