
SPB-2620UW-XSG / SPB-2620BUW-XSG / SPB-2620AUW-XSG (RoHS Compliant)
9.953 Gbps 1270 nm Burst-Mode TX / 9.953 Gbps 1577 nm Continuous RX
SFP+ Package, ITU-T G.9807 XGS-PON ONU Transceiver

FEATURES

- Single fiber bi-directional data links symmetric TX 9.953Gbps/RX9.953Gbps application
- SFP+ package with SC/UPC receptacle
- Complies with SFP+ MSA (SFF-8431)
- Complies with ITU-T G.9807
- Complies with SFF-8472
- Complies with FCC 47 CFR Part 15, Class B
- Single 3.3V power supply
- Hot-pluggable capability
- High power 1270nm DML DFB LD and high sensitivity 1577nm APD
- Support 20km transmission distance with SMF
- CML compatible data input/output interface
- Low power dissipation <1.0W
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- 0 to 70°C Operation: SPB-2620UW-XSG
- -10 to 85°C Operation: SPB-2620BUW-XSG
- -40 to 85°C Operation: SPB-2620AUW-XSG
- RoHS-6 compliance

APPLICATIONS

- 10-Gigabit-capable passive optical networks

● Description

SPB-2620UW-XSG series is a transceiver for the optical network unit (ONU) of XGS-PON with 9.953 Gbps in downstream and 9.953 Gbps in upstream. The SPB-2620UW-XSG is high performance module for single fiber communications by using 1270 nm burst-mode transmitter and 1577 nm continuous-mode receiver. The transmitter section uses a multiple quantum well 1270 nm laser and is a class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated 1577 nm detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

LASER SAFETY

This single mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

ORDER INFORMATION

P/No.	TX				RX				Temp. (°C)	Package	RoHS Compliant
	Type	Speed (Gb/s)	λ (nm)	Power(dBm)	Type	Speed (Gb/s)	λ (nm)	Power(dBm)			
SPB-2620UW-XSG	BM	9.953	1270	9 / 4	CNT	9.953	1577	-8 / -28	0 to 70	SFP+	Yes
SPB-2620BUW-XSG	BM	9.953	1270	9 / 4	CNT	9.953	1577	-8 / -28	-10 to 85	SFP+	Yes
SPB-2620AUW-XSG	BM	9.953	1270	9 / 4	CNT	9.953	1577	-8 / -28	-40 to 85	SFP+	Yes

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Tstg	-40	85	°C	
Operating Case Temperature	Topr	0	70	°C	SPB-2620UW-XSG
		-10	85		SPB-2620BUW-XSG
		-40	85		SPB-2620AUW-XSG
Operating Humidity	OH	5	95	%	
Power Supply Voltage	Vcc	-0.5	3.6	V	

Recommended Operating Conditions					
Parameter	Symbol	Min	Typ	Max	Units / Notes
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Case Temperature	Topr	0		70	°C / SPB-2620UW-XSG
		-10		85	°C / SPB-2620BUW-XSG
		-40		85	°C / SPB-2620AUW-XSG
Power Supply Current	I _{CC(TX+RX)}		200	300	mA
Nominal Upstream Line Rate			9.953		Gbps
Nominal Downstream Line Rate			9.953		Gbps
Max Input Power				-5	dBm

