OLT-GSFP-20+ SFP EPON OLT Transceiver

PX-20+ 1250Mb/s With Digital RSSI Function

Product Description

The GSFP-20+ E-PON OLT transceiver module has been designed for low cost point to multi point (P2MP) Fiber to the Home, Business or Curb (FTTX) systems employing high-speed burst mode TDM receivers/transmitters in 1250 Mb/s symmetrical duplex data links. The device is based on the IEEE 802.3ah specification for bi-directional communications over a single fiber and incorporates a high performance 1310 nm burst mode APD Receiver and 1490 nm CW mode DFB transmitter. The Receiver Loss of Signal (Rx_LOS), Transmit Disable (Tx_DIS), Transmit Fault (Tx_FAULT) and the 8472 I^2C diagnostic interface monitor and control functions are LVTTL compatible. The industry standard 2x10 small form pluggable (SFP) package incorporates the SC receptacle. It is fabricated with a rugged die cast metal housing and cage assembly. Commercial and industrial case temperature ranges are available. RoHS compliant models are offered.

Applications

- Gigabit Ethernet Access Networks
- Fiber to the Home, Curb, Office (FTTx)
- Point to Multi Point Service (P2MP)

Features

- Dual Wavelength Bi-Directional Tx/Rx
- 1250 Mb/s Symmetrical Tx/Rx Data Rate
- 1310 nm APD/TIA Burst Mode Receiver
- 1490 nm CW Mode DFB Laser
- IEEE 802.3ah Compliant
- Single 3.3 Volt DC supply
- Low Power Consumption
- SFP Package Outline
- Single Fiber, Full Duplex Operation
- Optical Interface Options
  - SC Optical Receptacle
  - Bail Latching Mechanism
  - 2X10 Electrical SFP Connector
- Case Operating Temperature Range:
  - Commercial: 0 to +70°C
  - Industrial: -40°C to 85°C
- Data and Control Interfaces

Tx_DIS	LVTTL
Tx_FAULT	LVTTL
Rx_LOS	LVTTL
I2C Serial Data	LVTTL
I2C Serial Clock	LVTTL

- BER $<10^{-12}$ (PRBS = 2^7-1)

Applied Standards

- IEEE 802.3ah
- SFF-8472 Rev 9.3

Absolute Maximum Ratings					
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Notes**
Storage Temperature	T_{stg}	-40	+85	ºC	Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.
Relative Humidity - Storage	RH_S	0	95	%	
Relative Humidity - Operating	RH_O	0	85	%	
DC Supply Voltage	V_{CC}	0	3.6	V	
Absolute Maximum Ratings: Optical and Electrical Signal Levels					
TX_DISABLE Logic HIGH State	Tx_DIS	0	V_{CC}+0.5	V	
Rx_LOS Logic HIGH State	Rx_LOS	0	V_{CC}+0.5	V	

Recommended Operating Conditions						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Case Operating Temperature	T_{Case}	0	25	+70	ºC	Temperature Range = C
		-40	25	+85	ºC	Temperature Range = H
DC Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Module Supply Current	I_{IN}	-	270	500	mA	
Signaling Speed +/- 100 ppm	S	-	1250	-	Mb/s	

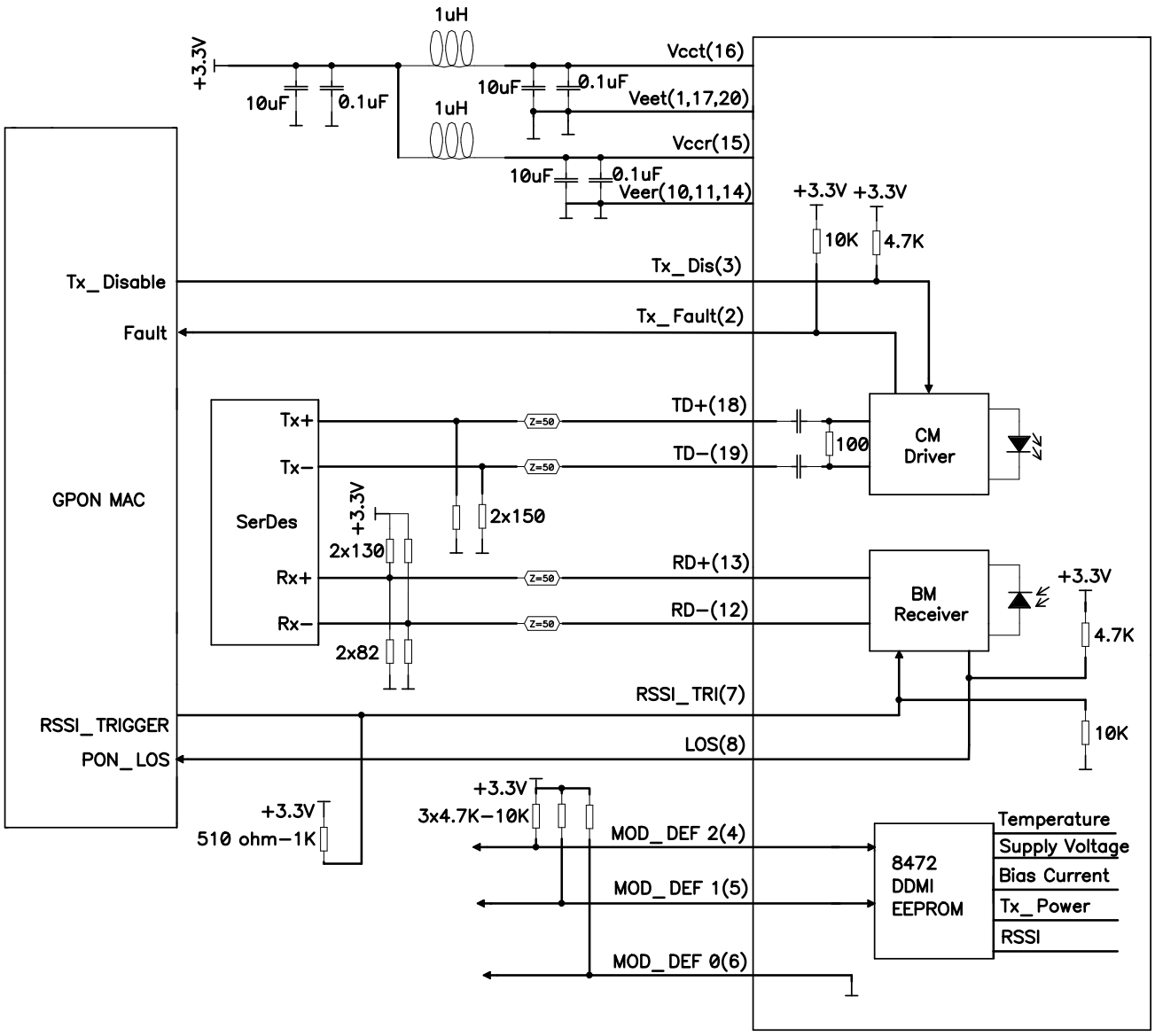
Ordering Information						
Part Number	**Latch Option (X)**		**Temperature Option (Y)**		**RoHS Option (Z)**	
LTE4302M-XYZ	**B**	Bail	**C**	0 to 70 ºC	+	RoHS Compliance
			H	-40 to 85 ºC		

