

**LT-94B73B-PWG / LT-94B73B-PW-AG**

**(RoHS Compliant)**

**3.3V / 2.488 Gbps 1490 nm Continuous-Mode TX /**

**1.244 Gbps 1310 nm Burst-Mode RX with Burst-Mode Signal Detect,**

**ITU-T G.984.2 G-PON CLASS B+ 2X6 SFF OLT Transceiver (with Reset-Less RX)**

**FEATURES**

- | Class B+ Optical Line Terminal (OLT) for ITU-T G.984.2 Gigabit-capable PON
- | 2.488 Gbps / 1490 nm Continuous-Mode Transmitter
- | 1.244 Gbps / 1310 nm Burst-Mode Receiver with 2R Output
- | **Resetless** BM Receiver Design
- | BM RX with 32 Bits Packet-to-packet Guard Time for over 15dB Packet Optical Power Difference
- | 0 to 70°C Operating: LT-94B73B-PWG
- | -20 to 85°C Operating: LT-94B73B-PW-AG
- | 2x6 SFF Package with SC/PC Pigtail
- | Single +3.3 V Power Supply
- | RoHS Compliant
- | Transmitter: AC Coupling Input
- | Receiver: DC Coupling Output
- | LVTTL TX Shutdown Input
- | **LVTTL TX Laser Failure Alarm Output**
- | **LVTTL High-Speed Burst-mode RX Signal Detect**
- | **Analog RX Received Power Monitor**
- | Wave Solderable and Aqueous Washable
- | Class 1 Laser International Safety Standard IEC-60825 Compliant

**APPLICATIONS**

- | Broadband G-PON System

**DESCRIPTION**

LT-94B73B series is ITU-T G.984.2 Class B+ optical line terminal (OLT) for 2.488 Gbps/1490 nm in downstream and 1.244 Gbps/1310 nm in upstream. The transmitter section uses a multiple quantum well 1490 nm DFB laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated 1310 nm burst-mode detector preamplifier (IDP) mounted in an optical header and a burst-mode limiting post-amplifier IC. **Unlike the conventional BM RX, the RX does not require reset pulse to receive optical data packets with different optical power.** LVPECL interface is used for differential inputs and outputs. A LVTTL logic interface simplifies interface to external circuitry.

**LASER SAFETY**

This single mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

**ORDER INFORMATION**

P/No	Class	TX				RX				Temp (°C)	Package	RoHS Compliant
		Type	Speed (Gb/s)	λ (nm)	Power (dBm)	Type	Speed (Gb/s)	λ (nm)	Sens. (dBm)			
LT-94B73B-PWG	B+	CNT	2.488	1490 DFB	1.5 / 5	BM, 2R	1.244	1310	-8 / -28	0 / 70	SFF 2X6	Yes
LT-94B73B-PW-AG	B+	CNT	2.488	1490 DFB	1.5 / 5	BM, 2R	1.244	1310	-8 / -28	-20 / 85	SFF 2X6	Yes
LT-94C73C-PWG	C	CNT	2.488	1490 DFB	7 / 3	BM, 2R	1.244	1310	-8 / -29	0 / 70	SFF 2X6	Yes

NOTE: 1. LT-XXXXXX-PWXG, SC/PC pigtail with fiber length 50 cm.

2. BM: Burst Mode; CNT: Continuous Mode; SFF: Small Form Factor Package.

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Tstg	-40	85	°C	
Operating Case Temperature	Topr	0 -20	70 85	°C	LT-94B73B-PWG LT-94B73B-PW-AG Air flow 1m/sec @>60°C
Power Supply Voltage	Vcc	-0.5	3.6	V	

Recommended Operating Conditions					
Parameter	Symbol	Min	Max.	Unit	Units / Notes
Power Supply Voltage	Vcc	3.13	3.47	V	V
Operating Case Temperature	Topr	0 -20	70 85	°C	LT-94B73B-PWG LT-94B73B-PW-AG Air flow 1m/sec @>60°C
Power Supply Current	I <sub>CC(TX+RX)</sub>		350	mA	

