

CSP-7840WG / CSP-7840BWG / CSP-7840AWG

(RoHS Compliant)

1.25 Gbps / 40km / 1310 nm TX & 1490 nm RX Digital Diagnostic 2-CH CSFP LC SM Transceiver

FEATURES

- 2-Fiber Bi-Directional CSFP Optical Transceiver
- Up to 1.25 Gbps Bi-directional Data Links
- Compliant with CSFP MSA 2.0 (Option2)
- IEEE802.3ah 100BASE-BX, 1000BASE-BX, SONET OC-3 / SDH STM-1, Compliant
- SFF-8472 Digital Diagnostic Function
- Duplex LC Connector
- 1310 nm DFB TX/1490nm RX
- Distance Up to 40 km
- AC/AC Coupling according to MSA
- Single +3.3 V Power Supply
- RoHS Compliant
- 0 to 70°C Operating: CSP-7840WG
- -10 to 85°C Operating: CSP-7840BWG
- -40 to 85°C Operating: CSP-7840AWG
- Class 1 Laser International Safety Standard IEC 60825 Compliant

APPLICATIONS

- WDM Gigabit Ethernet Links
- SONET/SDH Equipment Interconnect
- Fibre Channel Links

DESCRIPTION

The CSP-7840WG series single mode transceiver is a small form factor pluggable module for bi-directional serial optical data communications such as IEEE 802.3ah 1000BASE-BX by using 1310 nm DFB transmitter and 1490 nm receiver. It is with the SFP 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I²C series bus specified in the SFP MSA SFF-8472. The transmitter section uses a multiple quantum well 1310 nm DFB laser and is a class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated 1490 nm detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

LASER SAFETY

This single mode transceiver is a Class 1 laser product. It complies with IEC 60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

ORDER INFORMATION

| P/No. | Bit Rate (Gb/s) | 1000BASE | Distance (km) | TX (nm) | RX (nm) | Package | Temp (°C) | RoHS Compliant |
|-------------|-----------------|----------|---------------|----------|---------|------------------|-----------|----------------|
| CSP-7840WG | 1.25 | BX | 40 | 1310 DFB | 1490 | LC CSFP with DMI | 0 to 70 | Yes |
| CSP-7840BWG | 1.25 | BX | 40 | 1310 DFB | 1490 | LC CSFP with DMI | -10 to 85 | Yes |
| CSP-7840AWG | 1.25 | BX | 40 | 1310 DFB | 1490 | LC CSFP with DMI | -40 to 85 | Yes |

| Absolute Maximum Ratings | | | | | |
|----------------------------|--------|-----|-----|-------|----------------|
| Parameter | Symbol | Min | Max | Units | Notes |
| Storage Temperature | Tstg | -40 | 85 | °C | |
| Operating Case Temperature | Topr | 0 | 70 | °C | CSP-7840WG |
| | | -10 | 85 | | CSP-7840BWG |
| | | -40 | 85 | | CSP-7840AWG |
| Relative Humidity | RH | 0 | 85 | % | Non condensing |
| Power Supply Voltage | Vcc | 0 | 3.6 | V | |
| Input Voltage | --- | GND | Vcc | V | |
| Output Current | Iout | 0 | 30 | mA | |

| Recommended Operating Conditions | | | | | |
|----------------------------------|------------------------|------|------|------|------------------|
| Parameter | Symbol | Min | Typ | Max | Units / Notes |
| Power Supply Voltage | Vcc | 3.13 | 3.3 | 3.47 | V |
| Power Supply Current | I _{CC(TX+RX)} | | | 600 | mA / 2 Channels |
| Operating Case Temperature | Topr | 0 | | 70 | °C / CSP-7840WG |
| | | -10 | | 85 | °C / CSP-7840BWG |
| | | -40 | | 85 | °C / CSP-7840AWG |
| Data Rate | | | 1.25 | | Gb/s |

| Transmitter Optical Specifications (3.13V < Vcc < 3.47V) | | | | | | |
|--|---------------------|------|------|------|-------|--------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes |
| Average Launch Power | P _{O, Avg} | -6 | | +2 | dBm | 1 |
| Extinction Ratio | ER | 9 | | | | |
| Output Center Wavelength | λ _c | 1260 | 1310 | 1360 | nm | |
| Output Spectrum Width | σ _λ | | | 1 | nm | -20 dB width |
| Average Launch Power of OFF Transmitter | | | | -45 | dBm | |

