LS-DWxx1G-80C

1.25Gbps SFP DWDM Transceiver, Single Mode, 80km Reach

Product Features

- Supports up to 1.25Gbps bit rates
- Hot-pluggable SFP footprint
- 100GHz ITU channel spacing with integrated wavelength locker, Up to 80km for SMF transmission
- Compliant with SFP MSA and SFF-8472 with duplex LC receptacle
- Compatible with RoHS
- Single +3.3V power supply
- DWDM EML laser transmitter and PIN photo-detector
- Real Time Digital Diagnostic Monitoring
- Operating case temperature:

  Standard: 0 to +70°C

  Industrial: -40 to +85°C

Applications

- 1.25Gbps DWDM & SONET networks
- Bandwidth aggregation
- Other Optical links



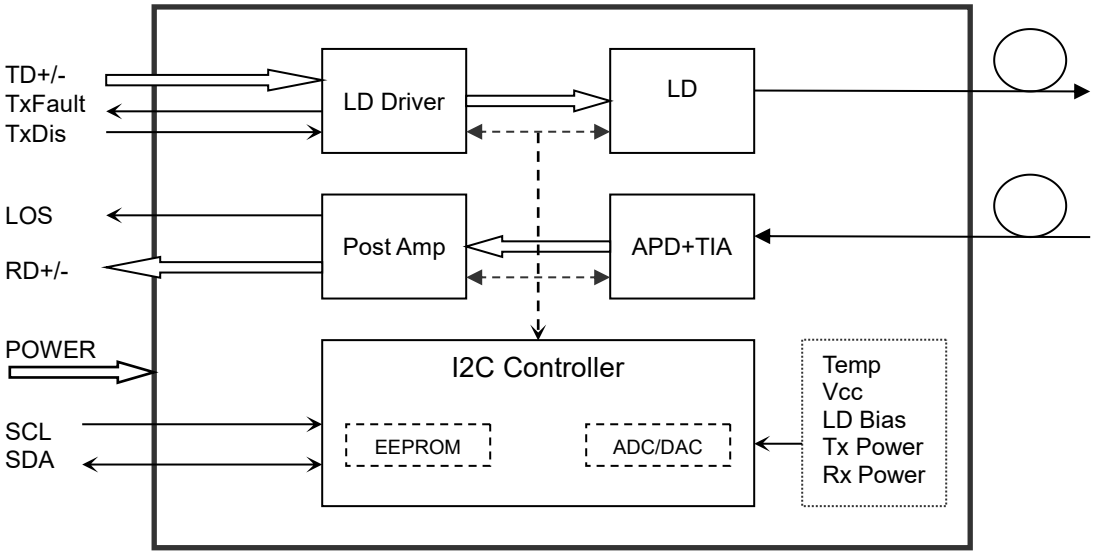
Description

The transceivers include and PIN photo-detector diode and temperature stabilized DWDM EML transmitter. Digital diagnostic functions are available via an I2C.This module is designed for single mode fiber and operates at a nominal wavelength of 100GHz ITU Grid, C Band DWDM wavelength. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

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Module Block Diagram



Transceiver functional diagram

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Tc	0		+70	°C
Power Supply Voltage	Vcc	3.135	3.30	3.465	V
Power Supply Current	Icc			450	mA
Data Rate			1.25		Gbps

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Optical and Electrical Characteristics

Parameter		Symbol	Min	Typical	Max	Unit	Notes
Transmitter							
Centre Wavelength		λc	1528.77		1563.86	nm	
Spectral Width（-20dB）		Δλ			1	nm	
Side-Mode Suppression Ratio		SMSR	30	-		dB	
Average Output Power		Pout	0		+4.0	dBm	1
Extinction Ratio		ER	9			dB	
Data Input Swing Differential		VIN	180		850	mV	2
Input Differential Impedance		ZIN	90	100	110	Ω	
TX Disable	Disable		2.0		Vcc	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	
Receiver							
Centre Wavelength		λc	1270		1610	nm	
Receiver Sensitivity					-26	dBm	3
LOS De-Assert		LOSD			-27	dBm	4
LOS Assert		LOSA	-36			dBm	4
Input Saturation Power (overload)		Psat	-3			dBm	
LOS Hysteresis			0.5	2	6	dB	

Notes:

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2^{31}-1 test pattern @2500Mbps, BER ≤1×10^{-12}.
4. When LOS de-asserted, the RX data+/- output is High-level (fixed).

