XPAK **V23833-G2005-A101**
850 nm Module **V23833-G6005-A101**
10 Gigabit Pluggable Transceiver **V23833-G6005-A111**
**Compatible with XPAK MSA Rev. 2.3**

Preliminary Data Sheet

Features

Standards

• Compatible with IEEE Std 802.3ae™-2002
• Compatible with Fibre Channel 10GFC Draft 3.5
• Compatible with XPAK MSA Rev. 2.3

Optical

• IEEE Ethernet: Serial 850 nm 10GBASE-SR
• T11 Fibre Channel: Serial 850 nm 1200-M5-SN-I; 1200-M5E-SN-I; 1200-M6-SN-I
• 10 Gigabit Fibre Channel: 10.51875 Gbit/s (V23833-G2005-A101)
• 10 Gigabit Ethernet: 10.3125 Gbit/s (V23833-G6005-A1x1)
• Transmission distance
  – up to 82 m[1] (50 μm MMF)
  – up to 300 m[1] (on special MMF)
• Vertical Cavity Surface Emitting Laser at 850 nm (VCSEL)
• LC connector, multimode fiber
• Full duplex transmission mode
• Eye safety class 1M (IEC 60825-1:A2)

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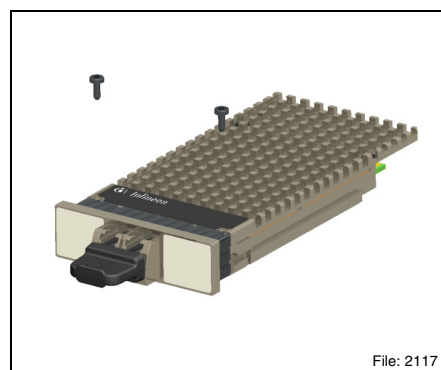
[1] Maximum reach as defined by IEEE. Longer reach possible depending upon link implementation.

Part Number	Standard	De-Latch Mechanism	Connector	Laser Class
V23833-G2005-A101	Fibre Channel	Bail	LC	1M
V23833-G6005-A101	Ethernet	Bail	LC	1M
V23833-G6005-A111	Ethernet	None	LC	1M

- DOM
    - Loss Of Signal from receiver
    - Supply voltage monitor (+3.3 V, Adaptable Power Supply)
    - Transmit power
    - Module temperature
    - Received power
    - Transmit bias current monitor

Mechanical

- Mezzanine profile: 2.68" L x 1.42" W x 0.38" H (68.07 mm x 35.99 mm x 9.8 mm)
- Mezzanine module height for PCI card applications mid-board mounting
- Separated signal/chassis ground (a common signal/chassis ground module version is available upon request)
- Belly-to-belly applications
- De-latch mechanism with low extraction force (V23833-Gxxxx-Ax0x only)
- Built-in heat sink

Electrical

- Hot pluggable
- Power supply: +5.0 V, +3.3 V, Adaptable Power Supply (APS: +1.8 V)
- Total power consumption: 3.4 W typical
- XAUI electrical interface
    - 3.125 Gbit/s Ethernet (V23833-G60xx-xxxx)
    - 3.1875 Gbit/s Fibre Channel (V23833-G20xx-xxxx)
- Management and control via MDIO 2-wire bus
- 70-pin connector

Applications

- 10 Gbit/s Ethernet and Fibre Channel transmission systems for Short Range (SR)
- Integration on PCI card
- Mid-board mounting
- Belly-to-belly for high density applications
- Enterprise and campus network applications
- Storage applications
- Backplane and switch applications
- Core and edge routers
- Aggregation point for lower date rate
- XPAK evaluation kit V23833-G9909-Z001 available upon request
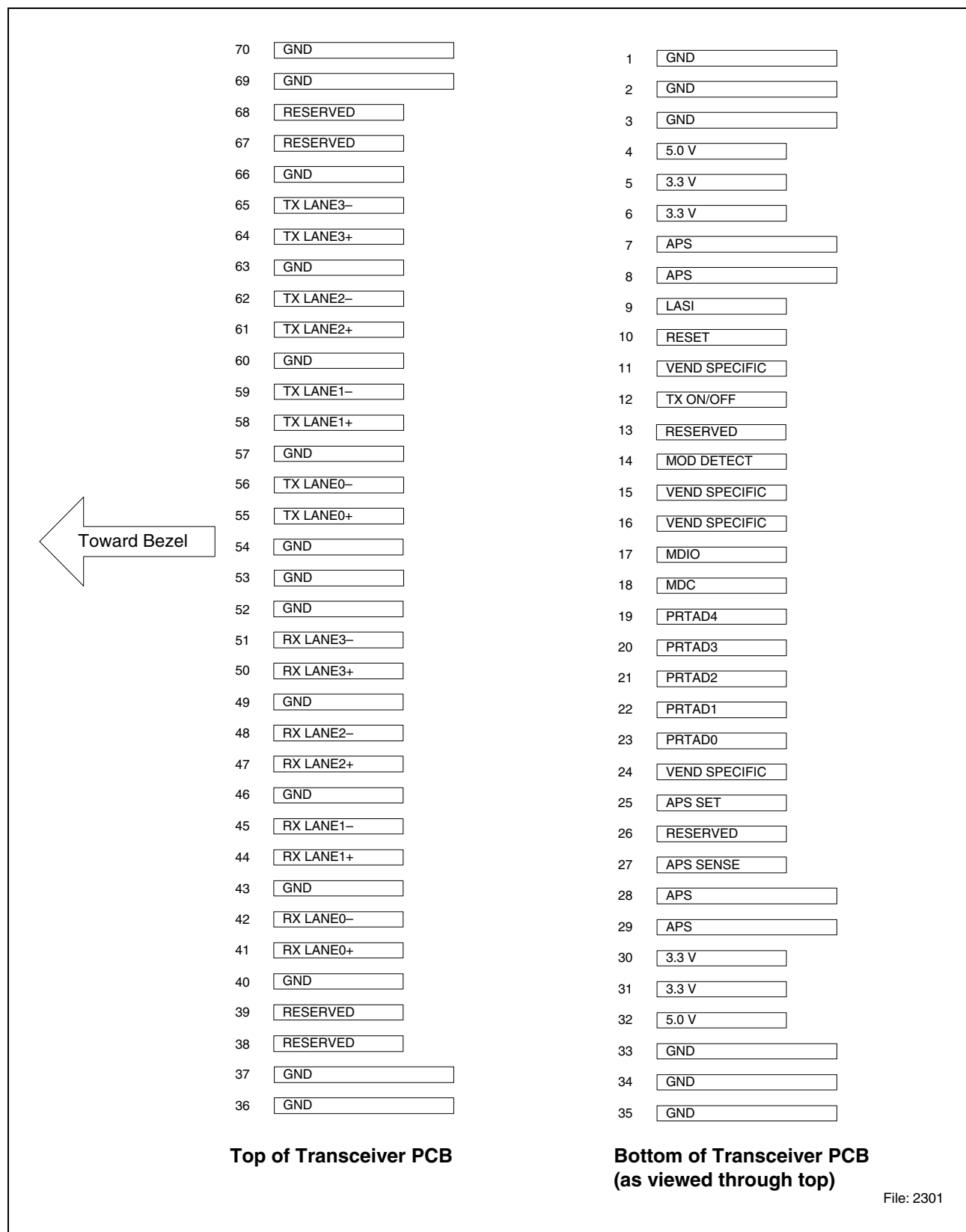
Pin Configuration

