



E2O Communications, Inc.

3.3V VF-45™ Transceiver for 100Base-FX 1310 nm LED for Multimode Fiber

EM012-V3EA Preliminary Data Sheet



Features

- 1310nm Light Emitting Diode Technology
- Compliant with specifications for IEEE-802.3z Fast Ethernet (100Base-FX) at 125 Mbps
- VF-45™ (SG) Receptacle Compatible with IEC Standard SG Optical Connector
- Compliant with Multi-Source Agreement (MSA) Small Form Factor (SFF) 2x5 Footprint
- 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 EM012-V3 from E2O Communications is a 3.3V Small Form Factor (SFF) transceiver designed for use in Fast Ethernet applications. The EM012-V3 transceivers provide the ferrule-less VF-45™ (SG) optical receptacle that is compatible with the IEC standard SG connector. The transceiver also complies with the industry standard 2x5 footprint and meets the mezzanine height requirement of 9.8 mm.

Each EM012-V3 transceiver consists of an optical subassembly housing both the transmitter and the receiver, and an electrical subassembly. All are packaged together with a top metal cover and bottom plastic base.

The transmitter consists of a high-performance 1310-nm LED while the receiver consists of an Indium Gallium Arsenide (InGaAs) PIN and a preamplifier.

All EM012-V3 transceivers also include a Signal Detect circuit, which provides a PECL 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 EM012-V3 transceivers have been designed to perform to the specified limits. All transceivers comply with the FCC Class B limits.

Immunity

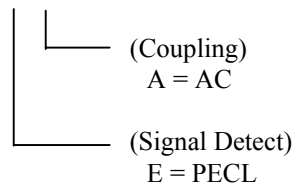
The EM012-V3 transceiver has been designed to provide good immunity to radio-frequency electromagnetic fields. Key components to achieve the good electromagnetic compliance (EMC) are the metal cover, and the chassis shield.

Eye Safety

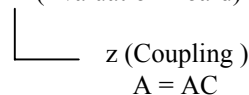
The EM012-V3 1310-nm LED-based transceivers have been designed to meet Class 1 eye safety and comply with FDA 21CFR 1040.10 and 1040.11 and the IEC 825-1.

Ordering Information

EM012-V3 E A



EB-SFF-z (Evaluation Board)





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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
Storage Temperature	T_S	-40		85	°C	
Soldering Temperature				260	°C	6 sec. on leads only
Supply Voltage	V_{CC}			5.0	V	V_{CC} – 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		2.0	V	

ELECTRICAL CHARACTERISTICS ($T_A = 0^{\circ}\text{C}$ to 70°C , $V_{CC} = 3.15\text{V}$ to 3.45V)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
TRANSMITTER						
Supply Current	I_{CCT}		135	200	mA	
Data Input Voltage - Low	$V_{IL}-V_{CC}$	-1.810		-1.620	V	
Data Input Voltage - High	$V_{IH}-V_{CC}$	-1.165		-0.880	V	
Data Input Voltage - Bias	V_B-V_{CC}		-1.32		V	
RECEIVER						
Supply Current	I_{CCR}		80	130	mA	
Data Output Peak-to-Peak Differential Voltage	$V_{O,P-P}$	0.5		1.9	V	
Data Output Rise & Fall Times	t_r, t_f			2.5	ns	10-90%
Signal Detect Output Voltage - Low	$V_{OL}-V_{CC}$	-1.810		-1.620	V	
Signal Detect Output Voltage - High	$V_{OH}-V_{CC}$	-1.045		-0.880	V	
Signal Detect Output Voltage - Bias	V_B-V_{CC}		-1.32		V	



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OPTICAL CHARACTERISTICS ($T_A = 0^\circ\text{C}$ to 70°C , $V_{CC} = 3.15\text{V}$ to 3.45V)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
TRANSMITTER						
Output Optical Power 50/125 μm , NA = 0.20 fiber	P_{OUT}	-24		-14	dBm avg.	
Output Optical Power 62.5/125 μm , NA = 0.275 fiber	P_{OUT}	-20		-14	dBm avg.	
Optical Extinction Ratio		10			dB	
Center Wavelength	λ_c	1260	1320	1380	nm	
Spectral Width – rms	σ	135			nm	
Optical Rise/Fall Time	t_r / t_f			3	ns	10-90%
Transmitter Optical Contributed Jitter (TOTAL)	TJ			0.6	ns	
RECEIVER						
Minimum Optical Input Power (Sensitivity)	$P_{\text{IN Min}}$			-31	dBm avg.	
Maximum Optical Input Power (Saturation)	$P_{\text{IN Max}}$	-14			dBm avg.	
Operating Center Wavelength	λ_c	1260		1380	nm	
Signal Detect – Asserted	P_A	-42.5		-31	dBm avg.	
Signal Detect – Deasserted	P_D	-45		-31.5	dBm avg.	
Signal Detect – Hysteresis	$P_A - P_D$	1.5		2.5	dB	



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Figure 1 - SFF Transceiver Package Dimensions in mm and [inches].

