Technical Information

PrimeSTACK™

6PS18012E4FG34676

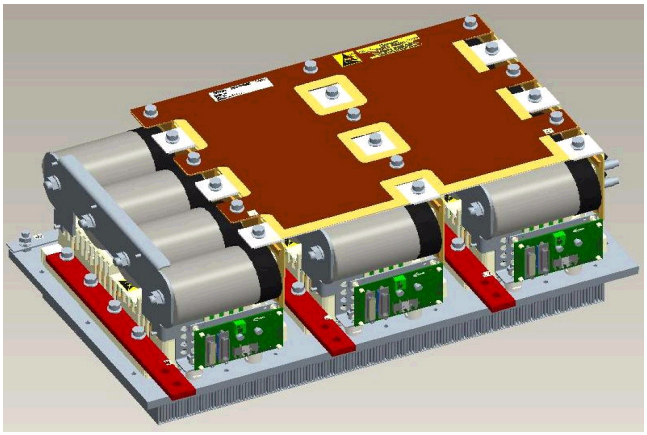
Preliminary data

General information

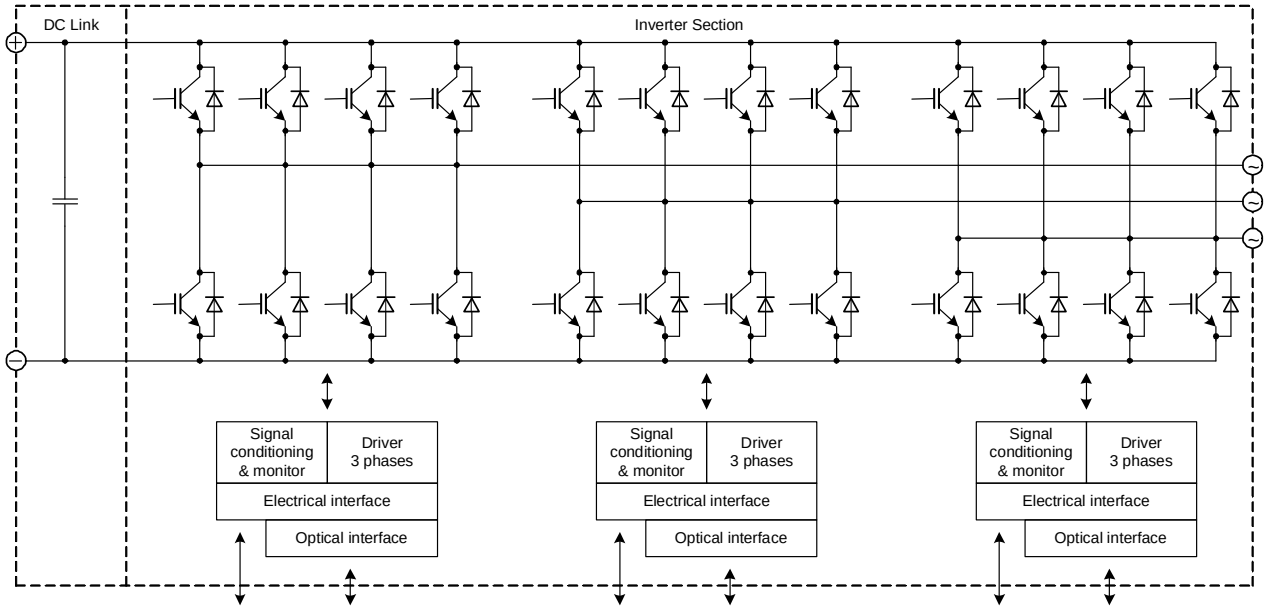
IGBT Stack for typical voltages of up to 400 V_{RMS}
Rated output current 828 A_{RMS}

