

RSPD-16GD40-CXX

16Gbps FC DWDM SFP+ Transceiver, C-Band, EML, 40km Reach

Product Features

- Supports up to 16Gbps bit rates
- Hot-pluggable SFP+ footprint
- DWDM EML laser and PIN photodiode, Up to 40km for SMF transmission
- Compliant with SFP+ MSA and SFF-8472 with duplex LC receptacle
- Compatible with RoHS
- Single +3.3V power supply
- Real Time Digital Diagnostic Monitoring
- Operating case temperature:
Standard: 0 to +70°C



Applications

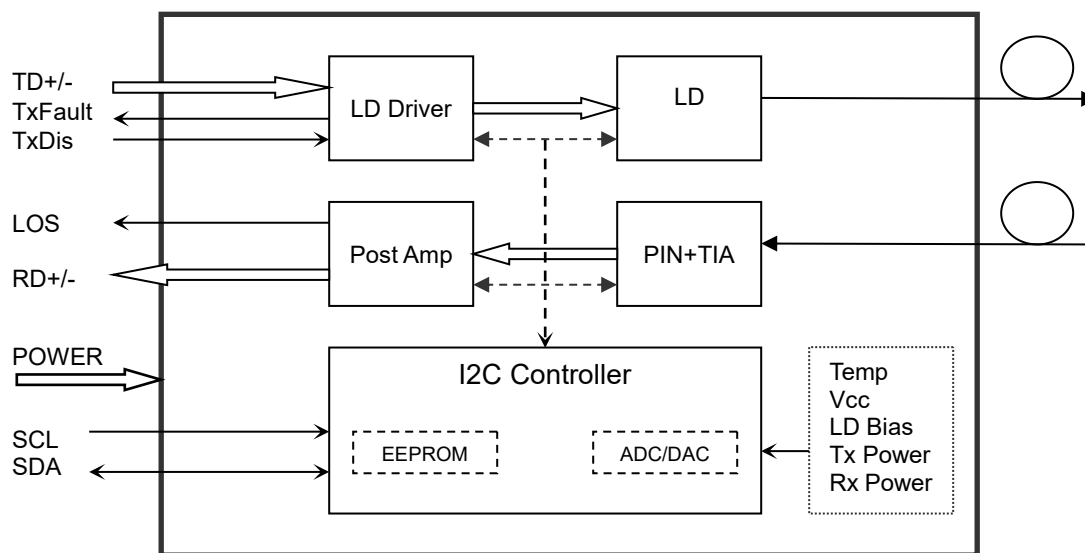
- 4.25/8.5/16G Fibre channel
- Other Optical links

Description

The SFP+ transceivers are high performance, cost effective modules supporting data rate of 16Gbps and 40km transmission distance with SMF.

The transceiver consists of three sections: a Cooled EML laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement and SFF-8472 digital diagnostics functions.



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			550	mA
Data Rate		4.25	16		Gbps

Optical and Electrical Characteristics

Parameter		Symbol	Min	Typical	Max	Unit	Notes
Transmitter							
Optical Wavelength-End Of Life		λ	X-100	X	X+100	pm	
Optical Wavelength-Beginning Of Life		λ	X-25	X	X+25	pm	
Spectral Width (-20dB)		$\Delta\lambda$			1	nm	
Side-Mode Suppression Ratio		SMSR	30	-		dB	
Average Output Power		P_{out}	-1		+4	dBm	1
Extinction Ratio		ER	8.2			dB	
Data Input Swing Differential		V_{IN}	180		850	mV	2
Input Differential Impedance		Z_{IN}	90	100	110	Ω	
TX Disable	Disable		2.0		V_{cc}	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		V_{cc}	V	
	Normal		0		0.8	V	
Receiver							
Centre Wavelength		λ_c	1260		1620	nm	
Receiver Sensitivity					-16	dBm	3
Receiver Overload			0.5			dBm	3
LOS De-Assert		LOS_D			-17	dBm	
LOS Assert		LOS_A	-28			dBm	
LOS Hysteresis			0.5			dB	
Data Output Swing Differential		V_{out}	300		900	mV	4
LOS	High		2.0		V_{cc}	V	
	Low				0.8	V	

Notes:

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2³¹-1 test pattern @16000Mbps, BER $\leq 1 \times 10^{-12}$.
4. Internally AC-coupled.