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Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on			1	ms
Tx Disable Assert Time	t_off			100	µs
Time To Initialize, including Reset of Tx Fault	t_init			300	ms
Tx Fault Assert Time	t_fault			100	µs
Tx Disable To Reset	t_reset	10			µs
LOS Assert Time	t_loss_on			100	µs
LOS De-assert Time	t_loss_off			100	µs
Serial ID Clock Rate	f_serial_clock		100	400	KHz
MOD_DEF (0:2)-High	V_H	2		Vcc	V
MOD_DEF (0:2)-Low	V_L			0.8	V

Diagnostics

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal
Voltage	3.0 to 3.6	V	±3%	Internal
Bias Current	0 to 100	mA	±10%	Internal
TX Power	0 to +4	dBm	±3dB	Internal
RX Power	-32 to -6	dBm	±3dB	Internal

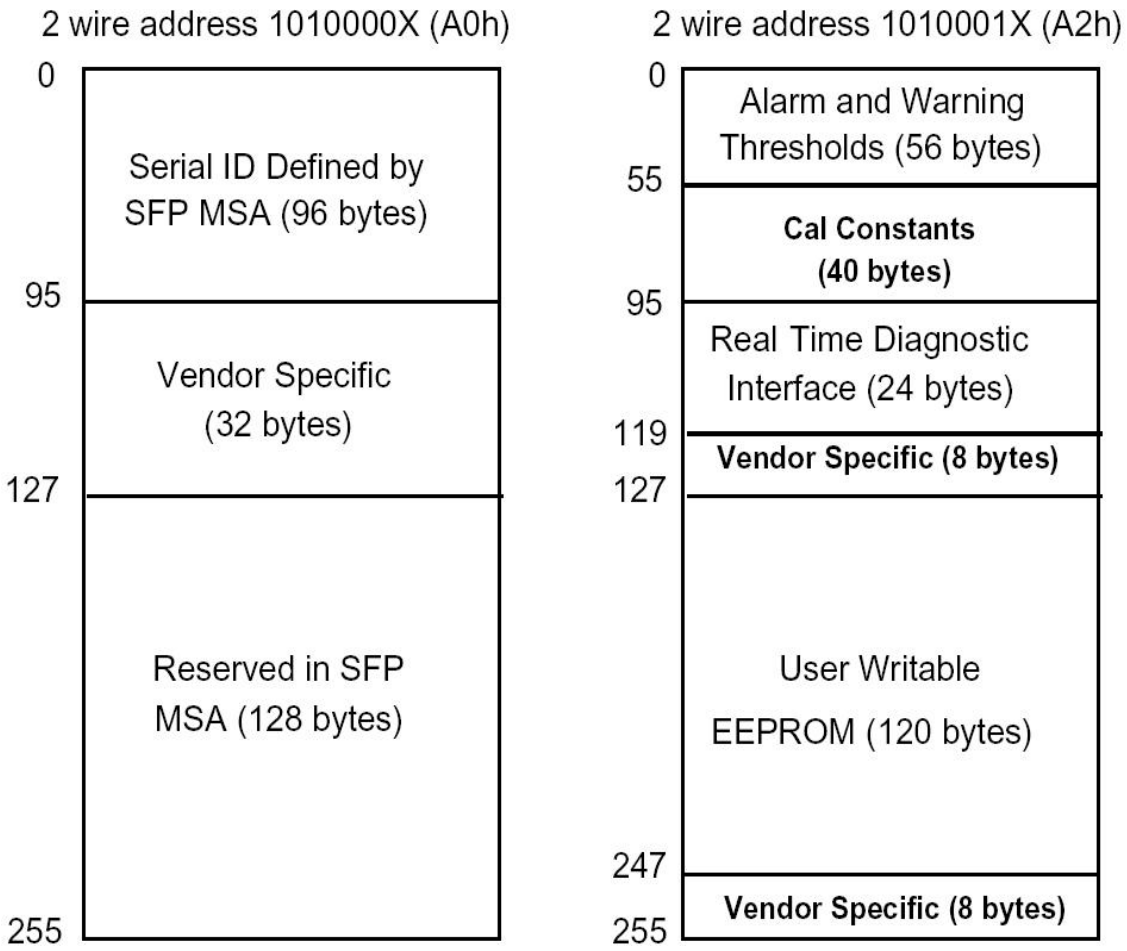
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Digital Diagnostic Memory Map