· High power converter
· Solar power
· Motor drives

· 62mm power module
· Trenchstop™ IGBT4



Topology	B6I
Application	Inverter
Load type	Resistive, inductive
Semiconductor (Inverter Section)	12x FF450R12KE4
DC Link	4.8 mF
Heatsink	Forced air cooled (fan not included)
Implemented sensors	Current, voltage, temperature
Driver signals IGBT	Optical
Approvals	UL 94, prepared for UL 508C
Sales - name	6PS18012E4FG34676
SP - No.	SP000796402



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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
DC link voltage		V_{DC}	850	V
Insulation management	according to installation height of 2000 m	V_{line}	500	V_{RMS}
Insulation test voltage	according to EN 50178, f = 50 Hz, t = 1 s	V_{ISOL}	2.5	kV_{RMS}
Repetitive peak collector current inverter section (IGBT)	tp = 1 ms	I_{CRM2}	2500	A
Repetitive peak forward current inverter section (Diode)	tp = 1 ms	I_{FRM2}	2440	A
I^2t-value inverter section (Diode)	V_R = 0 V, t_p = 10 ms, T_{vj} = 125 °C	I^2t	122	kA^2s
Continuous current inverter section		I_{AC2}	828	A_{RMS}
Junction temperature	under switching conditions	T_{vjop}	150	°C
Switching frequency inverter section		f_{sw2}	6	kHz

Notes
Further maximum ratings are specified in the following dedicated sections

Characteristic values

DC Link

			min.	typ.	max.	
Rated voltage		V_{DC}		650	800	V
Over voltage shutdown	within 5000 µs			850		V
Capacitor	1 s, 12 p	C_{DC}		4.8		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		82		kΩ

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}			828	A_{RMS}
Rated continuous current for 150% overload capability	$I_{AC\ 150\%}$ = 902 A_{RMS}, $t_{on\ over}$ = 60 s, $T_j \leq$ 125 °C	$I_{AC\ over1}$			601	A_{RMS}
Rated continuous current for 150% overload capability	$I_{AC\ 150\%}$ = 1023 A_{RMS}, $t_{on\ over}$ = 3 s, $T_j \leq$ 125 °C	$I_{AC\ over2}$			682	A_{RMS}
Over current shutdown	within 15 µs	$I_{AC\ OC}$		2500		A_{peak}
Power losses	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}		7800		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		
Optical interface board	ref. to separate Application Note			OEA240		
			min.	typ.	max.	
Auxiliary voltage		V_{aux}	18	24	30	V
Auxiliary power requirement	V_{aux} = 24 V	P_{aux}			40	W
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 1 mA, @ 828 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 1 mA, @ 850 V	$V_{DC\ ana}$	8.3	8.5	8.7	V
Analog temperature sensor output inverter section (NTC)	load max 1 mA, @T_{NTC} = 88 °C, corresponds to T_j = 125 °C at rated conditions	$V_{Theta\ NTC2}$	11.4	11.6	11.8	V
Over temperature shutdown inverter section	@T_{NTC} = 92 °C	$V_{Error\ OT2}$		12.5		V
Optical input power		$P_{opt\ in}$		12		µW
Optical output power		$P_{opt\ out}$			60	µW

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	Optical interfaces, PCB, DC link capacitor, bus bar, excluding cooling medium		$T_{op\ amb}$	-25		55	°C
Cooling air velocity	Optical interfaces, PCB, DC link capacitor, bus bar, standard atmosphere		V_{air}	2			m/s
Humidity	no condensation		Rel. F	5		85	%
Protection degree					IP00		
Pollution degree					2		
Dimensions	width x depth x height			657	438	302	mm
Weight					52		kg

Notes
Dimension "depth" does not include the data cables

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 according to DIN 41882	$\Delta V/\Delta t$	1290			dm³/min
Air pressure drop	at min. air flow	Δp		425		mbar
Air inlet temperature		T_{inlet}	-40		40	°C

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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		×	
Data cable for control signals		×	
Fan			
Collector-emitter Active Clamping		×	
O-ring		×	
Set of M8x25 screws incl. washers		×	

