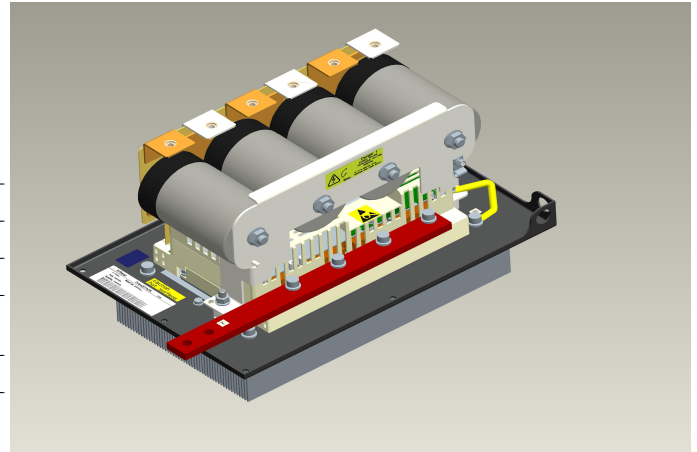


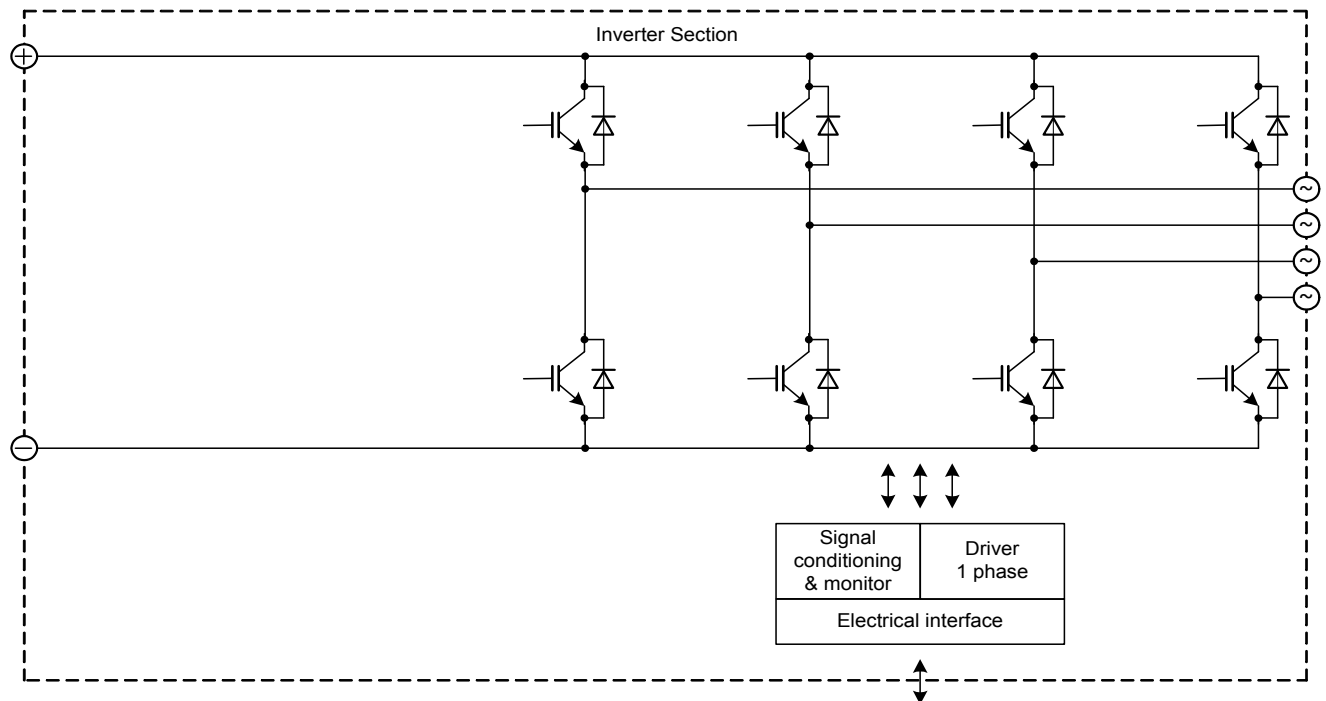
## General information

**IGBT Stack for typical voltages of up to 400 V<sub>RMS</sub>**  
**Rated output current 770 A<sub>RMS</sub>**

- Solar power
- Motor drives
- High power converter
- 62mm power module
- Trenchstop™ IGBT4