Transmitter Electrical Specifications						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Conditions / Notes**
Tx_Data Differential Input Voltage	V_{IH}-V_{IL}	600	-	1900	mV	LVPECL Tx_DATA Electrical Signal
Tx_DIS = HIGH (Transmitter OFF / DISABLED)	V_{OH}	2.4	-	3.3	V	LVTTL
Tx_DIS = LOW (Transmitter ON / ENABLED)	V_{OL}	0	-	0.8	V	LVTTL
Receiver Electrical Specifications						
Rx Data Output Voltage - LOW	VIL-VCC	-2	-	-1.58	V	
Rx Data Output Voltage - HIGH	VIH-VCC	-1.1	-	-0.74	V	
Rx_LOS = LOW (Receiver ON / NORMAL)	V_{OL}	0	-	0.8	V	LVTTL
Rx_LOS = HIGH(Receiver OFF / LOSS OF SIGNAL)	V_{OH}	2.4	-	3.3	V	LVTTL

Transmitter Optical Specifications						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Conditions / Notes**
Transmitter Type		1490 nm DFB CW Mode				
Average Output Power (9/125 m SMF)	Pout	2.5	-	7.0	dBm	
Optical Output with Tx OFF	Pout	-	-	-39	dBm	
Optical Rise and Fall Time	Tr / t_f	-	-	250	ps	20% to 80%
Tx Wavelength	λ	1480	1490	1500	nm	
Spectral Line Width @ -20dB	Δλ	-	-	1.0	nm	IEEE 802.3ah Compliant
Side Mode Suppression Mode	SMSR	30	-	-	dB	
Extinction Ratio	ER	9	-	-	dB	
Relative Intensity Noise	RIN	-	-	-118	dB/Hz	
Total Jitter	Tj	-	-	0.2	UI	
Transmit Reflectance	RFL	-	-	-12	dB	

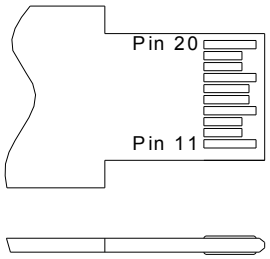
Receiver Optical Specifications						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Conditions / Notes**
Receiver Type		1310 nm APD/TIA Burst Mode				
Wavelength	λ	1260	1310	1360	nm	
Receiver Sensitivity	Pin	-	-	-30	dBm	Note1
Receiver Overload Optical Power	Pin(SAT)	-6	-	-	dBm	Note1
Maximum Input Optical Power	Pin(MAX)	-	-	4	dBm	Damage Threshold
Receiver Reflectance	RFL	-	-	-12	dB	
Vertical Eye Closure Penalty	VEP	2.2	-	-	dB	
Receiver Settling Time	Trx	-	-	400	ns	
Rx_LOS Assert	P_a	-45	-	-	dBm	
Rx_LOS Deassert	P_d	-	-	-30.5	dBm	
Rx_LOS Hysteresis	P_{hy}	0.5	-	5	dB	
Note1: BER<10^{-12}, 1250 Mb/s, PRBS 2^7-1 ER=10						

ELECTRICAL INTERFACE

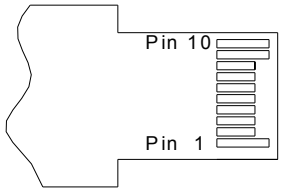


PIN ASSIGNMENT

TOP VIEW
OF BOARD



BOTTOM VIEW
OF BOARD



SFP Pin Assignment			
Pin	**Symbol**	**Description**	**Notes**
1	V_{EET}	Transmitter Ground	
2	Tx_FAULT	Transmitter Fault, LOW = Normal Operation, HIGH = Fault Indication	
3	Tx_DIS	Transmit Disable, LOW = Normal Operation, HIGH = Disables Module	
4	MOD_DEF 2	Module Definition 2 - Two-Wire Interface - Serial Data	Note 1
5	MOD_DEF 1	Module Definition 1 - Two-Wire Interface - Clock Signal	Note 1
6	MOD_DEF 0	Module Definition 0 - Presence Pin, Internal Connected to Digital Ground	Note 1
7	RSSI_TRI	RSSI Trigger Input	Note 2
8	Rx_LOS	Receiver Loss of Signal, LOW = Normal Operation, HIGH = Loss of Signal	
9	V_{EER}	Receiver Ground	
10	V_{EER}	Receiver Ground	
11	V_{EER}	Receiver Ground	
12	RD-	Rx_Data Output (Inverted)	Note 3
13	RD+	Rx_Data Output (Non Inverted)	Note 3
14	V_{EER}	Receiver Ground	
15	V_{CCR}	Receiver DC Power	3.3 V +/- 5%
16	V_{CCT}	Transmitter DC Power	3.3 V +/- 5%
17	V_{EET}	Transmitter Ground	
18	TD+	Tx_Data Input (Non Inverted)	Note 4
19	TD-	Tx_Data Input (Inverted)	Note 4
20	V_{EET}	Transmitter Ground	

Notes

1. Require a pull up resistor of 4.7K to 10K Ohms
2. Require a pull up resistor of 510 to 1K Ohms, if the RSSI_Trigger driver is with open-collector output.
3. The 100 Ohm differential Rx Data output is internally DC coupled.
4. The 100 Ohm differential Tx Data input is internally AC coupled and terminated.

