Technical Information

PrimeSTACK™

2PS12017E44F36671

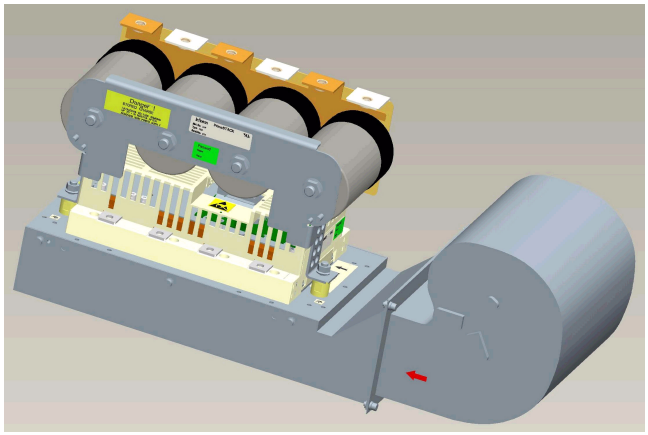
Preliminary data

General information

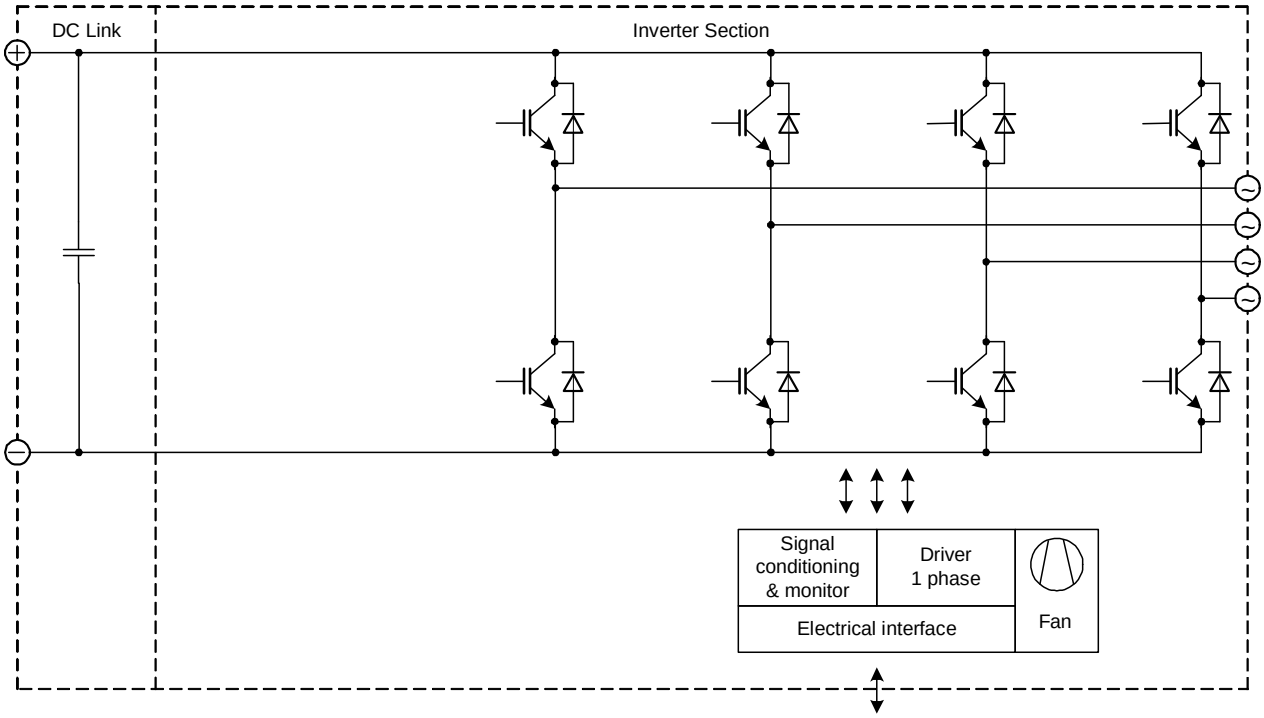
IGBT STACK for typical voltages of up to 690V_{RMS}
Rated output current 630A_{RMS}

