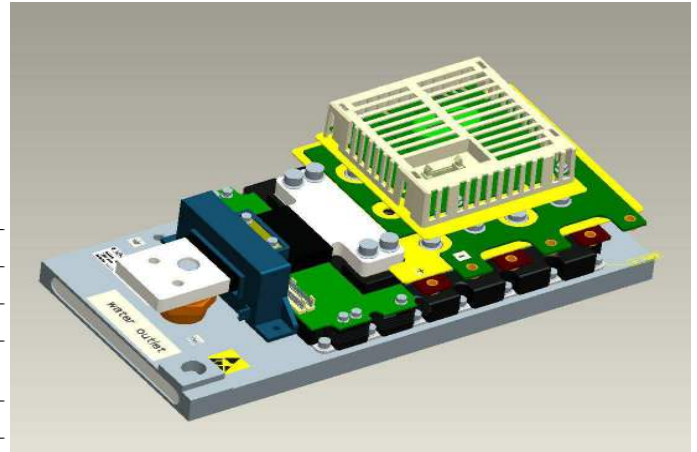


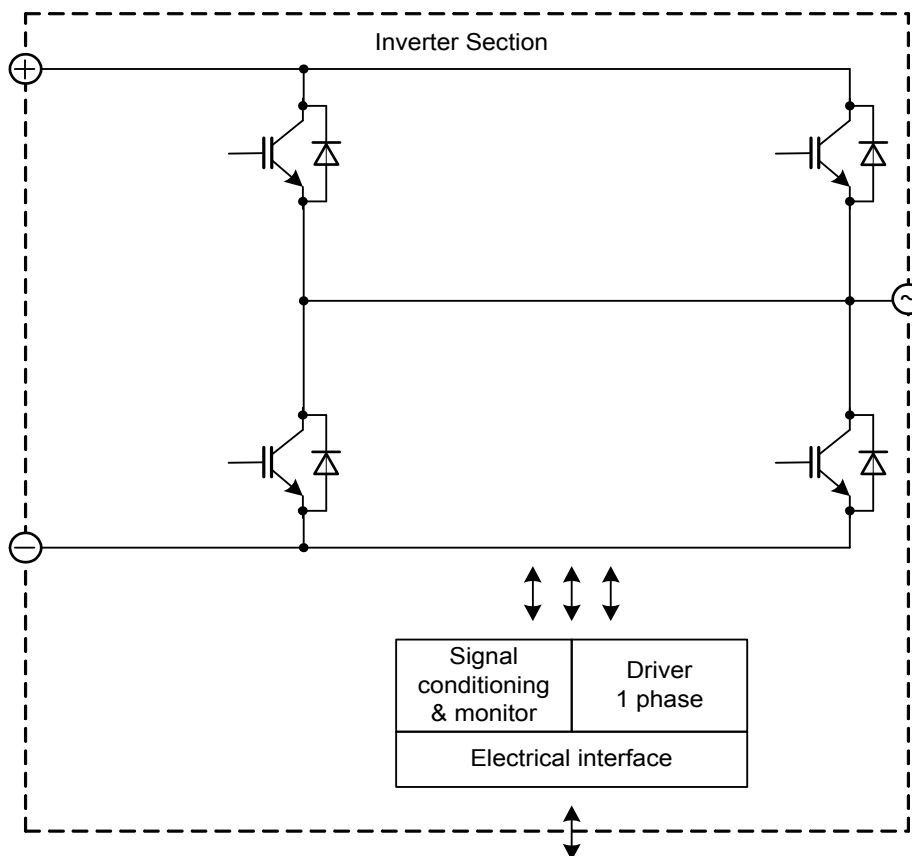
**General information**

**IGBT Stack for typical voltages of up to 690 V<sub>RMS</sub>**  
**Rated output current 1520 A<sub>RMS</sub>**

- High power converter
- Wind power
- Motor drives
  
- PrimePACK™3 module
- Extended operational temperature
- Low V<sub>cesat</sub>



Topology	1/2B2I
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



prepared by: OW	date of publication: 2013-10-08
approved by: AR	revision: 2.2

## Preliminary data

### Absolute maximum rated values

Collector-emitter voltage	IGBT; $T_{vj} = 25^{\circ}\text{C}$	$V_{CES}$	1700	V
Repetitive peak reverse voltage	Diode; $T_{vj} = 25^{\circ}\text{C}$	$V_{RRM}$	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	$\text{kV}_{RMS}$
Repetitive peak collector current inverter section (IGBT)	$t_p = 1 \text{ ms}$	$I_{CRM2}$	2500	A
Repetitive peak forward current inverter section (Diode)	$t_p = 1 \text{ ms}$	$I_{FRM2}$	2500	A
Continuous current inverter section		$I_{AC2}$	1660	$A_{RMS}$
Junction temperature	under switching conditions	$T_{vjop}$	150	$^{\circ}\text{C}$
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	$V_{DC} = 1100 \text{ V}$ , $V_{AC} = 690 \text{ V}_{RMS}$ , $\cos(\varphi) = 0.85$ , $f_{AC \text{ sine}} = 50 \text{ Hz}$ , $f_{sw} = 2000 \text{ Hz}$ , $T_{inlet} = 40^{\circ}\text{C}$ , $T_j \leq 150^{\circ}\text{C}$	$I_{AC}$			1520	$A_{RMS}$
Continuous current at low frequency	$V_{DC} = 1100 \text{ V}$ , $V_{AC} = 690 \text{ V}_{RMS}$ , $f_{AC \text{ sine}} = 0 \text{ Hz}$ , $f_{sw} = 2000 \text{ Hz}$ , $T_{inlet} = 40^{\circ}\text{C}$ , $T_j \leq 150^{\circ}\text{C}$	$I_{AC \text{ low}}$			770	$A_{RMS}$
Rated continuous current for 150% overload capability	$I_{AC \text{ 150\%}} = 1660 \text{ A}_{RMS}$ , $t_{on \text{ over}} = 3 \text{ s}$ , $T_j \leq 150^{\circ}\text{C}$	$I_{AC \text{ over1}}$			1110	$A_{RMS}$
