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Technical Information

ModSTACK™

2LS20017E42W36702

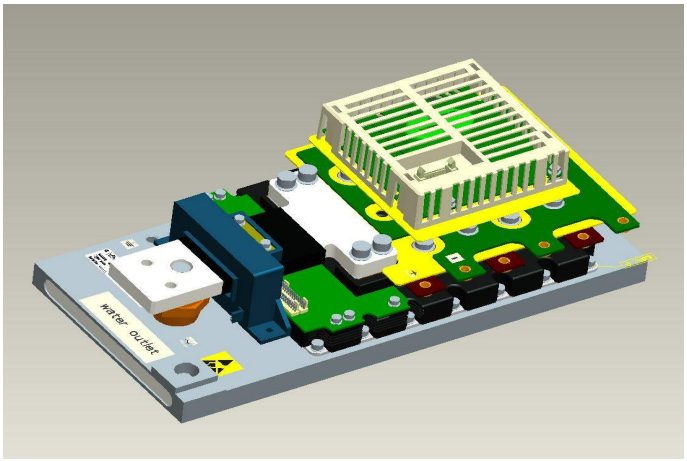
Preliminary data

General information

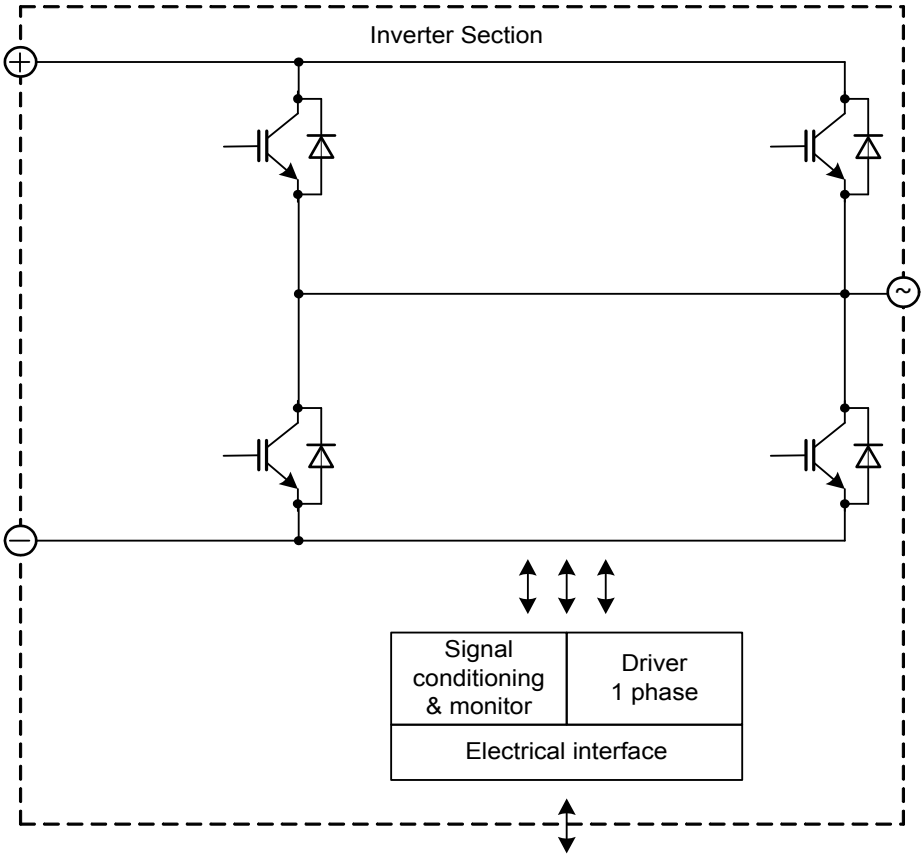
IGBT Stack for typical voltages of up to 690 V_{RMS}
Rated output current 1520 A_{RMS}

