PEDF1231U-S-05-02

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OAT1231U-S-05 Preliminary

MU duplex Transceiver at 1.25 Gbit/s

GENERAL DESCRIPTION

The OAT1231U-S-05 transceiver is a long wavelength optical transceiver intended for up to 1.25 Gbit/s applications as Gigabit Ethernet. The transceiver is operated from single 3.3 V DC power supply and with LVPECL logic interface. Package style is the multisourced 2 × 5 pins small form factor with integral MU duplex connector interface. The Transceiver is provide double port densities from traditional SC 1 × 9 transceiver. The laser output is certified to be Class 1 laser safe as defined by IEC 60825-1.

FEATURES

- Multisourced 2 × 5 pins small form factor package
- MU duplex connector interface
- Compliant with IEEE 802.3 z/Gigabit Ethernet
- Up to 5 km with 9/125 μm SMF
- Single 3.3 V power supply
- LVPECL logic compatible data interface
- 1300 nm fabry perot laser with automatic power control
- Class 1 Laser eye safe
- 0°C to 70°C operating temperature range
- Transmitter disable input
- TTL signal detect output

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Storage Temperature	T_S	–40	85	°C
Operating Temperature	T_A	0	70	°C
Lead Soldering Temperature	—	—	260/10	°C/s
Supply Voltage	V_{CC}	—	5	V
Input Voltage	V_I	0	V_{CC} + 0.5	V

TRANSCEIVER OPTICAL AND ELECTRICAL CHARACTERISTICS
(T_C = 0°C to 70°C, V_{CC} = 3.135 V to 3.465 V)

Parameter	Notes	Symbol	Min.	Typ.	Max.	Unit
Supply Current		Icc		200	250	mA

Transmitter Section

Parameter		Notes	Symbol	Min.	Typ.	Max.	Unit
Average Optical Output Power			P_O	–11.0		–3	dBm
Optical Wavelength			λc	1270	1310	1355	nm
RMS Spectral Width			Δλ			4	nm
Extinction Ratio			ER	9			dB
Relative Intensity Noise			RIN			–120	dB/Hz
Optical Wave Form		1		Compliant with IEEE 802.3z eye mask			
Differential Input Voltage			V_{IN}	0.4		1.0	V
Data Input Voltage Levels		2	V_{IL}	V_{CC} – 1.810		V_{CC} – 1.475	V
			V_{IH}	V_{CC} – 1.165		V_{CC} – 0.880	V
Transmit Disable Voltage	Disable	3	V_{ID}	2.0			V
	Enable	3	V_{IE}			0.8	V
Input Impedance		5	R_{IN}	95	100	105	Ω
Optical Connector repeatability					0.15		dB

Receiver Section

Parameter		Notes	Symbol	Min	Typ.	Max	Unit
Optical Input Sensitivity		4	P_{IN}			–19	dBm
Maximum Optical Input		4	P_{MAX}	–3			dBm
Optical Wavelength			λc	1270		1355	nm
Return Loss				12	35		dB
Output Voltage Levels		2	V_{OL}	V_{CC} – 1.810		V_{CC} – 1.620	V
			V_{OH}	V_{CC} – 1.025		V_{CC} – 0.880	V
Signal Detect Output Voltage	High	3	V_{OA}	2.4			V
	Low	3	V_{OD}			0.4	V
Assert Level			P_A			–19	dBm
Deassert Level			P_D	–30			dBm
Hysteresis			P_{HYS}	0.5		4	dB

Notes:
1. Transmitter optical waveform characteristics are specified by an eye diagram shown in Figure 1. The eye mask test is performed using a receiver with a fourth-order Bessel Thompson filter discussed in IEEE 802.3z
2. LVPECL compatible interface.
3. TTL compatible interface.
4. BER of 1×10^{-12}measured with 1.25 Gbit/s 2^7–1 PRBS.
5. Measured between TD+ and TD–.

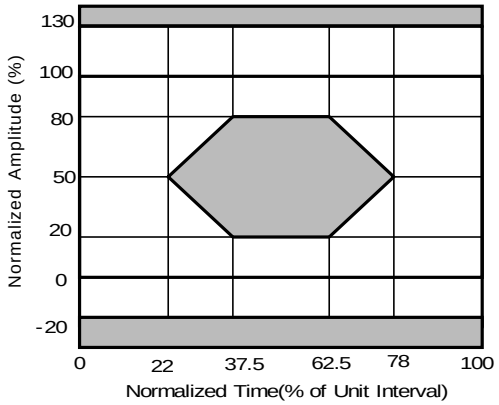


Figure 1. Transmitter Eye Diagram

APPLICATION INFORMATION

Electrical interface

Figure3 shows the recommended interface and power supply filtering circuit for operating the transceiver. TD+ and TD- inputs are internally terminated with differential 100Ω. The input signal that was terminated in the Serializer side are connected to TD+/TD- through the AC coupling capacitors. When the Seliaeaizer is LVPECL output then AC coupling capacitors are not required. RD+ and RD- outputs are LVPECL interface and not internally terminated. RD+ and RD- should be coupled to ground through 180Ω and connected to Deserializer through AC coupling capacitor. When the Deeliaeaizer inputs are LVPECL then AC coupling capacitors are not required.

