

SFP-1G-LR13-20

SFP, 1.25Gbps, 20Km, LC, DDM

1. Feature:

- SFP package with LC connector
- 1310nm FP laser and PIN photo detector
- Up to 20Km transmission on SMF
- +3.3V single power supply
- LVPECL compatible data input/output interface
- Low EMI and excellent ESD protection
- laser safety standard IEC-60825 compliant
- Compatible with RoHS
- Digital Diagnostic SFF-8472 compliant
- Signal Ground Isolated to Case



2. Application:

- 1.25Gb/s 1000Base-LX Ethernet
- 1.06 Gb/s Fibre Channel

● 3. Absolute Maximum Ratings:

| Parameter | Symbol | Minimum | Maximum | Units |
|-----------------------------|--------|---------|---------|-------|
| Storage Temperature | Tst | -40 | +85 | °C |
| Supply Voltage | Vcc | 0 | +3.6 | V |
| Operating Relative Humidity | RH | 5 | 95 | % |

4. Operation Environment:

| Parameter | Symbol | Min | Typical | Max | Units |
|----------------------------|--------|------|---------|------|-------|
| Supply Voltage | Vcc | 3.15 | 3.3 | 3.45 | V |
| Operating Case Temperature | Tc | 0 | | +70 | |
| Power Dissipation | | | | 1 | W |
| Data Rate | | | 1.25 | | Gbps |

5. Optical Characteristics:

(Ambient Operating Temperature 0°C to +70°C, Vcc =3.3 V)

| Parameter | Symbol | Min. | Typ. | Max. | Units |
|----------------------------|---|------|------|------|-------|
| Transmitter Section | | | | | |
| Center Wavelength | λ_o | 1260 | 1310 | 1360 | nm |
| Spectral Width(RMS) | $\Delta\lambda$ | - | - | 4 | nm |
| Average Output Power | Po | -9 | - | -3 | dBm |
| Extinction Ratio | Er | 9 | - | | dB |
| Rise/Fall Time(20%~80%) | Tr/Tf | | | 300 | ps |
| Total jitter | Tj | | | 0.43 | UI |
| Optical Eye Diagram | IEEE 802.3z and ANSI Fibre Channel Compatible | | | | |
| Receiver Section | | | | | |
| Center Wavelength | λ_o | 1260 | | 1620 | nm |
| Receiver Sensitivity | Rsen | | | -22 | dBm |
| Receiver Overload | Rov | -3 | | | dBm |
| Return Loss | | 12 | | | dB |
| LOS Assert | LOS _A | -36 | | | dBm |
| LOS Dessert | LOS _D | | | -23 | dBm |
| LOS Hysteresis | | 0.5 | | 5 | |

6. Electrical Characteristics:

(Ambient Operating Temperature 0°C to +70°C, Vcc =3.3 V)

| Parameter | Symbol | Min. | Typ. | Max. | unit |
|-------------------------------|----------|------|------|------|------|
| Transmitter Section | | | | | |
| Input Differential Impedence | Zin | 90 | 100 | 110 | Ohm |
| Data Input Swing Differential | Vin | 500 | | 2400 | mV |
| TX Disable | Disable | 2.0 | | Vcc | V |
| | Enable | 0 | | 0.8 | V |
| TX Fault | Assert | 2.0 | | Vcc | V |
| | Deassert | 0 | | 0.8 | V |
| Receiver Section | | | | | |
| Output differential impedance | Zout | | 100 | | Ohm |
| Data Input Swing Differential | Vout | 370 | | 2000 | mV |
| Rx_LOS | Assert | 2.0 | | Vcc | V |
| | Deassert | 0 | | 0.8 | V |

