

FEATURES

- Supports up to 6.144Gb/s bit rates
- -40 to 85°C operating case temperature
- SFP+ package with duplex LC Receptacle connectors
- CWDM uncooled DFB laser transmitter and high performance PIN-TIA receiver
- Hot-pluggable capability
- Single 3.3V power supply
- Low power dissipation
- Up to 12dB power budget over SMF
- SFI electrical interface
- Low EMI and excellent ESD protection
- Built-in Digital Diagnostic monitoring (DDM) function
- Class I laser product
- RoHS-6 compliance

APPLICATIONS

- CPRI rates 2.4576Gb/s, 4.9152Gb/s, 6.144Gb/s
- CWDM Network

STANDARDS

- Complies with SFP+ MSA (SFF-8431)
- Complies with SFF-8472
- Complies with SFF-8432
- Complies with FCC 47 CFR Part 15, Class B
- Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

ABSOLUTE MAXIMUM RATING

| Parameter | Symbol | Min. | Max. | Unit | Notes |
|-----------------------------|-----------|------|------|------|-------|
| Storage Ambient Temperature | T_{STG} | -40 | 85 | °C | |
| Operating Case Temperature | T_c | -40 | 85 | °C | |
| Operating Humidity | OH | 5 | 95 | % | |
| Power Supply Voltage | V_{CC} | -0.5 | 3.6 | V | |

RECOMMENDED OPERATING CONDITION

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|----------------------------|----------|------|------|-------|------|-------|
| Operating Case Temperature | T_c | -40 | | +85 | °C | |
| Power Supply Voltage | V_{CC} | 3.13 | 3.3 | 3.47 | V | |
| Power Supply Current | I_{CC} | | | 360 | mA | |
| Date Rate | | | | 6.144 | Gbps | |
| Data Rate Drift | | -100 | | +100 | PPM | |

TRANSMITTER OPTICAL CHARACTERISTICS

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|----------------------------------|-----------------|-------------|-----------|-------------|------|-------------------------|
| Centre Wavelength | λ_c | $\lambda-8$ | λ | $\lambda+8$ | nm | |
| Spectral Width (-20dB) | $\Delta\lambda$ | | | 1 | nm | |
| Average Output Power | P_{OUT} | -2 | | 2 | dBm | Launched into SMF Fiber |
| Average Power of OFF Transmitter | P_{OFF} | | | -30 | dBm | |
| Extinction Ratio | ER | 3.5 | | | dB | |
| Side Mode Suppression Ratio | SMSR | 30 | | | dB | |

TRANSMITTER ELECTRICAL CHARACTERISTICS

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|-------------------------------|---------|------|------|---------------------|----------|-------|
| Data Input Differential Swing | | 180 | | 700 | mV | |
| Input Differential Impedance | | 85 | 100 | 115 | Ω | |
| TX Disable | Disable | 2 | | VCC+0.3 | V | |
| | Enable | -0.3 | | 0.8 | V | |
| TX Fault | Fault | 2.4 | | VCC _{HOST} | V | |
| | Normal | -0.3 | | 0.4 | V | |

RECEIVER OPTICAL CHARACTERISTICS

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--------------------------|------------------|------|------|------|------|------------------------------|
| Operating Wavelength | λ_c | 1260 | | 1620 | nm | |
| Sensitivity | SEN | | | -14 | dBm | BER<1E-12, 6.144Gb/s, PRBS31 |
| Saturation Optical Power | SAT | 0 | | | dBm | |
| LOS De-Assert | LOS _D | | | -18 | dBm | |
| LOS Assert | LOS _A | -30 | | | dBm | |
| LOS Hysteresis | HYS | 0.5 | | 5 | dB | |

RECEIVER ELECTRICAL CHARACTERISTICS

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Notes |
|--------------------------------|--------|------|------|---------------------|------|-------|
| Differential data output swing | Vout | 350 | | 850 | mV | |
| Rx_LOS Output Voltage - High | High | 2.4 | | VCC _{HOST} | V | |
| Rx_LOS Output Voltage - Low | Low | -0.3 | | 0.4 | V | |

| PIN DESCRIPTION | | | |
|-----------------|-------------------|------------------------------|---|
| PIN | Name | Description | Notes |
| 1 | V _{EE} 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 _{EE} T or V _{EE} R in the module |
| 7 | RS0 | Not Connected | |
| 8 | RX_LOS | Loss of Signal | Low: signal detected; High: loss of signal |
| 9 | RS1 | Not Connected | |
| 10 | V _{EE} R | Receiver Ground | |
| 11 | V _{EE} R | Receiver Ground | |
| 12 | RD- | Inv. Received Data Out | AC-coupled, CML |
| 13 | RD+ | Received Data Out | AC-coupled, CML |
| 14 | V _{EE} R | Receiver Ground | |
| 15 | V _{CC} R | Receiver Power | |
| 16 | V _{CC} T | Transmitter Power | |
| 17 | V _{EE} T | Transmitter Ground | |
| 18 | TD+ | Transmit Data In | AC-coupled, CML |
| 19 | TD- | Inv. Transmit Data In | AC-coupled, CML |
| 20 | V _{EE} T | Transmitter Ground | |

