

# SPT-P556G-80D

## 10Gbps SFP+ Optical Transceiver, 80km Reach

### Features

- Compliant with SFF-8413 and IEEE802.3ae
- Support Multi Rate up to 4.9G/6.144Gbps
- Cooled EML transmitter and APD receiver
- link length up to 80km
- Low Power Dissipation 1.4W Typical (Maximum:2W)
- 0 to 70°C Operating Case Temperature
- Single 3.3V power supply
- Diagnostic Performance Monitoring of module temperature, supply Voltages, laser bias current, transmit optical power, receive optical power
- RoHS6 compliant and lead free

### Applications

- Radio Base Station
- LTE optical repeater application
- OBSAI interface, such as 6.144 Gb/s, 3.072 Gb/s, 1.536 Gb/s, 0.768Gb/s
- CPRI interface, such as 6.144 Gb/s, 4.915 Gb/s, 2.458 Gb/s, 1.229 Gb/s, 0.614Gb/s

### Product Description

SPT-P136G-80D is a high performance, cost effective modules, which is supporting Multi Rate 4.9G/6.144Gbps and transmission distance up to 40km on SM fiber. The transceiver consists of two sections: The transmitter section incorporates a 1550nm DFB driver and re-timer. The receiver section consists of a PIN photodiode integrated with a Trans impedance preamplifier (TIA). The module is hot pluggable into the 20-pin connector. The high-speed electrical interface is based on low voltage logic, with nominal 100 Ohms differential impedance and AC coupled in the module.

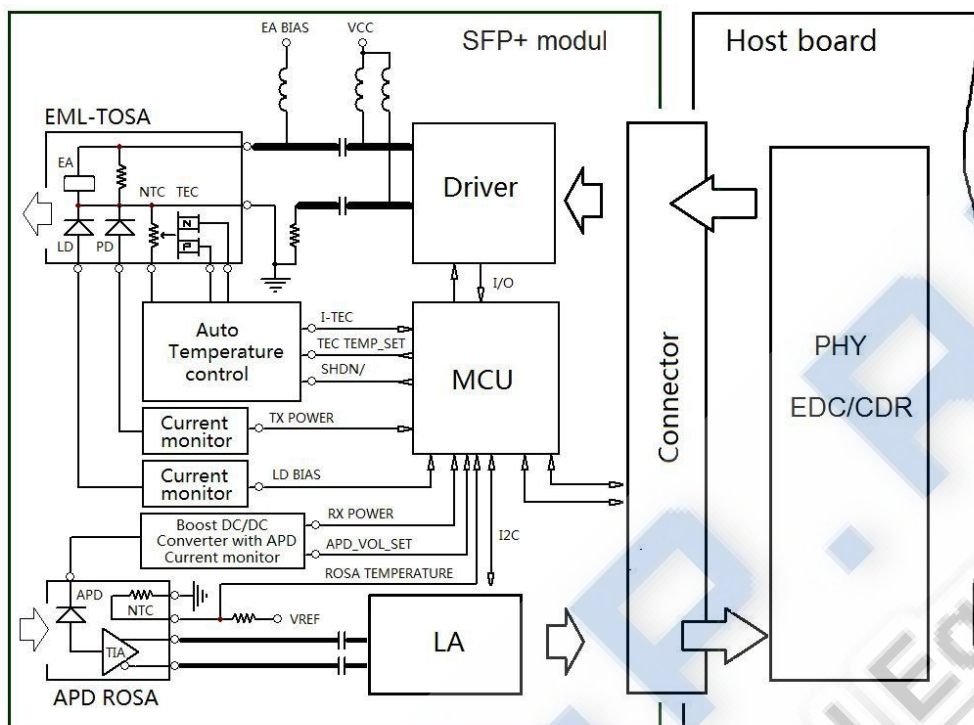


Figure 1. Module Block Diagram

### Absolute Maximum Ratings

| Parameters          | Symbol | Min. | Max. | Unit |
|---------------------|--------|------|------|------|
| Supply Voltage      | Vcc    | -0.5 | 3.8  | V    |
| Storage Temperature | Tst    | -40  | 85   | °C   |
| Relative Humidity   | Rh     | 0    | 85   | %    |

### Operating Conditions

| Parameter                  | Symbol | Min. | Typical | Max  | Unit |
|----------------------------|--------|------|---------|------|------|
| Supply Voltage             | Vcc    | 3.13 | 3.3     | 3.47 | V    |
| Supply current             | Icc    |      | 420     | 610  | mA   |
| Operating Case temperature | Tca    | -5   | -       | 70   | °C   |
| Module Power Dissipation   | Pm     | -    | 1.4     | 1.5  | W    |

#### Notes:

[1] Supply current is shared between VCCTX and VCCR X.

[2] In-rush is defined as current level above steady state current requirements.