Top of Transceiver PCB		Bottom of Transceiver PCB (as viewed through top)	
70	GND	1	GND
69	GND	2	GND
68	RESERVED	3	GND
67	RESERVED	4	5.0 V
66	GND	5	3.3 V
65	TX LANE3–	6	3.3 V
64	TX LANE3+	7	APS
63	GND	8	APS
62	TX LANE2–	9	LASI
61	TX LANE2+	10	RESET
60	GND	11	VEND SPECIFIC
59	TX LANE1–	12	TX ON/OFF
58	TX LANE1+	13	RESERVED
57	GND	14	MOD DETECT
56	TX LANE0–	15	VEND SPECIFIC
55	TX LANE0+	16	VEND SPECIFIC
54	GND	17	MDIO
53	GND	18	MDC
52	GND	19	PRTAD4
51	RX LANE3–	20	PRTAD3
50	RX LANE3+	21	PRTAD2
49	GND	22	PRTAD1
48	RX LANE2–	23	PRTAD0
47	RX LANE2+	24	VEND SPECIFIC
46	GND	25	APS SET
45	RX LANE1–	26	RESERVED
44	RX LANE1+	27	APS SENSE
43	GND	28	APS
42	RX LANE0–	29	APS
41	RX LANE0+	30	3.3 V
40	GND	31	3.3 V
39	RESERVED	32	5.0 V
38	RESERVED	33	GND
37	GND	34	GND
36	GND	35	GND

Toward Bezel

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Figure 1   XPAK Transceiver Electrical Pad Layout

Connector Pin Assignments

Pin No.	Signal Name	Pin No.	Signal Name
1	GND	70	GND
2	GND	69	GND
3	GND	68	Reserved
4	+5.0 V DC Power	67	Reserved
5	+3.3 V DC Power	66	GND
6	+3.3 V DC Power	65	TX LANE3–
7	APS	64	TX LANE3+
8	APS	63	GND
9	LASI	62	TX LANE2–
10	RESET	61	TX LANE2+
11	Vendor Specific	60	GND
12	TX ON/OFF	59	TX LANE1–
13	Reserved	58	TX LANE1+
14	MOD DETECT	57	GND
15	Vendor Specific	56	TX LANE0–
16	Vendor Specific	55	TX LANE0+
17	MDIO	54	GND
18	MDC	53	GND
19	PRTAD4	52	GND
20	PRTAD3	51	RX LANE3–
21	PRTAD2	50	RX LANE3+
22	PRTAD1	49	GND
23	PRTAD0	48	RX LANE2–
24	Vendor Specific	47	RX LANE2+
25	APS SET	46	GND
26	Reserved	45	RX LANE1–
27	APS SENSE	44	RX LANE1+
28	APS	43	GND
29	APS	42	RX LANE0–
30	+3.3 V DC Power	41	RX LANE0+
31	+3.3 V DC Power	40	GND
32	+5.0 V DC Power	39	Reserved
33	GND	38	Reserved
34	GND	37	GND
35	GND	36	GND

Pin Description

Signal Name	Level	I/O	Pin No.	Description
Management and Monitoring Ports				
MDIO	Open Drain	I/O	17	Management Data I/O. Requires external 10 - 22 kΩ pull-up to 1.8 V on host.
MDC	1.2 V CMOS	I	18	Management Data Clock Input
PRTAD4	1.2 V CMOS	I	19	Port Address Input bit 4
PRTAD3	1.2 V CMOS	I	20	Port Address Input bit 3
PRTAD2	1.2 V CMOS	I	21	Port Address Input bit 2
PRTAD1	1.2 V CMOS	I	22	Port Address Input bit 1
PRTAD0	1.2 V CMOS	I	23	Port Address Input bit 0
LASI	Open Drain	O	9	Link Alarm Status Interrupt Output. Open Drain Compatible Output with 10 - 20 kΩ pull-up on host. Logic high = Normal Operation Logic low = Status Flag Triggered
RESET	Open Drain	I	10	Reset Input. Open Drain Compatible Input with 10 kΩ pull-up to APS internal to transceiver. Logic high = Normal Operation Logic low = RESET Note: 1.8 V is APS
Vendor Specific			11,15,16,24	Vendor Specific Pins. Leave unconnected when not used.
TX ON/OFF	Open Drain	I	12	TX ON/OFF Input. Open Drain Compatible Input with 10 kΩ pull-up to APS internal to transceiver. Logic high = Transmitter On Logic low = Transmitter Off Note: 1.8 V is APS
MOD DETECT		O	14	Pulled low inside transceiver through a 1 kΩ resistor to Ground

Pin Description (cont'd)

Signal Name	Level	I/O	Pin No.	Description
Transmit Functions				
Reserved		I	68	Reserved For Future Use
Reserved		I	67	Reserved For Future Use
TX LANE 3–	AC-coupled,	I	65	Module XAUI Input Lane 3–
TX LANE 3+	Internally	I	64	Module XAUI Input Lane 3+
TX LANE 2–	biased	I	62	Module XAUI Input Lane 2–
TX LANE 2+	differential	I	61	Module XAUI Input Lane 2+
TX LANE 1–	XAUI	I	59	Module XAUI Input Lane 1–
TX LANE 1+		I	58	Module XAUI Input Lane 1+
TX LANE 0–		I	56	Module XAUI Input Lane 0–
TX LANE 0+		I	55	Module XAUI Input Lane 0+
Receive Functions				
Reserved		O	38	Reserved For Future Use
Reserved		O	39	Reserved For Future Use
RX LANE 0+	AC-coupled,	O	41	Module XAUI Output Lane 0+
RX LANE 0–	Internally	O	42	Module XAUI Output Lane 0–
RX LANE 1+	biased	O	44	Module XAUI Output Lane 1+
RX LANE 1–	differential	O	45	Module XAUI Output Lane 1–
RX LANE 2+	XAUI	O	47	Module XAUI Output Lane 2+
RX LANE 2–		O	48	Module XAUI Output Lane 2–
RX LANE 3+		O	50	Module XAUI Output Lane 3+
RX LANE 3–		O	51	Module XAUI Output Lane 3–

Pin Description (cont'd)

Signal Name	Level	I/O	Pin No.	Description
DC Power				
GND	0 V DC	I	1,2,3,33,34, 35,36,37,40, 43,46,49,52, 53,54,57,60, 63,66,69,70	Ground connection for signal ground on the module
APS	+1.8 V	I	7,8,28,29	Input from Adaptive Power Supply
APS SENSE	+1.8 V	O	27	APS Sense Output. Connected to the APS input inside transceiver.
APS SET	GND	I	25	Feedback input from APS. Connected to GND through a zero Ω resistor inside the transceiver.
3.3 V	+3.3 V DC	I	5,6,30,31	DC Power Input, +3.3 V DC, Nominal
5.0 V	+5.0 V DC	I	4,32	DC Power Input, +5.0 V DC, Nominal
Reserved			26	Reserved for APD. Do not connect.
Reserved			13	Reserved. Do not connect.

Description

System Block Diagram (10 Gbit/s Ethernet)
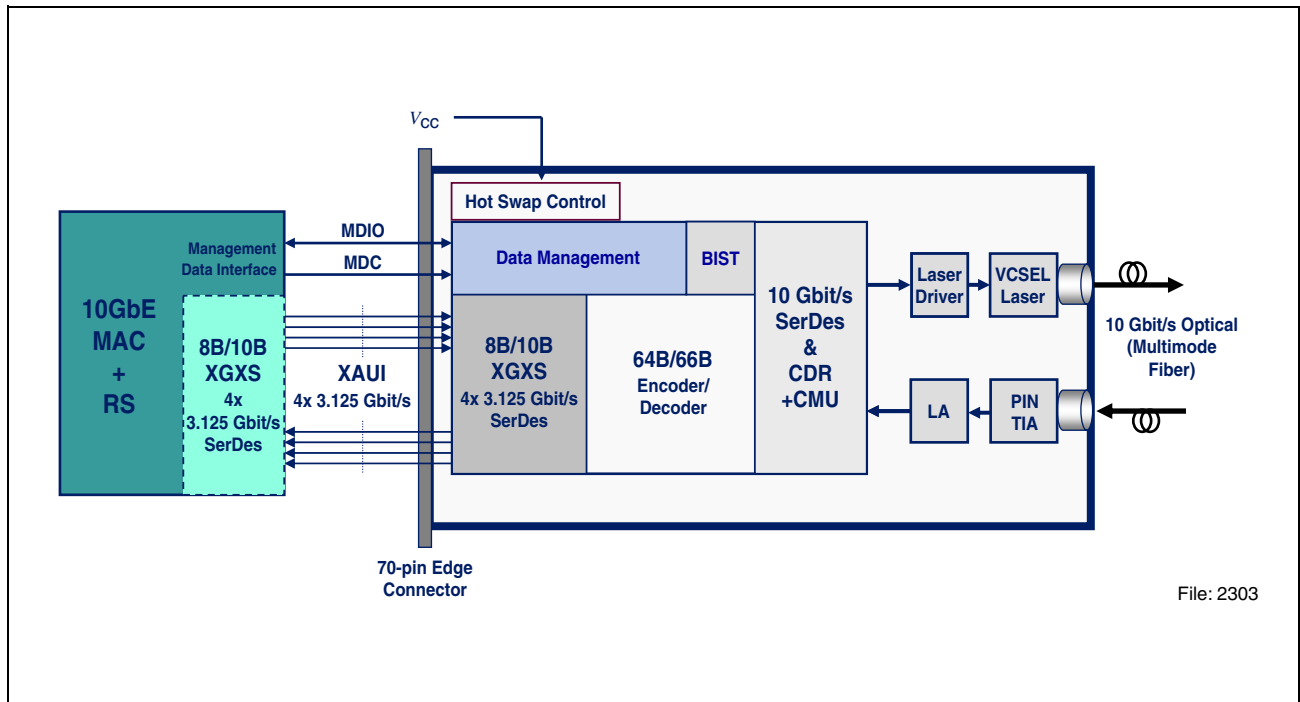
Figure 2

