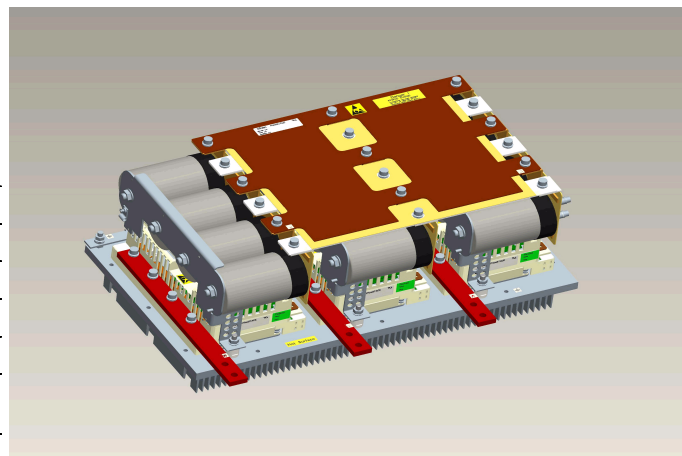


General information

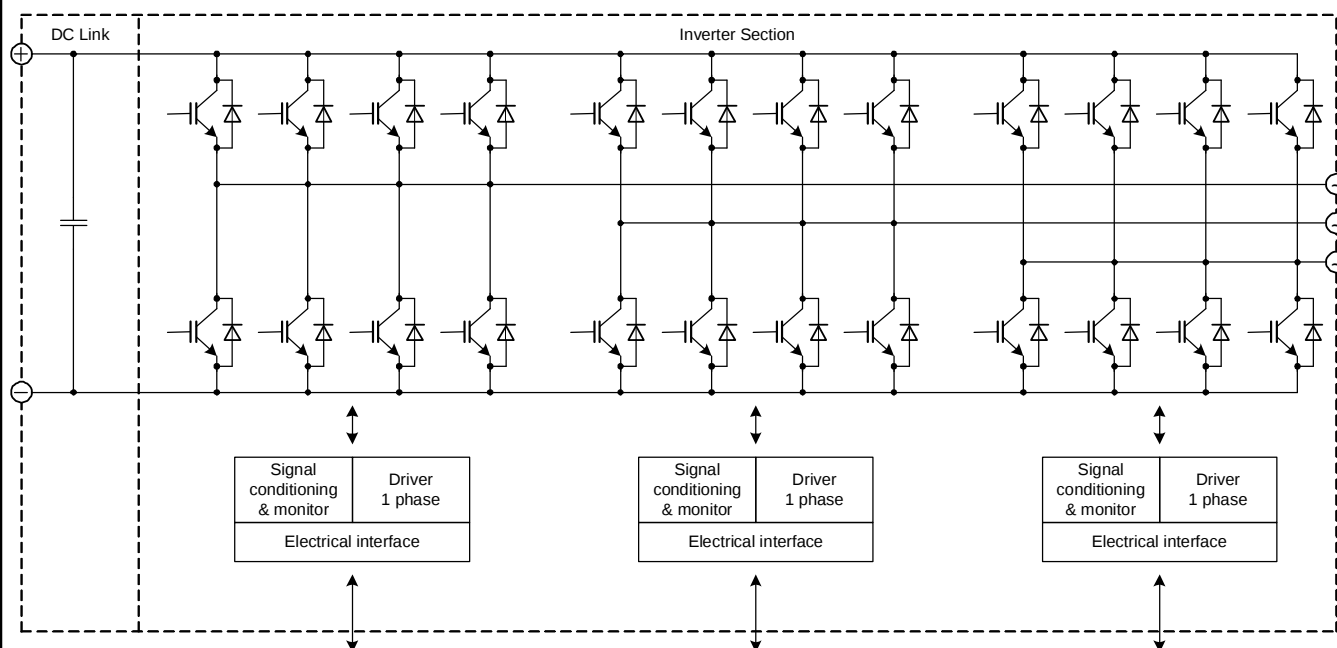
IGBT Stack for typical voltages of up to 400 V_{RMS}
Rated output current 729 A_{RMS}

