



## 3.3V GBIC Transceiver for Fibre Channel & 1000Base-SX 850 nm VCSEL for Multimode Fiber

E2O Communications, Inc.

### EMxxx-G3TA 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 applications at 1.06 Gbps
- Duplex SC Optical Connector
- Conforms to Industry Standard Gigabit Interface Converter (GBIC) specification Rev. 5.5
- 20-pin SCA Electrical Connector
- Operates with 50  $\mu\text{m}$  and 62.5  $\mu\text{m}$  multimode optical fibers
- Class 1 Laser Safety Compliant
- Single +3.3V Power Supply
- Hot-Pluggable
- EEPROM with Serial ID Functionality

#### Product Description

The EMxxx-G3TA from E2O Communications is a 3.3V duplex-SC transceiver designed for use in Fibre Channel and Gigabit Ethernet applications. The transceiver conforms to the Gigabit Interface Converter (GBIC) specification and meets the mezzanine height requirement of 9.8 mm. Each EMxxx-G3TA transceiver consists of a transmitter optical subassembly, a receiver optical subassembly, and an electrical subassembly. All are housed within a plastic/metal package.

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

a preamplifier. At the same time, a serial EEPROM in the transceiver allows the user to access information such as the GBIC's capabilities, the standard interfaces as well as the manufacturer. Details of the Serial Identification Protocol are contained in Annex D of the GBIC Multi-Source Agreement (MSA) specification.

All EMxxx-G3TA transceivers also include a loss-of-Signal-Detect circuit which provides a TTL logic high output when an unusable 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-G3TA transceivers have been designed to perform to the specified limits. All transceivers comply with the FCC Class B limits.

#### Immunity

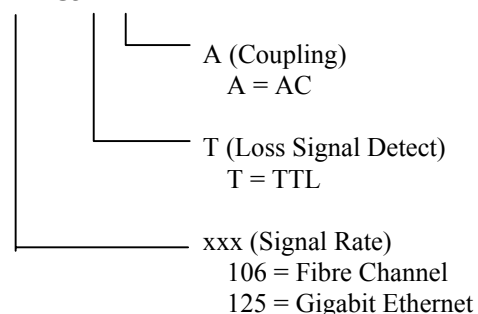
The EMxxx-G3TA transceiver has been designed to provide good immunity to radio-frequency electromagnetic fields. Key components to achieve the good electromagnetic compliance (EMC) are the metallized plastic housing, and the chassis shield.

#### Eye Safety

The EMxxx-G3TA 850-nm VCSEL-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

EMxxx-G3 T A



EB-GBIC-A (Evaluation Board)



## 3.3V GBIC 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    |                   |
| 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 $70^{\circ}\text{C}$ , $V_{CC} = 3.15\text{V}$ to $3.45\text{V}$ )

| PARAMETER                                     | SYMBOL      | MIN. | TYP. | MAX.     | UNITS | NOTES  |
|-----------------------------------------------|-------------|------|------|----------|-------|--------|
| <b>TRANSMITTER</b>                            |             |      |      |          |       |        |
| Supply Current                                | $I_{CCT}$   |      | 80   | 100      | mA    |        |
| <b>RECEIVER</b>                               |             |      |      |          |       |        |
| 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% |
| Loss Signal Detect Output – High              | $V_{oh}$    | 2.0  |      | $V_{CC}$ | V     |        |
| Loss Signal Detect Output - Low               | $V_{ol}$    | 0.0  |      | 0.5      | V     |        |



## 3.3V GBIC Transceiver for Fibre Channel & 1000Base-SX 850 nm VCSEL for Multimode Fiber

E2O Communications, Inc.

