



FEATURES

- Single fiber bi-directional data links TX 10.3125Gbps/ Burst Mode RX1.25Gbps application
- Single fiber bi-directional data links TX 1.25Gbps/ Burst Mode RX1.25Gbps application
- 0 to 70°C operating case temperature
- 3.3V, 5V power supply
- XFP package with SC Receptacle connector
- Hot-pluggable capability
- High power temperature-stabilized 1577nm EML LD
- High power 1490nm DFB LD
- High sensitivity 1310nm APD
- Support 20Km transmission distance over SMF
- Low EMI and excellent ESD protection
- Digital diagnostic monitor interface
- RoHS-6 compliance for SOEX6376-XSGB

APPLICATIONS

- 10GEAPON PRX30 OLT
- GEAPON PX20+ OLT

STANDARDS

- Complies with INF-8077i
- Complies with IEEE 802.3av
- Complies with IEEE 802.3ah
- Complies with China Telecom EPON equipment technology requirement V2.1
- 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_{STG}	-40	85	°C	
Operating Case Temperature	T_c	0	70	°C	
Operating Humidity	OH	5	95	%	
VCC3 Power Supply Voltage	VCC	0	3.6	V	
VCC5 Power Supply Voltage	VCC	0	5.5	V	

RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	T_c	0		+70	°C	
VCC3 Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
VCC5 Power Supply Voltage	V_{CC}	4.75	5	5.25	V	
VCC3 Power Supply Current	ICC		-	700	mA	
VCC5 Power Supply Current	ICC		-	250	mA	
Date Rate			10.3125/1.25		Gbps	
Date Rate Drift		-100		+100	PPM	

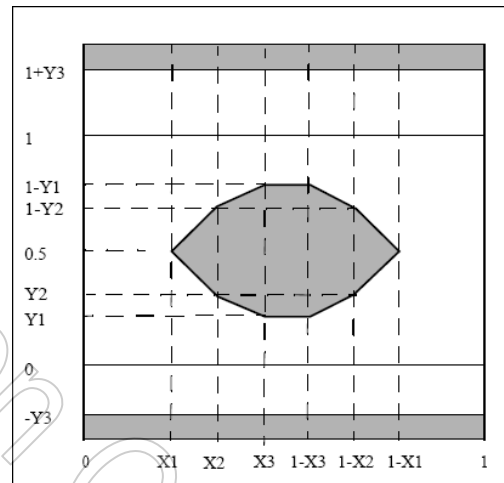
10GEPON TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Optical Center Wavelength	λ_c	1575		1580	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power	AOP	+2.5		+5	dBm	Launched into SMF
Power-OFF Transmitter Optical Power				-39	dBm	
Extinction Ratio	ER	7			dB	PRBS2 ³¹ -1 @10.3125Gbps
Total Jitter	TJ			0.39	UI	PRBS2 ³¹ -1 @10.3125Gbps
Transmitter Reflectance				-10	dB	
Transmitter and Dispersion Penalty	TDP			1.5	dB	Transmit on 20km SMF
Optical Waveform Diagram		Compliant with IEEE Std 802.3av				Figure 1, Mask Margin > 5%

10GEPON 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	Ω	
Transmitter Disable Voltage - Low		0		0.8	V	
Transmitter Disable Voltage - High		2.0		V_{CC}	V	

10GEPON TRANSMITTER EYE MASK DEFINITIONS AND TEST PROCEDURE



X1	X2	X3	Y1	Y2	Y3	Unit
0.25	0.40	0.45	0.25	0.28	0.40	UI

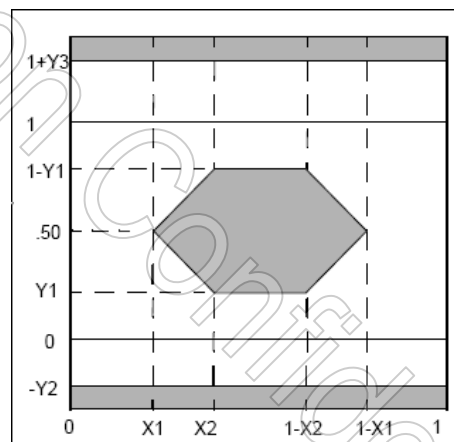
Figure 1 10GEPON Transmitter Eye Mask Definitions

