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SFP SC Receptacle GPON OLT Class C+ Transceiver

FHM3520DS-43



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General Description

It is based on the ITU-T G.984.2 Class C+ specifications for bidirectional communications over a single fiber and incorporates a high performance 1310nm Burst Mode APD/TIA receiver and 1490nm CW mode DFB transmitter with internal optical isolator.

Features

- * Single fiber bi-directional data links asymmetric TX 2488Mbps/ RX 1244Mbps application
- * 1490nm continuous-mode DFB laser transmitter and 1310nm burst-mode APD-TIA receiver
- * Small Form Factor Pluggable package with SC/UPC Connector
- * 0 to 70°C operating temperature
- * Single 3.3V power supply
- * Digital diagnostic monitoring interface
- * Digital burst RSSI function to monitor the received optical power level
- * LVPECL compatible data input/output interface
- * LVTTTL transmitter disable control
- * LVTTTL transmitter laser fault alarm
- * Fast LVTTTL receiver Signal Detect (SD) indication response
- * Low EMI and excellent ESD protection
- * Class I laser safety standard IEC-60825 compliant
- * RoHS6 Compliance

Applications

- * Gigabit-capable Passive Optical Networks (GPON)

Applications

- * Complies with SFP Multi-Source Agreement (MSA) INF-8074i
- * Complies with ITU-T G.984.2 Amendment 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
- * Complies with SFF-8472
- * Compatible with TR-NWT-000870 4.1 ESD sensitivity classification Class2.
- * Compatible with Telcordia GR-468-CORE

Specification

Absolute Maximum Ratings				
Parameter	Symbol	Min	Max	Unit
Storage Ambient Temperature	T _{STG}	-40	85	° C
Storage Humidity	H _S	5	90	%
Operating Humidity	H _O	5	85	%
Power Supply Voltage	V _{CC}	0	+3.6	V
Recommended Operating Conditions				

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	T_C	0		70	° C
Power Supply Voltage	V_{CC}	3.135	3.3	3.46 5	V
Supply Current	I_{CC}			500	mA
Power Consumption	P_W			1.65	W
Data Rate			TX 2.488 / RX 1.244		Gbps

Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter Differential Input Voltage		600		1600	mV	
Receiver Differential Output Voltage		400		1600	mV	LVPECL, DC Coupled
Transmit Fault Alarm Voltage	V_{OH} V_{OL}	2.4 0		V_{CC} 0.4	V V	LVTTTL LVTTTL
Transmit Disable Voltage	V_{OH} V_{OL}	2 0		V_{CC} 0.8	V V	LVTTTL LVTTTL
Input Differential Impedance		90	100	110	Ω	
Transmit Disable Assert Time	T_{OFF}			100	us	
Signal Detect Voltage	V_{OH} V_{OL}	2.4 0		V_{CC} 0.4	V V	LVTTTL LVTTTL
Reset Signal	V_{IH} V_{IL}	2.0 0		V_{CC} 0.8	V V	LVTTTL LVTTTL

Optical transmitter Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Launched Power (avg.)	P_{OUT}	+3		+7	dBm	
Operating Wavelength Range	λ_C	148 0		1500	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	

Side Mode Suppression Ratio	SMSR	30				
Extinction Ratio	ER	8.2			dB	PRBS 2 ²³ -1 @2.488G bit/s
Transmitter Dispersion Penalty	TDP		1		dB	Transmit on 20km SMF
Optical Output Power after TX Disable	P _{DIS}			-39	dBm	
Output Eye Diagram	Compliant with ITU-T G.984.2					
Transmitter Reflectance Tolerance			-10		dB	
Optical Receiver Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Wavelength Range	λ_c	1260		1360	nm	
Receiver Sensitivity	P _{SEN}			-30	dBm	PRBS 2 ²³ -1+72CID @1.244Gbps, transmitter is operating
Optical Input Power Overload	S _{AT}	-12			dBm	
Dynamic Range		15			dB	Figure 1
Receiver Reflectance				-20	dB	