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

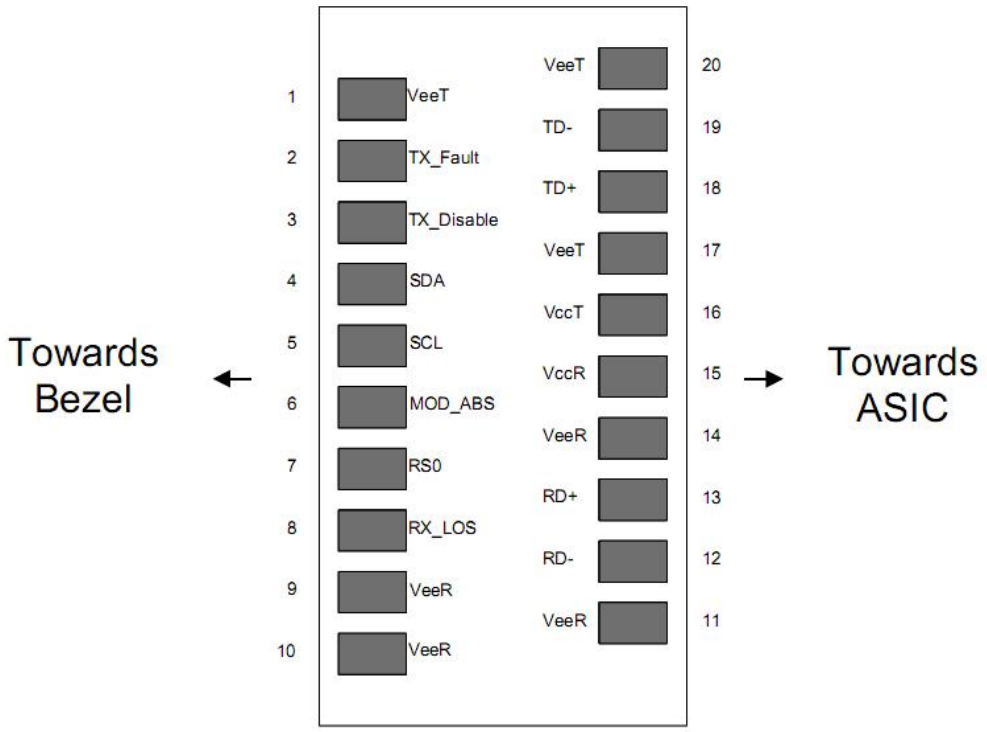
The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following.



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Pin Descriptions



Pin	Signal Name	Description	Plug Seq.	Notes
1	VEET	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	SDA	SDA Serial Data Signal	3	
5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	
7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	Note 3
9	VEER	Receiver ground	1	
10	VEER	Receiver ground	1	
11	VEER	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
14	VEER	Receiver ground	1	
15	VCCR	Receiver Power Supply	2	
16	VCCT	Transmitter Power Supply	2	