GEPON TRANSMITTER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Optical Center Wavelength	λ_c	1480		1500	nm	
Optical Spectrum Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Optical Power	AOP	+3		+7	dBm	Launched into SMF
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	9			dB	PRBS 2^7-1 test pattern @1.25Gbit/s
Total Jitter	TJ			0.43	UI	PRBS 2^7-1 test pattern @1.25Gbit/s
Rise/Fall Time (20%-80%)	T_R/T_F			260	ps	Bessel-Thompson Filter OFF.
Optical Return Loss Tolerance				15	dB	
Transmitter Reflectance				-10	dB	
Transmitter and Dispersion Penalty	TDP			2.3	dB	Transmit on 20km SMF
Optical Waveform Diagram	Compliant with IEEE Std 802.3ah™-2004					Figure 2, Mask Margin>5%

GEPON TRANSMITTER ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Input Differential Swing		500		1200	mV	LVPECL input, AC coupled
Input Differential Impedance		90	100	110	Ω	
Transmitter Disable Voltage - Low		0		0.8	V	
Transmitter Disable Voltage - High		2.0		V_{CC}	V	

GEPON TRANSMITTER EYE MASK DEFINITIONS AND TEST PROCEDURE


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

Figure 2 GEPON Transmitter Eye Mask Definitions

RECEIVER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength		1260		1360	nm	
Sensitivity	SEN			-31	dBm	PRBS 2 ⁷ -1@1.25Gbps BER $\leq 1 \times 10^{-12}$
Saturation Optical Power	SAT	-8			dBm	PRBS 2 ⁷ -1@1.25Gbps BER $\leq 1 \times 10^{-12}$
Loss Of Signal De-assert Level				-33	dBm	
Loss Of Signal Assert Level		-40			dBm	
Loss Of Signal Hysteresis		0.5		6	dBm	
Receiver Reflectance				-12	dB	

RECEIVER ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit.	Notes
Receiver Threshold Settling Time	$T_{SETTLING}$			300	ns	Figure 3
Data Output Differential Swing		400		1600	mV	LVPECL output, DC coupled
Loss Of Signal Assert Time				512	ns	
Loss Of Signal Deassert Time				512	ns	
Loss Of Signal Voltage - Low		0		0.4	V	
Loss Of Signal Voltage - High		2.4		VCC	V	

