
MPB2510-D0I-CxxT

Features

- ◆ Support 24.3Gbps to 25.78Gbps
- ◆ Uncooled CWDM DFB Laser and PIN photo detector
- ◆ Duplex LC receptacle optical interface compliant
- ◆ 3.3V power supplies required
- ◆ Hot-pluggable
- ◆ AC coupling of CML signals
- ◆ Class1 laser safety compliance
- ◆ Operating temperature range:
Industrial: -40°C~85°C
- ◆ RoHS compliant
- ◆ DDMI function available with internally calibrated mode

Applications

- ◆ 25G Ethernet
- ◆ eCPRI

Standards

- ◆ Compliant with IEEE802.3cc
- ◆ Compliant with INF-8432
- ◆ Compliant with SFF-8472

Specification

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Unit	
Storage Temperature Range	Ts	-40	85	°C	
Relative Humidity(without dew)	RH	5	95	%	
Power Supply Voltage	Vcc	-0.3	4	V	
Recommended Operating Conditions					
Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature (Industrial)		-40		85	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Supply Current ¹	Icc		330	420	mA
Data Rate		-	25.78	-	Gbps
Fiber Length 9/125μm core SMF		-	10	-	km

*Note:

1. The supply current is SFP28 module's working current.

Electrical Characteristics						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter Differential Input Voltage		200		900	mV	
Receiver Differential Output Voltage		300		1000	mV	
Transmit Fault Alarm Voltage	V _{OH}	2.4		V _{cc} +0.3	V	LVTTL
	V _{OL}	-0.3		0.4	V	LVTTL
Transmit Disable Voltage	V _{IH}	2		V _{cc} +0.3	V	LVTTL
	V _{IL}	-0.3		0.8	V	LVTTL
Loss of Signal (LOS)	V _{OH}	2.4		V _{cc} +0.3	V	LVTTL
	V _{OL}	-0.3		0.4	V	LVTTL

Optical transmitter Characteristics							
Parameter	Symbol	Min	Typical	Max	Unit	Notes	
Launched Power (avg.)	P _{OUT}	-7		2	dBm		
Operating Wavelength Range	λ_c	1264.5	1271	1277.5	nm	MPB2510-D0I-C27T	
		1284.5	1291	1297.5		MPB2510-D0I-C29T	
		1304.5	1311	1317.5		MPB2510-D0I-C31T	
		1324.5	1331	1337.5		MPB2510-D0I-C33T	
		1344.5	1351	1357.5		MPB2510-D0I-C35T	
		1364.5	1371	1377.5		MPB2510-D0I-C37T	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm		
Side Mode Suppression Ratio	SMSR	30					
Extinction Ratio	ER	3			dB	1	
Optical Output Power after TX Disable	P _{DIS}			-30	dBm		
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}		{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}					2
Optical Receiver Characteristics							
Parameter	Symbol	Min	Typical	Max	Unit	Notes	
Wavelength Range	λ_c	1260		1620	nm		
Receiver Sensitivity	P _{SEN}			-12	dBm	3	
Average receive power		-13.3		2	dBm		
Optical Power Input Overload	P _{IN}	2			dBm		
LOS	Optical Deassert	P _{SDD}		-14	dBm		
	Optical Assert	P _{SDA}	-30		dBm		
LOS hysteresis		0.5			dB	4	

*Note:

1. For the measurements, the device was driven with 2³¹-1 PRBS pattern.
2. Hit ratio 5×10⁻⁵ hits per sample.
3. Measured with a PRBS 2³¹-1 test pattern, @25.78Gbps, ER=4.5dB, BER≤5×10⁻⁵.

Digital Diagnostic Monitoring Information

Parameter	Accuracy	Calibration	Note
Temperature	±3°C	Internal	-40 to 85°C
Voltage	±3%	Internal	3.1 to 3.5V
Bias Current	±10%	Internal	Specified by normal value
TX Power	±3dB	Internal	-7 to 2dBm
RX Power	±3dB	Internal	-12 to 2dBm

Pin definition

The SFP28 modules are hot-pluggable. Hot pluggable refers to plugging in or unplugging a module while the host board is powered. The SFP28 host connector is a 0.8 mm pitch 20 position right angle improved connector specified by SFF-8431, or stacked connector with equivalent electrical performance. Host PCB contact assignment is shown in Figure 1 and contact definitions are given in Table following. SFP28 module contacts mates with the host in the order of ground, power, followed by signal as illustrated by Figure 2 and the contact sequence order listed in the table.