PIN OUT DRAWING (TOP VIEW)

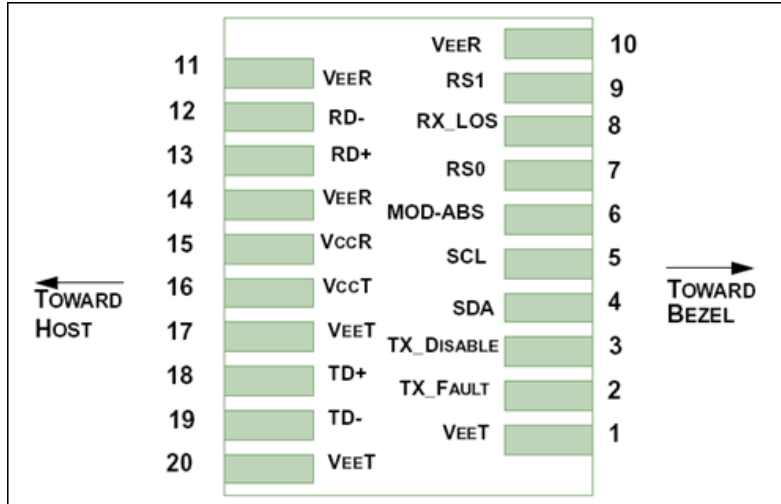


Figure 1 Pin Out Drawing (Top view)

