RSPD-16GD20-CXX

14.025Gbps SFP+ DWDM Transceiver, Single Mode, 20km Reach

Product Features

- Supports up to 14.025Gbps bit rates
- Hot-pluggable SFP+ footprint
- 100GHz ITU, C Band DWDM Cooled EML laser and PIN photodiode, Up to 20km 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

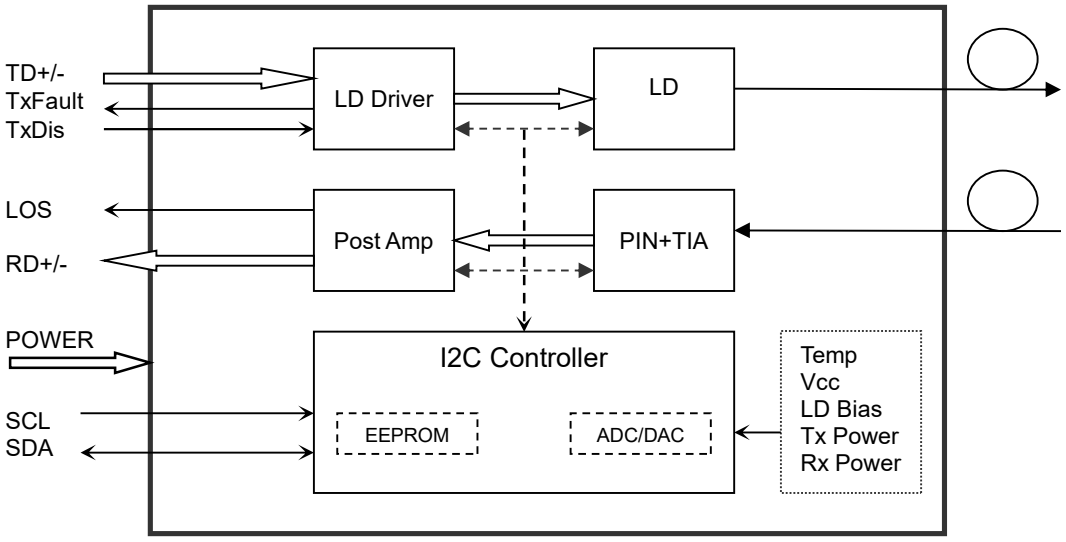
- 4.25/8.5/14.025G Fibre channel
- Other Optical links

Description

The SFP+ transceivers are high performance, cost effective modules supporting data rate of 14.025Gbps and 20km 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	14.025		Gbps

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		P_{out}	-1		+3	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		Vcc	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	
Receiver							
Centre Wavelength		λc	1260		1620	nm	
Receiver Sensitivity					-14	dBm	3
Receiver Overload			0.5			dBm	3
LOS De-Assert		LOS_D			-15	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		Vcc	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 2^{31}-1 test pattern @14025Mbps, BER ≤1×10^{-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		Vcc	V
MOD_DEF (0:2)-Low	V_L			0.8	V

