

FEATURES

- ✦ Single fiber bi-directional data links TX 9.953Gbps/ Burst Mode RX 2.488Gbps application
- ✦ 0 to 70°C operating case temperature
- ✦ 3.3V power supply
- ✦ SFP+ package with SC/UPC Receptacle connector
- ✦ Hot-pluggable capability
- ✦ High power 1577nm EML DFB LD
- ✦ High sensitivity 1270nm APD
- ✦ Support 20km transmission distance with SMF
- ✦ Low EMI and excellent ESD protection
- ✦ Digital diagnostic monitor interface
- ✦ RoHS6 compliance

APPLICATIONS

- ✦ XG-PON OLT SFP N1

STANDARDS

- ✦ Complies with SFF-8431
- ✦ Complies with SFF-8432
- ✦ Complies with SFF-8472
- ✦ Complies with ITU-T G.987.2
- ✦ Complies with FCC 47 CFR Part 15, Class B
- ✦ 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 _{STG}	-40	85	°C	
Operating Case Temperature	T _C	0	70	°C	
Operating Humidity	OH	5	85	%	
VCC3 Power Supply Voltage	V _{CC}	0	3.6	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	
VCC3 Power Supply Current	I _{CC}			550	mA	
Data Rate			9.953/2.488		Gbps	
Data Rate Drift		-100		+100	PPM	

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 (BOL)	AOP	+2.5		+6	dBm	Launched into SMF @ Room Temperature
Average Launch Optical Power (EOL)	AOP	+2		+6	dBm	Launched into SMF @ 0~70°C
Power-OFF Transmitter Optical Power				-39	dBm	Launched into SMF
Extinction Ratio	ER	8.2			dB	PRBS2 ³¹ -1
Transmitter Reflectance				-10	dB	
Transmitter tolerance to reflected optical power		-15			dB	
Transmitter and Dispersion Penalty	TDP			1	dB	Transmit on 20km SMF
Optical Waveform Diagram	Compliant with ITU-T 987.2					Figure 1, Mask Margi $n > 5\%$

TRANSMITTER ELECTRICAL CHARACTERISTICS						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Input Differential Swing		120		820	mV	CML input, AC coupled
Input Differential Impedance		80	100	120	Ω	
Transmitter Disable Voltage - Low		0		0.8	V	Transmitter On
Transmitter Disable Voltage - High		2.0		V_{CC}	V	Transmitter Off
Transmitter Fault Voltage - Low		0		0.4	V	Transmitter On
Transmitter Fault Voltage - High		2.4		V_{CC}	V	Transmitter Fault

