

Technical Information

ModSTACK™ 6MS2400R17KE3-3F-B16B9C23VTIO



Vorläufige Daten
preliminary data

Key data

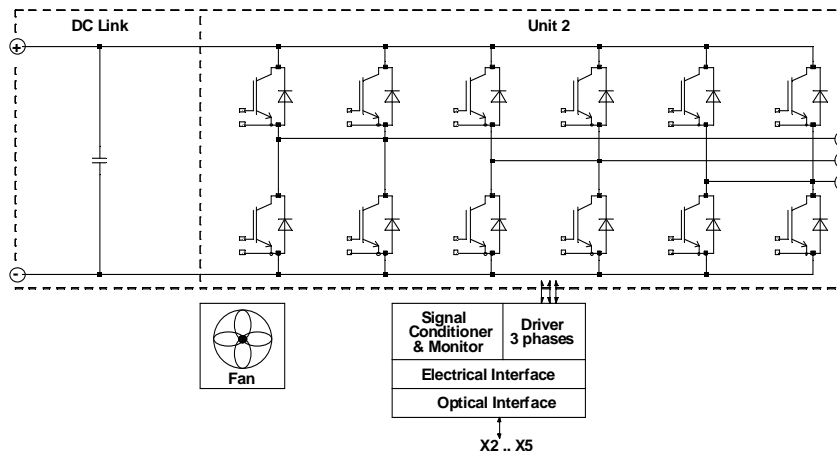
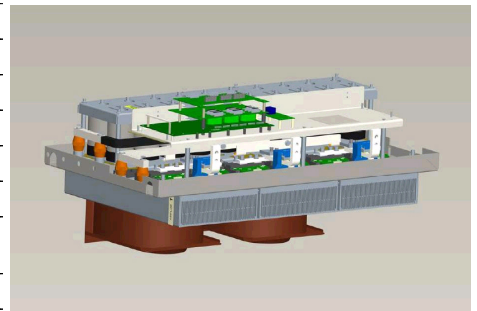
3x 629A rms at 690V rms, forced air (fan included)

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	forced air (fan included)
Market	wind
Implemented sensors	current, voltage, temperature
Semicond. (Unit 1)	none
DC Link	8.4mF
Semicond. (Unit 2)	IGBT 6x FF1200R17KE3_B2
Driver signals IGBT	optical HFBR-15X1 / HFBR-25X1
Standards	EN50178
Sales - name	6MS24017E33F33878
Internal ID	33878
Mechanical drawing number	33878_MB
Electrical drawing number	ModSTACK B6_01_OEA101_Rev03
Dimensions (width x depth x height)	1090 mm x 596 mm x 470 mm
Weight	110 kg



prepared by: Hoelbe Oliver	date of publication: 2009-08-20
approved by: Jürgen Schiele	revision: 2.0

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Electrical data

DC Link			min	typ	max	units
Voltage		V_{DC}		1100	1200	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	$V_{Unit2} = 690V_{RMS}$, $V_{DC} = 1100V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 50Hz$, $f_{sw2} = 2000Hz$, $\cos(\phi) = -0,99$	I_{Unit2}			629	A_{RMS}
Continuous current overload cap.	$T_{inlet} = 40^{\circ}C$, for overload capability 150% for 60s			452		A_{RMS}
Short time current	$T_{inlet} = 40^{\circ}C$, 10s, every 180s, initial load = 560 A_{RMS}	I_{Unit2}			700	A_{RMS}
DC current	no rotating field, $T_{inlet} = 40^{\circ}C$	$I_{Unit2 DC}$			228,0	A_{av}
Overcurrent shutdown	within 15µs			1300		A_{peak}
Switching frequency		f_{sw2}			3000	Hz
Power losses	$V_{Unit2} = 690V$, $V_{DC} = 1100V$, $T_{inlet} = 40^{\circ}C$, $T_J \leq 125^{\circ}C$, $f_{Unit2} = 50Hz$, $f_{sw2} = 2000Hz$, $\cos(\phi) = -0,99$, $I_{Unit2} = 629A_{RMS}$	P_{loss2}		7460		W
Power factor		$\cos(\phi)_{Unit2}$	-1,00		1,00	

General data			min	typ	max	units
Power losses (PCB and capacitor)		$P_{loss aux}$			220	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 $_{RMS}$

Important component data			min	typ	max	units
DC Link capacitor		C_{DC}		8,40		mF
		type		Foil		
Rated voltage	per device	U_R		1100		V_{DC}
Surge voltage	per device	U_{Surge}			1650	V
Rated capacitance	per device	C_R		420		µF
Capacitance tolerance	per device	Tol	-15		0	%
wiring system	series, parallel			1s, 20p		
Balance or discharge resistors	per DC Link unit	R_b		6,0		kΩ