LTE4302M I²C Memory Map (Page A0 HEX, Unlisted Fields are Blank / Empty)							
Address		**Memory Contents**		**Description**	**Name of Field**	**SFP MSA Reference**	**Notes**
Decimal	**HEX**	**Decimal**	**HEX**				
0	00	3	03	SFP	Identifier	Table 3.2	
1	01	4	04	GBIC MOD_DEF4 Interface	Extended Identifier	Table 3.3	
2	02	1	01	SC Receptacle	Connector Values	Table 3.4	
6	06	128	80	1000BASE PX	Transceiver Codes	Table 3.5	
11	0B	03	03	NRZ Encoding	Encoding Codes	Table 3.6	
12	0C	13	0D	1250 Mb/s Data Rate	Nominal Bit Rate		
14	0E	20	14	Link Length in km Units = 20	9 micron fiber length		
15	0F	200	C8	Link Length in 100 m Units = 200	9 micron fiber length		
20 to 35	14 to 23	XXX	XX	Vendor Name	"Hisense"		ASCII Format
40 to 48	28 to 30	XXX	XX	Vendor Part Number	"LTE4302M-BX+"		ASCII Format
56 to 59	38 to 3B	XXX	XX	Vendor Revision Number	Revision		ASCII Format
60 to 61	3D to 3E	1490	05D2	Wavelength = 1490 nm			
65	41	26	1A	Tx_DIS, Tx_FAULT, Rx_LOS	Option Values	Table 3.7	
66	42	20	14	Maximum Bit Rate Tolerance			
67	43	20	14	Minimum Bit Rate Tolerance			
68 to 83	44 to 53	XXX	XX	Vendor Serial Number	Hisense Serial Number		
84 to 91	54 to 5B	XXX	XX	Vendor Date Code	Product Date Code		“YYMMDD”
92	5C	104	68	Diagnostic Monitoring Type	Digital Diagnostic Monitoring Implemented Address Change Required		
93	5D	160	A0	Enhanced Options	Alarm/Warning Flags Soft Tx_FAULT Monitor		
94	5E	01	01	SFF-8472 Compliance	SFF 8472 Revision 9.3 Implemented		
95	5F	XXX	XX	CC_EXT	Check_Sum (64 to 94) = TBD		
96-127	60-7F	XXX	XX	Vendor Specific	Vendor Specific EEPROM		

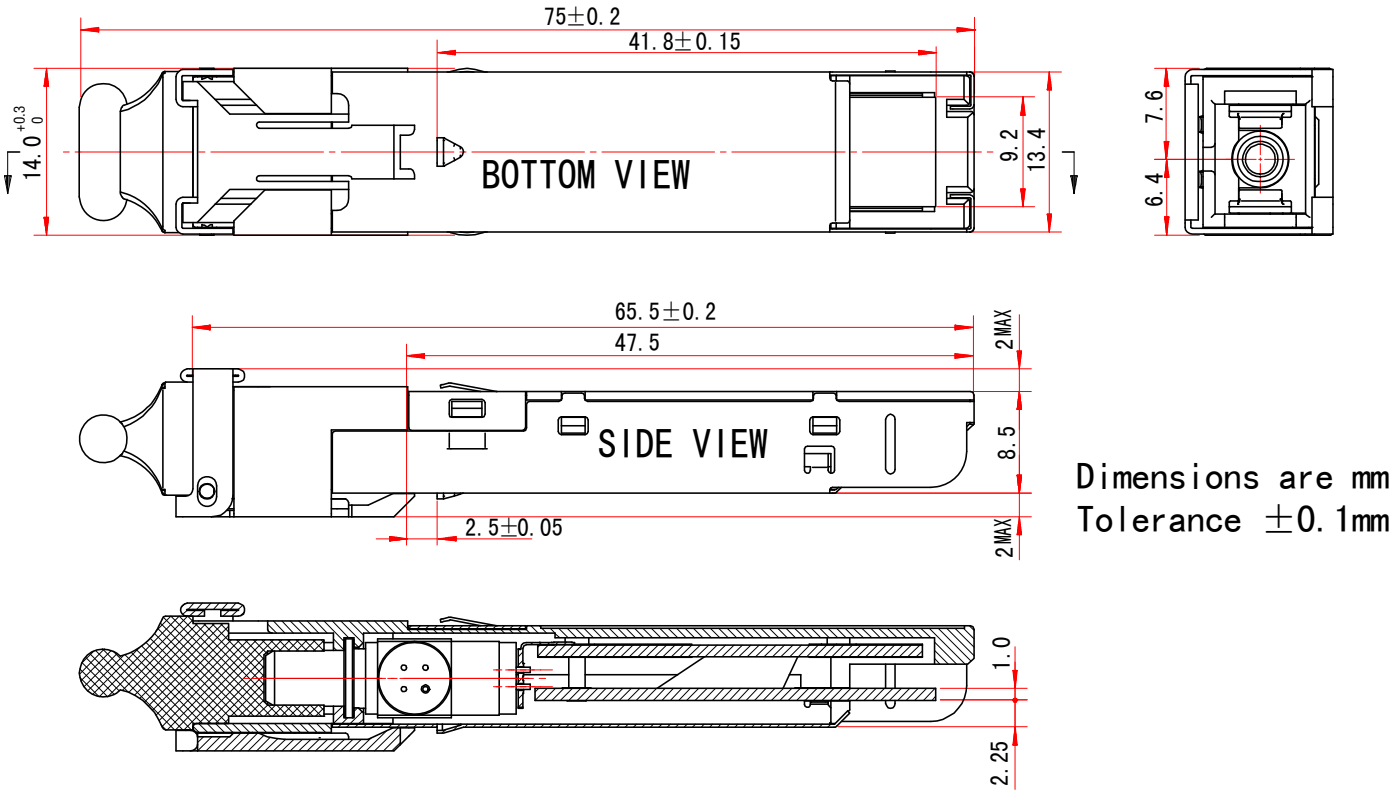
A2 (hex) 8472 Digital Diagnostic Table - Summary of Parameters in the A2 (hex) Parametric Table

The data in the parameter tables are compared with the data in the measured data tables in order to create a warning or alarm status bit, the Warning or Alarm bit is set when the parameter drops below or exceeds the Low or High values stored in memory, the device is internally calibrated.