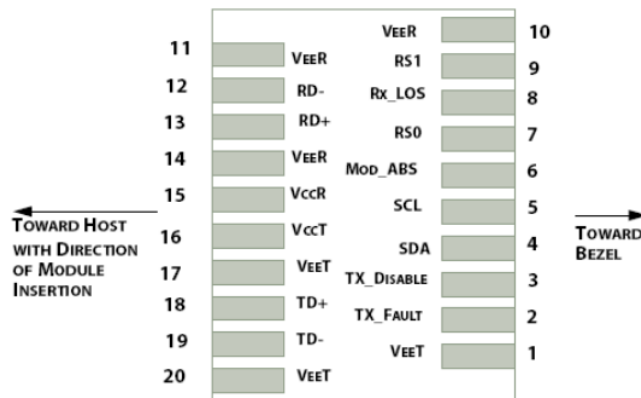


Figure 1 SFP28 Pad Assignment Top View

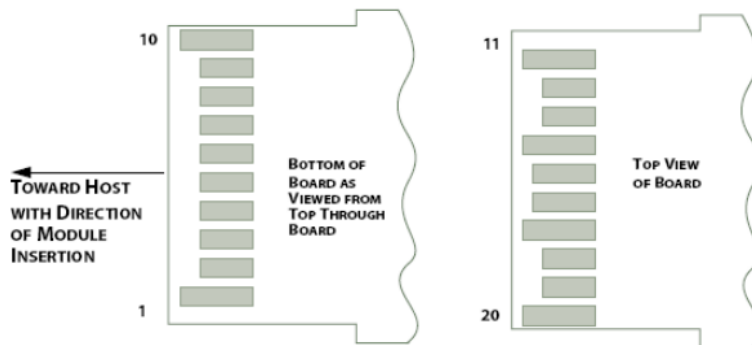


Figure 2 SFP28 Module Contact Assignments

Pin	Symbol	Name/Description	Power Seq.	Note
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1st	1
2	TX_Fault	Transmitter Fault, Low: normal; High: abnormal	3rd	2
3	TX_Disable	Transmitter Disable High: Transmitter off Low: Transmitter on	3rd	3
4	SDA	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i)	3rd	4
5	SCL	2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i)	3rd	4
6	Mod_ABS	Module Absent, Connect to VeeT or VeeR in Module	3rd	5
7	RS0	NA	3rd	6
8	RX_LOS	Receiver Loss of Signal indication High: loss of signal Low: signal detected	3rd	7
9	RS1	NA	3rd	8
10	VeeR	Receiver Ground	1st	1
11	VeeR	Receiver Ground	1st	1
12	RD-	Receiver Inverted DATA out. AC Coupled. CML-O	3rd	9
13	RD+	Receiver Non-inverted DATA out. AC Coupled. CML-O	3rd	9
14	VeeR	Receiver Ground	1st	1
15	VccR	Receiver Power Supply	2nd	10
16	VccT	Transmitter Power Supply	2nd	10
17	VeeT	Transmitter Ground	1st	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled. CML-I	3rd	11
19	TD-	Transmitter Inverted DATA in. AC Coupled. CML-I	3rd	11
20	SDA	Transmitter Ground	1st	1

SFP28 Module PIN Definition

Power Seq.: Pin engagement sequence during hot plugging.

Note1. The module signal ground contacts.

Note2. This pin is an open drain/collector and should be pulled up to Vcc-host in the host with a 4.7k~10k Ohm resistor.

Note3. This pin is pulled up to VccT with a 4.7k~10k Ohm resistor in modules.

Note4. SDA&SCL (IIC) are needed pull up 4.7k~10k Ohm resistors on host board.

Note5. Mod_ABS is connected to VeeT or VeeR in the SFP28 module.

Note6. Unused.

Note7. Module RX_Los of signal indication need pull up 4.7k~10k Ohm resistor on host board.

Note8. Unused.

Note9. RD-/+: These are the differential receiver outputs. They are CML AC-coupled with 100 Ohm terminal resistor matching internal.

Note10. VccR and VccT are the receiver and transmitter power supplies.

