

EUP-0S11-20C

Features

- Single fiber bi-directional data links
- 1310nm DFB laser transmitter and 1490nm PIN receiver
- 1.25Gbps burst mode transmission
- 1.25Gbps continuous mode receiver data rate
- SFP 2x10 package with SC/UPC Receptacle Connector
- Single 3.3V power supply
- Digital diagnostic monitoring interface
- LVPECL compatible data input/output interface
- Provide TX burst mode signal detect function
- LVTTTL transmitter laser fault alarm
- Low EMI and excellent ESD protection
- Class I laser safety standard IEC-60825 compliant
- RoHS6 Compliance



Applications

- Gigabit Ethernet Passive Optical Networks (GEAPON)
- Access Networks
- FTTX

Standards

- Complies with SFP Multi-Source Agreement (MSA) SFF-8074i
 - Complies with IEEE 802.3ah-2004
 - Complies with FCC 47 CFR Part 15, Class B
 - Complies with FDA 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007
 - Complies with SFF-8472
 - Compatible with TR-NWT-000870 4.1 ESD sensitivity classification Class2.
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- Compatible with Telcordia GR-468-CORE

Absolute Maximum Ratings

Table 1- Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Storage Ambient Temperature	T _{STG}	-40	85	°C
Storage Humidity	H _s	5	90	%
Operating Humidity	H _o	5	85	%
Power Supply Voltage	V _{CC}	0	+3.6	V
Receiver Damaged Threshold		+4		dBm

Recommended Operating Conditions

Table 2- Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T _c	-5		70	°C	EUP-0S11-20C
		-40		85		EPON-ONT-SFP-I
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Power Consumption	P _w			1	W	
Data Rate			1.25		Gbps	

Electrical Characteristics

Table 3- Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Total Supply Current	I _{CC}			300	mA	
Transmitter						
Transmitter Differential Input Voltage		300		2400	mV	
Transmitter Common-Mode Data Input Voltage	V _{CM}	1.6		2.4	V	Note 1
Tx_Fault Output Voltage - High	V _{OH}	2.4		V _{CC}	V	LVTTTL
Tx_Fault Output Voltage - Low	V _{OL}	0		0.4	V	LVTTTL
Tx_SD Output Voltage - High	V _{OH}	2.4		V _{CC}	V	LVTTTL
Tx_SD Output Voltage - Low	V _{OL}	0		0.4	V	LVTTTL
TX_Burst Input Voltage - High	V _{IH}	2		V _{CC}	V	LVTTTL
TX_Burst Input Voltage - Low	V _{IL}	0		0.8	V	LVTTTL
Input Differential Impedance		85	100	115	Ω	

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver						
Receiver Differential Output Voltage		500		1200	mV	AC Coupled
SD Voltage - High	V _{LOSH}	2.4		V _{CC}	V	LVTTTL
SD Voltage - Low	V _{LOSL}	0		0.4	V	LVTTTL
SD Assert Time	T _{LOSA}			100	us	
SD De-assert Time	T _{LOSD}			100	us	
Output Differential Impedance		90	100	110	Ω	

Note : Requirement for DC couple on the host board.

Optical Transmitter Characteristics

Table 4- Optical Transmitter Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Average Output Power	P _{OUT}	0		4	dBm	
Center Wavelength	λ _c	1260		1360	nm	
Spectrum Width(-20dB)	Δλ			3.0	nm	
Side Mode Suppression Ratio	ER	9			dB	PRBS 2 ⁷ -1 @1.25Gbit/s
Extinction Ratio				260	ps	
Optical Rise Time				260	ps	
Optical Fall Time	P _{DIS}			-50	dBm	
Transmitter OFF Power	Compliant with IEEE Std 802.3ah™-2004					
Output Eye Diagram	T _{ON}			30	ns	
Burst Turn On Time	T _{OFF}			30	ns	
Burst Turn Off Time				-15	dB	