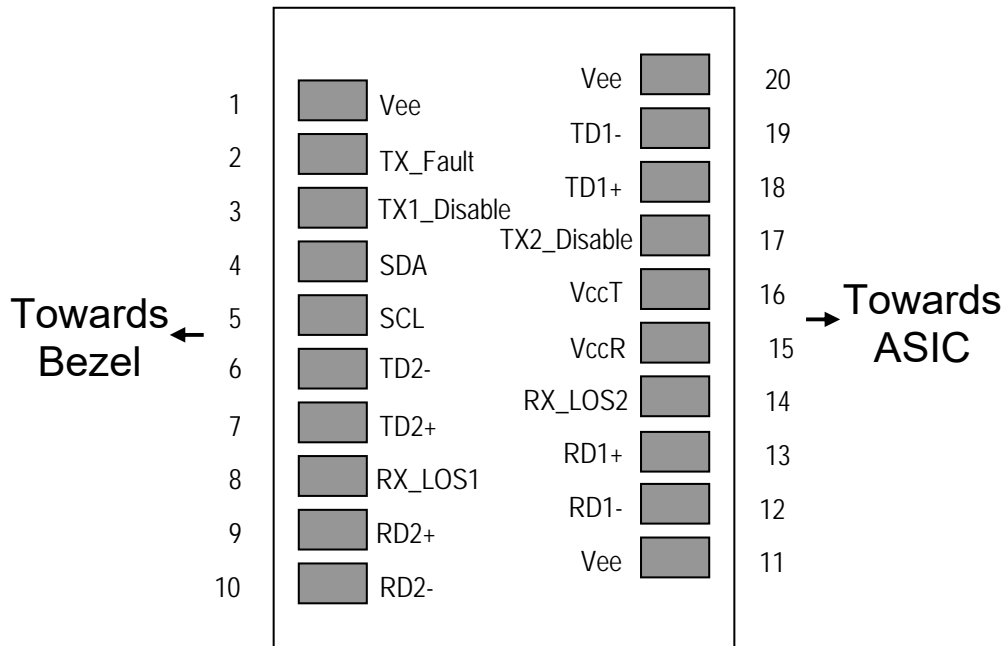
1. Output power is power coupled into a 9/125 μm single-mode fiber.

| Receiver Optical Specifications (3.13V < Vcc < 3.47V) | | | | | | |
|---|------------------|------|-----|------|-------|-------------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes |
| Sensitivity | Sen | | | -25 | dBm | 2, Average Power |
| Receiver Overload | P _{MAX} | -3 | --- | | dBm | |
| LOS -- Deasserted | LOS _D | --- | --- | -25 | dBm | Transition: high to low |
| LOS -- Asserted | LOS _A | -45 | --- | --- | dBm | Transition: low to high |
| LOS Hysteresis | LOS _H | 0.5 | 2 | 6 | dB | |
| Wavelength of Operation | λ _c | 1480 | | 1500 | nm | |