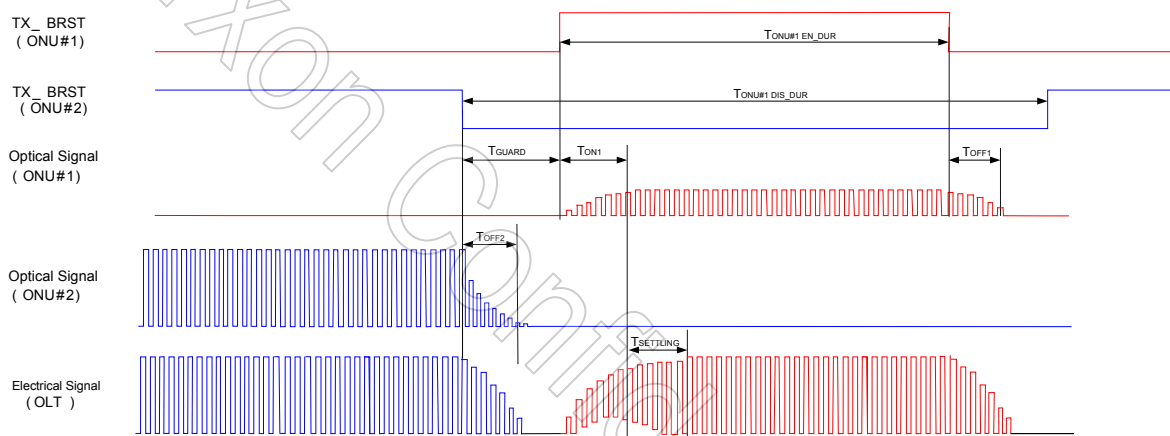
TIMING PARAMETER DEFINITIONS IN BURST MODE SEQUENCE


Figure 3 Timing Parameter Definitions in Burst Mode Sequence

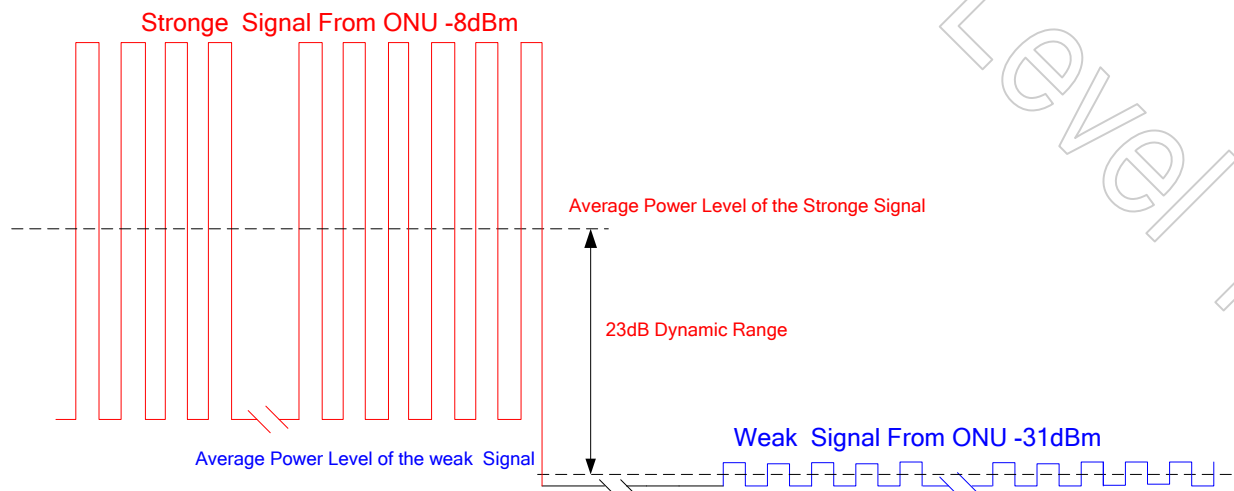
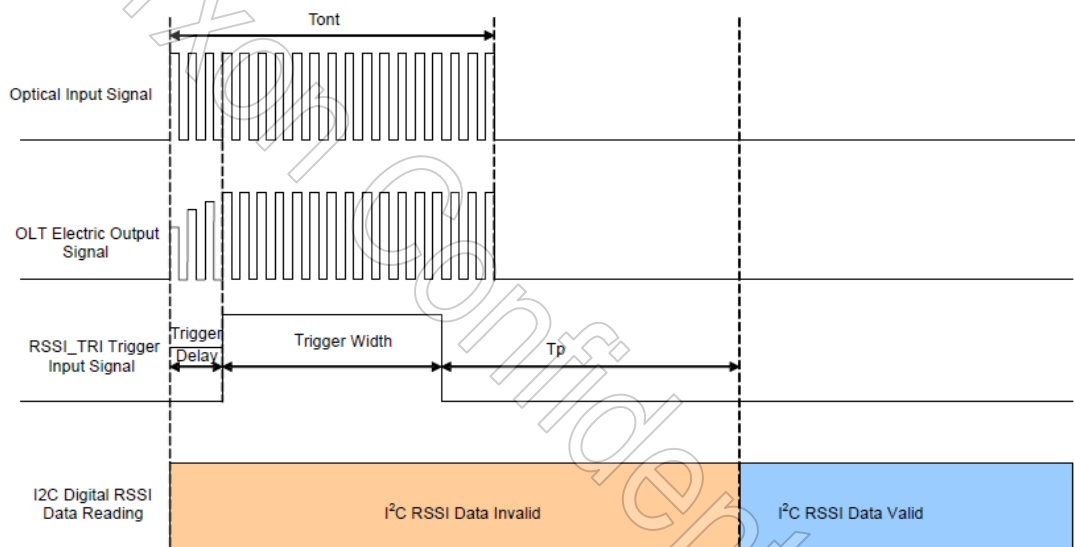
BURST MODE RECEIVER DYNAMIC RANGE