Optical Interface Standard Specifications

- IEEE Std 802.3ae™-2002 clause 52, 10GBASE-SR
- Fibre Channel 10GFC Draft 3.5, 1200-M5-SN-I
- Fibre Channel 10GFC Draft 3.5, 1200-M5E-SN-I
- Fibre Channel 10GFC Draft 3.5, 1200-M6-SN-I
- XPAK MSA 2.3

Standard	Fiber Type	Minimum Modal Bandwidth at 850 nm (MHz*km)	Operating Range[1] (meters)
IEEE	62.5 µm MMF	160	2 to 26
	50 µm MMF	400	2 to 66
Fibre Channel	62.5 µm MMF	200	0.5 to 33
	50 µm MMF	500	0.5 to 82
	50 µm MMF	2000	0.5 to 300

[1] Longer reaches possible depending upon link implementation.

Description

Electrical Interface Standard Specifications

- IEEE Std 802.3ae™-2002 clause 45 & 47
- XPAK MSA 2.3

Environment: Thermal Management Recommendations

Operating air inlet temperature: 0°C - 50°C
Operating Airflow: 3 m/s maximum defined per XPAK MSA
Operating Humidity: 0% - 95% RH non-condensing

Module can withstand and operate with case temperature of 75°C for up to 96 hrs/yr. Transceiver requires airflow across cooling fins. Maximum airflow required per XPAK MSA is 3 m/s. Actual airflow required to provide adequate cooling for module is 1 m/s with a maximum air inlet temperature of 50°C. A maximum case temperature of 70°C must be observed.

Fibers and Connectors

The transceiver has LC receptacles for both Tx and Rx. The transceiver is designed for multimode LC cables, 0° polished endface (PC).

70-pin Connector

The module interface connector is a 70-pin, printed circuit board edge connection with a 0.5 mm pitch. The appropriate mating connector for the customer PCB is a 70-pin SMT, dual row, right angled, edge connector, 0.5 mm pitch (TycoAmp part number 1367337-1, Molex part number 74441-0003 or equivalent).

Cage Requirement

The cage assembly required to mount the XPAK module is defined by the MSA. There are two cage designs for the module, tall and mezzanine profile. For correct operation and EMI design the correct cage size must be selected for the appropriate module. Alternatively a flangeless cage design is specified where there is limited size. A sufficient EMI gasket that connects from the cage to the face plate must be fitted. The mechanical design must ensure that no air gaps exist between the cage and the face plate while the module is plugged in.

Recommended XPAK rail assembly, Molex part number 74732-0200.

Description

DOM Parameters

Parameter	Values			Unit
	min.	typ.	max.	
Transceiver Temperature Monitor Accuracy[1]			±5	°C
Transmit Bias Current Monitor Accuracy[2]			±10	%
Transmit Power Monitor Accuracy[3]			±3	dB
Receive Power Monitor Accuracy[3]			±3	dB

[1] 0 to 70°C case temperature.
[2] 0 to 12.5 mA.
[3] 0 to 6.5 mW.

Regulatory Compliance

Feature	Standard	Comments
ESD: Electrostatic Discharge to the Electrical Pins (HBM)	EIA/JESD22-A114-B (MIL-STD 883D Method 3015.7)	Class 1a (> 500 V)
Immunity: Against Electrostatic Discharge (ESD) to the Module Receptacle	EN 61000-4-2 IEC 61000-4-2	Discharges ranging from ±2 kV to ±15 kV to the front end / faceplate / receptacle cause no damage to module (under recommended conditions).
Immunity: Against Radio Frequency Electromagnetic Field	EN 61000-4-3 IEC 61000-4-3	With a field strength of 10 V/m, noise frequency ranges from 10 MHz to 2 GHz. No effect on module performance between the specification limits.
Emission: Electromagnetic Interference (EMI)	FCC 47 CFR Part 15, Class B EN 55022 Class B CISPR 22	Noise frequency range: 30 MHz to 40 GHz Radiated emission does not exceed specified limits when measured inside a shielding enclosure with MSA conform cutout.

Technical Data

Absolute Maximum Ratings

Parameter	Symbol	Limit Values		Unit
		min.	max.	
Storage Ambient Temperature[1]	T_{As}	−20	85	°C
Operating Ambient Temperature[1]	T_{Ao}	0	65	°C
Operating Case Temperature[1]	T_{Co}	0	80	°C
Supply Voltage +5.0 V	V_5	0	6	V
Supply Voltage +3.3 V	V_3	0	4	V
Supply Voltage APS	V_{aps}	0	2	V
Static Discharge Voltage, All Pins	ST_d		500	V
Average Receive Optical Power	$Rx_{P\ max}$		0	dBm

[1] Non condensing.

Exceeding any one of these values may permanently destroy the device.

Recommended Operating Conditions

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Operating Case Temperature[1]	T_C	0		70	°C
Transceiver Total Power Consumption	P		3.4	3.8	W
Supply Voltage +5.0 V	V_{CC5}	4.75	5.0	5.25	V
Supply Current +5.0 V	I_{CC5}		50		mA
Supply Voltage +3.3 V	V_{CC3}	3.14	3.3	3.47	V
Supply Current +3.3 V	I_{CC3}		550		mA
Supply Voltage APS	$V_{CC\ aps}$	1.746	1.8	1.854	V
Supply Current APS	$I_{CC\ aps}$		700		mA

[1] Worst case thermal location, see **Figure 12**.
See also **Environment: Thermal Management Recommendations**.

Optical Characteristics

(V_{CC5} = 4.75 V to 5.25 V, V_{CC3} = 3.14 V to 3.47 V, $V_{CC\,aps}$ = 1.746 V to 1.854 V, T_C = 0°C to 70°C)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Transmitter					
Launch Power in OMA[1]	$P_{O\text{-}OMA}$	−2.8			dBm
Average Launch Power	$P_{O\text{-}Avg}$	−3	−2	−1	dBm
Center Wavelength Range[1]	$\lambda_{C\text{-}Tx}$	840	850	860	nm
RMS Spectral Width[1]	σ_l		0.4	0.45	nm
Extinction Ratio	ER	3	5.5		dB
Relative Intensity Noise$_{12}$OMA	RIN			−128	dB/Hz
Eye Mask Definition	According to IEEE and Fibre Channel				
Transmitter and Dispersion Penalty	TDP			3.9	dB
Encircled Flux	EF	at 19 µm ≥ 86%, at 4.5 µm ≤ 30%			
Optical Return Loss Tolerance	ORL_T			12	dB
Average Launch Power of OFF Transmitter	$P_{O\text{-}OFF}$			−30	dBm
Receiver					
Stressed Receiver Sensitivity in OMA	$P_{IN\text{-}S}$			−7.5	dBm
Sensitivity in OMA[2]	P_{IN}			−11.1	dBm
Average Receive Power	$P_{IN\text{-}max}$			−1	dBm
Signal Detect Deassert Level	P_{SDL}	−30			dBm
Signal Detect Assert Level	P_{SD}		−20	−13	dBm
Signal Detect Hysteresis	P_{SD}	1	2	4	dB
Receiver Reflectance	REF_{Rx}			−12	dB
Center Wavelength Range	$\lambda_{C\text{-}Rx}$	840		860	nm
Electrical 3 dB Upper Cut-off Frequency	$3dB_{CO}$			12.3	GHz

[1] Conforms to IEEE triple trade off between center wavelength, RMS spectral width and minimum OMA.