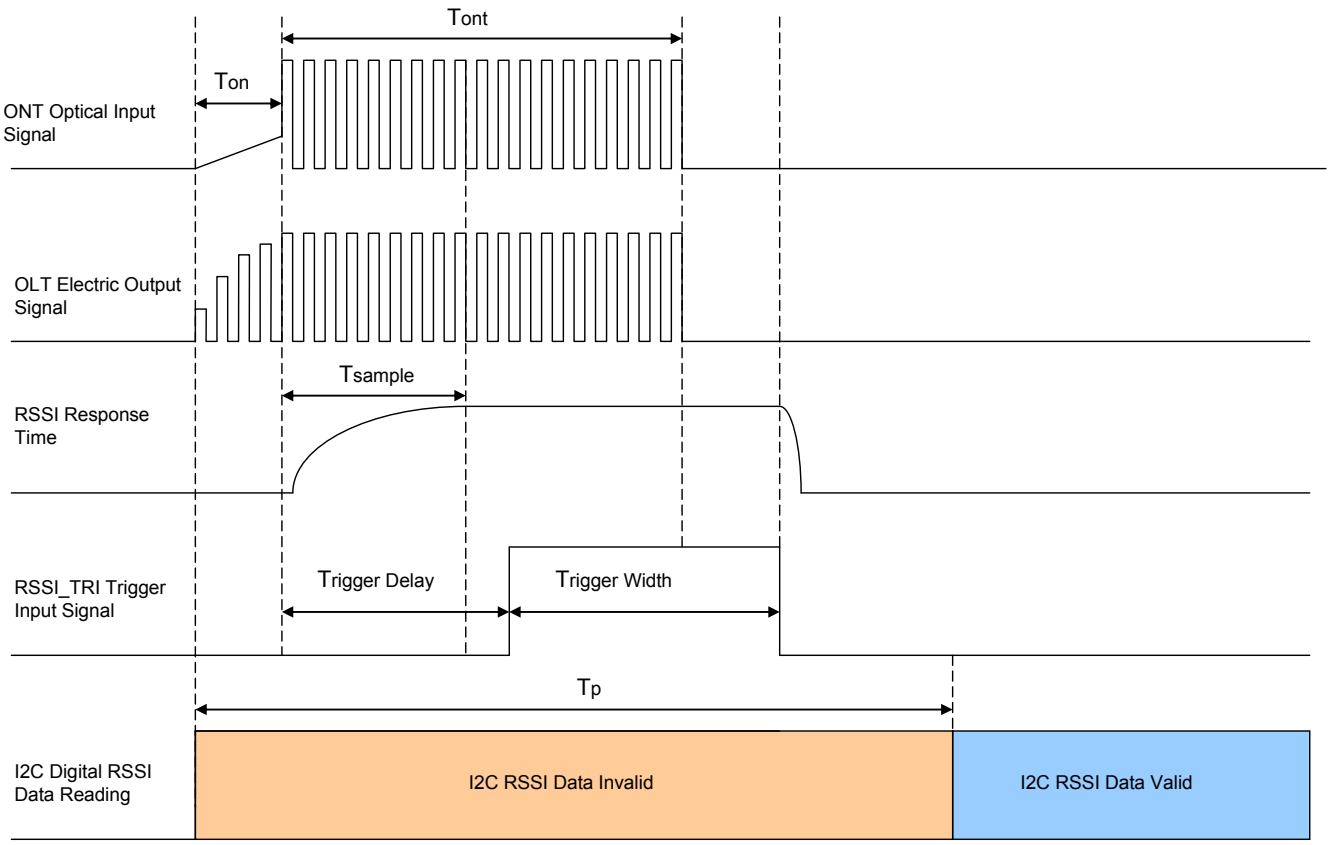
SFF-8472 Rev 9.3 A2 (HEX) Address Table for Alarm and Warning Data															
8472 Parameter	Alarm Threshold Data				Warning Threshold Data				Internally Measured Values		Alarm Bit (Set) Address + Position		Warning Bit (Set) Address + Position		Notes
	High Value		Low Value		High Value		Low Value								
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	High	Low	High	Low	
Temperature	00	01	02	03	04	05	06	07	96	97	112(7)	112(6)	116(7)	116(6)	
Vcc	08	09	10	11	12	13	14	15	98	99	112(5)	112(4)	116(5)	116(4)	
Tx Bias	16	17	18	19	20	21	22	23	100	101	112(3)	112(2)	116(3)	116(2)	
Tx Out	24	25	26	27	28	29	30	31	102	103	112(1)	112(0)	116(1)	116(0)	
RSSI	32	33	34	35	36	37	38	39	104	105	113(7)	113(6)	117(7)	117(6)	Note1

Note1:An external Trigger Signal is needed for RSSI function to Sample and Hold.

Mechanical Dimensions



Digital RSSI Sample/Hold Timing Specification



Parameter	Symbol	Min	Typical	Max	Unit
ONT Optical Input Signal Width	Tont	600	-	-	ns
ONT Transmitter ON	Ton	-	-	512	ns
RSSI Response Time	Tsample	-	300	500	ns
RSSI Trigger Delay	Ttrigger	300	500	Tont	ns
RSSI Trigger Width	Ti2c	2.5	3	100	μs
I2C Access Prohibited Time	Tp	200	-	500	μs (Note1)
RSSI Monitor Range	Pmon	-8	-	-30	dBm
RSSI Monitor Precision	Prssi	-2	+/-1	2	dB

Note 1: RSSI Data is invalid during I2C access prohibited time, please do not execute any I2C operation during the meantime.

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GEPON PX20 SFP OLT Transceiver