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on			2	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		V _{cc}	V
MOD_DEF (0:2)-Low	V _L			0.8	V

Diagnostics

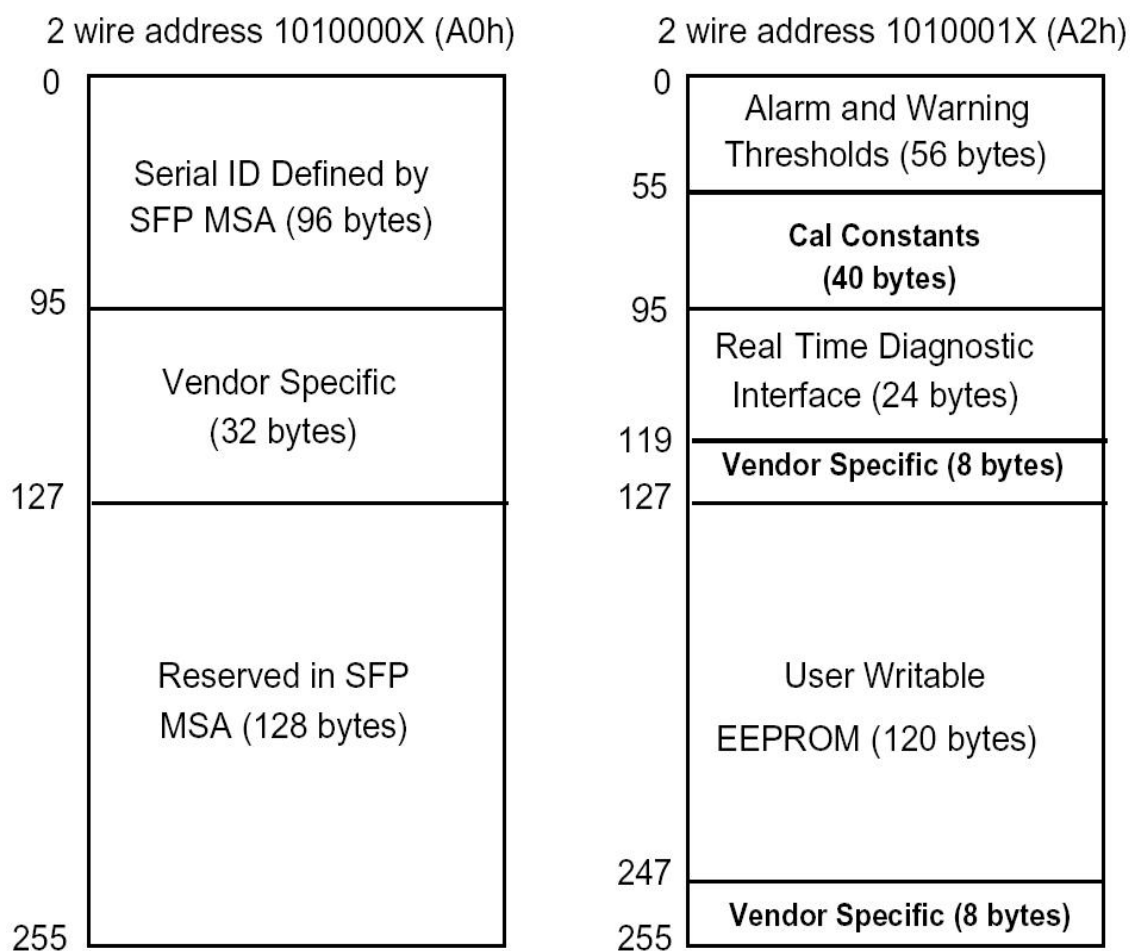
Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal
Voltage	3.0 to 3.6	V	±3%	Internal
Bias Current	0 to 100	mA	±10%	Internal
TX Power	-1 to +3	dBm	±3dB	Internal
RX Power	-16 to -1	dBm	±3dB	Internal