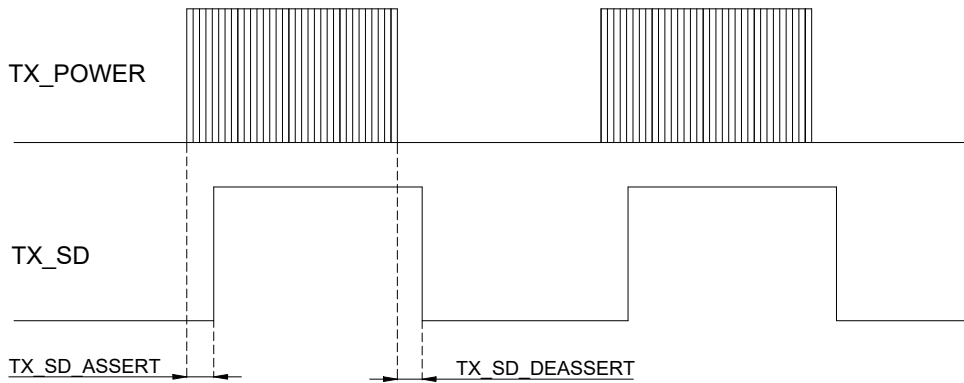
Transmitter Receiver Characteristics

Table 5- Transmitter Receiver Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Center Wavelength	λ _c	1480		1500	nm	
Receiver Sensitivity	SEN			-27	dBm	Note1
Input Saturation Power (Overload)	SAT	-3			dBm	Note1
LOS De-assert Level	LOSD			-28	dBm	
LOS Assert Level	LOSA	-44			dBm	
LOS hysteresis	HYS	0.5		6	dB	
Receiver Reflectance				-12	dB	

Note : Measured with 1490nm, PRBS 2⁷-1@1.25Gbps, ER=9dB, BER ≤1×10⁻¹²

Parameter	Symbol	Min.	Typ.	Max.	Units
TX_SD Assert Time	TTX_SD_ASSERT	-	-	100	ns
TX_SD De-assert Time	TTX_SD_DEASSERT	-	-	100	ns



TX_SD Timing Characteristics

Digital Diagnostic Monitoring Information

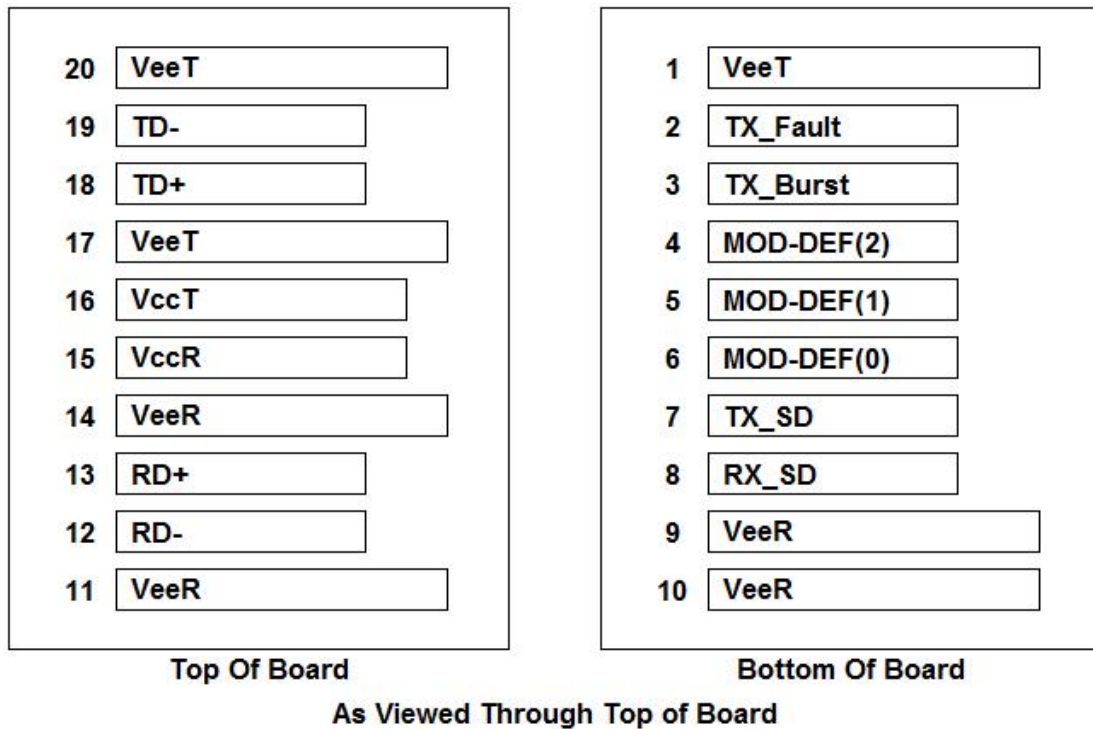
Table 6- Digital Diagnostic Monitoring Information