Topology	1/2 B2I
Application	Inverter
Load type	Resistive, inductive
Semiconductor (Inverter Section)	4x FF450R12KE4
DC Link	1.6 mF
Heatsink	Forced air cooled (fan not included)
Implemented sensors	Current, voltage, temperature
Driver signals IGBT	Electrical
Approvals	UL 508C
Sales - name	2PS18012E44G40113
SP - No.	SP001178324



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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		$V_{DC}$	1000	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)	$t_p = 1\text{ ms}$	$I_{CRM2}$	2560	A
Repetitive peak forward current inverter section (Diode)	$t_p = 1\text{ ms}$	$I_{FRM2}$	2440	A
Continuous current inverter section		$I_{AC2}$	820	$A_{RMS}$
Junction temperature	under switching conditions	$T_{vjop}$	150	$^{\circ}\text{C}$
Switching frequency inverter section	limited due to snubber caps	$f_{sw2}$	3	kHz

#### Notes

Further maximum ratings are specified in the following dedicated sections

### Characteristic values

#### DC Link

			min.	typ.	max.	
Rated voltage		$V_{DC}$		650	1000	V
Over voltage shutdown	within 600 $\mu\text{s}$			1050		V
Capacitor	1 s, 4 p, rated tol. 10 %	$C_{DC}$		1.6		mF
Maximum ripple current	per device, $T_{amb} = 55^{\circ}\text{C}$	$I_{ripple}$			49	$A_{RMS}$

#### Notes

Activ clamping diodes not implemented, max. DC link voltage for short circuit protection 500V  
Max. DC link voltage under switching conditions 1000V up to 300A ( $T_{junction} > 25^{\circ}\text{C}$ )

#### Inverter Section

			min.	typ.	max.	
Rated continuous current	$V_{DC} = 650\text{ V}$ , $V_{AC} = 400\text{ V}_{RMS}$ , $\cos(\varphi) = 0.85$ , $f_{AC\ sine} = 50\text{ Hz}$ , $f_{sw} = 3000\text{ Hz}$ , $T_{inlet} = 50^{\circ}\text{C}$ , $T_j \leq 125^{\circ}\text{C}$	$I_{AC}$		770		$A_{RMS}$
Rated continuous current for 150% overload capability	$I_{AC\ 150\%} = 820\text{ A}_{RMS}$ , $t_{on\ over} = 60\text{ s}$ , $T_j \leq 125^{\circ}\text{C}$	$I_{AC\ over1}$			550	$A_{RMS}$
Rated continuous current for 150% overload capability	$I_{AC\ 150\%} = 820\text{ A}_{RMS}$ , $t_{on\ over} = 3\text{ s}$ , $T_j \leq 125^{\circ}\text{C}$	$I_{AC\ over2}$			630	$A_{RMS}$
Over current shutdown	within 15 $\mu\text{s}$	$I_{AC\ OC}$		1280		$A_{peak}$
Power losses	$I_{AC} = 400\text{ A}$ , $V_{DC} = 650\text{ V}$ , $\cos(\varphi) = 0.85$ , $f_{AC\ sine} = 50\text{ Hz}$ , $f_{sw} = 3000\text{ Hz}$ , $T_{inlet} = 50^{\circ}\text{C}$ , $T_j \leq 125^{\circ}\text{C}$	$P_{loss}$		5600		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	$V_{aux} = 24\text{ V}$	$P_{aux}$			40	W
Digital input level	resistor to GND 10 k $\Omega$ , 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, @ 770 A <sub>RMS</sub>	$V_{IU\ ana2}$ $V_{IV\ ana2}$ $V_{IW\ ana2}$	6	6.1	6.2	V
Analog DC link voltage sensor output	load max 5 mA, @ 650 V	$V_{DC\ ana}$	5.4	5.5	5.6	V
Over temperature shutdown inverter section	load max 5 mA, @ T <sub>NTC</sub> = 86 °C	$V_{Error\ OT2}$	10.8	11	11.2	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		60	°C
Cooling air velocity	PCB, DC link capacitor, bus bar, standard atmosphere	$V_{air}$	2			m/s
Humidity	no condensation	Rel. F	0		85	%
Vibration	according to IEC 60721				5	m/s <sup>2</sup>
Shock	according to IEC 60721				50	m/s <sup>2</sup>
Protection degree			IP00			
Pollution degree			2			
Dimensions	width x depth x height		284	472	287	mm
Weight				19		kg

