



#### FEATURES

- Single fiber bi-directional data links TX 10.3125Gbps, Burst Mode RX 10.3125Gbps application
- Single fiber bi-directional data links TX 1.25Gbps, Burst Mode RX 1.25Gbps application
- 0 to 70°C operating case temperature
- 3.3V power supply
- SFP+ package with SC Receptacle connector
- Hot-pluggable capability
- High power 1577nm EML LD and 1490nm DFB LD
- High sensitivity 1270/1310nm APD
- Support 20km transmission distance with SMF
- RX\_SD indication
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- RoHS6 compliance

#### APPLICATIONS

- Symmetric 10GEPON OLT
- GEPON OLT PR40

#### STANDARDS

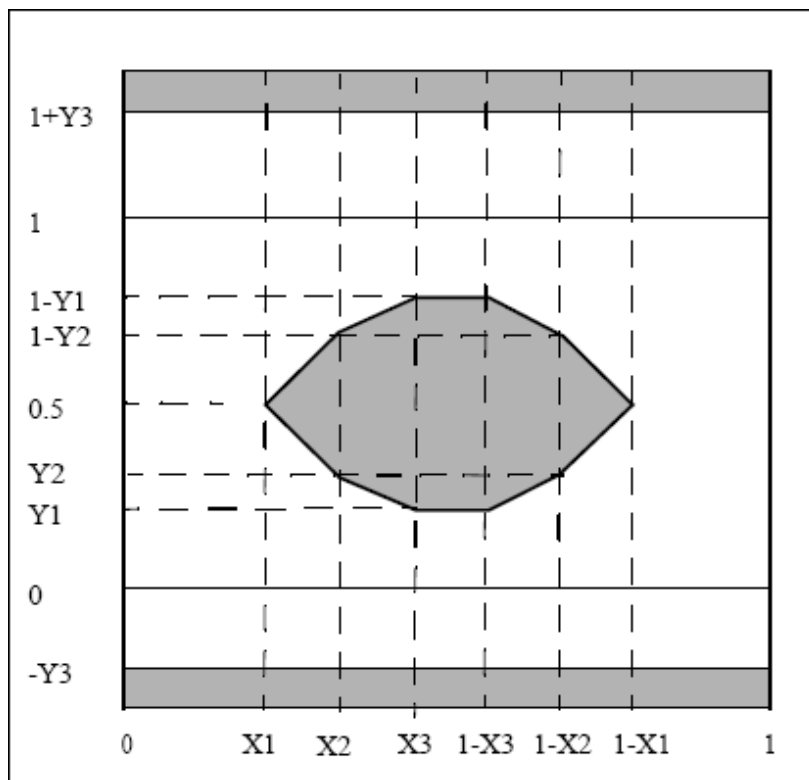
- Complies with SFF-8472
- Complies with IEEE-802.3bk
- Complies with FCC 47 CFR Part 15, Class B
- Complies with FDA 21 CFR 1040.10 and 1040.11

ABSOLUTE MAXIMUM RATING					
Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Ambient Temperature	T <sub>STG</sub>	-40	85	°C	
Operating Case Temperature	T <sub>A</sub>	0	70	°C	
Relative Storage Humidity	RH <sub>s</sub>	5	95	%	
Relative Operating Humidity	RH <sub>o</sub>	0	85	%	
VCC3 Power Supply Voltage	VCC3	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>	3.13	3.3	3.47	V	
Power Supply Consumption	P			2.5	W	
TX Data Rate			10.3125		Gbps	
			1.25			
RX Data Rate			10.3125		Gbps	
			1.25		Gbps	
Operating current				1000	mA	

10G EPON TRANSMITTER OPTICAL CHARACTERISTICS						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Optical Center Wavelength	$\lambda_c$	1575		1580	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF
Average Launch Optical Power (EOL)	AOP	+5		+9	dBm	Launched into SMF
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	6			dB	PRBS <sup>231</sup> -1 @10.3125Gbps
Optical Waveform Diagram	Compliant with IEEE Std 802.3bk					Figure 1, Mask Margin>5%

