Technical Information

ModSTACK™

2LS20017E42W36702

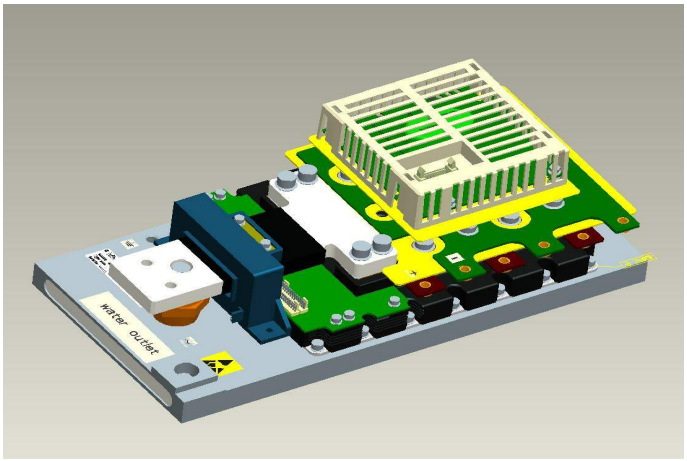
Preliminary data

General information

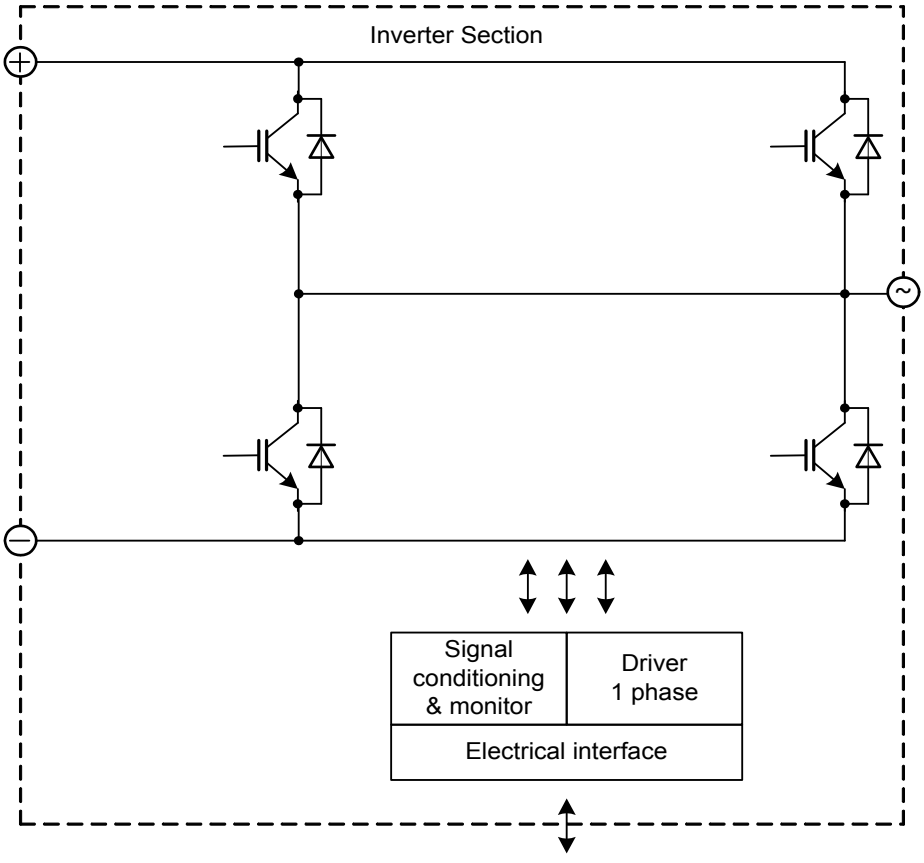
IGBT Stack for typical voltages of up to 690 V_{RMS}
Rated output current 1520 A_{RMS}