· High power converter
· Solar power
· Motor drives

· 62mm power module
· Trenchstop™ IGBT4



Topology	B6I
Application	Inverter
Load type	Resistive, inductive
Semiconductor (Inverter Section)	4x FF300R17KE4
DC Link	1.6 mF
Heatsink	Forced air cooled (fan included)
Implemented sensors	Current, voltage, temperature
Driver signals IGBT	Electrical
Approvals	UL 94, prepared for UL 508C
Sales - name	2PS12017E44F36671
SP - No.	SP000936824



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Absolute maximum rated values

Collector-emitter voltage	IGBT; T_{vj} = 25°C	V_{CES}	1700	V
Repetitive peak reverse voltage	Diode; T_{vj} = 25°C	V_{RRM}	1700	V
DC link voltage		V_{DC}	1250	V
Insulation management	according to installation height of 2000 m	V_{line}	690	V_{RMS}
Insulation test voltage	according to EN 50187, f = 50 Hz, t = 1 s	V_{ISOL}	2.5	kV_{RMS}
Repetitive peak collector current inverter section (IGBT)	t_p = 1 ms	I_{CRM2}	1900	A
Repetitive peak forward current inverter section (Diode)	t_p = 1 ms	I_{FRM2}	1800	A
I^2t-value inverter section (Diode)	V_R = 0 V, t_p = 10 ms, T_{vj} = 125 °C	I^2t	52	kA^2s
Continuous current inverter section		I_{AC2}	785	A_{RMS}
Junction temperature	under switching conditions	T_{vjop}	150	°C
Switching frequency inverter section		f_{sw2}	7	kHz

Notes
Further maximun ratings are specified in the following dedicated sections

Characteristic values

DC Link

			min.	typ.	max.	
Rated voltage		V_{DC}		1100	1200	V
Over voltage shutdown				1250		V
Capacitor	1 s, 4 p, rated tol. 10 %	C_{DC}		1.6		mF
		type		Foil		
Maximum ripple current	per device, T_{amb} = 55 °C	I_{ripple}			49	A_{RMS}
Balance or discharge resistor	per DC link unit	R_b		164		kΩ

Notes
Operation above 1100 V subject to reduced operating time according to EN 61071.

Inverter Section

			min.	typ.	max.	
Rated continuous current	V_{DC} = 1100 V, V_{AC} = 690 V_{RMS}, cos(φ) = 0.85, $f_{AC\ sine}$ = 50 Hz, f_{sw} = 2000 Hz, T_{inlet} = 40°C, $T_j \leq$ 125 °C	I_{AC}			630	A_{RMS}
Rated continuous current for 150% overload capability	$I_{AC\ 150\%}$ = 690 A_{RMS}, $t_{on\ over}$ = 60 s, $T_j \leq$ 125 °C	$I_{AC\ over1}$			460	A_{RMS}
Rated continuous current for 150% overload capability	$I_{AC\ 150\%}$ = 772 A_{RMS}, $t_{on\ over}$ = 3 s, $T_j \leq$ 125 °C	$I_{AC\ over2}$			515	A_{RMS}
Over current shutdown	within 15 µs	$I_{AC\ OC}$		1900		A_{peak}
Power losses	V_{DC} = 1100 V, V_{AC} = 360 V_{RMS}, cos(φ) = 0.85, $f_{AC\ sine}$ = 50 Hz, f_{sw} = 2000 Hz, T_{inlet} = 40 °C, $T_j \leq$ 125 °C	P_{loss}		2400		W

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

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Controller interface

Driver and interface board	ref. to separate Application Note			DR240		
				min.	typ.	max.	
Auxiliary voltage		V_{aux}	18	24	30	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, @ 630 A_{RMS}	$V_{IU\ ana2}$ $V_{IV\ ana2}$ $V_{IW\ ana2}$	3.3	3.4	3.5	V
Analog DC link voltage sensor output	load max 5 mA, @ 1100 V	$V_{DC\ ana}$	8.7	8.9	9.1	V
Analog temperature sensor output inverter section (NTC)	load max 5 mA, @T_{NTC} = 84 °C, corresponds to T_j = 124 °C at rated conditions	$V_{Theta\ NTC2}$	10.8	11	11.2	V
Over temperature shutdown inverter section	load max 5 mA, @T_{NTC} = 87 °C	$V_{Error\ OT2}$		11.4		V