10G EPON TRANSMITTER ELECTRICAL CHARACTERISTICS						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Input Differential Swing		120		820	mV	CML input, AC coupled
Input Differential Impedance		90	100	110	$\Omega$	
TX Disable	Disable	2		VCC+0.3	V	
	Enable	-0.3		0.8	V	
TX Fault	Fault	2.4		VCC+0.3	V	
	Normal	-0.3		0.4	V	
Transmitter Disable Time	T <sub>off</sub>			10	us	
Transmitter Enable Time	T <sub>on</sub>			2	ms	

**10G EPON TRANSMITTER EYE MASK DEFINITIONS AND TEST PROCEDURE**

**Figure 1 10G EPON Transmitter Eye Mask Definitions**

X3-X2	Y1	Y2	Y3	Y4	Unit
0.2	0.40	0.45	0.25	0.28	UI

**GEPON TRANSMITTER OPTICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Optical Center Wavelength	$\lambda_c$	1480		1500	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power (EOL)	AOP	+4		+10	dBm	Launched into SMF
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	6			dB	PRBS 2 <sup>7</sup> -1@1.25Gbps
Optical Waveform Diagram	Compliant with IEEE Std 802.3bkdB					Figure 2, Mask Margin>5%

**GEPON TRANSMITTER ELECTRICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Input Differential Swing		120		800	mV	CML input, AC coupled
Input Differential Impedance		90	100	110	$\Omega$	
TX Disable	Disable	2		VCC+0.3	V	
	Enable	-0.3		0.8	V	
TX Fault	Fault	2.4		VCC+0.3	V	
	Normal	-0.3		0.4	V	
Transmitter Disable Time	Toff			10	us	
Transmitter Enable Time	Ton			2	ms	

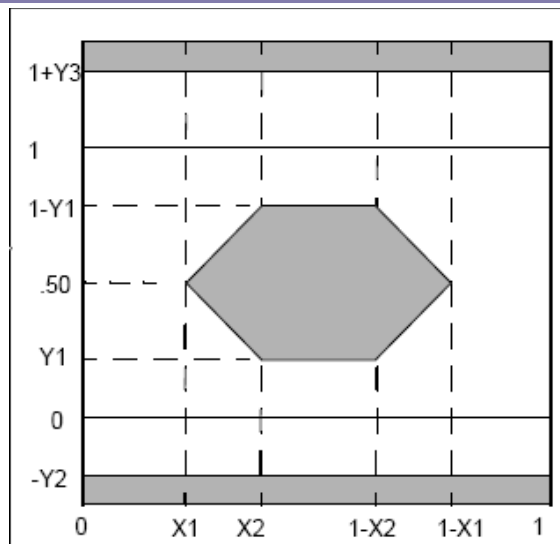
**GEPON TRANSMITTER EYE MASK DEFINITIONS AND TEST PROCEDURE**


Figure 2 GEPON Transmitter Eye Mask Definitions

X1	X2	Y1	Y2	Y3	Unit
0.22	0.375	0.20	0.20	0.30	UI

**10G EPON PON RECEIVER OPTICAL CHARACTERISTICS**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN			-29	dBm	PRBS2 <sup>31</sup> -1@10.3125Gbps BER $\leq 1 \times 10^{-3}$
Saturation Optical Power	SAT	-9			dBm	
Max Input power		-8			dBm	
LOS Assert Level				-30	dBm	
LOS De-Assert Level		-45			dBm	
Hysteresis		0.5		6	dB	