- 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
Design standards	UL 94, prepared for UL 508C
Sales - name	6PS18012E4FG35689
SP - No.	SP000885246



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Preliminary data

Absolute maximum rated values

Collector-emitter voltage	IGBT; $T_{vj} = 25^{\circ}\text{C}$	V_{CES}	1200	V
Repetitive peak reverse voltage	Diode; $T_{vj} = 25^{\circ}\text{C}$	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, $f = 50\text{ Hz}$, $t = 1\text{ s}$	V_{ISOL}	2.5	kV_{RMS}
Repetitive peak collector current inverter section (IGBT)	$t_p = 1\text{ ms}$	I_{CRM2}	2500	A
Repetitive peak forward current inverter section (Diode)	$t_p = 1\text{ ms}$	I_{FRM2}	2440	A
I^2t -value inverter section (Diode)	$V_R = 0\text{ V}$, $t_p = 10\text{ ms}$, $T_{vj} = 125^{\circ}\text{C}$	I^2t	122	kA^2s
Continuous current inverter section		I_{AC2}	800	A_{RMS}
Junction temperature	under switching conditions	T_{vjop}	150	$^{\circ}\text{C}$

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, $T_{amb} = 55^{\circ}\text{C}$	I_{ripple}			49	A_{RMS}
Balance or discharge resistor	per DC link unit	R_b		82		k Ω

Inverter Section

			min.	typ.	max.	
Rated continuous current	$V_{DC} = 650\text{ V}$, $V_{AC} = 400\text{ V}_{RMS}$, $\cos(\varphi) = 0.85$, $f_{AC\ sine} = 50\text{ Hz}$, $f_{sw} = 5000\text{ Hz}$, $T_{inlet} = 40^{\circ}\text{C}$, $T_j \leq 125^{\circ}\text{C}$	I_{AC}		729		A_{RMS}
Continuous current at low frequency	$V_{DC} = 650\text{ V}$, $V_{AC} = 400\text{ V}_{RMS}$, $\cos(\varphi) = 0.85$, $f_{AC\ sine} = 0\text{ Hz}$, $f_{sw} = 5000\text{ Hz}$, $T_{inlet} = 40^{\circ}\text{C}$, $T_j \leq 125^{\circ}\text{C}$	$I_{AC\ low}$		360		A_{RMS}
Rated continuous current for 150% overload capability	$I_{AC\ 150\%} = 925\text{ A}_{RMS}$, $t_{on\ over} = 3\text{ s}$, $T_j \leq 125^{\circ}\text{C}$	$I_{AC\ over1}$		617		A_{RMS}
Rated continuous current for 150% overload capability	$I_{AC\ 150\%} = 803\text{ A}_{RMS}$, $t_{on\ over} = 60\text{ s}$, $T_j \leq 125^{\circ}\text{C}$	$I_{AC\ over2}$		535		A_{RMS}
Over current shutdown	within 15 μs	$I_{AC\ OC}$		2500		A_{peak}
Power losses	$I_{AC} = 729\text{ A}$, $V_{DC} = 650\text{ V}$, $V_{AC} = 400\text{ V}_{RMS}$, $\cos(\varphi) = 0.85$, $f_{AC\ sine} = 50\text{ Hz}$, $f_{sw} = 5000\text{ Hz}$, $T_{inlet} = 40^{\circ}\text{C}$, $T_j \leq 125^{\circ}\text{C}$	P_{loss}		6790		W

Notes

Maximum junction temperature limited to 125 $^{\circ}\text{C}$ under all operating conditions

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Preliminary data

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	$V_{aux} = 24\text{ V}$	P_{aux}			120	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 1 mA, @ 729 A _{RMS}	$V_{IU\ ana2}$ $V_{IV\ ana2}$ $V_{IW\ ana2}$	2.9	3	3.1	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} = 81 °C	$V_{Theta\ NTC2}$		10		V
Over temperature shutdown inverter section	load max 1 mA, @ T _{NTC} = 86 °C	$V_{Error\ OT2}$		10.9		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	5		85	%
Protection degree			IP00			
Pollution degree			2			
Dimensions	width x depth x height		658	438	302	mm
Weight				50		kg

