



EPON ONU SFF Optical Transceiver

APEPU34SYHxxSP2

■ Product Features

- ✓ 1310nm burst-mode transmitter with FP laser
- ✓ 1490nm continuous-mode receiver with PIN-TIA
- ✓ Compliant to IEEE 802.3ah™-2004 Specifications
- ✓ SFF package with SC receptacle form
- ✓ Single +3.3V power supply
- ✓ Low power dissipation <1W
- ✓ Digital diagnostic interface compliant with SFF-8472



■ Applications

- ✓ 1000BASE-PX20-U GEAPON ONU

■ General

ATOP's APEPU34SYHxxSP2 Small Form Factor (SFF) transceivers are compatible with the Small Form Factor Multi-Sourcing Agreement (MSA). The transceivers are single fiber bi-directional data links with symmetric 1.244Gbps upstream and 1.244Gbps downstream. They are RoHS compliant and lead-free.

■ Product Selection

Part Number	Operating temperature	DDMI
APEPU34SYHCXSP2	Commercial	No
APEPU34SYHCDSP2	Commercial	Yes
APEPU34SYHIXSP2	Industrial	No
APEPU34SYHIDSP2	Industrial	Yes



■ **Regulatory Compliance**

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Single SC Receptacle: compatible with IEC 61000-4-2
- Immunity compatible with IEC 61000-4-3
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2
- RoHS compliant with RoHS 2 (2011/65/EU)

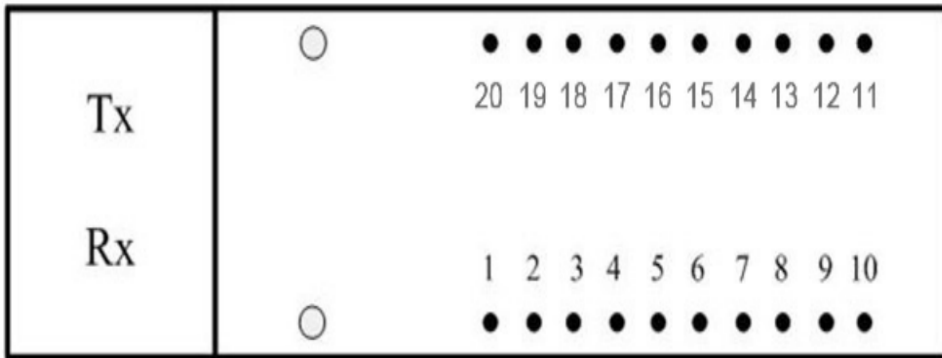
■ **Pin Descriptions**

Pin	Symbol	Name/Description	Ref.
1	NC	No Function Definition.	
2	VeeR	Receiver Signal Ground.	1
3	VeeR	Receiver Signal Ground.	1
4	NC	No Function Definition.	
5	NC	No Function Definition.	
6	VeeR	Receiver Signal Ground.	1
7	VeeR	Receiver Signal Ground.	1
8	SD	Receiver Signal-Detected Indication.	
9	RD-	Inverted Receiver Data Output.	2
10	RD+	Non-inverted Receiver Data Output.	2
11	VccT	Transmitter Power Supply.	
12	VeeT	Transmitter Signal Ground.	1
13	TX_Burst	Transmitter Burst Mode Control.	3
14	TD+	Non-inverted Transmitter Data Input.	2
15	TD-	Inverted Transmitter Data Input.	2
16	VeeT	Transmitter Signal Ground.	1
17	SCL	The clock line of two wire serial interface.	4
18	SDA	The data line of two wire serial interface.	4
19	TX_Fault	Transmitter Fault.	
20	TX_SD	Transmitter State Indication.	5

MS	Mounting Studs.	6
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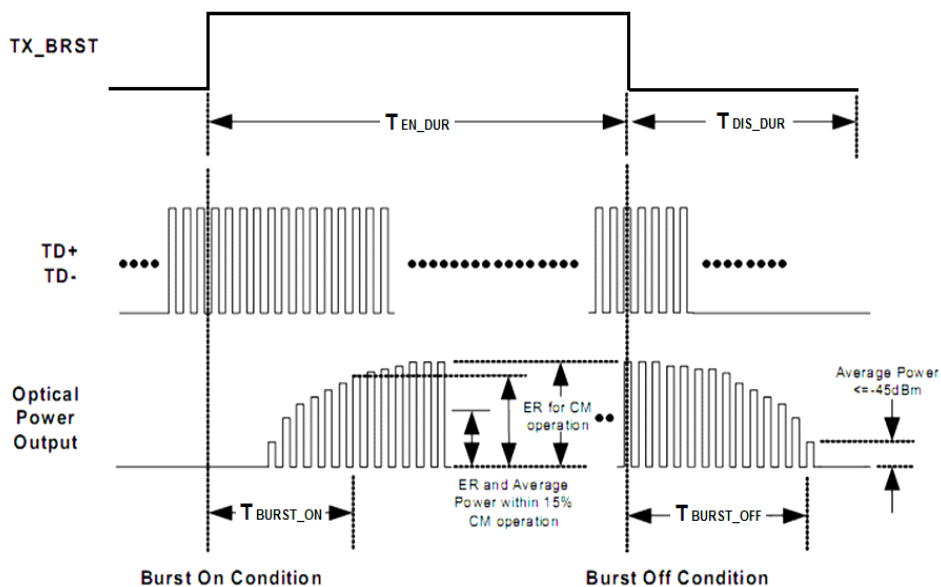
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. LVPECL logic output, DC coupled.
3. High level Enable optical signal output.
4. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V.
5. TX_SD Assert When Transmitter ON; LVTTTL logic output.
6. Connected to chassis ground, not to signal ground.

