

## SO02CW33-PNGA-xx Single Wavelength CWDM CPRI BIDI SFP Transceiver

### Features

- Support bidirectional multi-rate transmission up to CPRI3
- 0 to 70°C operating case temperature
- SFP package with single LC/APC receptacle connector
- Hot-pluggable capability
- Single 3.3V power supply
- SWDM DFB transmitter and high performance PIN receiver
- 16dB link budget
- Low EMI and excellent ESD protection
- Built-in Digital Diagnostic monitoring (DDM) function
- Class I laser product
- RoHS-6

### Applications

- CPRI
- GbE
- CWDM

### Standards

- Complies with SFP MSA
- Complies with SFF-8472

## Product Selection

| Order information |                  |                        |
|-------------------|------------------|------------------------|
| Channel           | Product Number   | Center Wavelength (nm) |
| 27                | SO02CW33-PNGA-27 | 1271                   |
| 29                | SO02CW33-PNGA-29 | 1291                   |
| 31                | SO02CW33-PNGA-31 | 1311                   |
| 33                | SO02CW33-PNGA-33 | 1331                   |
| 35                | SO02CW33-PNGA-35 | 1351                   |
| 37                | SO02CW33-PNGA-37 | 1371                   |
| 39                | SO02CW33-PNGA-39 | 1391                   |
| 41                | SO02CW33-PNGA-41 | 1411                   |
| 43                | SO02CW33-PNGA-43 | 1431                   |
| 45                | SO02CW33-PNGA-45 | 1451                   |
| 47                | SO02CW33-PNGA-47 | 1471                   |
| 49                | SO02CW33-PNGA-49 | 1491                   |
| 51                | SO02CW33-PNGA-51 | 1511                   |
| 53                | SO02CW33-PNGA-53 | 1531                   |
| 55                | SO02CW33-PNGA-55 | 1551                   |
| 57                | SO02CW33-PNGA-57 | 1571                   |
| 59                | SO02CW33-PNGA-59 | 1591                   |
| 61                | SO02CW33-PNGA-61 | 1611                   |

| ABSOLUTE MAXIMUM RATING     |                  |      |      |      |       |
|-----------------------------|------------------|------|------|------|-------|
| Parameter                   | Symbol           | Min. | Max. | Unit | Notes |
| Storage Ambient Temperature | T <sub>STG</sub> | -40  | 85   | °C   |       |
| Operating Humidity          | OH               | 5    | 85   | %    |       |
| Power Supply Voltage        | V <sub>CC</sub>  | -0.5 | 3.6  | V    |       |
| Receiver Damaged Threshold  |                  | +3   |      | dBm  |       |

| RECOMMENDED OPERATING CONDITION |                 |      |      |      |      |       |
|---------------------------------|-----------------|------|------|------|------|-------|
| Parameter                       | Symbol          | Min. | Typ. | Max. | Unit | Notes |
| Operating Case Temperature      | T <sub>C</sub>  | 0    |      | +70  | °C   |       |
| Power Supply Voltage            | V <sub>CC</sub> | 3.13 | 3.3  | 3.47 | V    |       |
| Power Supply Current            | I <sub>CC</sub> |      |      | 300  | mA   |       |
| Data Rate                       |                 |      | 2.5  | 3.1  | Gbps |       |
| Data Rate Drift                 |                 | -100 |      | +100 | PPM  |       |

**TRANSMITTER OPTICAL CHARACTERISTICS**

| Parameter                    | Symbol          | Min.              | Typ.        | Max.              | Unit | Notes |
|------------------------------|-----------------|-------------------|-------------|-------------------|------|-------|
| Average Launch Optical Power | $P_{OUT}$       | -3                | -           | +2                | dBm  |       |
| Extinction Ratio             | ER              | 8.2               | -           | -                 | dB   |       |
| Centre Wavelength            | $\lambda_c$     | $\lambda_c - 6.5$ | $\lambda_c$ | $\lambda_c + 6.5$ | nm   |       |
| Spectral Width (-20dB)       | $\Delta\lambda$ | -                 | -           | 1                 | nm   |       |
| Side Mode Suppression Mode   | SMSR            | 30                |             |                   | dB   |       |