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}	2			m/s
Humidity	no condensation		Rel. F	0		95	%
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			270	671	291	mm
Weight					22		kg

Notes
Torque at DC Termianls: 6-10 Nm
Torque at AC Terminal: 16-20 Nm

Heatsink air cooled

			min.	typ.	max.	
Air flow	T_{air} = 20 °C, P_{air} = 1013 hPa, dry and dust free, measured at the side of the heat sink	$\Delta V/\Delta t$	430			m³/h
Air pressure drop	at min. air flow	Δp		425		mbar
Air inlet temperature		T_{inlet}	-40		40	°C

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Fan data

			min.	typ.	max.	
Type				EBM.D2E 146-AP47		
Voltage		V_{fan}		230		V_{RMS}
Frequency		f_{fan}		50		Hz
Current		I_{fan}		1.3		A_{RMS}

Overview of optional components

	Unit 1 (not installed	Inverter Section	Unit 3 (not installed)
Parallel interface board			
Optical interface board			
Voltage sensor		×	
Current sensor		×	
Temperature sensor		×	
DC link capacitors		×	
Fan		×	
Collector-emitter Active Clamping		×	

Notes
Setting of Active Clamping TVS-Diodes V_Z = 1200 V

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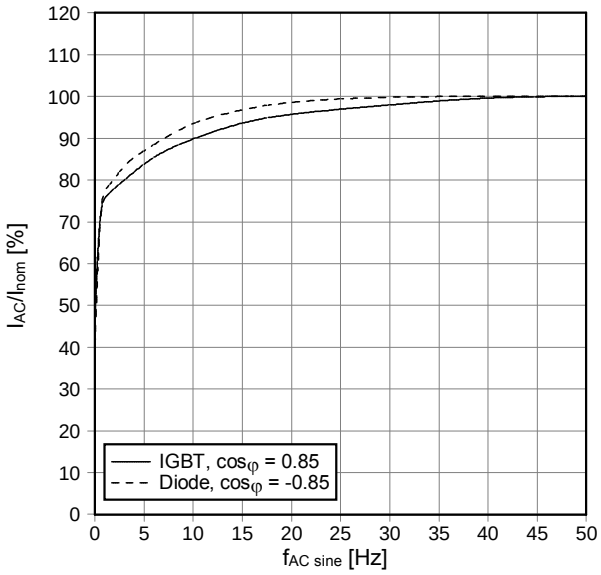
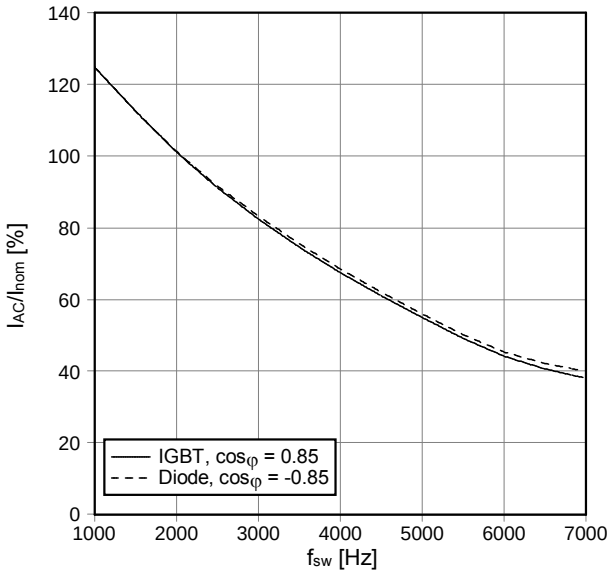
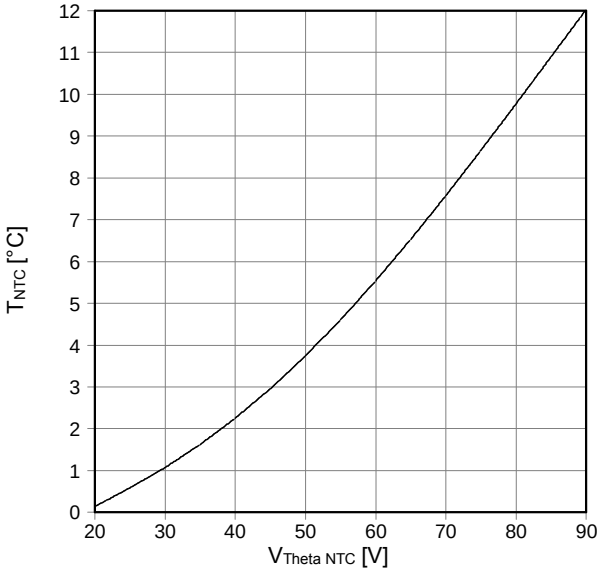
$f_{AC\ sine}$ - derating curve IGBT (motor), Diode (generator)
V_{DC} = 1100 V, V_{AC} = 690 V_{RMS}, f_{sw} = 2 kHz, $\cos\varphi$ = ±0.85,
T_{inlet} = 40 °C and nom. cooling conditions