Transmitter Specifications ( 0°C < Topr < 70°C, 3.13V < Vcc < 3.47V )						
Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
<b>Optical</b>						
Optical Transmit Power	P <sub>o</sub>	1.5		5	dBm	1
Output Center Wavelength	λ	1480		1500	nm	
Output Spectrum Width	Δ λ			1	nm	-20 dB Width
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	E <sub>R</sub>	10			dB	
Data Rate			2.488		Gb/s	
Optical Rise Time				150	ps	20% to 80% Values
Optical Fall Time				150	ps	20% to 80% Values
Relative Intensity Noise	RIN			-120	dB/Hz	
Downstream Optical Penalty				0.5	dB	
<b>Electrical</b>						
Data Input Current – Low		-350			μA	
Data Input Current – High				350	μA	
Differential Input Voltage	V <sub>IH</sub> - V <sub>IL</sub>	400		2400	mV	Peak-to-Peak
Shutdown Input Voltage -- Low	V <sub>TSHDN,L</sub>	0		0.8	V	TX Output Disable
Shutdown Input Voltage -- High	V <sub>TSHDN,H</sub>	2.0		Vcc	V	TX Output Enable
TX Laser Alarm Voltage -- Low	V <sub>TLE,L</sub>	0		0.5	V	TX laser normal
TX Laser Alarm Voltage -- High	V <sub>TLE,H</sub>	2.0		Vcc	V	TX laser fail
Shut Off Time for Tx Shutdown	t <sub>DIS</sub>		30		μs	

1. Output power is power coupled into a 9/125 μm single mode fiber.

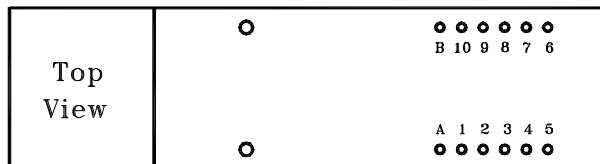
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**Receiver Characteristics ( 0°C < Topr < 70°C, 3.13V < Vcc < 3.47V )**

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
<b>Optical</b>						
Sensitivity	Sen			-28	dBm	2
Saturation Optical Power	Sat	-8			dBm	2
Wavelength of Operation		1260		1360	nm	3
Data Rate			1.244		Gb/s	
Packet-to-Packet Guard Time		32			Bits	4,5
DC Optical Tolerance		Sen +3			dB	
Optical Return Loss		20			dB	
Signal Detect -- Asserted	Pa			-28	dBm	Transition: low to high
Signal Detect -- Deasserted	Pd	-40			dBm	Transition: high to low
Signal detect -- Hysteresis		2			dB	
<b>Electrical</b>						
Data Output Voltage – Low	V <sub>OL</sub>	V <sub>CC</sub> - 1.935		V <sub>CC</sub> - 1.56	V	
Data Output Voltage – High	V <sub>OH</sub>	V <sub>CC</sub> - 1.135		V <sub>CC</sub> - 0.76	V	
Consecutive Identical Digit Immunity		72			Bits	
Signal Detect Output Voltage -- Low	V <sub>OL</sub>			0.5	V	
Signal Detect Output Voltage -- High	V <sub>OH</sub>	2.0			V	
Signal Detect Assert Time	AS <sub>MAX</sub>	10	15	30	ns	Transition: low to high
Signal Detect Deassert Time	ANS <sub>MAX</sub>	80	100	150	ns	Transition: high to low
Received Power Monitoring Voltage	V <sub>RPM</sub>				V	Refer Figure 3.
Rest Between Packet					Resetless	

2. Sensitivity and saturation levels at BER 1E-10 for a 2<sup>23</sup>-1 @ ER=10.
3. At least 30 dB optical isolation for the wavelength 1480 to 1500 nm.
4. No reset is needed.
5. The optical power difference between neighboring packets is up to 15 dB.