#### Notes

System data valid for continuous operation

### Heatsink air cooled

			min.	typ.	max.	
Air flow	$T_{air} = 20\text{ °C}$ , $P_{air} = 1013\text{ hPa}$ , dry and dust free, measured at the side of the heat sink according to DIN 41882	$\Delta V/\Delta t$	500			m <sup>3</sup> /h
Air pressure drop	at min. air flow	$\Delta p$		200		Pa
Air inlet temperature		$T_{inlet}$	-30		55	°C

#### Notes

Conditions are standard Infineon characterization for heatsinks.

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# Technical Information

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## 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	
Temperature simulation			
DC link capacitors		x	
Data cable for control signals			
Fan			
Collector-emitter Active Clamping			
Snubber capacitors		x	

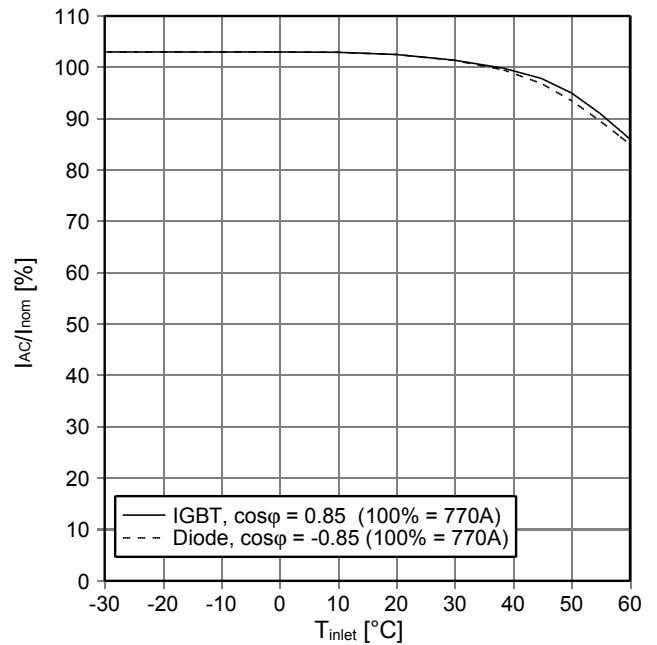
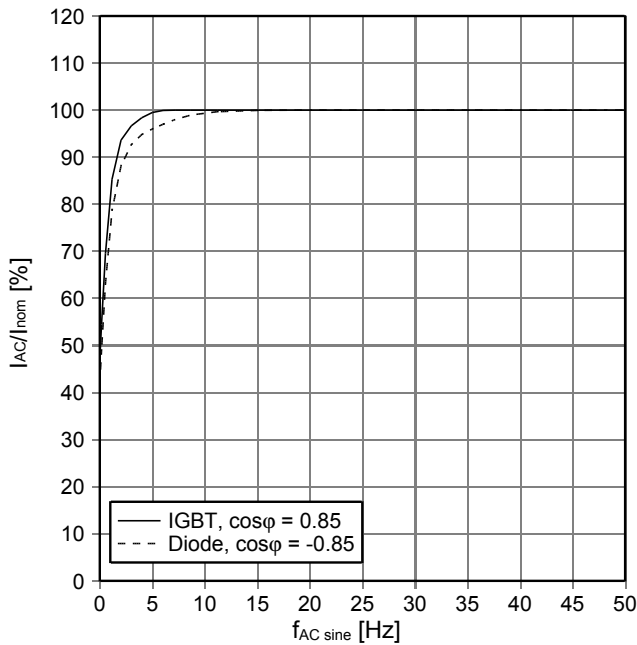
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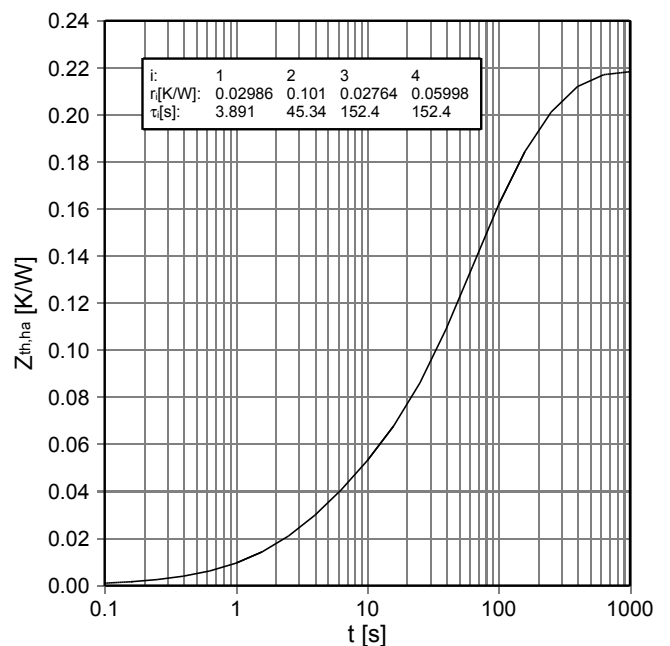
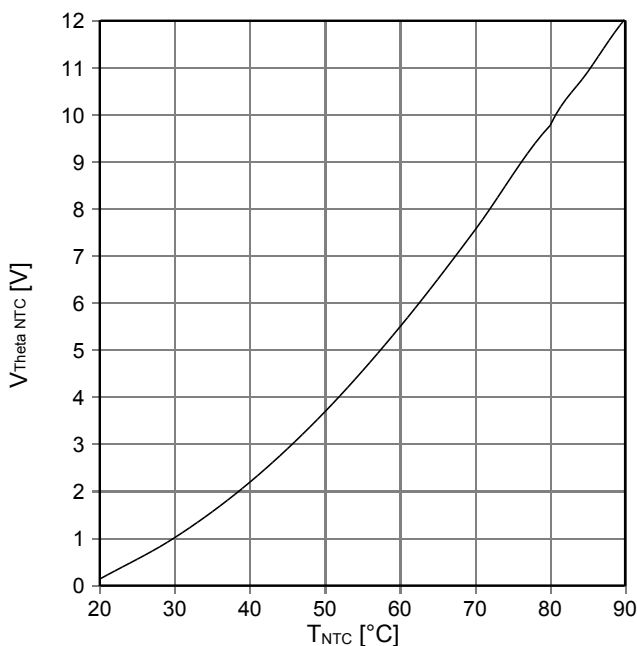
$f_{AC\ sine}$  - derating curve IGBT (motor), Diode (generator)  
 $V_{DC} = 650\ V$ ,  $V_{AC} = 400\ V_{RMS}$ ,  $f_{sw} = 3\ kHz$ ,  $\cos\phi = \pm 0.85$ ,  
 $T_{inlet} = 50\ ^\circ C$  and nom. cooling conditions