Signal Detect

The Signal Detect (SD) output is positive TTL logic. This output provides a logical low output signal when the optical signal into the receiver has been interrupted or the light level has fallen below the minimum signal-detect threshold. This signal is used to get a state of receiving DATA logically, not a BET monitor.

Transmitter Disable

The Transmitter Disable (Tdis) input is a laser enable function. When Tdis is TTL logical low input or opened transmitter is normally operating. When Tdis is TTL logical high input transmitter optical output is shut down.

Laser Eye Safety

The OAT1231U-S-05 is laser-based transceivers, and is Class 1 laser products. It complies with IEC 60825-1 and FDA 21 CFR 1040.10 and 1040.11. This is also eye safe when used within the data sheet limits. When optical connector unterminated, do not look into optical port with a magnifying glass and so on.

Caution:

Use of controls, adjustments, and procedures other than those specified herein may result in hazardous laser radiation exposure. If this product is used with unauthorized revision, classification for laser product safety standard is invalid. The person performing such an act must classify the product at your responsibility and take appropriate actions according to the law.

Optical connector repeatability

The system designer is annoyed well from the unstableness of the optical output by the connector mating and de-mating of the transmitter. MU connector is very high performance connector. The OAT1231U-S-05 with MU duplex was designed carefully so as not to reduce this characteristic. Thus typical optical output change may be approximately less than 0.15dB.

PIN DESCRIPTION

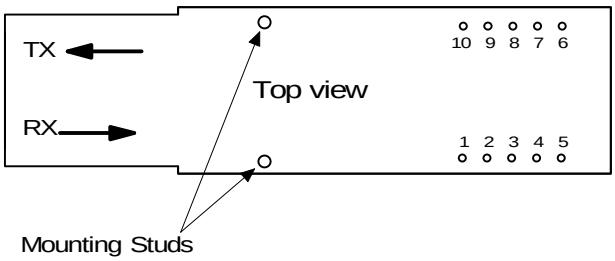
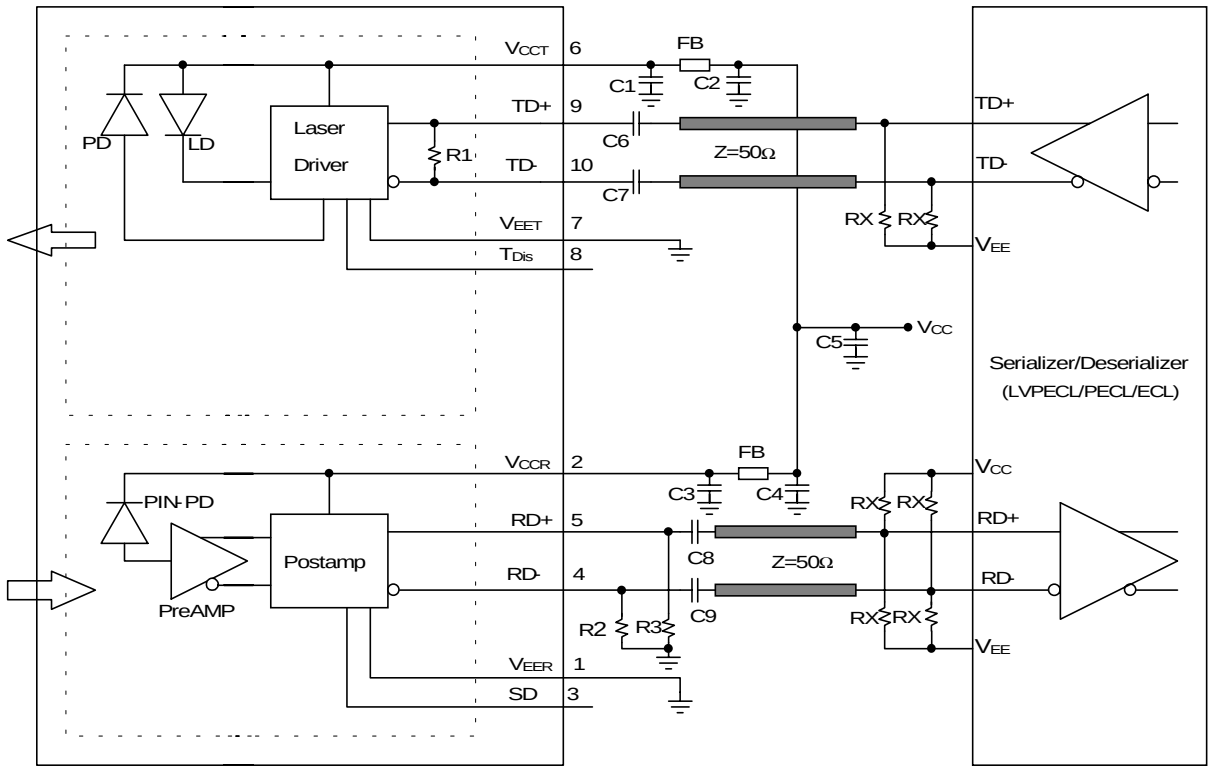