· High power converter
· Wind power
· Motor drives

· PrimePACK™3 module
· Extended operational temperature
· Low V_{cesat}



Topology	$^1/_2$B2I
Application	Inverter
Load type	Resistive, inductive
Semiconductor (Inverter Section)	2x FF1000R17IE4
Heatsink	Water cooled
Implemented sensors	Current, temperature
Driver signals IGBT	Electrical
Design standards	EN 50178
Sales - name	2LS20017E42W36702
SP - No.	SP000934308



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Preliminary data

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		V_{ISOL}	2.5	kV_{RMS}
Repetitive peak collector current inverter section (IGBT)	t_p = 1 ms	I_{CRM2}	2500	A
Repetitive peak forward current inverter section (Diode)	t_p = 1 ms	I_{FRM2}	2500	A
Continuous current inverter section		I_{AC2}	1660	A_{RMS}
Junction temperature	under switching conditions	T_{vjop}	150	°C
Switching frequency inverter section		f_{sw2}	4	kHz

Notes
Further maximum ratings are specified in the following dedicated sections

Characteristic values

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, $T_j \leq$ 150 °C	I_{AC}			1520	A_{RMS}
Continuous current at low frequency	V_{DC} = 1100 V, V_{AC} = 690 V_{RMS}, $f_{AC\ sine}$ = 0 Hz, f_{sw} = 2000 Hz, T_{inlet} = 40 °C, $T_j \leq$ 150 °C	$I_{AC\ low}$			770	A_{RMS}
Rated continuous current for 150% overload capability	$I_{AC\ 150\%}$ = 1660 A_{RMS}, $t_{on\ over}$ = 3 s, $T_j \leq$ 150 °C	$I_{AC\ over1}$			1110	A_{RMS}
Over current shutdown	within 15 µs	$I_{AC\ OC}$		4200		A_{peak}
Power losses	I_{AC} = 1520 A, 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, $T_j \leq$ 150 °C	P_{loss}		6700		W

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 1.8 kΩ, capacitor to GND 4 nF, logic high = on, min. 15 mA	$V_{in\ low}$	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, @ 1520 A_{RMS}	$V_{IU\ ana2}$ $V_{IV\ ana2}$ $V_{IW\ ana2}$	3.3	3.4	3.5	V
Analog temperature sensor output inverter section (NTC)	load max 1 mA, @T_{NTC} = 66 °C, corresponds to T_j = 150 °C at rated conditions	$V_{Theta\ NTC2}$	6.4	6.5	6.6	V
Over temperature shutdown inverter section	load max 1 mA, @T_{NTC} = 75 °C	$V_{Error\ OT2}$		8.6		V

Preliminary data

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, bus bar, excluding cooling medium		$T_{op\ amb}$	-25		55	°C
Humidity	no condensation		Rel. F	0		95	%
Vibration						5	m/s²
Shock						40	m/s²
Protection degree					IP00		
Pollution degree					2		
Dimensions	width x depth x height			205	400	117	mm
Weight					9		kg

Heatsink water cooled

			min.	typ.	max.	
Water flow	according to coolant specification from Infineon	$\Delta V/\Delta t$	15			dm³/min
Water pressure					8	bar
Water pressure drop		Δp		60		mbar
Coolant inlet temperature		T_{inlet}	-40		55	°C

Notes
Composition of coolant: Water and 52 vol. % Antifrogen N

Overview of optional components

	Unit 1	Inverter Section	Unit 3
Parallel interface board			
Optical interface board			
Voltage sensor			
Current sensor		×	
Temperature sensor		×	
Temperature simulation			
DC link capacitors			
Data cable for control signals			
Collector for water cooled heatsink			
Collector-emitter Active Clamping		×	