Parameter	Accuracy	Calibration	Note
Temperature	±3°C	Internal	
Voltage	±3%	Internal	
Bias Current	±10mA	Internal	
TX Power	±3dB	Internal	
RX Power	±3dB	Internal	

Note: The digital diagnostic monitoring interface defines 256-byte memory map in EEPROM, which makes use of the 8 bit address 1010001X (A2h). Please refer to the SFF-8472 Rev 10.2 for the detail information.

Pin Assignment

Pin Diagram



Pin Descriptions

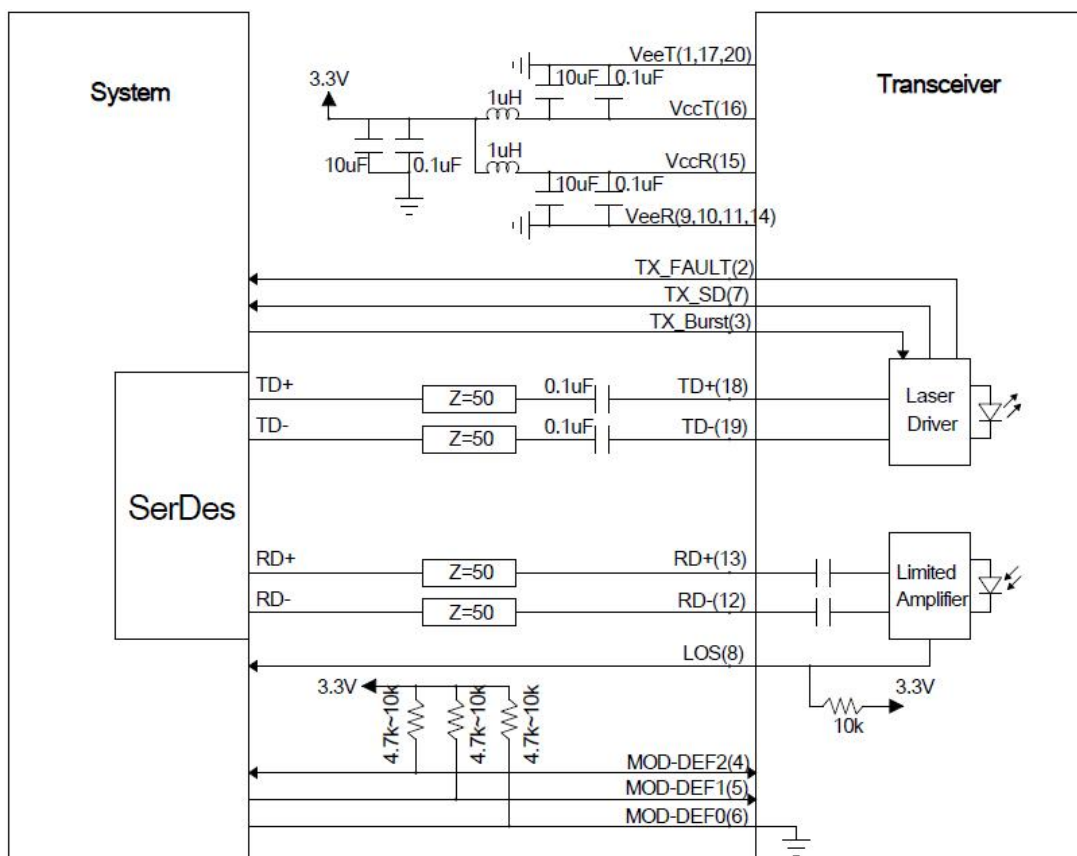
Table 7-Pin Descriptions

Pin No	Symbol	Name/Description	Power Seq.	Notes
1	VeeT	Transmitter Ground	1st	
2	TX_Fault	Transmitter Fault Indication, Logic 1 indicates Transmitter Fault.	3rd	1
3	TX_Burst	Transmitter Burst Enable Input, LVTTTL Input	3rd	
4	MOD-DEF(2)	Module Definition 2. Data line for two wire Serial ID.	3rd	2
5	MOD-DEF(1)	Module Definition 1. Clock line for two wire Serial ID.	3rd	2
6	MOD-DEF(0)	Module Definition 0. Grounded within the module.	3rd	2
7	TX_SD	Transmitter Signal Detected Indication, LVTTTL Output, Active High.	3rd	1
8	RX_SD	Receiver Signal Detected Indication, LVTTTL Output, Logic 1 indicates Signal Detected.	3rd	3
9	VeeR	Receiver Ground	1st	