Figure 4 Burst Mode Receiver Dynamic Range in GEPON System

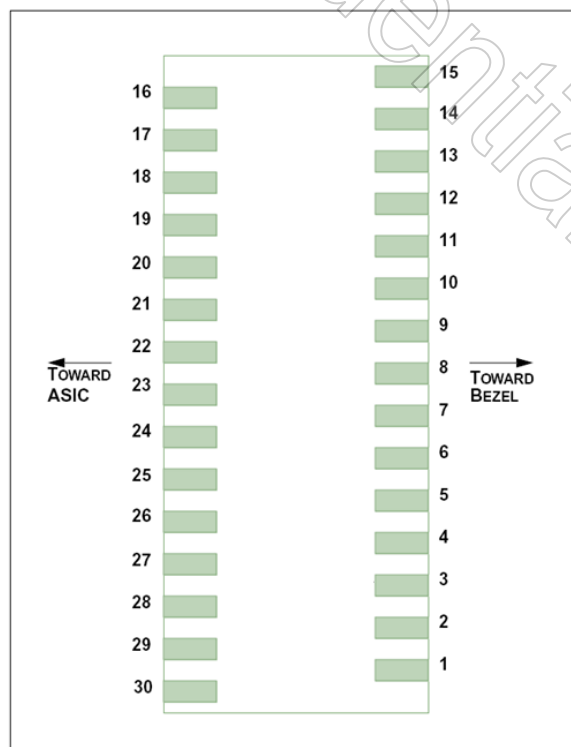
RSSI CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		V _{CC}	V	
RSSI Trigger width	T _W		500		ns	Figure 5
RSSI Trigger Delay	T _D		300		ns	Refer to first bit of the preamble
Optical Signal During Time	T _{ONT}		1500		ns	For RSSI Measurement
I2C Access Prohibited Time				500	μs	

Timing Parameter Definitions in RSSI Trigger

Figure 5 Timing Parameter Definitions in RSSI Trigger
PIN DESCRIPTION

PIN	Name	Description	Notes
1	GND	Module Ground	
2	TX-1G-Pa	Non-Inverted Transmit Data in	LVPECL input, AC coupled
3	TX-1G-Na	Inverted Transmit Data in	LVPECL input, AC coupled
4	GND	Module Ground	
5	TX_DIS	Transmitter Disable	LVTTTL Input, Low: transmitter on
6	VCC5	+5V Power Supply	
7	GND	Module Ground	
8	VCC3_TX	Transmitter 3.3V Power Supply	
9	VCC3_RX	Receiver 3.3V Power Supply	
10	SCL	The clock line	The clock line of two wire serial interface
11	SDA	The data line	The data line of two wire serial interface
12	MOD_ABS	Indicates Module is not present.	Grounded in the Module

13	NC	Not be Connected in the transceiver	
14	RX_LOS	Loss of signal	LVTTTL output. High: loss of signal
15	GND	Module Ground	
16	GND	Module Ground	
17	N.C.	Not be Connected in the transceiver	
18	N.C.	Not be Connected in the transceiver	
19	GND	Module Ground	
20	RD_1G_N	Inverted Received Data Out	LVPECL Output, DC coupled
21	RD_1G_P	Non-inverted Received Data Out	LVPECL Output, DC coupled
22	NC	Not be Connected in the transceiver	
23	RSSI_TRIG	RSSI Trigger for Transceiver	High: enable RSSI A/D conversion
24	N.C.	Not be Connected in the transceiver	
25	N.C.	Not be Connected in the transceiver	
26	N.C	Not be Connected in the transceiver	
27	GND	Module Ground	
28	TX_10G_N	Inverted Transmit Data in	CML input, AC coupled
29	TX_10G_P	Non-Inverted Transmit Data in	CML input, AC coupled
30	GND	Module Ground	