Over current shutdown	within 15 $\mu\text{s}$	$I_{AC \text{ OC}}$		4200		$A_{\text{peak}}$
Power losses	$I_{AC} = 1520 \text{ A}$ , $V_{DC} = 1100 \text{ V}$ , $V_{AC} = 690 \text{ V}_{RMS}$ , $\cos(\varphi) = 0.85$ , $f_{AC \text{ sine}} = 50 \text{ Hz}$ , $f_{sw} = 2000 \text{ Hz}$ , $T_{inlet} = 40^{\circ}\text{C}$ , $T_j \leq 150^{\circ}\text{C}$	$P_{\text{loss}}$		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	$V_{aux} = 24 \text{ V}$	$P_{aux}$			40	W
Digital input level	resistor to GND 1.8 k $\Omega$ , capacitor to GND 4 nF, logic high = on, min. 15 mA	$V_{in \text{ low}}$	0		4	V
		$V_{in \text{ high}}$	11		15	V
Digital output level	open collector, logic low = no fault, max. 15 mA	$V_{out \text{ low}}$	0		1.5	V
		$V_{out \text{ high}}$		15		V
Analog current sensor output inverter section	load max 1 mA, @ 1520 $A_{RMS}$	$V_{IU \text{ ana2}}$ $V_{IV \text{ ana2}}$ $V_{IW \text{ ana2}}$	3.3	3.4	3.5	V
Analog temperature sensor output inverter section (NTC)	load max 1 mA, @ $T_{NTC} = 66^{\circ}\text{C}$ , corresponds to $T_j = 150^{\circ}\text{C}$ at rated conditions	$V_{\text{Theta NTC2}}$	6.4	6.5	6.6	V
Over temperature shutdown inverter section	load max 1 mA, @ $T_{NTC} = 75^{\circ}\text{C}$	$V_{\text{Error OT2}}$		8.6		V

prepared by: OW	date of publication: 2013-10-08
approved by: AR	revision: 2.2

# Technical Information

ModSTACK™

# 2LS20017E42W36702



## 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/s <sup>2</sup>	
Shock					40	m/s <sup>2</sup>	
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				dm <sup>3</sup> /min
Water pressure					8		bar
Water pressure drop		$\Delta p$		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		x	
Temperature sensor		x	
Temperature simulation			
DC link capacitors			
Data cable for control signals			
Collector for water cooled heatsink			
Collector-emitter Active Clamping		x	

