

# Technical Information

PrimeSTACK™

**2PS18012E44G38553**



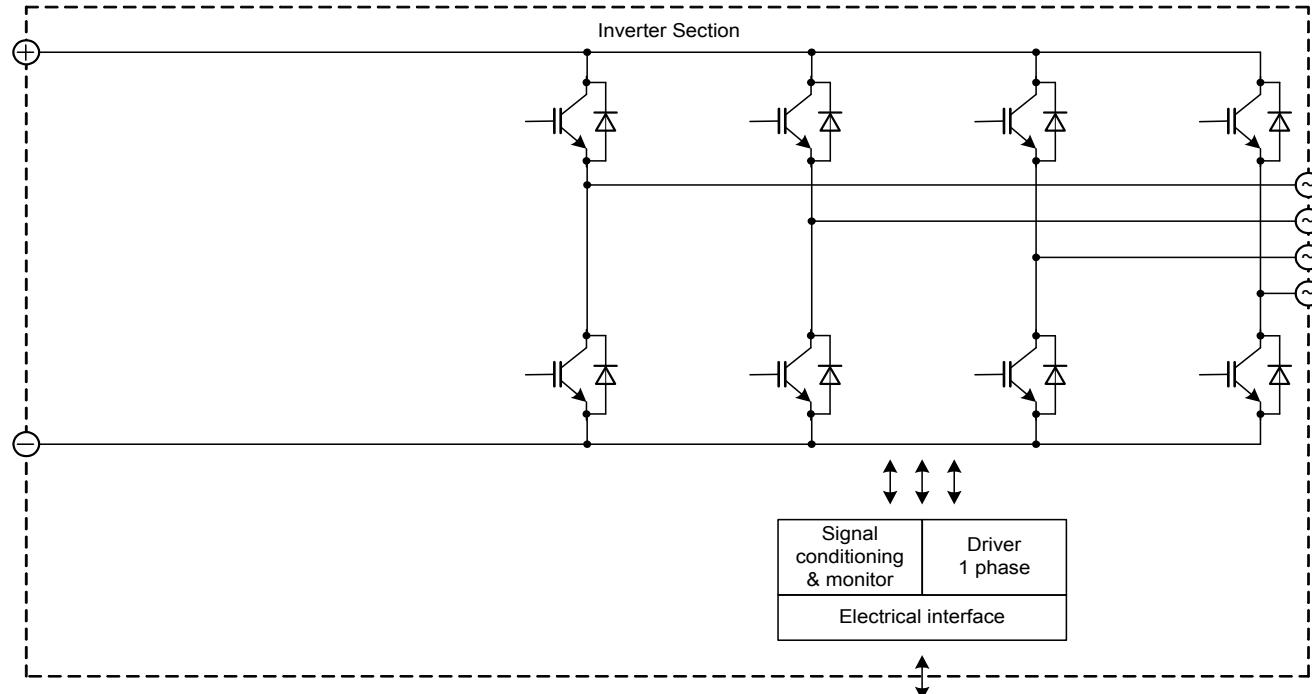
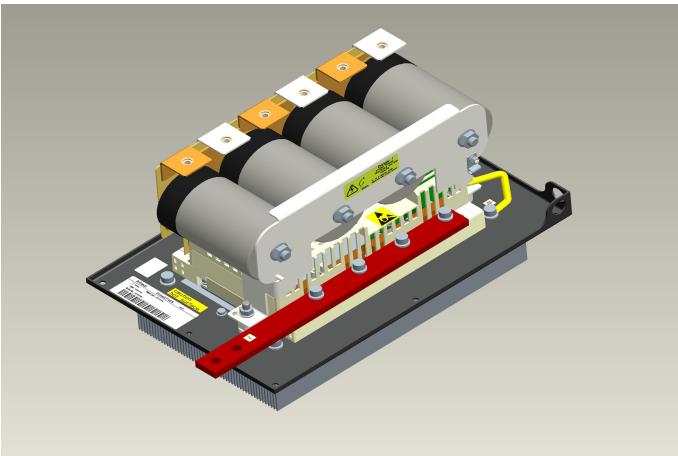
Preliminary data

## 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, temperature
Driver signals IGBT	Electrical
Approvals	UL 508C
Sales - name	2PS18012E4FG38553
SP - No.	SP001062698



