1. General Requirements

All components have to be mounted according to the drawing: GAA26800MX The bare board is specified as: GAA610ADB

2. Revision History

Version	Date	Revised by	Description
1.0	2010-APR-13	A. Tutat	Initial Version

3. Code Requirements

The board has been laid out according to the requirements in EN81, VDE110-1 (Transient Voltage 4kV; Inhomogeneous Field, Pollution Degree 2 and Safety relevant areas to other areas: Pollution Degree 3; Clearance Distance: Table2; Creepage Distance: Table

Date	Changes	Name	Toot Domissement for		GAA2680	OMY TR
			Test Requirement for PBX BIDI		GAAZUU	JONIX_TTT
			I BA_BIBI		12 SHEETS	- SHEET 1
			OTIS	RESP	2010-APR-13	A. Tutat
			Elevator Company	CHK	2010-APR-13	M. Dehmlow
			Enigneering Center Berlin	AUT	2010-APR-13	CA47A-000528

4. Data logging Requirements for the purpose of statistical analysis.

All measurement results should be written together with the PCB serial number and production-date into a file. The time-interval to produce a back-up of the file should be determined by the factory. Also must be determined how many records are captured per file.

Construction of the file:

- 1. PCB serial number
- 2. production-date
- 3. all measurement results, The variable-names should consist of a combination of Symbol-Name and Parameter-Name.) Visual separation through special character, for example: *********************************.

5. Electrical Requirements

Unless otherwise noted MIN/MAX values are valid for temperatures between +0degC and +70degC. All typical values are calculated for an ambient temperature of Ta=25degC.

DC values have to be measured with an average reading meter. AC values have to be measured with a true-RMS meter. DC values are marked with the unit V or A, AC values are marked with Vrms or Arms.

The remark "Logic Level" (LL) relates to HCMOS standard: "High" = 3.5V ... 5.7V and "Low"=-0.7V ... 1.0V.

Date	Changes	Name	Toot Dogwiyement for		GAA26800MX TR
			Test Requirement for PBX BIDI		GAAZUUUNIA_TH
			I BA_BIBI		12 SHEETS - SHEET 2
			OTIS	RESP	2010-APR-13 A. Tutat
			Elevator Company	CHK	2010-APR-13 M. Dehmlow
			Enigneering Center Berlin	AUT	2010-APR-13 CA47A-000528

5.1. Power supply

If within the test cases no other supply voltages are indicated, the board has to be supplied with the following voltages:

24V HL2 +24V / current limitable to max. 500mA at P5.46 (referenced to HL2)

HL2 at P5.44

24V SE +24V / current limitable to max. 500mA at P1.1 (referenced to 24V SE RTN)

24V_SE_RTN at P1.2

24V SW +24V / current limitable to max. 500mA at P4.1 (referenced to 24V SW RTN)

24V_SW_RTN at P4.2

24V SENSE +24V / current limitable to max. 500mA at P5.50 (referenced to 24V SENSE RTN)

24V_SENSE_RTN at P5.48

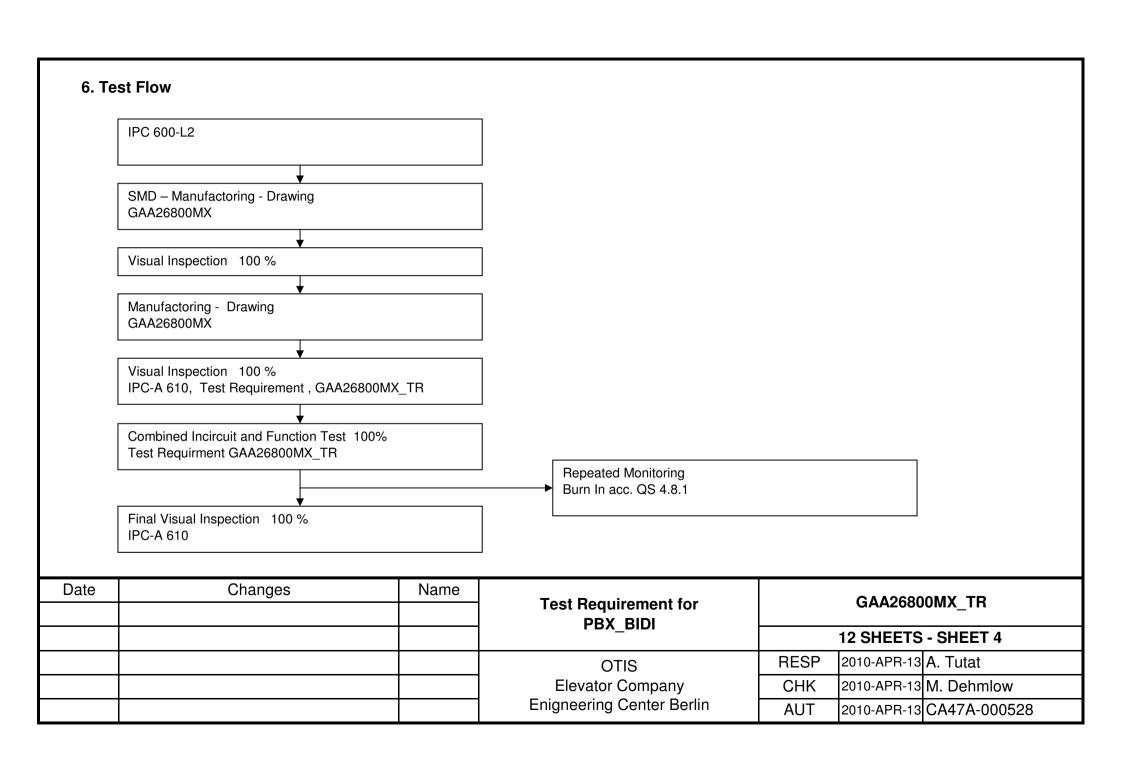
V+15V +15V / current limitable to max. 200mA at P3.40 (referenced to AGND)
V-15V -15V / current limitable to max. 200mA at P3.39 (referenced to AGND)

AGND at P3.38

VCC +5V / current limitable to max. 200mA at P3.13 (referenced to GND)