Notes
Setting of Active Clamping TVS-Diodes: V_Z = 1280 V

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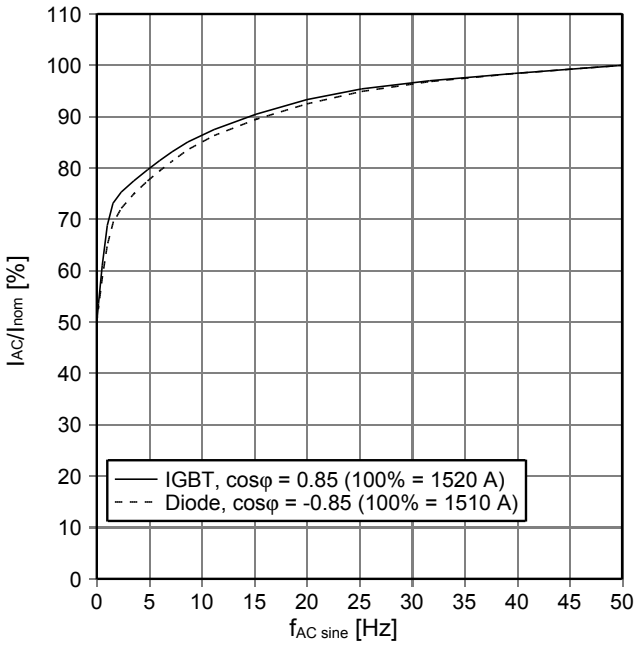
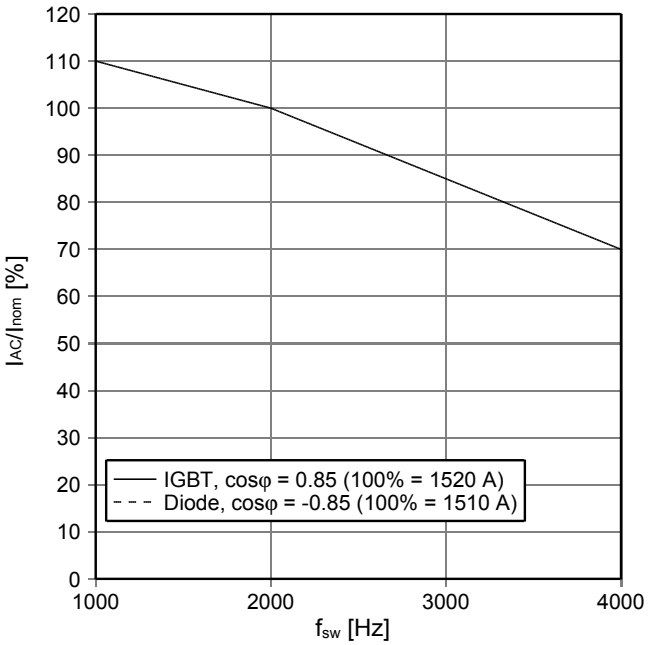
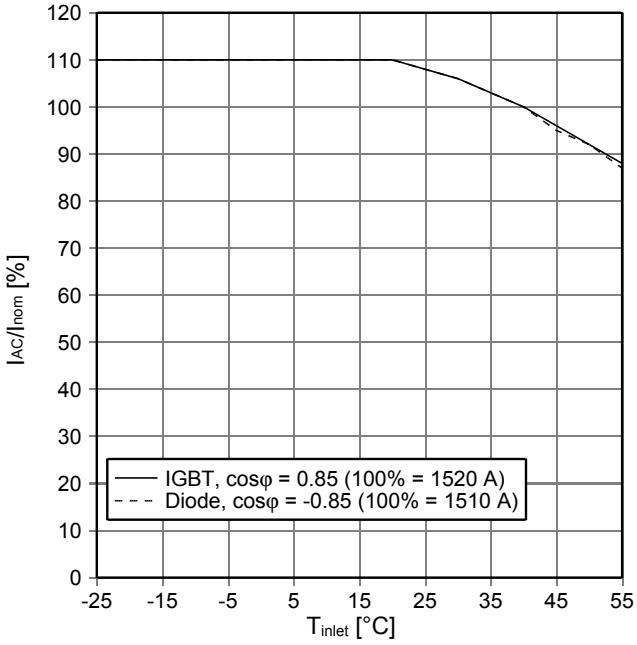
$f_{AC\ sine}$ - derating curve IGBT (motor), Diode (generator)
V_{DC} = 1100 V, V_{AC} = 690 V_{RMS}, f_{sw} = 2 kHz, cosφ = ±0.85,
T_{inlet} = 40 °C and nom. cooling conditions