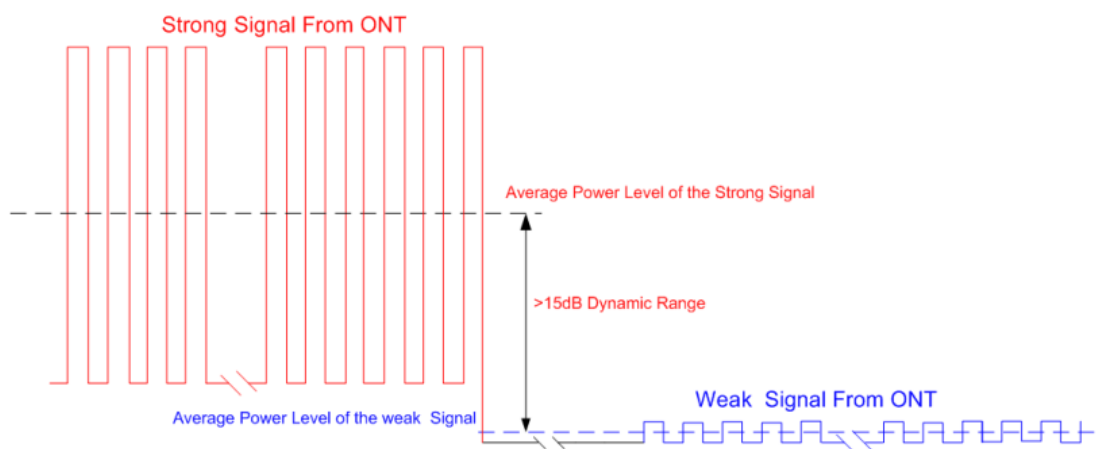


Figure 1 Burst Mode Receiver Dynamic Range in GPON System

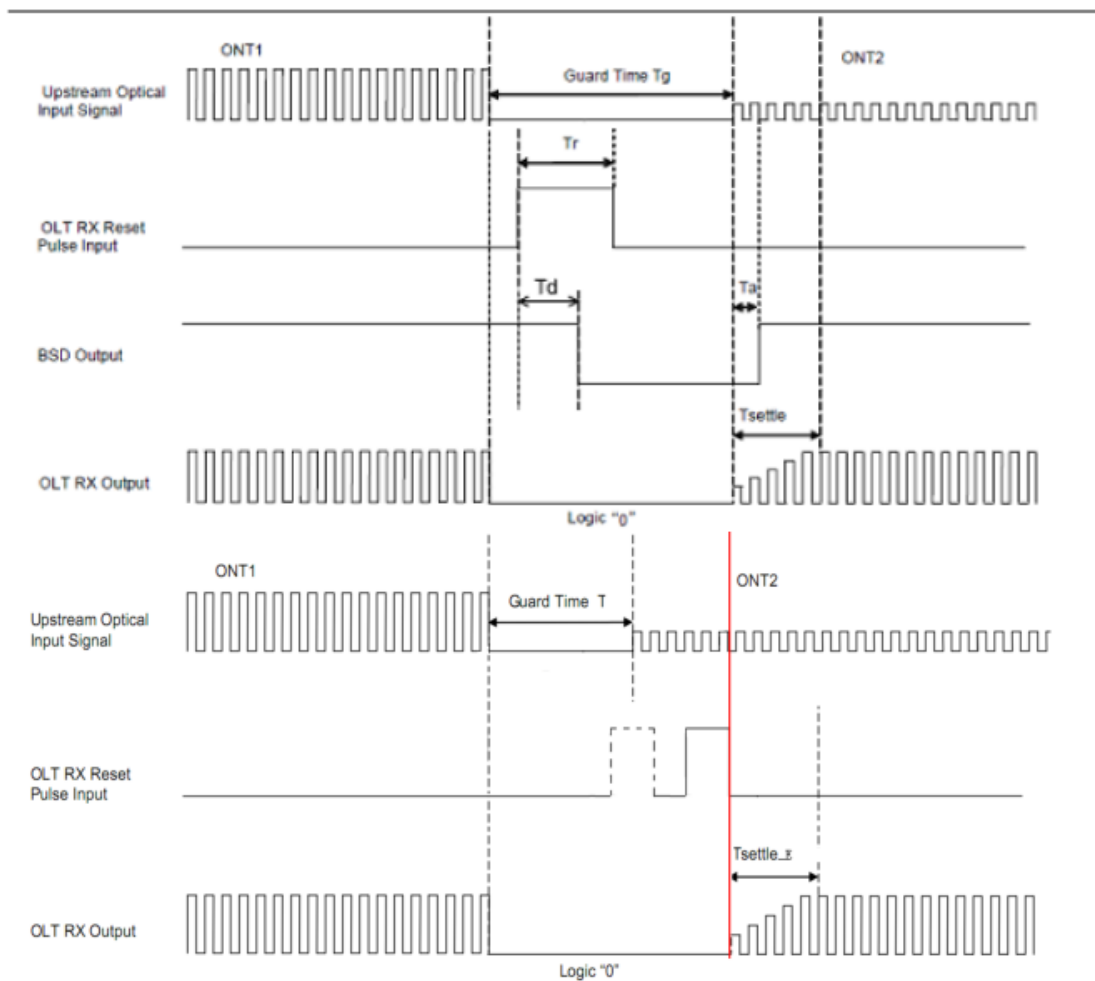


Figure 2 Burst Receiver Timing Sequence

Receiver Timing Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Guard Time	T_G	32			bit	
Reset Pulse Width ⁽¹⁾	T_R		16		bit	
Receiver Amplitude	T_{SETTLE}			24	bit	
Recovery Time ⁽²⁾	T_{SETTLE_E}			16	bit	
Signal Detect Assert Time	T_A			25	ns	
Signal Detect De-assert Time	T_D			10	ns	

(1) Reset Pulse support 2 modes in Figure2.

(2) SD signal pulls down immediately after Reset signal, and pulls up while detected RX burst signal till

the next Reset signal.

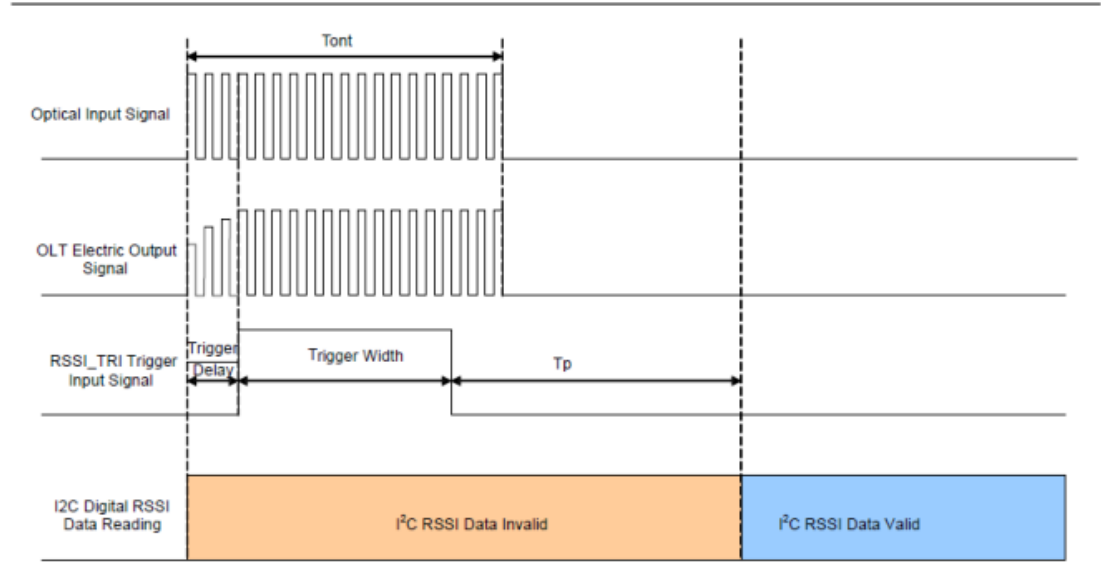


Figure 3 RSSI Timing Sequence

RSSI Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		Vcc	V	
RSSI Trigger Delay	T _D	300		3000	ns	
Optical Signal During Time	T _{ONT}	800			ns	
RSSI Trigger width	T _w		500	T _{ONT} - T _D	ns	
I2C Access Prohibited Time	T _p			500	μs	

Digital Diagnostic Monitoring Information

Parameter	Accuracy	Calibration	Note
Temperature	±3°C	Internal	
Voltage	±3%	Internal	
Bias Current	±10%	Internal	
TX Power	±3dB	Internal	
RX Power	±3dB	Internal	-32 to -10dBm

Note: The digital diagnostic monitoring interface defines 256-byte memory map in

EEPROM, which makes use of the 8 bit address 1010001X(A2h). Please refer to the SFF-8472 for the detail information.