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

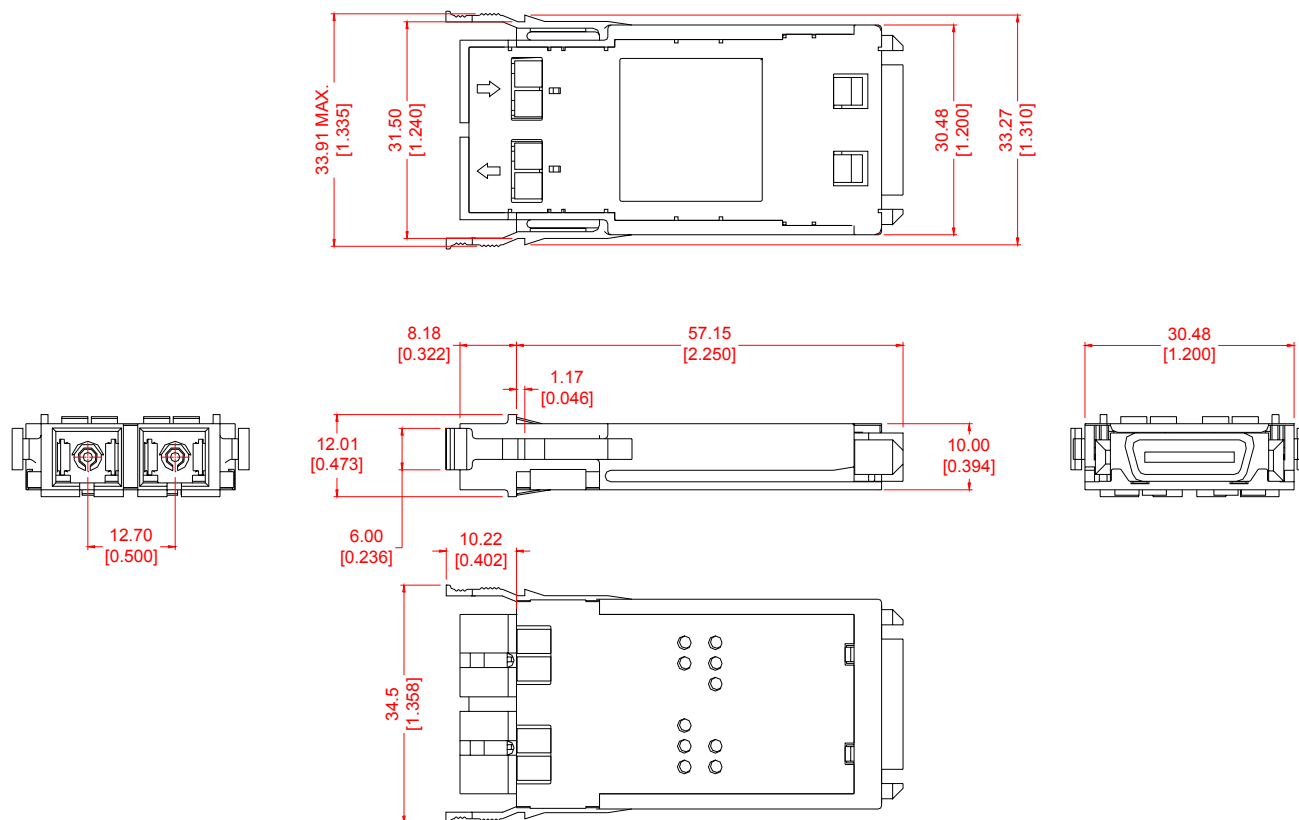
| PARAMETER                                                         | SYMBOL              | MIN. | TYP. | MAX. | UNITS         | NOTES                     |
|-------------------------------------------------------------------|---------------------|------|------|------|---------------|---------------------------|
| <b>TRANSMITTER</b>                                                |                     |      |      |      |               |                           |
| Output Optical Power<br>50/125 $\mu\text{m}$ , NA = 0.20 fiber    | $P_{\text{OUT}}$    | -9.5 |      | -4   | dBm<br>avg.   |                           |
| Output Optical Power<br>62.5/125 $\mu\text{m}$ , NA = 0.275 fiber | $P_{\text{OUT}}$    | -9.5 |      | -4   | dBm<br>avg.   |                           |
| Optical Extinction Ratio                                          |                     | 9    |      |      | dB            |                           |
| Center Wavelength                                                 | $\lambda_c$         | 840  | 850  | 860  | nm            |                           |
| Spectral Width – rms                                              | $\sigma$            |      |      | 0.85 | nm            |                           |
| Optical Rise/Fall Time                                            | $t_r / t_f$         |      |      | 0.26 | ns            | 20-80%                    |
| Optical Modulation Amplitude                                      | OMA                 | 160  |      |      | $\mu\text{W}$ | Pk to Pk<br>Applies to FC |
| Relative Intensity Noise                                          | RIN                 |      | -122 | -117 | dB/Hz         |                           |
| Transmitter Optical Contributed<br>Jitter (TOTAL)                 | TJ                  |      |      | 225  | ps            |                           |
| <b>RECEIVER</b>                                                   |                     |      |      |      |               |                           |
| Minimum Optical Input Power<br>(Sensitivity)                      | $P_{\text{IN Min}}$ |      |      | -17  | dBm<br>avg.   |                           |
| Maximum Optical Input Power<br>(Saturation)                       | $P_{\text{IN Max}}$ | 0    |      |      | dBm<br>avg.   |                           |
| Operating Center Wavelength                                       | $\lambda_c$         | 770  |      | 860  | nm            |                           |
| Optical Modulation Amplitude                                      | OMA                 | 31   |      |      | $\mu\text{W}$ | Pk to Pk<br>Applies to FC |
| Return Loss                                                       |                     | 12   |      |      | dB            |                           |
| Signal Detect – Asserted                                          | $P_A$               |      |      | -17  | dBm<br>avg.   |                           |
| Signal Detect – Deasserted                                        | $P_D$               | -30  |      |      | dBm<br>avg.   |                           |
| Signal Detect – Hysteresis                                        | $P_A - P_D$         | 0.5  |      | 5.0  | dB            |                           |



## 3.3V GBIC Transceiver for Fibre Channel & 1000Base-SX 850 nm VCSEL for Multimode Fiber

E2O Communications, Inc.

Figure 1 – Package Outline in mm [inches].



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.