TRANSMITTER EYE MASK DEFINITIONS AND TEST PROCEDURE

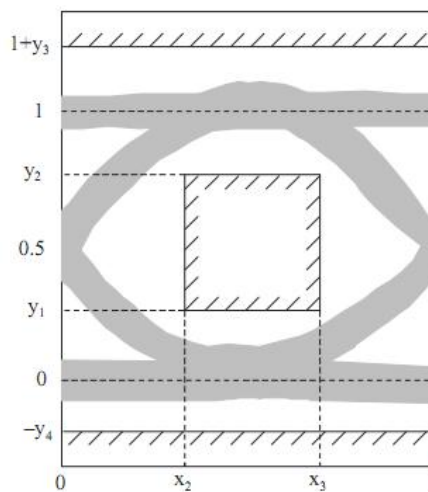


Figure 1 XGPON Transmitter Eye Mask Definitions

X3-X2	Y1	Y2	Y3	Y4	Unit
0.2	0.25	0.75	0.25	0.25	UI

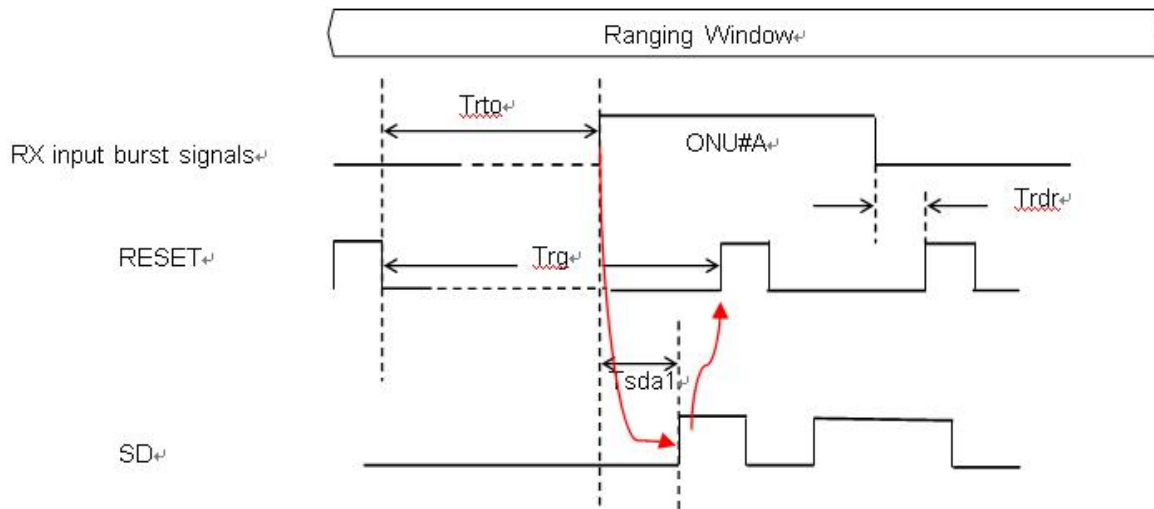
RECEIVER OPTICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Wavelength		1260		1280	nm	
Sensitivity	SEN(BOL)			-28.5	dBm	PRBS 2 ²³ -1@2.488Gbps BER ≤1×10 ⁻⁴
	SEN(EOL)			-27.5	dBm	PRBS 2 ²³ -1@2.488Gbps BER ≤1×10 ⁻⁴
Saturation Optical Power	SAT	-7			dBm	
Burst Dynamic Range		15			dB	
Signal Detect Assert	SDA			-29.5	dBm	
Signal Detect De-assert	SDD	-45			dBm	
Signal Detect Hysteresis		0.5		7.5	dB	
Receiver Reflectance				-20	dB	

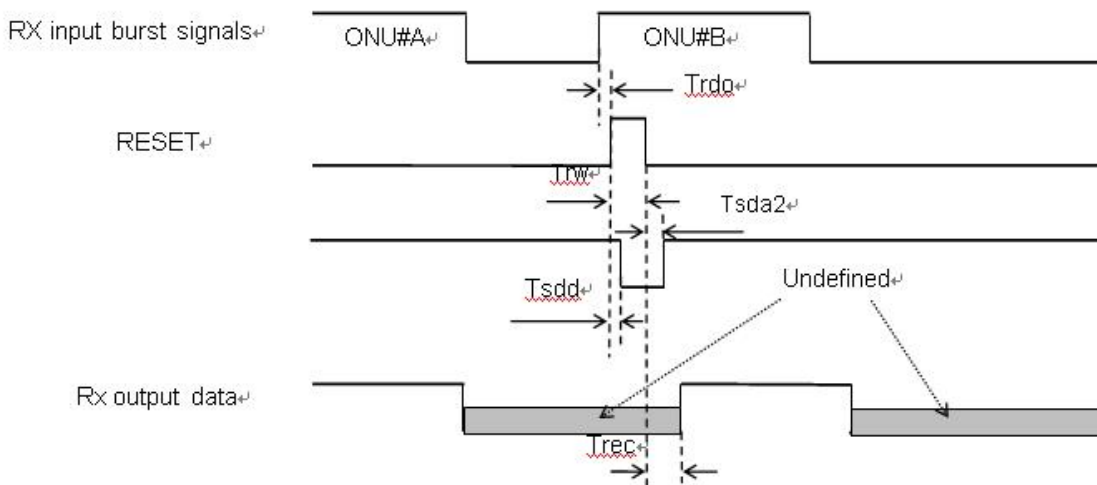
RECEIVER ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min.	Typ.	Max.	Unit.	Notes
Data Output Differential Swing		340		850	mV	CML output, AC coupled
Reset width	Trw	25.6			ns	Figure 2
Signal Detect Assert Time	Tsda1			50	ns	Figure 2
Signal Detect Assert Time	Tsda2			50	ns	Figure 2
Signal Detect De-assert Time	Tsdd			12.8	ns	Figure 2
Data recovery time	Trec			25.6	ns	Figure 2
Reset To ONU Optical Time	Trto	0	-	250	us	Figure 2
Reset Guard Time	Trg	0	-	250	us	Figure 2
Reset-Low		0		0.8	V	
Reset-High		2.0		Vcc	V	
Signal Detect Voltage-Low		0		0.6	V	
Signal Detect Voltage-High		2.4		Vcc	V	
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		Vcc	V	
Upstream Signal Width	T _{ONT}	550			ns	Figure 4
RSSI Trigger Delay	T _D	25			ns	Figure 4
RSSI Trigger Width	T _w	500			ns	Figure 4
I ² C Access Prohibited Time	T _P	500			μs	Figure 4