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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 1,8k Ω , 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 629A	$V_{ana out}$	4,15	4,23	4,31	V
Analog DC Link voltage output	load max 1mA; at 1100V	$V_{DC out}$	7,73	7,89	8,05	V
Analog temperature output	load max 1mA; at $T_{NTC} = 74^{\circ}C$ correspond to $T_j = 125^{\circ}C$	$V_{T out}$	9,41	9,60	9,79	V
Overtemperature shutdown	at $T_{NTC} = 76^{\circ}C$ correspond to $T_j = 130^{\circ}C$	$V_{T out OT}$		10		V
Optical interface board	see separate technical information		OEA101			
Optical input power				12		μW
Optical output power					60	μW

Heat sink air cooled / Thermal data

			min	typ	max	units
Airflow	$T_{Air} = 20^{\circ}C$, Pair = 1013hPa, dry- and dust free, measured on side of heat sink. according to DIN 41882	$\Delta V / \Delta t_{Air}$	2700			m ³ /h
Air pressure drop		Δp_{Air}		300		Pa
Cooling air inlet temperature	heat sink temperature > -25 $^{\circ}C$	T_{inlet}	-25		40	$^{\circ}C$

Fan data

			min	typ	max	units
Type	assumed		2x Ziehl-Abegg. RF22P-2DK.3F.1R			
Voltage		V_{Fan}		400		V_{RMS}
Frequency		f_{Fan}		50		Hz
Current		I_{Fan}		3,90		A_{RMS}

IGBT data unit 2

			min	typ	max	units
Type	assumed					
collector-emitter saturation voltage	$I_c = 1200A$; $V_{ge} = 15V$; $T_{vj} = 125^{\circ}C$	$V_{CE sat}$		2,4		V
parameter for linear model	$T_{vj} = 25^{\circ}C$	V_{ce1}		1,1		V
parameter for linear model	$T_{vj} = 25^{\circ}C$	r_{ce1}		0,75		m Ω
parameter for linear model	$T_{vj} = 125^{\circ}C$	V_{ce2}		1		V
parameter for linear model	$T_{vj} = 125^{\circ}C$	r_{ce2}		1,167		m Ω
turn-on / turn-off energy loss per pulse	$T_{vj} = 25^{\circ}C$	E_1		240 / 305		mJ
turn-on / turn-off energy loss per pulse	$T_{vj} = 125^{\circ}C$	E_2		350 / 445		mJ
thermal resistance, junction to case	per IGBT	R_{thjc}		0,019		K/W
thermal resistance, case to heatsink	per IGBT	R_{thch}		0,023		K/W

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Diode data unit 2

			min	typ	max	units
Type	assumed					
forward voltage	$I_F = 1200A; V_{ge} = 0V; T_{vj} = 125^\circ C$	V_F		1,9		V
parameter for linear model	$T_{vj} = 25^\circ C$	V_{F1}		1,15		V
parameter for linear model	$T_{vj} = 25^\circ C$	r_{F1}		0,542		mΩ
parameter for linear model	$T_{vj} = 125^\circ C$	V_{F2}		1		V
parameter for linear model	$T_{vj} = 125^\circ C$	r_{F2}		0,75		mΩ
reverse recovery energy	$T_{vj} = 25^\circ C$	E_{rec1}		190		mJ
reverse recovery energy	$T_{vj} = 125^\circ C$	E_{rec2}		340		mJ
thermal resistance, junction to case	per Diode	R_{thjc}		0,042		K/W
thermal resistance, case to heatsink	per Diode	R_{thch}		0,052		K/W

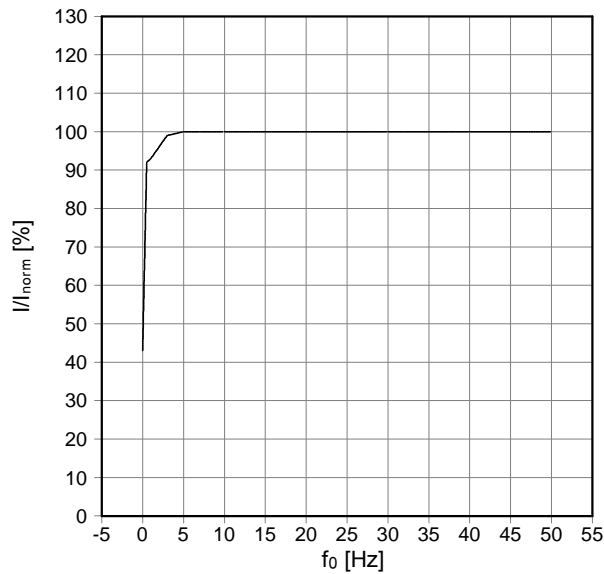
Environmental conditions

			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 air 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/s ²
Continuous vibration	according to EN60068				20	m/s ²
Shock	according to EN60068				100	m/s ²
Protection degree			IP00			
Pollution degree			2			
Dimensions	width × depth × height		1090	596	470	mm
Weight with heat sink	approximation			110,0		kg