PIN OUT DRAWING

Figure 6 Pin out Drawing

TYPICAL INTERFACE CIRCUIT

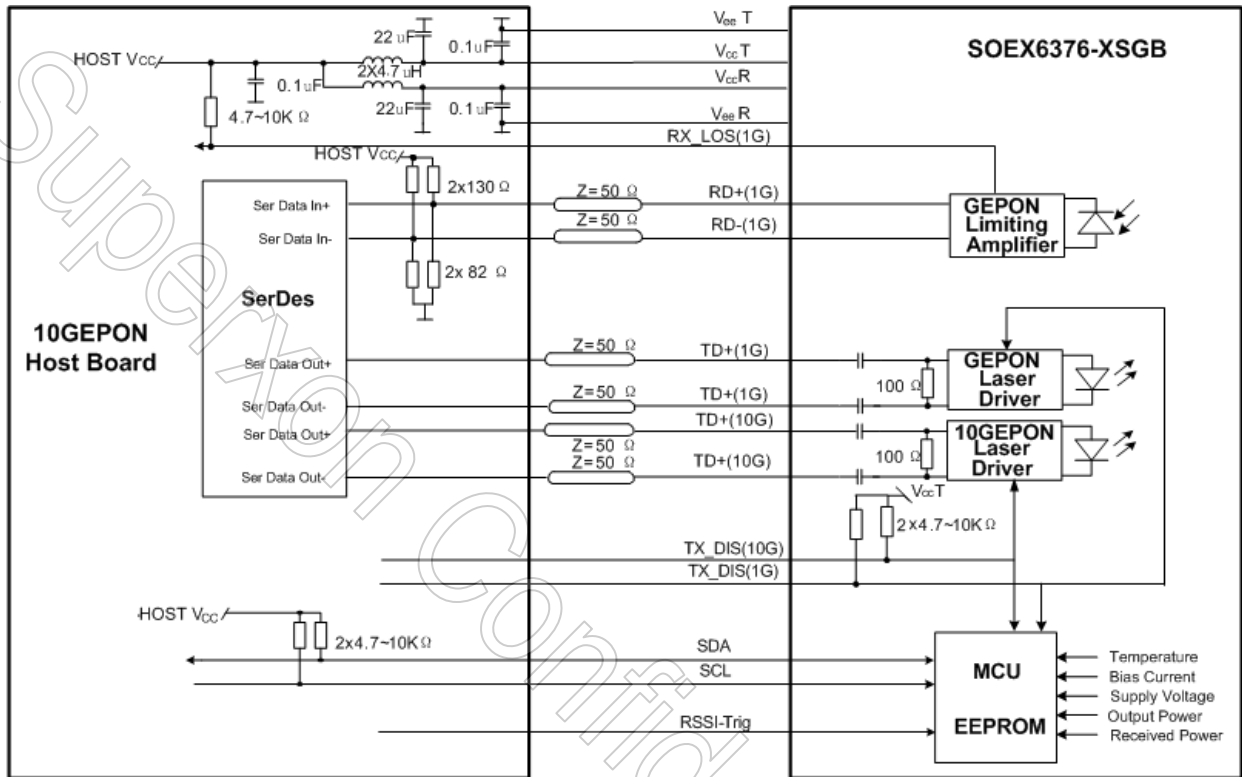


Figure 7 Typical Interface Circuit

PACKAGE OUTLINE

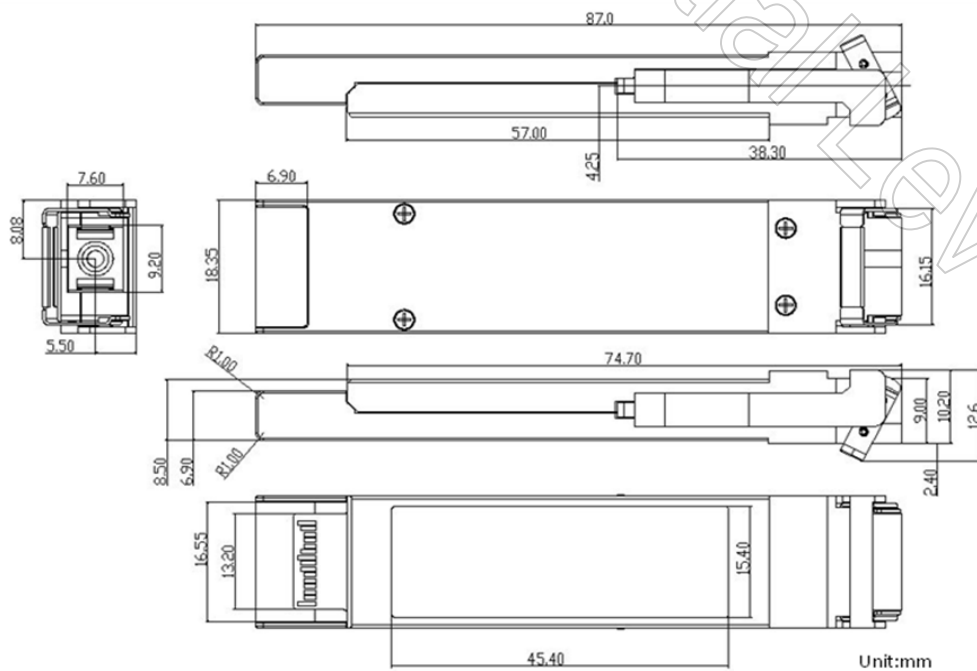
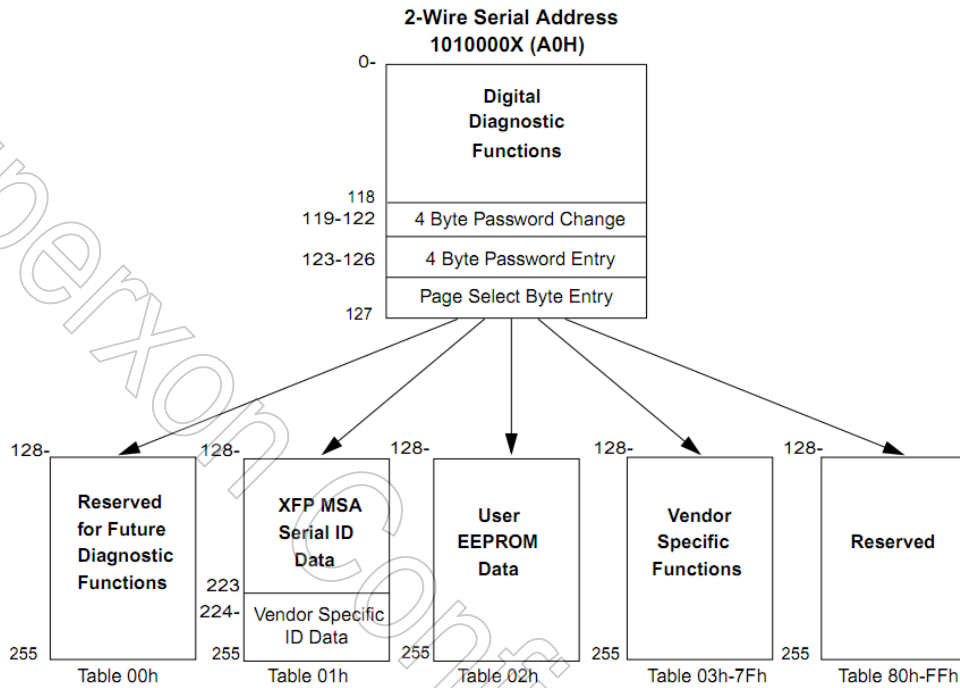