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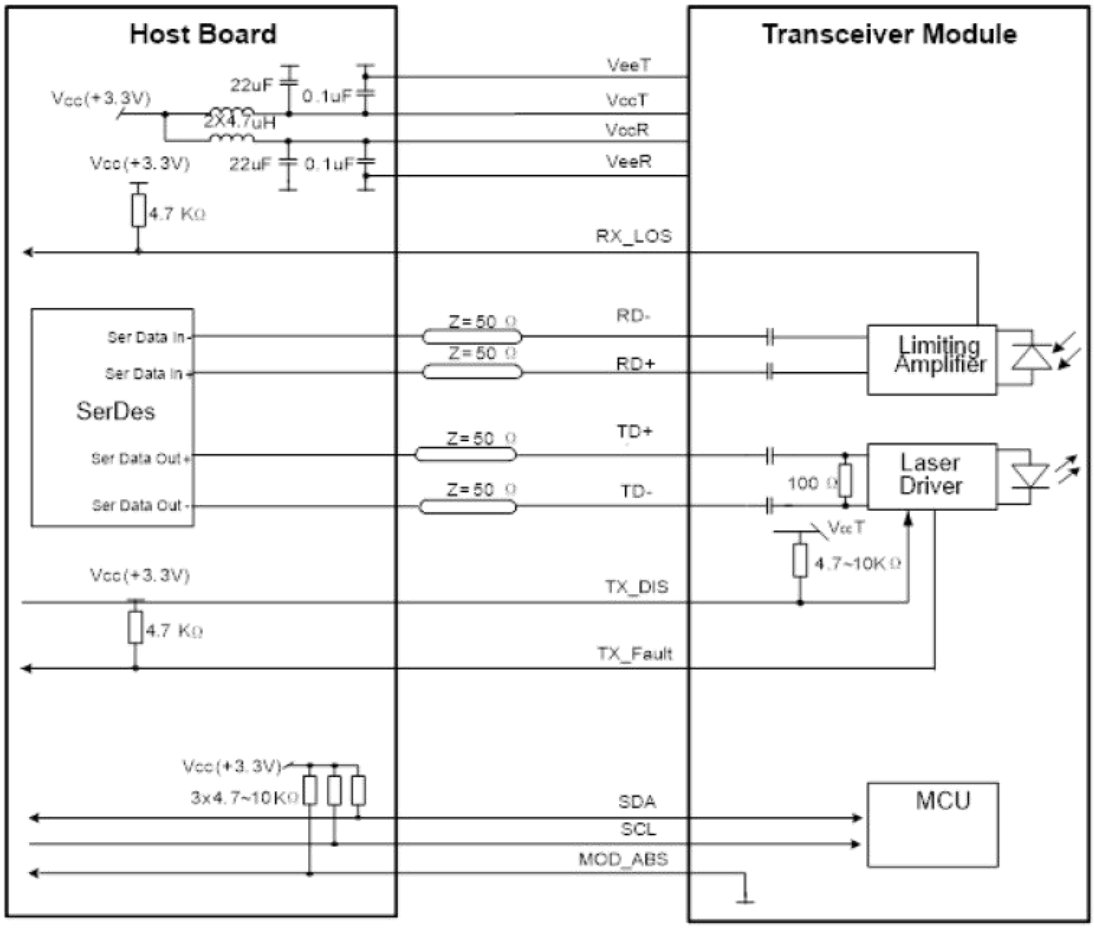
17	VEET	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 5
19	TD-	Inv. Transmit Data In	3	Note 5
20	VEET	Transmitter Ground	1	

Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

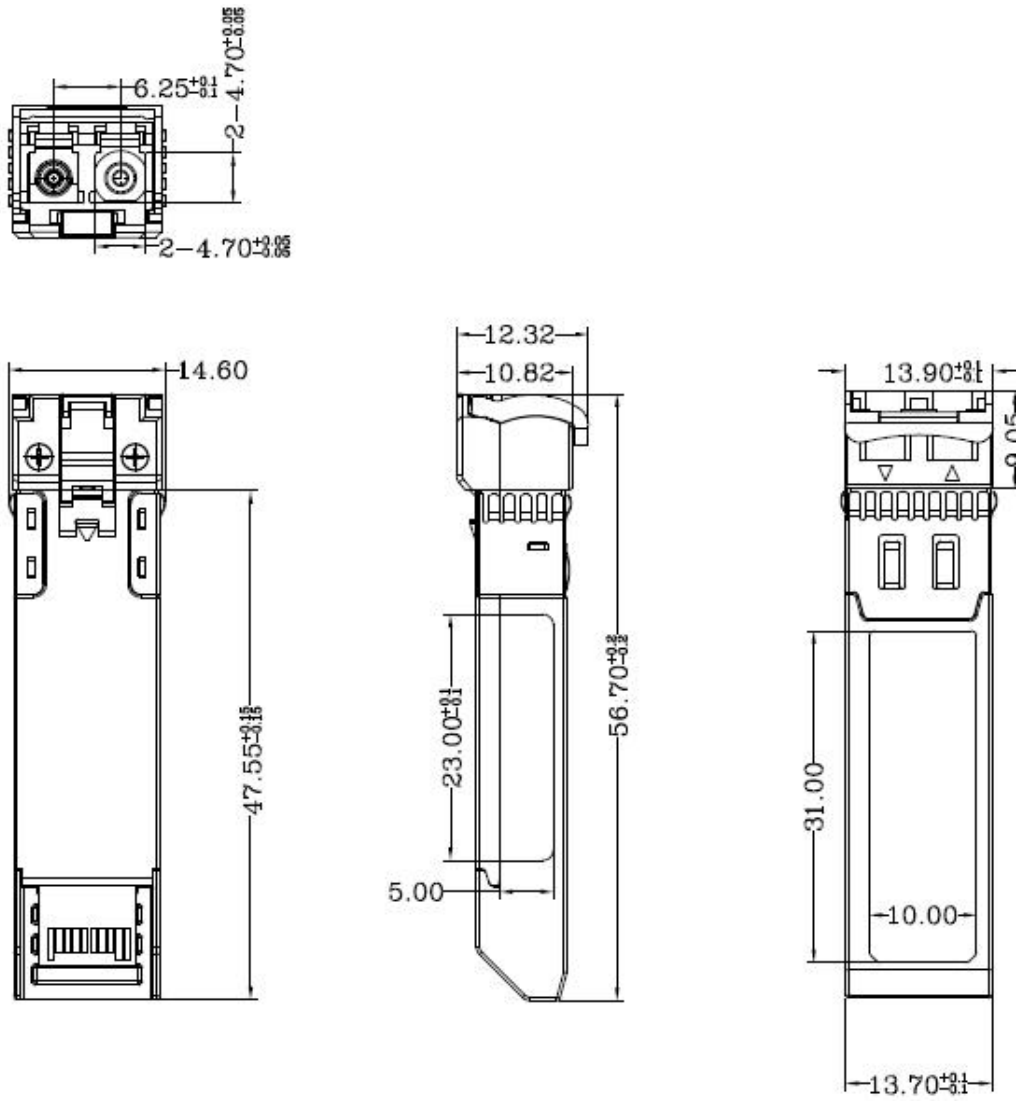
1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
2) Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3) LOS is open collector output. Should be pulled up with 4.7k~10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
4) RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
5) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Recommended Interface Circuit



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Mechanical Dimensions



Ordering information

Part Number	Product Description
LS-DWxx1G-80C	DWDM, 1.25Gbps, LC, 80km, 0°C~+70°C, with DDM, xx: **λC Code**
LS-DWxx1G-80I	DWDM, 1.25Gbps, LC, 80km, -40°C~+85°C, with DDM, xx: **λC Code**

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λC Wavelength Guide					
ITU Channel Product Code	**Wavelength**	**Frequency(THz)**	**ITU Channel Product Code**	**Wavelength**	**Frequency(THz)**
C12	1567.95	191.20	C42	1543.73	194.20
C13	1567.13	191.30	C43	1542.94	194.30
C14	1566.31	191.40	C44	1542.14	194.40
C15	1565.50	191.50	C45	1541.35	194.50
C16	1564.68	191.60	C46	1540.56	194.60
C17	1563.86	191.70	C47	1539.77	194.70
C18	1563.05	191.80	C48	1538.98	194.80
C19	1562.23	191.90	C49	1538.19	194.90
C20	1561.42	192.00	C50	1537.40	195.00
C21	1560.61	192.10	C51	1536.61	195.10
C22	1559.79	192.20	C52	1535.82	195.20
C23	1558.98	192.30	C53	1535.04	195.30
C24	1558.17	192.40	C54	1534.25	195.40
C25	1557.36	192.50	C55	1533.47	195.50
C26	1556.55	192.60	C56	1532.68	195.60
C27	1555.75	192.70	C57	1531.90	195.70
C28	1554.94	192.80	C58	1531.12	195.80
C29	1554.13	192.90	C59	1530.33	195.90
C30	1553.33	193.00	C60	1529.55	196.00
C31	1552.52	193.10	C61	1528.77	196.10
C32	1551.72	193.20	C62	1527.99	196.20
C33	1550.92	193.30	C63	1527.22	196.30
C34	1550.12	193.40	C64	1526.44	196.40
C35	1549.32	193.50	C65	1525.66	196.50
C36	1548.51	193.60	C66	1524.89	196.60
C37	1547.72	193.70	C67	1524.11	196.70
C38	1546.92	193.80	C68	1523.34	196.80
C39	1546.12	193.90	C69	1522.56	196.90
C40	1545.32	194.00	C70	1521.79	197.00
C41	1544.53	194.10			

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