2. Measured with average power; BER < 10⁻¹² and PRBS 2³¹-1 @ 1.25Gbps.

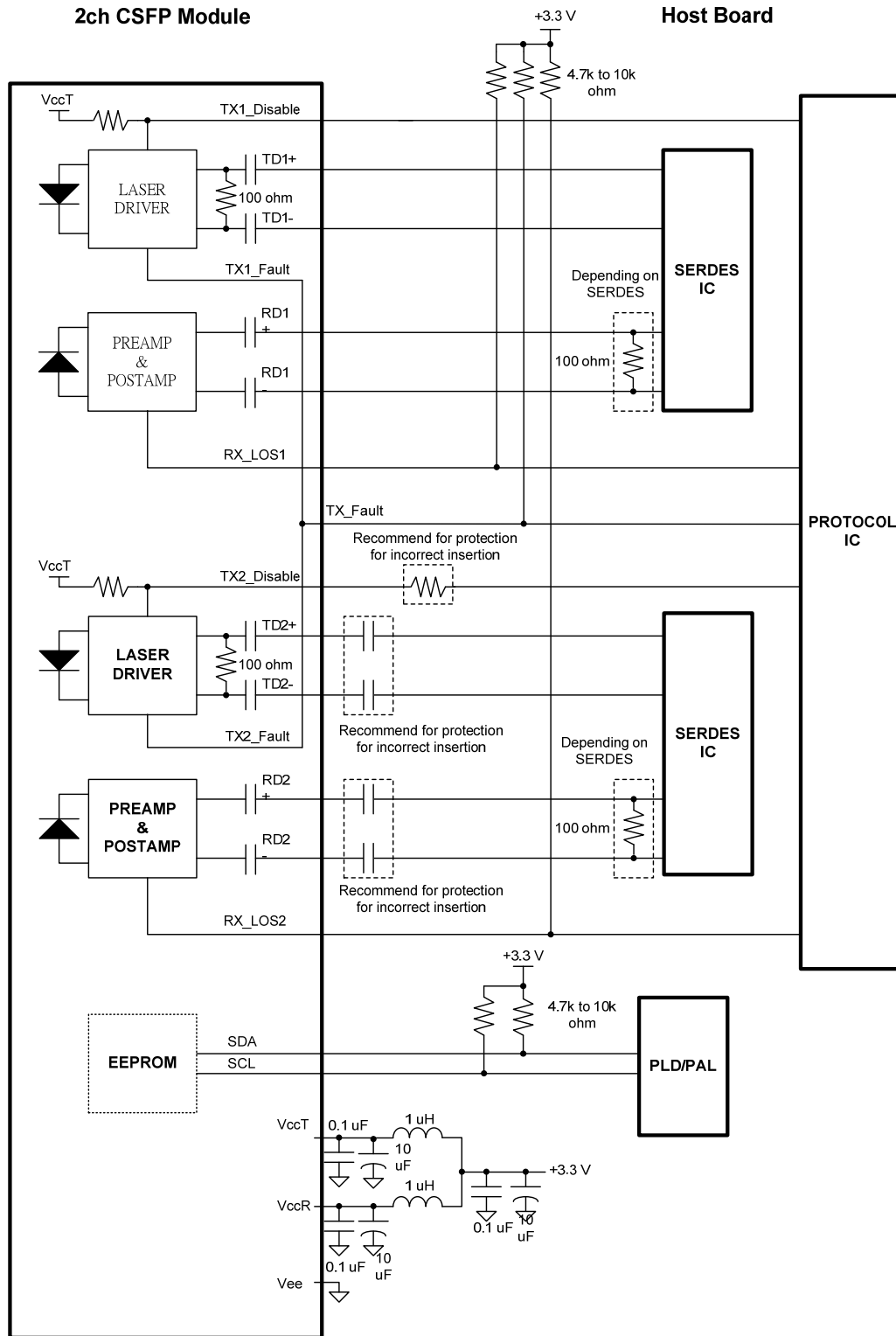
| Electrical Characteristics | | | | | | |
|--|--------|-----|------|------|-------|-----------------------|
| Parameter | Symbol | Min | Typ | Max | Units | Notes |
| High-Speed Signal (CML) Interface Specification | | | | | | |
| Input Data Rate | | | 1.25 | | Gb/s | |
| Differential Data Input Amplitude | | 500 | | 2400 | mVpp | Internally AC coupled |
| Output Data Rate | | | 1.25 | | Gb/s | |
| Low-Speed Signal (LVTTTL) Interface Specification | | | | | | |
| Input High Voltage | | 2.0 | | Vcc | V | |
| Input Low Voltage | | GND | | 0.8 | V | |
| Output High Voltage | | 2.0 | | Vcc | V | |
| Output Low Voltage | | GND | | 0.8 | V | |

