Technical Information

ModSTACK™ 6MS1600R17KE3-3WAH-B9C18VTIOIN

Vorläufige Daten
preliminary data

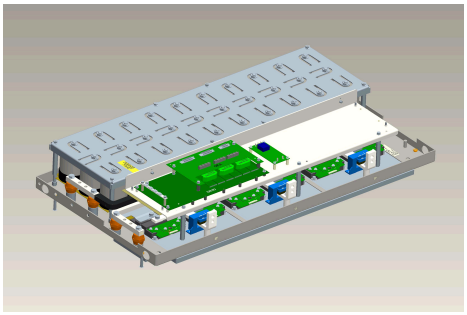
Key data

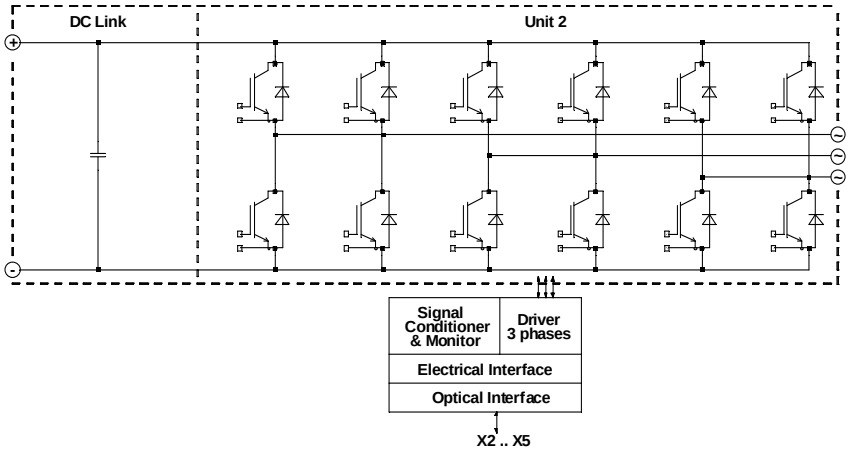
3x 974A rms at 690V rms, water cooled

General information

Stacks for various inverter application. Semiconductors, heat sinks, capacitors, drivers and sensors included. These are only technical data!
Please read carefully the complete documentation and maintain the proper design environment!
Especially note the EMC environment and the controller's functionality.

Topology		DC Link + B6I
Application / Modulation		Inverter / Sine
Load type		resistive, inductive
Cooling		water cooled
Market		wind
Implemented sensors		current, voltage, temperature
Semicond. (Unit 1)		none
DC Link		12mF
Semicond. (Unit 2)	IGBT	6x FF800R17KE3_B2
Driver signals IGBT		optical HFBR-15X1 / HFBR-25X1
Standards		EN50178
Sales - name		6MS16017E33W32630
Internal ID		32630
Mechanical drawing number		32630_MB
Electrical drawing number		57000008
Dimensions (width x depth x height)		1090 mm x 596 mm x 257 mm
Weight		83 kg





prepared by: Hoelbe Oliver	date of publication: 2009-09-18
approved by: Jürgen Schiele	revision: 2.1

Vorläufige Daten
preliminary data

Note

Heat sink with aluminum cooling channel.
Composites of fluid: Water and 52 vol. % Antifrogen N.
Water connection pipe not mounted (IN); available on request.
Grounding terminal (screw) not mounted (IN); available on request.

Electrical data

DC Link				min	typ	max	units
Voltage		V_{DC}			1100	1250	V
Overvoltage shutdown	within 150µs				1250		V