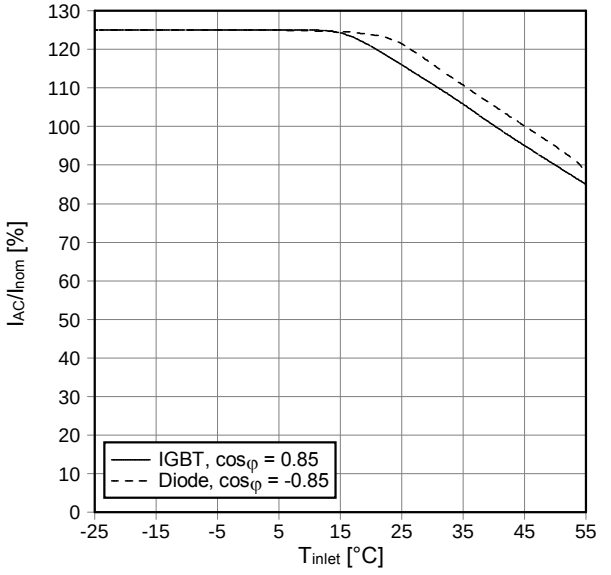
f_{sw} - derating curve IGBT (motor), Diode (generator)
V_{DC} = 1100 V, V_{AC} = 690V_{RMS}, $f_{AC\ sine}$ = 50 Hz, $\cos\varphi$ = ±0.85,
T_{inlet} = 40 °C and nom. cooling conditions



Analog temperature sensor output $V_{Theta\ NTC}$
Sensing NTC of heatsink



T_{inlet} - derating curve IGBT (motor), Diode (generator)
V_{DC} = 1100 V, V_{AC} = 690 V_{RMS}, f_{sw} = 2 kHz, $f_{AC\ sine}$ = 50 Hz, $\cos\varphi$ = ±0.85,
T_{inlet} = 40 °C and nom. cooling conditions



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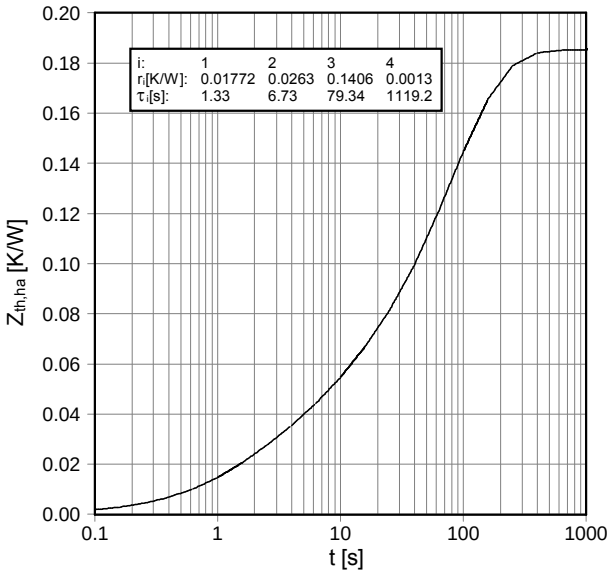
$Z_{th,ha}$ - thermal impedance heatsink to ambient per switch
nom. cooling conditions