**CONNECTION DIAGRAM**



PIN	Signal Name	Description	PIN	Signal Name	Description
A	RPM	Receiver Power Monitor.	B	LF	Laser failure warning out. This pin is high when LD fails.
1	RX Ground	Receiver Ground. Connect this pin to ground plane.	10	TD-	Negative transmitter data In. Internally terminated for LVPECL. AC coupled.
2	RX Vcc	RX power supply input. Connect to 3.3 V power supply	9	TD+	Positive transmitter data In. Internally terminated for LVPECL. AC coupled.
3	RX SD	Signal Detect. High when single is present (LVTTTL)	8	TxDis	Transmitter Disable. TX is disabled when this pin is low. Internally pulled to "High"..
4	RX OUT (-)	Negative RX output, Differential LVPECL. DC coupled.	7	TX Ground	Transmitter Ground. Directly connect this plan to ground plane
5	RX OUT (+)	Positive RX output, Differential LVPECL. DC Coupled.	6	TX Vcc	TX power supply input. Connect to 3.3 V power supply
MS	MS	Mounting Studs. Connect to Chassis Ground			

## PACKET-TO-PACKET SPACING

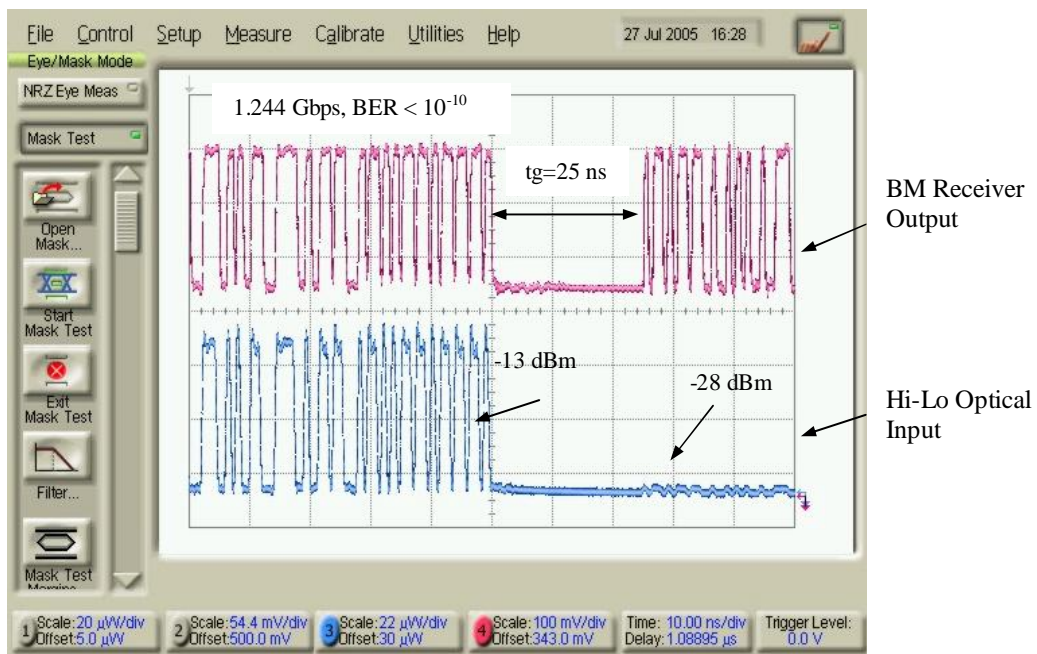
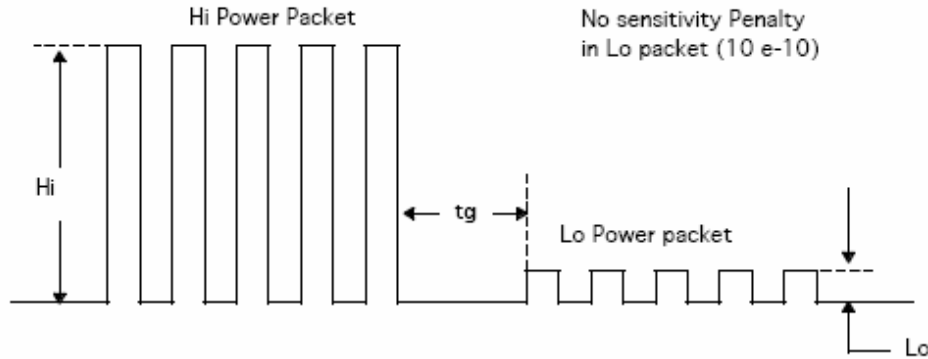