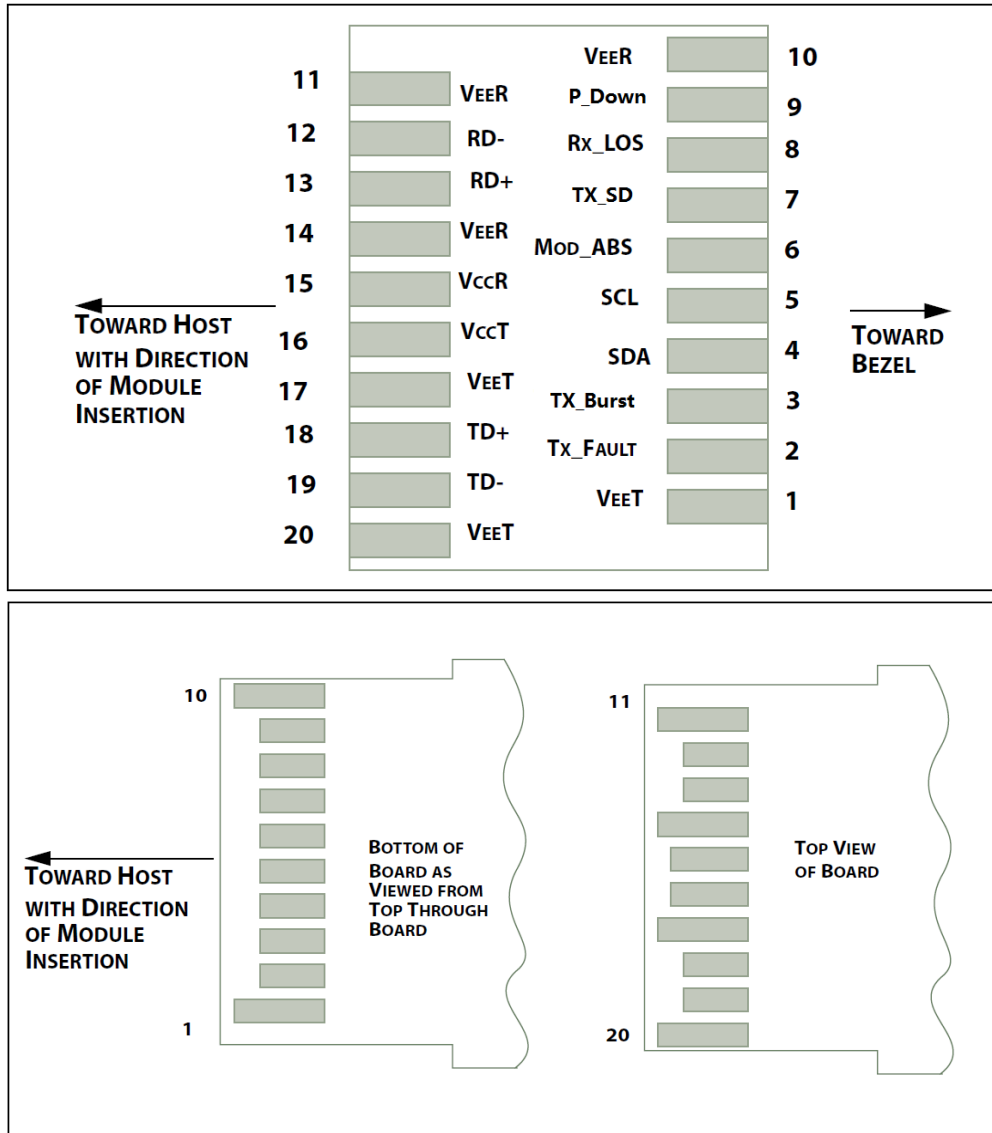
Transmitter Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical						
Average Launch Power	Po, AVG	4	-	9	dBm	1
		5	-	9	dBm	2
Extinction Ratio	ER	6	-	-	dB	
Output Center Wavelength	λ_c	1260	1270	1280	Nm	
Output Spectrum Width	$\Delta\lambda$	-		1	nm	-20 dB width
Side Mode Suppression Ratio	SMSR	30			dB	
Data Rate			9.953		Gbps	
Burst on Time	T-on			50	ns	
Burst off Time	T-off			50	ns	
Tx-SD Assert	SD-on			350	ns	
Tx-SD De-Assert	SD-off			350	ns	
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20 km SMF
Transmitter Tolerance to Reflected Optical Power		-15			dB	
Eye diagram		Compliant With ITU-T G.987.2, PRBS 2E31-1 test pattern @9.953 Gb/s				
Electrical						
Input Differential Impedance	ZIN		110		Ohm	
Data Input Swing Differential	VIN	200	-	2000	mV	
Burst Disable		2.0		Vcc	V	
Burst Enable		0		0.8	V	
Tx-Fault Voltage - Low		0		0.4	V	
Tx-Fault Voltage - High		Vcc-0.2		Vcc	V	

1. EOL, over temperature, output power is power coupled into a 9/125 μm single-mode fiber.
2. BOL, room temperature, output power is power coupled into a 9/125 μm single-mode fiber.