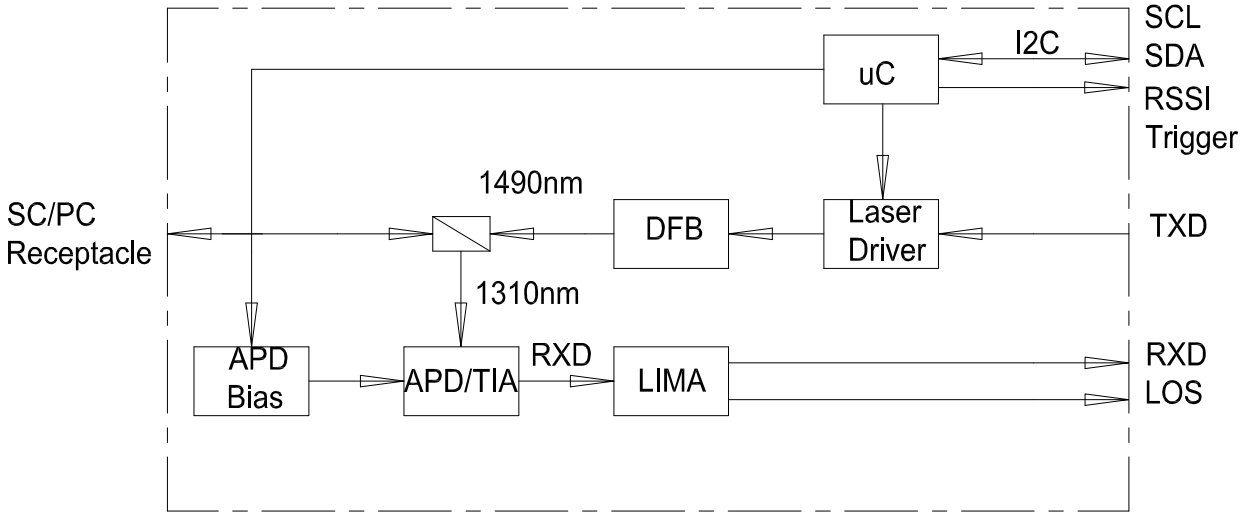
1. Features

- SFP with SC/PC Connector Transceiver
- 1490 nm DFB Tx
- 1310 nm APD Rx
- Digital diagnostics SFF-8472 Compliant
- 1250 Mbps continuous mode Transmission
- 1250 Mbps Burst mode receiver Data Rate
- Provide fast RSSI function
- Operation case temperature: -5~70°C
- Complies with RoHS directive (2002/95/EC)

2. Application

- GEPON OLT IEEE802.3ah 1000BASE-PX20
- FTTx

3. Function Diagram



4. Ordering Information

Part Number	Product description	RoHS Compliant
MTM-LB4551CP	GEPON PX20 OLT SFP with digital RSSI, -5~70°C	RoHS-5

5. Recommended Operating Conditions

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_{STG}	-40	85	°C
Operating Case Temperature	T_C	-5	70	°C
Power Supply Voltage	V_{CC}	3.1	3.5	V
Total Power Supply Current	I_{CC}	-	350	mA

6. Transmitter Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Optical Transmitter Power	P_0	2	-	7	dBm	1
Optical Transmitter Power off	P_{OFF}	-	-	-50	dBm	
Output Center Wavelength	λ	1480	-	1500	nm	
Output Spectrum Width	Δλ	-	-	1.0	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio	ER	9	-	-	dB	
Optical Rise Time	-	-	-	260	ps	
Optical Fall Time	-	-	-	260	ps	
Optical Eye Diagram	Compliant with IEEE Std 802.3ah™-2004					
Tolerence to Tx Back Reflection	-	-15	-	-	dB	
Data Rate	-	-	1.25	-	Gb/s	
Single Ended Data Input Voltage Swing	V_{PP}	200	-	1200	mV	
Differential Input Impedance	Z_{IN}	80	100	120	ohm	
Tx_fault Output Voltage- High	V_{OH}	2.4	-	-	V	
Tx_fault Output Voltage- Low	V_{OL}	-	-	0.4	V	
Tx_Dis Input Voltage- High	V_{IH}	2.0	-	-	V	
Tx_Dis Input Voltage- Low	V_{IL}	-	-	0.8	V	

Note 1: 1.25Gbps continuous-mode , PRBS2^7-1.

7. Receiver Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Wavelength of Operation	-	1260	-	1360	nm	-
Data Rate	-	-	1.25	-	Gb/s	-
Sensitivity	Sen	-	-	-30	dBm	1
Saturation Optical Power	Sat	-8	-	-	dBm	1
LOS Assert Level	LOSA	-45	-	-	dBm	2
LOS Deassert Level	LOSD	-	-	-31	dBm	2
Reflectance of equipment	-	-	-	-20	dB	
Receiver Burst-mode Dynamic Range	-	15	-	-	dB	3
Data Output Voltage - High	V_{OH}	VccR -1.05	-	VccR -0.85	V	-
Data Output Voltage - Low	V_{OL}	VccR -1.84	-	VccR -1.60	V	-
RSSI accuracy	-	-3	-	3	dB	4
LOS Output Voltage- High	V_{LOSH}	2	-	-	V	
LOS Output Voltage- Low	V_{LOSL}	-	-	0.8	V	
LOS Assert Time	T_A	-	-	500	ns	
LOS Deassert Time	T_D	-	-	500	ns	

Note 1: Measured with 1310nm, 1.25Gbps PRBS2^7-1 Single burst packet optical input, ER=10dB, BER=1x10^{-10}.

Note 2: Measured at continuous mode.

Note 3: Input optical power level difference of adjacent burst packets.

Note 4: Receiver optical power ranged from -8dBm to -30dBm, measured with 1310nm, 1.25Gbps PRBS2^7-1 burst-mode optical input, ER=10dB, 50%duty cycle.

8. RSSI Timing Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
RSSI Trigger Delay Time	T_{TRI}	25	-	-	ns
RSSI Sampling Time	T_{SAMPLE}	350	-	-	ns
RSSI Data Available Delay Time	T_{RSSI_DATA}	-	-	500	us