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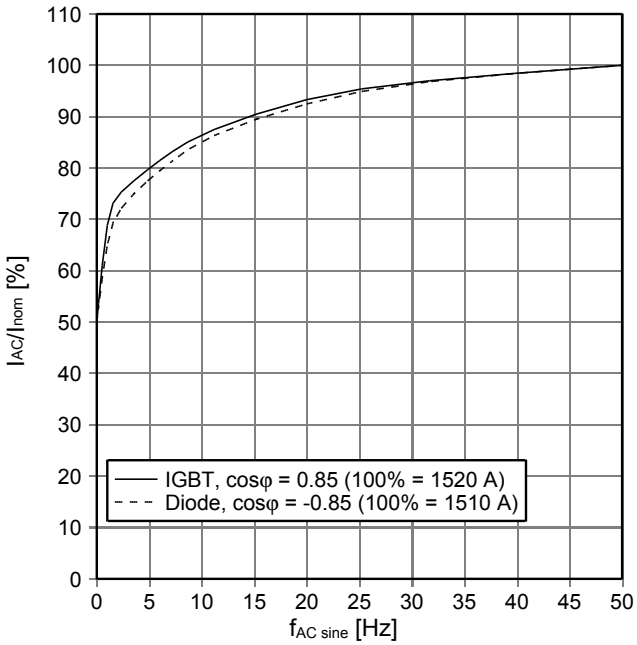
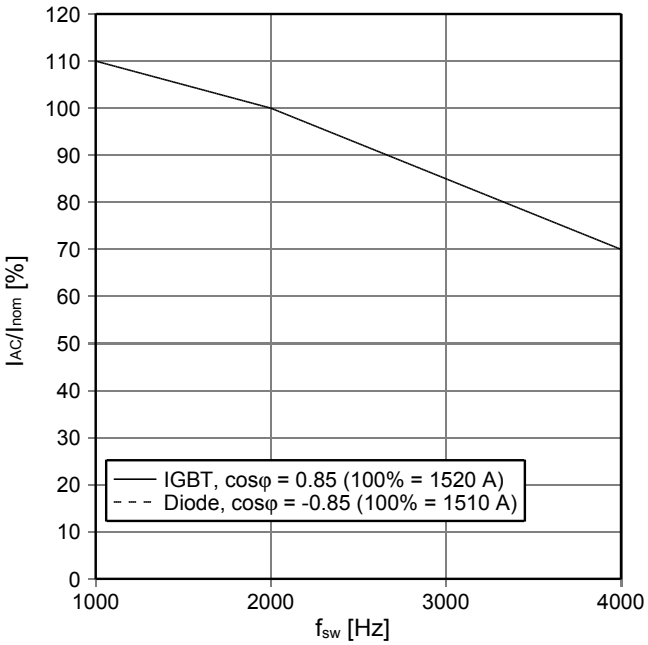
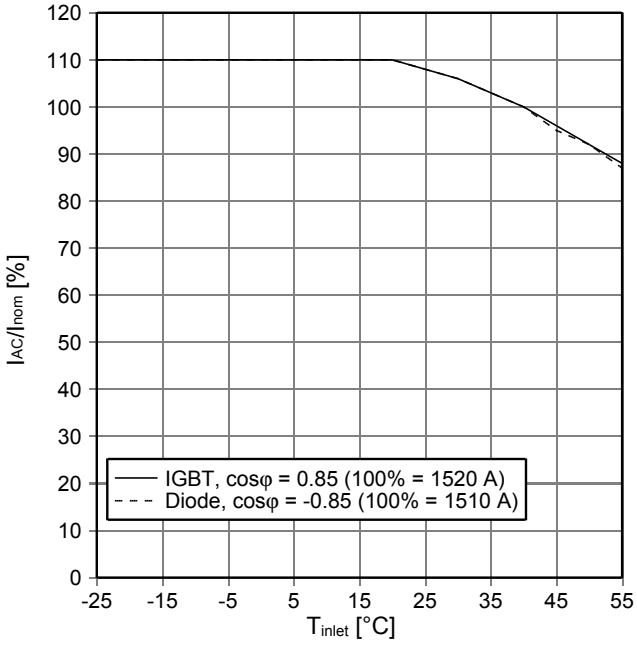
$f_{AC\ sine}$ - derating curve IGBT (motor), Diode (generator)
V_{DC} = 1100 V, V_{AC} = 690 V_{RMS}, f_{sw} = 2 kHz, cosφ = ±0.85,
T_{inlet} = 40 °C and nom. cooling conditions