GND at P3.12

Date	Changes	Name	Toot Poquiroment for		GAA26800MX TR
			Test Requirement for PBX BIDI		GAA20000WIX_III
			I BA_BIBI		12 SHEETS - SHEET 3
			OTIS	RESP	2010-APR-13 A. Tutat
			Elevator Company	CHK	2010-APR-13 M. Dehmlow
			Enigneering Center Berlin	AUT	2010-APR-13 CA47A-000528



Test Requirement for PBX, BIDI GAA28800MX All measuring printers reflexions provide as described in size or resources, loss provided and size of the part of the														
A constraint discontinue, the critical disgrand of the PCAS is required. A minimating point is reference goint as executed in laid of reference, see points or component designation. Best dates only for PSX BID, INVERTER-PLACTIONALITY. ACADESCOMMAX, marked with rote 2 Brown PSK, BID, INVERTER-PLACTIONALITY. CAADESCOMMAX, marked with rote 2 Test classes. Description Test classes. Descri	Test Requirement for PBX_BIDI GAA26800MX	<u> </u>												
All measuring portes : reference points are described in fixed or reference point agree described in fixed or reference point agree only for PEX BILD immorrally warranted with roles 1 Pay Bild immorrally warranted with roles 2 Pay Bild immorrally warranted with roles 3 Pay Bild immorrally warranted warr														
Lex State January Samples Lower Specification Limit Upon Specif													Value range	
Lower Specification Limit													· u.u.o · ugo	
Section Sect							S	ample	S			Low	or Specification Li	mit
Big														
Description Section Description Description Section Description Descri												Ορρ	or opecinication Li	· · · ·
Description Section Description Desc	5. Highly Accelerated Life Test, test cases required for HALT, market					Boa	ard S	Serial I	lumb	er	_	LSL	Typical	USL
Second State Seco	Description			1				<u> </u>	14	-			Тургос	
Second Second Privary PHASE R(U) 1 quisscent current consumption: 247, SW @ 24VDC 160,00 250	Description	ಕ ಕ	anacified condition	unit										
SMPS characteristic 2		ין בן												
SMMS characteristic 2 disescent current consumption; 24V_SE @ 24VDC MA	Power Supply: IGBT Gate Driver PHASE R(U)	1										180,00	236,00	290,00
Current: IGBT driver Supris, SENSING SMPS				mA										
PWM_VCG_RU_24V_DRIVER_RTN SAVE PRIVER_RTN V		2										180,00	236,00	290,00
LISENSE RUI : 24V ORIVER RTN V	Switched Mode Power Supply											40.00	44.00	10.00
SWITCHING ON POUT-CYCLE wo any additional load PPWM CONTROLLER duptup in or MOSFET DAIN GATE, SENSE, RU. 24, DRIVER, RTN White SWITCHING FREQUENCY PPWM CONTROLLER duptup in or MOSFET DAIN GATE, SENSE, RU. 24, DRIVER, RTN MHz GATE, SENSE, RU. 24, DRIVER, RTN GATE, SENSE, RU. 24, GATE, SENSE, RU.		<u> </u>		V										
PWM CONTROLLER Quiptur pion of MOSFET DRAIN GATE SHARE RU: 24 DRIVER RTN DRAIN, RU: 24 DRIVER RTN SWITCHING REQUENCY PWM CONTROLLER Quiptur pion of MOSFET DRAIN GATE SHARE RU: 24 DRIVER RTN 3 : 27V RU P: 127V RU P RTN 3 : 27V RU P: 127V RU P RTN 3 : 27V RU P: 127V RU P RTN REF 399 RU RU: 127V RU RU RU RU RUR REF 309 RU RU: 127V RU RU RUR REF 309 RU RU: 127V RU RUR RUR RUR RUR RUR RUR RUR	Power Fail Detection			┞—			+		+-	1-		-,		
GATE_SENSE_RU_24_DRIVER_RTN DRAIN_RU_24_DRIVER_RTN SWITCHING FREQUENCY PWM_CONTROLLER output pin or MOSFET DRAIN GATE_SENSE_RU_24_DRIVER_RTN DRAIN_RU_24_DRIVER_RTN 3 *27V_RU_P:*27V_RU_P_RTN 4 *27V_RU_P:*27V_RU_P_RTN 5 *27V_RU_N *27V_RU_P_RTN 6 *50 *7.00 *7.50 7 *50 *7.00 *7.50 8 *27V_RU_N *27V_RU_P_RTN 6 *50 *7.00 *7.50 7 *50 *7.00 *7.50 8 *27V_RU_P *27V_RU_P_RTN 6 *50 *7.00 *7.50 8 *27V_RU_P *27V_RU_P_RTN 8 *2800 *27.00 *28.00 2 *200 *2.40 2 *20												5,00	20,00	30,00
ORAL PRIVE SENSE RULE 2 DRIVER TRYN SWITCHING FREQUENCY			PWM CONTROLLER output pin or MOSFET DRAIN	%										
SWITCHING FREQUENCY PMM CONTROLLER output pin or MOSFET DRAIN CATE_SENSE_RU_24_DRIVER_RTN														
PWM CONTROLLER output pin or MOSFET DRAIN GATE SENSE RU: 24. DRIVER, RTN DRAIN_RU: 24_DRIVER, RTN 3. 427V, RU. P: 427V, RU. P. RTN 26.00 27.00 28.00 27.00 27.00 28.00 27.00 28.00 27.00 27.00 28.00 27.00 27.00 28.00 27.00 27.00 28.00 27.00 27.00 28.00 27.00 28.00 27.00 27.00 2														
GATE_SENSE_RU_:24_DRIVER_RTN READ												140,00	160,00	180,00
DRAIN_RU : 24_DRIVER_RTN 3														
3 +27V RU P:+27V RU P RTN 3 +27V RU N:+27V RU P RTN REF 299 RU P:+27V RU P RTN REF 295 RU N:+27V RU N RTN PIGBT threshold voltage Increase +27V RU N from 0V until output a transition occurs: HIGH to LOW MX1: PP_IGBT = 205 RU N:+27V RU N RTN REF 295 RU N:+27V RU N RTN PIGBT threshold voltage Increase +27V RU N from 0V until output a transition occurs: HIGH to LOW MX1: PP_IGBT = 205 RU N:+27V RU N RTN PIGBT hirthy and voltage Increase +27V RU N from 0V until output a transition occurs: HIGH to LOW MX2: PF_IGBT = 205 RU N:+27V RU N GW and 24V_SE supply, add an adjustable supply only on ### PIGBT = 205 RU N:+27V RU N from 0V until output a transition occurs: HIGH to LOW MX2: PF_IGBT = 205 RU N:+27V RU N GW and 24V_SE supply, add an adjustable supply only on				kHz										
3 +27V RU N : +27V RU N RTN REF 39V RU P: +27V RU P RTN REF 39V RU P: +27V RU P RTN REF 2V5 RU N -27V RU P RTN REF 2V5 RU N -27V RU P RTN REF 2V5 RU N -27V RU P RTN REF 39V RU N -27V RU N RTN REF 39V RU N -27V RU N RTN REF 2V5 RU N			DRAIN_RU: 24_DRIVER_RTN											
3 +27V RU N : +27V RU N RTN REF 39V RU P: +27V RU P RTN REF 39V RU P: +27V RU P RTN REF 2V5 RU N -27V RU P RTN REF 2V5 RU N -27V RU P RTN REF 2V5 RU N -27V RU P RTN REF 39V RU N -27V RU N RTN REF 39V RU N -27V RU N RTN REF 2V5 RU N		-	OTM DIL D. OTM DIL D. DTM	_	_		_	_	_	+		22.22	07.00	00.00
