



## 100M~2.5Gb/s DWDM SFP Transceiver

### APSDxxLM3CDLB2

#### ■ Product Features

- ✓ Up to 2.5Gb/s data links
- ✓ Duplex LC connector
- ✓ Hot-pluggable SFP footprint
- ✓ Uncooled DFB laser transmitter
- ✓ RoHS compliant and Lead Free
- ✓ Up to 120Km on 9/125um SMF
- ✓ 100GHz channel spacing
- ✓ Metal enclosure for lower EMI
- ✓ Single +3.3V power supply
- ✓ Power dissipation <1.8W
- ✓ SFP MSA SFF-8074i Compliant

#### ■ Applications

- ✓ Gigabit Ethernet
- ✓ 1x Fibre Channel

#### ■ General

ATOP's APSDxxLM3CDLB2 Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). It is designed for DWDM SONET/ SDH, Gigabit Ethernet and Fiber-Channel applications.

#### ■ Product Channel Selection

Product Code	ITU channel	Frequency	Center Wavelength(nm)
APSD61LM3CDLB2	61	196.1	1528.77
APSD60LM3CDLB2	60	196.0	1529.55
APSD59LM3CDLB2	59	195.9	1530.33
APSD58LM3CDLB2	58	195.8	1531.12
APSD57LM3CDLB2	57	195.7	1531.90
APSD56LM3CDLB2	56	195.6	1532.68
APSD55LM3CDLB2	55	195.5	1533.47
APSD54LM3CDLB2	54	195.4	1534.25



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APSD53LM3CDLB2	53	195.3	1535.04
APSD52LM3CDLB2	52	195.2	1535.82
APSD51LM3CDLB2	51	195.1	1536.61
APSD50LM3CDLB2	50	195.0	1537.40
APSD49LM3CDLB2	49	194.9	1538.19
APSD48LM3CDLB2	48	194.8	1538.98
APSD47LM3CDLB2	47	194.7	1539.77
APSD46LM3CDLB2	46	194.6	1540.56
APSD45LM3CDLB2	45	194.5	1541.35
APSD44LM3CDLB2	44	194.4	1542.14
APSD43LM3CDLB2	43	194.3	1542.94
APSD42LM3CDLB2	42	194.2	1543.73
APSD41LM3CDLB2	41	194.1	1544.53
APSD40LM3CDLB2	40	194.0	1545.32
APSD39LM3CDLB2	39	193.9	1546.12
APSD38LM3CDLB2	38	193.8	1546.92
APSD37LM3CDLB2	37	193.7	1547.72
APSD36LM3CDLB2	36	193.6	1548.51
APSD35LM3CDLB2	35	193.5	1549.32
APSD34LM3CDLB2	34	193.4	1550.12
APSD33LM3CDLB2	33	193.3	1550.92
APSD32LM3CDLB2	32	193.2	1551.72
APSD31LM3CDLB2	31	193.1	1552.52
APSD30LM3CDLB2	30	193.0	1553.33
APSD29LM3CDLB2	29	192.9	1554.13
APSD28LM3CDLB2	28	192.8	1554.94
APSD27LM3CDLB2	27	192.7	1555.75
APSD26LM3CDLB2	26	192.6	1556.55
APSD25LM3CDLB2	25	192.5	1557.36



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APSD24LM3CDLB2	24	192.4	1558.17
APSD23LM3CDLB2	23	192.3	1558.98
APSD22LM3CDLB2	22	192.2	1559.79
APSD21LM3CDLB2	21	192.1	1560.61
APSD20LM3CDLB2	20	192.0	1561.42
APSD19LM3CDLB2	19	191.9	1562.23
APSD18LM3CDLB2	18	191.8	1563.05
APSD17LM3CDLB2	17	191.7	1563.86

## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Duplex LC Receptacle: compatible with IEC 61000-4-2
- Immunity compatible with IEC 61000-4-3
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2
- RoHS compliant with RoHS 2 (2011/65/EU)