**10G EPON RECEIVER ELECTRICAL CHARACTERISTICS**

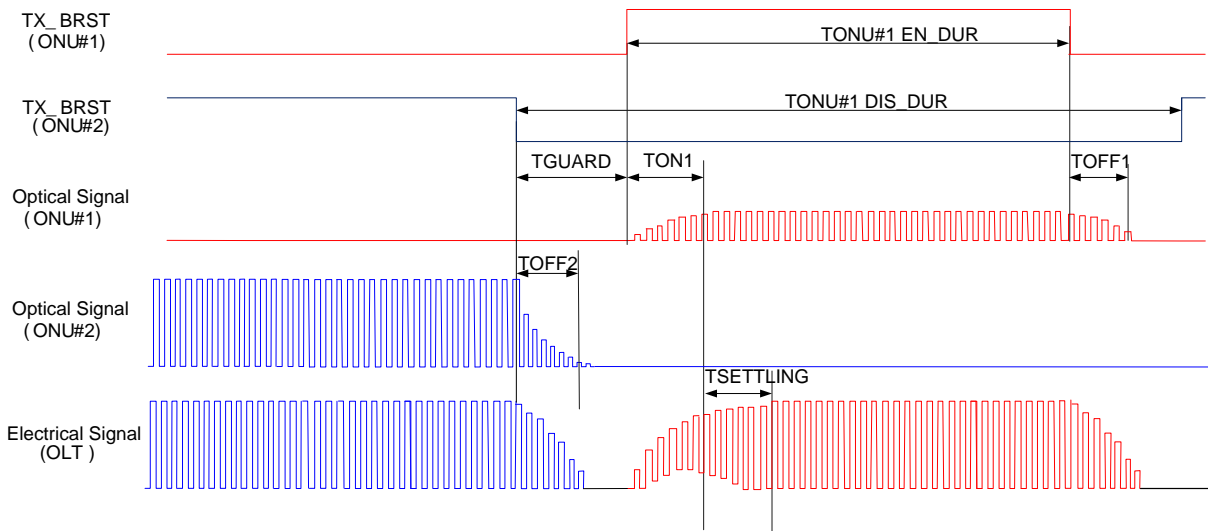
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Receiver Threshold Settling Time	T <sub>SETTLING</sub>		300	800	ns	Figure 3
Data Output Differential Swing		400		1000	mV	DC coupled, CML output
Input Differential Impedance	Z <sub>in</sub>	90	100	110	Ω	
LOS Assert Level Time				1024	ns	
LOS De-Assert Level Time				512	ns	
LOS Voltage - Low		-0.3		0.4	V	
LOS Voltage - High		2.4		VCC+0.3	V	
RSSI Trigger-Low		-0.3		0.8	V	
RSSI Trigger-High		2.0		VCC+0.3	V	

**GEPON RECEIVER OPTICAL CHARACTERISTICS**

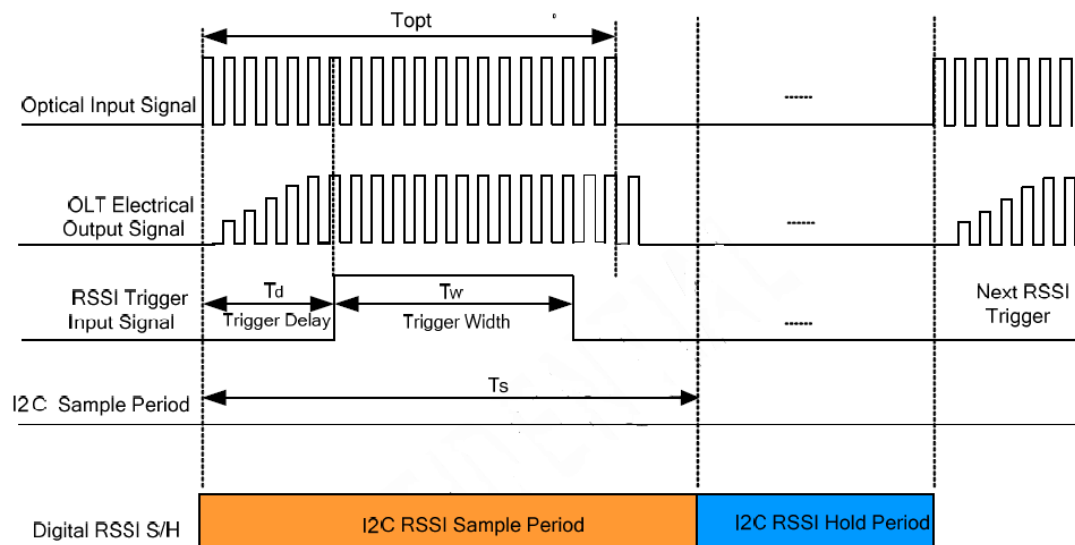
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength		1290	1310	1330	nm	
Sensitivity	SEN			-32	dBm	PRBS 2 <sup>7</sup> -1 @ 1.25Gbps BER ≤ 1×10 <sup>-12</sup>
Max Input power		-6			dBm	
Saturation Optical Power	SAT	-12			dBm	
LOS Assert Level				-32.5	dBm	
LOS De-Assert Level		-45			dBm	
Hysteresis		0.5		6	dB	