REF 3V9 RU P: +27V RU P RTN REF 2V5 RU P: +27V RU P RTN PF_IGBT threshold voltage Increases +27V_RU_P from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_CONV: GND Preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on +27V_RU_P reterenced to +27V_RU_PRTN REF 3V3 RU N: +27V_RU_N RTN REF 2V5 RU N: +27V_RU_N RTN PF_IGBT threshold voltage Increases +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_INV: GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on		3		-	-		_			-				
REF_2V5_RU_P:=27V_RU_P_RTN		3		-			_			+				
PF_IGBT threshold voltage Increase +27V_RU_P from 0V until output a transition occurs: HIGH to LOW MXI: PF_IGBT_INV: GND MX2: PF_IGBT_CONV: GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on +27V_RU_P referenced to +27V_RU_P_RTN REF_3V9_RU_N: +27V_RU_N_RTN RF_2V5_RU_N: +27V_RU_N_RTN PF_IGBT threshold voltage Increase +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MXI: PF_IGBT_LONV: GND MX2: PF_IGBT_LONV: GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on		-		-						-				
Increase +27V_RU_P from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV : GND MX2: PF_IGBT_CONV : GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on +27V_RU_P referenced to +27V_RU_P RTN REF_2VS_RU_N : +27V_RU_N RTN REF_2VS_RU_N : +27V_RU_N RTN PF_IGBT_INV : GND MX1: PF_IGBT_INV : GND MX2: PF_IGBT_INV : GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on on adjustable supply only on on the supply only on the supply supply only on the s		-		-						-				
MX1: PF_IGBT_CONV : GND MX2: PF_IGBT_CONV : GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on +27V_RU_P referenced to +27V_RU_P_RTN REF_3V9_RU_N: +27V_RU_N_RTN REF_2V5_RU_N: +27V_RU_N_RTN PF_IGBT threshold voltage Increases +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_CONV: GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on												2,00	2,40	2,80
MX2: PF_IGBT_CONV : GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on +27V_RU_P referenced to +27V_RU_P_RTN REF_3V9_RU_N : +27V_RU_N_RTN PF_IGBT threshold voltage Increase +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV : GND MX2: PF_IGBT_CONV : GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on														
preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on +27V_RU_P referenced to +27V_RU_P_RTN REF_3V9_RU_N: +27V_RU_N_RTN REF_2V5_RU_N: +27V_RU_N_RTN PF_IGBT threshold voltage Increase +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_INV: GND myeparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on														
disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on +27V_RU_P referenced to +27V_RU_P_RTN REF_3V9_RU_N: +27V_RU_N_RTN REF_2V5_RU_N: +27V_RU_N_RTN PF_IGBT threshold voltage Increase +27V_RU_M from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_IONV: GND MX2: PF_IGBT_CONV: GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on			IMX2: PF_IGBT_CONV : GND											
disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on +27V_RU_P referenced to +27V_RU_P_RTN REF_3V9_RU_N: +27V_RU_N_RTN REF_2V5_RU_N: +27V_RU_N_RTN PF_IGBT threshold voltage Increase +27V_RU_M from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_CONV: GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on														
add an adjustable supply only on +27V_RU_P referenced to +27V_RU_P_RTN REF_3V9_RU_N: +27V_RU_N_RTN REF_2V5_RU_N: +27V_RU_N_RTN PF_IGBT threshold voltage Increase +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_CONV: GND PREF_BT_CONV: GND MX2: PF_IGBT_CONV: GND Add an adjustable supply only on														
+27V_RU_P referenced to +27V_RU_P_RTN														
REF_3V9_RU_N:+27V_RU_N_RTN REF_2V5_RU_N:+27V_RU_N_RTN PF_IGBT threshold voltage Increase +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_CONV: GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on														
REF_3V9_RU_N:+27V_RU_N_RTN REF_2V5_RU_N:+27V_RU_N_RTN PF_IGBT threshold voltage Increase +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_CONV: GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on			+2/V_RU_P referenced to +2/V_RU_P_RTN											
REF_2V5_RU_N: +27V_RU_N_RTN PF_IGBT threshold voltage Increase +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_CONV: GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on				V										
PF_IGBT threshold voltage Increase +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV: GND MX2: PF_IGBT_CONV: GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on														
Increase +27V_RU_N from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV : GND MX2: PF_IGBT_CONV : GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on			REF_2V5_RU_N:+27V_RU_N_RTN									2,38	2,50	2,63
MX1: PF_IGBT_INV : GND MX2: PF_IGBT_CONV : GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on												2,00	2,40	2,80
MX2: PF_IGBT_CONV : GND preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on			Increase +27V_RU_N from 0V until output a transition occurs: HIGH to LOW											
preparation: disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on														
disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on			MX2: PF_IGBT_CONV : GND											
disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on														
disconnect primary 24V_SW and 24V_SE supply, add an adjustable supply only on			preparation:											
add an adjustable supply only on			disconnect primary 24V_SW and 24V_SE supply,											
		_			-	_	\dashv		+-	+				