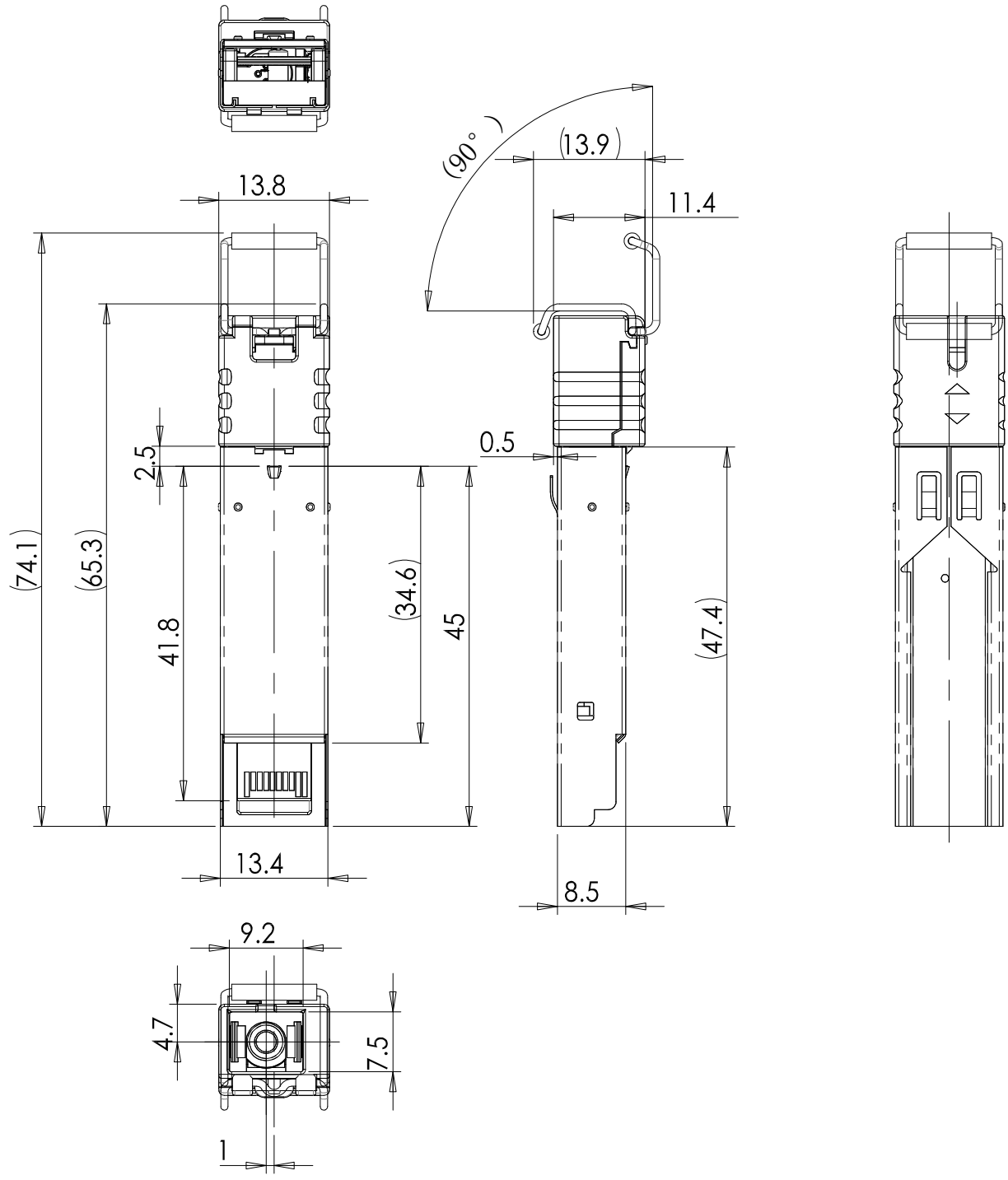
9. Digital Diagnostic Monitoring Accuracy

Parameter	Accuracy	Units	Notes
Transceiver Temperature	±3	°C	Temperature sensor
Power Supply Voltage	±3	%	Vcc=3.13~3.47V
TX Bias Current	±10	mA	
TX Optical Power	±2	dB	Average Power