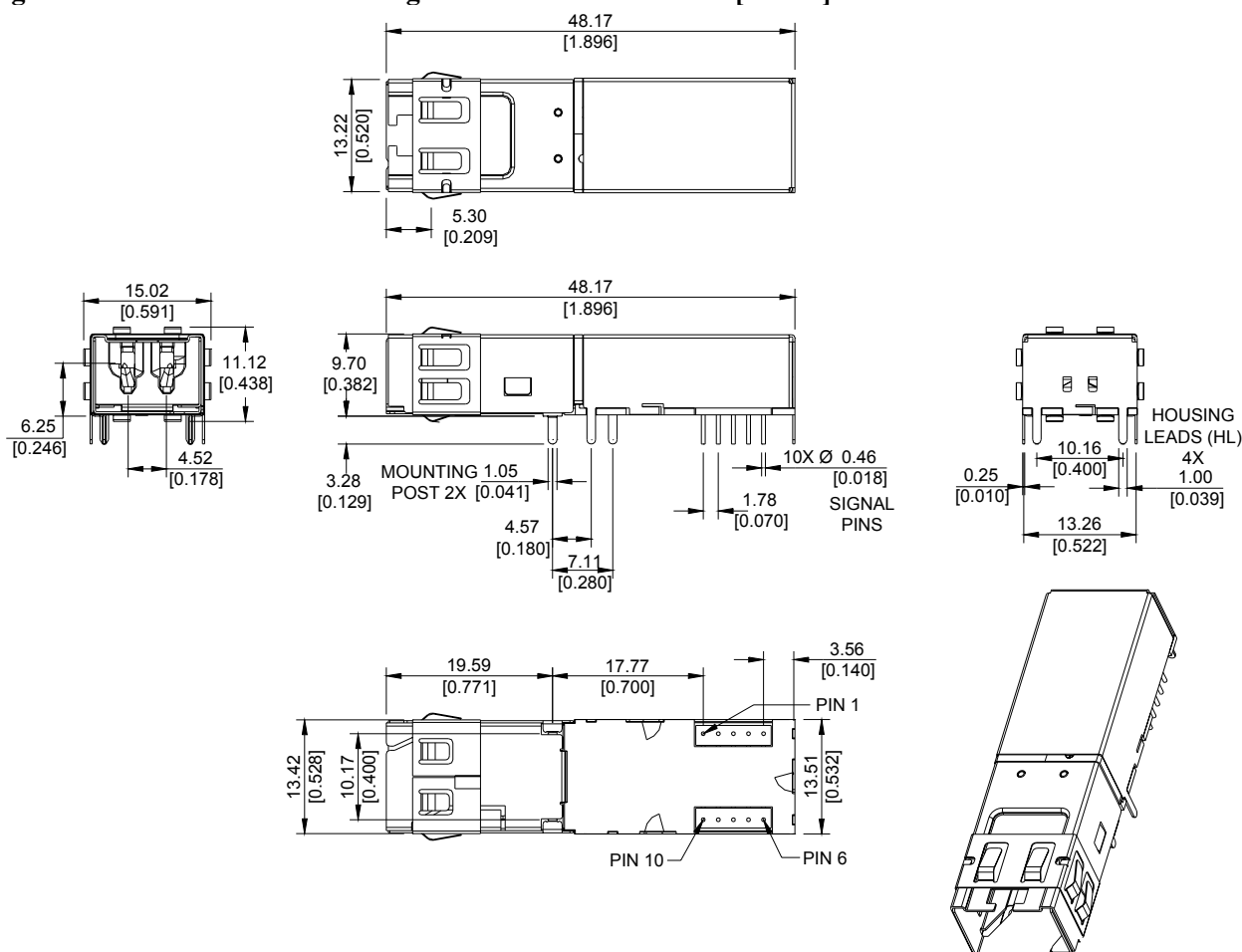


TABLE 1. PINOUT TABLE

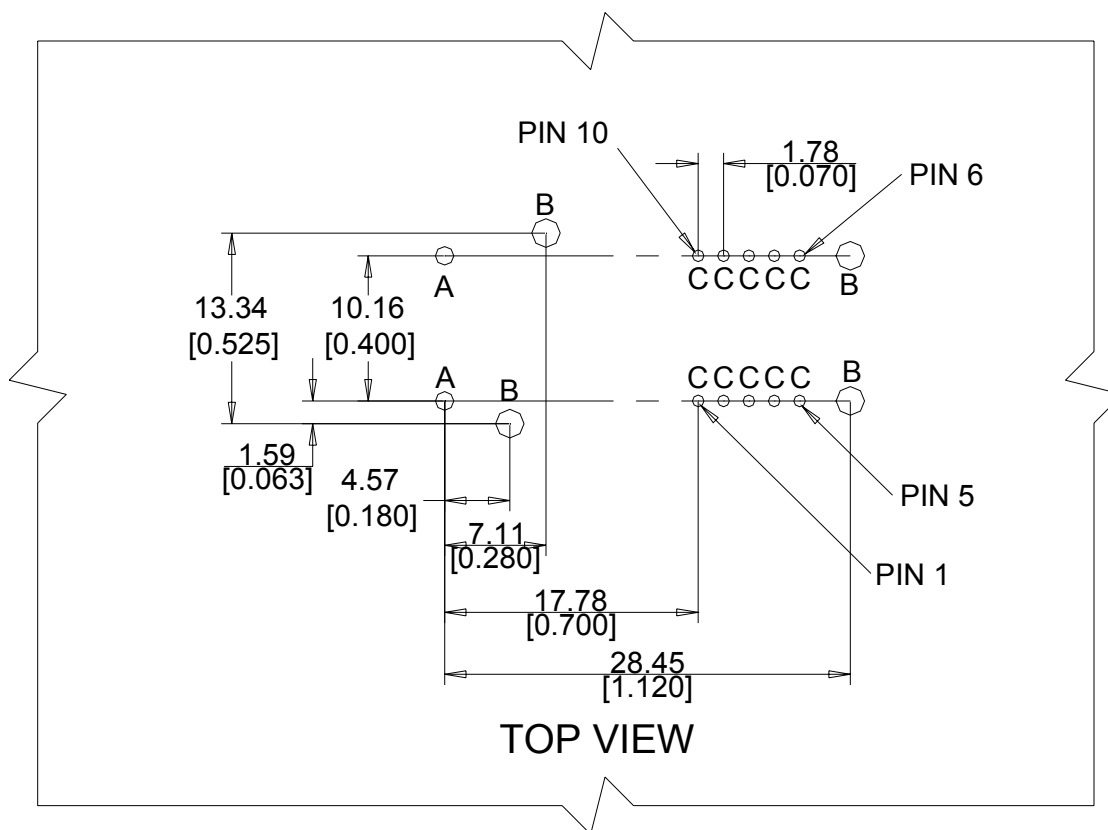
Pin	Symbol	Functional Description
Mounting Posts		The mounting posts are provided for transceiver mechanical attachment to the circuit board. They should not be connected to the circuit ground but can be connected to the chassis ground.
Housing Leads		The housing leads should be connected to circuit ground.
1	V _{EER}	Receiver Signal Ground
2	V _{CCR}	+3.3 Volt Receiver Power Supply
3	SD	Signal Detect is a PECL 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	NC	No Connection
