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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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Specification

Small Form Factor Pluggable

Simplex LC Receptacle – SFP BIDI

ONU - Bidirectional Optical Transceivers

1000BASE-BX10-U

1250Mbit/s




Ordering Information

T B S - S x C A 1 - G 1 1

Voltage / Temperature

1 : 3.3V / +0°C ~ +70°C

2 : 3.3V / -40°C ~ +85°C

| Model Name | Voltage | Category | Device type | Interface | SD/LOS | Temperature | Distance | Latch Color |
|---------------|---------|----------|-------------|---------------------|--------|-------------|----------|---|
| TBS-S1CA1-G11 | 3.3V | W/O DDMI | FP / PIN | AC / AC Coupling | LVTTTL | +0°C~+70°C | 20km | Blue |
| TBS-S2CA1-G11 | | | | | | -40°C~+85°C | |  |

Features

- ROHS Compliant
- Standard Small Form Factor Pluggable Package – SFP MSA Compliant
- IEEE802.3AH 1000BASE-BX10-U Compliant
- Laser Class 1 Product – IEC60825-1 Compliant
- Standard Simplex LC Receptacle Optical Interface
- Single Fiber and Full Duplex Solution – Integrated WDM Filter
- Single + 3.3 V Power Supply
- Differential LVPECL Data Input and Output
- LVTTTL Loss of Signal
- Serial ID through I²C Interface
- Low Power Consumption

Absolute Maximum Ratings

| Parameter | Symbol | Min | Typ | Max | Unit |
|-----------------------------|-----------------|-----|-----|-----------------|------|
| Storage temperature | T _S | -40 | -- | 85 | °C |
| Supply voltage | V _{CC} | 0 | -- | 4 | V |
| Operating Relative Humidity | -- | 5 | -- | 95 | % |
| Input voltage | V _{IN} | 0 | -- | V _{CC} | V |

Operating Conditions

| Parameter | Symbol | Min | Typ | Max | Unit |
|--|-----------------|-----|-----|-----|------|
| Supply Voltage | V _{CC} | 3.1 | 3.3 | 3.5 | V |
| Operating Case temperature (TBS-S1CA1-G11) | T _C | 0 | -- | 70 | °C |
| Operating Case temperature (TBS-S2CA1-G11) | | -40 | -- | 85 | |
| Total Current (Transmitter + Receiver) | I _{CC} | -- | -- | 250 | mA |

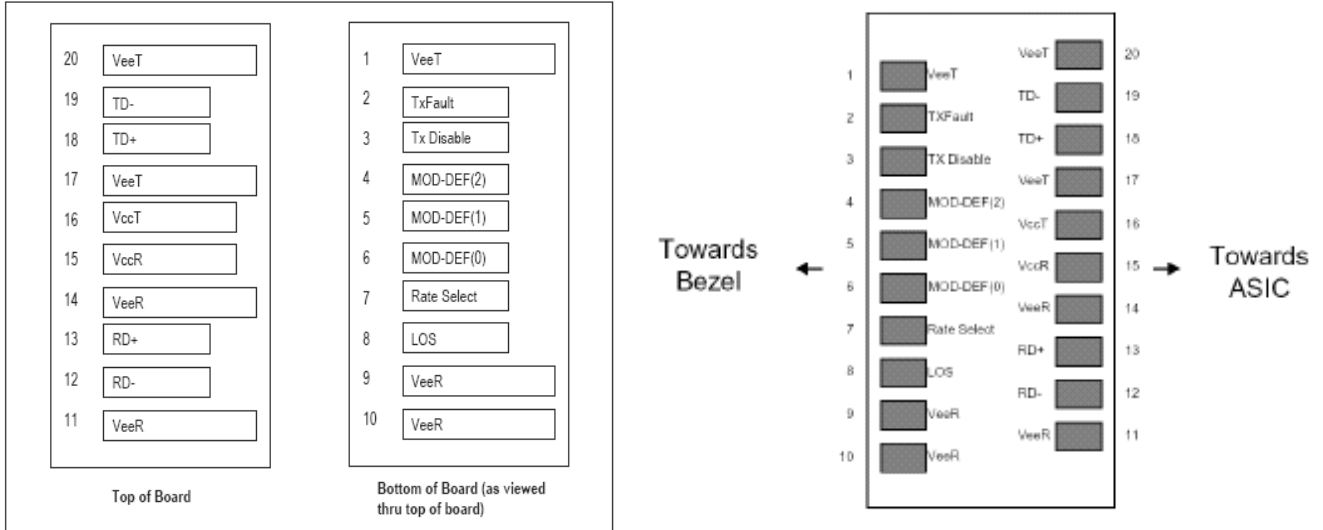
Transmitter Specifications ($V_{CC}=3.1V\sim 3.5V$; $T_C=0^{\circ}C\sim 70^{\circ}C$ / $T_C=-40^{\circ}C\sim 85^{\circ}C$)