**GEPON RECEIVER ELECTRICAL CHARACTERISTICS**

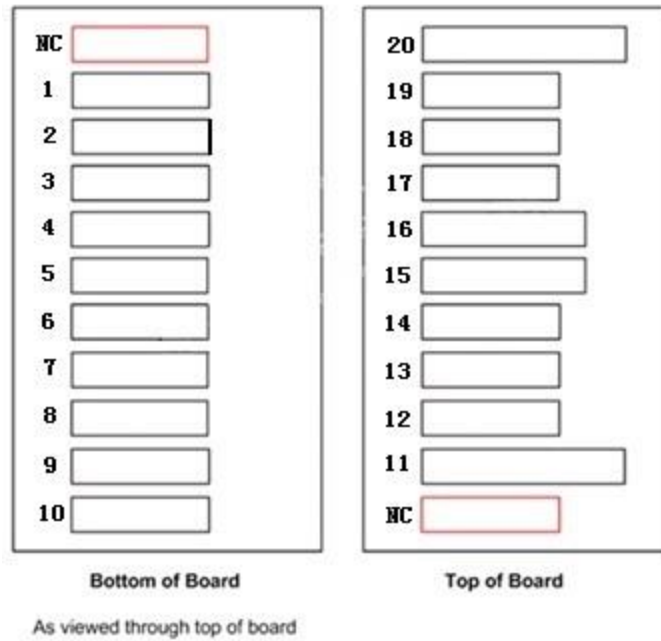
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Receiver Threshold Settling Time	T <sub>SETTLING</sub>			300	ns	Figure 3
Data Output Differential Swing		600		1600	mV	DC coupled, LVPECL output
Input Differential Impedance	Z <sub>in</sub>	90	100	110	Ω	
LOS Assert Level Time				1024	ns	
LOS De-Assert Level Time				512	ns	
LOS Voltage - Low		-0.3		0.4	V	
LOS Voltage - High		2.4		VCC+0.3	V	
RSSI Trigger-Low		-0.3		0.8	V	
RSSI Trigger-High		2.0		VCC+0.3	V	

**TIMING PARAMETER DEFINITIONS IN BURST MODE SEQUENCE**

**Figure 3 Timing Parameter Definitions in Burst Mode Sequence**
**RSSI TIMING SEQUENCE**

Parameter	Symbol	Min.	Typ.	Max.	Unit.	Notes
Optical Signal During Time	$T_{opt}$	1500			ns	
RSSI Trigger width	$T_w$		500		ns	
RSSI Trigger Delay	$T_D$		300		ns	
I <sup>2</sup> C Access Prohibited Time	$T_s$			500	$\mu$ s	
I <sup>2</sup> C Bus Frequency			100	200	KHz	