Unit 2 AC				min	typ	max	units
Voltage	depending on controller	V_{Unit2}			690		V_{RMS}
Continuous current	V_{Unit2} = 690V_{RMS}, V_{DC} = 1100V, T_{inlet} = 40°C, $T_J \leq$ 125°C, f_{Unit2} = 50Hz, f_{sw2} = 2000Hz, cos(phi) = 0,90	I_{Unit2}				974	A_{RMS}
Continuous current overload cap.	T_{inlet} = 40°C, for overload capability 150% for 60s				659		A_{RMS}
Short time current	T_{inlet} = 40°C, 10s, every 180s, initial load = 832A_{RMS}	I_{Unit2}				1040	A_{RMS}
DC current	no rotating field, T_{inlet} = 40°C	$I_{Unit2\ DC}$				488,0	A_{av}
Overcurrent shutdown	within 15µs				1700		A_{peak}
Switching frequency		f_{sw2}				4500	Hz
Power losses	V_{Unit2} = 690V, V_{DC} = 1100V, T_{inlet} = 40°C, $T_J \leq$ 125°C, f_{Unit2} = 50Hz, f_{sw2} = 2000Hz, cos(phi) = 0,90, I_{Unit2} = 974A_{RMS}	P_{loss2}			12300		W
Power factor		$cos(phi)_{Unit2}$		-1,00		1,00	

General data				min	typ	max	units
Power losses (PCB and capacitor)		$P_{loss\ aux}$				400	W
EMC test	according to IEC61800-3 at named interfaces	power	V_{Burst}		2		kV
		control	V_{Burst}		1		kV
		aux (24V)	V_{Surge}		1		kV
Insulation management is designed for			V_{Line}		690		V_{RMS}
Insulation test voltage	according to EN50178, f = 50Hz, t = 60s		V_{isol}		2,5		kV_{RMS}

prepared by: Hoelbe Oliver	date of publication: 2009-09-18
approved by: Jürgen Schiele	revision: 2.1

Vorläufige Daten
preliminary data

Important component data

			min	typ	max	units
DC Link capacitor		C_{DC}		12,00		mF
		type		Foil		
Temperature range			-40		+85	°C
Rated voltage	per device	U_R		1100		V_{DC}
Surge voltage	per device	U_{Surge}			1650	V
Rated capacitance	per device	C_R		400		µF
Capacitance tolerance	per device	Tol	-10		+10	%
Maximum ripple current	per device, T_{amb} = 60°C	I_{Rmax}			45	A_{RMS}
wiring system	**s**eries, **p**arallel			1s, 30p		
Balance or discharge resistors	per DC Link unit	R_b		6,0		kΩ

Controller interface data

			min	typ	max	units
Auxiliary voltage		V_{aux}	18	24	30	V_{av}
Auxiliary power requirement	V_{aux} = 24V_{av}	P_{aux}		40		W
Driver and interface board	see separate technical information			TR110 / DR110		
Driver core				EiceDRIVER 2ED300C17-S		
Digital input level	resistor to GND 1,8kΩ, capacitor to GND 4nF, high = on, min 15mA	V_{in}	0,0		15,0	V
Digital output level	open collector, low = ok, max 15mA	V_{out}	0,0		15,0	V
Analog current outputs Unit 2	load max 1mA; at 900A	$V_{ana\ out}$	4,50	4,59	4,68	V
Analog DC Link voltage output	load max 1mA; at 1250V	$V_{DC\ out}$	8,79	8,97	9,15	V
Analog temperature output	load max 1mA; at T_{NTC} = 66°C correspond to T_j = 125°C	$V_{T\ out}$	9,21	9,40	9,59	V
Overtemperature shutdown	at T_{NTC} = 69°C correspond to T_j = 130°C	$V_{T\ out\ OT}$		10		V
Optical interface board	see separate technical information			OEA101		
Optical input power				12		µW
Optical output power					60	µW

Heat sink water cooled / Thermal data

			min	typ	max	units
Water flow	according cooling water specification from infineon	$\Delta V/\Delta t_{Water}$	12			dm³/min
Water pressure drop		Δp_{Water}		400		mbar
Water pressure					8	bar
Cooling water inlet temperature		T_{inlet}	-25		40	°C
Water connection				3/4		in

prepared by: Hoelbe Oliver	date of publication: 2009-09-18
approved by: Jürgen Schiele	revision: 2.1