Figure 2. Pin Description

Pin	Symbol	Description
Mounting Studs		Two mounting studs are provided for transceiver mechanical attachment to the circuit board. They may also provide an optical connection of the transceiver to the equipment chassis ground.
1	V_{EER}	Receiver Signal Ground.
2	V_{CCR}	Receiver Power Supply.
3	SD	Signal Detect. Normal Operation: Logic “1” Output. Fault Condition: Logic “0” Output.
4	RD–	Received Data Out Bar. No internal terminations are provided.
5	RD+	Received Data Out. No internal terminations are provided.
6	V_{CCT}	Transmitter Power Supply.
7	V_{EET}	Transmitter Signal Ground.
8	T_{DIS}	Transmitter Disable. Normal Operation: Logic “0” Input or Open Transmit Disable: Logic “1” Input or Connect V_{CC}
9	TD+	Transmitter Data In. An internal 50 Ω termination is provided, consisting of a Thevenin termination.
10	TD–	Transmitter Data In Bar. An internal 50 Ω termination is provided, consisting of a Thevenin termination.

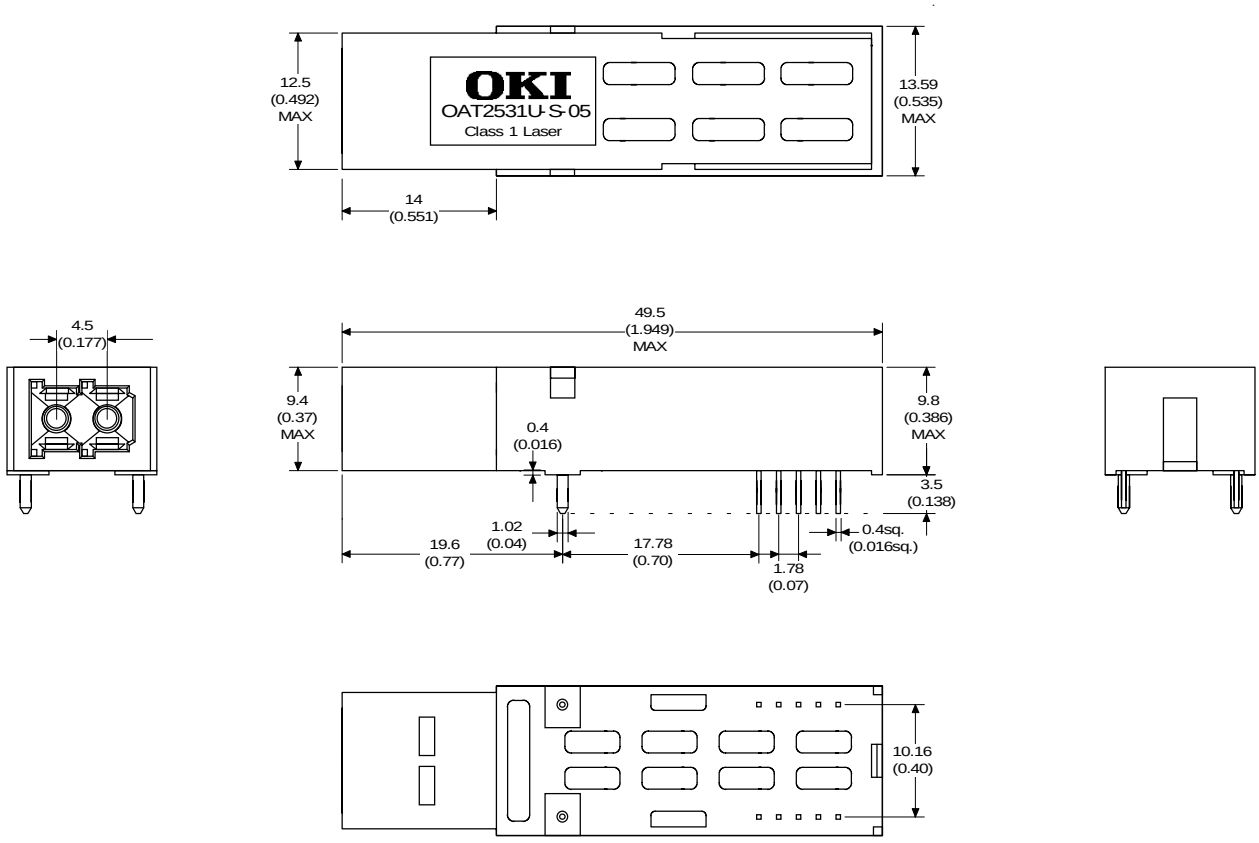
ELECTRICAL INTERFACE CIRCUITS



Notes:
C1 = C2 = C3 = C4 = 0.1 μF C5 = 10 μF
C6 = C7 = C8 = C9 = 0.01 μF
R1 = 100 Ω
R2 = R3 = 180 Ω
FB = Ferrite bead (BLM11HA601SG)
RX = Depend on SELDES interface.

Figure 3. Recommended Interface Circuit

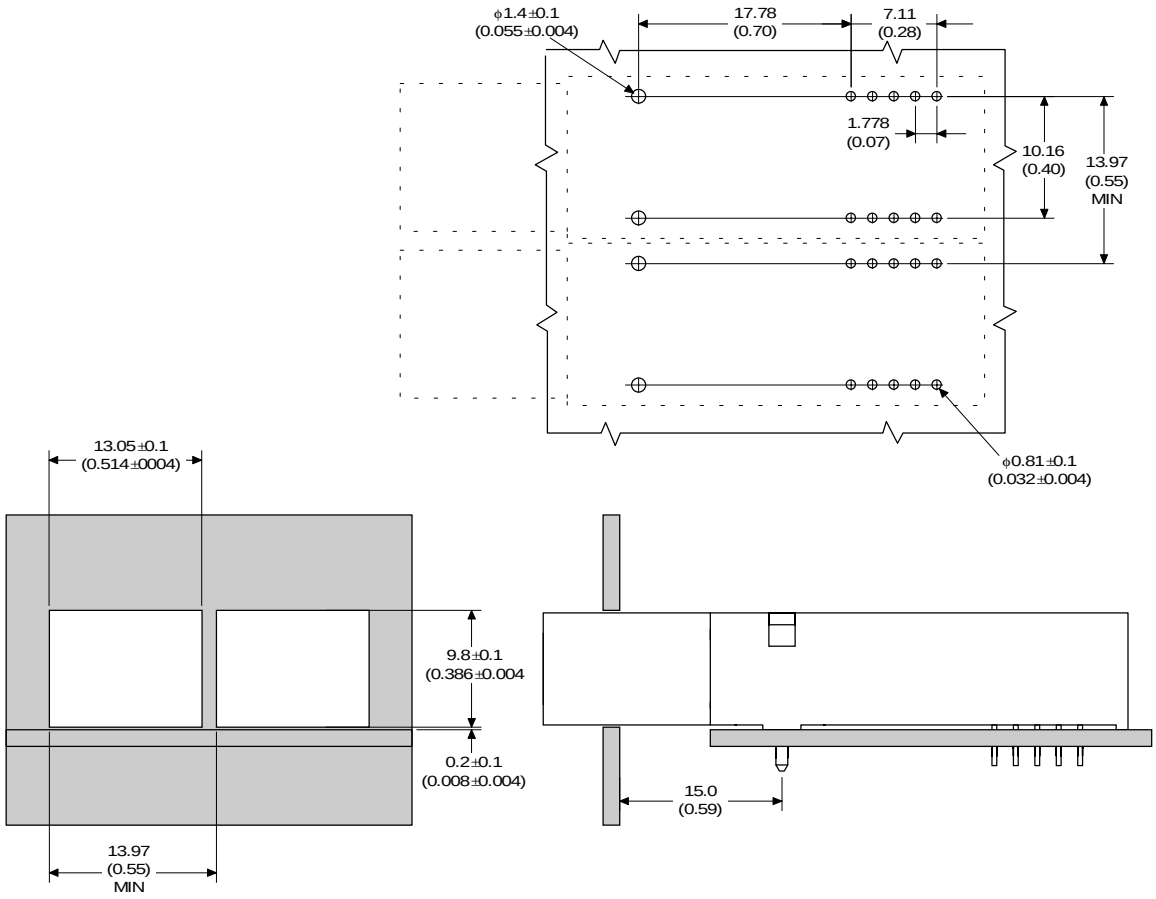
PACKAGE OUTLINE



Dimensions are millimeters (inches)

Figure 4. Package Outline

CIRCUIT BOARD LAYOUT AND PANEL OPENING



Dimensions are millimeters (inches)

Figure 5. Recommended Circuit Board Layout and Panel Opening

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