Diagnostics

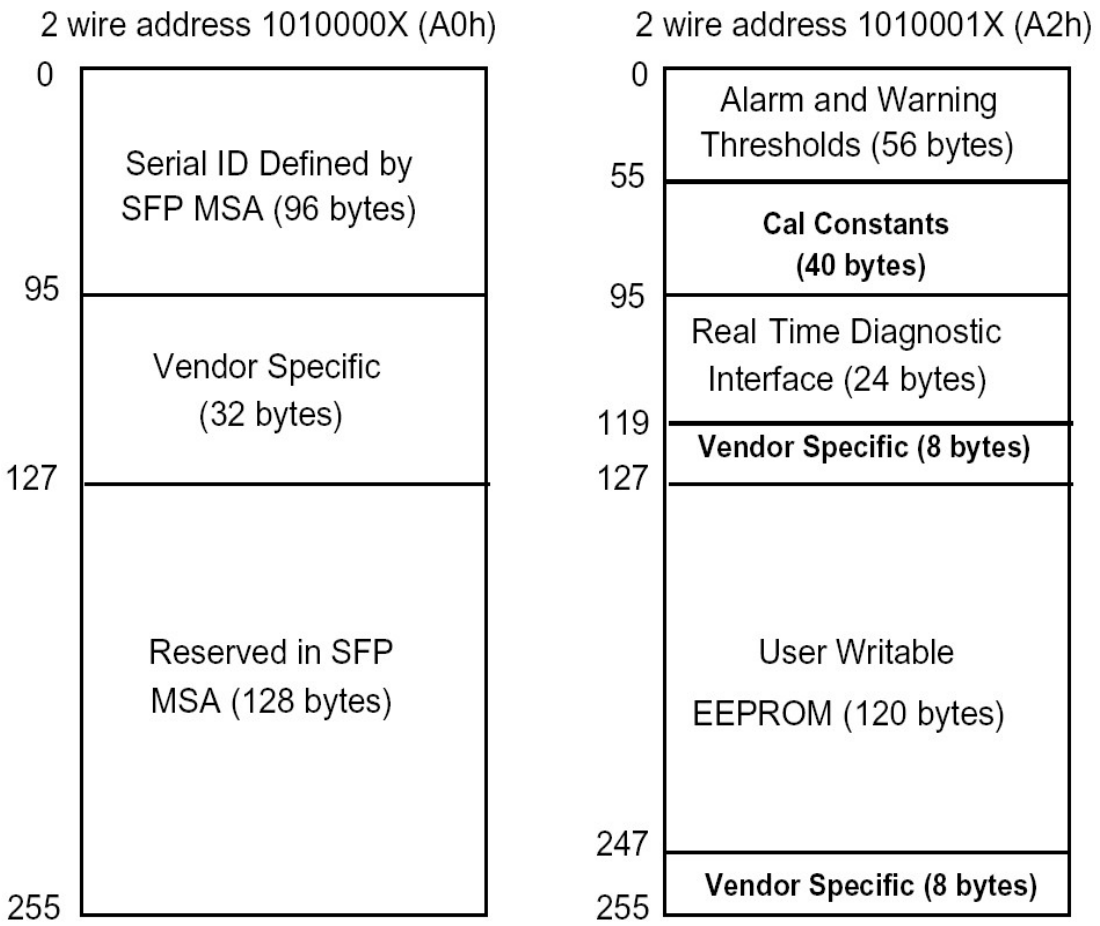
Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal
Voltage	3.0 to 3.6	V	±3%	Internal
Bias Current	0 to 100	mA	±10%	Internal
TX Power	-1 to +3	dBm	±3dB	Internal
RX Power	-16 to -1	dBm	±3dB	Internal

Digital Diagnostic Memory Map

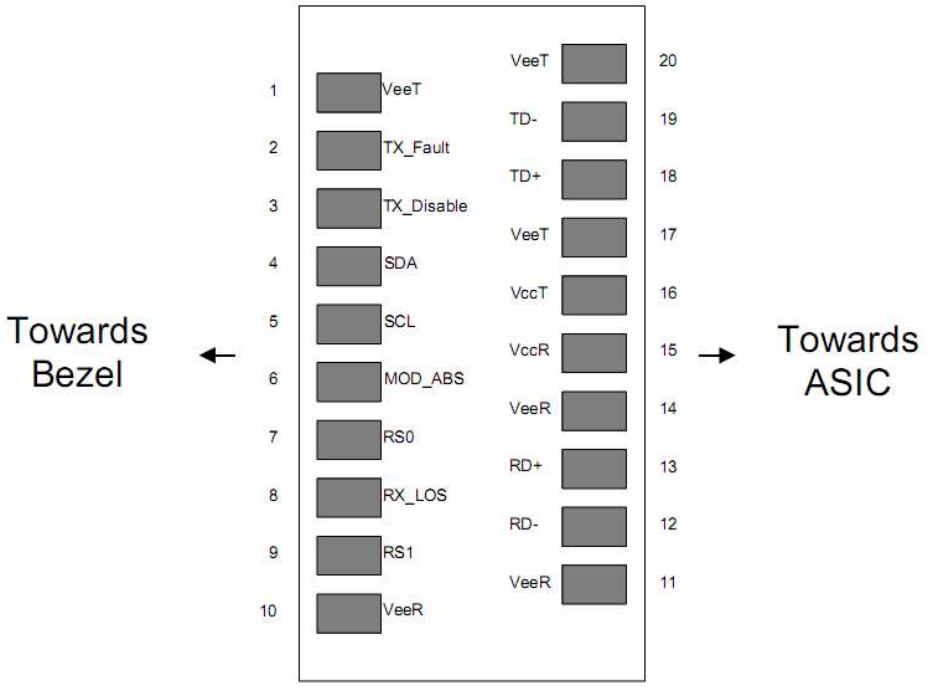
The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