**Digital RSSI Sample/Hold Timing Specification**

**Figure 4 Timing Parameter Definitions in RSSI Trigger**

**PIN OUT DRAWING**

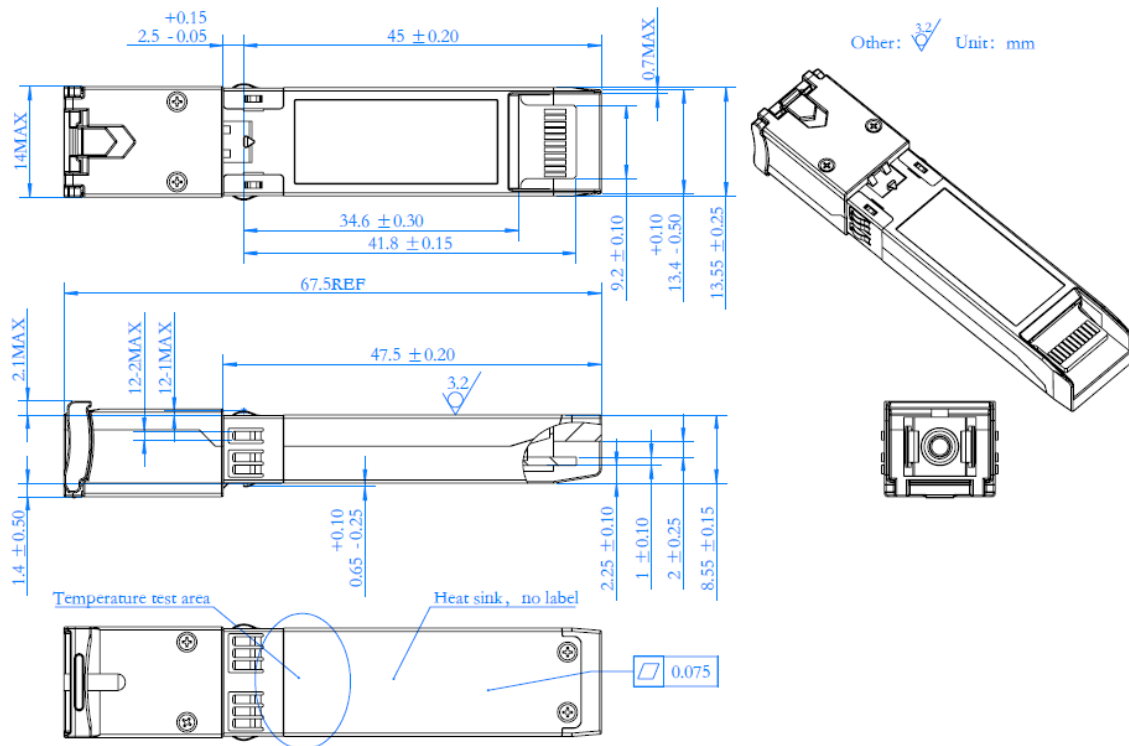


**Figure 5 Pin Out Drawing**

PIN DESCRIPTION			
PIN	Name	Description	Notes
NC	N/C		
1	EPON_TD+	1G Transmit Data In	AC coupled, CML input
2	EPON_TD-	Inv. 1G Transmit Data In	AC coupled, CML input
3	MOD_ABS	Indicates Module is not present.	Grounded in the Module
4	SDA	2-Wire Serial Interface Data	The data line of two wire serial interface
5	SCL	2-Wire Serial Interface Clock	The clock line of two wire serial interface
6	EPON_RD-	Inv. Received 1G Data Out	DC coupled, LVPECL output
7	N/C		
8	RX_LOS	RX_LOS Indicator	High: lost signal
9	Trig	Receiver RSSI trigger input	
10	EPON_RD+	Received 1G Data Out	DC coupled, LVPECL output
NC	N/C		
11	GND	Module Ground	
12	10GEPON_RD-	Inv. Received 10G Data Out	DC coupled, CML output
13	10GEPON_RD+	Received 10G Data Out	DC coupled, CML output
14	TX_Fault	Indication of Transmitter Fault	
15	VCCR	3.3V DC Power Input	
16	VCCT	3.3V DC Power Input	

