



5V 1x9 SC Transceiver for Fibre Channel & 1000Base-SX 850 nm VCSEL for Multimode Fiber

E2O Communications, Inc.

EMxxx-N5yz-ss Data Sheet



Features

- 850nm Vertical Cavity Surface Emitting Laser (VCSEL) Source Technology
- Compliant with specifications for IEEE-802.3z Gigabit Ethernet (1000Base-SX) at 1.25 Gbps
- Compliant with ANSI specifications for Fibre Channel Standards at 1.06 Gbps
- Class 1 Laser Safety Compliant
- Single +5V Power Supply
- Operates with 50 μ m and 62.5 μ m multimode optical fibers
- Industry Standard 1x9 Footprint with Integral Duplex SC Connector
- Meets Mezzanine Height Standard of 9.8 mm
- Wave Solderable / Aqueous Washable

Product Description

The EMxxx-N5 from E2O Communications is a duplex-SC transceiver designed for use in Fibre Channel and Gigabit Ethernet applications. It operates with a single +5V power supply. The transceiver complies with the industry standard 1x9 footprint and meets the mezzanine height requirement of 9.8 mm. Each EMxxx-N5 transceiver consists of a transmitter optical subassembly, a receiver optical subassembly and an electrical subassembly. All are packaged inside a plastic frame with metal cover.

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

All EMxxx-N5 transceivers also include a Signal Detect circuit, which provides a TTL or ECL 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 EMxxx-N5 transceivers have been designed to perform to the specified limits. All transceivers comply with FCC Class B limits.

Immunity

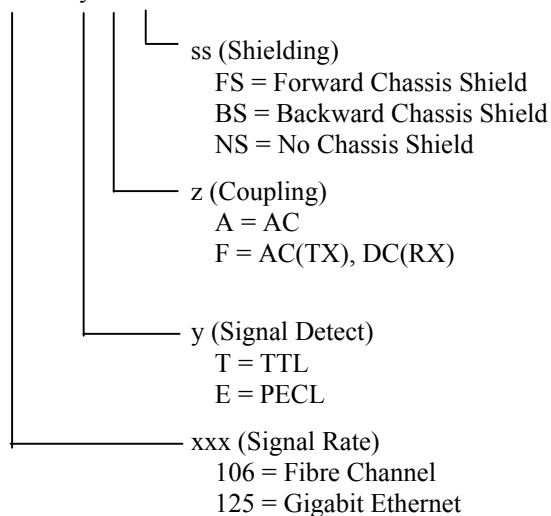
The EMxxx-N5 transceiver has been designed to provide good immunity to radio-frequency electromagnetic fields. Key components to achieve the good electromagnetic compliance (EMC) are the internal shields, the metal cover, and the chassis shield.

Eye Safety

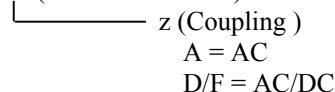
The EMxxx-N5 850-nm VCSEL-based transceivers have been designed to meet Class 1 eye safety and comply with FDA 21CFR1040.10 and 1040.11 and the IEC 825-1.

Ordering Information

EMxxx-N5 y z ss



EB-1x9-z (Evaluation Board)





5V 1x9 SC Transceiver for Fibre Channel & 1000Base-SX 850 nm VCSEL for Multimode Fiber

E2O Communications, Inc.

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}			6.0	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}	4.75		5.25	V	
Transmitter Differential Input Voltage	V_D	0.6		2.0	V	

ELECTRICAL CHARACTERISTICS ($T_A = 0^{\circ}\text{C}$ to 70°C , $V_{CC} = 4.75\text{V}$ to 5.25V)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
TRANSMITTER						
Supply Current	I_{CCT}		80	100	mA	
RECEIVER						
Supply Current	I_{CCR}		100	200	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			0.25	ns	20-80%
TTL Signal Detect Output – High	$V_{OH,TTL}$	2.0		V_{CC}	V	
TTL Signal Detect Output - Low	$V_{OL,TTL}$	0.0		0.5	V	
ECL Signal Detect Output – High	$V_{OH,ECL}$		$V_{CC}-0.9$		V	ECL 100K Compatible
ECL Signal Detect Output - Low	$V_{OL,ECL}$		$V_{CC}-1.7$		V	ECL 100K Compatible



5V 1x9 SC Transceiver for Fibre Channel & 1000Base-SX 850 nm VCSEL for Multimode Fiber

E2O Communications, Inc.