Figure 1. High-Low packet test at Hi/Lo ratio=15 dB

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 TIME CHARACTERISTICS OF SIGNAL DETECT  
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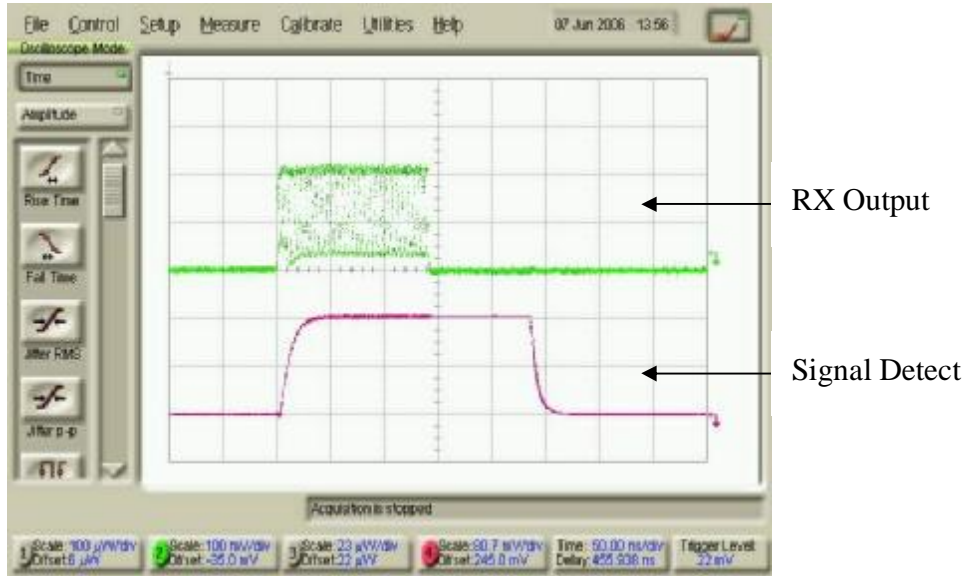


Figure 2. Timing characteristics of Signal Detect. Signal Detect: Low to High ~20 ns, High to Low ~100 ns (> 100 bit "0")