[2] Receiver sensitivity, which is defined for an ideal input signal is informative only.

Electrical DC Characteristics

(V_{CC5} = 4.75 V to 5.25 V, V_{CC3} = 3.14 V to 3.47 V, $V_{CC\,aps}$ = 1.746 V to 1.854 V, T_C = 0°C to 70°C)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
1.2 V CMOS (1.8 V CMOS Compatible[1]) I/O DC Characteristics (PRTAD; LASI; RESET; TX_ONOFF)					
External Pull-up Resistor for Open Drain	R_{pullup}	10		22	kΩ
Output High Voltage[2]	V_{oh}	1			V
Output Low Voltage[2]	V_{ol}			0.15	V
Input High Voltage	V_{ih}	0.84		1.854	V
Input Low Voltage	V_{il}			0.36	V
Input Pull-down Current[3]	I_{pd}	20		120	µA
XAUI I/O DC Characteristics (TXLANE[0..3]; RXLANE[0..3])					
Differential Input Amplitude (pk-pk)[4]	V_{in_xaui}	200		2500	mV
Differential Output Amplitude (pk-pk)[4]	V_{out_xaui}	800		1600	mV
MDIO I/O DC Characteristics (MDIO; MDC)					
Output Low Voltage[5]	V_{OL}	−0.3		0.2	V
Output Low Current	I_{OL}			4	mA
Input High Voltage	V_{IH}	0.84		1.854	V
Input Low Voltage	V_{IL}	−0.3		0.36	V
Pull-up Supply Voltage	V_{PU}	1.746	1.8	1.854	V
Input Capacitance	C_{IN}			10	pF
Load Capacitance	C_{LOAD}			470	pF
External Pull-up Resistance	R_{LOAD}	200			Ω

[1] For 1.8 V CMOS V_{oh} = 1.65 V min., V_{ol} = 0.15 V max., V_{ih} = 1.17 V min., V_{il} = 0.63 V max.

[2] $R_{pull-up}$ = 10 kΩ to 1.8 V.

[3] V_{in} = 1.8 V.

[4] AC coupled.

[5] I_{OL} = 100 µA.

Electrical AC Characteristics

(V_{CC5} = 4.75 V to 5.25 V, V_{CC3} = 3.14 V to 3.47 V, $V_{CC\,aps}$ = 1.746 V to 1.854 V, T_C = 0°C to 70°C)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
XAUI Input AC Characteristics (TXLANE[0..3])					
Baud Rate Fibre Channel Ethernet	R_{XAUIIN}		3.1875 3.125		Gbit/s
Baud Rate Tolerance	$R_{TOLXAUI}$	−100		100	ppm
Differential Input Impedance	Z_{INXAUI}	80	100	120	Ω
Differential Return Loss[1]	$|S_{11}|$	10			dB
Input Differential Skew[2]	t_{SKEWIN}			75	ps
Jitter Amplitude Tolerance[3]	$J_{XAUITOL}$				
XAUI Output AC Characteristics (RXLANE[0..3])					
Baud Rate Fibre Channel Ethernet	$R_{XAUIOUT}$		3.1875 3.125		Gbit/s
Baud Rate Variation	$R_{XAUIVAR}$	−100		100	ppm
Rise and Fall Times 20% - 80%	t_r, t_f	40		100	ps
Output Differential Skew	$t_{SKEWOUT}$			15	ps
Output Differential Impedance	$Z_{OUTXAUI}$	80	100	120	Ω
Differential Output Return Loss[1]	$|S_{22}|$	10			dB
Total Jitter[4]	TJ_{XAUI}			0.35	UI
Deterministic Jitter[4]	DJ_{XAUI}			0.17	UI
Power-On Reset AC Characteristics					
Power-On Reset and TX_ONOFF Characteristics	According to XENPAK MSA Issue 3.0 Draft 4.0, 2002-9-9				

Electrical AC Characteristics (cont'd)

(V_{CC5} = 4.75 V to 5.25 V, V_{CC3} = 3.14 V to 3.47 V, $V_{CC\ aps}$ = 1.746 V to 1.854 V, T_C = 0°C to 70°C)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
MDIO I/O AC Characteristics (MDIO; MDC)					
MDIO Data Hold Time	t_{HOLD}	10			ns
MDIO Data Setup Time	t_{SU}	10			ns
Delay from MDC Rising Edge to MDIO Data Change	t_{DELAY}			300	ns
MDC Clock Rate	f_{MAX}			2.5	MHz

[1] 100 MHz to 2.5 GHz.
[2] At crossing point.
[3] Per IEEE Std 802.3ea.
[4] At near-end. No pre-equalization. 1 UI = 320 ps.

Mechanical Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Module Retention Force (latch strength)	F_{RET}		200		N
Module Insertion Force	F_{IN}		40		N
Module Extraction Force (with kick-out)	F_{EXT-K}		16		N
Module Extraction Force (without kick-out)	F_{EXT}		25		N
0-80 UNF Screw Torque[1]	$\tau_{0-80\ UNF}$			10	cNm

[1] Two 0-80 UNF screws are used to secure the XPAK module (no bail de-latch version V23833-Gxxxx-Ax1x) in the cage. The XPAK module is supplied with the screws assembled, and removal is required prior to insertion into the cage.

Eye Safety

This laser based multimode transceiver is a Class 1M product. It complies with IEC 60825-1 and FDA 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice 50, dated July 26, 2001.

INVISIBLE LASER RADIATION
DO NOT VIEW DIRECTLY WITH OPTICAL INSTRUMENTS
CLASS 1M LASER PRODUCT

To meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Attention: All adjustments have been made at the factory prior to shipment of the devices. No maintenance or alteration to the device is required. Tampering with or modifying the performance of the device will result in voided product warranty.

Note: Failure to adhere to the above restrictions could result in a modification that is considered an act of "manufacturing", and will require, under law, recertification of the modified product with the U.S. Food and Drug Administration (ref. 21 CFR 1040.10 (i)).

Laser Data

Wavelength	850 nm
Accessible Emission Limit (as defined by IEC: 7 mm aperture at 100 mm distance)	749 µW
Beam divergence (full angle)	22°
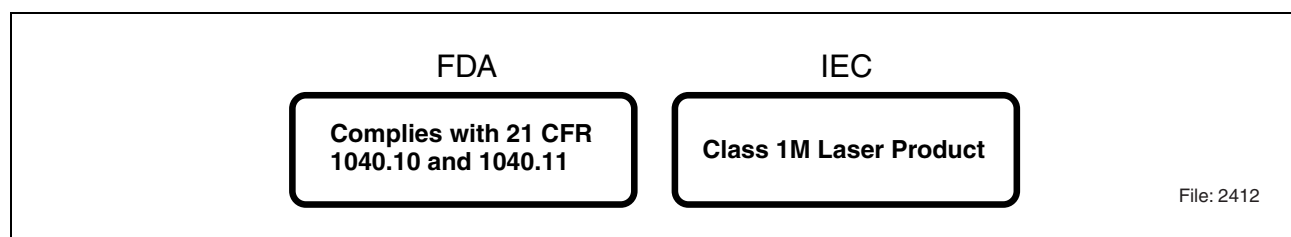
Figure 3   Required Labels
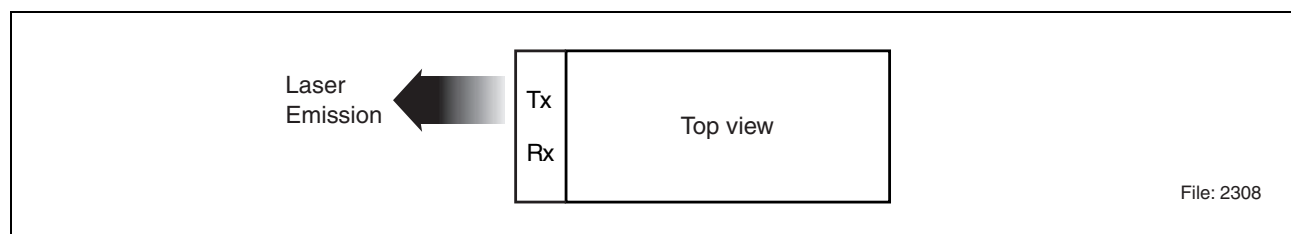
Figure 4   Laser Emission