Digital Diagnostic Memory Map

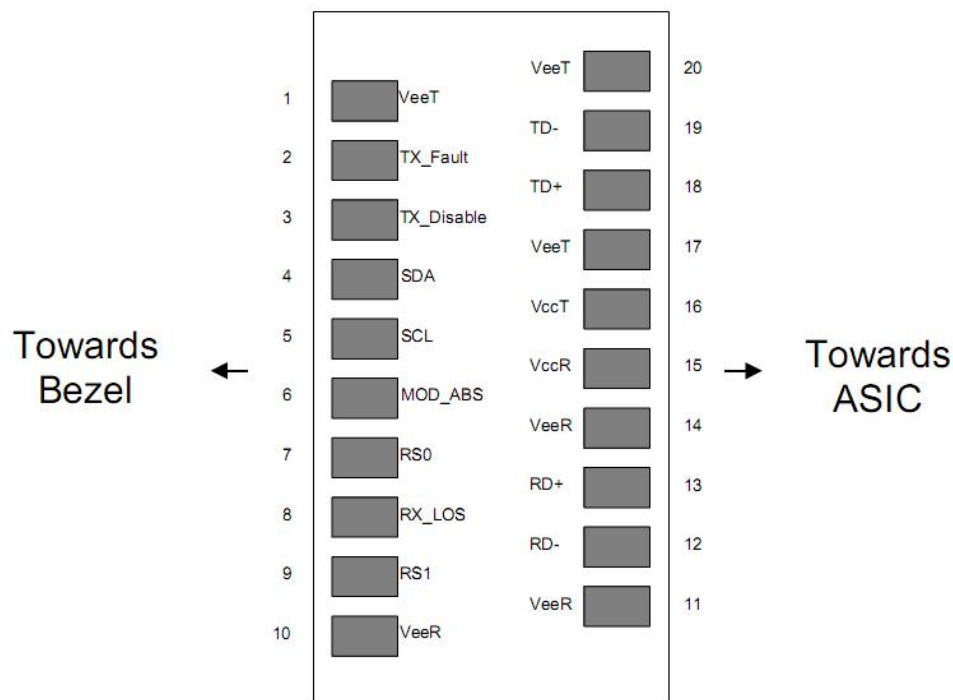
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

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.



Pin Descriptions



Pin	Signal Name	Description	Plug Seq.	Notes
1	V _{EET}	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	RS1	Not Connected	3	
10	V _{EE} R	Receiver ground	1	
11	V _{EE} R	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
14	V _{EE} R	Receiver ground	1	
15	V _{CC} R	Receiver Power Supply	2	
16	V _{CC} T	Transmitter Power Supply	2	
17	V _{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 5