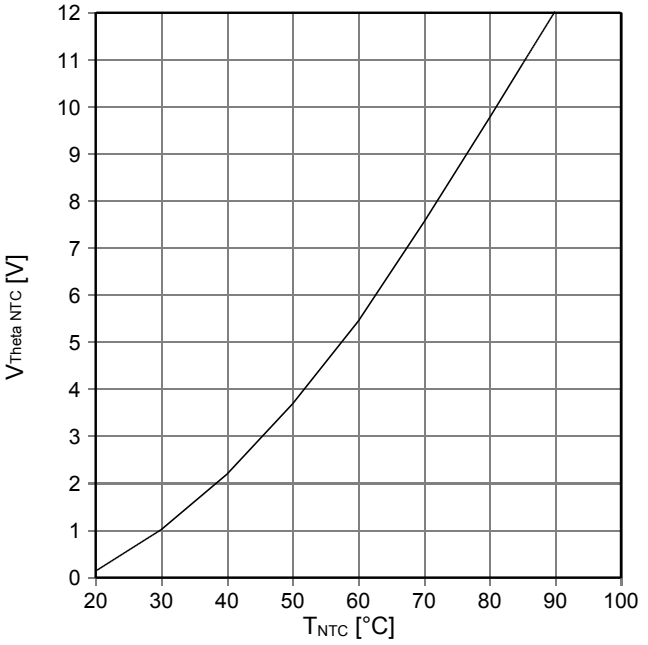
f_{sw} - derating curve IGBT (motor), Diode (generator)
V_{DC} = 1100 V, V_{AC} = 690 V_{RMS}, $f_{AC\ sine}$ = 50 Hz, cosφ = ±0.85,
T_{inlet} = 40 °C and nom. cooling conditions



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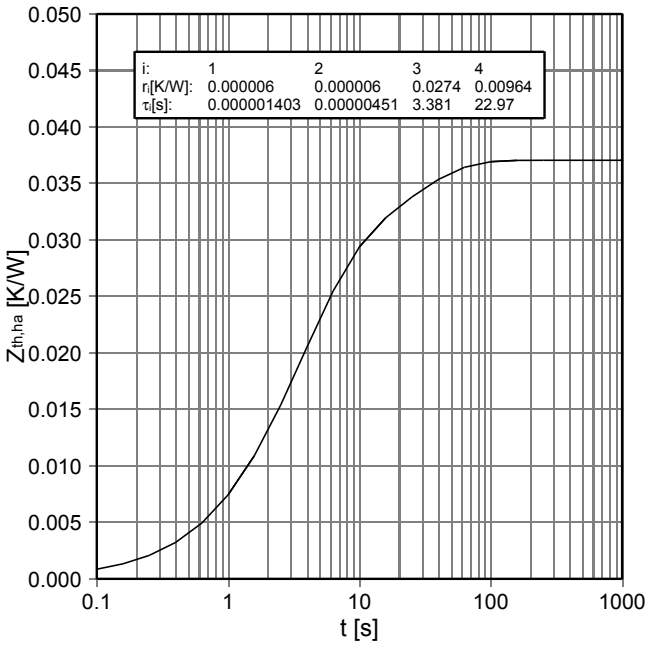
$Z_{th,ha}$ - thermal impedance heatsink to ambient per switch
nom. cooling conditions