INCOMING OPTICAL POWER V.S. THE MONITORING ANALOG VOLTAGE

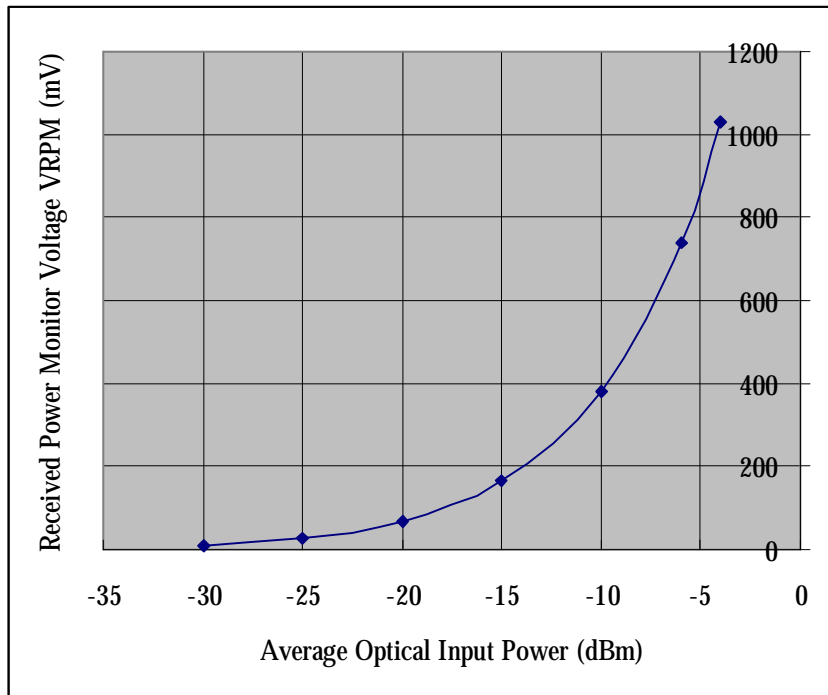
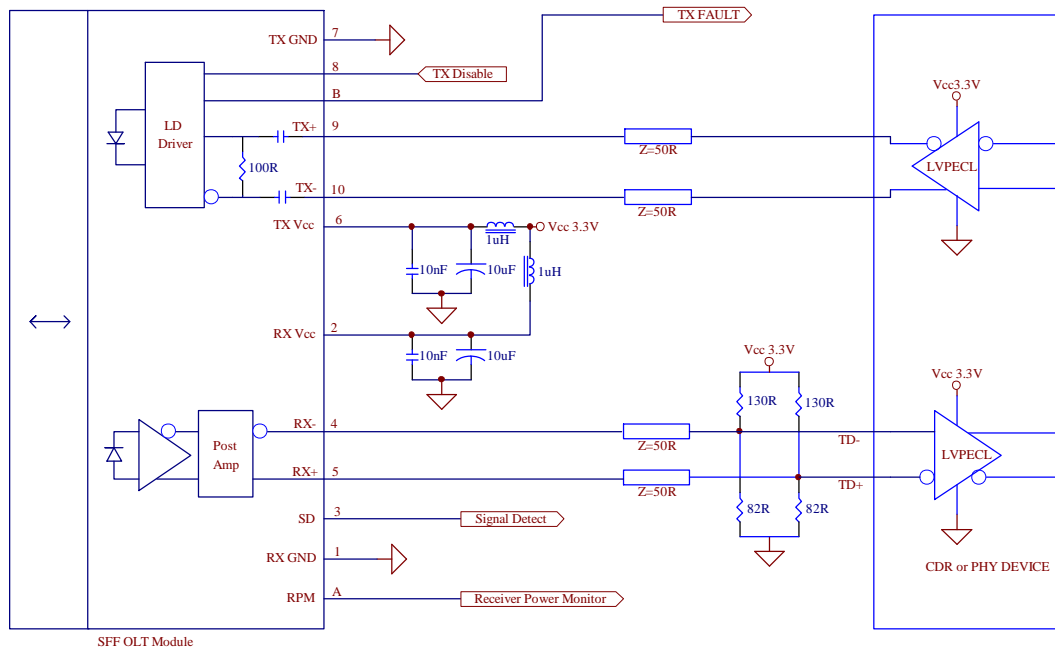


