

## FEATURES

- Single fiber bi-directional data links asymmetric TX 2.488Gbps/RX9.953Gbps application
- 0 to 70°C operating case temperature
- Single 3.3V power supply
- SFP+ package with SC/UPC Receptacle connector
- 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
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- RoHS compliance

## APPLICATIONS

- 10-Gigabit-capable passive optical networks(XG-PON) ONU (ODN:N1 or N2a class)

## STANDARDS

- Complies with SFP+ MSA (SFF-8431)
- Complies with ITU-T G.987.2
- Complies with SFF-8472
- Complies with FCC 47 CFR Part 15, Class B
- Complies with FDA 21 CFR 1040.10 and 1040.11, Class I
- Complies with FDA 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007

### ABSOLUTE MAXIMUM RATING

Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Ambient Temperature	T <sub>STG</sub>	-40	85	°C	
Operating Case Temperature	T <sub>c</sub>	0	70	°C	
Operating Humidity	OH	5	95	%	
Power Supply Voltage	V <sub>CC</sub>	0	3.6	V	

### RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	T <sub>c</sub>	0		+70	°C	
Power Supply Voltage	V <sub>CC</sub>	3.15	3.3	3.45	V	
Power Supply Current	I <sub>CC</sub>			450	mA	
Nominal upstream line rate			2.48832		Gbps	
Nominal downstream line rate			9.95328		Gbps	

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TRANSMITTER OPTICAL CHARACTERISTICS						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Average Launch Optical Power	$P_{OUT}$	2	-	7	dBm	EOL, Launched into 9/125 $\mu$ m single mode fiber
Extinction Ratio	ER	8.2	-	-	dB	
Centre Wavelength	$\lambda$	1260	1270	1280	nm	
Spectral Width (-20dB)	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Mode	SMSR	30			dB	
Burst on time	T-on			32	bits	
Burst off time	T-off			32	bits	
Tx-SD Assert	SD-on			100	ns	
Tx-SD De-Assert	SD-off			100	ns	
Transmitter and dispersion penalty	TDP			0.5	dB	Transmit on 40km SMF
Transmitter tolerance to reflected optical power		-15			dB	
Transmitter reflectance of TX, measured at TX wavelength				-6	dB	
Eye Diagram	Compliant With ITU-T G.987.2					PRBS 2 <sup>23</sup> -1 test pattern @2.48832Gbit/s

TRANSMITTER ELECTRICAL CHARACTERISTICS						
Parameter	Sym	Min.	Typ.	Max.	Unit	Notes
Input Differential Impedance	ZIN	90	100	110	$\Omega$	
Data Input Swing Differential	VIN	200	-	1600	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		2.4		Vcc	V	

RECEIVER CHARACTERISTICS						
Parameter	Sym	Min.	Typ.	Max.	Unit	Notes
Optical Center Wavelength	$\lambda_c$	1575	-	1580	nm	
Receiver Sensitivity				-28	dBm	Measured with PRBS 2 <sup>31</sup> -1test pattern @9.953Gbit/s,BER $\leq 1 \times 10^{-3}$
Receiver Overload		-8			dBm	Measured with PRBS 2 <sup>31</sup> -1test pattern @9.953Gbit/s,BER $\leq 1 \times 10^{-3}$
Receiver reflectance				-20	dB	
LOS Assert		-44			dBm	
LOS De-Assert				-29	dBm	
LOS Hysteresis		0.5		5	dB	
Data Output Swing Differential	$V_{OUT}$	340	-	850	mV	
LOS	High	2.4	-	Vcc	V	
	Low	0	-	0.4	V	

PIN DESCRIPTION			
PIN	Name	Description	Notes
1	VeeT	Module Transmitter Ground	
2	Tx_Fault	Module Transmitter Fault	Low: normal; High: abnormal
3	Tx_Burst	Transmitter Burst Enable	TTL Input, Low: transmitter on
4	SDA	Module Definition 2	2 wire serial ID interface, SDA
5	SCL	Module Definition 1	2 wire serial ID interface, SCL
6	MOD_ABS	Module Absent	Connected to VeeT or VeeR in the module
7	TX_SD	Tx Transmitter State Indication	TX_Indication Assert When Transmitter ON
8	Rx_LOS	Receiver Signal Indication	Low: signal detected; High: loss of signal
9	NC	Not Connect	NC
10	VeeR	Module Receiver Ground	
11	VeeR	Module Receiver Ground	
12	RD-	Inverted Received Data Out	AC-coupled,
13	RD+	Non-inverted Received Data Out	AC-coupled,
14	VeeR	Module Receiver Ground	
15	VCCR	Module Receiver 3.3 V Supply	
16	VCCT	Module Transmitter 3.3 V Supply	
17	VeeT	Module Transmitter Ground	
18	TD+	Non-Inverted Transmit Data in	AC-coupled
19	TD-	Inverted Transmit Data in	AC-coupled
20	VeeT	Module Transmitter Ground	