7. EEPROM INFORMATION (A0) :

| Addr | Field Size (Bytes) | Name of Field | HEX | Description |
|-------|--------------------|-----------------|--|------------------|
| 0 | 1 | Identifier | 03 | SFP |
| 1 | 1 | Ext. Identifier | 04 | MOD4 |
| 2 | 1 | Connector | 07 | LC |
| 3-10 | 8 | Transceiver | 00 00 00 02 12 00 0D 01 | Transmitter Code |
| 11 | 1 | Encoding | 01 | 8B10B |
| 12 | 1 | BR, nominal | 0D | 1250M bps |
| 13 | 1 | Reserved | 00 | |
| 14 | 1 | Length (9um)-km | 14 | 20km |
| 15 | 1 | Length (9um) | 64/C8/FF | |
| 16 | 1 | Length (50um) | 00 | |
| 17 | 1 | Length (62.5um) | 00 | |
| 18 | 1 | Length (copper) | 00 | |
| 19 | 1 | Reserved | 00 | |
| 20-35 | 16 | Vendor name | 57 49 4E 54 4F 50 20 20 20 20 20 20 20 20 20 20 | |
| 36 | 1 | Reserved | 00 | |

| | | | | |
|--------|-----|------------------|--|------------------------------|
| 37-39 | 3 | Vendor OUI | 00 00 00 | |
| 40-55 | 16 | Vendor PN | xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx xx | ASC II |
| 56-59 | 4 | Vendor rev | 31 2E 30 20 | V1.0 |
| 60-61 | 2 | Wavelength | 05 1E | 1310nm |
| 62 | 1 | Reserved | 00 | |
| 63 | 1 | CC BASE | XX | Check sum of byte 0~62 |
| 64-65 | 2 | Options | 00 1A | LOS, TX_DISABLE, TX_FAULT |
| 66 | 1 | BR, max | 32 | 50% |
| 67 | 1 | BR, min | 32 | 50% |
| 68-83 | 16 | Vendor SN | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 | Unspecified |
| 84-91 | 8 | Vendor date code | XX XX XX 20 | Year, Month, Day |
| 92-94 | 3 | Reserved | 00 | |
| 95 | 1 | CC_EXT | XX | Check sum of byte 64~94 |
| 96-255 | 160 | Vendor specific | | |

8. Diagnostics:

| Parameter | Range | Accuracy | Unit | Calibration |
|--------------|-------------|----------|------|-------------|
| Temperature | 0 ~ 70 | ±5 | ℃ | Internal |
| Voltage | 3.15 ~ 3.45 | 0.1 | V | Internal |
| Bias Current | 10 ~ 80 | ±2 | mA | Internal |
| Tx Power | -9 ~ -3 | ±2 | dBm | Internal |
| Rx Power | -26~-3 | ±3 | dBm | Internal |

9. Pin Description:

| Pins | Name | Discription | NOTE |
|------|-------------|------------------------------|------|
| 1 | VeeT | Transmitter Ground | |
| 2 | Tx Fault | Transmitter Fault Indication | 1 |
| 3 | Tx Disable | Transmitter Disable | 2 |
| 4 | MOD DEF2 | Module Definition 2 | 3 |
| 5 | MOD DEF1 | Module Definition 1 | 3 |
| 6 | MOD DEF0 | Module Definition 0 | 3 |
| 7 | Rate Select | Not Connected | |
| 8 | LOS | Loss of Signal | 4 |
| 9 | VeeR | Receiver Ground | |
| 10 | VeeR | Receiver Ground | |
| 11 | VeeR | Receiver Ground | |
| 12 | RD- | Inv. Received Data Output | 5 |
| 13 | RD+ | IReceived Data Output | 5 |
| 14 | VeeR | Receiver Ground | |
| 15 | VccR | Receiver Power | |
| 16 | VccT | Transmitter Power | |
| 17 | VeeT | Transmitter Ground | |
| 18 | TD+ | Transmit Data Input | 6 |
| 19 | TD- | Inv. Transmit Data Input | 6 |
| 20 | VeeT | Transmitter Ground | |