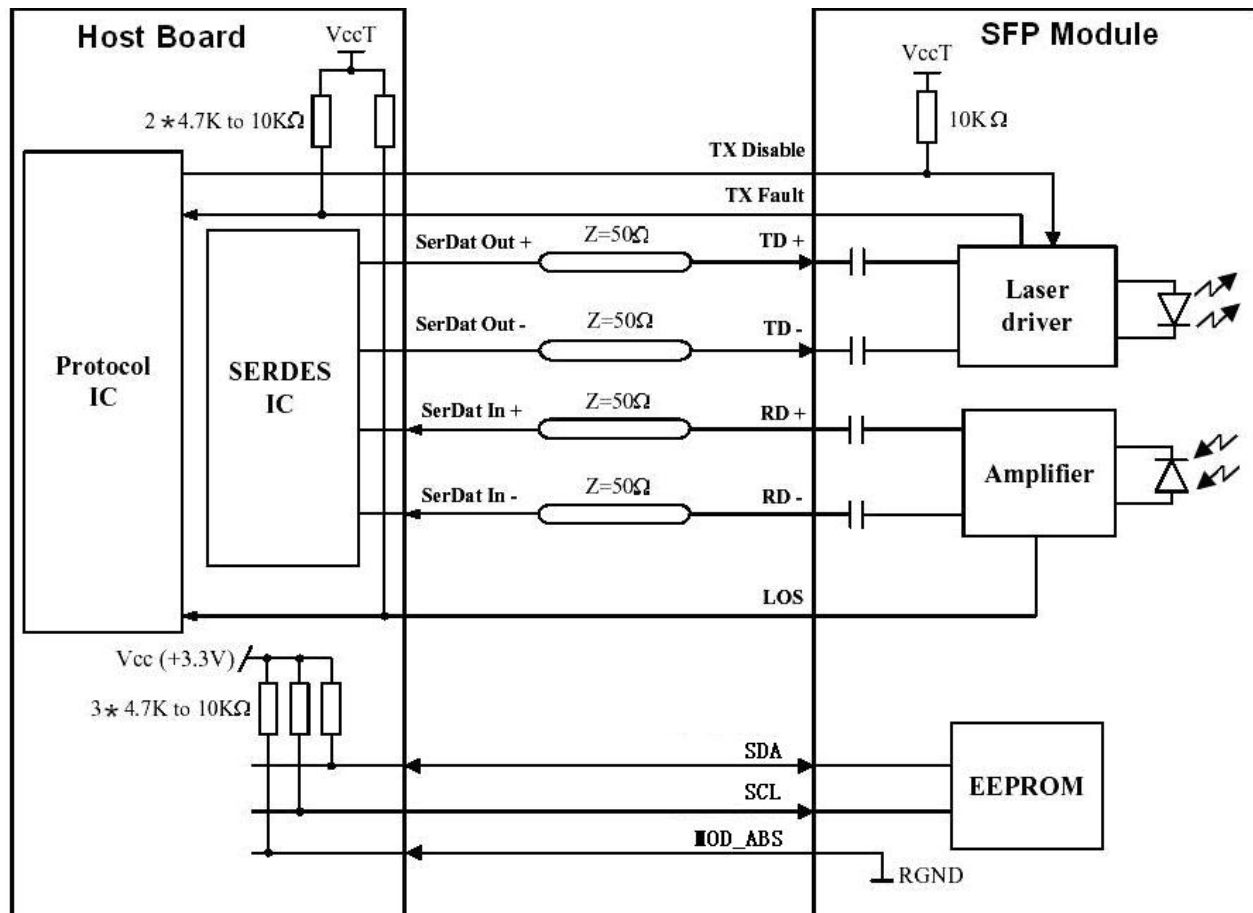
19	TD-	Inv. Transmit Data In	3	Note 5
20	V _{EET}	Transmitter Ground	1	

Notes:

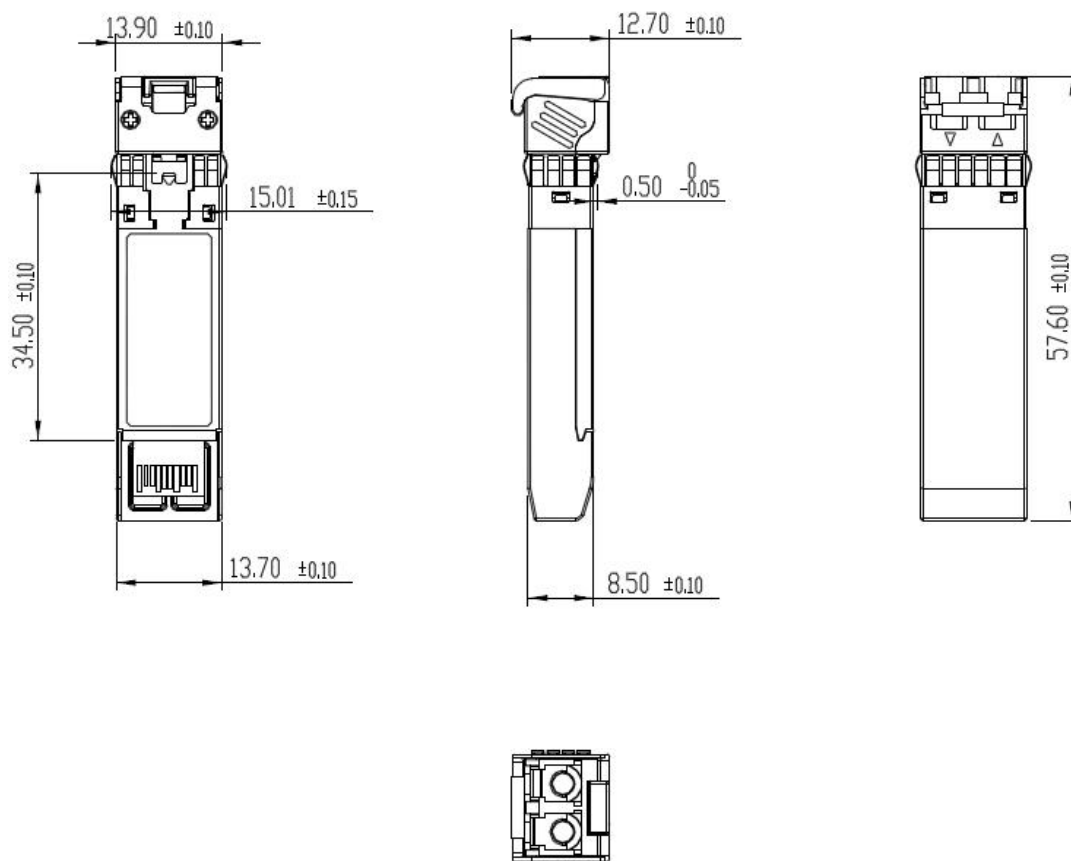
Plug Seq.: Pin engagement sequence during hot plugging.