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

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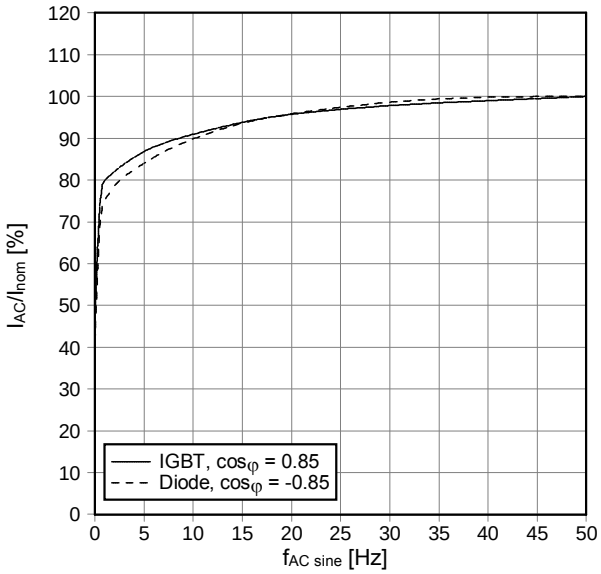
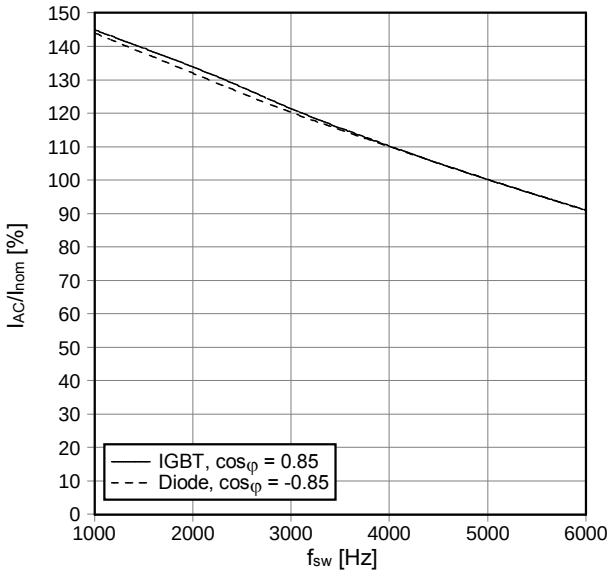
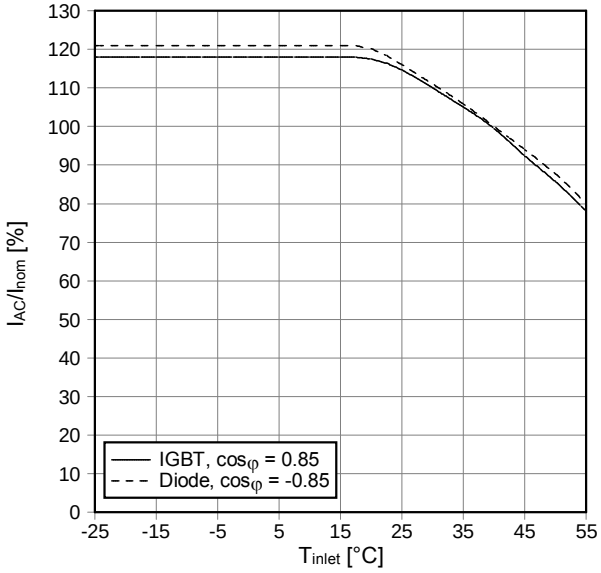
$f_{AC\ sine}$ - derating curve IGBT (motor), Diode (generator)
V_{DC} = 650 V, V_{AC} = 400 V_{RMS}, f_{sw} = 5 kHz, $\cos\varphi$ = ±0.85,
T_{inlet} = 40 °C and nom. cooling conditions