Note11. TD-/+: These are the differential transmitter inputs. They are CML AC-coupled with 100 Ohm terminal resistor matching internal.

Typical application Circuit

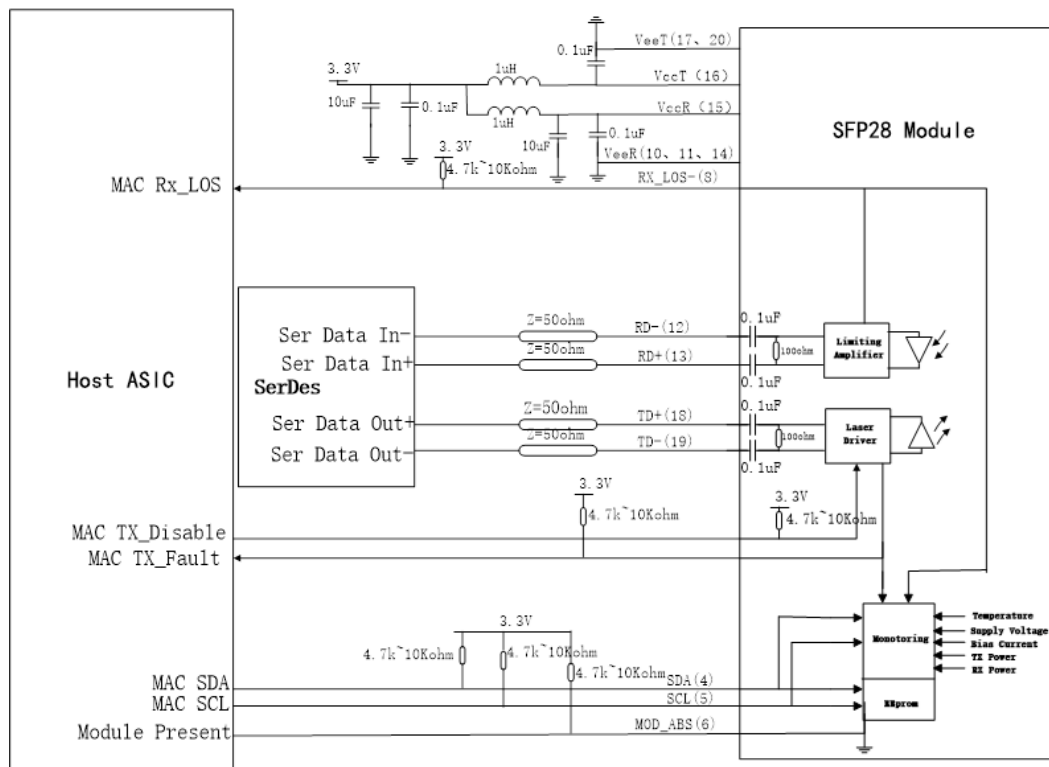


Figure 3 Typical Interface Circuit

EEPROM Serial ID Memory Contents

The optical transceiver contains an EEPROM. It provides access to sophisticated identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information. When the serial protocol is activated, the host generates the serial clock signal (SCL, Mod Def 1). The positive edge clocks data into those segments of the EEPROM that are not writing protected within

the SFP28 transceiver. The negative edge clocks data from the SFP28 transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. The diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56–95 at wire serial bus address A2h. The digital diagnostic memory map specific data fields define as following.