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



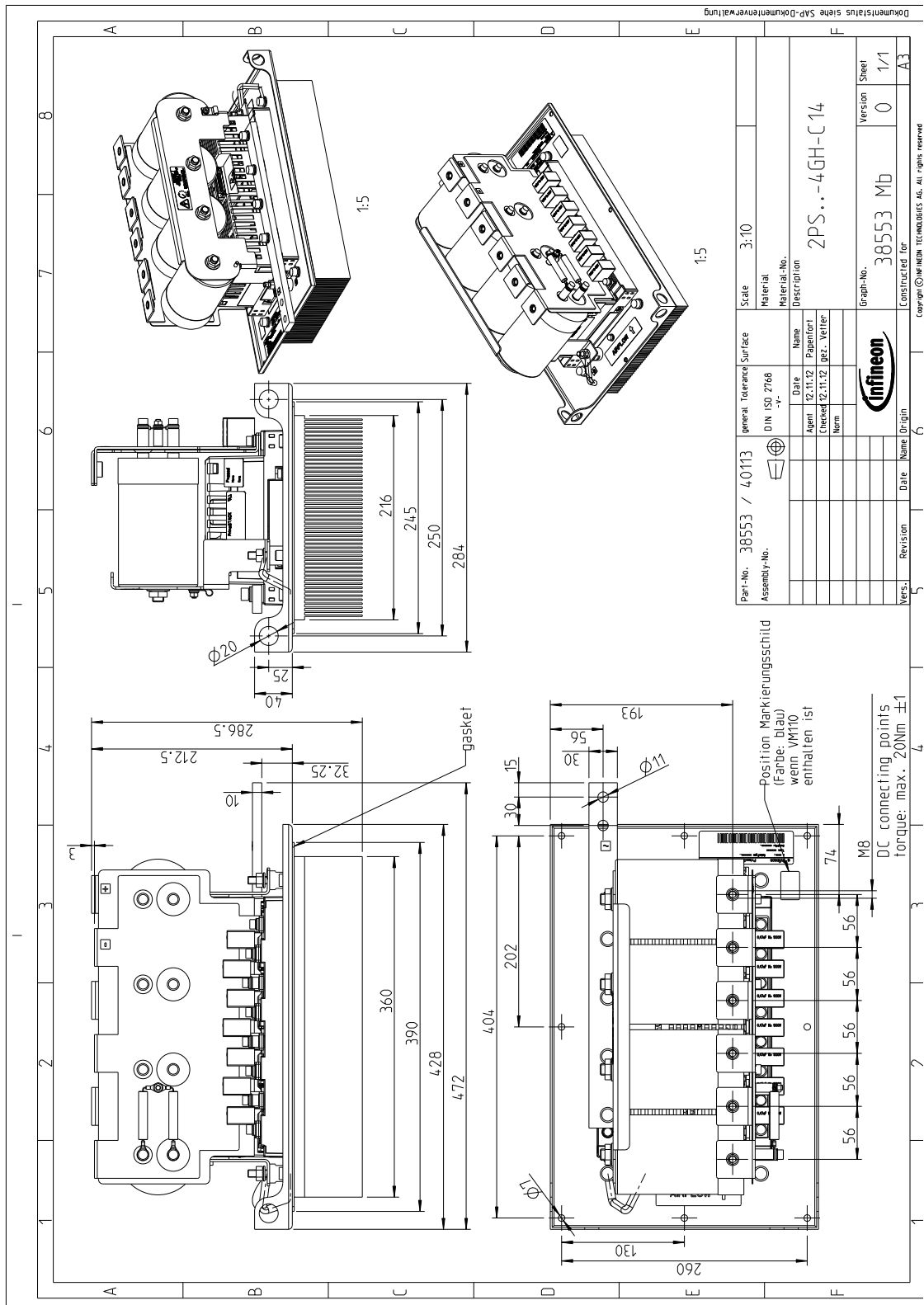
Analog temperature sensor output  $V_{Theta\ NTC}$   
 Sensing NTC of heatsink