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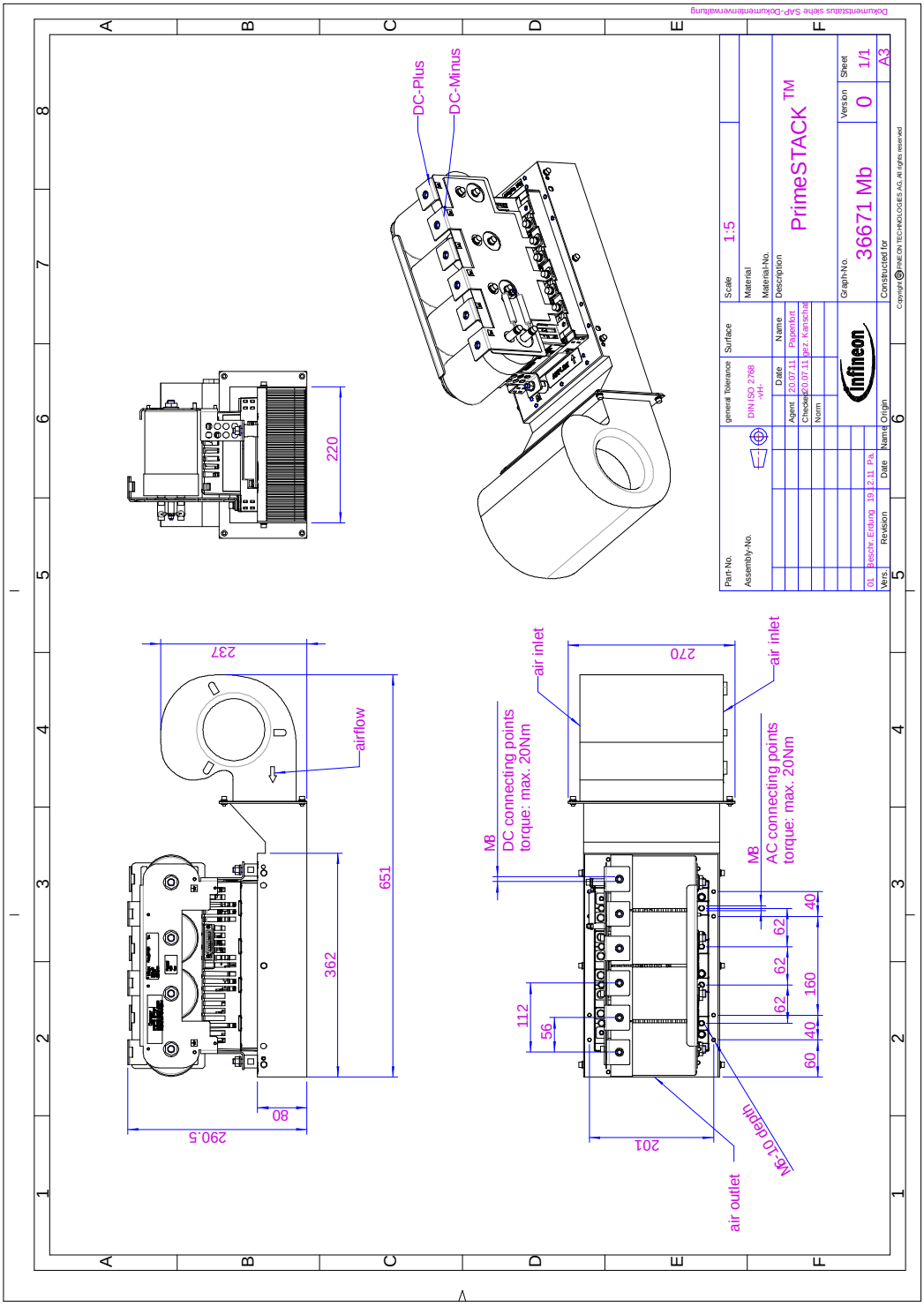
Mechanical drawing