**TRANSMITTER ELECTRICAL CHARACTERISTICS**

| Parameter                     | Symbol  | Min. | Typ. | Max. | Unit     | Notes |
|-------------------------------|---------|------|------|------|----------|-------|
| Data Input Differential Swing |         | 400  |      | 2000 | mV       |       |
| Input Differential Impedance  |         | 85   | 100  | 115  | $\Omega$ |       |
| TX Disable                    | Disable | 2    |      | VCC  | V        |       |
|                               | Enable  | 0    |      | 0.8  | V        |       |
| TX Fault                      | Normal  | 2.4  |      | VCC  | V        |       |
|                               | Fault   | 0    |      | 0.4  | V        |       |

**RECEIVER OPTICAL CHARACTERISTICS**
**RECEIVER ELECTRICAL CHARACTERISTICS**

| Parameter                      | Symbol    | Min. | Typ. | Max. | Unit | Notes           |
|--------------------------------|-----------|------|------|------|------|-----------------|
| Differential data output swing | $V_{out}$ | 400  |      | 2000 | mV   | CML AC coupling |
| Rx_LOS Output Voltage - High   | High      | 2.4  |      | Vcc  | V    |                 |
| Rx_LOS Output Voltage - Low    | Low       | 0    |      | 0.4  | V    |                 |
| LOS Assert                     | $LOS_A$   | -35  |      |      | dBm  |                 |
| LOS Hysteresis                 | HYS       | 0.5  |      | 5    | dB   |                 |

| <b>PIN DESCRIPTION</b> |                   |                              |   |
|------------------------|-------------------|------------------------------|---|
| <b>PIN</b>             | <b>Name</b>       | <b>Description</b>           | <b>Notes</b>  |
| 1                      | V <sub>EE</sub> T | Transmitter Ground           |   |
| 2                      | TX_Fault          | Transmitter Fault Indication | Low: normal; High: abnormal                                       |
| 3                      | TX_Disable        | Transmitter Disable          | Low: transmitter on; High: transmitter off                        |
| 4                      | SDA               | SDA                          | The data line of two wire serial interface                        |
| 5                      | SCL               | SCL                          | The clock line of two wire serial interface                       |
| 6                      | MOD_ABS           | Module Absent                | Connected to V <sub>EE</sub> T or V <sub>EE</sub> R in the module |
| 7                      | Rate              | Not Connected                |   |
| 8                      | RX_LOS            | Loss of Signal               | Low: signal detected; High: loss of signal                        |
| 9                      | V <sub>EE</sub> R | Receiver Ground              |   |
| 10                     | V <sub>EE</sub> R | Receiver Ground              |   |
| 11                     | V <sub>EE</sub> R | Receiver Ground              |   |
| 12                     | RD-               | Inv. Received Data Out       | CML AC-coupling   |
| 13                     | RD+               | Received Data Out            | CML AC-coupling   |
| 14                     | V <sub>EE</sub> R | Receiver Ground              |   |
| 15                     | V <sub>cc</sub> R | Receiver Power               |   |
| 16                     | V <sub>cc</sub> T | Transmitter Power            |   |
| 17                     | V <sub>EE</sub> T | Transmitter Ground           |   |
| 18                     | TD+               | Transmit Data In             | CML AC-coupling   |
| 19                     | TD-               | Inv. Transmit Data In        | CML AC-coupling   |
| 20                     | V <sub>EE</sub> T | Transmitter Ground           |   |