Vorläufige Daten
preliminary data

IGBT data unit 2

			min	typ	max	units
Type	assumed					
collector-emitter saturation voltage	I_c = 800A; V_{ge} = 15V; T_{vj} = 125°C	$V_{CE\ sat}$		2,4		V
parameter for linear model	T_{vj} = 25°C	V_{ce1}		1,08		V
parameter for linear model	T_{vj} = 25°C	r_{ce1}		1,15		mΩ
parameter for linear model	T_{vj} = 125°C	V_{ce2}		1		V
parameter for linear model	T_{vj} = 125°C	r_{ce2}		1,75		mΩ
turn-on / turn-off energy loss per pulse	T_{vj} = 25°C	E_1		165 / 200		mJ
turn-on / turn-off energy loss per pulse	T_{vj} = 125°C	E_2		240 / 295		mJ
thermal resistance, junction to case	per IGBT	R_{thjc}		0,024		K/W
thermal resistance, case to heatsink	per IGBT	R_{thch}		0,025		K/W

Diode data unit 2

			min	typ	max	units
Type	assumed					
forward voltage	I_F = 800A; V_{ge} = 0V; T_{vj} = 125°C	V_F		1,6		V
parameter for linear model	T_{vj} = 25°C	V_{F1}		1,03		V
parameter for linear model	T_{vj} = 25°C	r_{F1}		0,65		mΩ
parameter for linear model	T_{vj} = 125°C	V_{F2}		0,84		V
parameter for linear model	T_{vj} = 125°C	r_{F2}		0,95		mΩ
reverse recovery energy	T_{vj} = 25°C	E_{rec1}		160		mJ
reverse recovery energy	T_{vj} = 125°C	E_{rec2}		280		mJ
thermal resistance, junction to case	per Diode	R_{thjc}		0,042		K/W
thermal resistance, case to heatsink	per Diode	R_{thch}		0,044		K/W

prepared by: Hoelbe Oliver	date of publication: 2009-09-18
approved by: Jürgen Schiele	revision: 2.1

Vorläufige Daten
preliminary data

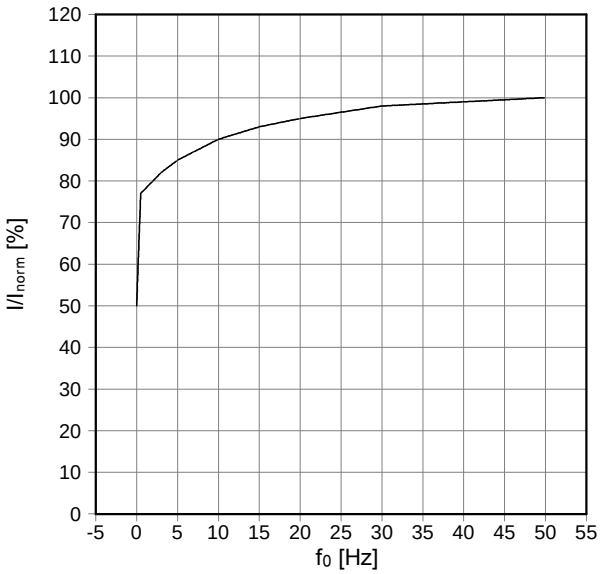
Environmental conditions

			min	typ	max	units
Storage temperature		T_{stor}	-40		65	°C
Ambient temperature	minimum 0°C for optional optical interface	T_{amb}	-25		55	°C
Operating temperature	see chapter Heat sink water cooled / Thermal data					
Cooling air velocity (PCB and capacitor)		$V_{Air\ PCB}$	2,0			m/s
Air pressure	standard atmosphere	p_{Air}	900		1100	hPa
Humidity	no condensation	Rel. F	0		95	%
Installation height			0		1000	m
Vibration	according to EN60068				10	m/s²
Continuous vibration	according to EN60068				20	m/s²
Shock	according to EN60068				100	m/s²
Protection degree				IP00		
Pollution degree				2		
Dimensions	width × depth × height		1090	596	257	mm
Weight with heat sink	approximation			83,0		kg
Weight without heat sink	approximation			65,0		kg