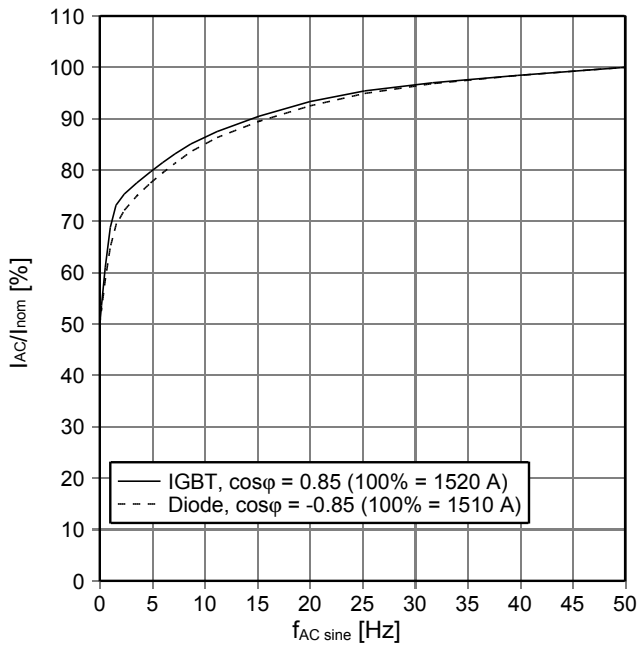
#### Notes

Setting of Active Clamping TVS-Diodes:  $V_z = 1280\text{ V}$

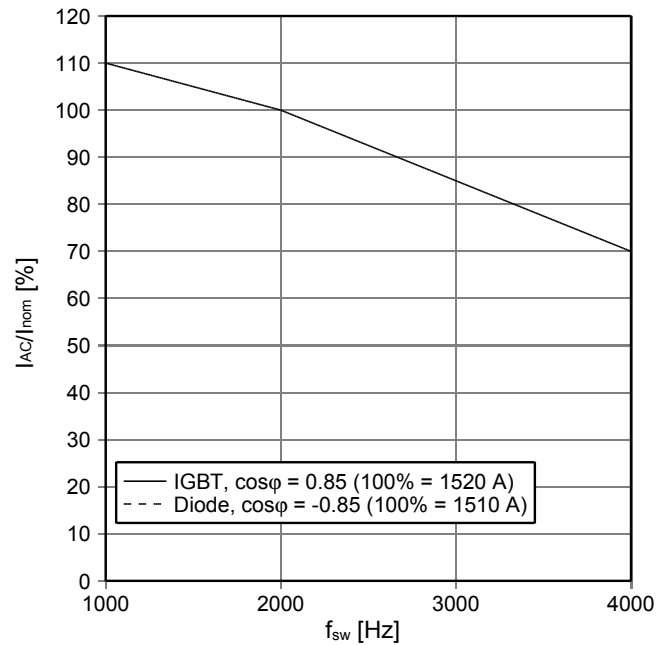
prepared by: OW	date of publication: 2013-10-08
approved by: AR	revision: 2.2

## Preliminary data

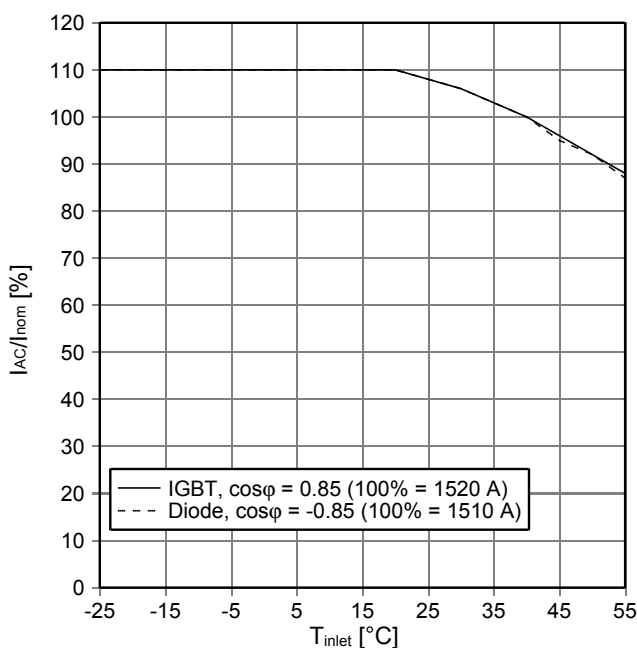
$f_{AC\ sine}$  - derating curve IGBT (motor), Diode (generator)  
 $V_{DC} = 1100\text{ V}$ ,  $V_{AC} = 690\text{ V}_{RMS}$ ,  $f_{sw} = 2\text{ kHz}$ ,  $\cos\phi = \pm 0.85$ ,  
 $T_{inlet} = 40\text{ °C}$  and nom. cooling conditions