Test Requirement for PBX BIDI GAA2680	омх													
All measuring instruments must be calibrated!!! As an additional document, the circuit diagram of the PCBA is													., .	
 All measuring points: reference points are described in kind of 4. PBX_BIDI alternatively assembled with CONVERTER- or INV test cases only for PBX_BIDI, INVERTER-FUNCTIONALIT 	of netnames VERTER-FU TY, GAA2	INCTIONALITY 26800 MX1 , marked with note: 1				:	Sample	es				Low	Value range er Specification Lir	
test cases only for PBX_BIDI, CONVERTER-FUNCTIONA 5. Highly Accelerated Life Test, test cases required for HALT, m												Орр	er Specification Lir	THE
5. Highly Accelerated Life Test, test cases required for HALT, if		Test cases			Bo	ard	Serial I	Numl	ner .			LSL	Typical	USL
Description			1			aru	Jeriar	Nullii	Jei	1		LSL	Турісаі	USL
Description	note	@ specified condition	unit											
						_								
Power Supply: IGBT Gate Driver PHASE S(V)		PWM_VCC_SV : 24V_DRIVER_RTN	V									10,00	11,00	13,00
		I_SENSE_SV: 24V_DRIVER_RTN	_ `									0,30	0,60	0,80
SMPS characteristic		SWITCHING ON-DUTY-CYCLE w/o any additional load										5,00	20,00	30,00
Switched Mode Power Supply		PWM CONTROLLER output pin or MOSFET DRAIN GATE SENSE SV: 24 DRIVER RTN	%											
Dawen Fail Datastian		DRAIN SV: 24 DRIVER RTN												
Power Fail Detection		SWITCHING FREQUENCY										140.00	160.00	180.00
		PWM CONTROLLER output pin or MOSFET DRAIN	l									0,00	, 00,00	700,00
		GATE_SENSE_RU: 24_DRIVER_RTN	kHz											
		DRAIN_RU : 24_DRIVER_RTN												
		3 +27V_SV_P: +27V_SV_P_RTN										26,00	27,00	28,00
		3 +27V_SV_N:+27V_SV_N_RTN										26,00	27,00	28,00
		REF_3V9_SV_P:+27V_SV_P_RTN										6,50	7,00	7,50
		REF_2V5_SV_P:+27V_SV_P_RTN PF IGBT threshold voltage	-									2,38 2,00	2,50 2,40	2,63 2,80
		Increase +27V_SV_P from 0V until output a transition occurs: HIGH to LOW MX1: PF_IGBT_INV : GND										2,00	2,40	2,00
		MX2: PF_IGBT_CONV : GND preparation:												
		disconnect primary 24V SW and 24V SE supply,												
		add an adjustable supply only on												
		+27V_SV_P referenced to +27V_SV_P_RTN												
			V											
		REF 3V9 SV N:+27V SV N RTN									+	6,50	7,00	7,50
		REF_2V5_SV_N:+27V_SV_N_RTN										2,38	2,50	2,63
		PF_IGBT threshold voltage										2,00	2,40	2,80
		Increase +27V_SV_N from 0V until output a transition occurs: HIGH to LOW												
		MX1: PF_IGBT_INV : GND												
		MX2: PF_IGBT_CONV : GND												
		preparation:												
		disconnect primary 24V SW and 24V SE supply,												
		add an adjustable supply only on												
		+27V_SV_N referenced to +27V_SV_N_RTN												
						_		_	4	_				

T D	OOONAV											
Test Requirement for PBX_BIDI GAA26 1. All measuring instruments must be calibrated!!! 2. As an additional document, the circuit diagram of the PCB 3. All measuring points: reference points are described in ki 4. PBX_BIDI alternatively assembled with CONVERTER- or test cases only for PBX_BIDI, INVERTER-FUNCTION, test cases only for PBX_BIDI, CONVERTER-FUNCTIOS 5. Highly Accelerated Life Test, test cases required for HAL	iA is required. nd of netnames, test points or com INVERTER-FUNCTIONALITY ALITY, GAA26800 MX1 , marked DNALITY, GAA26800 MX2 , marked	with note: 1				Sam	ples			Low	Value range er Specification Lir er Specification Lir	
	Test cases				Board	Seri	al Nun	ber		LSL	Typical	USL
Description	note	measuring point : reference point @ specified condition	unit									
Power Supply: IGBT Gate Driver PHASE T(W)		N : 24V_DRIVER_RTN : 24V_DRIVER_RTN	V							10,00	11,00 0,60	13,00 0,80
SMPS characteristic Switched Mode Power Supply	PWM CONTRO GATE_SENSE	N-DUTY-CYCLE w/o any additional load DLLER output pin or MOSFET DRAIN _TW : 24_DRIVER_RTN 4_DRIVER_RTN	%							5,00	20,00	30,00
Power Fail Detection	SWITCHING F PWM CONTRO GATE_SENSE		kHz							140,00	160,00	180,00
	3 +27V_TW_P:- 3 +27V TW N:-	+27V_TW_P_RTN +27V_TW_N_RTN								26,00 26,00	27,00 27,00	28,00 28,00
		_P:+27V_TW_P_RTN _P:+27V_TW_P_RTN		 -	-			_	-	6,50 2.38	7,00 2,50	7,50 2,63
	PF_IGBT thres Increase +27V_ MX1: PF_IGBT MX2: PF_IGBT preparation: disconnect print add an adjustate	shold voltageTW_P from 0V until output a transition occurs: HIGH to LO\ _INV : GND	v							2,00	2,40	2,80 2,80
	REF_3V9_TW	N:+27V_TW_N_RTN								6,50	7,00	7,50
		N:+27V_TW_N_RTN								2,38	2,50	2,63
	MX1: PF_IGBT MX2: PF_IGBT preparation: disconnect prim add an adjustat	_ TW_N from 0V until output a transition occurs: HIGH to LO ¹ _INV: GND	v							2,00	2,40	2,80