CONNECTION DIAGRAM



| PIN | Signal Name | Description | PIN | Signal Name | Description |
|-----|-----------------|---|-----|-------------------|---|
| 1 | V _{EE} | Transmitter Signal Ground | 11 | V _{EE} | Receiver Signal Ground |
| 2 | TX_Fault | Transmitter Fault Indication. Logic "1" Output = Laser Fault. Logic "0" Output = Normal Operation | 12 | RD1- | Inverse Receiver Data Out Ch1 |
| 3 | TX1_Disable | Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on. | 13 | RD1+ | Receiver Data Out Ch1 |
| 4 | SDA | Modulation Definition 2 – Two wires serial ID Interface | 14 | RX_LOS2 | Loss of Signal Out Ch 2(OC). |
| 5 | SCL | Modulation Definition 1 – Two wires serial ID Interface | 15 | V _{CC} R | Receiver Power – 3.3V±5% |
| 6 | TD2- | Transmitter Data In Ch2 | 16 | V _{CC} T | Transmitter Power – 3.3V±5% |
| 7 | TD2+ | Inverse Transmitter Data In Ch2 | 17 | TX2_Disable | Logic "1" Input (or no connection) = Laser off, Logic "0" = Laser on. |
| 8 | RX_LOS1 | Loss of Signal Out Ch1(OC). | 18 | TD1+ | Transmitter Data In Ch1 |
| 9 | RD2+ | Receiver Data Out Ch2 | 19 | TD1- | Inverse Transmitter Data In Ch1 |
| 10 | RD2- | Inverse Receiver Data Out Ch2 | 20 | V _{EE} | Transmitter Signal Ground |

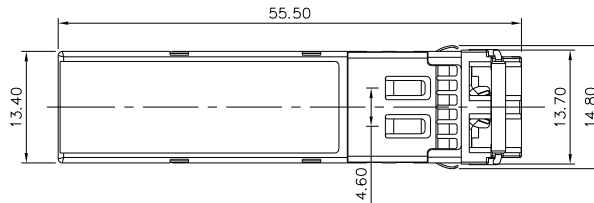
RECOMMENDED CIRCUIT SCHEMATIC



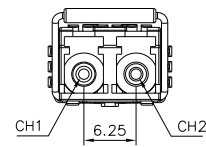
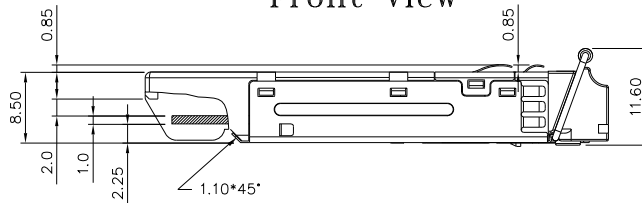
PACKAGE DIAGRAM

Units in mm

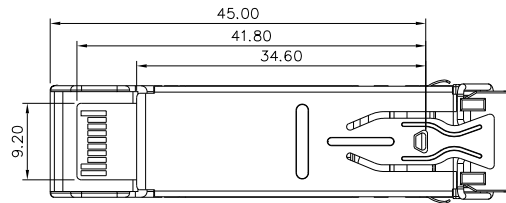
Top View



Front View



Side View



Bottom View

Note: Specifications subject to change without notice.

REVISION HISTORY

| Version | Subject | Release Date |
|---------|-------------------|--------------|
| 1.0 | Initial datasheet | 2021/4/8 |
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