EEPROM Memory Map

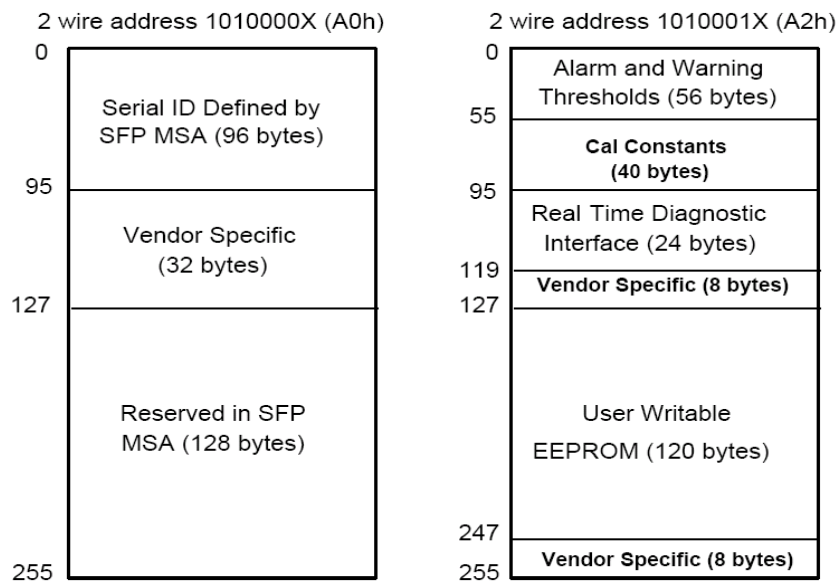


Figure 4 EEPROM Memory Map Specific Data Field Descriptions

EEPROM Serial ID Memory Contents (2-Wire Address A0h)

Address	Name of field	Hex	Description
BASE ID Fields			
00	Identifier	03	SFP/SFP+/SFP28 transceiver
01	Ext. Identifier	04	Serial ID module supported

02	Connector	07	LC (Lucent Connector)
03-05	Transceiver Codes	00 00 00	Not defined
06	Transceiver Codes	00	Not defined
07-10	Transceiver Codes	00 00 00	Not defined
11	Encoding	03	NRZ
12	BR, Nominal	FF	25.0Gb/s
13	Rate Identifier	00	Not defined
14	Length(9um)-km	0A	10(km)
15	Length(9um)-m	64	10000(m)
16	Length(50um)	00	Transceiver transmit distance
17	Length(62.5um)	00	
18	Length(cable)	00	Not support cable
19	Length(OM3)	00	Not support OM3
20-35	Vendor Name	4D 45 4E 54 45 43 48 4F 50 54 4F	"MENTECHOPTO"(ASCII character)
36	Reserved	00	Not defined
37-39	Vendor OUI	00 00 00	Not defined
40-55	Vendor P/N	xx xx xx xx	"MPB2510-D0I-CxxT"(ASCII character)
56-59	Vendor P/N Rev.	31 2E 30 20	"1.0"(ASCII character)
60-61	Laser Wavelength	04 F7/ 05 0B / 05 1F/ 05 33 / 05 47 / 05 5B	1271 / 1291 / 1311/ 1331/ 1351 / 1371nm
62	Reserved	00	Not defined
63	CC_BASE	xx	Check sum of bytes 0-62
Extended ID Fields			
64-65	Options	00 1A	TX_Disable, TX_Fault and RX_LOS are implemented
66	BR, max	00	Upper bit rate margin, 0%
67	BR, min	00	Lower bit rate margin, 0%
68-83	Vendor SN	xx.....xx	Vendor Serial Number in ASCII character
84-91	Date Code	Data Code	Vendor Date Code in ASCII character
92	Diagnostic Monitoring Type	68	Internally calibrated, RX DDM represents average input optical power
93	Enhanced options	F0	Optional Alarm/warning flags, soft Tx_Disable control and monitoring, soft Tx_Fault and soft RX_LOS monitoring are implemented
94	SFF-8472 compliant	08	SFF-8472 compliant with revision 12.0
95	CC-EXT	xx	Check sum of bytes 64-94
Vendor Specific ID Field			

96-127	Vendor Specific	00	Vendor specific EEPROM
128-255	Reserved	00	Reserved for future use

Digital Diagnostic Monitoring Interface: Alarm and Warning Thresholds

(2-Wire Address A2h)

Address	#Bytes	Name	Real Value	Unit	Hex
			Industrial		
00-01	2	Temp High Alarm	100	°C	
02-03	2	Temp Low Alarm	-50	°C	
04-05	2	Temp High Warning	85	°C	
06-07	2	Temp Low Warning	-40	°C	
08-09	2	Voltage High Alarm	3.7	V	
10-11	2	Voltage Low Alarm	3	V	
12-13	2	Voltage High Warning	3.5	V	
14-15	2	Voltage Low Warning	3.1	V	
16-17	2	Bias High Alarm	100	mA	
18-19	2	Bias Low Alarm	5	mA	
20-21	2	Bias High Warning	80	mA	
22-23	2	Bias Low Warning	10	mA	
24-25	2	TX Power High Alarm	4	dBm	
26-27	2	TX Power Low Alarm	-9	dBm	
28-29	2	TX Power High Warning	2	dBm	
30-31	2	TX Power Low Warning	-7	dBm	
32-33	2	RX Power High Alarm	4	dBm	
34-35	2	RX Power Low Alarm	-14	dBm	
36-37	2	RX Power High Warning	2	dBm	
38-39	2	RX Power Low Warning	-12	dBm	
40-55	16	Reserved	Reserved		