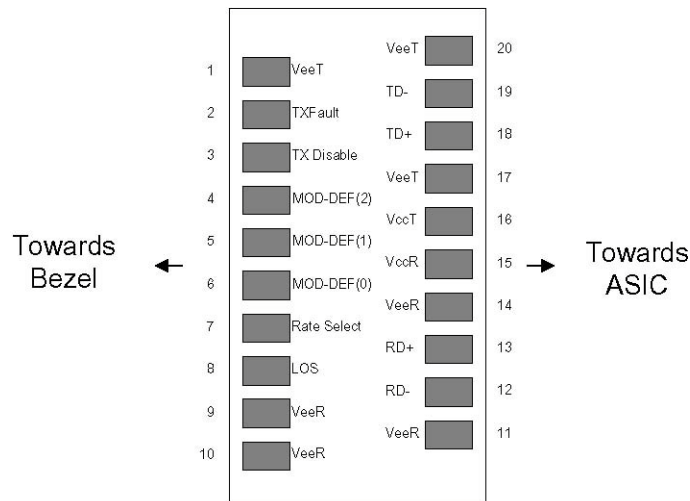
## Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	VeeT	Transmitter Ground (Common with Receiver Ground)	1
2	TX Fault	Transmitter Fault.	
3	TX Disable	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	4
9	VeeR	Receiver Ground (Common with Transmitter Ground)	1
10	VeeR	Receiver Ground (Common with Transmitter Ground)	1
11	VeeR	Receiver Ground (Common with Transmitter Ground)	1

12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VeeR	Receiver Ground (Common with Transmitter Ground)	1
15	VccR	Receiver Power Supply	
16	VccT	Transmitter Power Supply	
17	VeeT	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VeeT	Transmitter Ground (Common with Receiver Ground)	1

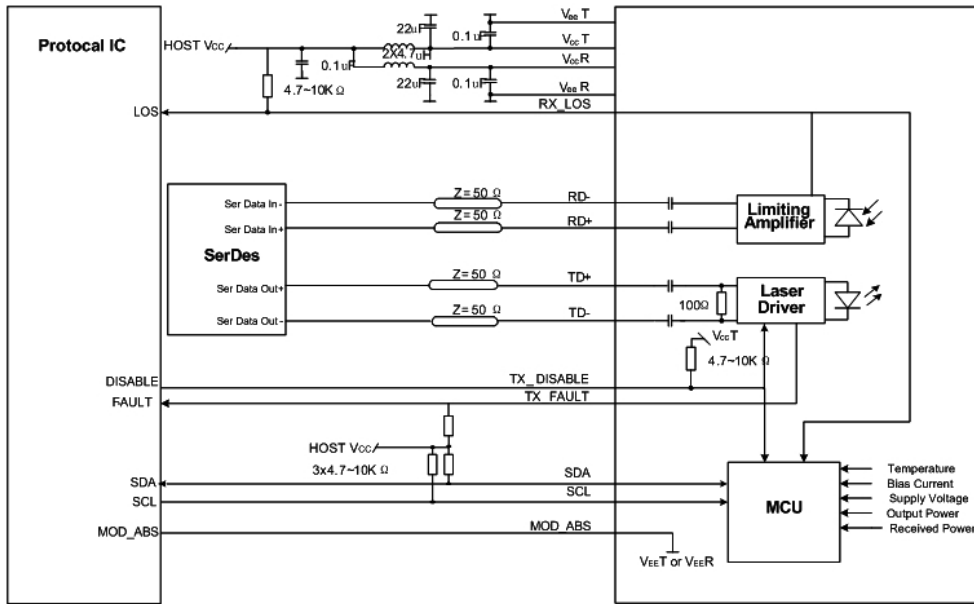
**Notes:**

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TX Disable >2.0V or open, enabled on TX Disable <0.8V.
3. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V.  
 MOD\_DEF (0) pulls line low to indicate module is plugged in.
4. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.



**Pin-out of Connector Block on Host Board**

■ **Recommend Circuit Schematic**



## ■ Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		+4.0	V	
Storage Temperature	TS	-40		+85	°C	
Operating Humidity	RH	0		85	%	

## ■ Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc	3.13	3.30	3.47	V	
Power Supply Current	Icc			500	mA	
Case Operating Temperature	Tc	0		+70	°C	1
	Tl	-40		+85		2
Data Rate(Gigabit Ethernet)			1.25		Gbps	
Data Rate(Fibre Channel)			1.063		Gbps	
9/125um G.652 SMF	Lmax			120	km	

### Notes:

1. For commercial class product.



2. For industrial class product.

■ **Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)**

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
<b>Transmitter</b>						
Input differential impedance	Rin		100		Ω	1
Single ended data input swing	Vin, pp	250		1200	mV	
TX Disable-High		Vcc – 1.3		Vcc	V	
TX Disable-Low		Vee		Vee+ 0.8	V	
TX Fault-High		Vcc-0.5		Vcc	V	
TX Fault-Low		Vee		Vee+0.5	V	
<b>Receiver</b>						
Single ended data output swing	Vout, pp	300	400	800	mV	2
Data output rise time	tr			175	ps	3
Data output fall time	tf			175	ps	3
LOS-High		Vcc – 0.5		Vcc	V	
LOS-Low		Vee		Vee+0.5	V	