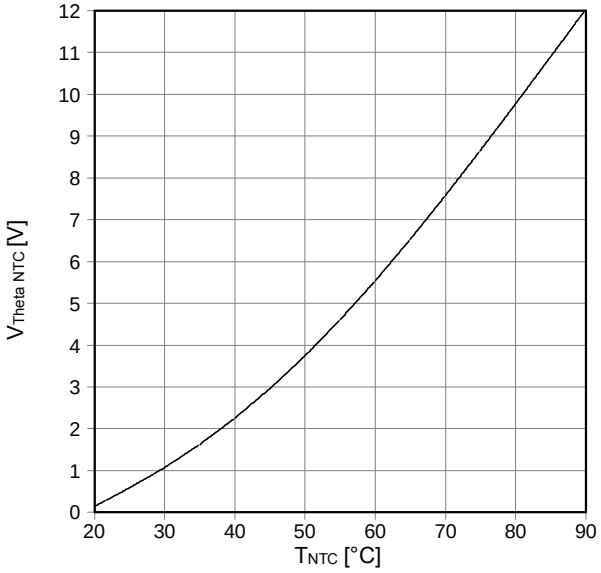
f_{sw} - derating curve IGBT (motor), Diode (generator)
V_{DC} = 650 V, V_{AC} = 400 V_{RMS}, $f_{AC\ sine}$ = 50 Hz, $\cos\varphi$ = ±0.85,
T_{inlet} = 40 °C and nom. cooling conditions



T_{inlet} - derating curve IGBT (motor), Diode (generator)
V_{DC} = 650 V, V_{AC} = 400 V_{RMS}, f_{sw} = 5 kHz, $f_{AC\ sine}$ = 50 Hz,
$\cos\varphi$ = ±0.85 and nom. cooling conditions



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



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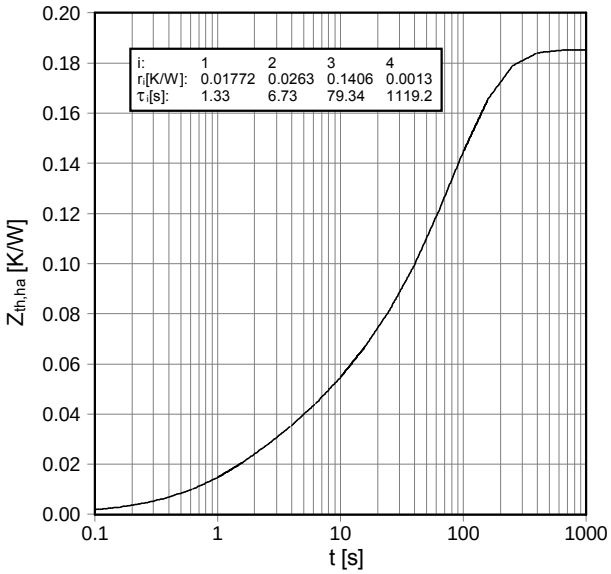
$Z_{th,ha}$ - thermal impedance heatsink to ambient per switch
nom. cooling conditions