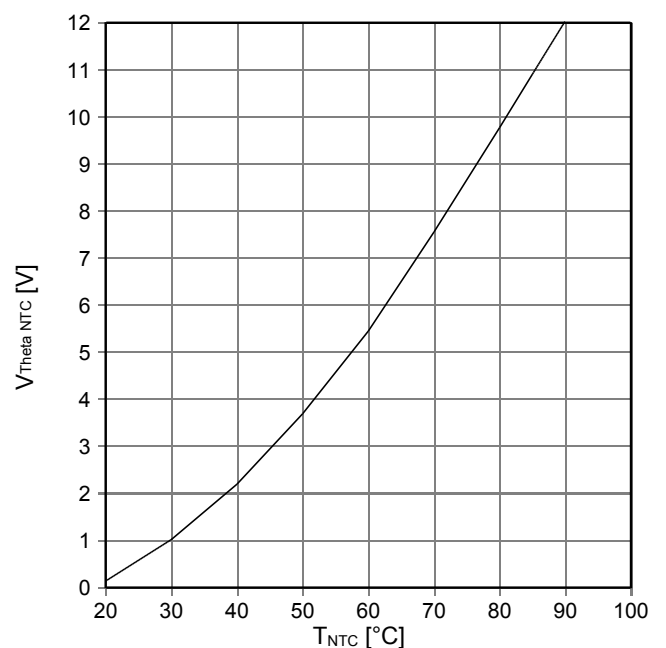
$f_{sw}$  - derating curve IGBT (motor), Diode (generator)  
 $V_{DC} = 1100\text{ V}$ ,  $V_{AC} = 690\text{ V}_{RMS}$ ,  $f_{AC\ sine} = 50\text{ Hz}$ ,  $\cos\phi = \pm 0.85$ ,  
 $T_{inlet} = 40\text{ °C}$  and nom. cooling conditions



$T_{inlet}$  - derating curve IGBT (motor), Diode (generator)  
 $V_{DC} = 1100\text{ V}$ ,  $V_{AC} = 690\text{ V}_{RMS}$ ,  $f_{sw} = 2\text{ kHz}$ ,  $f_{AC\ sine} = 50\text{ Hz}$ ,  
 $\cos\phi = \pm 0.85$  and nom. cooling conditions



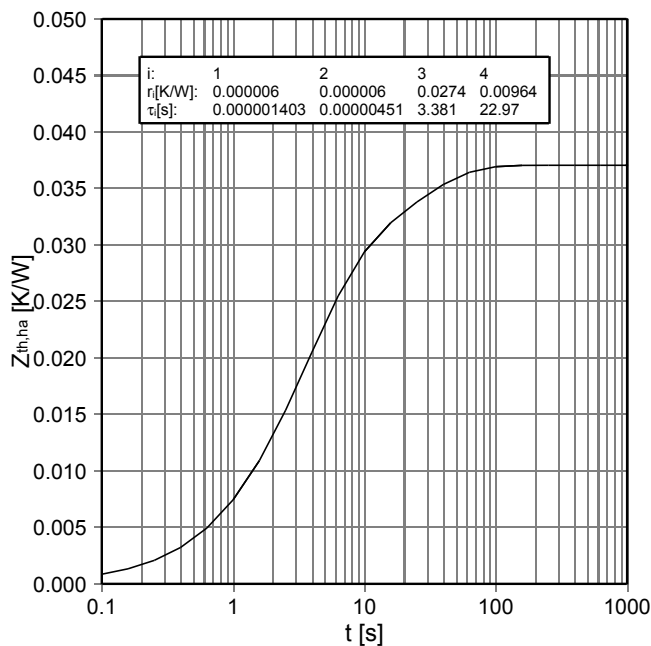
Analog temperature sensor output  $V_{Theta\ NTC}$   
 Sensing NTC of IGBT module