**Notes:**

1. AC coupled.
2. Into 100 ohm differential termination.
3. 20 – 80 %

■ **Optical Characteristics (TOP=25°C, Vcc=3.3 Volts)**

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
<b>Transmitter</b>						
Output Opt. Power	PO	0		+4	dBm	1
Optical Wavelength	λ	As per ITU-T 694.1			nm	
Spectral Width(-20dB)	Δ λ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Total Jitter	TJ			0.35	UI	
Optical Extinction Ratio	ER	9			dB	
Center Wavelength	λc EOL	z-100	z	Z+100	pm	

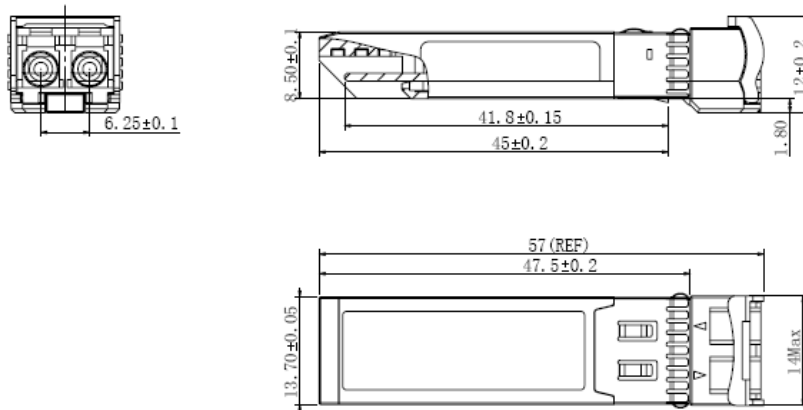
Receiver						
RX Sensitivity @2.488Gb/s	SENS			-30	dBm	2,3
Receiver Overload		-9			dBm	
Optical Center Wavelength	$\lambda_C$	1270		1600	nm	
LOS De-Assert	LOSD			-32	dBm	
LOS Assert	LOSA	-45			dBm	
LOS Hysteresis		0.5		5	dB	

**Notes:**

1. Class 1 Laser Safety.
2. Measured with conformance signals defined in FC-PI-2 Rev. 10.0 specifications.
3. Measured with PRBS  $2^7-1$  at  $10^{-12}$  BER.

**Mechanical Specifications**

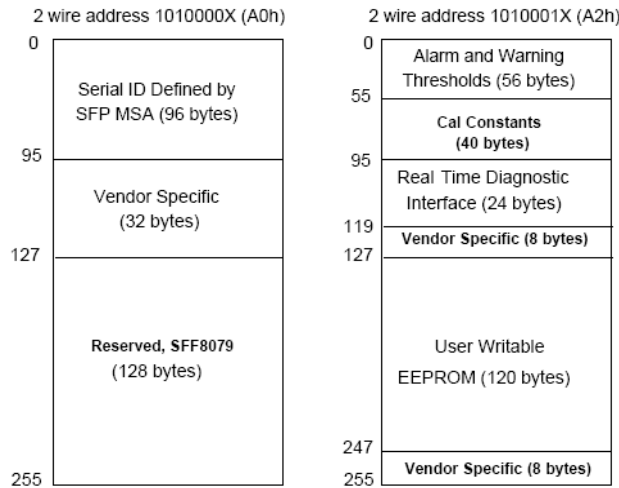
ATOP's Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA), dimensions are in mm.



**APSDxxLM3CDLB2**

**EEPROM Information**

EEPROM memory map specific data field description is as below:



### ■ Digital Diagnostic Monitoring Interface

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

Parameter	Range	Accuracy	Calibration
Temperature	0 to +70°C (C)	±3°C	Internal
	-40 to +85°C (I)		
Voltage	2.97 to 3.63V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
TX Power	0 to +4dBm	±3dB	Internal
RX Power	-30 to -9dBm	±3dB	Internal

### ■ Revision History

Revision	Initiated	Reviewed	Approved	DCN	Release Date
Version1.0	yangpeiyun	sunbin	dinqzheng	New Released.	Mar 28, 2013

### ■ For More Information

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