OPTICAL CHARACTERISTICS ($T_A = 0^\circ\text{C}$ to 70°C , $V_{CC} = 4.75\text{V}$ to 5.25V)

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%
Optical Modulation Amplitude	OMA	160			μW	Pk to Pk Applies to FC
Relative Intensity Noise	RIN		-122	-117	dB/Hz	
Transmitter Optical Contributed Jitter (TOTAL)	TJ			225	ps	
RECEIVER						
Minimum Optical Input Power (Sensitivity)	$P_{\text{IN Min}}$			-17	dBm avg.	
Maximum Optical Input Power (Saturation)	$P_{\text{IN Max}}$	0			dBm avg.	
Operating Center Wavelength	λ_c	770		860	nm	
Optical Modulation Amplitude	OMA	31			μW	Pk to Pk Applies to FC
Return Loss		12			dB	
Signal Detect – Asserted	P_A			-17	dBm avg.	
Signal Detect – Deasserted	P_D	-30			dBm avg.	
Signal Detect – Hysteresis	$P_A - P_D$	0.5		5.0	dB	

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	RD+	Receiver Data Non-inverted Differential Output
3	RD-	Receiver Data Inverted Differential Output
4	SD	Signal Detect is a TTL or ECL output. A high level indicates a valid optical signal.
5	V_{CCR}	+5 V Receiver Power Supply
6	V_{CCT}	+5 V Transmitter Power Supply
7	TD-	Transmitter Data Inverted Differential Input
8	TD+	Transmitter Data Non-inverted Differential Input
9	V_{EET}	Transmitter Signal Ground



5V 1x9 SC Transceiver for Fibre Channel & 1000Base-SX 850 nm VCSEL for Multimode Fiber

E2O Communications, Inc.

Figure 1A – Backward Shield Module mechanical dimensions in mm [inches].

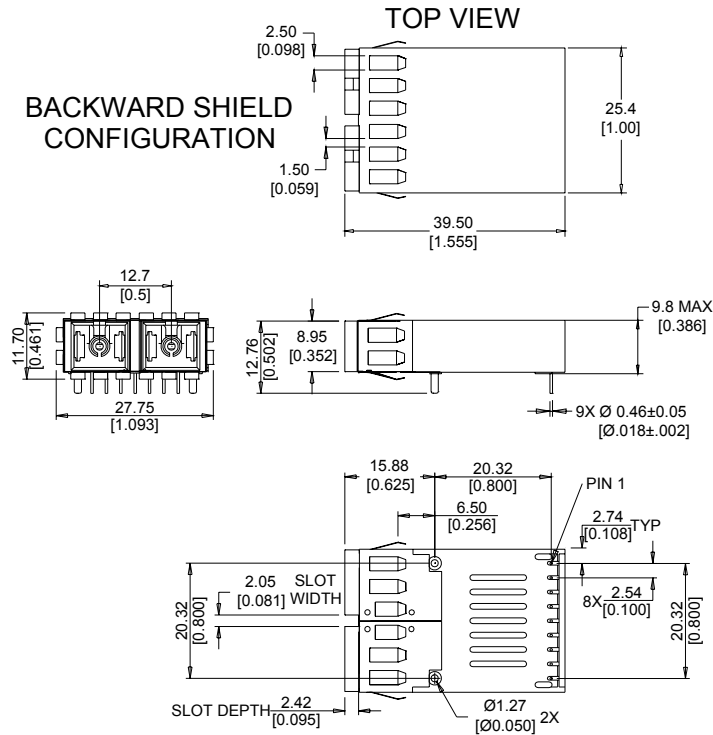
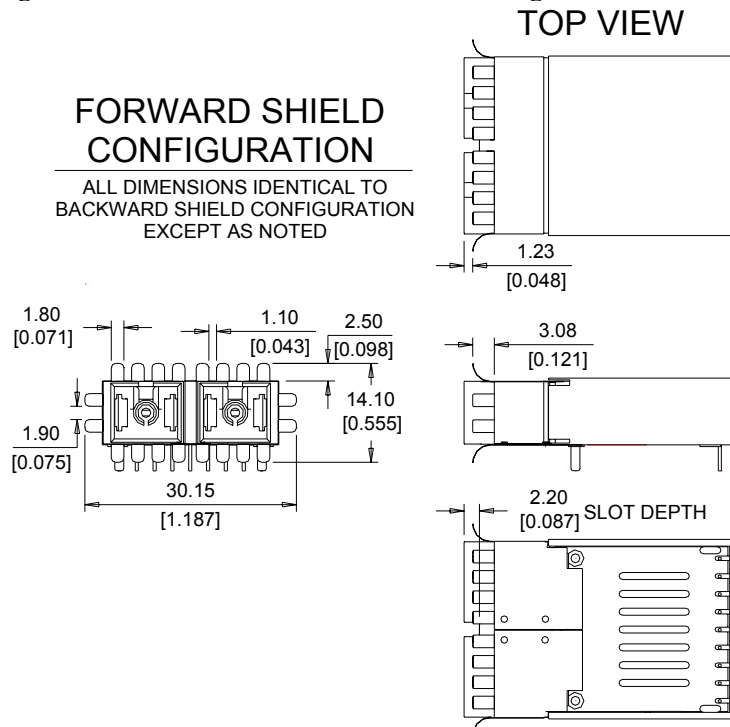