| Parameter | Symbol | Min | Typ | Max | Unit |
|------------------------------------|------------------------------|---|------|--------------|-------|
| Optical Characteristics | | | | | |
| Output Optical Power | P_{out} | -8 | -- | -2 | dBm |
| Extinction Ratio | ER | 9 | -- | -- | dB |
| Center Wavelength | λ_C | 1260 | 1310 | 1360 | nm |
| Spectral Width (RMS) | σ | IEEE802.3AH 1000BASE-BX10-U Table 59-4 | | | nm |
| Rise/Fall time (20-80%) | $T_{r,f}$ | -- | -- | 260 | ps |
| Relative Intensity Noise | RIN | -- | -- | -120 | dB/Hz |
| Output Eye | Compliant with IEEE 802.3 AH | | | | |
| Max. P_{out} TX-DISABLE Asserted | P_{OFF} | -- | -- | -45 | dBm |
| Electrical Characteristics | | | | | |
| Differential Input Voltage | V_{DIFF} | 0.4 | -- | 2.0 | V |
| Tx_Disable_Input_High | V_{DISH} | 2.0 | -- | $V_{CC}+0.3$ | V |
| Tx_Disable_Input_Low | V_{DISL} | 0 | -- | 0.8 | V |
| Tx_Fault_Output_High | V_{FH} | 2.0 | -- | $V_{CC}+0.3$ | V |
| Tx_Fault_Output_Low | V_{FL} | 0 | -- | 0.8 | V |

Receiver Specifications ($V_{CC}=3.1V\sim 3.5V$; $T_C=0^{\circ}C\sim 70^{\circ}C$ / $T_C=-40^{\circ}C\sim 85^{\circ}C$)