TIMING PARAMETER DEFINITIONS IN BURST MODE SEQUENCE



Timing requirements of ranging period



Timing requirements of normal operating

Figure 2 Timing Parameter Definitions in Burst Mode Sequence

BURST MODE RECEIVER DYNAMIC RANGE

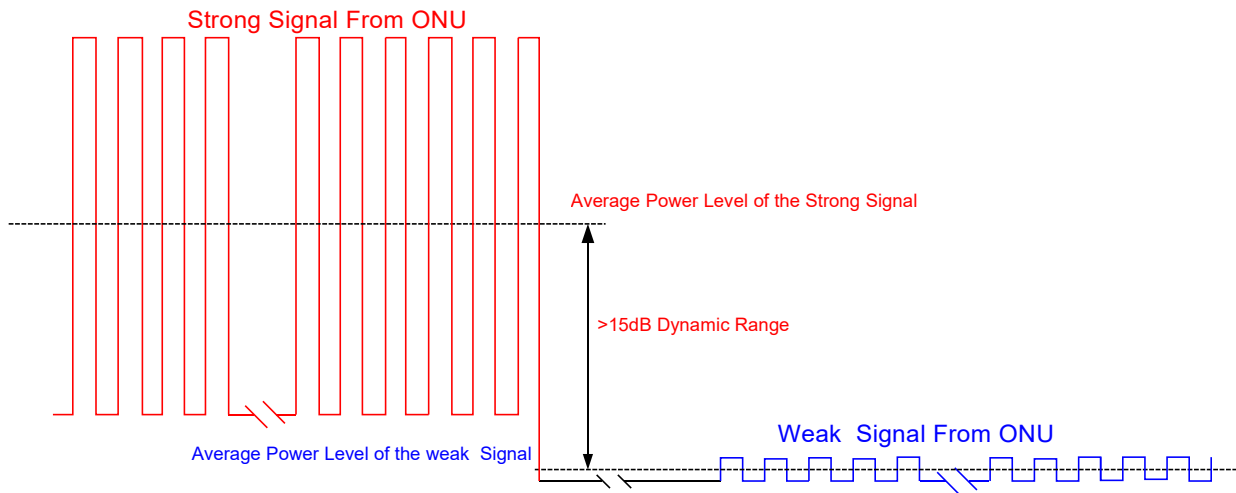


Figure 3 Burst Mode Receiver Dynamic Range in XGPON System

TIMING PARAMETER DEFINITIONS IN RSSI TRIGGER

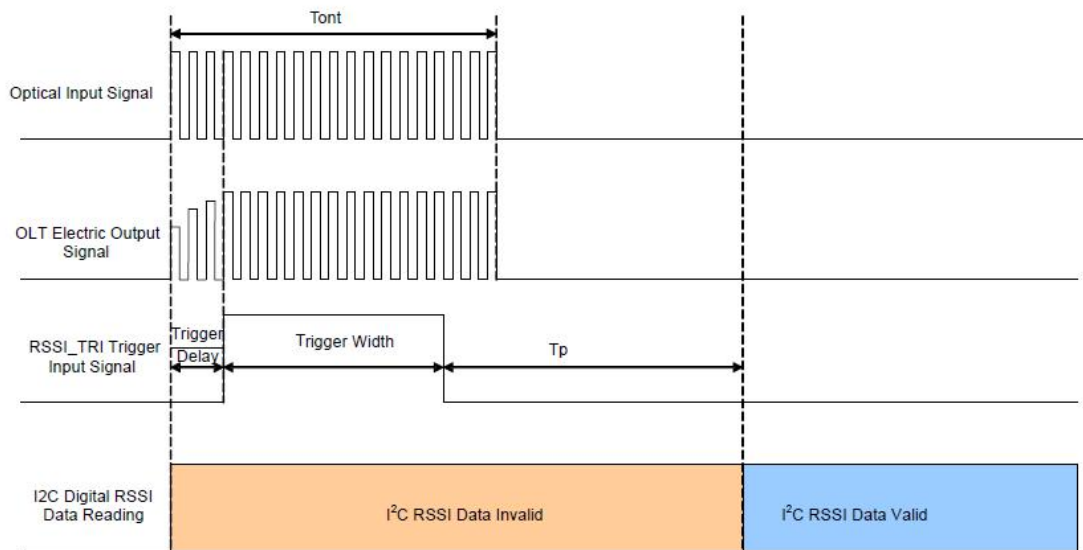


Figure 4 Timing Parameter Definitions in RSSI Trigger

PIN DESCRIPTION			
PIN	Name	Description	Notes
1	VEET	Transmitter Ground	
2	TX Fault	Transmitter Fault Indication	LVTTTL, High Indicates TX Laser Fault
3	TX Disable	Transmitter Disable	LVTTTL, Low: transmitter on
4	SDA	The data line	The data line of two wire serial interface
5	SCL	The clock line	The clock line of two wire serial interface
6	MOD-DEF0	Module definition 0	Grounded in module
7	RESET	Burst Receiver Reset	LVTTTL, High level Reset
8	SD	SD output	LVTTTL, High active
9	RSSI_TRIG	RSSI trigger for Transceiver A/D converter	LVTTTL, High active
10	VEER	Receiver Ground	
11	VEER	Receiver Ground	
12	RD-	inverted Received Data Out	CML Output, AC coupled
13	RD+	Non-inverted Received Data Out	CML Output, AC coupled
14	VEER	Receiver Ground	
15	VCCR	Receiver 3.3V Power Supply	
16	VCCT	Transmitter 3.3V Power Supply	
17	VEET	Transmitter Ground	
18	TD+	Non-Inverted Transmit Data in	CML input, AC coupled
19	TD-	Inverted Transmit Data in	CML input, AC coupled
20	VEET	Transmitter Ground	