Application Notes

NVRAM Register Contents

Address		Group	XENPAK MSA 3.0	Value		Comment
Dec	Hex		Definition	Dec	Hex	
32775	8007	Header	XENPAK MSA version supported	30	1E	Rev. 3.0
32776	8008		NVR size in bytes	1	1	256
32777	8009			0	0	
32778	800A		Number of bytes used	0	0	181
32779	800B			181	B5	
32780	800C		Basic field address	11	B	B
32781	800D		Customer field address	119	77	77
32782	800E		Vendor field address	167	A7	A7
32783	800F		Extended vendor field address	0	0	0
32784	8010			0	0	0
32785	8011		Reserved	0	0	0
32786	8012	Basic	Transceived type	4	4	XPAK
32787	8013		Connector	2	2	LC
32788	8014		Encoding	1	1	NRZ
32789	8015		Bit rate	40	28	10313
32790	8016			73	49	
32791	8017		Protocol	1	1	10GBE
32792	8018		Standards compliance codes	1	1	SR
32793	8019			0	0	not used
32794	801A			0	0	not used
32795	801B			0	0	not used
32796	801C			0	0	not used
32797	801D			0	0	not used
32798	801E			0	0	not used
32799	801F			0	0	not used
32800	8020			0	0	not used
32801	8021			0	0	not used
32802	8022		Range	0	0	0.3 km
32803	8023			30	1E	

NVRAM Register Contents (cont'd)

Address		Group	XENPAK MSA 3.0	Value		Comment
Dec	Hex		Definition	Dec	Hex	
32804	8024	Basic	Fiber type	1	1	MM
32805	8025			0	0	
32806	8026		Wavelength channel 0	1	1	850 nm
32807	8027			76	4C	
32808	8028			8	8	
32809	8029		Wavelength channel 1	0	0	not used
32810	802A			0	0	not used
32811	802B			0	0	not used
32812	802C		Wavelength channel 2	0	0	not used
32813	802D			0	0	not used
32814	802E			0	0	not used
32815	802F		Wavelength channel 3	0	0	not used
32816	8030			0	0	not used
32817	8031			0	0	not used
32818	8032		Package OUI	1	1	00-0A-CB
32819	8033			67	43	
32820	8034			76	4C	
32821	8035			32	20	
32822	8036		Vendor OUI	3	3	00-13-19
32823	8037			34	22	
32824	8038			96	60	
32825	8039			0	0	
32826	803A		Vendor name	73	49	I
32827	803B			78	4E	N
32828	803C			70	46	F
32829	803D			73	49	I
32830	803E			78	4E	N
32831	803F			69	45	E
32832	8040			79	4F	O
32833	8041			78	4E	N

NVRAM Register Contents (cont'd)

Address		Group	XENPAK MSA 3.0	Value		Comment
Dec	Hex		Definition	Dec	Hex	
32834	8042	Basic	Vendor name	32	20	
32835	8043			70	46	F
32836	8044			79	4F	O
32837	8045			32	20	
32838	8046			71	47	G
32839	8047			109	6D	m
32840	8048			98	62	b
32841	8049			72	48	H
32842	804A		Vendor part number	86	56	V
32843	804B			50	32	2
32844	804C			51	33	3
32845	804D			56	38	8
32846	804E			51	33	3
32847	804F			51	33	3
32848	8050			45	2D	-
32849	8051			71	47	G
32850	8052			1)	1)	1)
32851	8053			48	30	0
32852	8054			48	30	0
32853	8055			53	35	5
32854	8056			65	41	A
32855	8057			49	31	1
32856	8058			2)	2)	2)
32857	8059			49	31	1
32858	805A		Vendor revision	66	42	B
32859	805B			50	32	2

NVRAM Register Contents (cont'd)

Address		Group	XENPAK MSA 3.0	Value		Comment
Dec	Hex		Definition	Dec	Hex	
32860	805C	Basic	Vendor serial number	80	50	
32861	805D			80	50	
32862	805E			80	50	
32863	805F			80	50	
32864	8060			80	50	
32865	8061			80	50	
32866	8062			80	50	
32867	8063			80	50	
32868	8064			80	50	
32869	8065			80	50	
32870	8066			80	50	
32871	8067			80	50	
32872	8068			80	50	
32873	8069			80	50	
32874	806A			80	50	
32875	806B			80	50	
32876	806C		Year code			
32877	806D					
32878	806E					
32879	806F					
32880	8070		Month code			
32881	8071					
32882	8072		Day code			
32883	8073					
32884	8074		Lot code			
32885	8075					
32886	8076		5 V stressed environment reference	1	1	50 mA
32887	8077		3.3 V stressed environment reference	1	1	550 mA
32888	8078		APS stressed environment reference	2	2	750 mA