10	VeeR	Receiver Ground	1st	
11	VeeR	Receiver Ground	1st	
12	RD-	Inverse Received Data Out, AC coupled	3rd	
13	RD+	Received Data Out, AC coupled	3rd	
14	VeeR	Receiver Ground	1st	
15	VccR	Receiver Power	2nd	
16	VccT	Transmitter Power	2nd	

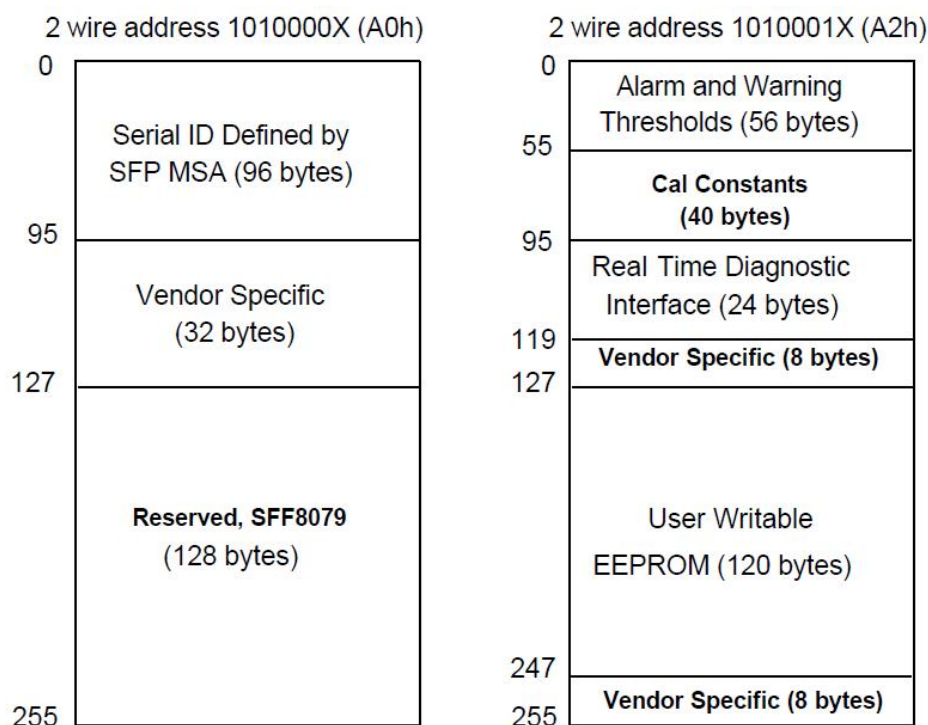
Pin No	Symbol	Name/Description	Power Seq.	Notes
17	VeeT	Transmitter Ground	1st	
18	TD+	Transmit Data In, AC coupled	3rd	
19	TD-	Inverse Transmit Data In, AC coupled	3rd	
20	VeeT	Transmitter Ground	1st	

Note :

1. TX Fault and TX_SD are open collector/drain output which should be pulled up externally with a 4.7k - 10kΩ resistor on the host board. Pull up voltage between 2.0V and $V_{ccT/R}+0.3V$. When high, this output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to $<0.8V$.
2. Mod-Def 0,1,2. These 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 V_{ccT} or V_{ccR} .
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
3. RX_SD is an open collector/drain output, which should be pulled up with a 4.7k - 10kΩ resistor. Pull up voltage between 2.0V and $V_{ccT/R}+0.3V$. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to $<0.8V$.