Test Requirement for PBX_BIDI GAA26800MX 1. All measuring instruments must be calibrated!!! 2. As an additional document, the circuit diagram of the PCBA is required. 3. All measuring points: reference points are described in kind of netrology. 4. PBX_BIDI alternatively assembled with CONVERTER- or INVERTER test cases only for PBX_BIDI, INVERTER-FUNCTIONALITY, test cases only for PBX_BIDI, CONVERTER-FUNCTIONALITY, 5. Highly Accelerated Life Test, test cases required for HALT, marked	ed. ames, test points or component designator. R-FUNCTIONALITY 3AA26800 MX 1, marked with note: 1 GAA26800 MX 2, marked with note: 2					Sam	ples					Value range er Specification Lir	
or righty receivance and received course required for right in amount	Test cases				Boar	d Seri	al Num	her			LSL	Typical	USL
Description		oint			1					T		.,,,	
	measuring point : reference page 2 group of the condition	unit											
Power Supply: SENSING	1 quiescent current consumption: 24V_SENSE @ 24VD0 current: SENSING SMPS	; mA									20,00	100,00	200,00
SMPS characteristic Switched Mode Power Supply	VCC_PWM_CONTROLLER : 24V_SMPS_SENSE_RT	N V									10,00	12,00	14,00
Switched Mode Power Supply	I_SENSE_PWM_CONTROLLER: 24V_SMPS_SENSE_RTN	V									0,30	0,60	0,80
	1 SWITCHING ON-DUTY-CYCLE PWM CONTROLLER output pin or MOSFET DRAIN SMPS_SENSE_GATE: 24V_SMPS_SENSE_RTN SMPS_SENSE_DRAIN: 24V_SMPS_SENSE_RTN	%									22,00	27,00	32,00
	SWITCHING ON-DUTY-CYCLE PWM CONTROLLER output pin or MOSFET DRAIN SMPS_SENSE_GATE: 24V_SMPS_SENSE_RTN SMPS_SENSE_DRAIN: 24V_SMPS_SENSE_RTN	%									34,00	39,00	44,00
	SWITCHING FREQUENCY PWM CONTROLLER output pin or MOSFET DRAIN SMPS_SENSE_GATE: 24V_SMPS_SENSE_RTN SMPS_SENSE_DRAIN: 24V_SMPS_SENSE_RTN	kHz									140,00	160,00	180,00
	3 InvTempUref (Addr.: 0x10) CnvTempUref (Addr.: 0x10) measuring point: S+15V / SGND signal: +15V_SENSE / GND_SENSE	mV									14250,00	15000,00	15750,00
	3 -15V_SENSE : GND_SENSE										-15750,00	-15000,00	-14250,00
Power Supply: PTC Temperature Measurement SMPS characteristic	quiescent current consumption: 24V_HL2 @ 24VDC current: SENSING SMPS	mA									20,00	100,00	200,00
Switched Mode Power Supply	SW_TEMP_SENSOR : HL2 3 5V HL2 : HL2	kHz									180,00 4,75	200,00 5,00	220,00 5,25
preparation:	PTC_ADC: HL2 @ open PTC_1/PTC_6	V									3,00	3,70	5,00
Please connect, the test cases referred resistors between the inputs:	PTC_ADC: HL2 @ 1k, 1% resistor between PTC_1/PTC_6 PTC_ADC: HL2 @ SHORT-CIRCUIT PTC_1/PTC_6	V									1,00 0,00	1,20 0,32	1,80 0,50
PTC_1 and PTC_6	PTC_1: PTC_6	mA									4,00	4,60	5,60
DC-Link-LED acquisition via a LED sensor	Pilot LED flashing Frequency										5,00	7,00	15,00
preparation: 5VDC supply: DCP_LED referenced to DCN_LED_6 (NE555 Timer-pin1)		Hz											
IGBT Gate Driver voltages	RUP_G11:RUP_E11@PWM_RP, PWM_UP=HIGH:GN	D									-16,00	-9,50	-5,00
preparation:	RUP_G11:RUP_E11@PWM_RP, PWM_UP= LOW :GN	D									14,00	15,70	17,00
1.) All drivers must be stimulated such that a connected IGBT would be	RUN_G21:RUN_E21@PWM_RN, PWM_UN=HIGH:G	ND									-16,00	-9,50	-5,00
switched on. Add an IGBT Gate-Emitter load, a 100nF±10% ceramic or metal foil	RUN_G21:RUN_E21@PWM_RN, PWM_UN= LOW :Gf	ID					-+	+		+	14,00	15,70	17,00
capacitor must be connected between the measuring points:	SVP G11:SVP E11@PWM SP, PWM VP=HIGH:GN	D			+	+ +	-+	+	_		-16,00	-9,50	-5,00
RUP_G11 : RUP_E11, RUN_G21 : RUN_E21	SVP G11:SVP E11@PWM SP, PWM VP= LOW :GN)				+	+	+			14,00	15,70	17,00
SVP_G11 : SVP_E11, SVN_G21 : SVN_E21 TWP G11 : TWP E11, TWN G21 : TWN E21	SVN G21:SVN E21@PWM SN, PWM VN=HIGH:GN	V	\vdash		-	\vdash	-+	+		-	-16,00	-9,50	-5,00
	SVN G21:SVN E21@PWM SN, PWM VN=LOW:GN				\perp		_	+		-	14,00	15,70	17,00
short circuit: IGBT Collector to IGBT Emitter RUP C1 : RUP E11 : RUN E21	TWP G11:TWP E11@PWM TP, PWM WP=HIGH:G				-		_	+			-16,00		-5,00
SVP_C1:SVP_E11:SVN_E21	TWP_G11:TWP_E11@PWM_TP, PWM_WP=HIGH:G							-	_	1	14,00	-9,50 15,70	17,00
	I VVF_GTT.TVVF_ETT@PVVIVI_TP, PVVIVI_VVP=LOW:G	ND.				1					14,00	15,70	17,00
TWP_C1 : TWP_E11 : TWN_E21	TIME OUT THE FOLCOWER THE BUILT HE	ND		_	+	+ +			-	+			
TWP_C1 : TWP_E11 : TWN_E21 2.) only GAA26800MX2 OUT EN CONV:GND set to HIGH level	TWN_G21:TWN_E21@PWM_TN, PWM_WN=HIGH:C										-16,00 14,00	-9,50 15,70	-5,00 17,00