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## 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	$\text{kV}_{RMS}$
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
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	$V_{DC} = 650 \text{ V}$ , $V_{AC} = 400 \text{ V}_{RMS}$ , $\cos(\phi) = 0.85$ , $f_{AC \text{ sine}} = 50 \text{ Hz}$ , $f_{sw} = 3000 \text{ Hz}$ , $T_{inlet} = 50^\circ\text{C}$ , $T_j \leq 125^\circ\text{C}$	$I_{AC}$		770		$A_{RMS}$
Rated continuous current for 150% overload capability	$I_{AC \text{ 150\%}} = 820 \text{ A}_{RMS}$ , $t_{on \text{ over}} = 60 \text{ s}$ , $T_j \leq 125^\circ\text{C}$	$I_{AC \text{ over1}}$			550	$A_{RMS}$
Rated continuous current for 150% overload capability	$I_{AC \text{ 150\%}} = 820 \text{ A}_{RMS}$ , $t_{on \text{ over}} = 3 \text{ s}$ , $T_j \leq 125^\circ\text{C}$	$I_{AC \text{ over2}}$			630	$A_{RMS}$
Over current shutdown	within 15 $\mu\text{s}$	$I_{AC \text{ OC}}$		1280		$A_{peak}$
Power losses	$I_{AC} = 400 \text{ A}$ , $V_{DC} = 650 \text{ V}$ , $\cos(\phi) = 0.85$ , $f_{AC \text{ sine}} = 50 \text{ Hz}$ , $f_{sw} = 3000 \text{ Hz}$ , $T_{inlet} = 50^\circ\text{C}$ , $T_j \leq 125^\circ\text{C}$	$P_{loss}$		5600		W

### Notes

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

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### Controller interface

Driver and interface board	ref. to separate Application Note	DR240				
		min.	typ.	max.		
Auxiliary voltage		V <sub>aux</sub>	18	24	30	V
Auxiliary power requirement	V <sub>aux</sub> = 24 V	P <sub>aux</sub>			40	W
Digital input level	resistor to GND 10 kΩ, capacitor to GND 1 nF	V <sub>in</sub> low	0		4	V
		V <sub>in</sub> high	11		15	V
Digital output level	open collector, logic low = no fault, max. 15 mA	V <sub>out</sub> low	0		1.5	V
		V <sub>out</sub> high		15		V
Analog current sensor output inverter section	load max 5 mA, @ 770 A <sub>RMS</sub>	V <sub>IU ana2</sub> V <sub>IV ana2</sub> V <sub>IW ana2</sub>	6	6.1	6.2	V
Over temperature shutdown inverter section	load max 5 mA, @ T <sub>NTC</sub> = 86 °C	V <sub>Error oT2</sub>	10.8	11	11.2	V

### System data

			min.	typ.	max.	
EMC robustness	according to IEC 61800-3 at named interfaces	power	V <sub>Burst</sub>	2	kV	
		control	V <sub>Burst</sub>	1	kV	
		aux (24V)	V <sub>surge</sub>	1	kV	
Storage temperature		T <sub>stor</sub>	-40	80	°C	
Operational ambient temperature	PCB, DC link capacitor, bus bar, excluding cooling medium	T <sub>op amb</sub>	-25	60	°C	
Cooling air velocity	PCB, DC link capacitor, bus bar, standard atmosphere	V <sub>air</sub>	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 <sub>air</sub> = 20 °C, P <sub>air</sub> = 1013 hPa, dry and dust free, measured at the side of the heat sink according to DIN 41882	ΔV/Δt	500		m <sup>3</sup> /h
Air pressure drop	at min. air flow	Δp		200	Pa
Air inlet temperature		T <sub>inlet</sub>	-30	55	°C

#### Notes

Conditions are standard Infineon characterization for heatsinks.

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### Overview of optional components