**PIN OUT DRAWING (TOP VIEW)**

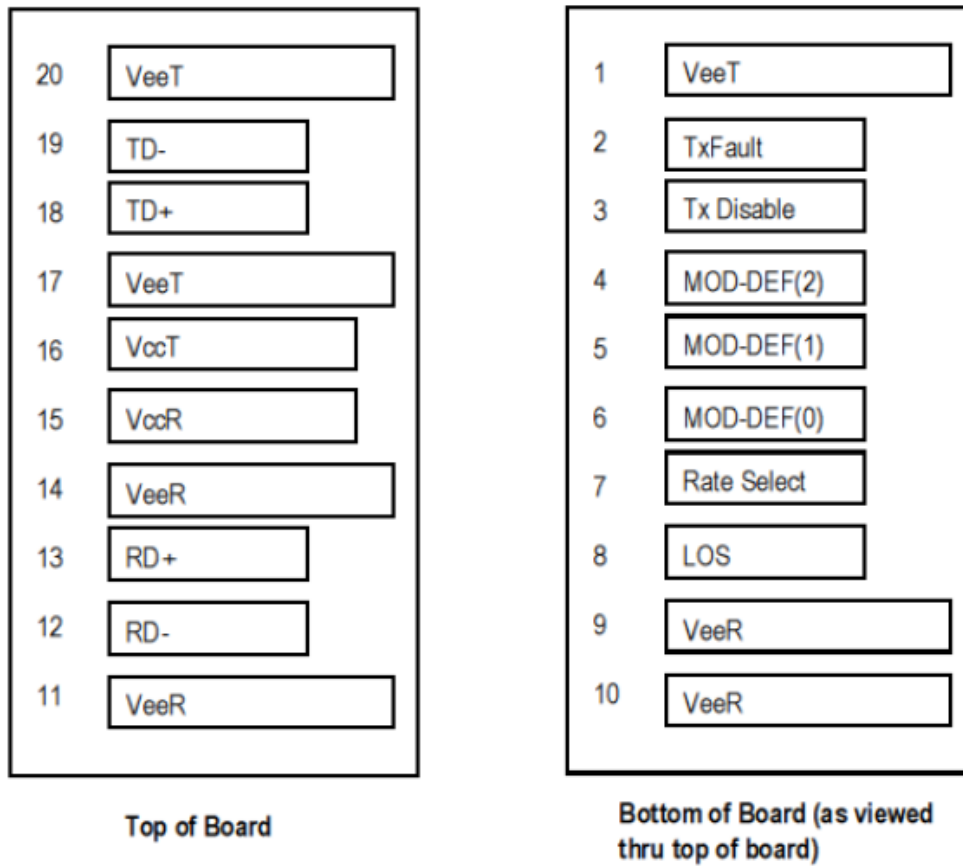


Figure 1 SFP Transceiver Electrical Pad Layout

## Typical Interface Circuit

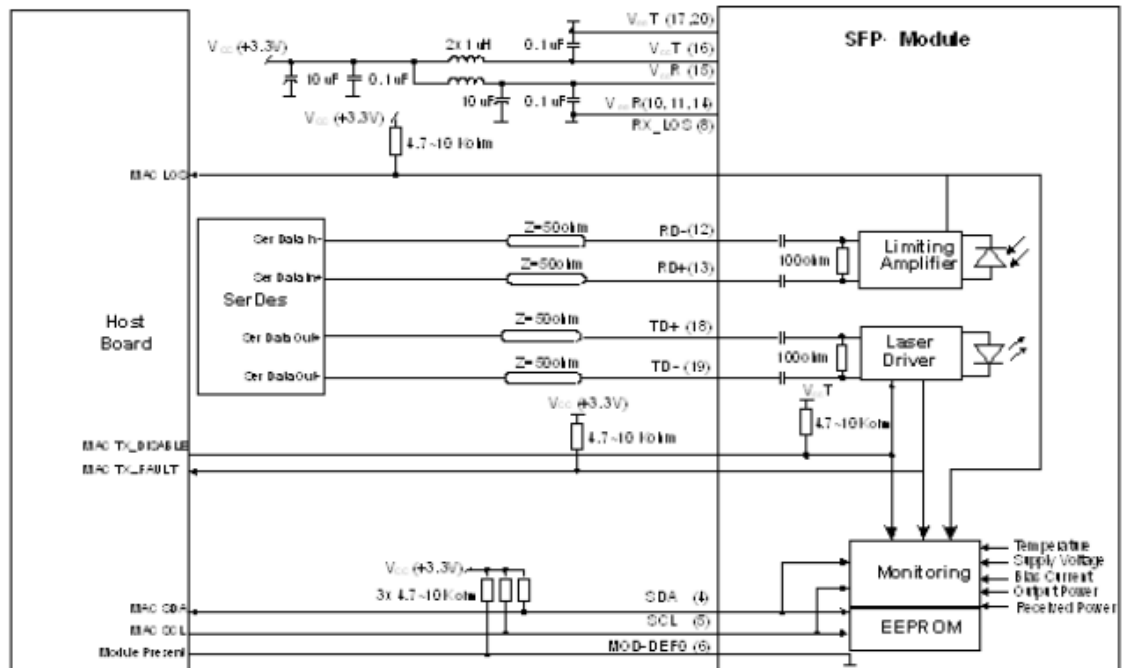


Figure 2 Typical Interface Circuit

## Package Outline

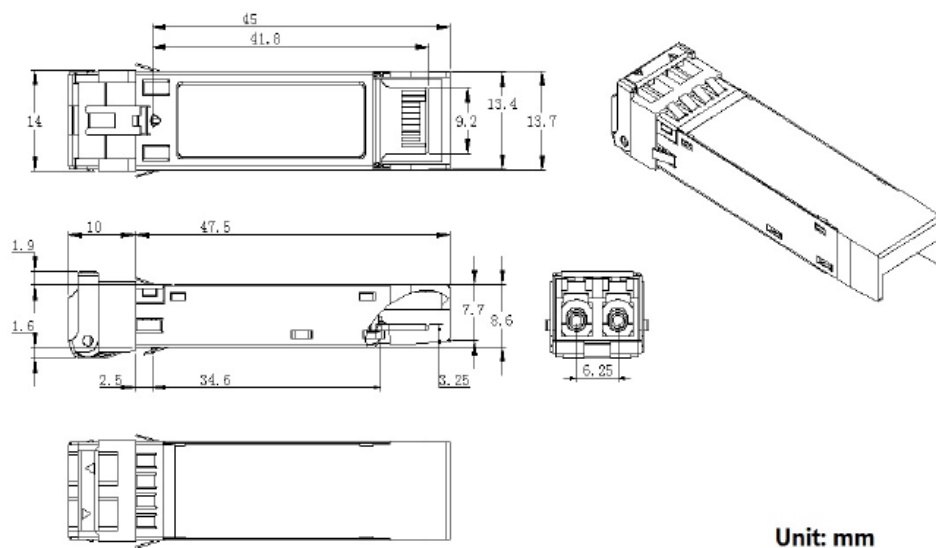


Figure 3 Package Outline

**EEPROM INFORMATION**

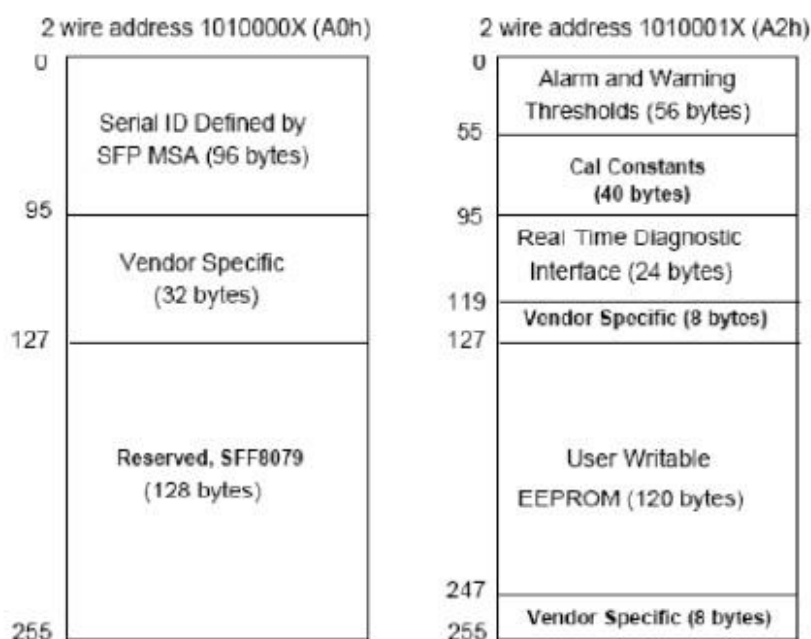


Figure 4 EEPROM Memory Map Specific Data Field Descriptions

**Warnings**

- **Handling Precautions:** This device is susceptible to damage as a result of electrostatic discharge (ESD). A Static free environment is highly recommended. Follow guidelines according to proper ESD procedures.
- **Laser Safety:** Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.