9	TD+	Transmitter Data Non-inverted Differential Input
10	TD-	Transmitter Data Inverted Differential Input



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Figure 2 – Recommended PCB Layout in mm and [inches].



RECOMMENDED HOLE SIZES

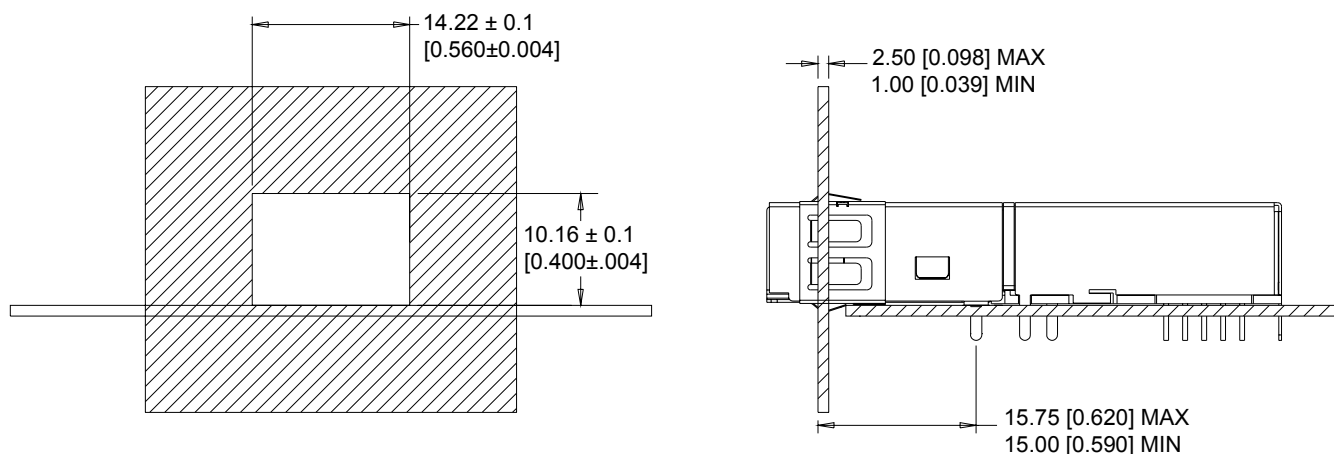
SYMBOL	QTY	DIAMETER(mm)	DIAMETER[inches]
A	2	1.40±0.1	[0.055±0.004]
B	4	1.40±0.1	[0.055±0.004]
C	10	0.81±0.1	[0.032±0.004]



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Figure 3 – Bezel Opening Dimensions in mm and [inches].



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