Pin definition

Pin No	Symbol	Name/Description	Power Seq.	Note
1	V _{EE} T	Transmitter Ground	1st	
2	TX Fault	Transmitter Fault Indication	3rd	High: abnormal; Low: normal
3	TX Disable	Transmitter Disable	3rd	High: transmitter disable; Low: transmitter enable. Internally 4.7k-10k Ω pull-up.
4	MOD-DEF2	Module Definition 2	3rd	The data line of two wire serial interface
5	MOD-DEF1	Module Definition 1	3rd	The clock line of two wire serial interface
6	MOD-DEF0	Module Definition 0	3rd	Connected to Ground in the transceiver
7	Reset	Receiver Reset	3rd	High: reset the receiver
8	SD	Signal Detect	3rd	High: signal detected; Low: loss of signal;
9	RSSI Trigger	RSSI Trigger for Transceiver A/D Conversion	3rd	High: enable RSSI A/D conversion
10	V _{EE} R	Receiver Ground	1st	
11	V _{EE} R	Receiver Ground	1st	
12	RD-	Inv. Receiver Data Out	3rd	LVPECL logic output, DC coupled
13	RD+	Receiver Data Out	3rd	LVPECL logic output, DC coupled
14	V _{EE} R	Received Ground	1st	
15	V _{CC} R	Receiver Power	2nd	
16	V _{CC} T	Transmitter Power	2nd	
17	V _{EE} T	Transmitter Ground	1st	
18	TD+	Transmit Data In	3rd	LVPECL logic input, AC