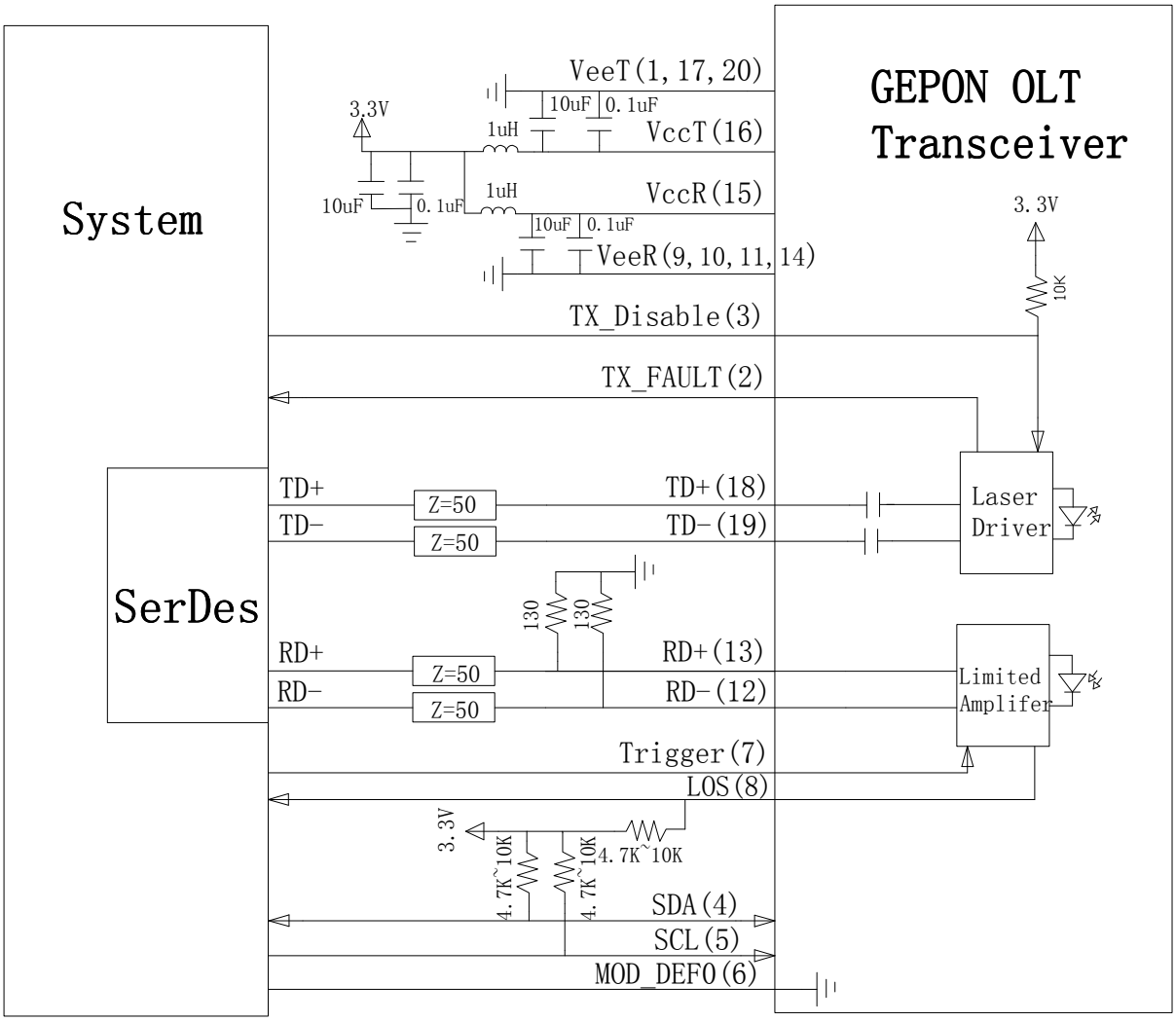
10. Pin Definitions

Pin#	Name	Function
1	VeeT	Transmitter Ground
2	TX_Fault	Transmitter Fault Indication, LVTTL Output, Active High
3	TX_Disable	Transmitter Disable, LVTTL Input. Optical output power is off when this PIN is high or left unconnected.
4	SDA	I^2C Data
5	SCL	I^2C Clock
6	MOD-DEF(0)	Internally grounded
7	RSSI_Trigger	RSSI Trigger Signal from Host, LVTTL input, Active High.
8	LOS	Loss of Signal, LVTTL Output, Active High.
9	VeeR	Receiver Ground
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground
12	RD-	Inv. Received Data Out, LVPECL,DC coupled
13	RD+	Received Data Out, LVPECL,DC coupled
14	VeeR	Receiver Ground
15	VccR	Receiver Power
16	VccT	Transmitter Power
17	VeeT	Transmitter Ground
18	TD+	Transmit Data In, LVPECL or CML (AC coupled; internally 100 ohms differential termination)
19	TD-	Inv. Transmit Data In, LVPECL or CML (AC coupled; internally 100 ohms differential termination)
20	VeeT	Transmitter Ground

11. Outline Drawing



12. Recommended Application Circuit



13. EEPROM serial ID memory contents (A0h)

Address (DEC)	Field Size (Byte)	Name of Field	Hex	Description
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	
2	1	Connector	01	SC
3-10	8	Transceiver	00 00 00 80 00 00 00 00	BASE-PX
11	1	Encoding	01	8B10B encoding code

Address (DEC)	Field Size (Byte)	Name of Field	Hex	Description
12	1	BR, Nominal	0C	1.2 Gbps
13	1	Reserved	00	Reserved
14	1	Length (9um)-km	14	20(km)
15	1	Length (9um)	C8	200(100m)
16	1	Length (50um)	00	Not Support
17	1	Length (62.5um)	00	Not Support
18	1	Length (Copper)	00	Not Support
19	1	Reserved	00	Reserved
20-35	16	Vendor name	4D 61 52 53	“MaRS”
36	1	Reserved	00	Reserved
37-39	3	Vendor OUI	00 00 00	OUI
40-55	16	Vendor PN	4D 54 4D 2D 4C 42 34 35 35 31 43 50	“MTM-LB4551CP”
56-59	4	Vendor Rev	31 20 20 20	Revision
60-61	2	Wavelength	05 D2	1490nm Laser Wavelength
62	1	Reserved	00	Reserved
63	1	CC_BASE	xx	Check sum of byte 0-62
64-65	2	Options	00 1A	LOS, TX_FAULT and TX_DISABLE
66	1	BR, max	00	Not Support
67	1	BR, min	00	Not Support
68-83	16	Vendor SN	xx……..xx	ASCII
84-91	8	Date code	xx……xx 20 20	Year, Month, Day
92	1	Diagnostic Monitoring Type	58	Externally Calibrated Received power measurement type-Average Power
93	1	Enhanced Options	E0	Alarm/warning flags implemented Soft TX_DISABLE control and monitoring implemented Soft TX_FAULT monitoring implemented
94	1	SFF-8472 Compliance	02	Diagnostics Compliance(SFF-8472 V9.5)
95	1	CC_EXT	xx	Check sum of byte 64-94
96-255	160	Vendor specific	xx	Vendor specific

14. EEPROM serial ID memory contents (A2h)

Address	Field Size (Byte)	Name of Field	Hex	Description
00~01	2	Temp High Alarm Thresholds	xx	MSB at low address, 95°C
02~03	2	Temp Low Alarm Thresholds	xx	MSB at low address, -10°C
04~05	2	Temp High Warning Thresholds	xx	MSB at low address, 90°C
06~07	2	Temp Low Warning Thresholds	xx	MSB at low address, 0°C
08~09	2	Voltage High Alarm Thresholds	xx	MSB at low address, 3.6V
10~11	2	Voltage Low Alarm Thresholds	xx	MSB at low address, 3.0V
12~13	2	Voltage High Warning Thresholds	xx	MSB at low address, 3.5V
14~15	2	Voltage Low Warning Thresholds	xx	MSB at low address, 3.1V
16~17	2	Bias High Alarm Thresholds	xx	MSB at low address, 90mA
18~19	2	Bias Low Alarm Thresholds	xx	MSB at low address, 1mA
20~21	2	Bias High Warning Thresholds	xx	MSB at low address, 70mA
22~23	2	Bias Low Warning Thresholds	xx	MSB at low address, 2mA
24~25	2	TX Power High Alarm Thresholds	xx	MSB at low address, 8dBm
26~27	2	TX Power Low Alarm Thresholds	xx	MSB at low address, 1dBm
28~29	2	TX Power High Warning Thresholds	xx	MSB at low address, 7dBm
30~31	2	TX Power Low Warning Thresholds	xx	MSB at low address, 2dBm
32~33	2	RX Power High Alarm Thresholds	xx	MSB at low address, -7dBm
34~35	2	RX Power Low Alarm Thresholds	xx	MSB at low address, -31dBm
36~37	2	RX Power High Warning Thresholds	xx	MSB at low address, -8dBm
38~39	2	RX Power Low Warning Thresholds	xx	MSB at low address, -30dBm