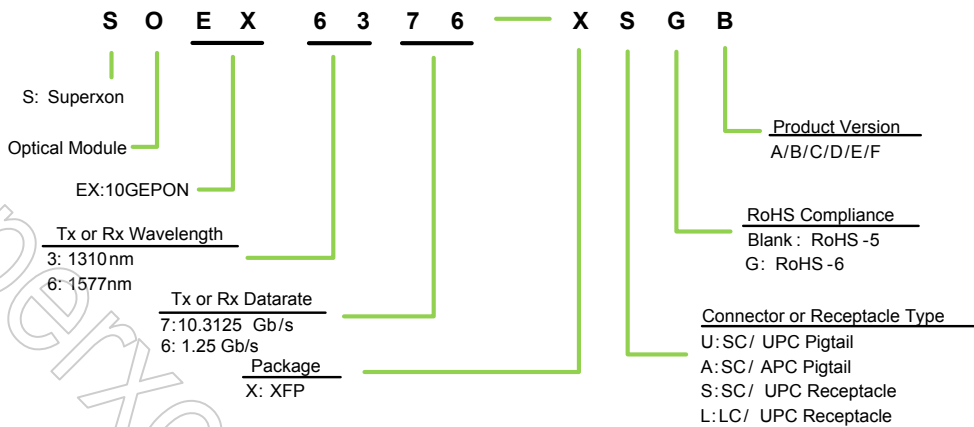
Figure 8 Package Outline

EEPROM INFORMATION

Figure 9 EEPROM Memory Map Specific Data Field Descriptions
DIGITAL DIAGNOSTIC MONITORING INTERFACE

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

Parameter	Range	Accuracy	Calibration	Notes
Temperature	0 to 70°C	±3°C	Internal	
Voltage	2.97 to 3.63V	±3%	Internal	
Bias Current	0 to 100mA	±10%	Internal	LSB:4uA
TX Power_1G	2 to 7dBm	±3dB	Internal	LSB:0.2uW
Bias Current_10G	0 to 150mA	±10%	Internal	LSB:4uA
TX Power_10G	2 to 5dBm	±3dB	Internal	LSB:0.2uW
RX Power monitor	-31 to -8dBm	±2dB	External	

ORDERING INFORMATION



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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