Typical Application Circuit**TX AC Couple:**

EEPROM Memory Map



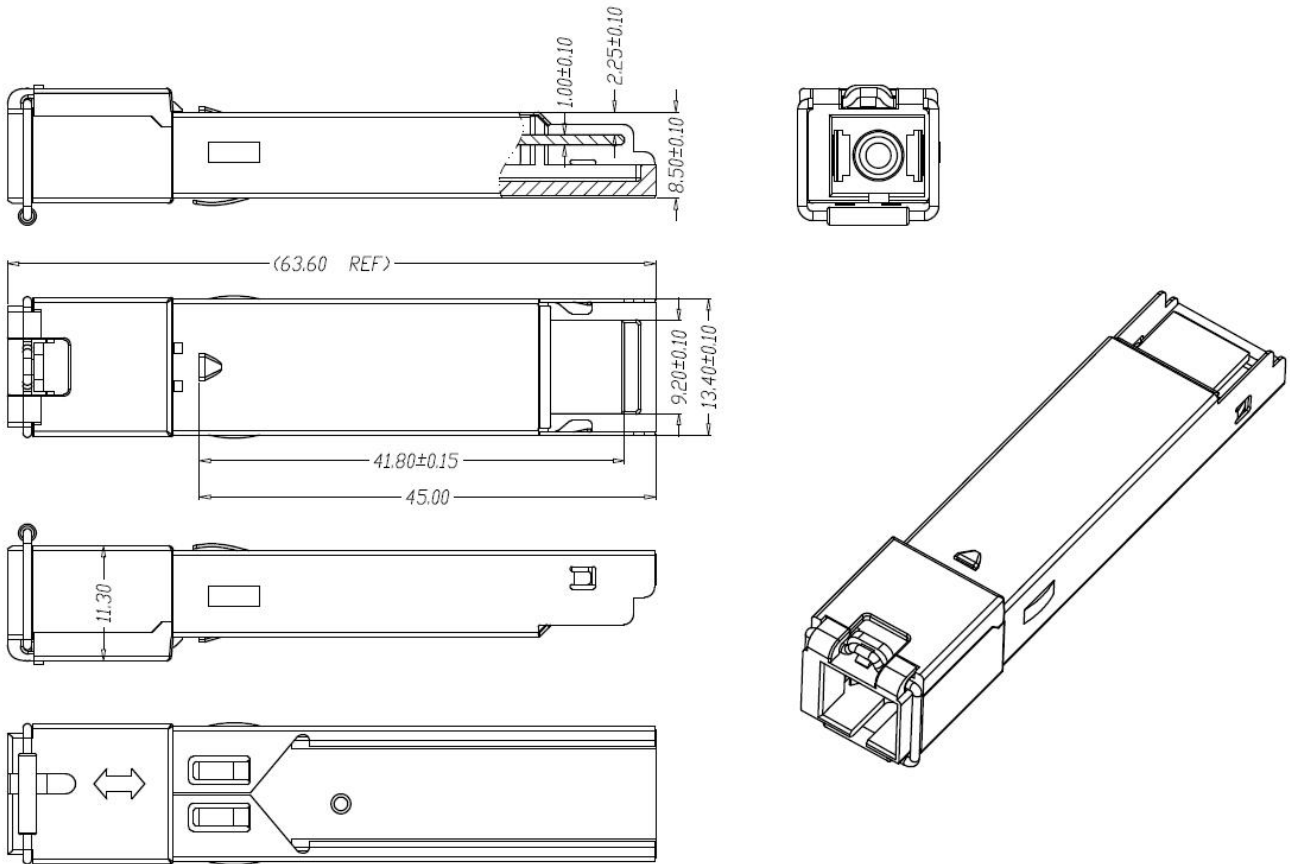
EEPROM Serial ID Memory Contents

The optical transceiver contains an EEPROM. It provides access to sophisticated identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. When the serial protocol is activated, the host generates the serial clock signal (SCL, Mod Def 1). The positive edge clocks data into those segments of the EEPROM that are not writing protected within the SFP transceiver. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. The diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 - 95 at wire serial bus address A2h. The digital diagnostic memory map specific data fields define as following.

Package Outline

Dimensions are in millimeters. All dimensions are $\pm 0.1\text{mm}$ unless otherwise specified. (Unit: mm)



Ordering information

Table 7- Ordering information

Part Number	Product Description
EUP-0S11-20C	SFP, Low Level Enable TX, -5~70,20km,with DDM
EUP-0S11-20CI	SFP, Low Level Enable TX, -40~85,20km,with DDM

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