PCB Cage Footprints

Figure 5   Standard Mounting
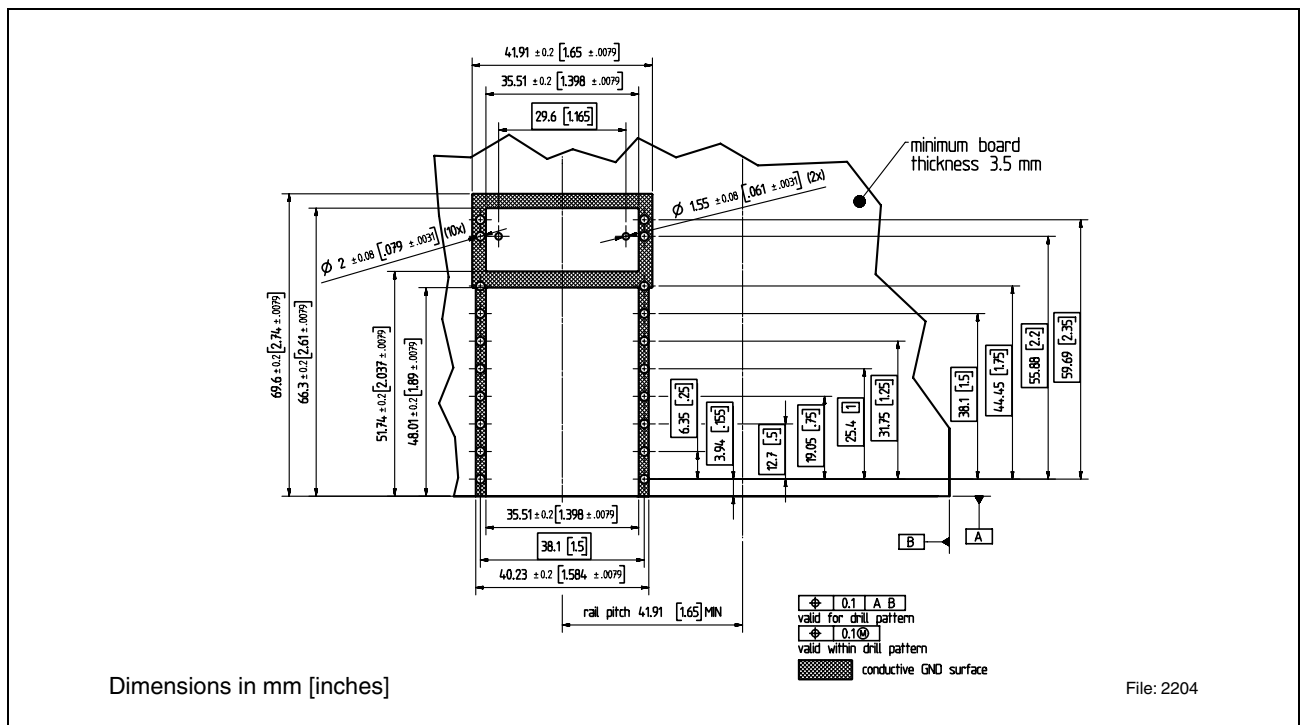
Figure 6   Belly-to-Belly Mounting
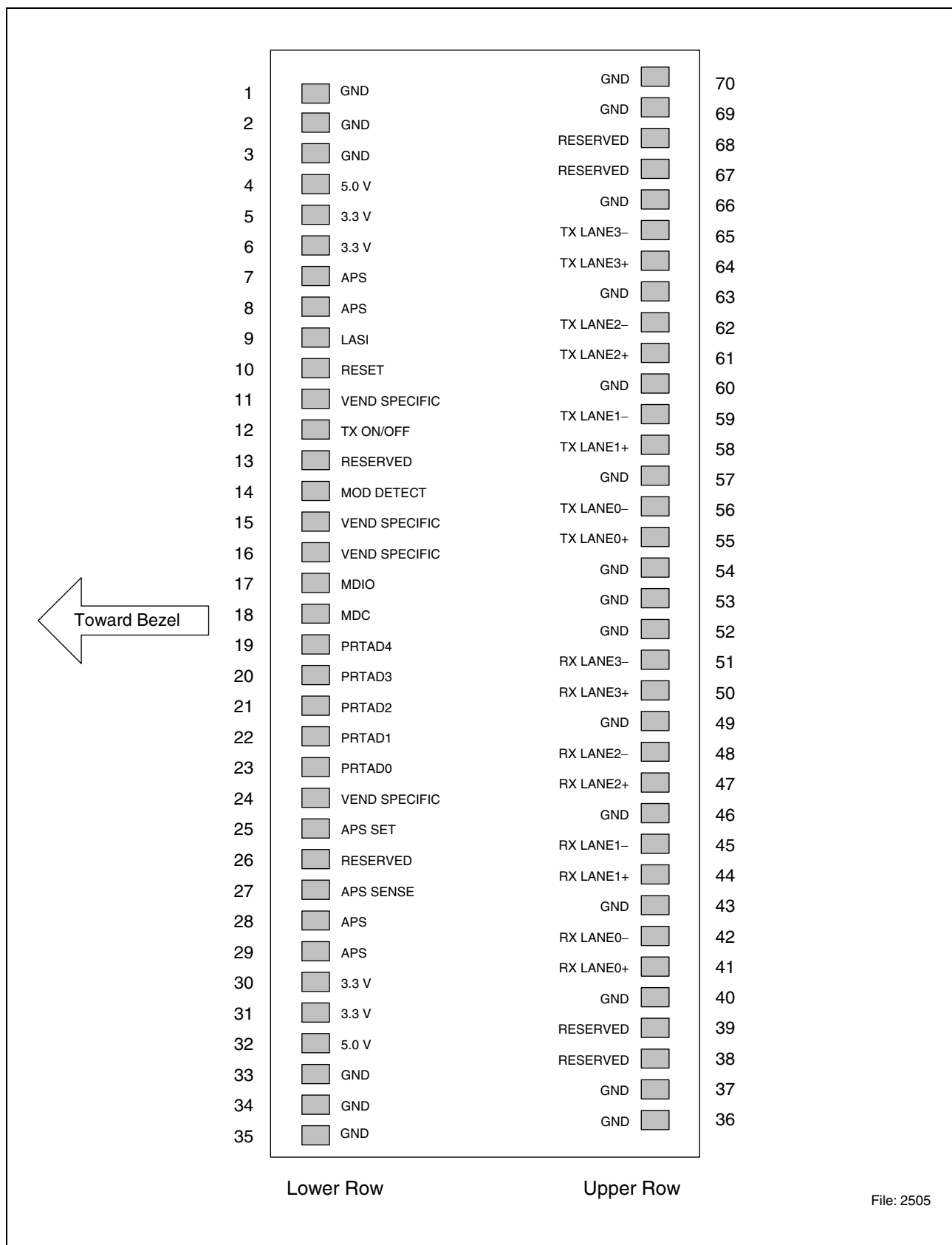
Application Notes

Host Board Layouts
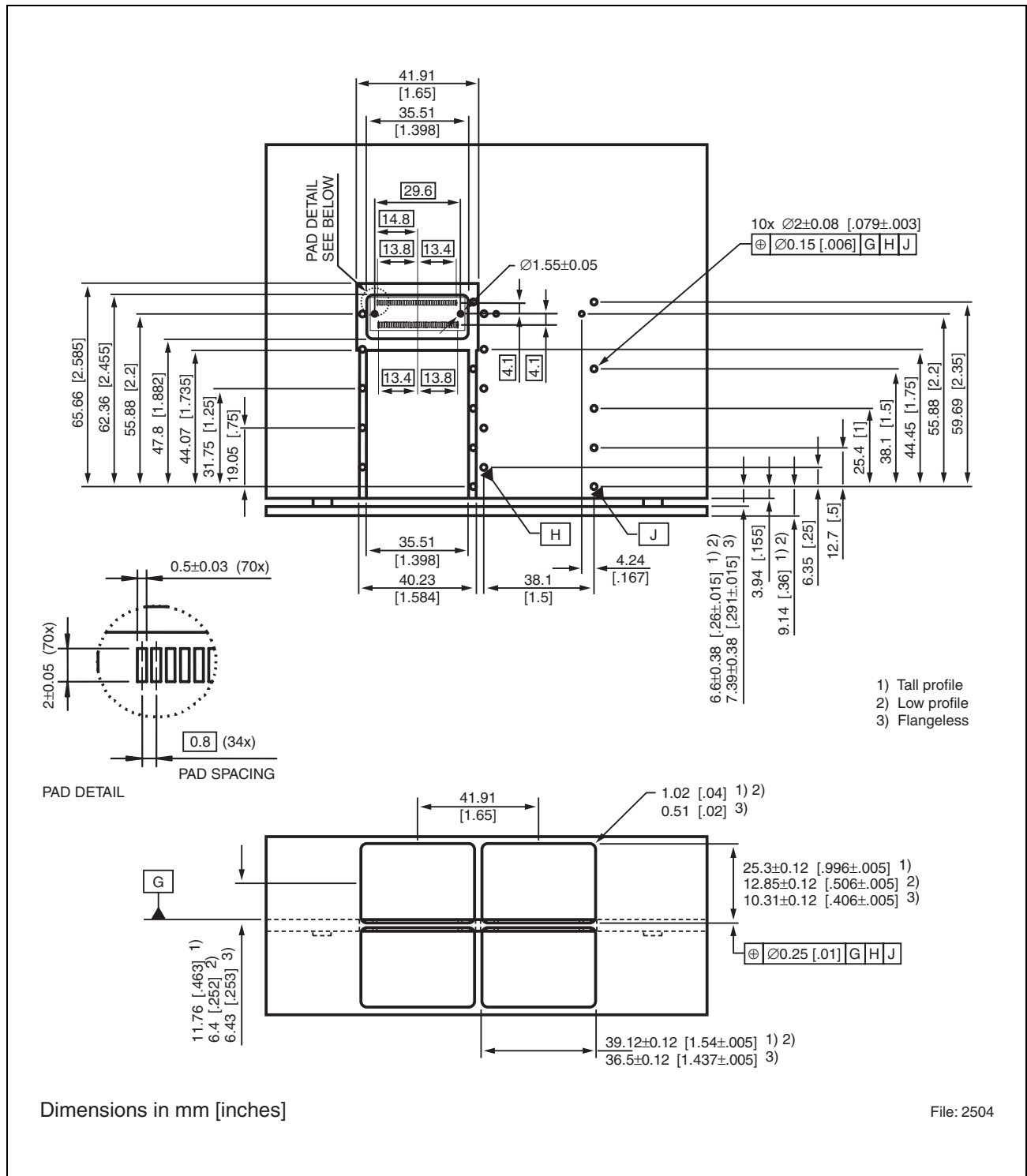
Figure 7   Host PCB, Board Connector Layout and Bezel Opening