Test Requirement for PBX_BIDI GAA26800MX 1. All measuring instruments must be calibrated!!! 2. As an additional document, the circuit diagram of the PCBA is require 3. All measuring points : reference points are described in kind of netnal 4. PBX_BIDI alternatively assembled with CONVERTER- or INVERTER test cases only for PBX_BIDI, INVERTER-FUNCTIONALITY, G test cases only for PBX_BIDI, CONVERTER-FUNCTIONALITY, G 5. Highly Accelerated Life Test, test cases required for HALT, marked w	mes, te I-FUNO AA268 AA268	CTIONALITY 00MX1, marked with note: 1 00MX2, marked with note: 2					Sam	ples				Value range ver Specification L ver Specification L	
Description		st cases		1	Во	ard	Seri	al Nu	mber		LSL	Typical	USL
Description	note note	measuring point : reference point @ specified condition	unit										
DRIVER_RESET_N logic low pulse width Description of the function: HCPL316J FAULT* changes from a high impedance state to a logic low, if the voltage on the HCPL316J DESAT pin exceeding an internal reference voltage of 7.5V while the IGBT is on. HCPL316J FAULT* output remains low until HCPL316J RESET* is brought low. HCPL316J FAULT* output is an open collector which allows the FAULT* outputs		GAA26800MX1: OCT_INV referenced to GND GAA26800MX2: CNV_OC_FLT referenced to GND HIGH pulse width @open only short circuit RUP_C1 : RUP_E11									200	360	45
from all HCPL-316Js to be connected together in a "wired OR" forming the signals: GAA26800MX1: OCT_INV referenced to GND GAA26800MX2: CNV_OC_FLT referenced to GND When one of the six HCPL316J FAULT* outputs change to low, the HCPL316J RESET* input will change to low after a time delay of the "DRIVER_RESET_N logic low pulse width"		GAA26800MX1: OCT_INV referenced to GND GAA26800MX2: CNV_OC_FLT referenced to GND HIGH pulse width @open only short circuit RUP_E11: RUN_E21									200	360	45
preparation: 1.)													
All drivers must be stimulated such that a connected IGBT would be switched on. PWM_RP=LOW:GND, PWM_UP=LOW:GND PWM_RN=LOW:GND, PWM_UN=LOW:GND PWM_SP=LOW:GND, PWM_VP=LOW:GND PWM_SN=LOW:GND, PWM_VN=LOW:GND PWM_TP=LOW:GND, PWM_WP=LOW:GND PWM_TN=LOW:GND, PWM_WP=LOW:GND		GAA26800MX1: OCT_INV referenced to GND GAA26800MX2: CNV_OC_FLT referenced to GND HIGH pulse width @open only short circuit SVP_C1: SVP_E11									200	360	45
2.) Add an IGBT Gate-Emitter load, a 100nF±10% ceramic or metal foil capacitor must be connected between the measure points: IGBT Gate to IGBT Emitter RUP_G11: RUP_E11, RUN_G21: RUN_E21 SVP_G11: SVP_E11, SVN_G21: SVN_E21 TWP_G11: TWP_E11, TWN_G21: TWN_E21 3.) Realize the following possibility to change between:		GAA26800MX1: OCT_INV referenced to GND GAA26800MX2: CNV_OC_FLT referenced to GND HIGH pulse width @open only short circuit SVP_E11: SVN_E21	ms								200	360	45
short circuit / open for approximate 1ms: IGBT Collector to IGBT Emitter RUP_C1: RUP_E11, RUP_E11: RUN_E21 SVP_C1: SVP_E11, SVP_E11: SVN_E21 TWP_C1: TWP_E11, TWP_E11: TWN_E21 4.) only GAA26800MX2 OUT_EN_CONV:GND set to HIGH level stimulation:		GAA26800MX1: OCT_INV referenced to GND GAA26800MX2: CNV_OC_FLT referenced to GND HIGH pulse width @open only short circuit TWP_C1 : TWP_E11									200	360	45
DESAT pins are executed successively by open only one of the short circuit "IGBT Collector to IGBT Emitter" for approximate 1ms. Keep a wait time condition to the next test case of approximate 500ms. All tests must be processed 2 times sequentially, in order to guarantee that no latch up effect appears.		GAA26800MX1: OCT_INV referenced to GND GAA26800MX2: CNV_OC_FLT referenced to GND HIGH pulse width @open only short circuit TWP_E11 : TWN_E21									200	360	45