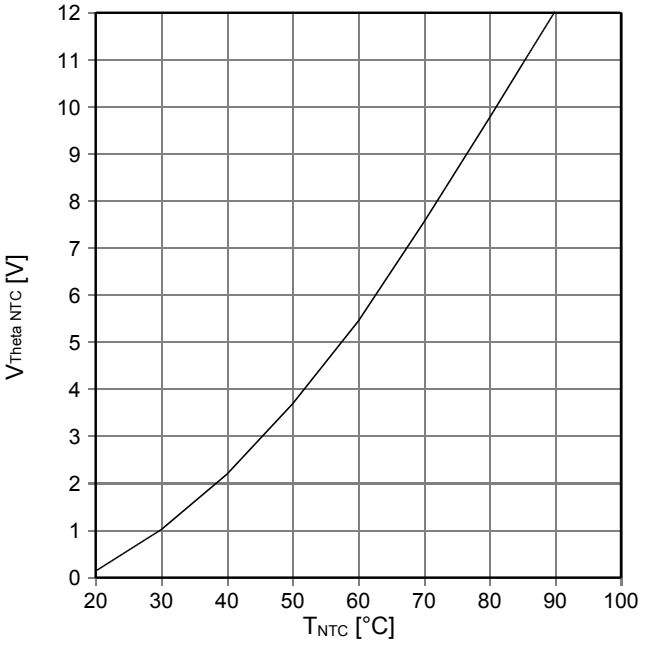
f_{sw} - derating curve IGBT (motor), Diode (generator)
V_{DC} = 1100 V, V_{AC} = 690 V_{RMS}, $f_{AC\ sine}$ = 50 Hz, cosφ = ±0.85,
T_{inlet} = 40 °C and nom. cooling conditions



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,
cosφ = ±0.85 and nom. cooling conditions



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



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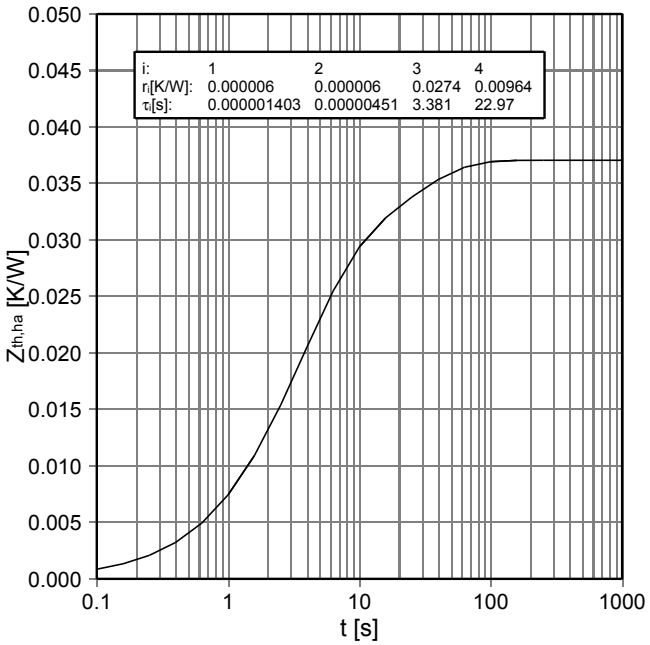
$Z_{th,ha}$ - thermal impedance heatsink to ambient per switch
nom. cooling conditions