prepared by: OW	date of publication: 2013-10-08
approved by: AR	revision: 2.2

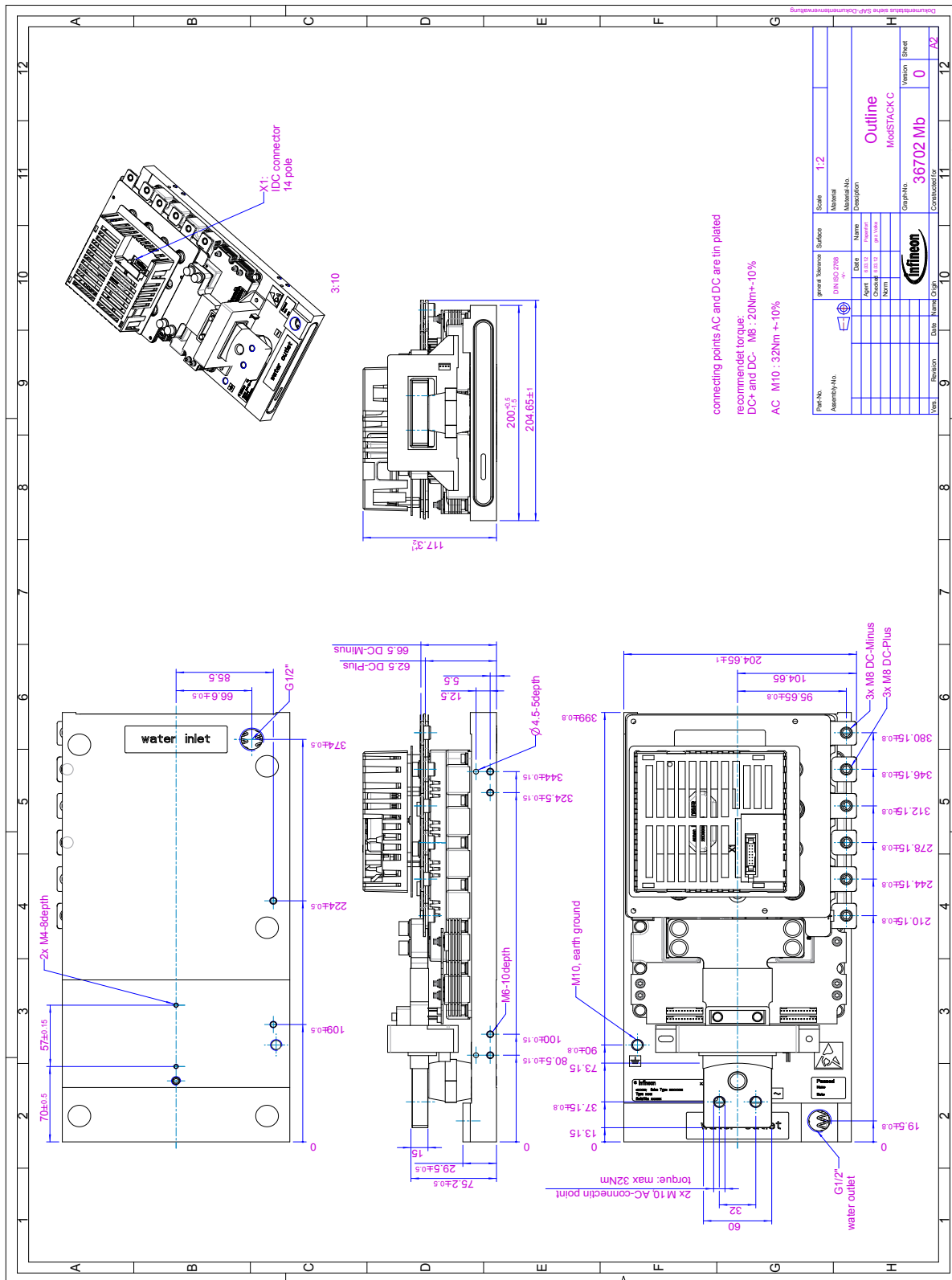


$Z_{th,ha}$  - thermal impedance heatsink to ambient per switch  
nom. cooling conditions