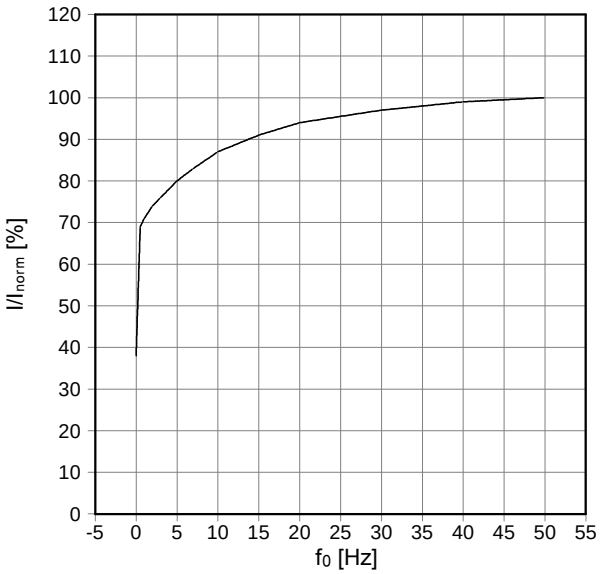
prepared by: Hoelbe Oliver	date of publication: 2009-09-18
approved by: Jürgen Schiele	revision: 2.1

Vorläufige Daten
preliminary data

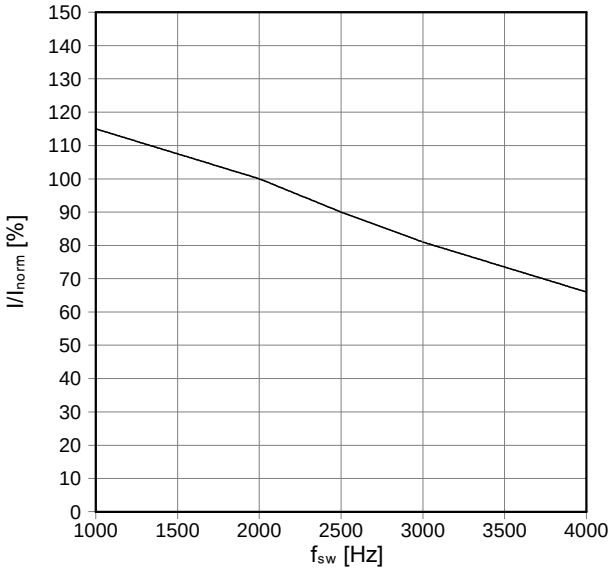
fo - derating curve IGBT (motor)
cos(phi) = 0,90
$T_{cool\ medium}$ = 40°C ; 100% = 974 A rms



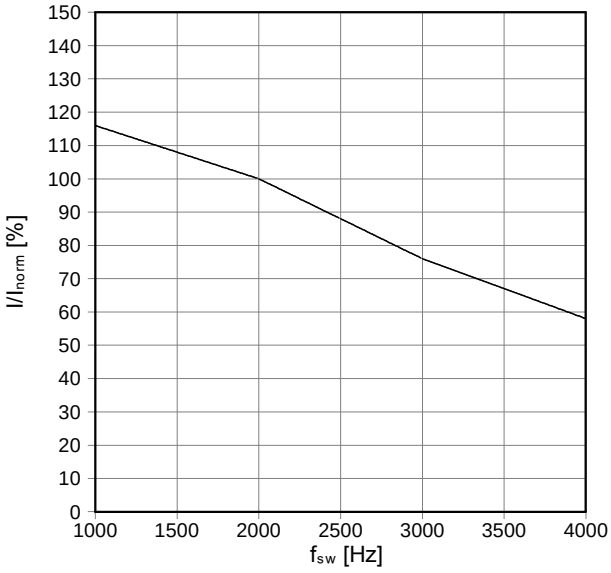
fo - derating curve Diode (generator)
cos(phi) = -0,90
$T_{cool\ medium}$ = 40°C ; 100% = 973 A rms



fsw - derating curve IGBT (motor)
cos(phi) = 0,90
$T_{cool\ medium}$ = 40°C ; 100% = 974 A rms