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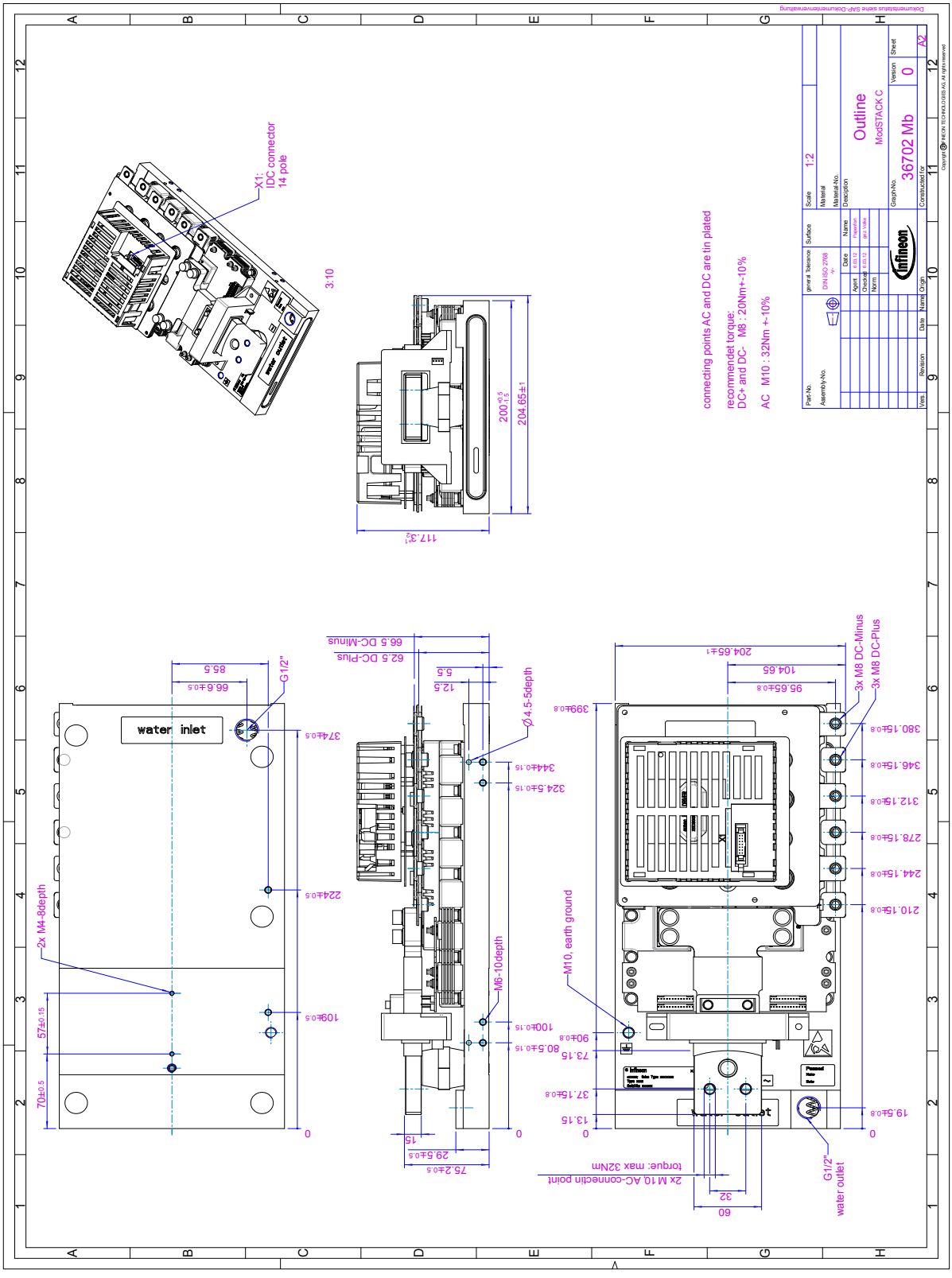
Mechanical drawing