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	$\Delta V/\Delta t$	1500			m³/h
Air pressure drop	at min. air flow	Δp		200		Pa
Air inlet temperature		T _{inlet}	-40		55	°C

Technical Information

PrimeSTACK™

6PS18012E4FG35689



Preliminary data

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	
DC link capacitors		x	
Data cable for control signals		x	
Fan			
Collector-emitter Active Clamping		x	

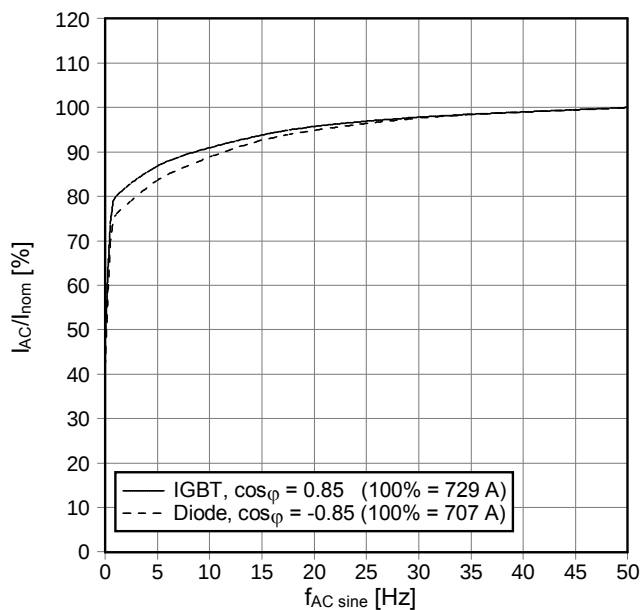
Notes

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

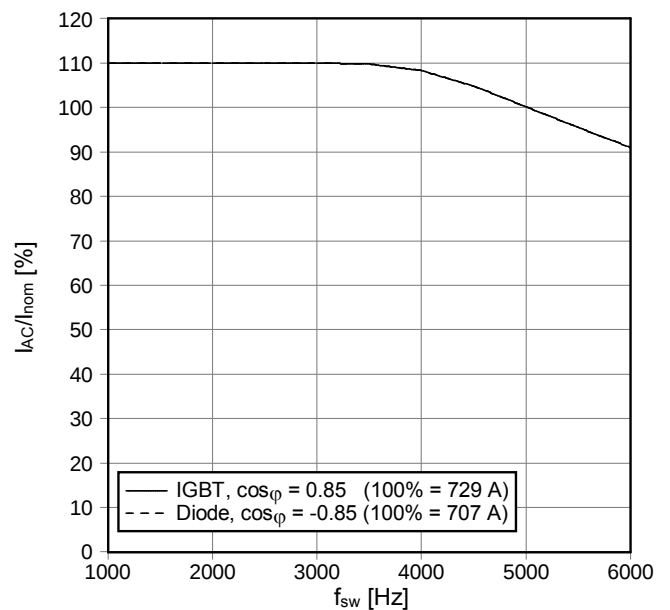
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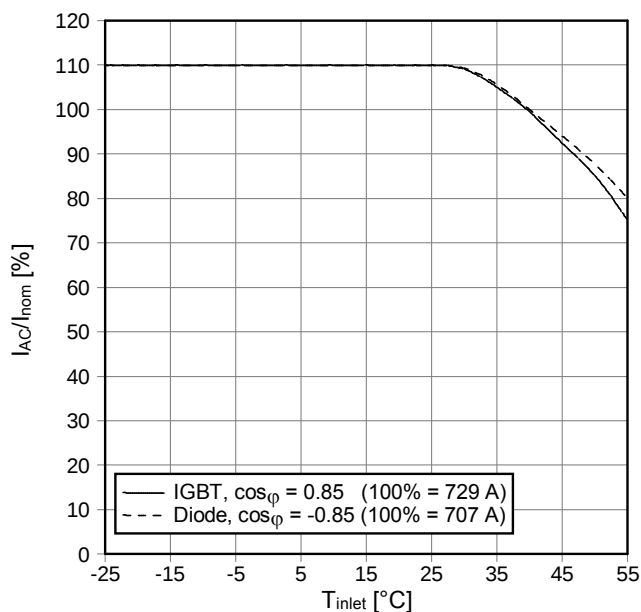
$f_{AC\ sine}$ - derating curve IGBT (motor), Diode (generator)
 $V_{DC} = 650\ V$, $V_{AC} = 400\ V_{RMS}$, $f_{sw} = 5\ kHz$, $\cos\varphi = \pm 0.85$,
 $T_{inlet} = 40\ ^\circ C$ and nom. cooling conditions