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

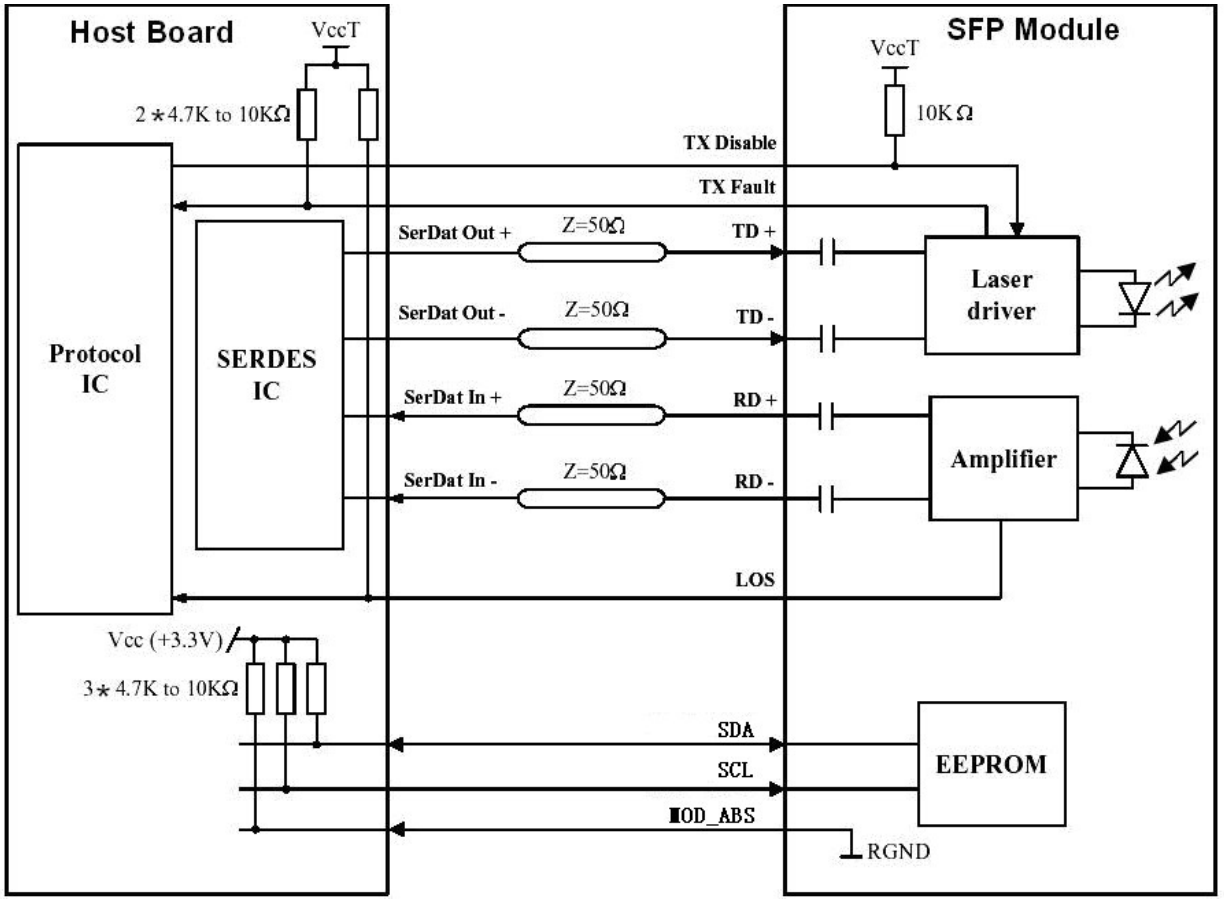


Pin	Signal Name	Description	Plug Seq.	Notes
1	V_{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	SDA	SDA Serial Data Signal	3	
5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	
7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	Note 3
9	RS1	Not Connected	3	
10	V_{EER}	Receiver ground	1	
11	V_{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
14	V_{EER}	Receiver ground	1	
15	V_{CCR}	Receiver Power Supply	2	
16	V_{CCT}	Transmitter Power Supply	2	
17	V_{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 5