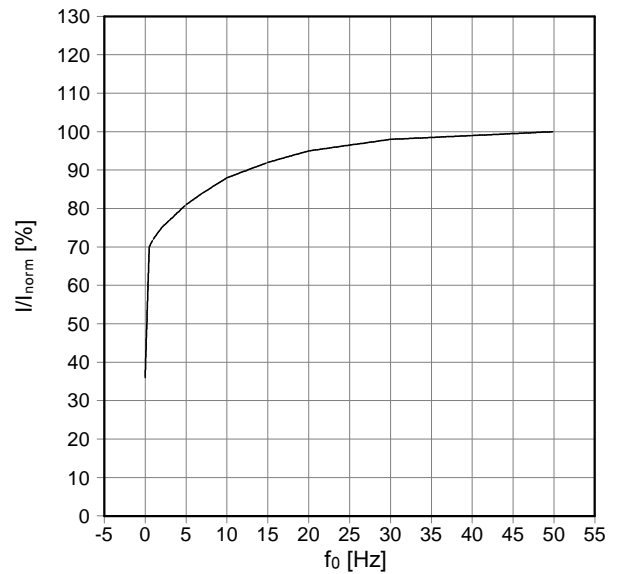
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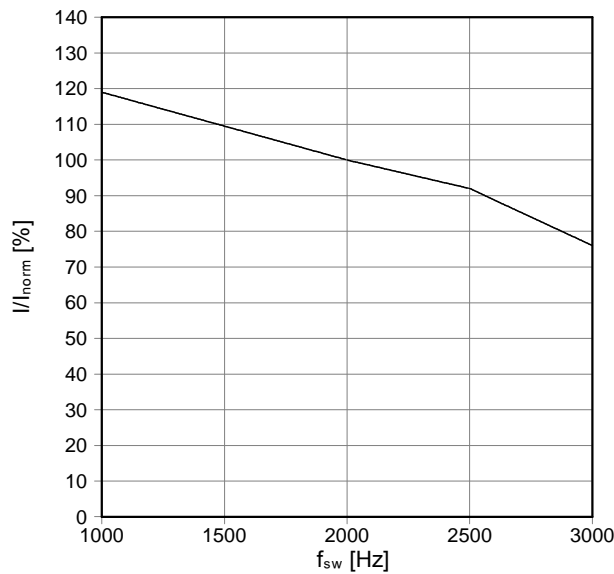
fo - derating curve IGBT (motor)
cos(phi) = 0,99
T_{cool medium} = 40°C ; 100% = 624 A rms



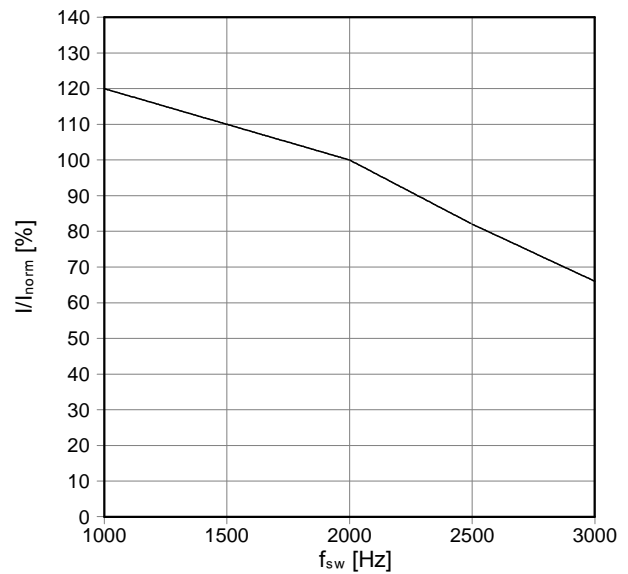
fo - derating curve Diode (generator)
cos(phi) = -0,99
T_{cool medium} = 40°C ; 100% = 629 A rms



fsw - derating curve IGBT (motor)
cos(phi) = 0,99
T_{cool medium} = 40°C ; 100% = 624 A rms



fsw - derating curve Diode (generator)
Diode, cos(phi) = -0,99
T_{cool medium} = 40°C ; 100% = 629 A rms