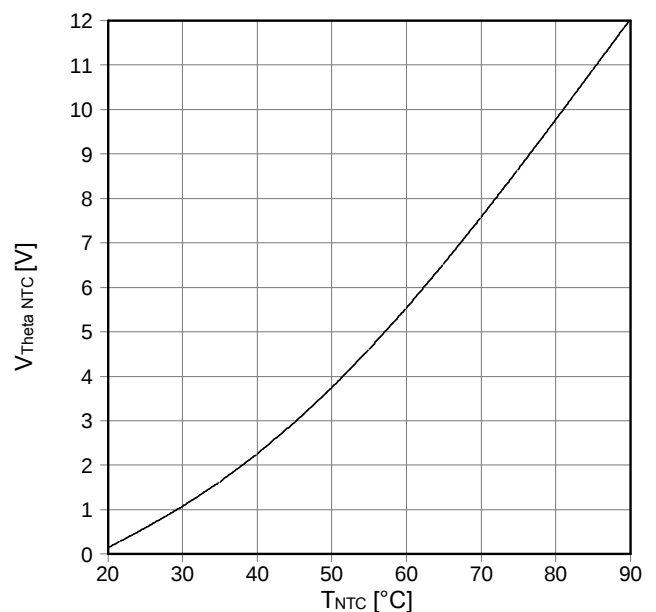
f_{sw} - derating curve IGBT (motor), Diode (generator)
 $V_{DC} = 650\ V$, $V_{AC} = 400\ V_{RMS}$, $f_{AC\ sine} = 50\ Hz$, $\cos\varphi = \pm 0.85$,
 $T_{inlet} = 40\ ^\circ C$ and nom. cooling conditions