- 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 V_{cc}+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



Mechanical Dimensions



Ordering information

RSPD-16GD40-CXX		XX: 100GHZ ITU Grid Wavelength	
Part No.	Central Wavelength(nm)	Frequency (THZ)	
RSPD-16GD40-C61	1528.77	196.1	
RSPD-16GD40-C60	1529.55	196.0	
RSPD-16GD40-C59	1530.33	195.9	
RSPD-16GD40-C58	1531.12	195.8	
RSPD-16GD40-C57	1531.90	195.7	
RSPD-16GD40-C56	1532.68	195.6	
RSPD-16GD40-C55	1533.47	195.5	
RSPD-16GD40-C54	1534.25	195.4	
RSPD-16GD40-C53	1535.04	195.3	
RSPD-16GD40-C52	1535.82	195.2	
RSPD-16GD40-C51	1536.61	195.1	

RSPD-16GD40-C50	1537.40	195.0
RSPD-16GD40-C49	1538.19	194.9
RSPD-16GD40-C48	1538.98	194.8
RSPD-16GD40-C47	1539.77	194.7
RSPD-16GD40-C46	1540.56	194.6
RSPD-16GD40-C45	1541.35	194.5
RSPD-16GD40-C44	1542.14	194.4
RSPD-16GD40-C43	1542.94	194.3
RSPD-16GD40-C42	1543.73	194.2
RSPD-16GD40-C41	1544.53	194.1
RSPD-16GD40-C40	1545.32	194.0
RSPD-16GD40-C39	1546.12	193.9
RSPD-16GD40-C38	1546.92	193.8
RSPD-16GD40-C37	1547.72	193.7
RSPD-16GD40-C36	1548.51	193.6
RSPD-16GD40-C35	1549.32	193.5
RSPD-16GD40-C34	1550.12	193.4
RSPD-16GD40-C33	1550.92	193.3
RSPD-16GD40-C32	1551.72	193.2
RSPD-16GD40-C31	1552.52	193.1
RSPD-16GD40-C30	1553.33	193.0
RSPD-16GD40-C29	1554.13	192.9
RSPD-16GD40-C28	1554.94	192.8
RSPD-16GD40-C27	1555.75	192.7
RSPD-16GD40-C26	1556.55	192.6
RSPD-16GD40-C25	1557.36	192.5
RSPD-16GD40-C24	1558.17	192.4
RSPD-16GD40-C23	1558.98	192.3
RSPD-16GD40-C22	1559.79	192.2
RSPD-16GD40-C21	1560.61	192.1
RSPD-16GD40-C20	1561.42	192.0
RSPD-16GD40-C19	1562.23	191.9
RSPD-16GD40-C18	1563.05	191.8
RSPD-16GD40-C17	1563.86	191.7