**PIN OUT DRAWING**

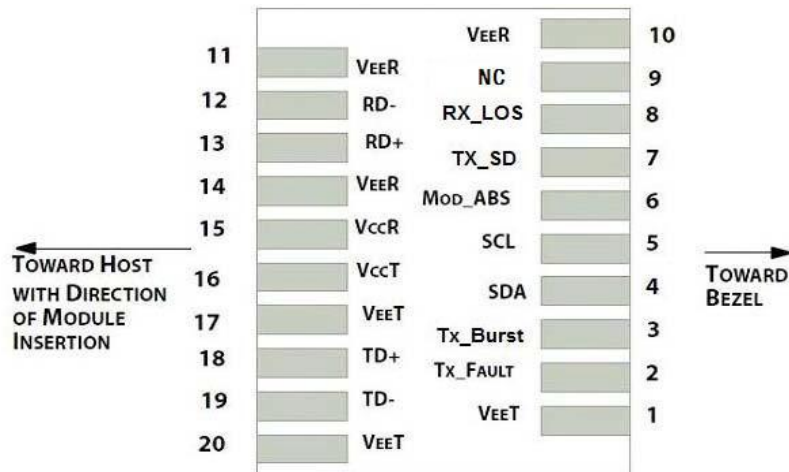
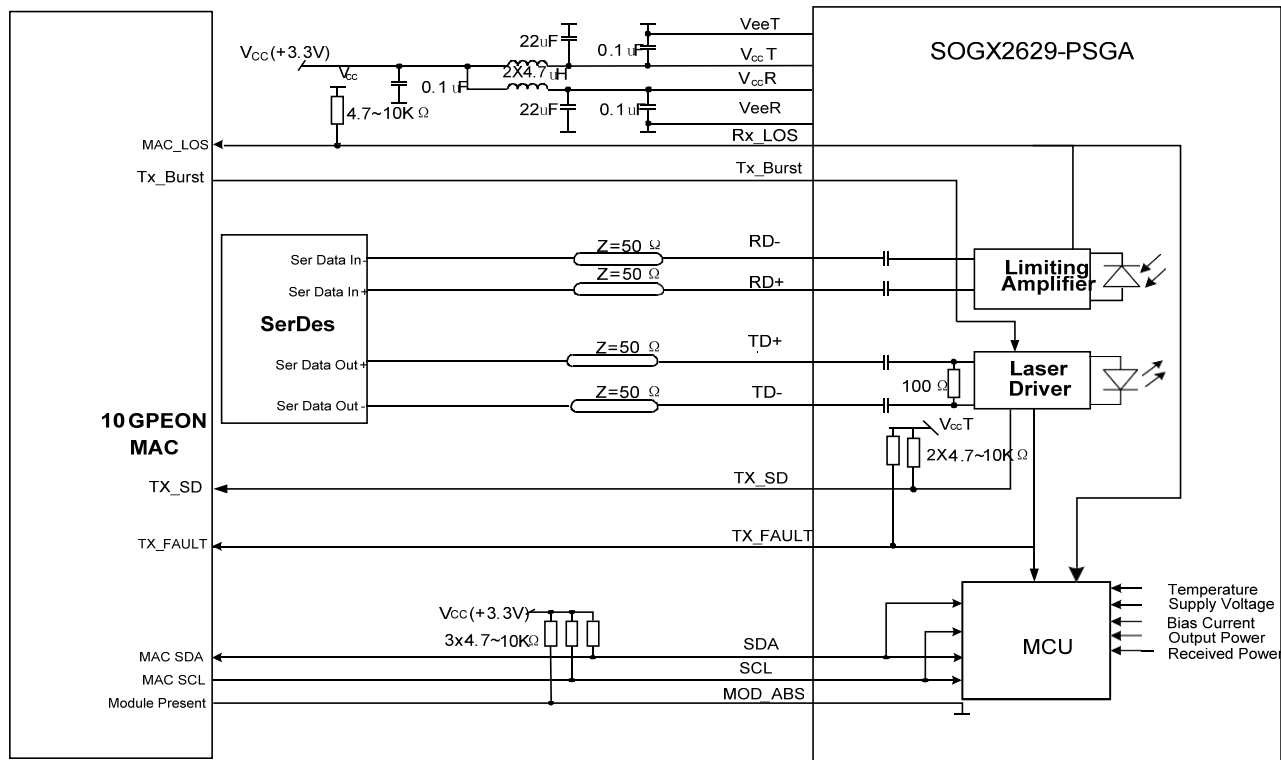