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

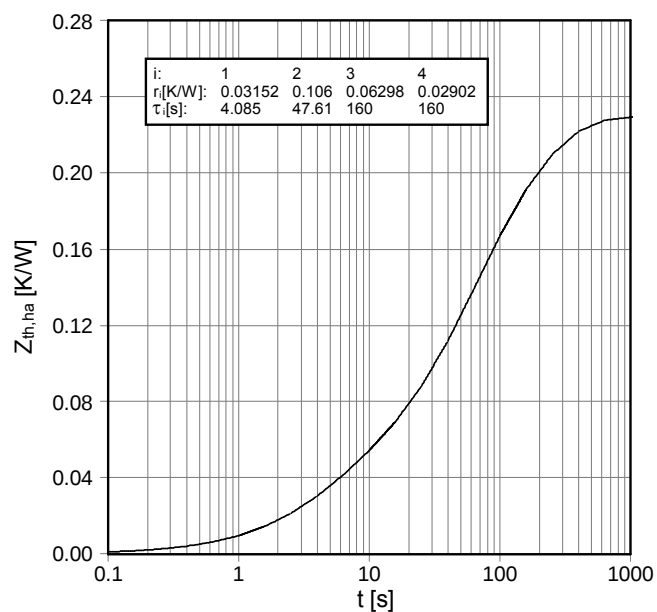


Analog temperature sensor output $V_{Theta\ NTC}$
 Sensing NTC of heatsink

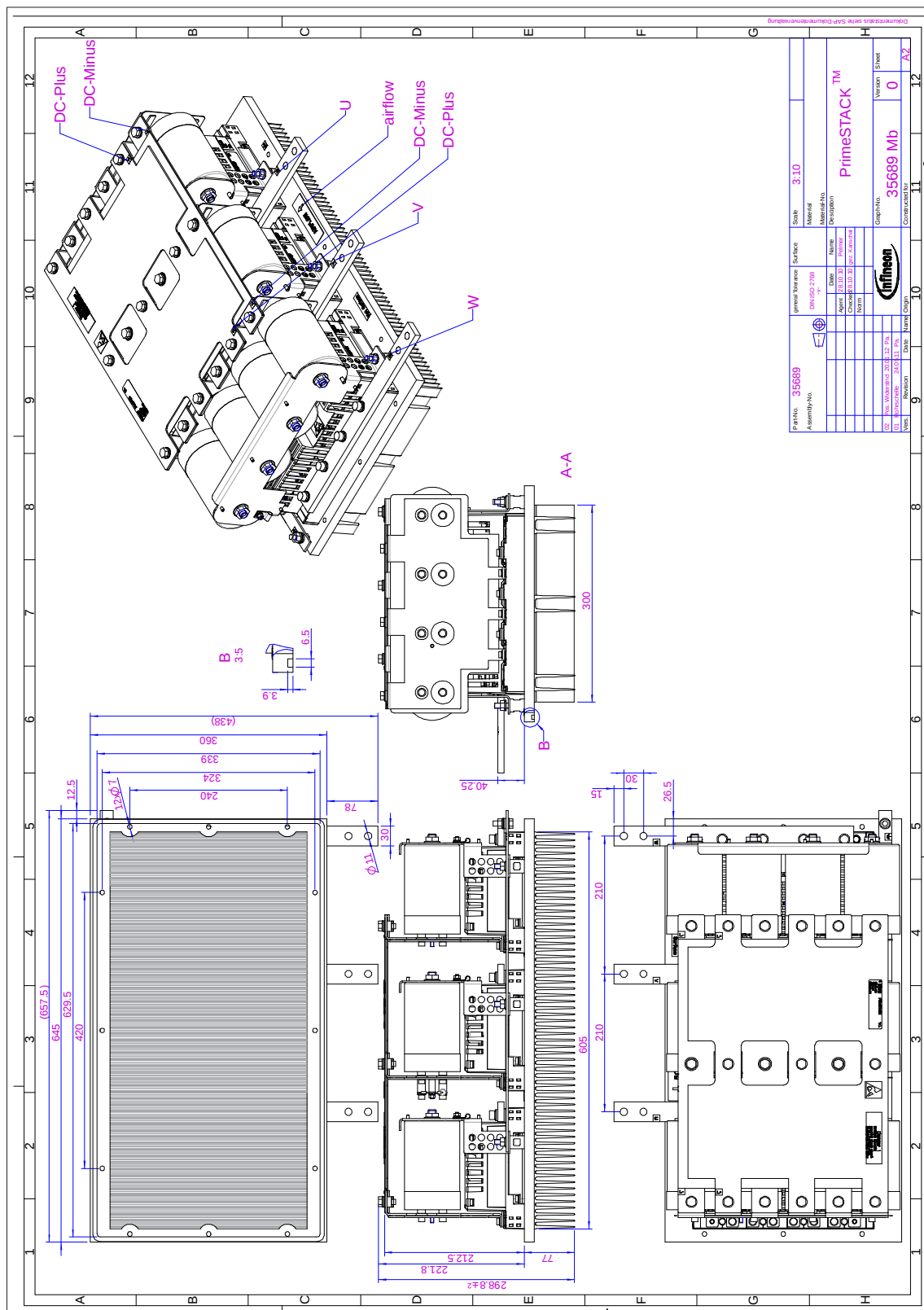


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$Z_{th,ha}$ - thermal impedance heatsink to ambient per switch
nom. cooling conditions