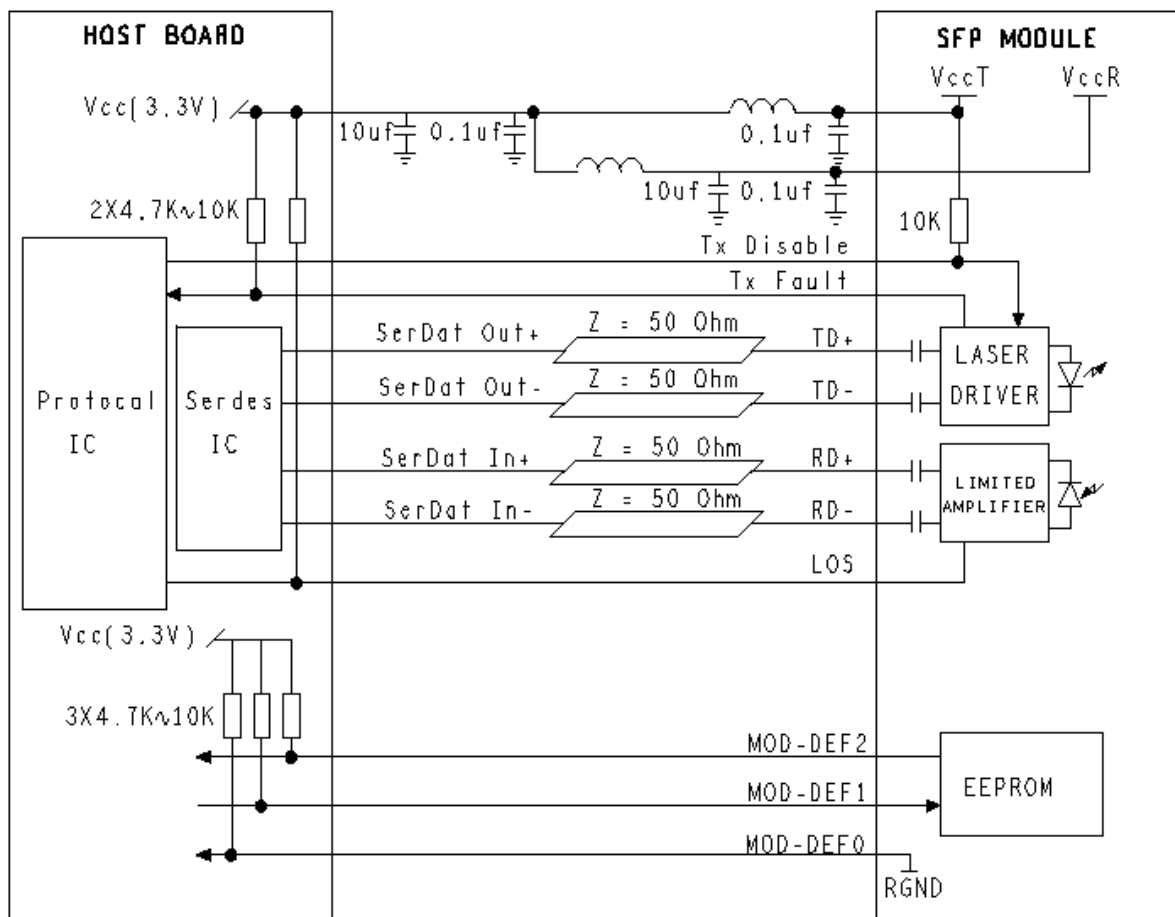
Notes:

- TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k~10kΩ resistor. Its states are:
 Low (0~0.8V): Transmitter on
 (>0.8V, <2.0V): Undefined
 High (2.0~3.3V): Transmitter Disabled
 Open: Transmitter Disabled
- MOD-DEF 0,1,2 are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
 MOD-DEF 0 is grounded by the module to indicate that the module is present
 MOD-DEF 1 is the clock line of two wire serial interface for serial ID

MOD-DEF 2 is the data line of two wire serial interface for serial ID

4. LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and $V_{cc}+0.3V$. Logic 0 indicates normal operation; logic 1 indicates loss of signal. In the low state, the output will be pulled to less than 0.8V.
5. These are the differential receiver output. They are internally AC-coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES.
6. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module.

10. Recommended Application Circuit:



11. Outline Dimensions (mm):