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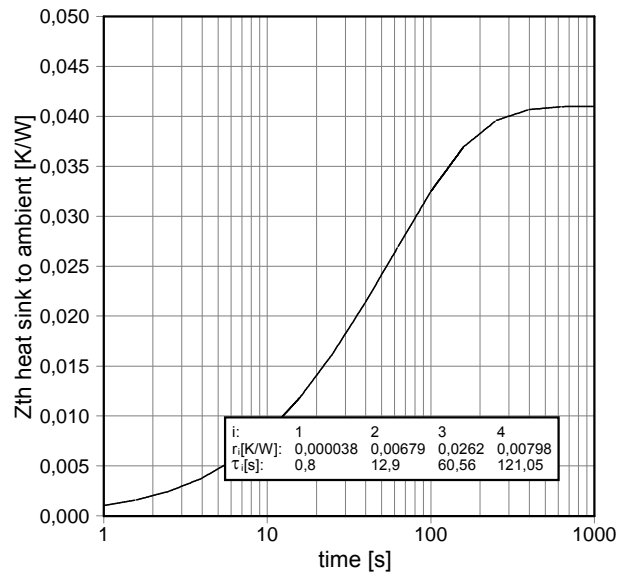
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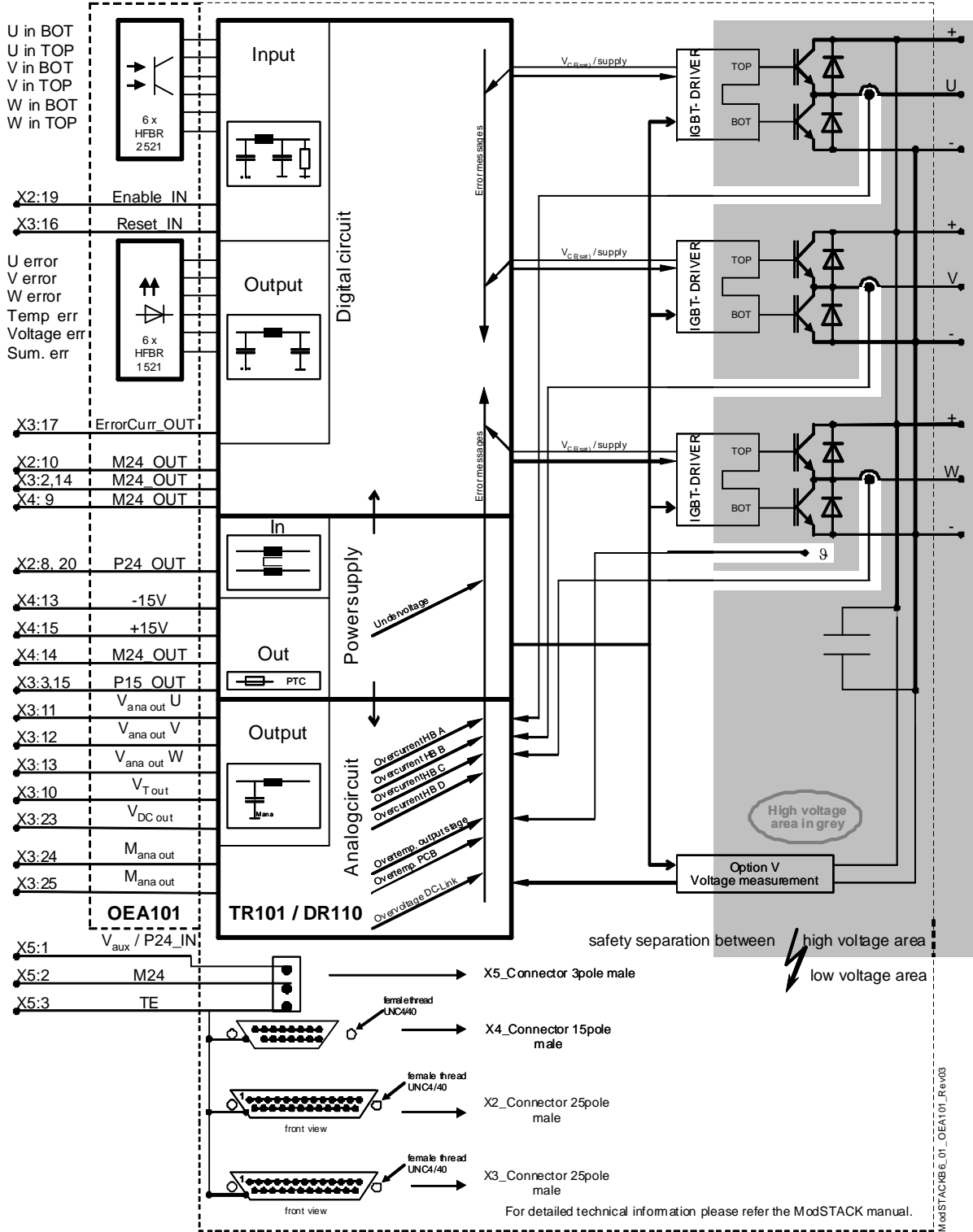
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Transient thermal impedance per module
 $T_{cool\ medium} = 40^{\circ}C$



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Circuit diagram



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- 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.

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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.

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