	Unit 1	Inverter Section	Unit 3
Parallel interface board			
Optical interface board			
Voltage sensor			
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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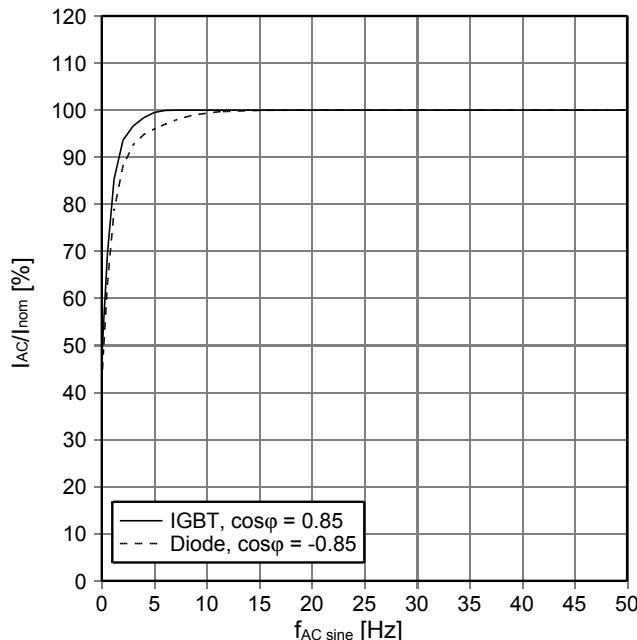
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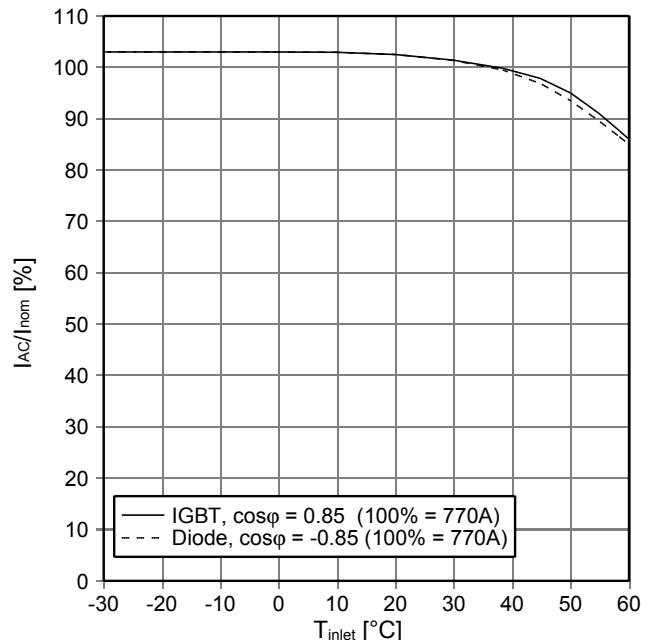
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$f_{AC\ sine}$  - derating curve IGBT (motor), Diode (generator)  
 $V_{DC} = 650\text{ V}$ ,  $V_{AC} = 400\text{ V}_{RMS}$ ,  $f_{sw} = 3\text{ kHz}$ ,  $\cos\phi = \pm 0.85$ ,  
 $T_{inlet} = 50\text{ }^{\circ}\text{C}$  and nom. cooling conditions

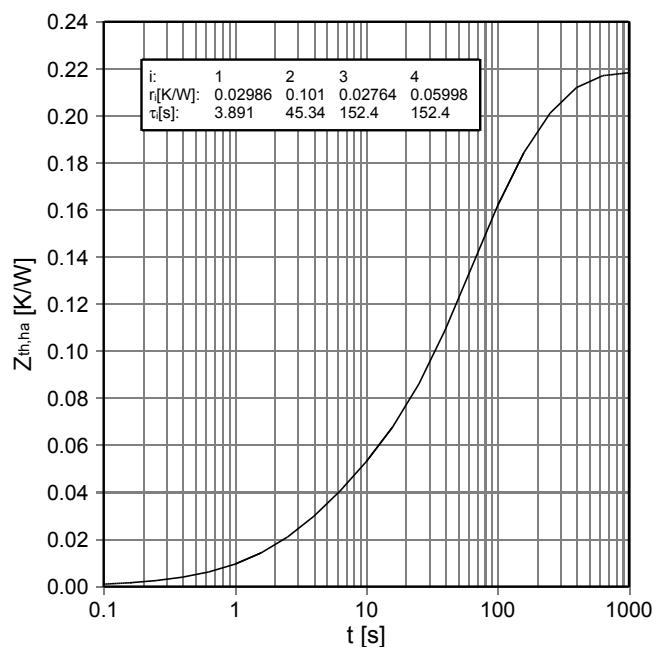
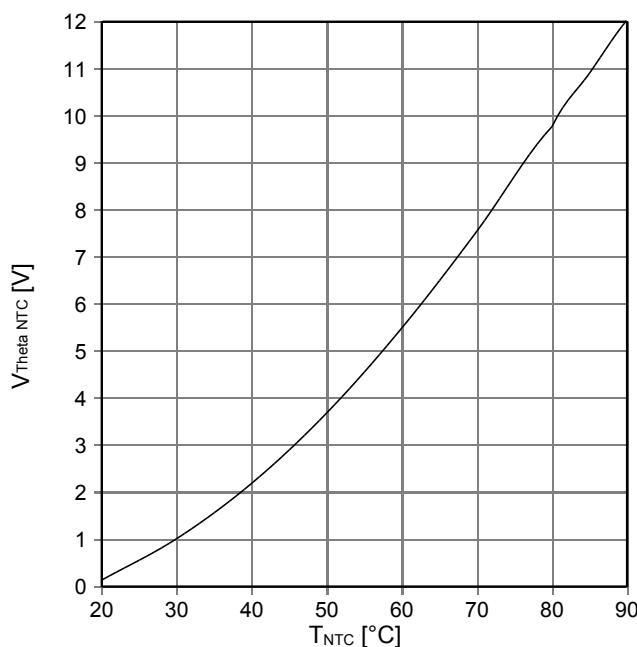
$T_{inlet}$  - derating curve IGBT (motor), Diode (generator)  
 $V_{DC} = 650\text{ V}$ ,  $V_{AC} = 400\text{ V}_{RMS}$ ,  $f_{AC\ sine} = 50\text{ Hz}$ ,  $\cos\phi = \pm 0.85$ ,  
 $T_{inlet} = 50\text{ }^{\circ}\text{C}$  and nom. cooling conditions