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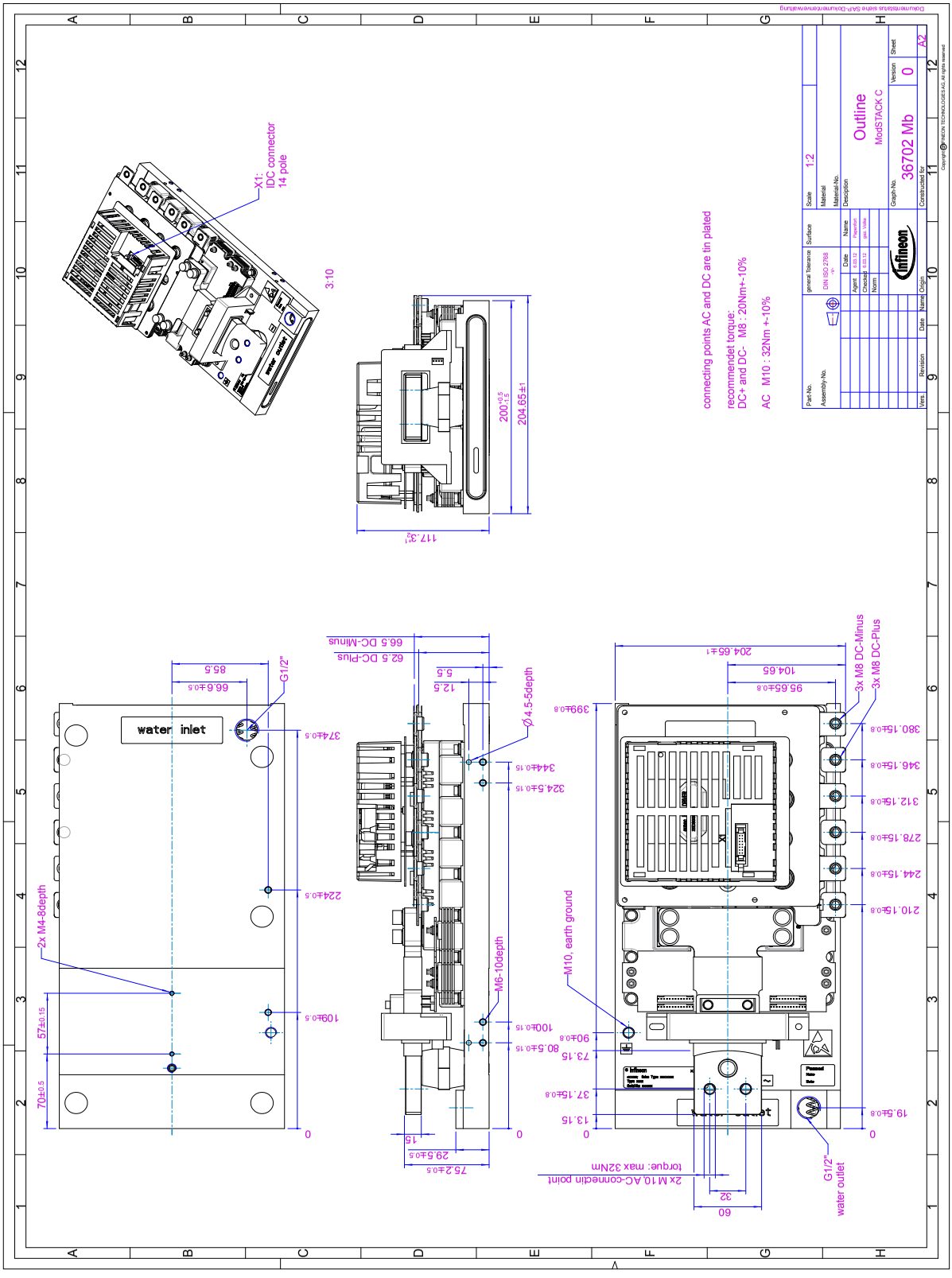
Mechanical drawing