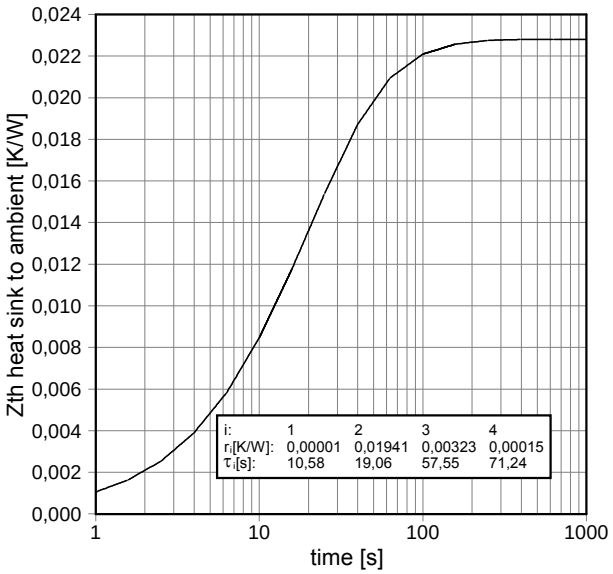
fsw - derating curve Diode (generator)
cos(phi) = -0.90
$T_{cool\ medium}$ = 40°C ; 100% = 973 A rms



prepared by: Hoelbe Oliver	date of publication: 2009-09-18
approved by: Jürgen Schiele	revision: 2.1

Vorläufige Daten
preliminary data

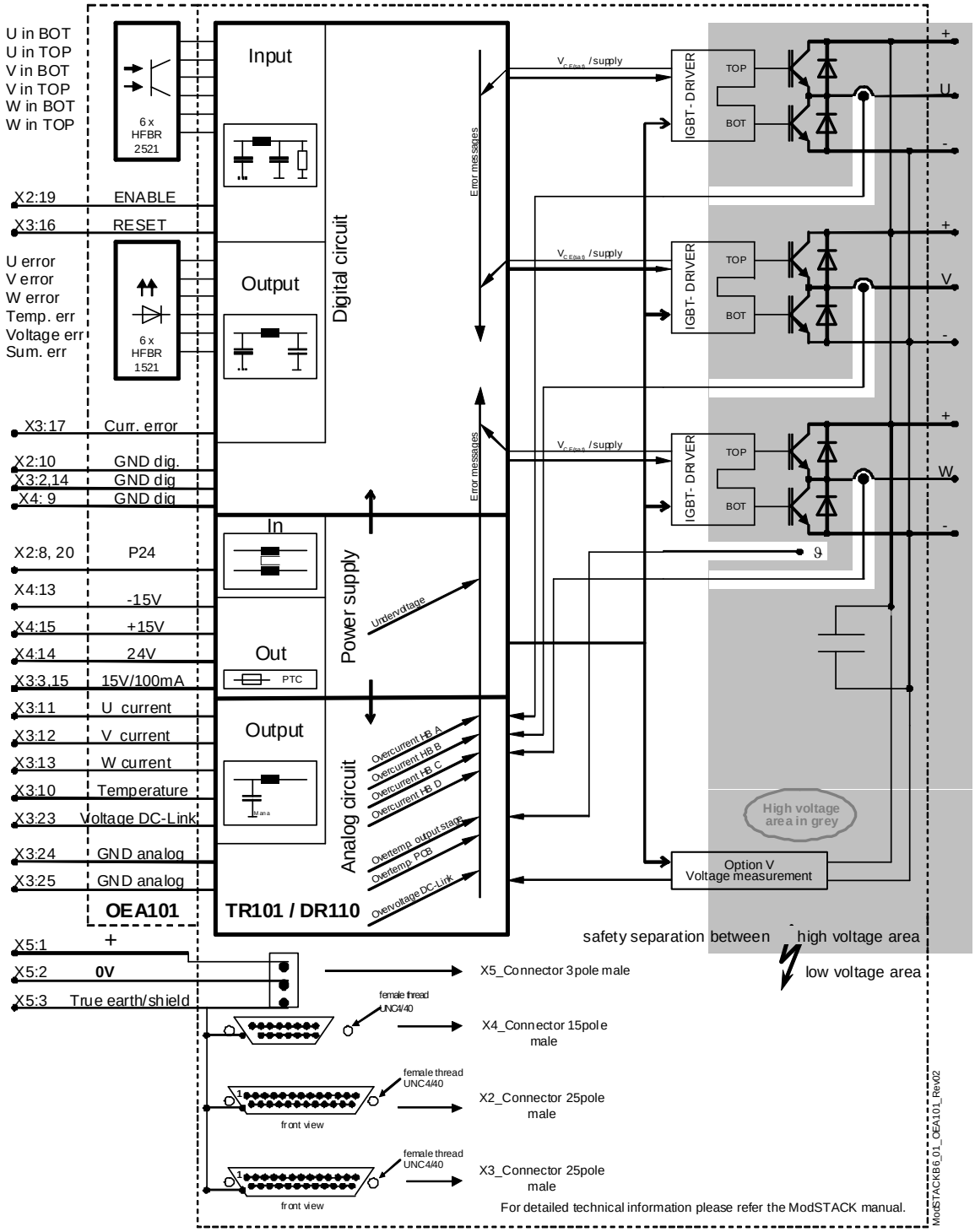
Transient thermal impedance per module
$T_{cool\ medium}$ = 40°C