Lower Row		Upper Row	
1	GND	GND	70
2	GND	GND	69
3	GND	RESERVED	68
4	5.0 V	RESERVED	67
5	3.3 V	GND	66
6	3.3 V	TX LANE3–	65
7	APS	TX LANE3+	64
8	APS	GND	63
9	LASI	TX LANE2–	62
10	RESET	TX LANE2+	61
11	VEND SPECIFIC	GND	60
12	TX ON/OFF	TX LANE1–	59
13	RESERVED	TX LANE1+	58
14	MOD DETECT	GND	57
15	VEND SPECIFIC	TX LANE0–	56
16	VEND SPECIFIC	TX LANE0+	55
17	MDIO	GND	54
18	MDC	GND	53
19	PRTAD4	GND	52
20	PRTAD3	RX LANE3–	51
21	PRTAD2	RX LANE3+	50
22	PRTAD1	GND	49
23	PRTAD0	RX LANE2–	48
24	VEND SPECIFIC	RX LANE2+	47
25	APS SET	GND	46
26	RESERVED	RX LANE1–	45
27	APS SENSE	RX LANE1+	44
28	APS	GND	43
29	APS	RX LANE0–	42
30	3.3 V	RX LANE0+	41
31	3.3 V	GND	40
32	5.0 V	RESERVED	39
33	GND	RESERVED	38
34	GND	GND	37
35	GND	GND	36

Toward Bezel

File: 2505

Figure 8 **Host Board Pad Layout**

Package Outlines

Dimensions in mm

File: 2201
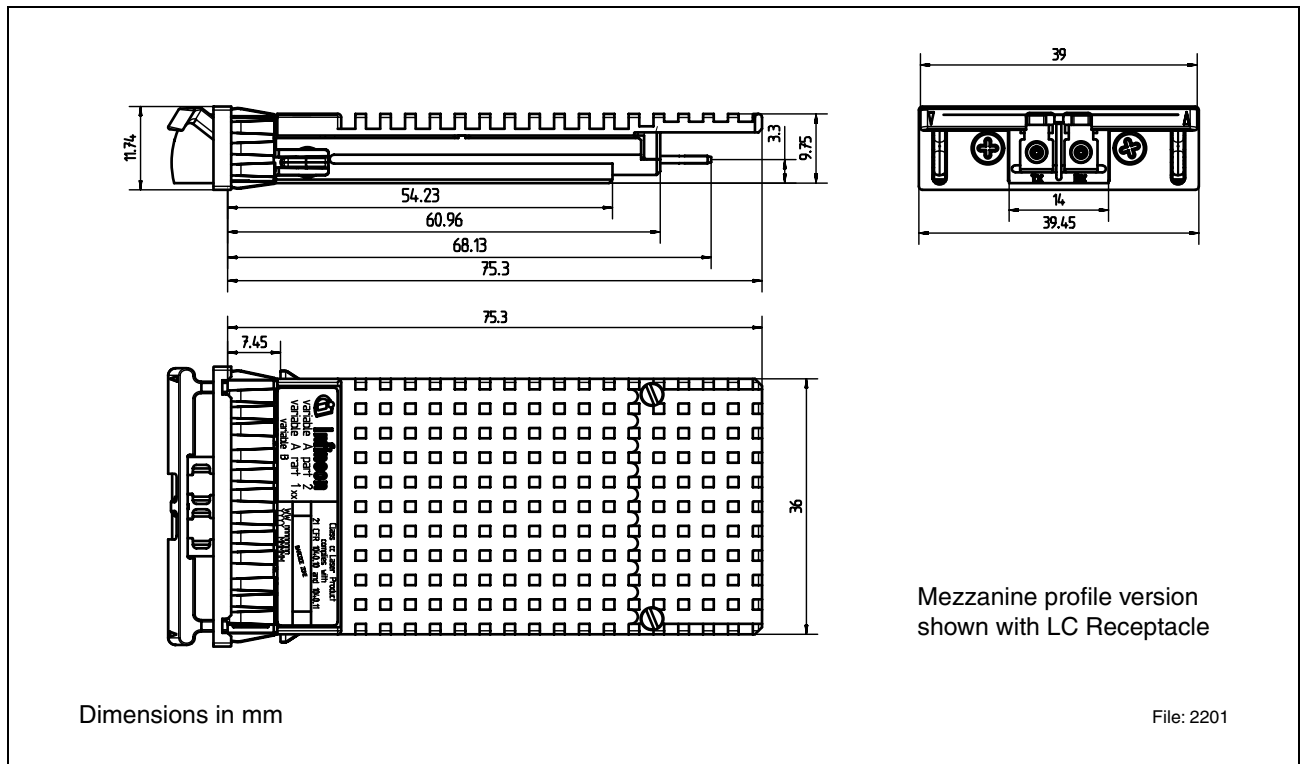
Figure 9   XPAK with Bail De-Latch Mechanism

Dimensions in mm [inches]

