



SPECTRUM TERRABIT DATASHEET (GLC-S40-13-CM)

SFP Transceiver: 1.25Gb/s, 1310nm, Single mode, 40km, w/o DDM Function



Features:

- ▄ Compliant with IEEE802.3Z
- ▄ Multi-Source Package with Duplex LC Connector
- ▄ Up to 1.25Gb/s Data Rate
- ▄ Up to Distance 40km
- ▄ Single Mode 1310nm DFB-LD
- ▄ Single +3.3V Power Supply
- ▄ Hot-Pluggable
- ▄ Compliant with Bellcore TA-NWT-000983
- ▄ Eye Safety Designed to Meet Laser Class1, Compliant with IEC60825-1
- ▄ RoHS Compliant Products Available

Applications:

- ▄ Gigabit Ethernet
- ▄ 1x Fiber Channel
- ▄ Switch to Switch Interface
- ▄ Switched Backplane Applications
- ▄ Router/ Server Interface
- ▄ Other Optical Links

Specification:

a) Electrical and Optical Characteristics: (Condition: T_a=T_{OP})

| Parameter | Symbol | Min | Typical | Max | Unit |
|--|-----------------|-----|---------|-----------------|--------|
| Transmitter Differential Input Voltage | +/-TX_DAT | 200 | - | 2400 | mV p-p |
| Supply Current | I _{CC} | - | 130 | 180 | mA |
| Tx_Disable Input Voltage – Low | V _{IL} | 0 | - | 0.8 | V |
| Tx_Disable Input Voltage – High | V _{IH} | 2.0 | - | V _{CC} | V |
| Tx_Fault Output Voltage – Low | V _{OL} | 0 | - | 0.8 | V |
| Tx_Fault Output Voltage – High | V _{OH} | 2.0 | - | V _{CC} | V |
| Receiver Differential Output Voltage | +/-RX_DAT | 600 | - | 1400 | mV p-p |
| Rx_LOS Output Voltage- Low | V _{OL} | 0 | - | 0.8 | V |
| Rx_LOS Output Voltage- High | V _{OH} | 2.0 | - | V _{CC} | V |

b) Transmitter

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|-------------------------|---------------------------|-----------------------|---------|-----------------------|------|
| Data Rate | B | - | 1250 | - | Mb/s |
| Centre Wavelength | λ_c | 1296 | 1310 | 1330 | nm |
| Output Spectral Width | λ | - | - | 1 | nm |
| Average Output Power | P _O | -2 | - | +3 | dBm |
| Extinction Ratio | EXT | 9 | - | - | dB |
| Data Input Voltage-High | V _{IHS} | V _{CC} -1.16 | - | V _{CC} -0.89 | V |
| Data Input Voltage -Low | V _{ILS} | V _{CC} -1.82 | - | V _{CC} -1.48 | V |
| Supply Current | I _{CC} | - | 90 | 150 | mA |
| Output Optical Eye | Compliant with IEEE802.3Z | | | | |



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c) Receiver

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|--------------------------------------|--------------------|-----------------------|---------|-----------------------|------|
| Receive Sensitivity | P _{min} | - | - | -23 | dBm |
| Maximum Input Power | P _{MAX} | -3 | - | - | dBm |
| Threshold-Assertion: | SD _{HIGH} | - | - | -24 | dBm |
| Signal Detect Threshold-Deassertion: | SD _{LOW} | -34 | - | - | dBm |
| Hysteresis | - | - | 2.0 | - | dBm |
| Output High Voltage | V _{OH} | V _{CC} -1.03 | - | V _{CC} -0.89 | V |
| Output Low Voltage | V _{OL} | V _{CC} -1.82 | - | V _{CC} -1.63 | V |
| Operating Wavelength | λ_c | 1100 | - | 1600 | nm |
| Supply Current | I _{CC} | - | 80 | 110 | mA |

d) Absolute Maximum Ratings: (T_C=25 °C)

| Parameter | Symbol | Min. | Max. | Unit |
|-----------------------|-----------------|------|------|------|
| Storage Temperature | T _{ST} | -40 | +85 | °C |
| Operating Temperature | T _{IP} | 0 | +70 | °C |
| Input Voltage | T _{CC} | 0 | +5 | V |

e) Recommended Operating Environment:

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|-----------------------|-----------------|------|---------|------|------|
| Supply Voltage | V _{CC} | +3.0 | +3.3 | +3.6 | V |
| Operating Temperature | T _{OP} | 0 | - | +70 | °C |

f) Timing Characteristics:

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|---|-----------------------|------|---------|------|------|
| TX_DISABLE Assert Time | t _{off} | - | 3 | 10 | Usec |
| TX_DISABLE Negate Time | t _{on} | - | 0.5 | 1 | Msec |
| Time to Initialize Include Reset of TX_FAULT | t _{int} | - | 30 | 300 | Msec |
| TX_FAULT from Fault to Assertion | t _{fault} | - | 20 | 100 | Usec |
| TX_DISBEL Time to Start Reset | t _{reset} | 10 | - | - | Usec |
| Receiver Loss of Signal Assert Time (Off to On) | T _{A,RX_LOS} | - | - | 100 | Usec |
| Receiver Loss of Signal Assert Time (On to Off) | T _{d,RX_LOS} | - | - | 100 | Usec |

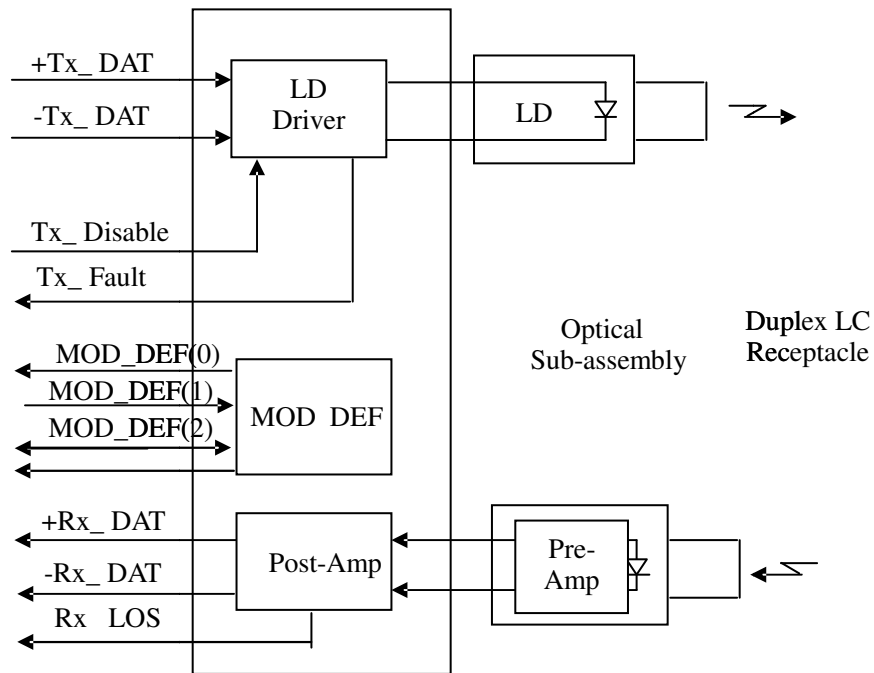


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g) Block Diagram of Transceiver:



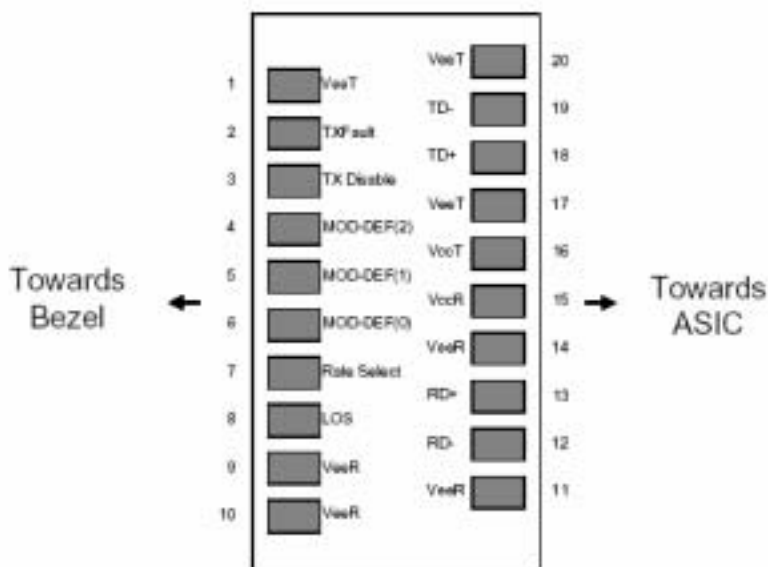


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Pin Assignment:



Pin out of Connector Block on Host Board

h) Pin Description:

| Pin | Symbol | Name/Description | Ref. |
|-----|--------------------|---|------|
| 1 | V _{EET} | Transmitter Ground (Common with Receiver Ground) | 1 |
| 2 | T _{FAULT} | Transmitter Fault. Low normal operation, High Fault indication | |
| 3 | T _{DIS} | Transmitter Disable. Laser output disabled on high or open. | 2 |
| 4 | MOD DEF(2) | Module Definition 2. Data line for Serial ID. | 3 |
| 5 | MOD DEF(1) | Module Definition 1. Clock line for Serial ID. | 3 |
| 6 | MOD DEF(0) | Module Definition 0. Grounded within the module. | 3 |
| 7 | Rate Select | No connection required | |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation. | 4 |
| 9 | V _{EER} | Receiver Ground (Common with Transmitter Ground) | 1 |
| 10 | V _{EER} | Receiver Ground (Common with Transmitter Ground) | 1 |
| 11 | V _{EER} | Receiver Ground (Common with Transmitter Ground) | 1 |
| 12 | RD- | Receiver Inverted DATA out. AC Coupled | |
| 13 | RD+ | Receiver Non-inverted DATA out. AC Coupled | |
| 14 | V _{EER} | Receiver Ground (Common with Transmitter Ground) | 1 |
| 15 | V _{CCR} | Receiver Power Supply | |
| 16 | V _{CCT} | Transmitter Power Supply | |
| 17 | V _{EET} | Transmitter Ground (Common with Receiver Ground) | 1 |
| 18 | TD+ | Transmitter Non-Inverted DATA in. AC Coupled. | |
| 19 | TD- | Transmitter Inverted DATA in. AC Coupled. | |
| 20 | V _{EET} | Transmitter Ground (Common with Receiver Ground) | 1 |

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF(0) pulls line low to indicate module is plugged in.
4. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



SPECTRUM TERRABIT DATASHEET (GLC-S40-13-C)

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i) Serial ID Memory Contents:

Serial ID Memory Contents:

| Data Address | Length (Byte) | Name of Length | Description and Contents |
|--------------|---------------|----------------|--|
| 0 | 1 | Identifier | Type of Serial transceiver (03h=SFP) |
| 1 | 1 | Reserved | Extended identifier of type serial transceiver (04h) |
| 2 | 1 | Connector | Code of optical connector type (07=LC) |
| 3-10 | 8 | Transceiver | Gigabit Ethernet 1000Base & Fiber Channel |
| 11 | 1 | Encoding | 8B10B (01h) |
| 12 | 1 | BR,Nominal | Nominal band rate, unit of 100Mbps |
| 13-14 | 2 | Reserved | (0000h) |
| 15 | 1 | Length(9um) | Link length supported for 9/125um fiber, units of 100m |
| 16 | 1 | Length(50um) | Link length supported for 50/125um fiber, units of 10m |
| 17 | 1 | Length(62.5um) | Link length supported for 62.5/125um fiber, units of 10m |
| 18 | 1 | Length(Copper) | Link length supported for copper, units of meters |
| 19 | 1 | Reserved | |
| 20-35 | 16 | Vendor Name | SFP vendor name: Spectrum |
| 36 | 1 | Reserved | |
| 37-39 | 3 | Vendor OUI | SFP transceiver vendor OUI ID |
| 40-55 | 16 | Vendor PN | Part Number: SPC-Sxx-xx-C |
| 56-59 | 4 | Vendor rev | Revision level for part number |
| 60-62 | 3 | Reserved | |
| 63 | 1 | CCID | Least significant byte of sum of data in address 0-62 |

Extended ID Fields

| Data Address | Length (Byte) | Name of Length | Description and Contents |
|--------------|---------------|----------------|---|
| 64-65 | 2 | Option | Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported) |
| 66 | 1 | BR, max | Upper bit rate margin, units of % |
| 67 | 1 | BR, min | Lower bit rate margin, units of % |
| 68-83 | 16 | Vendor SN | Serial number (ASCII) |
| 84-91 | 8 | Date code | Spectrum's Manufacturing date code |
| 92-94 | 3 | Reserved | |
| 95 | 1 | CCEX | Check code for the extended ID Fields (addresses 64 to 94) |

Vendor Specific ID Fields

| Data Address | Length (Byte) | Name of Length | Description and Contents |
|--------------|---------------|----------------|-------------------------------------|
| 96-127 | 32 | Readable | Spectrum's specific date, read only |

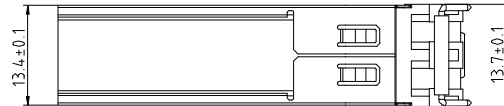
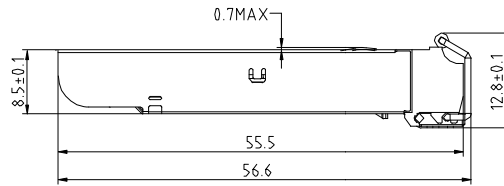
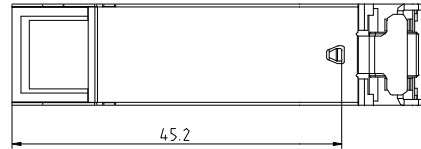
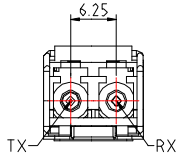
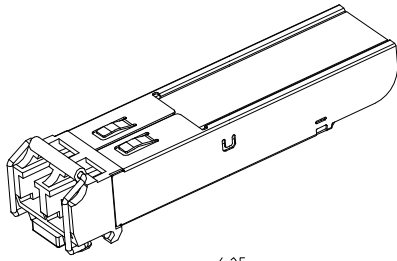