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



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



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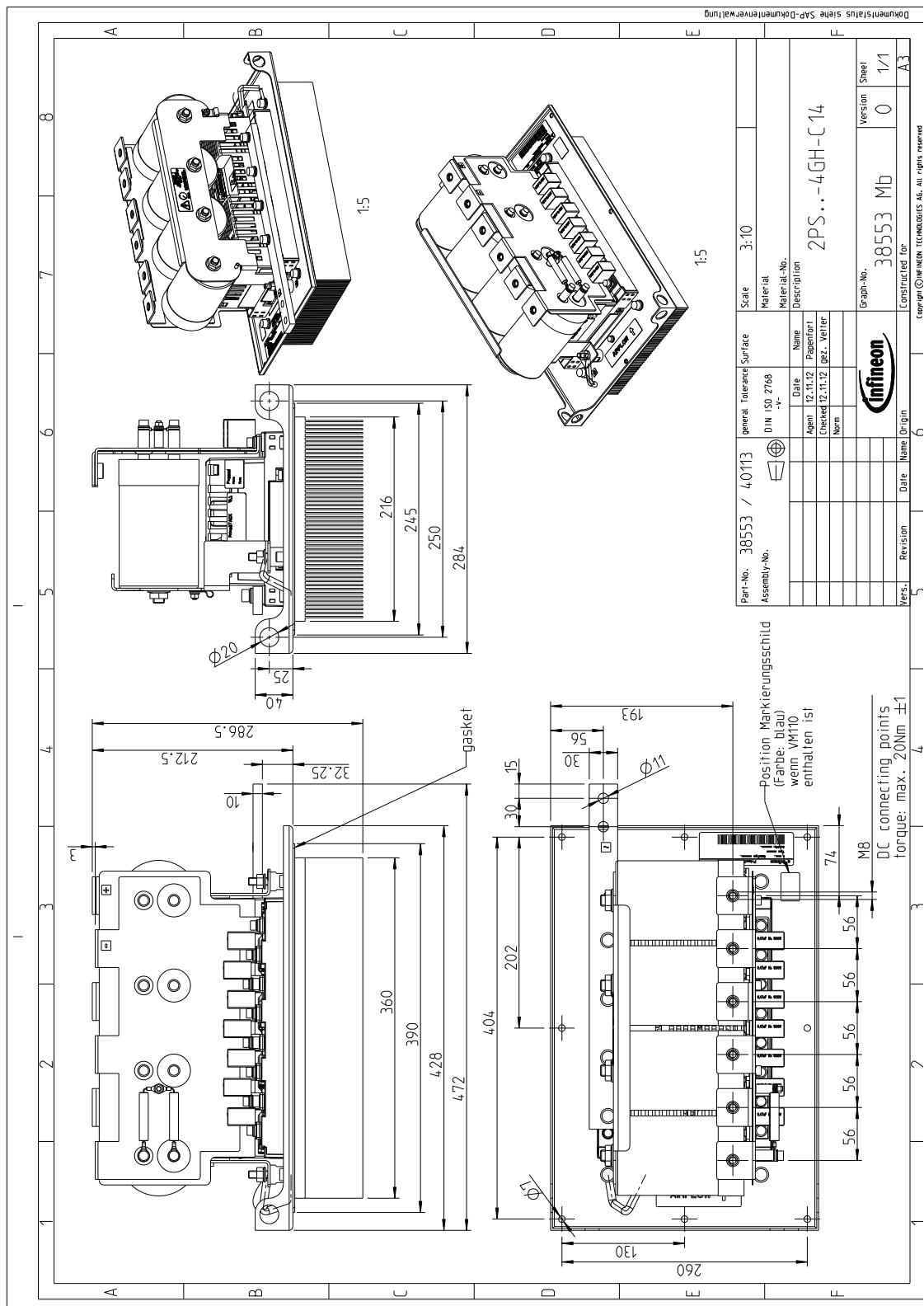
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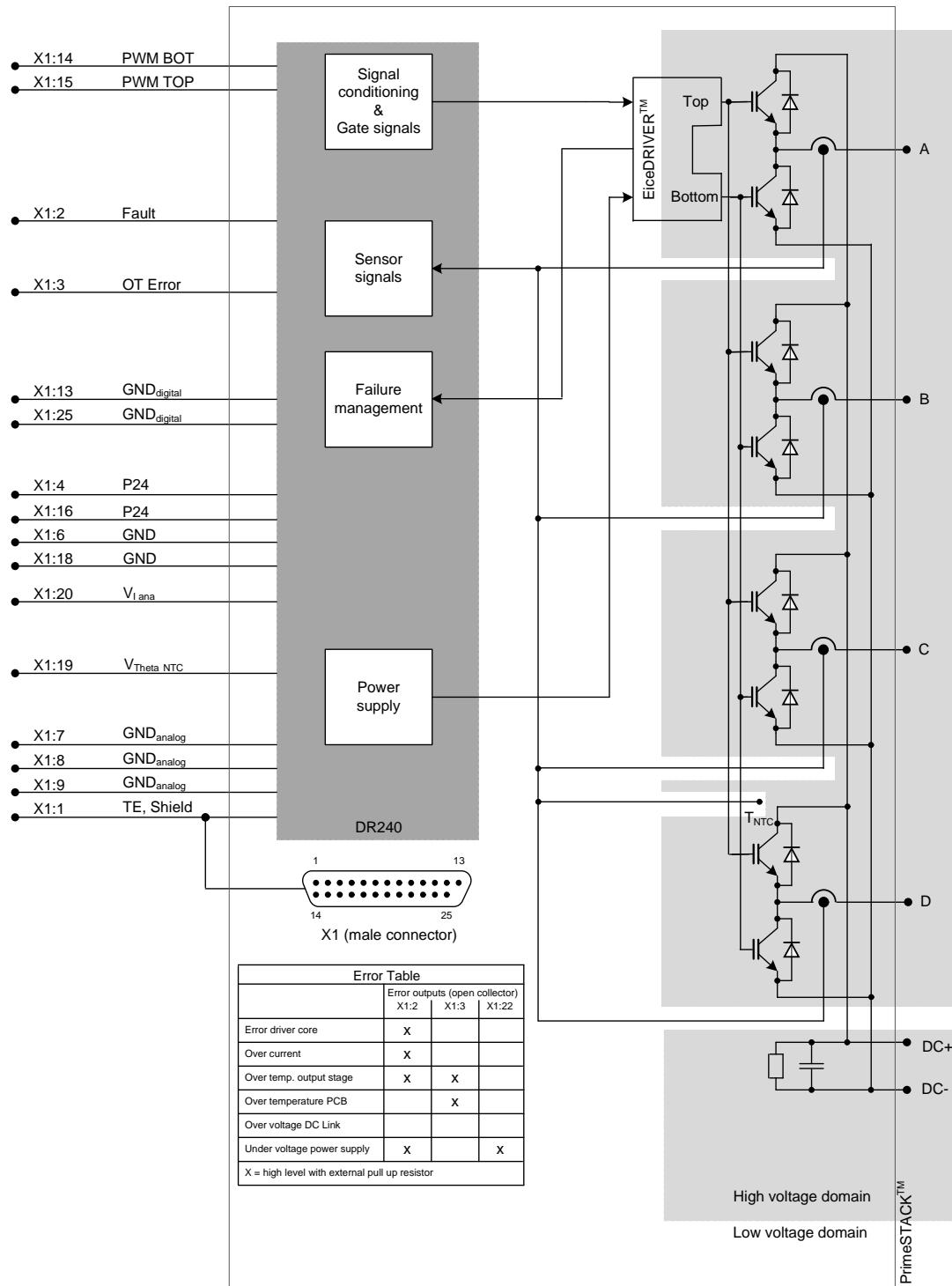
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## Mechanical drawing



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## Circuit diagram



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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

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and that we may make delivery depended on the realization  
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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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ООО "ЛайфЭлектроникс"

"LifeElectronics" LLC

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

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