Figure 1B – Forward Shield Module Package Dimensions in mm and [inches].

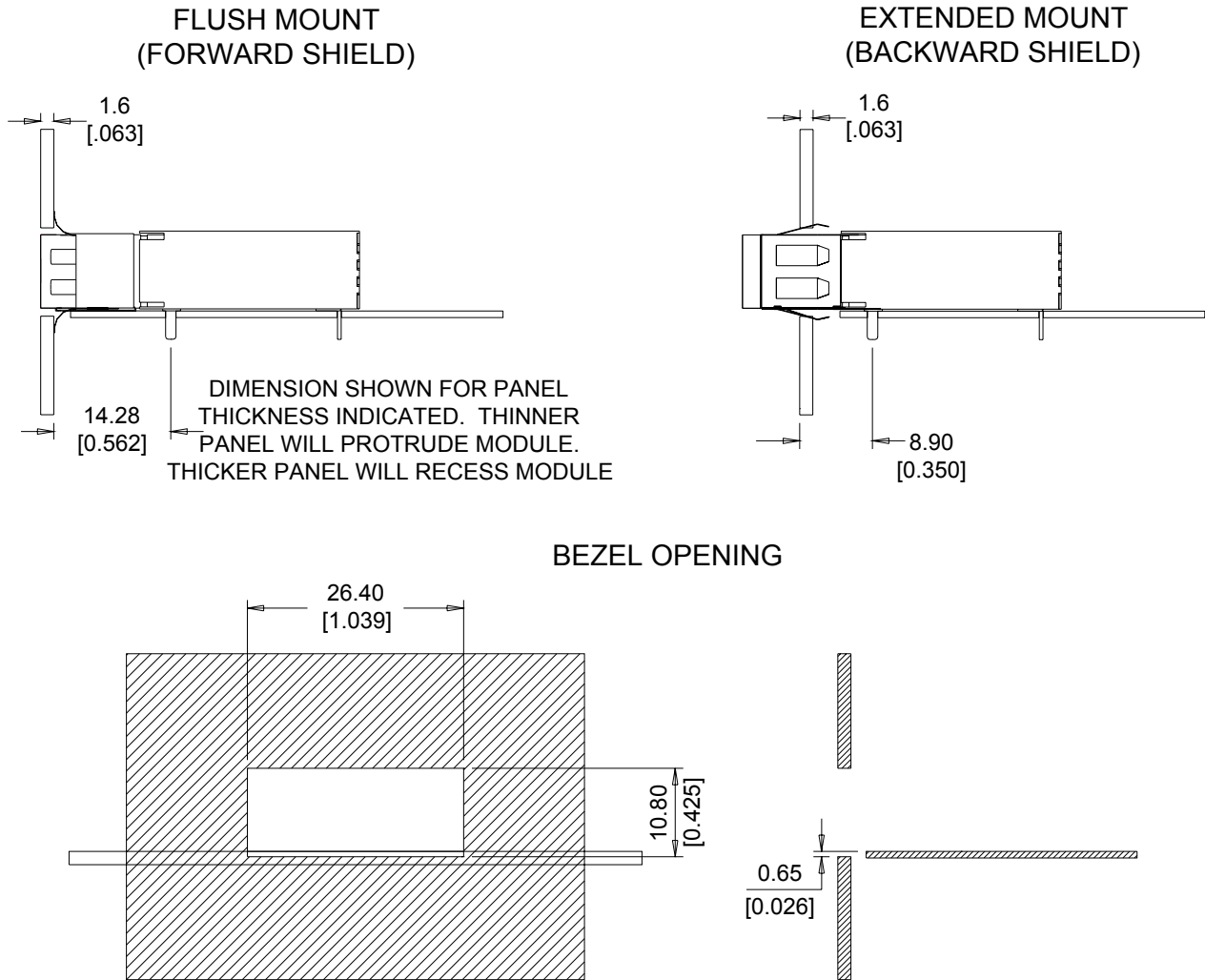




5V 1x9 SC Transceiver for Fibre Channel & 1000Base-SX 850 nm VCSEL for Multimode Fiber

E2O Communications, Inc.

Figure 2 – Bezel Opening Dimensions in mm and [inches].

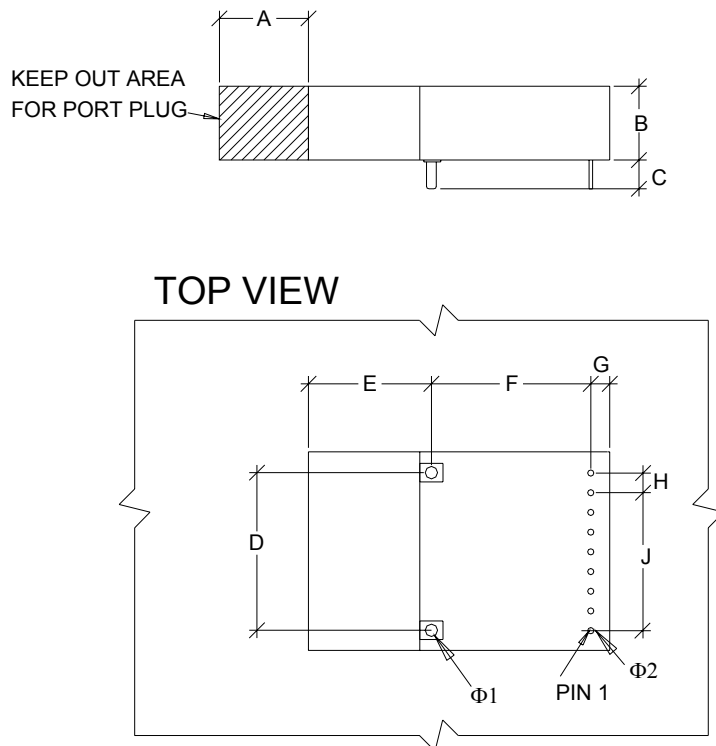




5V 1x9 SC Transceiver for Fibre Channel & 1000Base-SX 850 nm VCSEL for Multimode Fiber

E2O Communications, Inc.

Figure 3 – Recommended PCB Layout



DIMENSIONS (mm)		DIMENSIONS [inch]		RECOMMENDED HOLE SCHEDULE		
A	11.50	A	[0.453]	QTY	SYMBOL	SIZE (mm)
B	9.78	B	[0.385]	2	Φ1	Ø1.90
C	3.30	C	[0.130]	9	Φ2	Ø0.80
D	20.32	D	[0.800]			[Ø0.075]
E	15.90	E	[0.626]			[Ø0.031]
F	20.32	F	[0.800]			
G	3.40	G	[0.134]			
H	2.54	H	[0.100]			
J	17.78	J	[0.700]			

E2O Communications, Inc. reserves the right to make changes in product design, features, capabilities, function, or specifications at any time without notice. Information supplied by E2O Communications, Inc. is believed to be accurate and reliable at the time of release. No responsibility is assumed by E2O Communications, Inc. for its use nor for any infringements of third parties, which may result from its use. No license is granted by implication or otherwise under any patent right of E2O Communications, Inc.