prepared by: OW	date of publication: 2013-10-08
approved by: AR	revision: 2.2

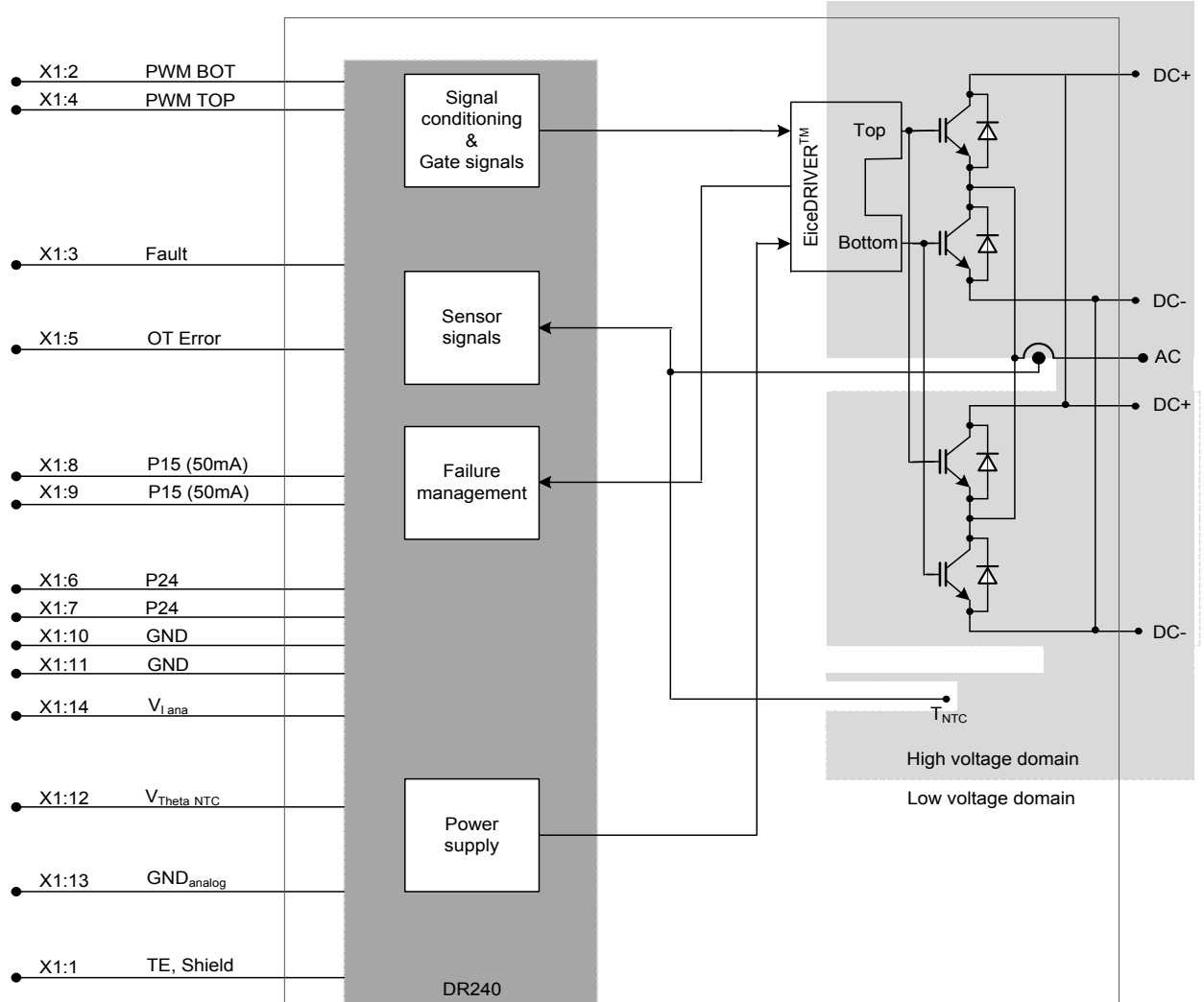
Mechanical drawing



Part No.	Assembly No.	general Revision	Substanz	Scale	Material	Material No.	Description	Graph No.	Version	Sheet
		01	2LS20017E42W36702	1:2			Outline	36702 Mb	0	12
								ModSTACKC		
								36702 Mb	0	12
								Contributor		
								Infineon		
								Date	11	11
								Revision		
								Drawn		
								Checked		
								Approved		

prepared by: OW	date of publication: 2013-10-08
approved by: AR	revision: 2.2

Circuit diagram



X1 (IDC Connector)  
14 pole male

	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

ModSTACK™

prepared by: OW	date of publication: 2013-10-08
approved by: AR	revision: 2.2



**Preliminary data**

**Terms & Conditions of usage**

The data contained in this product data sheet is exclusively intended for technically trained staff. You and your technical departments will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to such application.

This product data sheet is describing the characteristics of this product for which a warranty is granted. Any such warranty is granted exclusively pursuant to the terms and conditions of the supply agreement. There will be no guarantee of any kind for the product and its characteristics.

Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of our product, please contact the sales office, which is responsible for you (see [www.infineon.com](http://www.infineon.com), sales&contact). For those that are specifically interested we may provide application notes.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

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

- to perform joint Risk and Quality Assessments;
- the conclusion of Quality Agreements;
- to establish joint measures of an ongoing product survey, and that we may make delivery depended on the realization of any such measures.

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.

prepared by: OW	date of publication: 2013-10-08
approved by: AR	revision: 2.2