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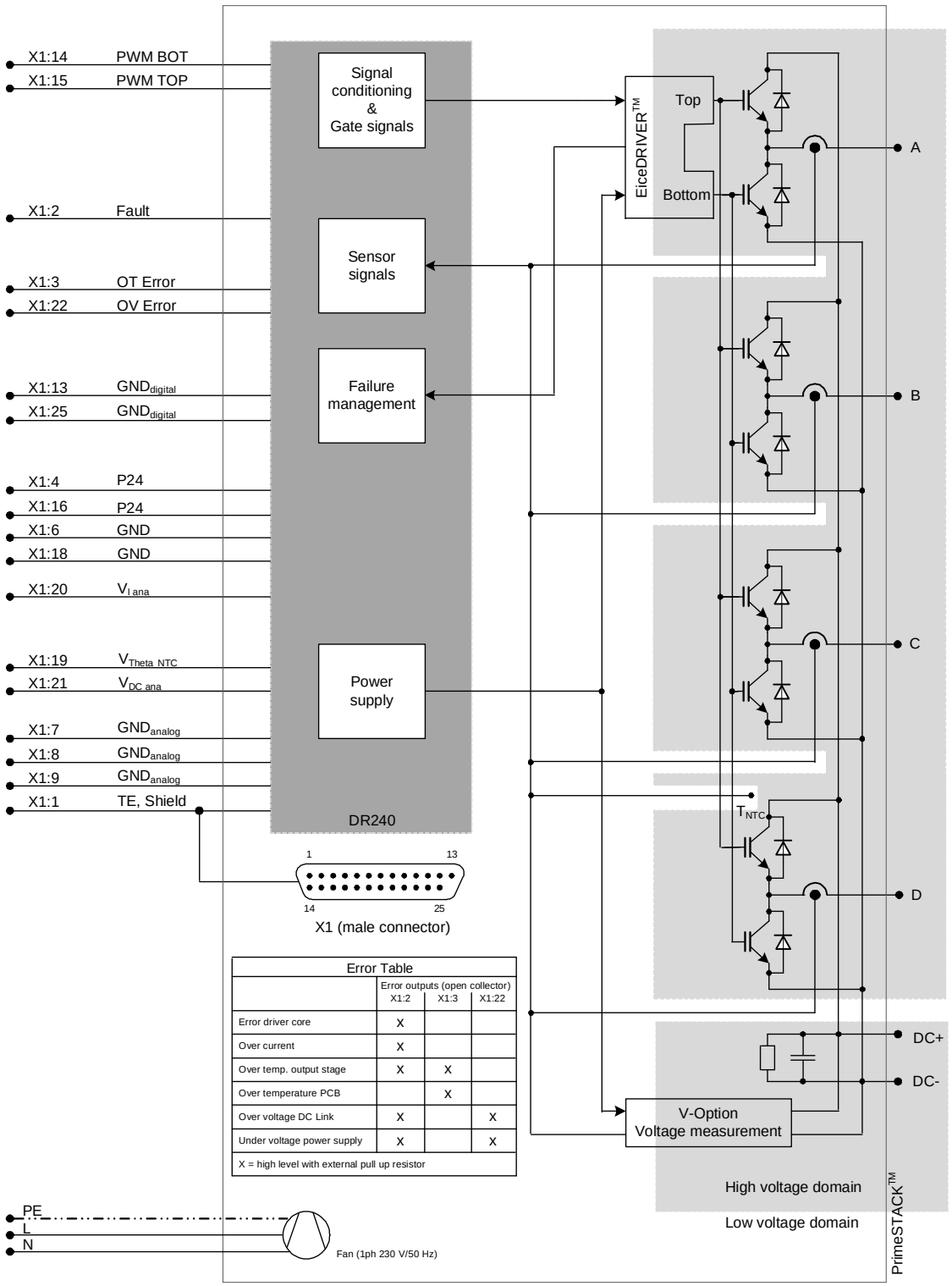
Circuit diagram



Error Table	Error outputs (open collector)		
	X1:2	X1:3	X1:22
Error driver core	X		
Over current	X		
Over temp. output stage	X	X	
Over temperature PCB		X	
Over voltage DC Link	X		X
Under voltage power supply	X		X
X = high level with external pull up resistor			

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- the conclusion of Quality Agreements;
- to establish joint measures of an ongoing product survey,
and that we may make delivery depended on the realization of any such measures.

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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.