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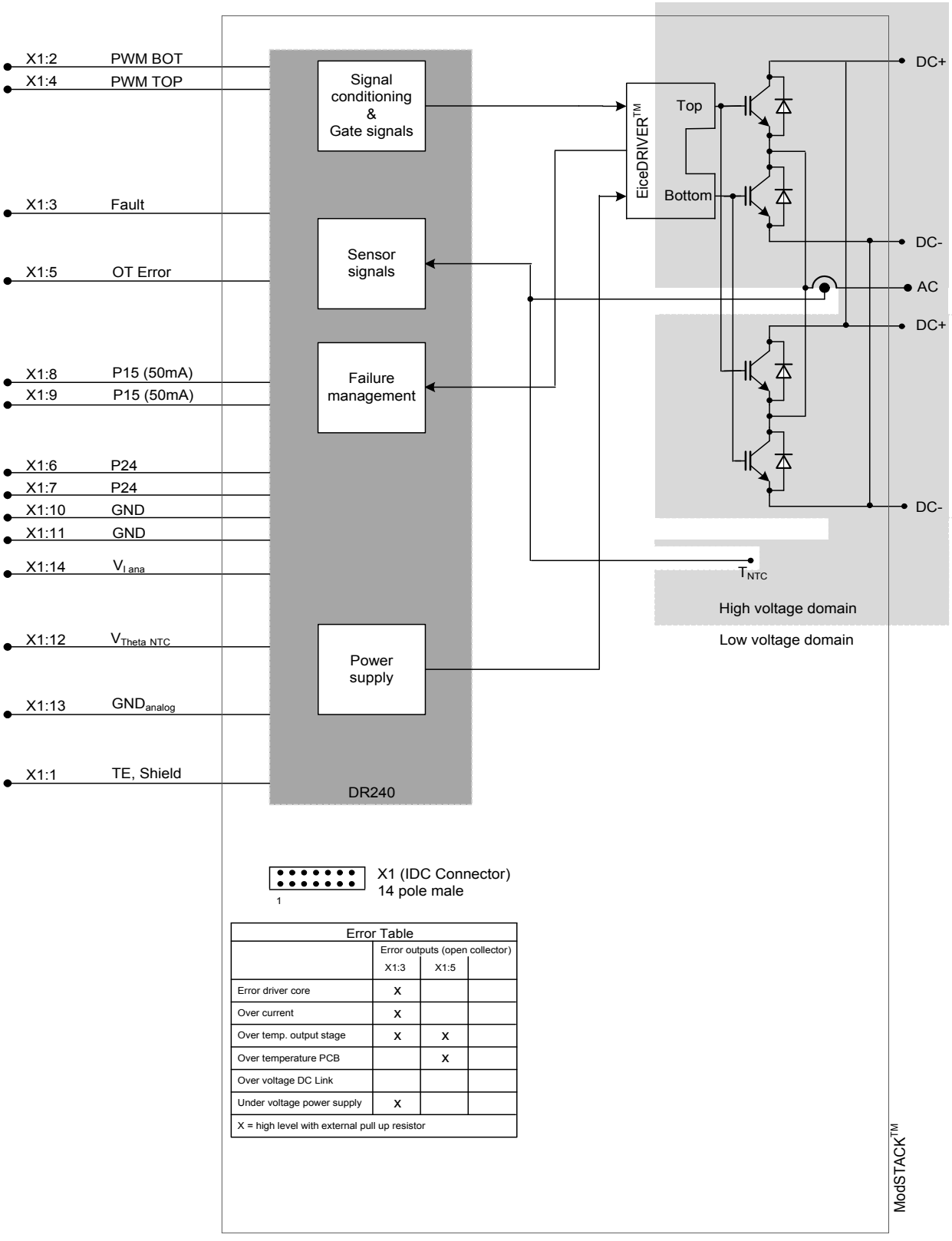
Circuit diagram



Error Table			
	Error outputs (open collector)		
	X1:3	X1:5	
Error driver core	X		
Over current	X		
Over temp. output stage	X	X	
Over temperature PCB		X	
Over voltage DC Link			
Under voltage power supply	X		
X = high level with external pull up resistor			

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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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