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j) Mechanical Dimensions:



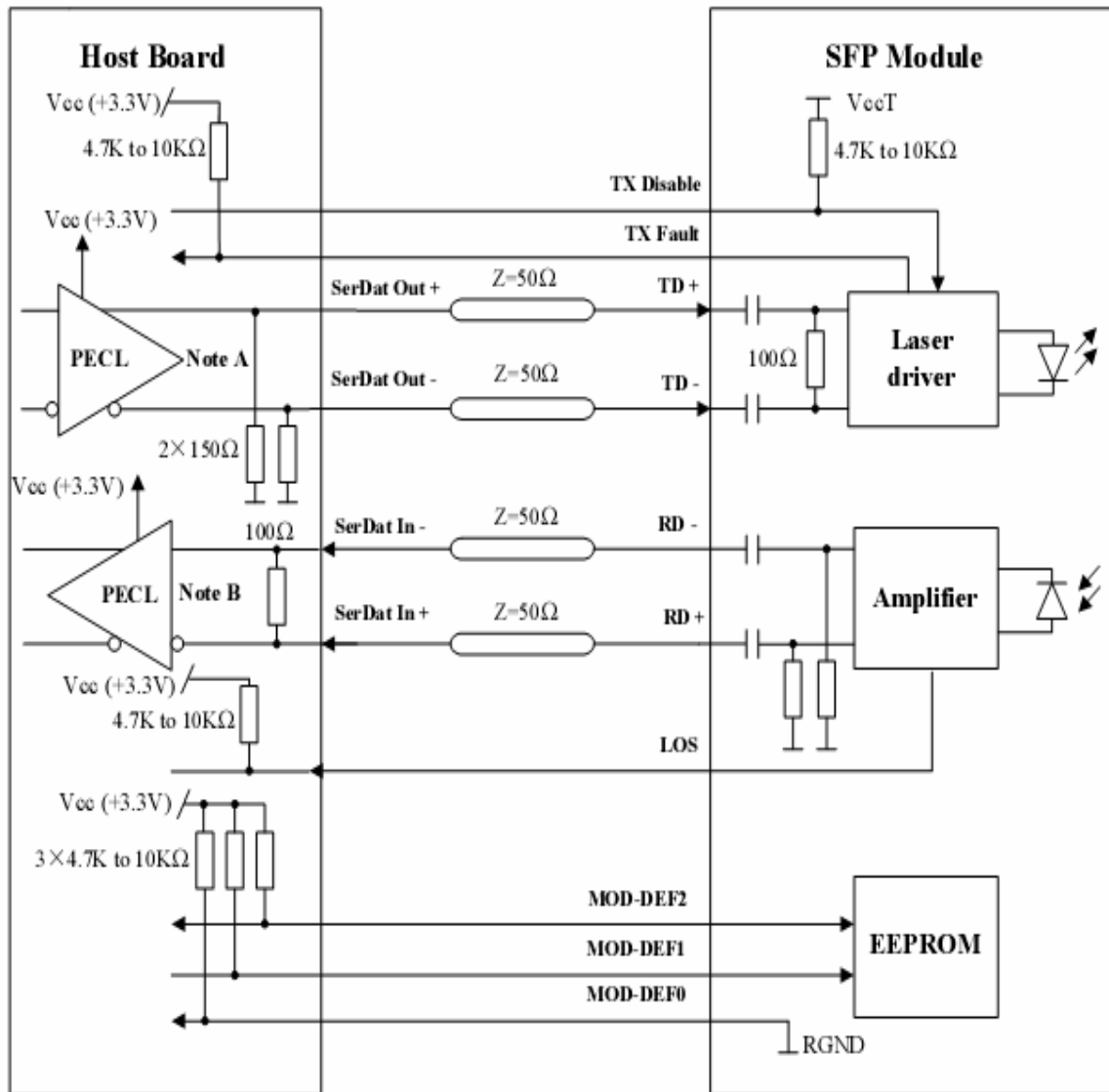


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k) Recommended Circuit:



Note A: Circuit assumes open emitter output

Note B: Circuit assumes high impedance internal bias @Vcc-1.3V