Address	Field Size (Byte)	Name of Field	Hex	Description
40~55	16	Reserved	xx	Reserved
56~59	4	Rx_PWR(4)	xx	Single precision floating point calibration data - Rx optical power. Bit7 of byte 56 is MSB. Bit 0 of byte 59 is LSB. For “internally calibrated” devices, Rx_PWR(4) should be set to zero , and useless.
60~63	4	Rx_PWR(3)	xx	Single precision floating point calibration data - Rx optical power. Bit 7 of byte 60 is MSB. Bit 0 of byte 63 is LSB. For “internally calibrated” devices, Rx_PWR(3) should be set to zero , and useless.
64~67	4	Rx_PWR(2)	xx	Single precision floating point calibration data, Rx optical power. Bit 7 of byte 64 is MSB, bit 0 of byte 67 is LSB. For “internally calibrated” devices, Rx_PWR(2) should be set to zero, and useless.
68~71	4	Rx_PWR(1)	xx	Single precision floating point calibration data, Rx optical power. Bit 7 of byte 68 is MSB, bit 0 of byte 71 is LSB. For “internally calibrated” devices, Rx_PWR(1) should be set to 1 , and useless.
72~75	4	Rx_PWR(0)	xx	Single precision floating point calibration data, Rx optical power. Bit 7 of byte 72 is MSB, bit 0 of byte 75 is LSB. For “internally calibrated” devices, Rx_PWR(0) should be set to zero , and useless.
76~77	2	Tx_I(Slope)	xx	Fixed decimal (unsigned) calibration data, laser bias current. Bit 7 of byte 76 is MSB, bit 0 of byte 77 is LSB. For “internally calibrated” devices, Tx_I(Slope) should be set to 1, and useless.
78~79	2	Tx_I(Offset)	xx	Fixed decimal (signed two’s complement) calibration data, laser bias current. Bit 7 of byte 78 is MSB, bit 0 of byte 79 is LSB. For “internally calibrated” devices, Tx_I(Offset)should be set to zero , and useless.
80~81	2	Tx_PWR(Slope)	xx	Fixed decimal (unsigned) calibration data, transmitter coupled output power. Bit 7 of byte 80 is MSB, bit 0 of byte 81 is LSB. For “internally calibrated” devices, Tx_PWR(Slope) should be set to 1 , and useless.
82~83	2	Tx_PWR(Offset)	xx	Fixed decimal (signed two’s complement) calibration data, transmitter coupled output power. Bit 7 of byte 82 is MSB, bit 0 of byte 83 is LSB. For “internally calibrated” devices, Tx_PWR(Offset) should be set to zero , and useless.
84~85	2	T (Slope)	xx	Fixed decimal (unsigned) calibration data, internal module temperature. Bit 7 of byte 84 is MSB, bit 0 of byte 85 is LSB. For “internally calibrated” devices, T(Slope) should be set to 1 , and useless.

Address	Field Size (Byte)	Name of Field	Hex	Description
86~87	2	T (Offset)	xx	Fixed decimal (signed two's complement) calibration data, internal module temperature. Bit 7 of byte 86 is MSB, bit 0 of byte 87 is LSB. For "internally calibrated" devices, T(Offset) should be set to zero, and useless.
88~89	2	V (Slope)	xx	Fixed decimal (unsigned) calibration data, internal module supply voltage. Bit 7 of byte 88 is MSB, bit 0 of byte 89 is LSB. For "internally calibrated" devices, V(Slope)should be set to 1 , and useless.
90~91	2	V (Offset)	xx	Fixed decimal (signed two's complement) calibration data, internal module supply voltage. Bit 7 of byte 90 is MSB. Bit 0 of byte 91 is LSB. For "internally calibrated" devices, V(Offset) should be set to zero, and useless.
92~94	3	Reserved	xx	Reserved
95	1	Checksum	xx	Byte 95 contains the low order 8 bits of the sum of bytes 0 – 94.
96	1	Temperature MSB	xx	Internally measured module temperature.
97	1	Temperature LSB	xx	
98	1	Vcc MSB	xx	Internally measured supply voltage in transceiver.
99	1	Vcc LSB	xx	
100	1	TX Bias MSB	xx	Internally measured TX Bias Current.
101	1	TX Bias LSB	xx	
102	1	TX Power MSB	xx	Measured TX output power.
103	1	TX Power LSB	xx	
104	1	RX Power MSB	xx	Measured RX input power.
105	1	RX Power LSB	xx	
106~109	4	Reserved	xx	Reserved
110	1 Bit	Reserved	x	Reserved
	1 Bit	Soft TX Disable	x	Read/write bit that allows software disable of laser. Writing '1' disables laser.
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	TX Fault	x	Tx Fail Status: 1=TX Fail; 0=TX Normal
	1 Bit	LOS	x	Signal Detect Status. Active High.
	1 Bit	Reserved	x	Reserved
111	1	Reserved	xx	Reserved
112	1 Bit	Temp High Alarm	x	Set when internal temperature exceeds high alarm level.
	1 Bit	Temp Low Alarm	x	Set when internal temperature is below low alarm level.
	1 Bit	Vcc High Alarm	x	Set when internal supply voltage exceeds high alarm

Address	Field Size (Byte)	Name of Field	Hex	Description
				level.
	1 Bit	Vcc Low Alarm	x	Set when internal supply voltage is below low alarm level.
	1 Bit	TX Bias High Alarm	x	Set when TX Bias current exceeds high alarm level.
	1 Bit	TX Bias Low Alarm	x	Set when TX Bias current is below low alarm level.
	1 Bit	TX Power High Alarm	x	Set when TX output power exceeds high alarm level.
	1 Bit	TX Power Low Alarm	x	Set when TX output power is below low alarm level.
113	1 Bit	RX Power High Alarm	x	Set when Received Power exceeds high alarm level.
	1 Bit	RX Power Low Alarm	x	Set when Received Power is below low alarm level.
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
114	1	Reserved	xx	Reserved
115	1	Reserved	xx	Reserved
116	1 Bit	Temp High Warning	x	Set when internal temperature exceeds high warning level.
	1 Bit	Temp Low Warning	x	Set when internal temperature is below low warning level.
	1 Bit	Vcc High Warning	x	Set when internal supply voltage exceeds high warning level.
	1 Bit	Vcc Low Warning	x	Set when internal supply voltage is below low warning level.
	1 Bit	TX Bias High Warning	x	Set when TX Bias current exceeds high warning level.
	1 Bit	TX Bias Low Warning	x	Set when TX Bias current is below low warning level.
	1 Bit	TX Power High Warning	x	Set when TX output power exceeds high warning level.
	1 Bit	TX Power Low Warning	x	Set when TX output power is below low warning level.
117	1 Bit	RX Power High Warning	x	Set when Received Power exceeds high warning level.
	1 Bit	RX Power Low Warning	x	Set when Received Power is below low warning level.
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved

Address	Field Size (Byte)	Name of Field	Hex	Description
	1 Bit	Reserved	x	Reserved
118	1	Reserved	xx	Reserved
119	1	Reserved	xx	Reserved
120-127	8	Vendor Specific	xx	Vendor Specific
128-247	120	User EEPROM	00	User writable EEPROM
248-255	8	Vendor Specific	00	Vendor Specific