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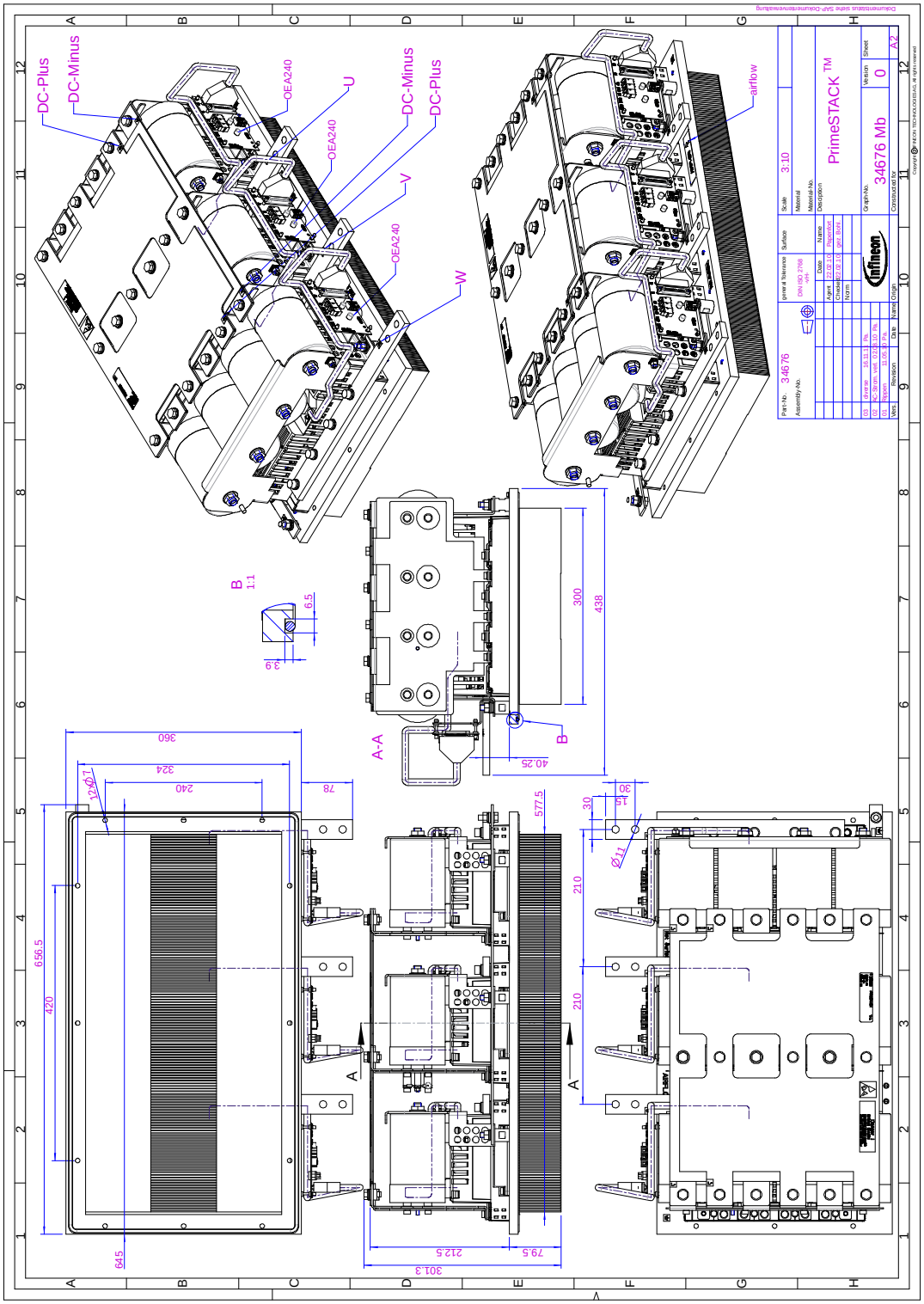
Mechanical drawing