TYPICAL INTERFACE CIRCUIT

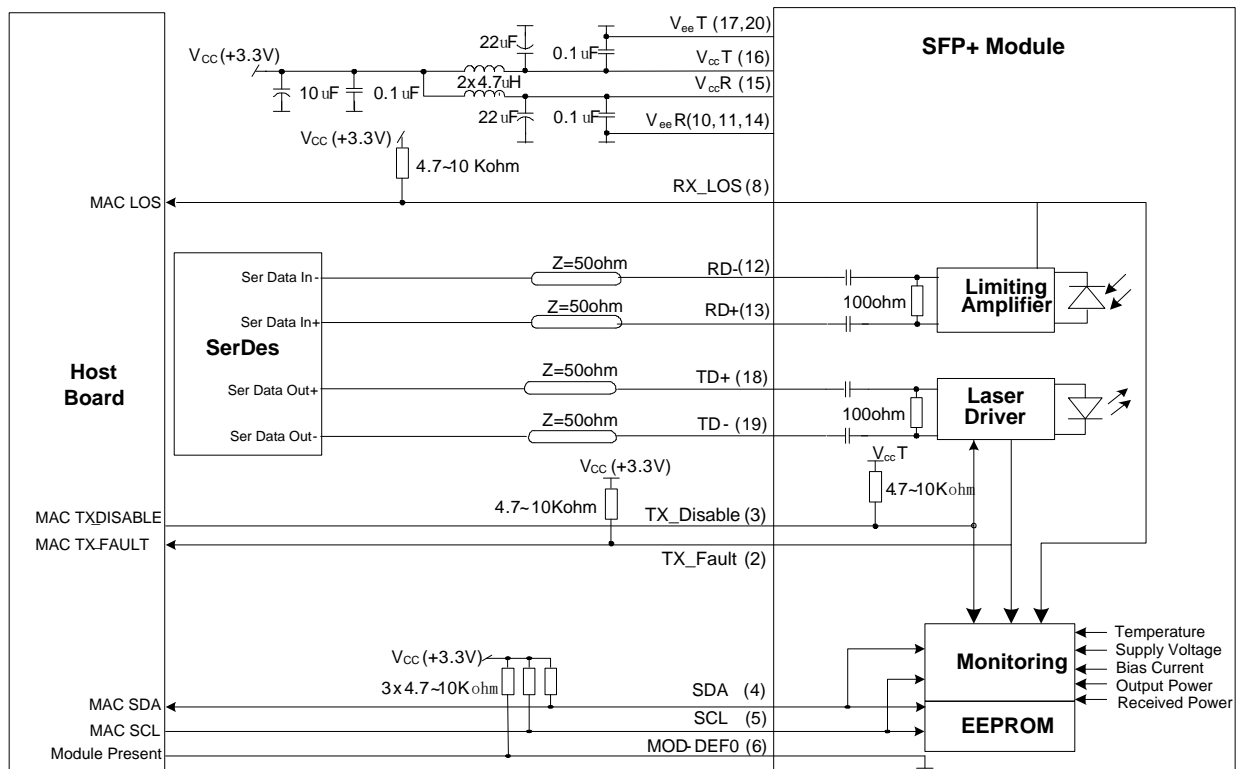


Figure 2 Typical Interface Circuit

PACKAGE OUTLINE

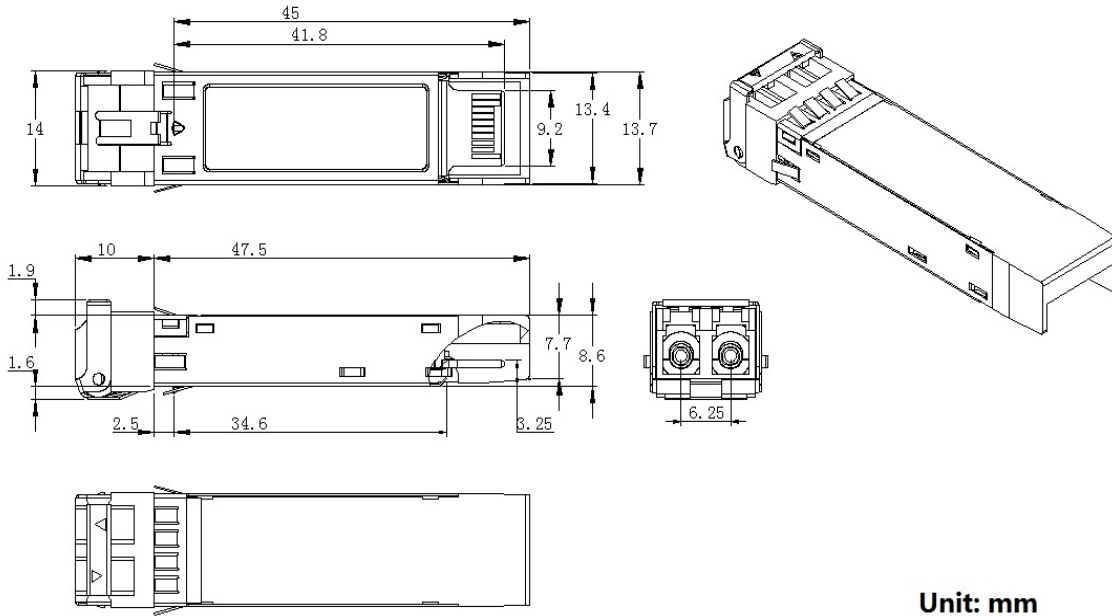


Figure 3 Package Outline

EEPROM INFORMATION

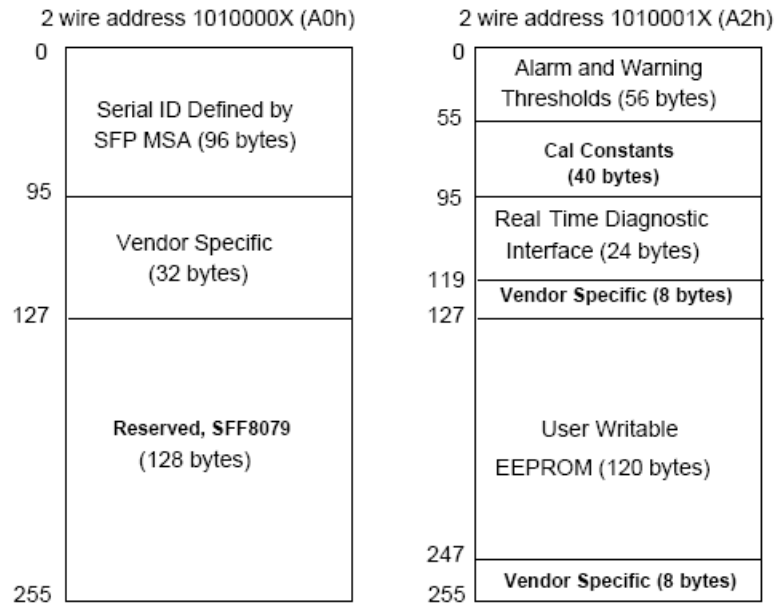


Figure 4 EEPROM Memory Map Specific Data Field Description

DIGITAL DIAGNOSTIC MONITORING INTERFACE

| Parameter | Range | Accuracy | Calibration | NOTES |
|------------------|---------------|----------|-------------|-------------|
| Temperature | -40 to 85°C | ±5°C | Internal | LSB: 1/256C |
| Voltage | 2.97 to 3.63V | ±3% | Internal | LSB: 0.1mV |
| Bias Current | 0 to 100mA | ±10% | Internal | LSB: 2uA |
| TX Power | -3 to +3dBm | ±3dB | Internal | LSB:0.1uW |
| RX Power monitor | -15 to +1dBm | ±3dB | Internal | LSB:0.1uW |

ORDERING INFORMATION

| Part No. | Tx/Rx | Data Rate | Operating Temp | Distance |
|----------------------|---------|-----------|----------------|----------|
| HOLS-PPCxx2066-LD-CD | DFB/APD | 6.144G | 0 to +70°C | 20km |
| HOLS-PPCxx2066-LD-ID | DFB/APD | 6.144G | -40 to +85°C | 20km |

Note:

XX is CWDM wavelength code as in the table below:

| Center Wavelength(nm) | Code | Center Wavelength(nm) | Code |
|-----------------------|------|-----------------------|------|
| 1271 | 27 | 1471 | 47 |
| 1291 | 29 | 1491 | 49 |
| 1311 | 31 | 1511 | 51 |
| 1331 | 33 | 1531 | 53 |
| 1351 | 35 | 1551 | 55 |
| 1371 | 37 | 1571 | 57 |
| 1391 | 39 | 1591 | 59 |
| 1411 | 41 | 1611 | 61 |

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.