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



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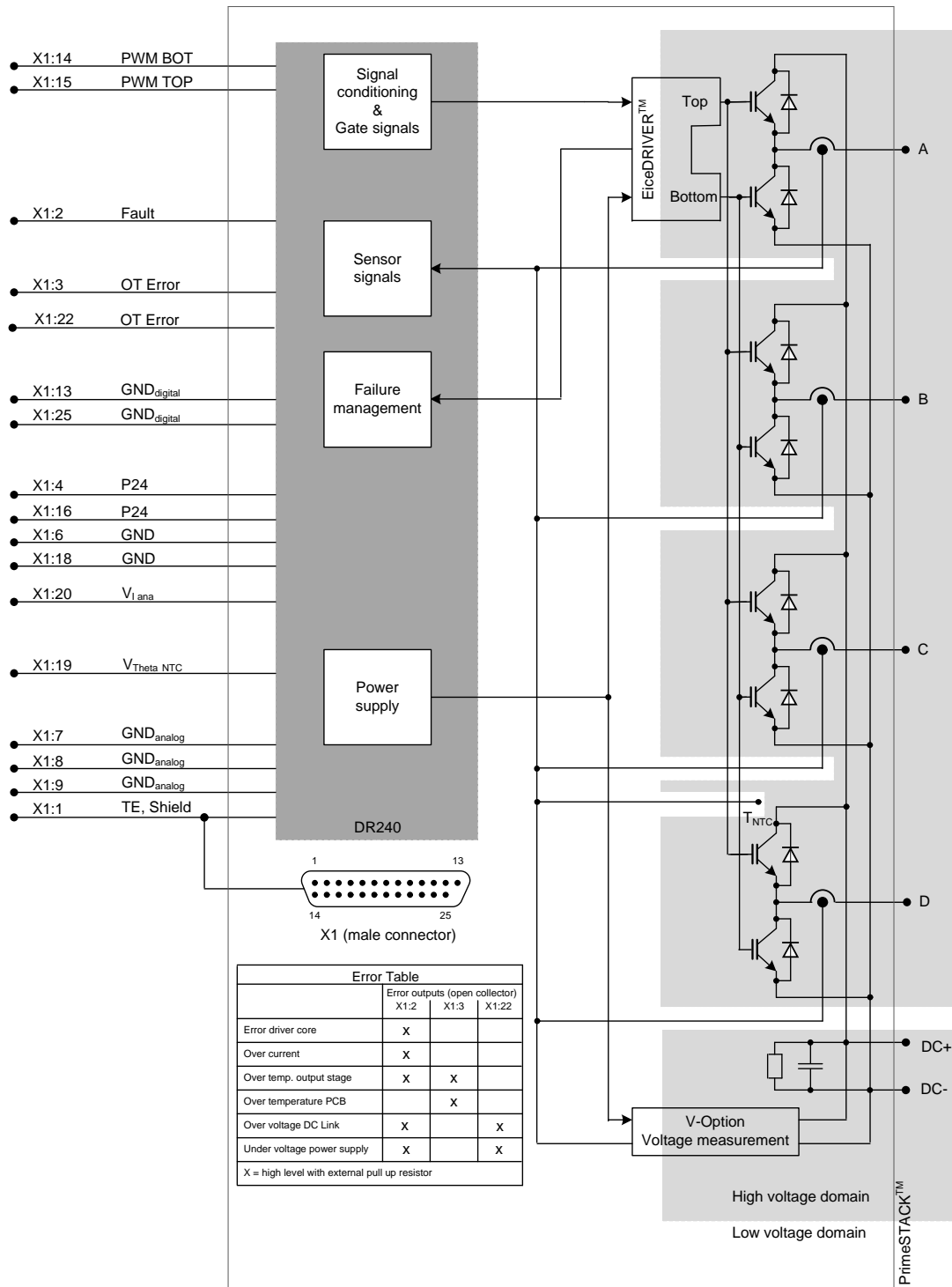
## Mechanical drawing



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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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# Technical Information

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# 2PS18012E44G40113



Preliminary data

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