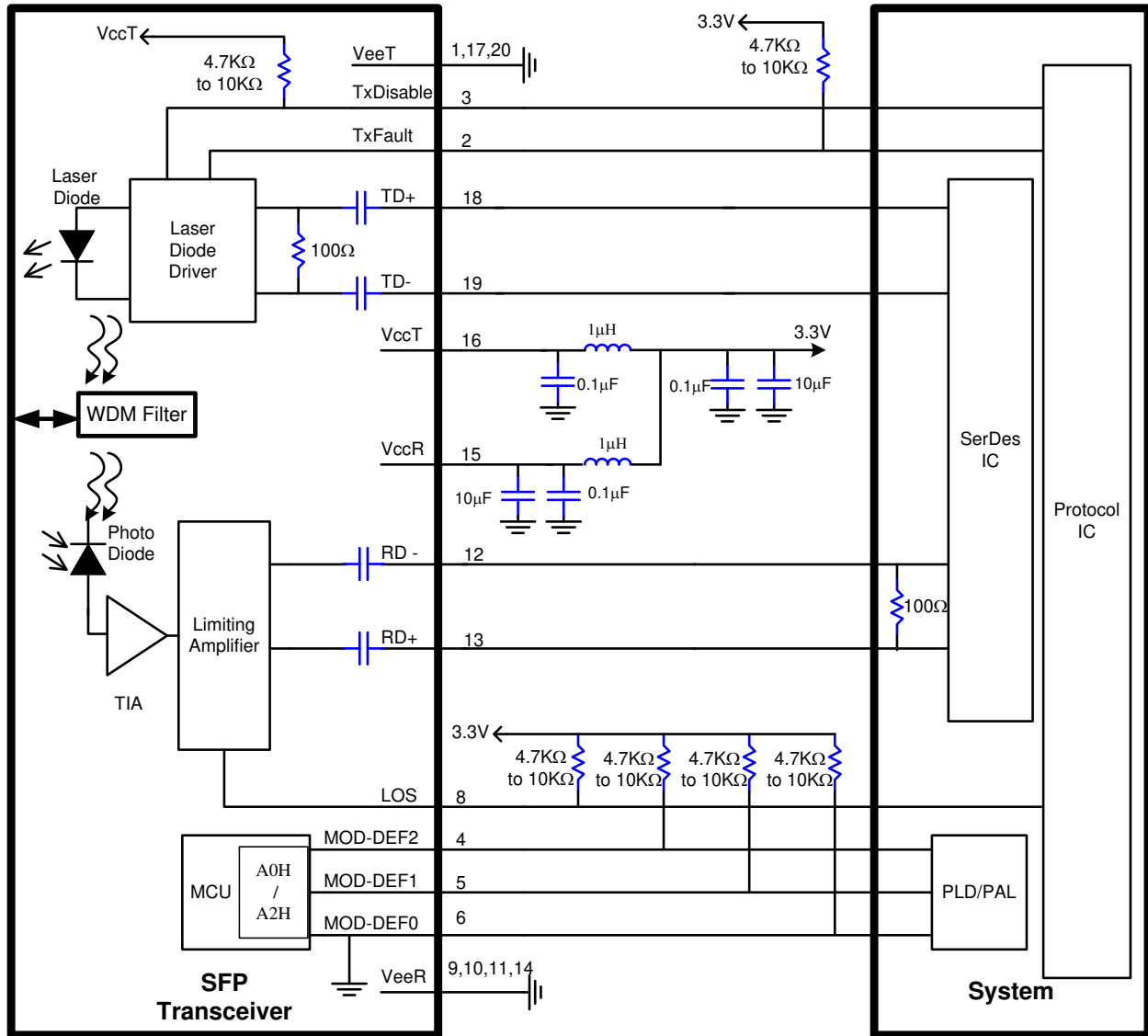
| Parameter | Symbol | Min | Typ | Max | Unit |
|--|-------------|------|-----|--------------|------|
| Optical Characteristics | | | | | |
| Optical Input Power-maximum | P_{SATIN} | -3 | -- | -- | dBm |
| Receiver Sensitivity (PRBS= 2^7-1 ; BER $\leq 10^{-12}$) | P_{SAN} | -- | -- | -23 | dBm |
| Operating Center Wavelength | λ_C | 1480 | -- | 1600 | nm |
| Optical Return Loss | ORL | 14 | -- | -- | dB |
| Loss of Signal – De-asserted | P_{LD} | -- | -- | -23 | dBm |
| Loss of Signal - Asserted | P_{LA} | -45 | -- | -- | dBm |
| Loss of Signal - Hysteresis | P_{LH} | 0.5 | -- | 6 | dB |
| Electrical Characteristics | | | | | |
| Differential Output Voltage | V_{DIFF} | 0.4 | -- | 2.0 | V |
| Receiver Loss of Signal Output Voltage -Low | V_{LOSL} | 0 | -- | 0.8 | V |
| Receiver Loss of Signal Output Voltage -High | V_{LOSH} | 2 | -- | $V_{CC}+0.3$ | V |