File: 2210
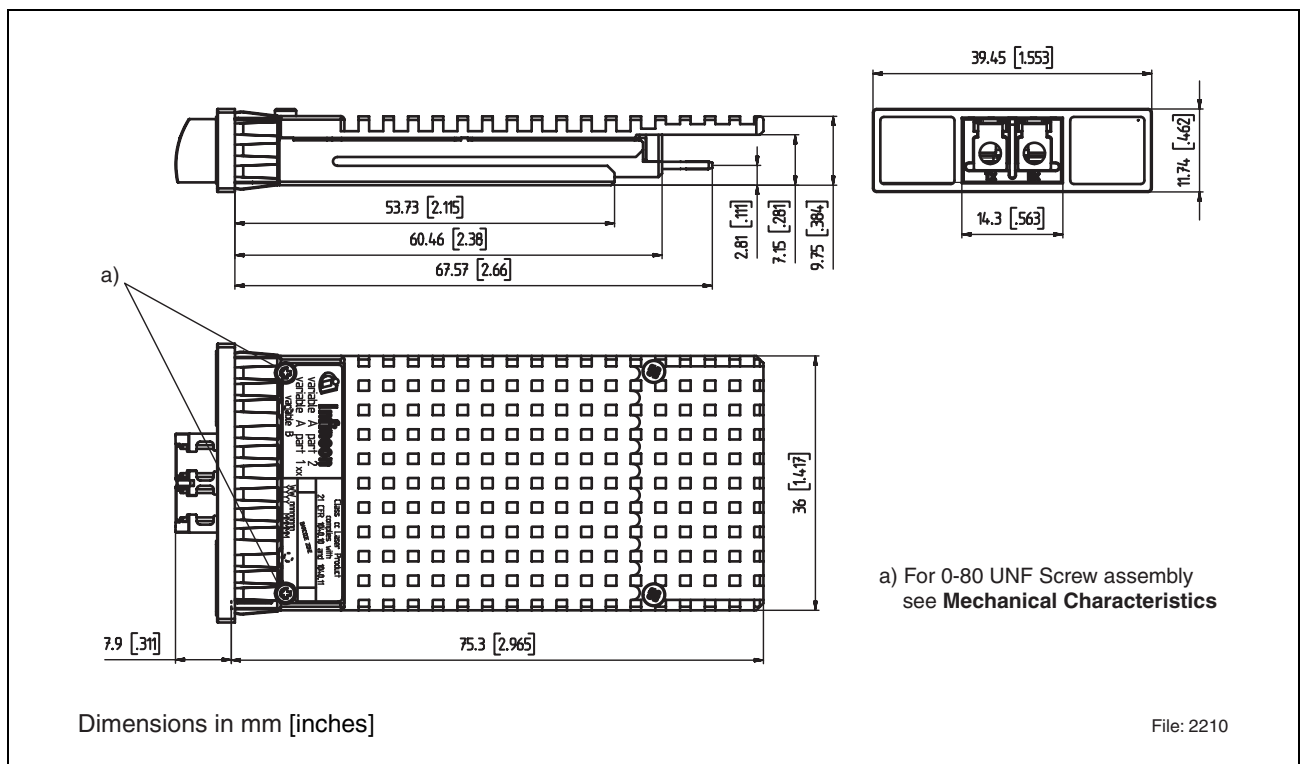
Figure 10   XPAK with No De-Latch Mechanism
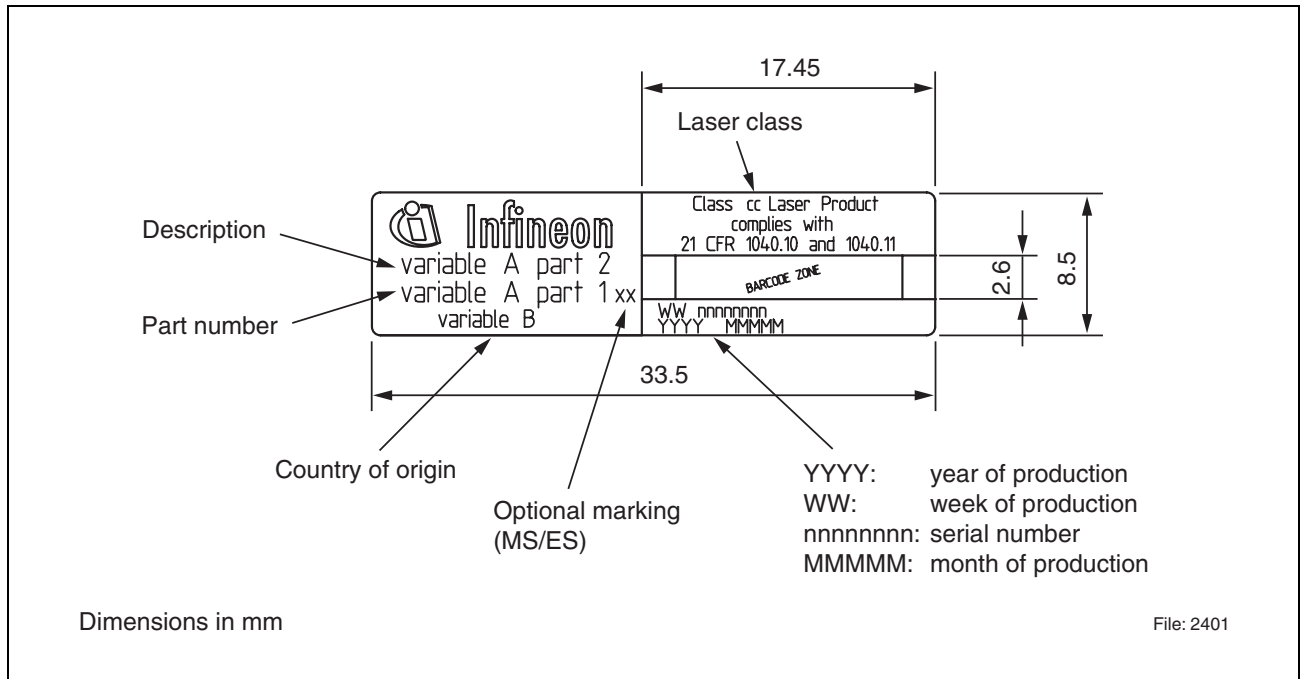
Figure 11   Label Description
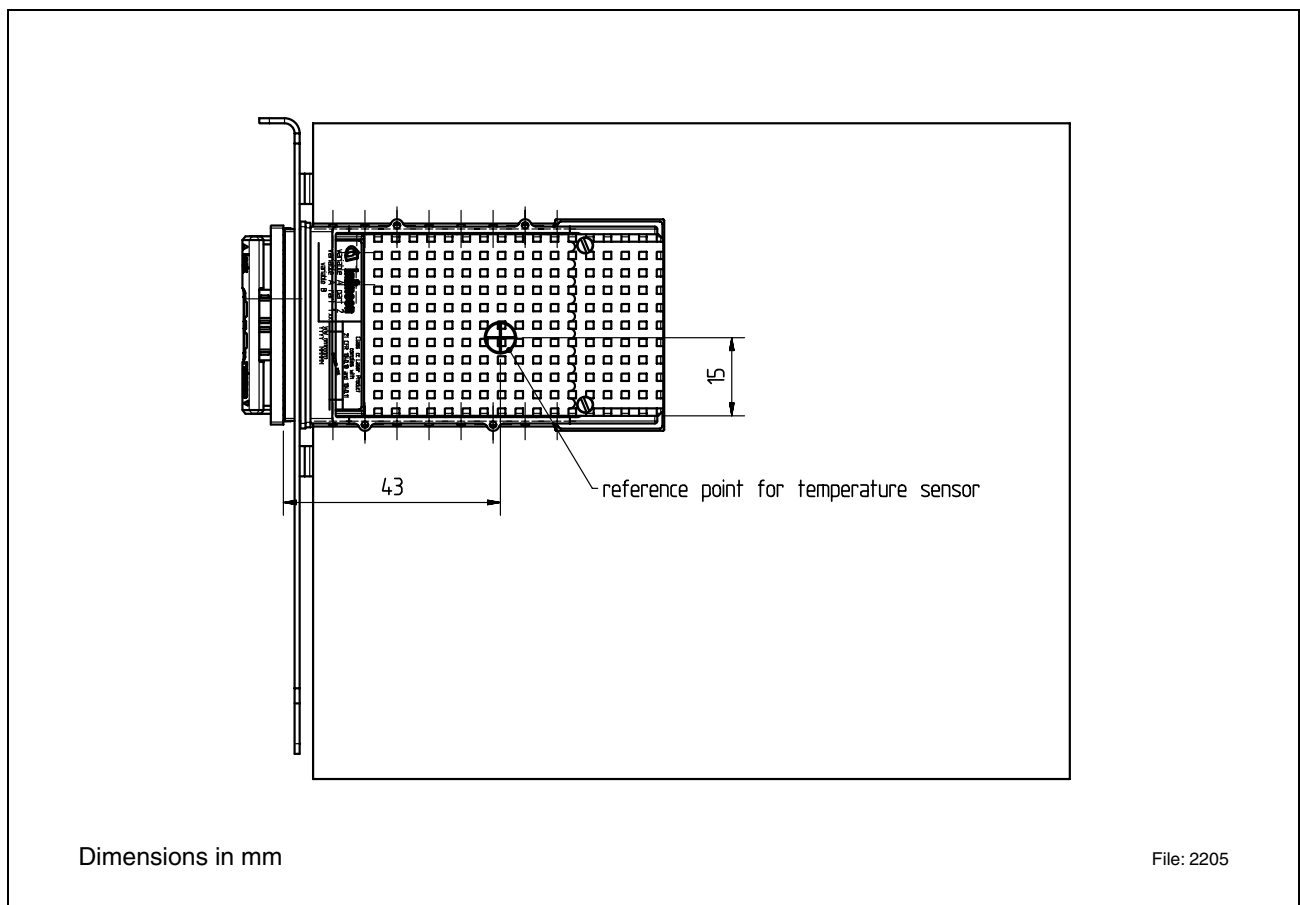
Figure 12   XPAK Temperature Reference Point

V23833-G2005-A101, V23833-G6005-A101, V23833-G6005-A111

Revision History:	**2004-05-13**	**DS3**
Previous Version:	2004-02-23	

Page	**Subjects (major changes since last revision)**
	V23833-G6005-A111 added
1, 2	**Optical** Features changed
2	**Electrical** Features changed
9	**Environment: Thermal Management Recommendations** changed
9	**Fibers and Connectors** changed
9	**Cage Requirement** changed
11	Table "**Recommended Operating Conditions**" changed
14	Table "**Electrical AC Characteristics**" changed
15	Table "**Mechanical Characteristics**" added
16	**Eye Safety** changed Table "**Laser Data**" added **Figure 3 Required Labels** added **Figure 4 Laser Emission** added
17	**NVRAM Register Contents** added
25	**Figure 10 XPAK with No De-Latch Mechanism** added