19	TD-	Inv. Transmit Data In	3rd	coupled
20	V _{EE} T	Transmitter Ground	1st	LVPECL logic input, AC coupled

Typical application Circuit

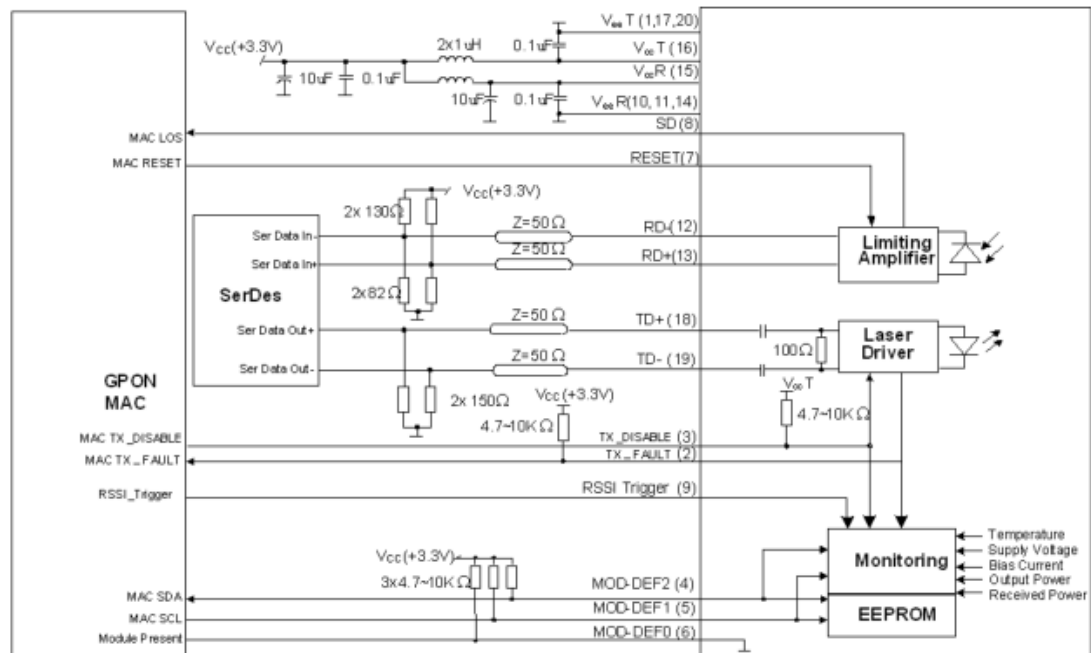


Figure 4 Typical Interface Circuit

EEPROM Memory Map

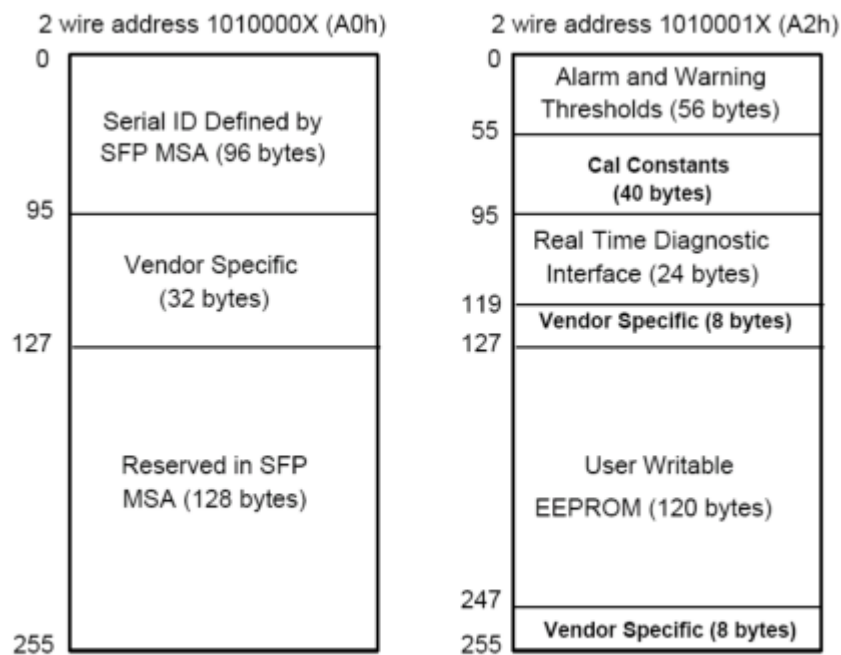


Figure 5 EEPROM Memory Map Specific Data Field Descriptions

Package Outline

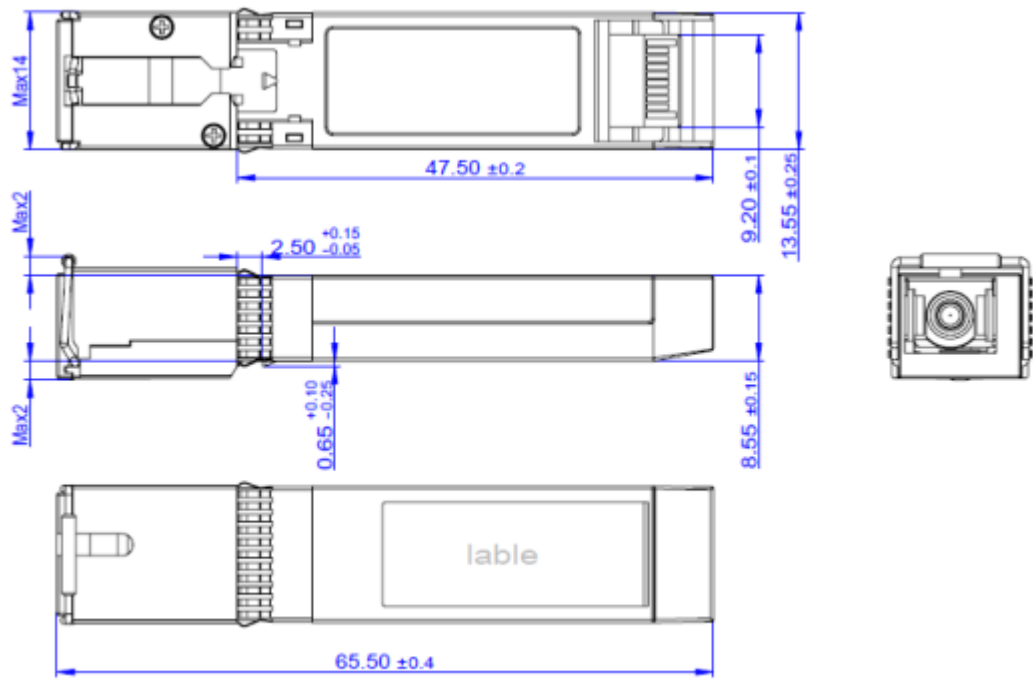


Figure 6 Package Outline

Ordering information

Specifications										
PART NO.			Rate	Tx	Po	Rx	Sen	Temp	Reach	DDM
	Package	Type	(Gbps)	(nm)	(dBm)	(nm)	(dBm)	(°C)	(km)	
FHM3520DS-43	SFP	GPON	2.488							
		OLT	TX/							
		Class	1.244	1490	3~7	1310	<-30	0~70	20	Y
		C+	RX							

SHENZHEN FH-NET OPTOELECTRONICS CO., LTD.
Tel: +86-755- 86051202 Fax: +86-755- 86051253 E-mail : sales@phyhome.com
Web : www.phyhome.com
Address : Building D1, TCL International E City, No.1001,Zhongshanyuan Rd, Nanshan District, Shenzhen City, China 518052