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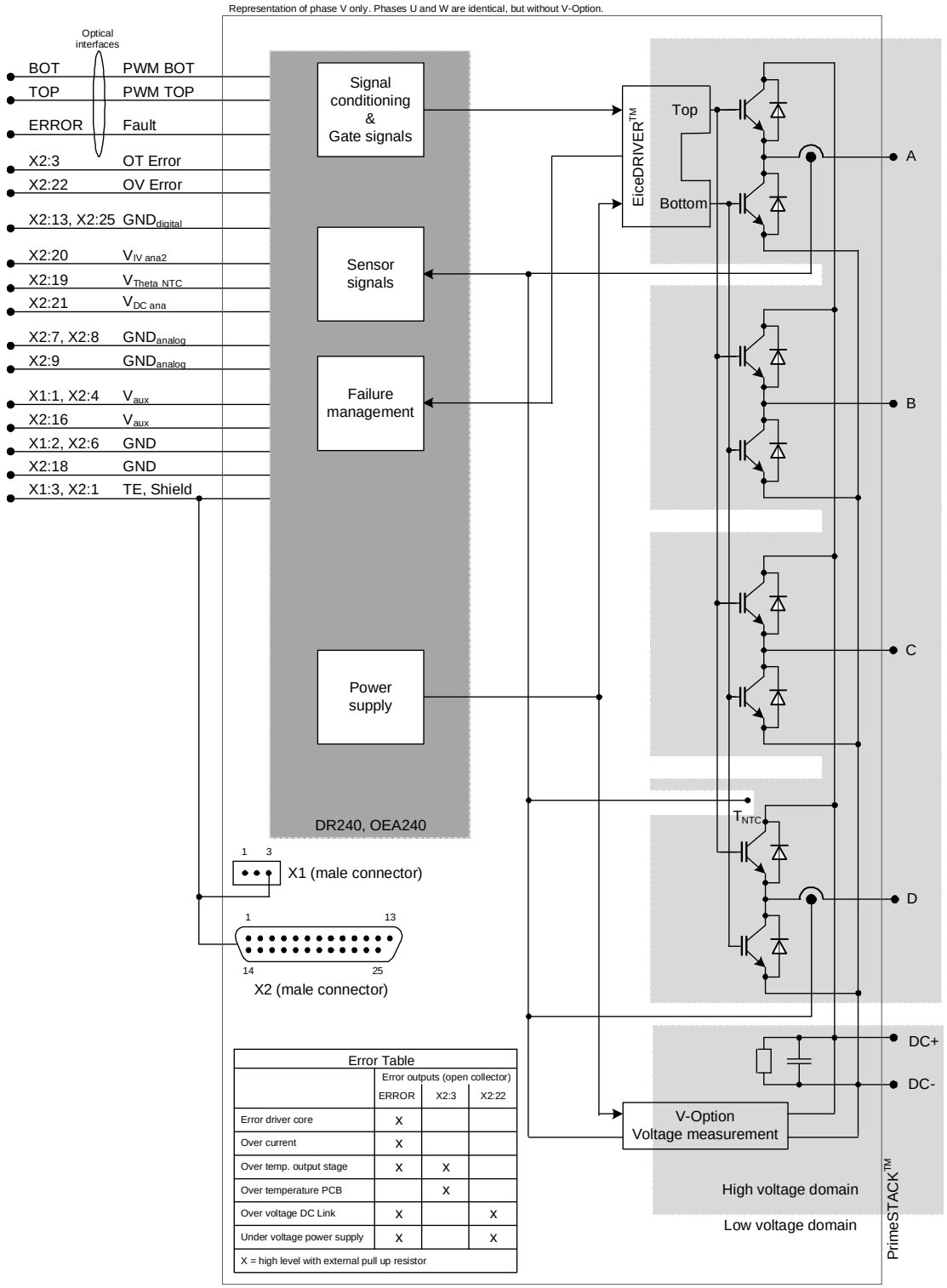
Circuit diagram



Error Table			
	Error outputs (open collector)		
	ERROR	X2:3	X2:22
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 data contained in this product data sheet is exclusively intended for technically trained staff. You and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application.

This product data sheet is describing the characteristics of this product for which a warranty is granted. Any such warranty is granted exclusively pursuant the terms and conditions of the supply agreement. There will be no guarantee of any kind for the product and its characteristics.

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Should you intend to use the Product in aviation applications, in health or live endangering or life support applications, please notify. Please note, that for any such applications we urgently recommend
- to perform joint Risk and Quality Assessments;
- 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.

If and to the extent necessary, please forward equivalent notices to your customers.

Changes of this product data sheet are reserved.

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.

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