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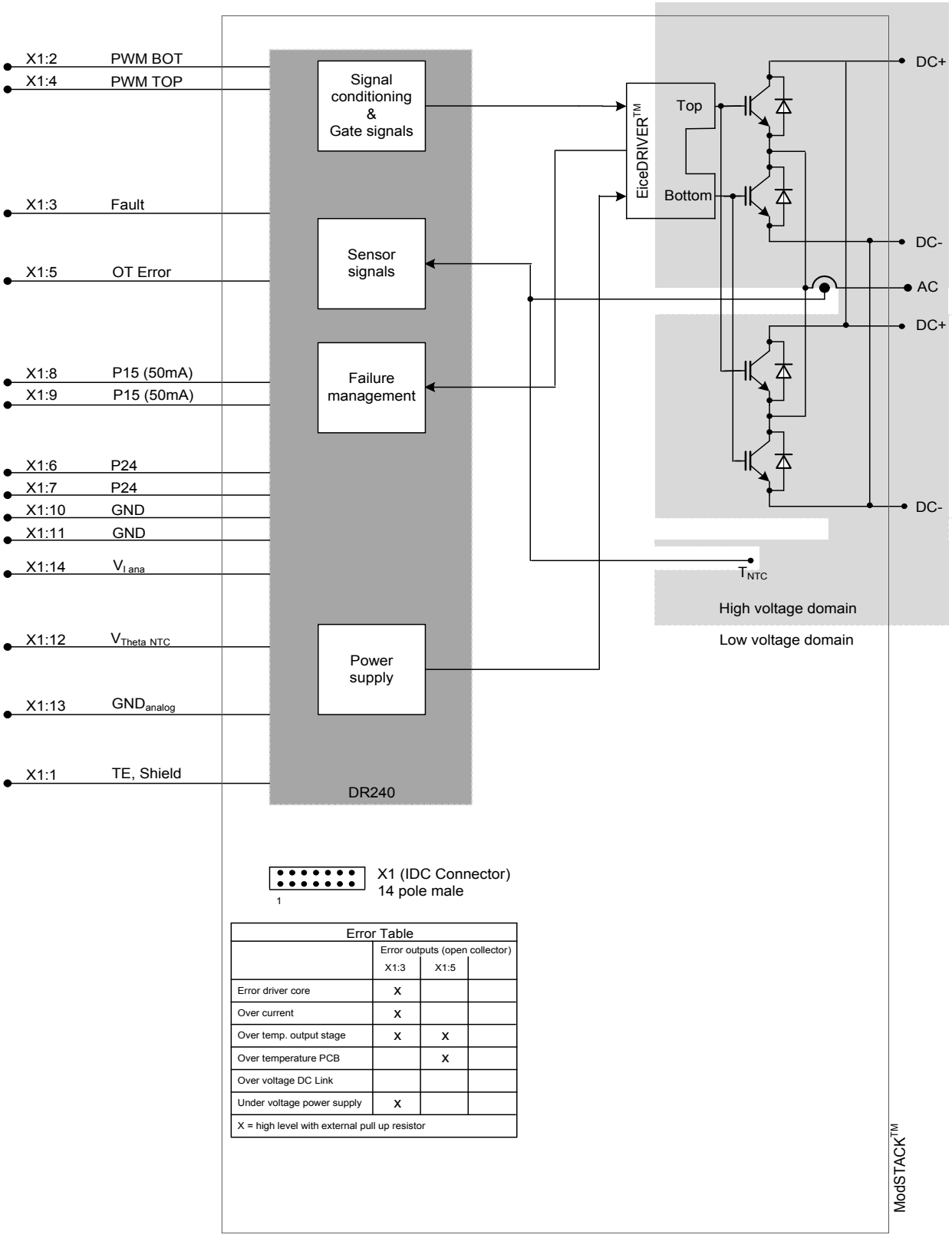
Circuit diagram



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			

Preliminary data

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