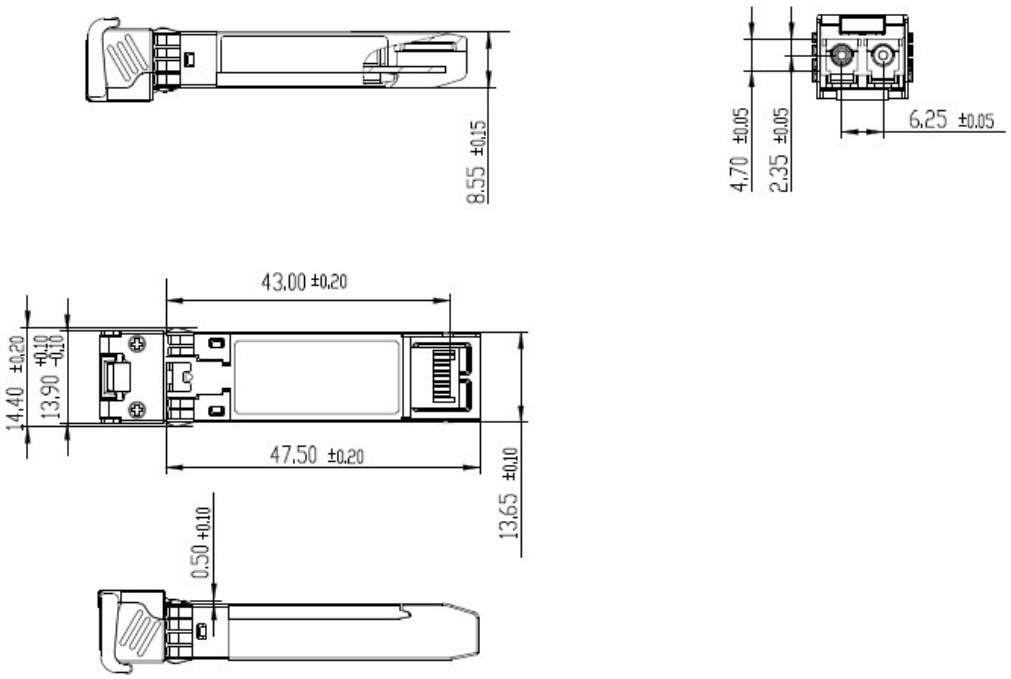
19	TD-	Inv. Transmit Data In	3	Note 5
20	V_{EET}	Transmitter Ground	1	

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 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



Mechanical Dimensions



Ordering information

Part Number	Product Description
RSPD-16GD20-C17	SFP+ C17 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C18	SFP+ C18 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C19	SFP+ C19 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C20	SFP+ C20 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C21	SFP+ C21 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C22	SFP+ C22 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C23	SFP+ C23 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C24	SFP+ C24 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C25	SFP+ C25 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C26	SFP+ C26 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C27	SFP+ C27 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C28	SFP+ C28 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C29	SFP+ C29 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C30	SFP+ C30 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM

RSPD-16GD20-C31	SFP+ C31 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C32	SFP+ C32 DWDM, 14.025Gbps, LC, 20km, 0° C~+70C, with DDM
RSPD-16GD20-C33	SFP+ C33 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C34	SFP+ C34 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C35	SFP+ C35 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C36	SFP+ C36 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C37	SFP+ C37 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C38	SFP+ C38 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C39	SFP+ C39 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C40	SFP+ C40 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C41	SFP+ C41 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C42	SFP+ C42 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C43	SFP+ C43 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C44	SFP+ C44 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C45	SFP+ C45 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C46	SFP+ C46 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C47	SFP+ C47 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C48	SFP+ C48 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C49	SFP+ C49 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C50	SFP+ C50 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C51	SFP+ C51 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C52	SFP+ C52 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C53	SFP+ C53 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C54	SFP+ C54 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C55	SFP+ C55 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C56	SFP+ C56 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C57	SFP+ C57 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C58	SFP+ C58 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C59	SFP+ C59 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C60	SFP+ C60 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM
RSPD-16GD20-C61	SFP+ C61 DWDM, 14.025Gbps, LC, 20km, 0°C~+70°C, with DDM