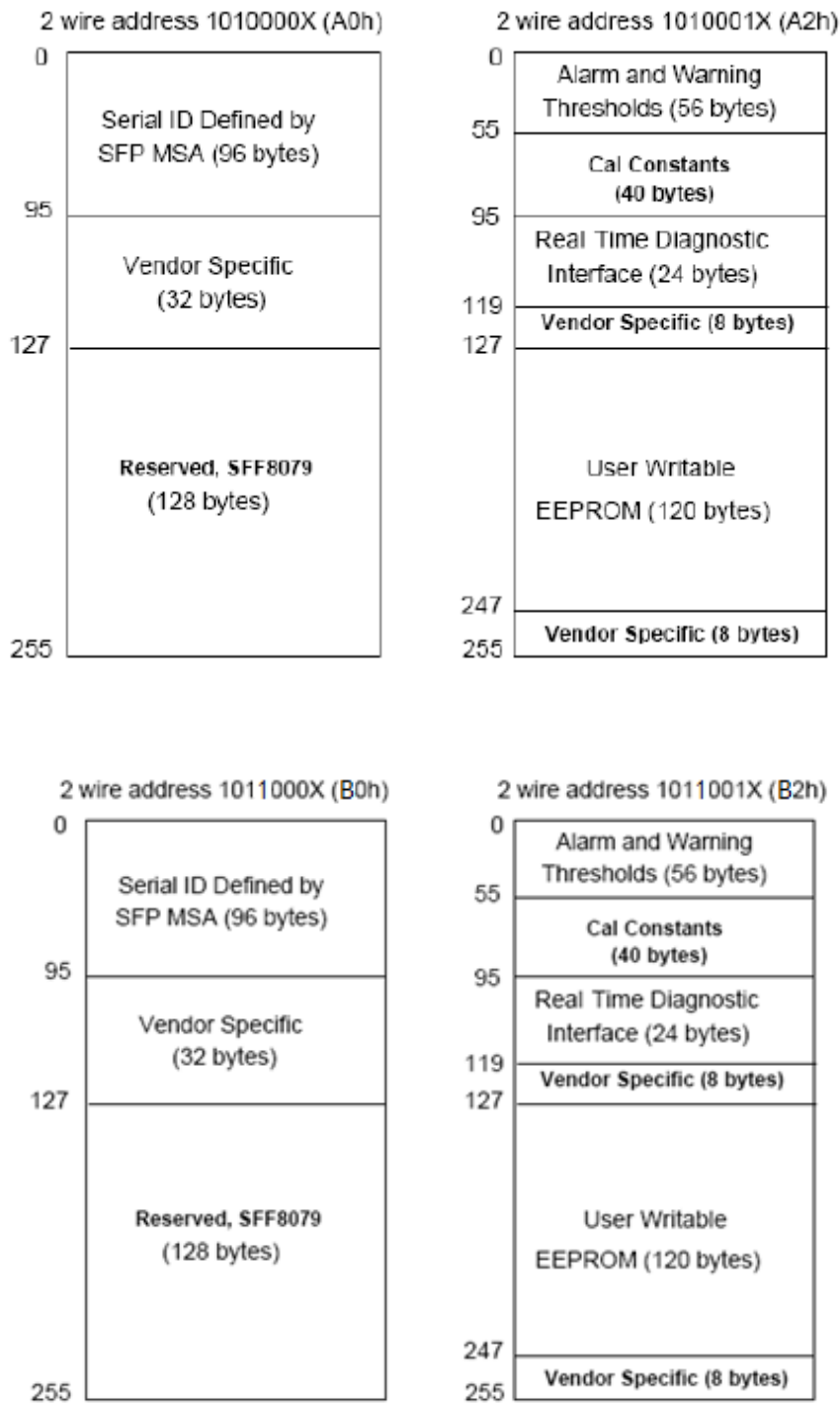
17	NC		
18	10GEPON_TD+	differential 10G Transmit Data In	AC coupled, CML input
19	10GEPON_TD-	Inv. differential 10G Transmit Data In	AC coupled, CML input
20	GND	Module Ground	

**PACKAGE OUTLINE**



**Figure 6 Package Outline**



**EEPROM INFORMATION**

**Figure 7 EEPROM Memory Map Specific Data Field Descriptions**

**DIGITAL DIAGNOSTIC MONITORING INTERFACE**

Parameter	Range	Accuracy	Calibration	NOTES
Temperature	0 to 70°C	±3°C	Internal	LSB: 1/256C
Voltage	2.97 to 3.63V	±5%	Internal	LSB: 0.1mV
Bias Current_10G	0 to 262mA	±10%	Internal	LSB: 4uA
TX Power_10G	5 to 9dBm	±2dB	Internal	LSB: 0.2uW
Bias Current_2.5G	0 to 262mA	±10%	Internal	LSB: 4uA
TX Power_2.5G	4 to 10dBm	±2dB	Internal	LSB: 0.2uW
RX Power Monitor	-32to -6dBm	±3dB	Internal	LSB: 0.1uW

**ORDERING INFORMATION**

PN	Temperature Rating	Unit
SOEX6277-PSGF	0 ~ 70	°C

**WARNINGS**

- Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.
- Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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