Test Requirement for PBX_BIDI GAA26800MX														
1. All measuring instruments must be calibrated!!! 2. As an additional document, the circuit diagram of the PCBA is require 3. All measuring points: reference points are described in kind of netna 4. PBX_BIDI alternatively assembled with CONVERTER- or INVERTER test cases only for PBX_BIDI, INVERTER-FUNCTIONALITY, G test cases only for PBX_BIDI, CONVERTER-FUNCTIONALITY, G 5. Highly Accelerated Life Test, test cases required for HALT, marked	mes, t R-FUN AA26 AA26	CTIONALITY 800MX1, marked with note: 1 800MX2, marked with note: 2					Sam	ples					Value range er Specification Li er Specification Li	
	Te	est cases			В	oard	Seri	al Nu	ımbe	r		LSL	Typical	USL
Description	note		unit			ou. u	001					101	Тургос	
POWER FAIL MONITORING thresholds PFAIL_RS_CONV signal changes from 1.) statical LOW level 2.) TOGGLE between LOW and HIGH 3.) statical HIGH level	2	PFAIL_RS_CONV / GND threshold toggle Decrease US from 7.4Vpp until PFAIL_RS_CONV threshold changes from statical LOW to TOGGLE										1,00	1,30	4,76
Umax_line_to_line=480V*1.1 resultant max. voltage range: ±3.7V (Vpp=7.4V) Umin_line_to_line=340V resultant min. voltage: Vpp=4.76V preparation: adjustable sinus voltage supply		PFAIL_RS_CONV / GND threshold statical LOW Decrease US from 7.4Vpp until PFAIL_RS_CONV threshold changes from TOGGLE to statical HIGH	Vpp									0,30	0,70	1,00
7.4Vpp@50Hz, offset=0V to US / GND_SENSE														
Hall Effect Current Sensor LEM: LA200-P TAMURA: S26P200D15Y VAC: T60404-N4646-X201		SENSE_IR, SENSE_IU : GNDA output-current @ 0A SENSE_IR, SENSE_IU : GNDA										-1,00 0,90	1,00	1,00
current conversion ratio: 1:2000 measure the output-current at a given input-current		LEM_IR_output-current @ 2A SENSE_IR, SENSE_IU : GNDA										-1,10	-1,00	-0,90
preparation: Apply R=60ohm between: SENSE_IR, SENSE_IU and GNDA		LEM_IR_output-current @ -2A SENSE_IS, SENSE_IV : GNDA	mA									-1,00	0,00	1,00
SENSE_IS, SENSE_IV and GNDA Input-current source cable put through the hole once. Polarity markings:		LEM_IS_output-current @ 0A SENSE_IS, SENSE_IV : GNDA LEM IS output-current @ 2A										0,90	1,00	1,10
A positive measuring output-current is obtained on terminal M (pin 2), when the primary input-current flows in the direction of the arrow.		SENSE_IS, SENSE_IV : GNDA LEM_IS_output-current @ -2A	_									-1,10	-1,00	-0,90
CHG-RELAY contact resistance	2	R_RES:RUO@REL1, REL2: contacts opened											contacts opened	
preparation: OUT_EN_INV:GND set to HIGH level OUT EN CONV:GND set to HIGH level		R_RES:RUO@REL1, REL2: contacts closed	VEC										contacts closed	
REL1, REL2: contacts closed CHRG_N:GND to LOW		S_RES:SVO@REL1, REL2: contacts opened	YES or NO										contacts opened	
REL1, REL2: contacts opened CHRG_N:GND to HIGH		S_RES:SVO@REL1, REL2: contacts closed											contacts closed	

 All measuring instruments must be calibrated!!! As an additional document, the circuit diagram of the PCBA is re All measuring points: reference points are described in kind of n PBX_BIDI alternatively assembled with CONVERTER- or INVEF test cases only for PBX_BIDI, INVERTER-FUNCTIONALITY, test cases only for PBX_BIDI, CONVERTER-FUNCTIONALITS. Highly Accelerated Life Test, test cases required for HALT, marl 	etnames, test points of RTER-FUNCTIONALI GAA26800 MX1 , m Y, GAA26800 MX2 , n	TY narked with note: 1				Samı	ples					Value range er Specification Liner Specification Lin	
Description	Test cases	measuring point : reference point		T	Board	Seria	al Num	ber	T		LSL	Typical	USL
	note	@ specified condition	unit										
VRS, VST		C / GNDA (±10%)									-2017,40	-1834,00	-1650,60
voltage gain calibration and	measuri	: 5V*-0.4115*0.89111=-1.83356V ng point: DC_VRS / SGND (±10%)									1852,20	2058,00	2263,80
transfer gain K3 (plausibility) check	measuri	/RS_DC_N / GND_SENSE ng point: VRS / AGND (±25%)	mV								1375,50	1834,00	2292,50
		/RS_OUT_DC_N / GNDA n: 2.0576V*0.89111=1.8335V											
Linear Optocoupler GAA629CL1		ng point: VRS_N / AGND /RS_OUT_N / GNDA									-1500,00	0,00	1500,00
Vendor Vishay: IL300-EF-X017T transfer gain K3 = 0.851 - 1.061 ± 0.5% Tamb = 0 ℃ to 75 ℃	transfer	gain K3_VRS (plausibility) check									0,80	1,00	1,10
Vendor Agilent / Avago: HCNR201		e with the following equation:											
transfer gain K3 = 0.93 - 1.07		=VRS_OUT_DC_N / (0.89111*VRS_DC_N) ng point: DC_VST / SGND (±10%)			1					+	1852,20	2058,00	2263,80
	signal: \	/ST_DC_N / GND_SENSE									•	·	
		ng point: VST / AGND (+-25%) /ST_OUT_DC_N / GNDA	mV								1375,50	1834,00	2292,50
		n: 2.0576V*0.89111=1.8335V											
		ng point: VST_N / AGND /ST_OUT_N / GNDA									-1500,00	0,00	1500,00
		gain K3_VST (plausibility) check									0,80	1,00	1,10
		e with the following equation:											
	K3_VST	= VST_OUT_DC_N / (0.89111*VST_DC_N)							+				
GBT TEMPERATURE MEASUREMENT	NTC1·N	TC2 (1.86V±10%)									1670,00	1860,00	2050,00
and	measuri	ng point: TEMP_IGBT / GNDA IEMP_IGBT / GNDA									1445,00	2040,00	2680,00
transfer gain K3 (plausibility) check	equation	:											
preparation: measure with connected resistor 5kohm, ±0.1%	with gain	3.107V*0.89111)-0.7258=2.04V range IL300: 0.81.2											
petween NTC1 / NTC2	(-3% = 1	and the state of t											
	max.: (1.) $(+3% = 2)$	2*2.77V)-0.7258=2.6V 2.68V)											
		oun (Addr.: 0x12) pun (Addr.: 0x12)	mV								1080,00	1200,00	1320,00
	measuri	ng point: TEMP_UN / GNDA											
		FEMP_UN / GNDA DUIn (Addr.: 0x14)			+ +						2950,00	3110,00	3270,00
	CnvTem prepara	pUin (Addr.: 0x14) tion:											
	measure	with connected resistor 5kohm between NTC1 / NTC2 ng point: NTC1 / SGND											
	signal: N	NTC1 / GND_SENSE											
	transfer proceed	gain K3_TEMP (plausibility) check ing:									0,80	1,00	1,10
	calculate K3_TEM	e with the following equation: P=											
	(TEMP_	IGBT+(TEMP_UN*0.604)) / (NTC1*0.89111)											
DC-LINK VOLTAGE MEASUREMENT and	measuri	Jin (Addr.: 0x18) ng point: DC_ME / GND_SENSE									2900,00	3000,00	3100,00
transfer gain K3 (plausibility) check	equation												
		.2V*2.4864=3V Jout (Addr.: 0x1A)			$\downarrow \downarrow$				+		2070,00	2673,00	3220,00
preparation:	measuri	ng point: UDCL / GNDA	mV								2070,00	2073,00	<i>5220,0</i> 0
1.)	equation		111 V										
CALIBRATED precision DC voltage reference OUTPUT VOLTAGE: +1.2V ±0.2% max	with gai	3V*0.89111=2,673V n range IL300: 0.81.2											
LOW NOISE: 10µVPP max (0.1Hz to 10Hz)	(-3% = 2												
conecetd to DCP_U_ME_1 / GND_SENSE	(+3% = 3	2°2,673V=3.208V 3.22V)											
2.)	transfer	gain K3_UDC (plausibility) check									0,80	1,00	1,10
short circuit is needed between DCN_U_ME_1 / GND_SENSE	calculate	e with the following equation: = UDCL / (0.89111*DC_ME)											

