EM125-L3Tz
Preliminary Data Sheet

Features

- **1.25 Gb/s Operating Data Rate Good for Gigabit Ethernet Applications**
- **LC Receptacle Compatible with Industry Standard LC Optical Connector**
- **850nm Vertical Cavity Surface Emitting Laser (VCSEL) Source Technology**
- **Compliant with Multi-Source Agreement (MSA) Small Form Factor (SFF) 2x5 Footprint**
- **Compliant with specifications for IEEE- 802.3z Gigabit Ethernet (1000Base-SX)**
- **Operates with 50 µm and 62.5 µm multimode optical fibers**
- **Class 1 Laser Safety Compliant**
- **Single +3.3V Power Supply**
- **Wave Solderable / Aqueous Washable**

Product Description

The EM125-L3 from E2O Communications is a 3.3V Small Form Factor (SFF) transceiver designed for use in Gigabit Ethernet applications. The EM125-L3 transceivers provide the LC optical receptacle that is compatible with the industry standard LC connector. The transceiver also complies with the industry standard 2x5 footprint and meets the mezzanine height requirement of 9.8 mm. Each EM125-L3 transceiver consists of an optical subassembly housing both the transmitter and the receiver, and an electrical subassembly. All are housed within a plastic/metal package.

The transmitter consists of a high-performance 850-nm VCSEL and the receiver consists of a GaAs PIN and a preamplifier.

All EM125-L3 transceivers also include a Signal Detect circuit, which provides a TTL logic high output when a usable input optical signal level is detected.

Electromagnetic Interference (EMI)

Most equipment utilizing high-speed transceivers will be required to meet the following requirements:

1) FCC in the United States
2) CENELEC EN55022 (CISPR 22) in Europe. and
3) VCCI in Japan.

To assist the customer in managing the overall equipment EMI performance, the EM125-L3 transceivers have been designed to perform to the specified limits. All transceivers comply with the FCC Class A limits.

Immunity

The EM125-L3 transceiver has been designed to provide good immunity to radio-frequency electromagnetic fields. Key components to achieve the good electromagnetic compliance (EMC) are the metal housing, and the chassis shield.

Eye Safety

The EM125-L3 850-nm VCSEL-based transceivers have been designed to meet Class 1 eye safety and comply with FDA 21CFR 1040.10 and 1040.11and the IEC 825-1.

Ordering Information

EM125-L3 T z

- z (Coupling)
  - A = AC
  - D = DC
- T (Signal Detect)
  - T = TTL

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
Storage Temperature	T_S	-40		85	°C	
Supply Voltage	V_{CC}			5.0	V	Vcc – ground

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
Ambient Operating Temperature	T_A	0		70	°C	
Supply Voltage	V_{CC}	3.1		3.5	V	
Transmitter Differential Input Voltage	V_D	0.6		2.4	V	

ELECTRICAL CHARACTERISTICS (T_A = 0°C to 70°C, V_{CC} = 3.15V to 3.45V)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
TRANSMITTER						
Supply Current	I_{CCT}			100	mA	
RECEIVER						
Supply Current	I_{CCR}			130	mA	
Data Output Peak-to-Peak Differential Voltage	$V_{O,P-P}$	0.6		0.8	V	
Data Output Rise & Fall Times	t_r,t_f			0.25	ns	20-80%
TTL Signal Detect Output – High	Voh,TTL	2.4		Vcc	V	
TTL Signal Detect Output - Low	Vol,TTL	0.0		0.4	V	

OPTICAL CHARACTERISTICS (T_A = 0°C to 70°C, V_{CC} = 3.15V to 3.45V)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
TRANSMITTER						
Output Optical Power 50/125 µm, NA = 0.20 fiber	P_{OUT}	-9.5		-4	dBm avg.	
Output Optical Power 62.5/125 µm, NA = 0.275 fiber	P_{OUT}	-9.5		-4	dBm avg.	
Optical Extinction Ratio		9			dB	
Center Wavelength	λ_C	840	850	860	nm	
Spectral Width – rms	σ			0.85	nm	
Optical Rise/Fall Time	t_r / t_f			0.26	ns	20-80%
RIN			-122	-117	dB/Hz	
Transmitter Optical Contributed Jitter (TOTAL)	TJ			225	ps	
RECEIVER						
Input Optical Power Minimum	P_{IN}	-17			dBm avg.	
Input Optical Power Maximum	P_{IN}	0.5			dBm avg.	
Operating Center Wavelength	λ_c	770		860	nm	
Return Loss		12			dB	
Signal Detect – Asserted	P_A			-18	dBm avg.	
Signal Detect – Deasserted	P_D	-30			dBm avg.	
Signal Detect – Hysteresis	P_A - P_D		3		dB	

Figure 1 - SFF Transceiver Package Dimensions (mm)