Pin Definition and Descriptions



| Pin | Name | Input/Output Level | Description |
|-----|-------------|--------------------|---|
| 1 | VeeT | Input | Transmitter ground |
| 2 | TXFault | Output/LVTTL | Laser failure indication. High level indicates "laser failure". Externally pulled up |
| 3 | TXDisable | Input/LVTTL | Transmitter disable, High signal/open disables TX laser output. Low level enables TX output, internally pulled up. |
| 4 | MOD-DEF(2) | Input/output | Module definition 2, SDA, Data line for I2C bus. Externally pulled up |
| 5 | MOD-DEF(1) | Input | Module definition 1, SCL, Clock for I2C bus. Externally pulled up |
| 6 | MOD-DEF(0) | Output | Module definition 0, Module present. Ground inside module. |
| 7 | Rate Select | - | No connection. |
| 8 | LOS | Output/LVTTL | Receiver loss of signal indication. Low signal indicates optical signal is present at RX input. Should be Externally pulled up. |
| 9 | VeeR | Input | Receiver ground |
| 10 | VeeR | Input | Receiver ground |
| 11 | VeeR | Input | Receiver ground |
| 12 | RD - | Output/CML | Inverted receiver data output (AC coupled) |
| 13 | RD + | Output/CML | Non-inverted receiver data output (AC coupled) |
| 14 | VeeR | Input | Receiver ground |
| 15 | VccR | Input | Receiver power supply |
| 16 | VccT | Input | Transmitter power supply |
| 17 | VeeT | Input | Transmitter ground |
| 18 | TD + | Input/LVPECL | Non-inverted transmitter data input (AC coupled) |
| 19 | TD - | Input/LVPECL | Inverted transmitter data input (AC coupled) |
| 20 | VeeT | Input | Transmitter ground |

Recommended Circuit Diagram



Content in 2-Wire Address A0H

| Address | HEX | Name of Field | Description |
|---------|---|--------------------------------------|---------------------------|
| 00 | 03 | Identifier | SFP |
| 01 | 04 | Extended Identifier | SFP |
| 02 | 07 | Connector type | LC |
| 03 | 00 | Infiniband Compliance Codes | Not compliant |
| 04 | 00 | SONET Compliance Codes | Not compliant |
| 05 | 00 | SONET Compliance Codes | Not compliant |
| 06 | 40 | Ethernet Compliance Codes | BASE-BX10 |
| 07 | 00 | Fiber Channel link length | Not compliant |
| 08 | 00 | Fiber Channel transmitter technology | Not compliant |
| 09 | 00 | Fiber Channel transmission media | Not compliant |
| 10 | 00 | Fiber Channel speed | Not compliant |
| 11 | 01 | Encoding codes: | 8B/10B |
| 12 | 0D | Nominal Bit Rate (units of 100Mbps) | 1300Mbps |
| 13 | 00 | Rate identifier | Unspecified |
| 14 | 14 | Link length supported for 9um fiber | 20 (units of km) |
| 15 | C8 | Link length supported for 9um fiber | 200 (units of 100m) |
| 16 | 00 | Link length supported for 50um,OM2 | N/A (units of 10m) |
| 17 | 00 | Link length supported for 62.5um,OM1 | N/A(units of 10m) |
| 18 | 00 | Link length supported for copper | N/A (units of 1m) |
| 19 | 00 | Link length supported for 50um,OM3 | N/A (units of 10m) |
| 20 ~ 35 | 46,4F,52,4D,45,52,49,43, ,41,4F,45,20,20,20,20,20 | Vendor Name | FORMERICA OE |
| 36 | 00 | Unallocated | |
| 37 ~ 39 | 00,00,00 | Vendor OUI | Unspecified |
| 40 ~ 55 | 54,42,53,2D,53,31(32),43,41,31, 2D,47,31,31,20,20,20 | Part Number | TBS-S1(2)CA1-G11 |
| 56 ~ 59 | 00,00,00,00 | Vendor Revision number | Unspecified |
| 60 ~ 61 | 05,1E | Laser Wavelength | 1310nm |
| 62 | 00 | Unallocated | |
| 63 | | CC_BASE: | Check sum of byte 0 ~ 62 |
| 64 | 00 | Options | |
| 65 | 1A | Options | TX-DIS, TX_FAULT, RX-LOS |
| 66 | 00 | Bit Rate, max. | Unspecified |
| 67 | 00 | Bit Rate, min. | Unspecified |
| 68 ~ 83 | Serial Number | Serial Number | |
| 84 ~ 89 | yy/mm/dd | Date Code | |
| 90 ~ 91 | 20,20 | Vendor specific lot code | Unspecified |
| 92 | 00 | Diagnostic Monitoring Type | W/O DDMI |
| 93 | 00 | Enhanced Options (soft) | Unallocated |
| 94 | 00 | SFF-8472 Compliance | Not Included |
| 95 | | CC_EXT | Check sum of byte 64 ~ 94 |
| 96~127 | | Vendor specific | |

Mechanical Outlines

(Unit : mm)