prepared by: Hoelbe Oliver	date of publication: 2009-09-18
approved by: Jürgen Schiele	revision: 2.1

Vorläufige Daten
preliminary data

Circuit diagram



prepared by: Hoelbe Oliver	date of publication: 2009-09-18
approved by: Jürgen Schiele	revision: 2.1

Vorläufige Daten
preliminary data

Nutzungsbedingungen

Die in diesem Produktdatenblatt enthaltenen Daten sind ausschließlich für technisch geschultes Fachpersonal bestimmt. Die Beurteilung der Eignung dieses Produktes für Ihre Anwendung sowie die Beurteilung der Vollständigkeit der bereitgestellten Produktdaten für diese Anwendung obliegt Ihnen bzw. Ihren technischen Abteilungen.

In diesem Produktdatenblatt werden diejenigen Merkmale beschrieben, für die wir eine liefervertragliche Gewährleistung übernehmen. Eine solche Gewährleistung richtet sich ausschließlich nach Maßgabe der im jeweiligen Liefervertrag enthaltenen Bestimmungen. Garantien jeglicher Art werden für das Produkt und dessen Eigenschaften keinesfalls übernommen.

Sollten Sie von uns Produktinformationen benötigen, die über den Inhalt dieses Produktdatenblatts hinausgehen und insbesondere eine spezifische Verwendung und den Einsatz dieses Produktes betreffen, setzen Sie sich bitte mit dem für Sie zuständigen Vertriebsbüro in Verbindung (siehe www.infineon.com, Vertrieb&Kontakt). Für Interessenten halten wir Application Notes bereit.

Aufgrund der technischen Anforderungen könnte unser Produkt gesundheitsgefährdende Substanzen enthalten. Bei Rückfragen zu den in diesem Produkt jeweils enthaltenen Substanzen setzen Sie sich bitte ebenfalls mit dem für Sie zuständigen Vertriebsbüro in Verbindung.

Sollten Sie beabsichtigen, das Produkt in Anwendungen der Luftfahrt, in gesundheits- oder lebensgefährdenden oder lebenserhaltenden Anwendungsbereichen einzusetzen, bitten wir um Mitteilung. Wir weisen darauf hin, dass wir für diese Fälle
- die gemeinsame Durchführung eines Risiko- und Qualitätsassessments;
- den Abschluss von speziellen Qualitätssicherungsvereinbarungen;
- die gemeinsame Einführung von Maßnahmen zu einer laufenden Produktbeobachtung dringend empfehlen und gegebenenfalls die Belieferung von der Umsetzung solcher Maßnahmen abhängig machen.

Soweit erforderlich, bitten wir Sie, entsprechende Hinweise an Ihre Kunden zu geben.

Inhaltliche Änderungen dieses Produktdatenblatts bleiben vorbehalten.