s an additional document, the circuit diagram of the PCBA is a lift measuring points: reference points are described in kind of BX_BIDI alternatively assembled with CONVERTER- or INVE test cases only for PBX_BIDI, INVERTER-FUNCTIONALITY test cases only for PBX_BIDI, CONVERTER-FUNCTIONAL lighly Accelerated Life Test, test cases required for HALT, materials.	netnames, ERTER-FUN Y, GAA26 ITY, GAA26	ICTIONALITY 800MX1, marked with note: 1 800MX2, marked with note: 2					amples					U p _l	Value range ver Specification L per Specification L	
Description	note	measuring point : reference point	unit		Boa	rd S	Serial N	lumbe	er			LSL	Typical	US
	Ĕ	@ specified condition												
ware-dependent ning values		InvTempUref (Addr.: 0x10) CnvTempUref (Addr.: 0x10)												
med measured values, see table above,		values margin: 140001500016000 InvTempUn (Addr.: 0x12)				+								
ulated on values in [mV] storing in the		CnvTempUn (Addr.: 0x12) values margin: 100012021500												
ROM		InvTempUin (Addr.: 0x14) CnvTempUin (Addr.: 0x14)												
bytes from trimming values must be written into the lower esses.		values margin: 161331073596												
26800MX1: I2C DEVICE Addr.: # 2 26800MX2: I2C DEVICE Addr.: # 4		InvTempUout (Addr.: 0x16) CnvTempUout (Addr.: 0x16)												
bus lines: .26800MX1: I2C SCL0 INV, I2C DA0 INV		values margin: 110027693784 proceeding:												
A26800MX 2 : I2C_SCL0_CONV, I2C_DA0_CONV		calculate with the following equation: InvTempUout= TEMP_IGBT+9060/15000*InvTempUn												
to be storing, informations from the board assigned lab	el:	CnvTempUout= TEMP_IGBT+9060/15000*CnvTempUn												
	1	InvUdcIUin (Addr.: 0x18) values margin: 274330003242												
	2	CnvVrsUinDC (Addr.: 0x18)												
	-	values margin: 450050005500												
S/N:MX1093400021		proceeding: calculate with the following equation:												
P/N:G1A26800MX1A-LF REV:2009-07-22	1	CnvVrsUinDC=VRS_DC_N*2.43 InvUdcIUout (Addr.: 0x1A)				+		-						
KE V. 2003 - 0.7 - 2.2	2	values margin: 187026673412 CnvVrsUoutDC (Addr.: 0x1A)	m\/				_							
	-	values margin: 350044555400	mV											
		proceeding: calculate with the following equation:												
	2	CnvVrsUoutDC=VRS_OUT_DC_N*2.43 CnvVrsUout (Addr.: 0x1C)												
S/N:MX2093400014	2	values margin: -150001500												
P/N:G1A26800MX2A-LF		constraint: if (VRS_OUT_N < 0) write (65536 - abs(VRS_OUT_N))												
REV:2009-07-22		and if (VRS_OUT_N >= 0) then write CnvVrsUout equal to VRS_OUT_N wi mV unit.	h											
	2	CnvVstUinDC (Addr.: 0x1E)												
A26800MX1: Package code: 0 = 20 (dez)		values margin: 450050005500 proceeding:												
A26800MX1: voltage_code:		calculate with the following equation:												
2 = 4 (dez)	2	CnvVstUinDC=VST_DC_N*2.43 CnvVstUoutDC (Addr: 0x20)				+	+		-		\vdash			
A26800MX1: power code:		values margin: 350044555400 proceeding:												
4 = 120 (dez)		calculate with the following equation: CnyVstUoutDC=VST_OUT_DC_N*2.43												
A26800MX1: Drive version number: 6 = 2 (dez)	2	CnvVstUout (Addr: 0x22)												
		values margin: -150001500 constraint:												
3 serial number S/N: 1000x010F		if (VST_OUT_N < 0) write (65536 - abs(VST_OUT_N)) and if (VST_OUT_N >= 0) then write CnvVstUout equal to VST_OUT_N wit	n											
byte; ASCII string; left-aligned; bytes filled with spaces		mV unit.												
code; Otis definition; e.g. A26800MX1: "MX1093400021 "	1	InvManufTestId (addr: 0x1C) must be set to enable the trimming parameter with set 0xDEC0 after end of												
A26800MX1: MX1093400021 A26800MX2: "MX2093400014 "		hardware test&calibration addr: 0x1C data: C0												
		addr: 0x1C data: C0 addr: 0x1D data: DE												
3 part number P/N: 120 bis 0x012F	2	CnvManufTestId (addr: 0x24)			-	-	\perp	-						
byte; ASCII string; left-aligned;	2	must be set to enable the trimming parameter with set 0xDEC0 after end of	HEX											
bytes filled with spaces code; Otis definition; e.g.		hardware test&calibration addr: 0x24 data: C0	112											
A26800MX1: "GAA26800MX1A-LF " A26800MX 2 : "GAA26800MX 2 A-LF "		addr: 0x25 data: DE												
paration: *_EN_INV:GND set to HIGH level														
T_EN_CONV:GND set to HIGH level							1		1	1	1 1			