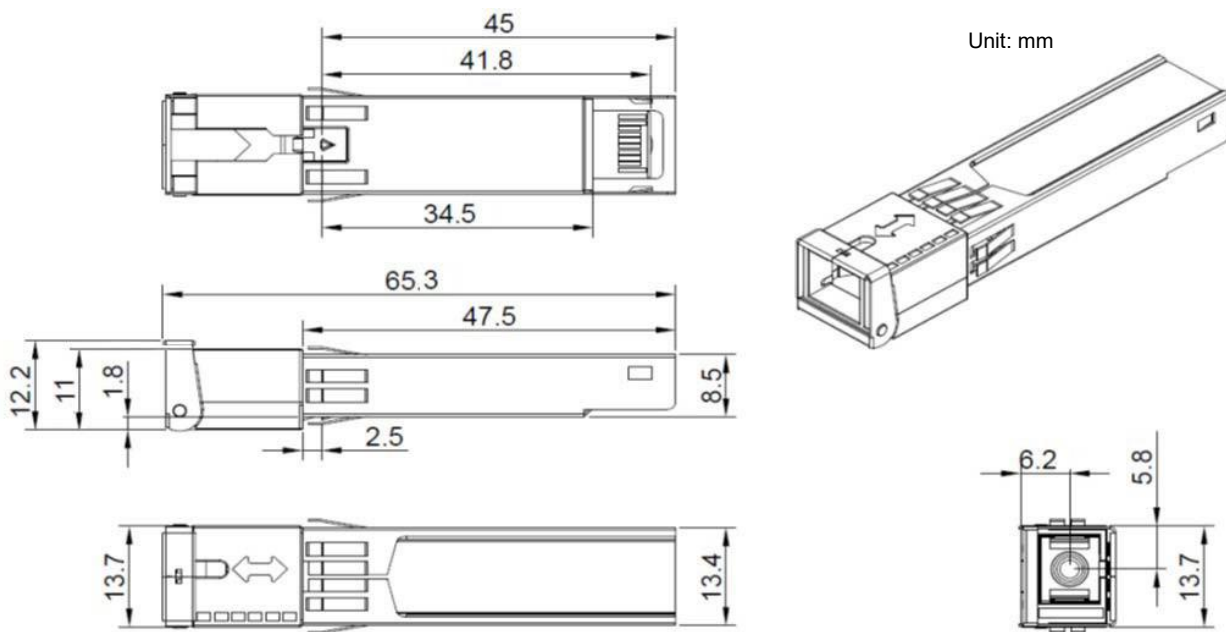
Figure 1 Pin Out Drawing

**TYPICAL INTERFACE CIRCUIT**

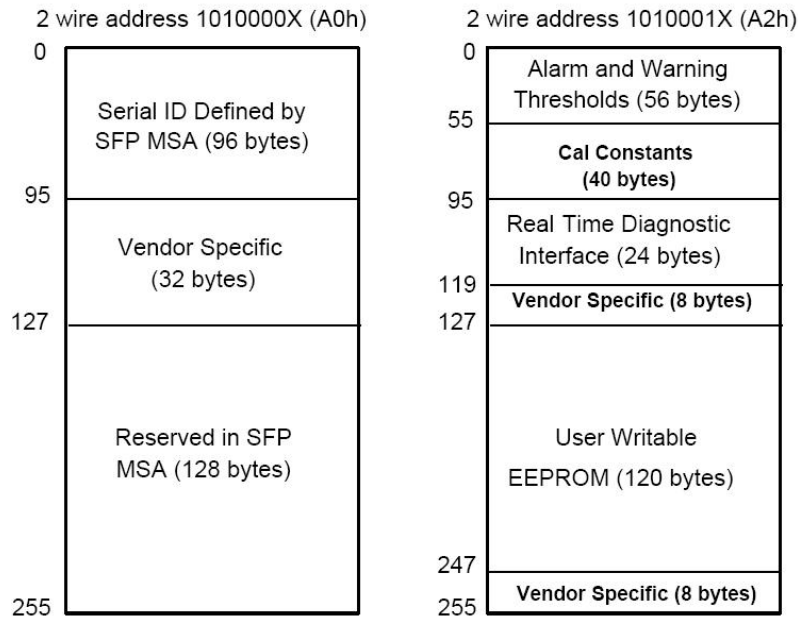


**Figure 2 Typical Interface Circuit**

**PACKAGE OUTLINE**



**Figure 3 Package Outline**



**Figure 4 EEPROM Memory Map Specific Data Field Descriptions**

**DIGITAL DIAGNOSTIC MONITORING INTERFACE**

Parameter	Range	Accuracy	Calibration	Notes
Temperature	0 to 70°C	±3°C	Internal	1LSB = 1/256°C
Voltage	3 to 3.6V	±3%	Internal	1LSB = 0.1mV
Bias Current	0 to 131mA	±10%	Internal	1LSB = 2uA
TX Power	0 to 9dBm	±3dB	Internal	1LSB = 0.1uW
RX Power monitor	-30 to -8dBm	±3dB	Internal	1LSB = 0.1uW

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