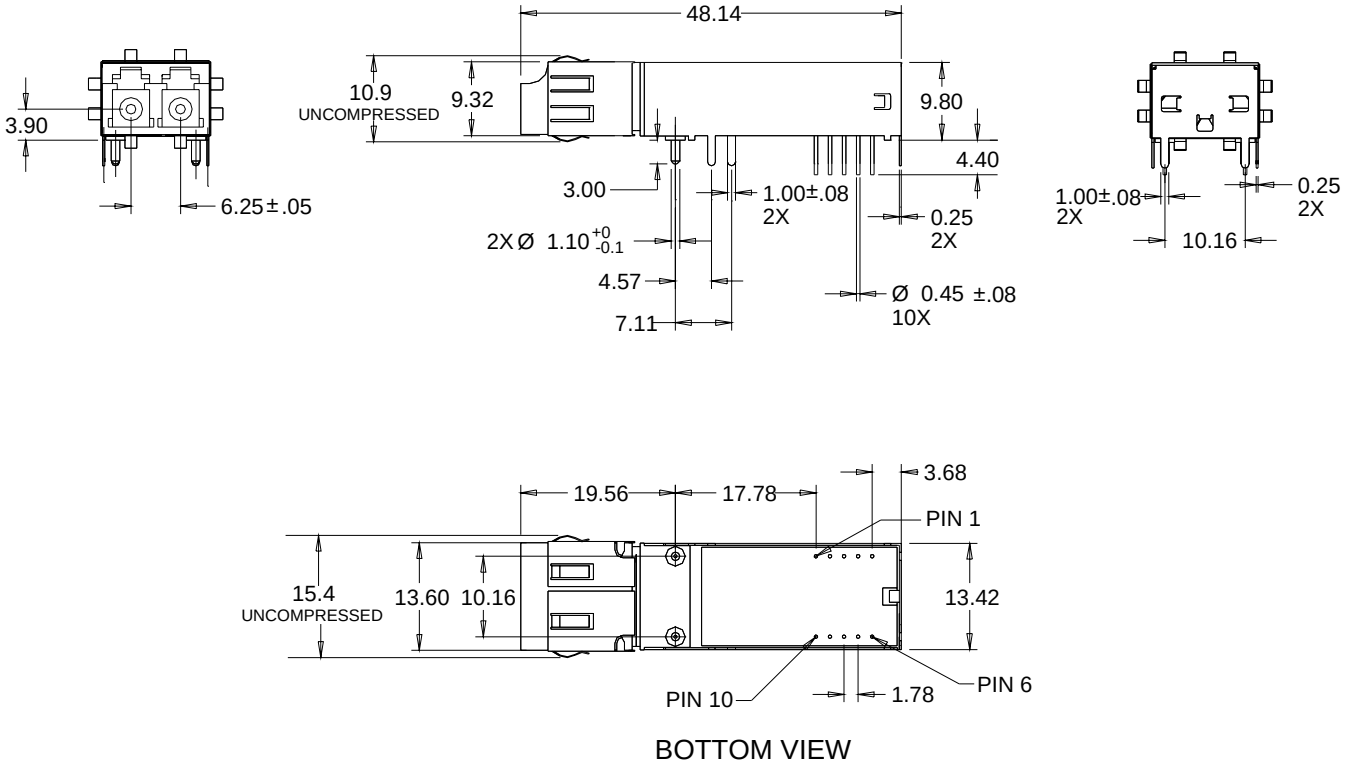
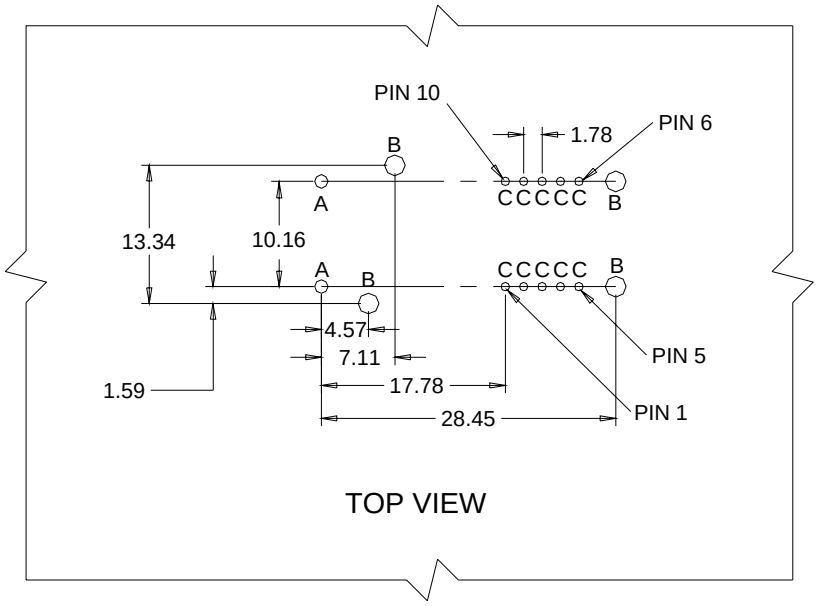


TABLE 1. PINOUT TABLE

Pin	Symbol	Functional Description
Mounting Posts		The mounting posts are provided for transceiver mechanical attachment to the circuit board. They should not be connected to the circuit ground but can be connected to the chassis ground.
1	V_{EER}	Receiver Signal Ground
2	V_{CCR}	+3.3 Volt Receiver Power Supply
3	SD	Signal Detect is a TTL or ECL output. A high level indicates a valid optical signal.
4	RD-	Receiver Data Inverted Differential Output
5	RD+	Receiver Data Non-inverted Differential Output
6	V_{CCT}	+3.3V Transmitter Power Supply
7	V_{EET}	Transmitter Signal Ground
8	TXdis	Transmitter Disable
9	TD+	Transmitter Data Non-inverted Differential Input
10	TD-	Transmitter Data Inverted Differential Input

Figure 2 – Recommended PCB Layout (mm)



RECOMMENDED HOLE SIZES

SYMBOL	QTY	DIAMETER(mm)
A	2	1.40±0.1
B	4	1.40±0.1
C	10	0.81±0.1

Figure 3 – Bezel Opening Dimensions (mm)