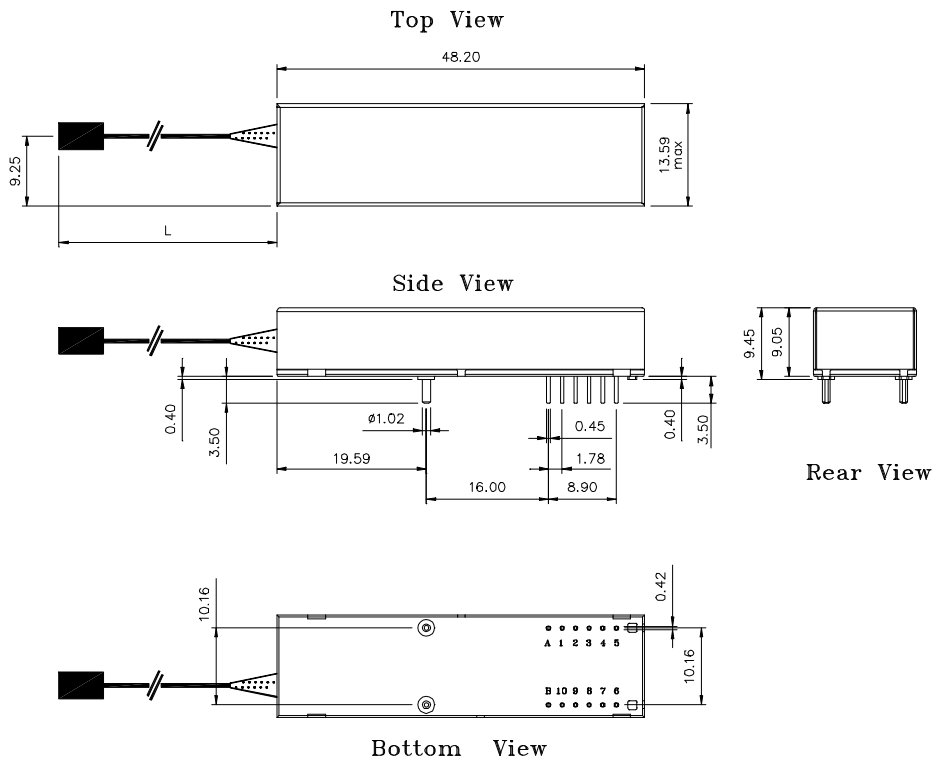
Figure 3. Relation between Power Monitor Output (PIN "A") and Average Incoming Optical Power

## RECOMMENDED CIRCUIT SCHEMATIC



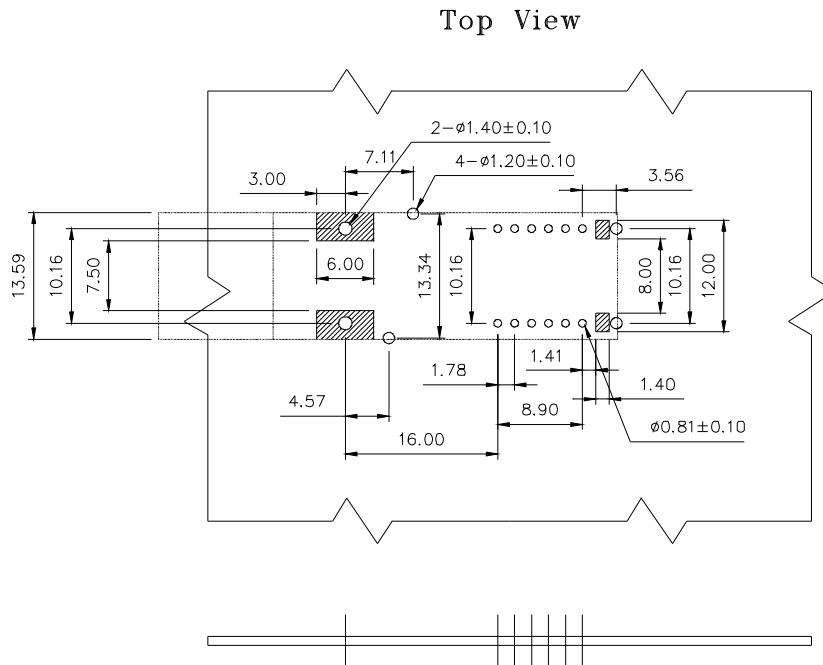
## PACKAGE DIAGRAM

Units in mm



**Note:** Specifications subject to change without notice. The 50 +/- 3 cm long pigtail with a SC/PC connector is standard. If non-standard pigtail is required, please make a contact with Optoway Technology Inc.

RECOMMENDED CIRCUIT BOARD LAYOUT



Notes:

1. This figure describes the recommended circuit board layout for the SFF OLT Transceiver.
2. The hatched areas are keep-out areas reserved for housing standoff. No metal traces or ground connection in keep-out area.
3. The mounting studs should be solder to chassis ground for mechanical integrity.