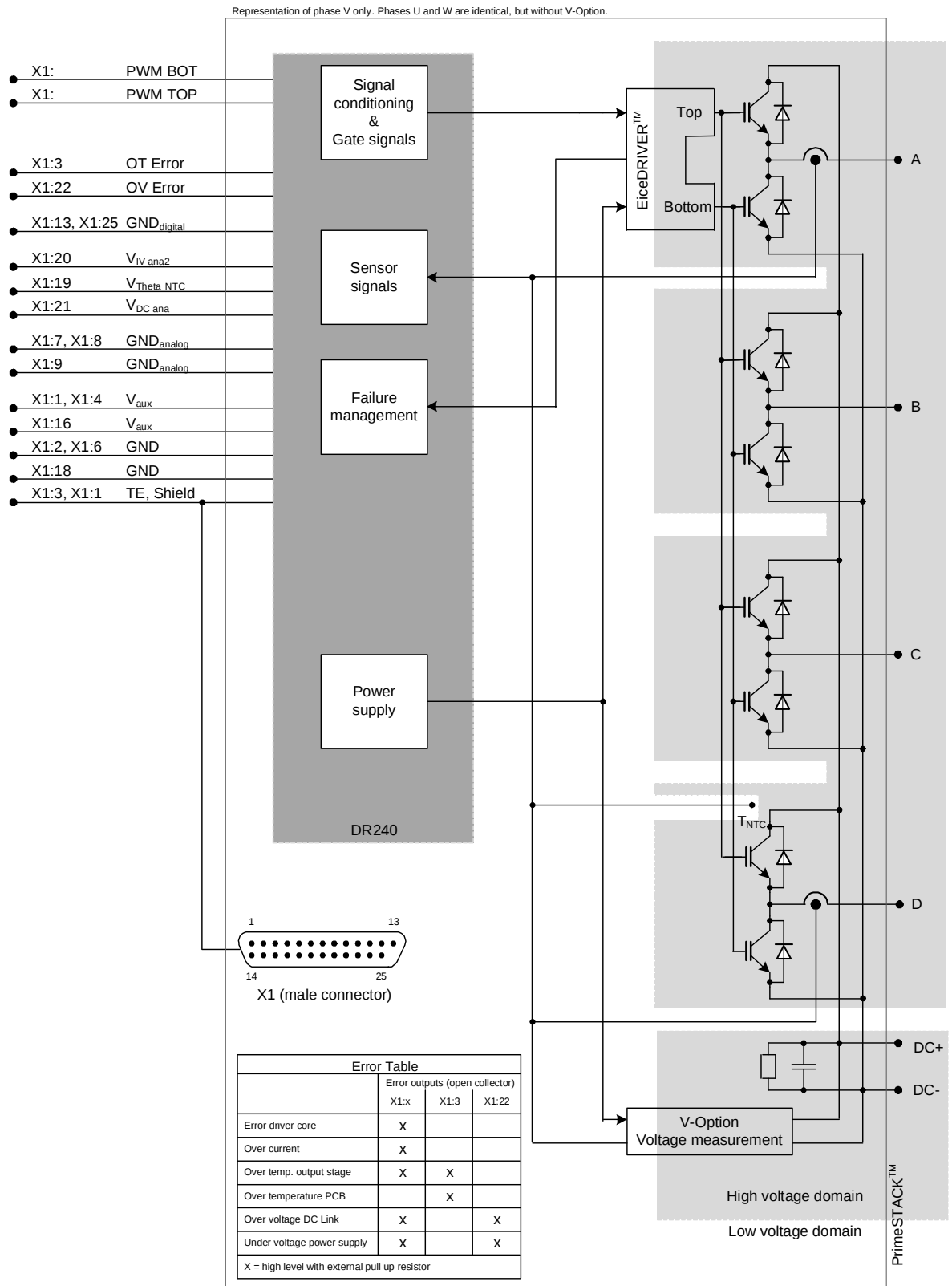
Mechanical drawing



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Circuit diagram



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