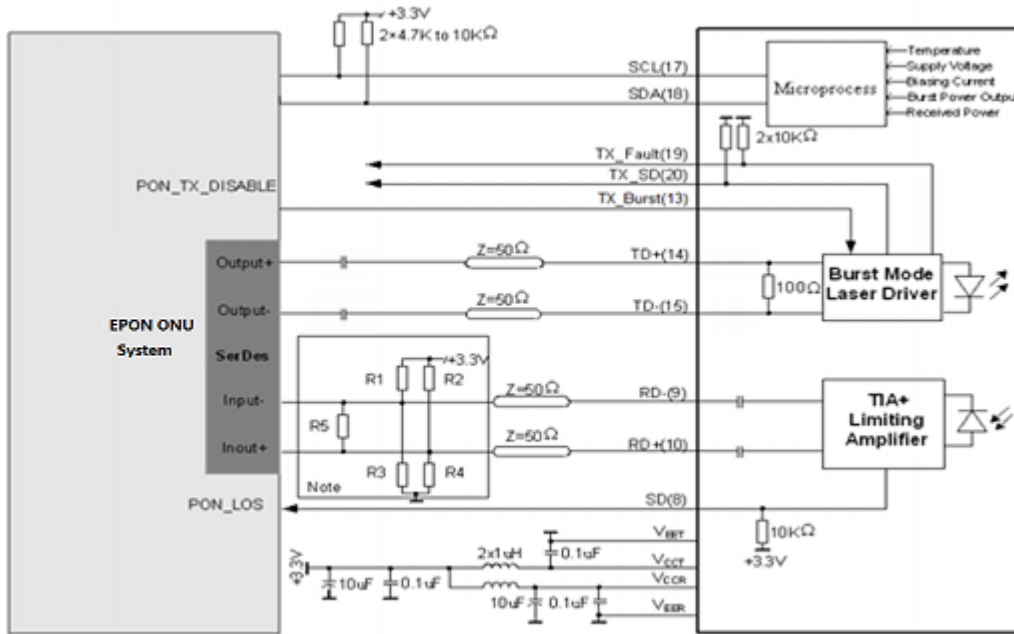


Pin assignment

Burst Mode Sequence



■ **Recommend Circuit Schematic**



Notes:

1. When input stages of SerDes IC with high impedance and internal bias to Vcc-1.3V, R1=R2=R3=R4=OPEN, R5=100;
2. When input stages of SerDes IC without internal bias to Vcc-1.3V, R1=R2=82, R3=R4=130, R5=OPEN

■ **Absolute Maximum Ratings**

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		+4.0	V	
Storage Temperature	TS	-40		+85	°C	
Operating Humidity	RH	5		95	%	

■ **Recommended Operating Conditions**

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc	3.13	3.30	3.47	V	
Power Supply Current	Icc			300	mA	Industrial
Case Operating Temperature	Tc	0		+70	°C	1
	Tl	-40		+85		2
Data Rate(TX)			1.244		Gbps	
Data Rate(RX)			1.244		Gbps	



Notes:

1. For commercial class product.
2. For industrial class product.

Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Input differential impedance	Rin	-	100	-	Ω	1
Single ended data input swing	Vin, pp	300	-	1200	mV	
TX Ben-High	-	Vcc -1.3	-	Vcc+0.3	V	
TX Ben-Low	-	Vee	-	Vee+ 0.8	V	
TX Fault-High	-	2.0	-	Vcc+0.3	V	
TX Fault-Low	-	0	-	0.8	V	
Receiver						
Single ended data output swing	Vout, pp	300	-	1000	mV	2
Data output rise time	tr	-	-	260	ps	3
Data output fall time	tf	-	-	260	ps	3
SD-High	-	2.0	-	Vcc+0.3	V	
SD-Low	-	0	-	0.8	V	

Notes:

1. AC coupled.
2. Into 100 ohm differential termination.
3. 20 – 80 %

Optical Characteristics (TOP=25°C, Vcc=3.3 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Output Opt. Power	PO	0	-	+4	dBm	1
Optical Wavelength	λ	1260	1310	1360	nm	
Optical Spectrum Width (RMS)	σ	-	-	3.5	nm	
Optical Rise/Fall Time	tr/tf	-	-	260	ps	2

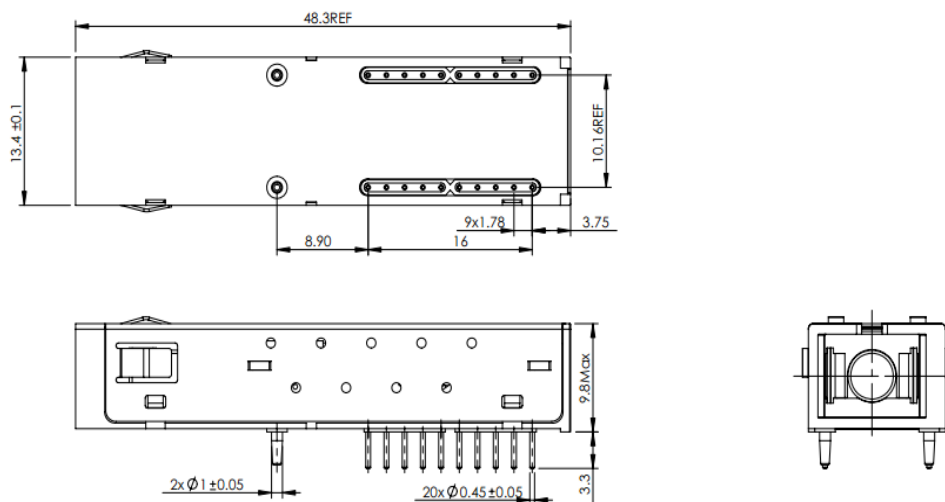
Burst Turn On/Off Time	Ton/Toff			30	ns	
Total Jitter	TJ	-	-	0.35	UI	
Optical Extinction Ratio	ER	9	-	-	dB	
Receiver						
RX Sensitivity @1.244Gb/s	SENS	-	-	-27	dBm	3, 4
Receiver Overload	-	-3	-	-	dBm	
Optical Center Wavelength	λ_C	1480	1490	1500	nm	
Signal Detect-Assert	SDA	-	-	-27	dBm	
Signal Detect-Deassert	SDD	-40	-	-	dBm	
Signal Detect-Hysteresis	-	0.5	-	6	dB	

Notes:

1. Class 1 Laser Safety.
2. Unfiltered, 20-80%. Measured with PRBS_{2⁷-1} test pattern @1.244Gbps..
3. Measured with conformance signals defined in FC-PI-2 Rev. 10.0 specifications.
4. Measured with PRBS _{2⁷-1} at 10⁻¹² BER.

Mechanical Specifications

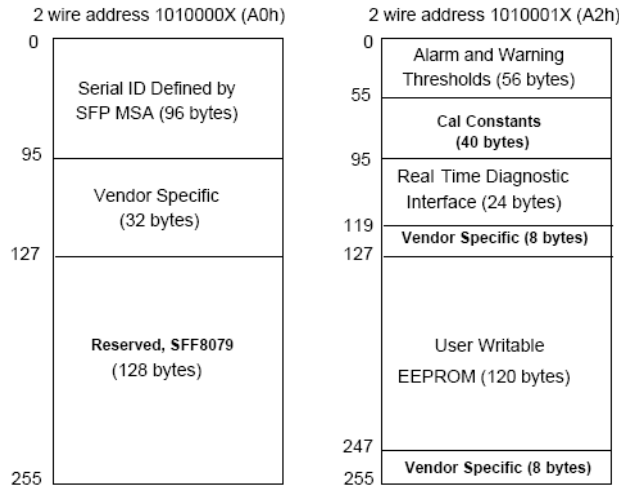
ATOP's Small Form Factor (SFF) transceivers are compatible with the dimensions defined by the SFF Multi-Sourcing Agreement (MSA), dimensions are in mm.



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■ EEPROM Information

EEPROM memory map specific data field description is as below:



■ Digital Diagnostic Monitoring Interface

Five transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

Parameter	Range	Accuracy	Calibration
Temperature	0 to +70°C (C)	±3°C	Internal
	-40 to +85°C (I)		
Voltage	3.13 to 3.47V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
TX Power	0 to +4dBm	±3dB	Internal
RX Power	-27 to -3dBm	±3dB	Internal

Revision History

Revision	Initiated	Reviewed	Approved	DCN	Release Date
Version1.0	yangpeiyun	sunbin	dingzheng	New Released.	July 29, 2016

■ For More Information

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