Receiver Specifications (0°C < Topr < 70°C, 3.13V < Vcc < 3.47V)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Optical						
Sensitivity – EOL, over temp.	Sen.			-28	dBm	3
Sensitivity – BOL, room temp.				-29	dBm	3
Receiver Overload	OL	-8			dBm	3
Wavelength of Operation		1575	1577	1580	nm	
Receiver Reflectance				-12	dB	
Optical Return Loss Tolerance				-15	dB	
Signal Detect Assert Level	Pa			-29	dBm	
Signal Detect Deassert Level	Pd	-39			dBm	
Signal Detect Hysteresis		0.5	2.5	5	dB	
Electrical						
Data Output Swing Differential	Vout	400	-	850	mV	
SD Output Voltage - High	V _{OH}	Vcc-0.2		Vcc	V	
SD Output Voltage - Low	V _{OL}	0		0.4	V	

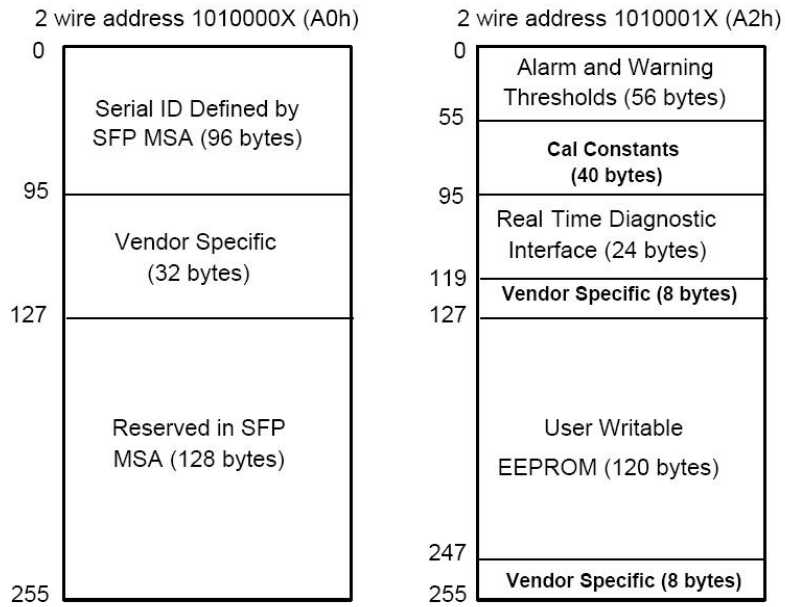
3. Measured with average power; BER $\leq 10^{-3}$ @9.953 Gb/s and PRBS 2³¹-1.