Package Outline

Dimensions are in millimeters. (Unit: mm)

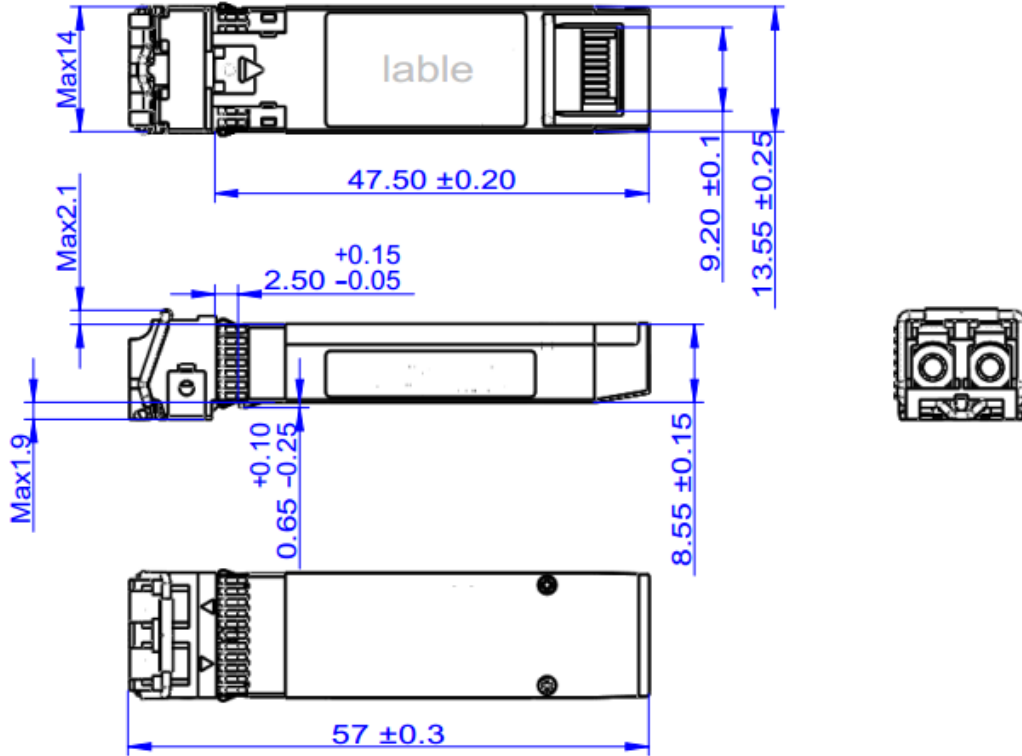


Figure 5 Package Outline

Regulatory Compliance

Feature	Test	Method
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000V for other pins.)
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B FCC Class B CENELEC EN55022 VCCI Class 1	Comply with standard
Immunity	IEC61000-4-3	Comply with standard

Ordering information

Part. No	Specifications								
	Form Factor	Data Rate (Gbps)	λ (nm)	Po (dBm)	RX	Sen* (dBm)	Temp (°C)	Reach (km)	DDM
MPB2510-D0I-C27T	SFP28	25.78	1271	-7~2	PIN	<-12	-40~+85	10	DDM; RoHS
MPB2510-D0I-C29T	SFP28	25.78	1291	-7~2	PIN	<-12	-40~+85	10	DDM; RoHS
MPB2510-D0I-C31T	SFP28	25.78	1311	-7~2	PIN	<-12	-40~+85	10	DDM; RoHS
MPB2510-D0I-C33T	SFP28	25.78	1331	-7~2	PIN	<-12	-40~+85	10	DDM; RoHS
MPB2510-D0I-C35T	SFP28	25.78	1351	-7~2	PIN	<-12	-40~+85	10	DDM; RoHS
MPB2510-D0I-C37T	SFP28	25.78	1371	-7~2	PIN	<-12	-40~+85	10	DDM; RoHS