PIN OUT DRAWING

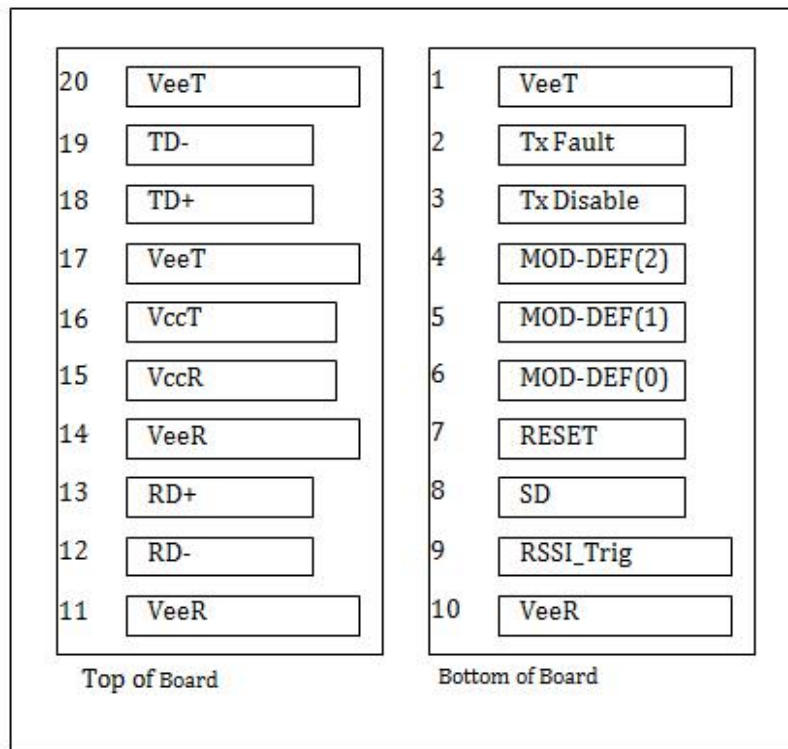


Figure 5 Pin Out Drawing

TYPICAL INTERFACE CIRCUIT

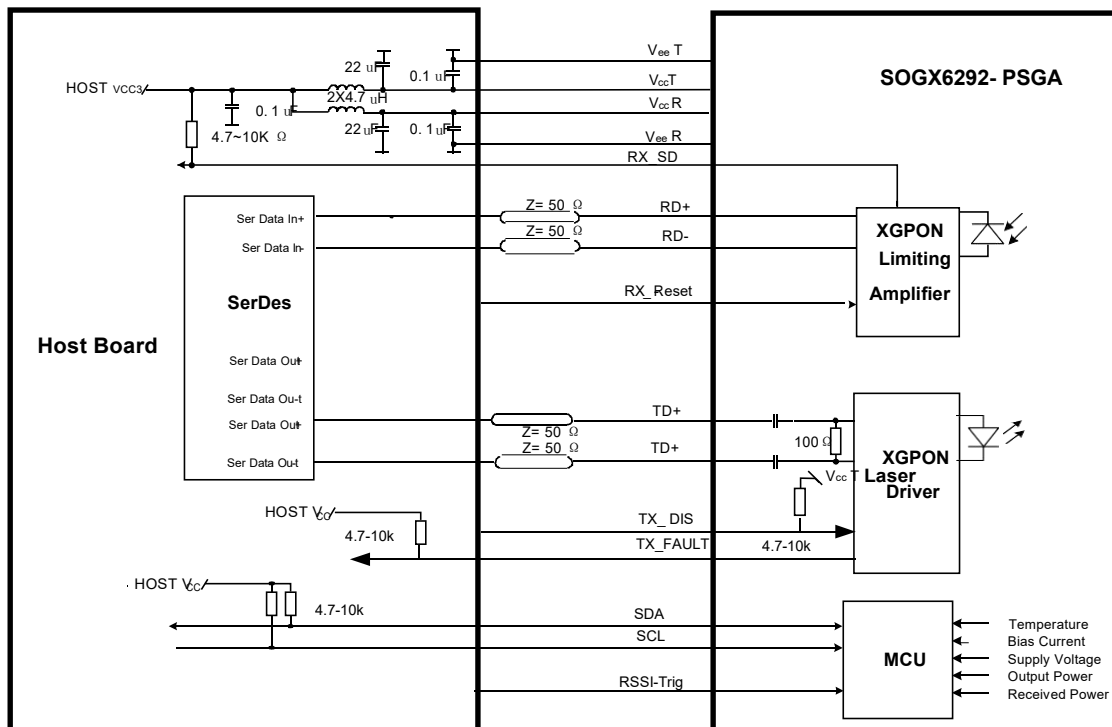


Figure 6 Typical Interface Circuit

PACKAGE OUTLINE

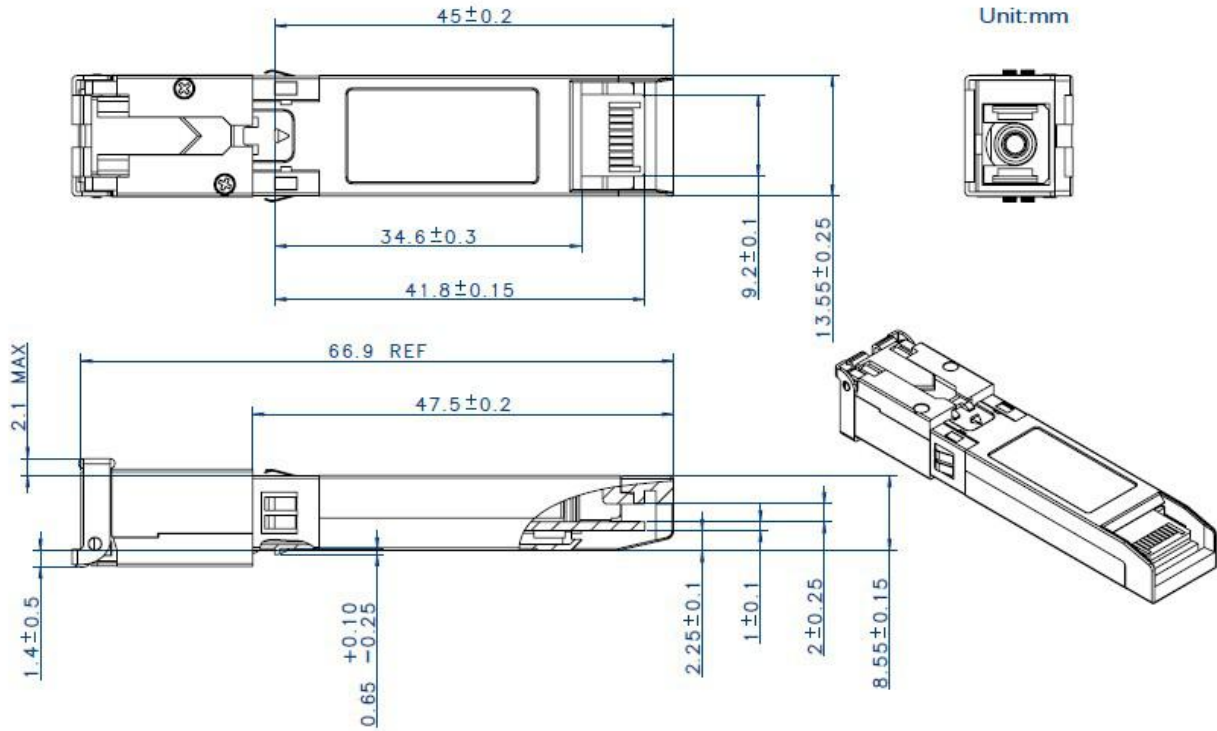


Figure 7 Package Outline

EEPROM INFORMATION

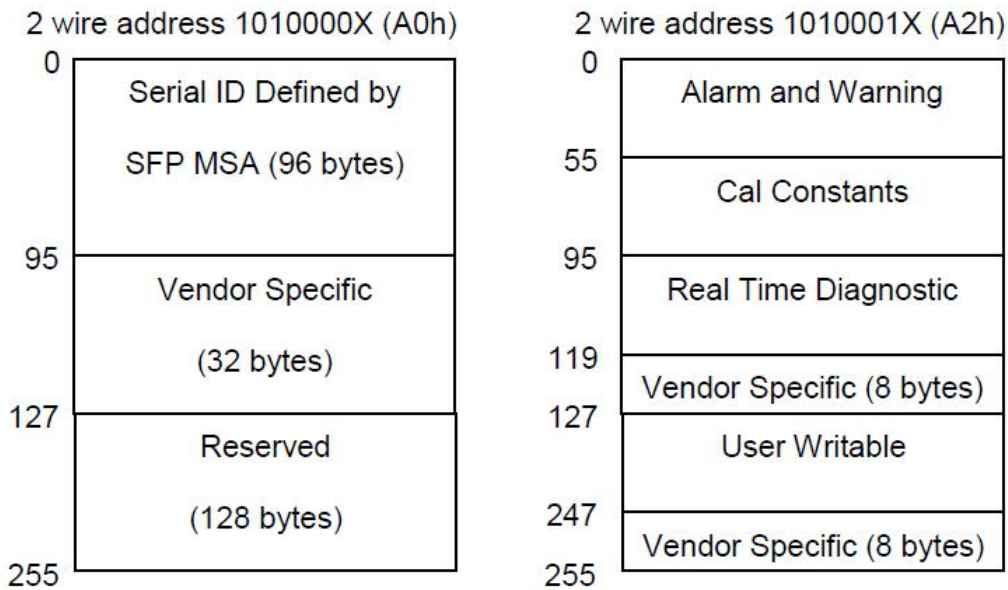


Figure 8 EEPROM Memory Map Specific Data Field Descriptions

DIGITAL DIAGNOSTIC MONITORING INTERFACE

Parameter	Range	Accuracy	Calibration	Notes
Temperature	-5 to 75°C	±3°C	Internal	1LSB = 1/256°C
Voltage	3.0 to 3.6V	±3%	Internal	1LSB = 0.1mV
Bias Current	0 to 262mA	±10%	Internal	1LSB = 4uA
TX Power	0 to 8dBm	±3dB	Internal	1LSB = 0.2uW
RX Power monitor	-29 to -7dBm	±3dB	Internal	1LSB = 0.1uW

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