CONNECTION DIAGRAM

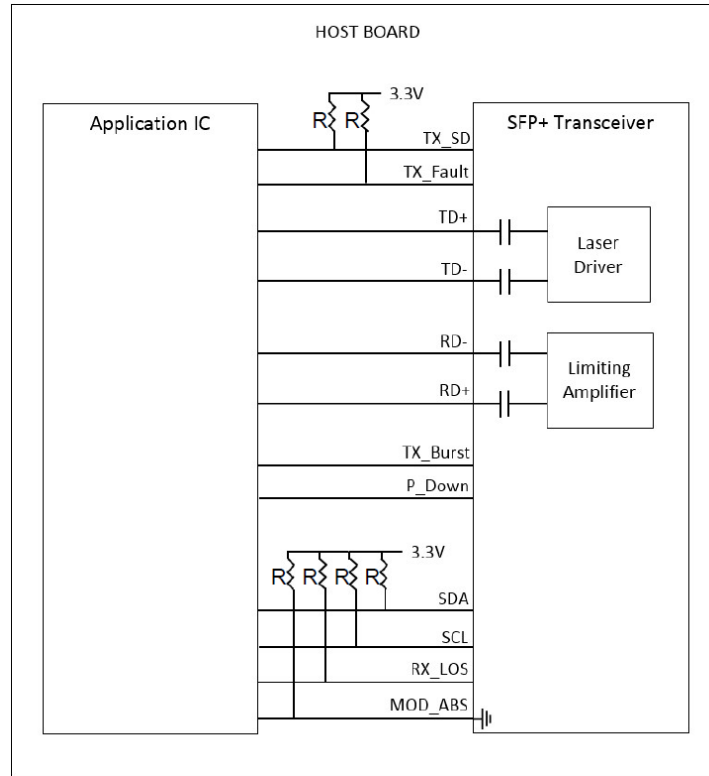


PIN	Signal Name	Description	PIN	Signal Name	Description
1	VeeT	Module Transmitter Ground	11	VeeR	Module Receiver Ground
2	TX_Fault	Module Transmitter Fault	12	RD-	Inverted Received Data Out
3	TX_Burst	Transmitter Burst Enable	13	RD+	Non-inverted Received Data Out
4	SDA	Module Definition 2	14	VeeR	Module Receiver Ground
5	SCL	Module Definition 1	15	VccR	Module Receiver 3.3 V Supply
6	MOD_ABS	Module Absent	16	VccT	Module Transmitter 3.3 V Supply
7	TX_SD	TX Transmitter State Indication	17	VeeT	Module Transmitter Ground
8	RX_LOS	Receiver Signal Indication	18	TD+	Non-Inverted Transmit Data in
9	P_DOWN	Power Down	19	TD-	Inverted Transmit Data in
10	VeeR	Module Receiver Ground	20	VeeT	Module Transmitter Ground

EEPROM BLOCK DIAGRAM



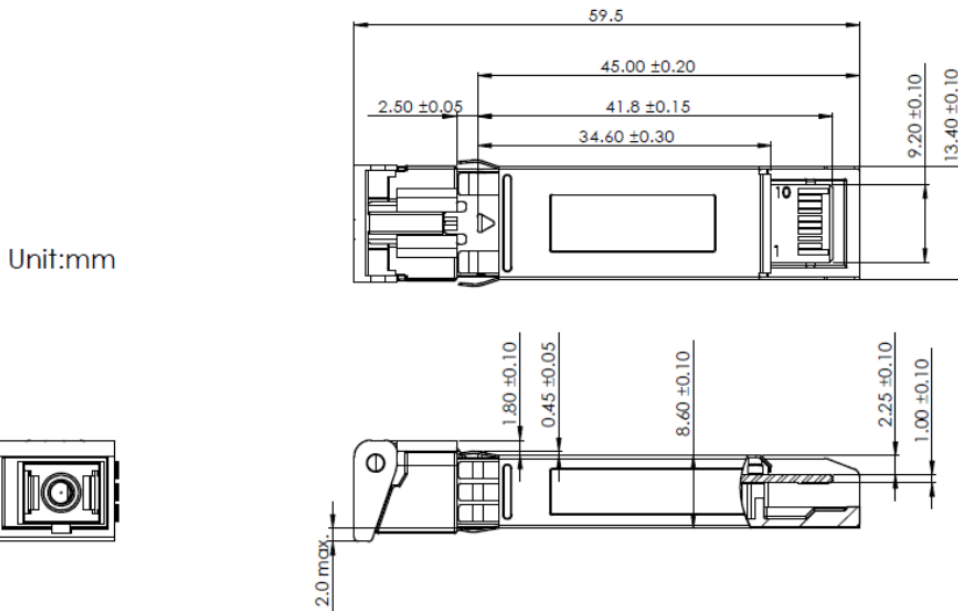
TYPICAL INTERFACE CIRCUIT



* R = 4.7KΩ – 10KΩ

PACKAGE DIAGRAM

Units in mm



Note: Specifications subject to change without notice.

REVISION HISTORY

Version	Subject	Release Date
1.0	Initial datasheet	2019/4/29
2.0	Add SPB-2620BUW-XSG and SPB-2620AUW-XSG	2020/8/31