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 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, 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.

prepared by: Hoelbe Oliver	date of publication: 2009-09-18
approved by: Jürgen Schiele	revision: 2.1

Vorläufige Daten
preliminary data

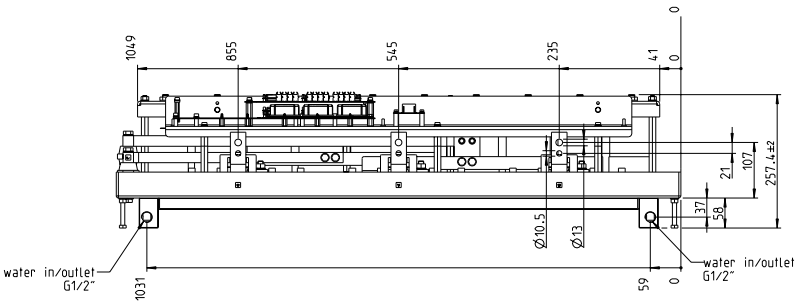
Sicherheitshinweise

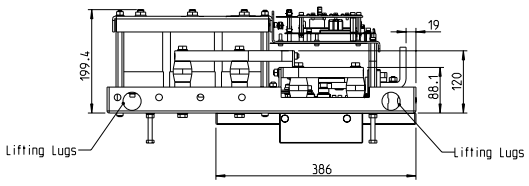
Bevor Sie mit der Installation und dem Betrieb der Baugruppe beginnen, lesen Sie bitte sorgfältig alle Sicherheitshinweise, Warnungen und beachten Sie die angebrachten Warnschilder. Vergewissern Sie sich, dass alle Warnschilder in leserlichem Zustand verbleiben und fehlende oder beschädigte Schilder ersetzt werden.

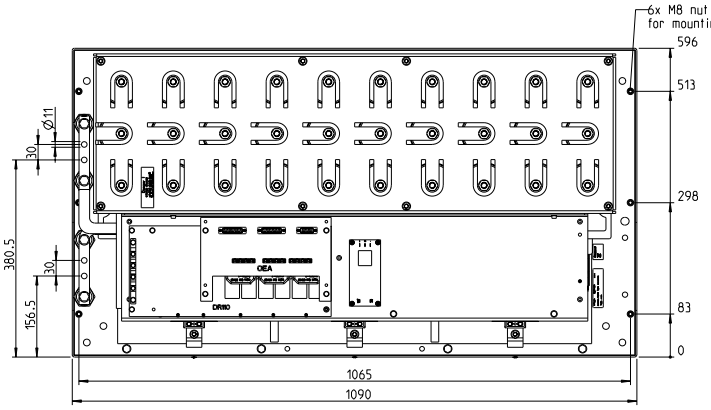
Safety Instructions

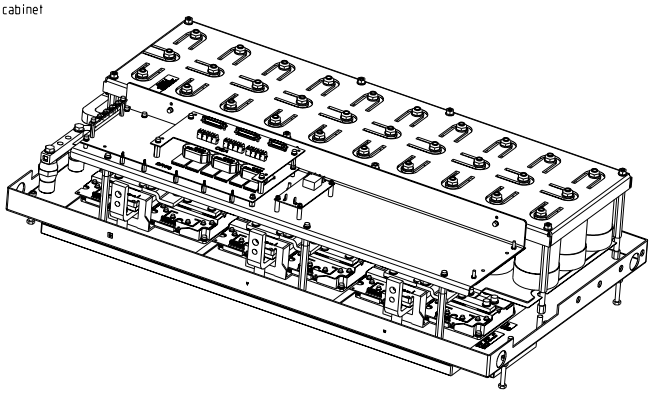
Prior to installation and operation, all safety notices and warnings and all warning signs attached to the equipment have to be carefully read. Make sure that all warning signs remain in a legible condition and that missing or damaged signs are replaced. To installation and operation, all safety notices 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: Hoelbe Oliver	date of publication: 2009-09-18
approved by: Jürgen Schiele	revision: 2.1









Part-No. 32630			general Tolerance	Surface	Scale 1:5		
Assembly-No.					Material		
					Material-No.		
			Date	Name	Description		
			Agent 19.09.2008	Peiner	Outline MS3		
			Checked 19.09.2008	gez.Bohlinder	6MSxx00Rxx xxx-3WCH-Cxx		
			Norm				
02	Kuehler ohne Täle	12.08.09	Pe		Graph-No. 32630	Version 0	Sheet 1/2
01	Bau-Gruppe:31881	27.07.09	Pe				
Vers.	Revision	Date	Name	Origin	Constructed for		A2

Dokumentstatus siehe SAP-Dokumentenverwaltung