### Optical Characteristics (TOP = 0 to 70 °C, VCC = 3.135 to 3.465 Volts)

| Parameter                   | Symbol      | Min. | Typical | Max. | Unit | Note |
|-----------------------------|-------------|------|---------|------|------|------|
| <b>Transmitter Section:</b> |             |      |         |      |      |      |
| Center Wavelength           | $\lambda_t$ | 1530 | 1550    | 1565 | nm   |      |

|                                |                   |      |  |      |       |   |
|--------------------------------|-------------------|------|--|------|-------|---|
| spectral width                 | $\Delta\lambda$   |      |  | 0.3  | nm    |   |
| Average Optical Power          | Pavg              | 0    |  | 4    | dBm   | 1 |
| Optical Power OMA              | Poma              | -2.1 |  |      | dBm   |   |
| Laser Off Power                | Poff              |      |  | -30  | dBm   |   |
| Extinction Ratio               | ER                | 8.2  |  |      | dB    |   |
| Transmitter Dispersion Penalty | TDP               |      |  | 3.0  | dB    | 2 |
| Relative Intensity Noise       | Rin               |      |  | -128 | dB/Hz | 3 |
| Optical Return Loss Tolerance  |                   | 21   |  |      | dB    |   |
| <b>Receiver Section:</b>       |                   |      |  |      |       |   |
| Center Wavelength              | $\lambda_r$       | 1260 |  | 1600 | nm    |   |
| Receiver Sensitivity           | Sen               |      |  | -23  | dBm   | 4 |
| Stressed Sensitivity (OMA)     | Sen <sub>ST</sub> |      |  | -21  | dBm   | 4 |
| Los Assert                     | LOS <sub>A</sub>  | -34  |  | -    | dBm   |   |
| Los Dessert                    | LOS <sub>D</sub>  |      |  | -24  | dBm   |   |
| Los Hysteresis                 | LOS <sub>H</sub>  | 0.5  |  |      | dB    |   |
| Overload                       | Sat               | 0    |  |      | dBm   | 5 |
| Receiver Reflectance           | Rrx               |      |  | -26  | dB    |   |

Note:

1. Average power figures are informative only, per IEEE802.3ae.
2. TWDP figure requires the host board to be SFF-8431 compliant. TWDP is calculated using the Matlab code provided in clause 68.6.6.2 of IEEE802.3ae.
3. 12dB reflection.
4. Conditions of stressed receiver tests per IEEE802.3ae. CSRS testing requires the host board to be SFF-8431 compliant.
5. Receiver overload specified in OMA and under the worst comprehensive stressed condition.

### Electrical Characteristics (TOP = 0 to 70 °C, VCC = 3.135 to 3.465 Volts)

| Parameter                                                             | Symbol             | Min.  | Typical | Max.    | Unit     | Note |
|-----------------------------------------------------------------------|--------------------|-------|---------|---------|----------|------|
| Supply Voltage                                                        | Vcc                | 3.135 |         | 3.465   | V        |      |
| Supply Current                                                        | Icc                |       |         | 500     | mA       |      |
| Power Consumption                                                     | P                  |       |         | 1.8     | W        |      |
| <b>Transmitter Section:</b>                                           |                    |       |         |         |          |      |
| Input differential impedance                                          | R <sub>in</sub>    |       | 100     |         | $\Omega$ | 1    |
| <a href="#">Tx Input Single Ended DC Voltage Tolerance (Ref VeeT)</a> | V                  | -0.3  |         | 4       | V        |      |
| Differential input voltage swing                                      | V <sub>in,pp</sub> | 180   |         | 700     | mV       | 2    |
| Transmit Disable Voltage                                              | V <sub>D</sub>     | 2     |         | Vcc     | V        | 3    |
| Transmit Enable Voltage                                               | V <sub>EN</sub>    | Vee   |         | Vee+0.8 | V        |      |
| <b>Receiver Section:</b>                                              |                    |       |         |         |          |      |



|                                       |                        |                 |  |                                 |    |   |
|---------------------------------------|------------------------|-----------------|--|---------------------------------|----|---|
| Single Ended Output Voltage Tolerance | V                      | -0.3            |  | 4                               | V  |   |
| Rx Output Diff Voltage                | Vo                     | 300             |  | 850                             | mV |   |
| Rx Output Rise and Fall Time          | Tr/Tf                  | 30              |  |                                 | ps | 4 |
| LOS Fault                             | V <sub>LOS fault</sub> | 2               |  | V <sub>CCHOS</sub> <sub>T</sub> | V  | 5 |
| LOS Normal                            | V <sub>LOS norm</sub>  | V <sub>ee</sub> |  | V <sub>ee</sub> +0.8            | V  | 5 |

## Digital Diagnostic Functions

| Parameter                     | Symbol    | Min.  | Max   | Unit | Notes                 |
|-------------------------------|-----------|-------|-------|------|-----------------------|
| <b>Accuracy</b>               |           |       |       |      |                       |
| Transceiver Temperature       | DMI_Temp  | -3    | +3    | degC | Over operating Temp   |
| TX Output optical power       | DMI_TX    | -3    | +3    | dB   |                       |
| RX Input optical power        | DMI_RX    | -3    | +3    | dB   | -3dBm to -12dBm range |
| Transceiver Supply voltage    | DMI_VCC   | -0.08 | +0.08 | V    | Full operating        |
| Bias current monitor          | DMI_Ibias | -10%  | 10%   | mA   |                       |
| <b>Dynamic Range Accuracy</b> |           |       |       |      |                       |
| Transceiver Temperature       | DMI_Temp  | 0     | 70    | degC |                       |
| TX Output optical power       | DMI_TX    | 0     | 4     | dBm  |                       |
| RX Input optical power        | DMI_RX    | -26   | 0     | dBm  |                       |
| Transceiver Supply voltage    | DMI_VCC   | 3.0   | 3.6   | V    |                       |
| Bias current monitor          | DMI_Ibias | 0     | 100   | mA   |                       |



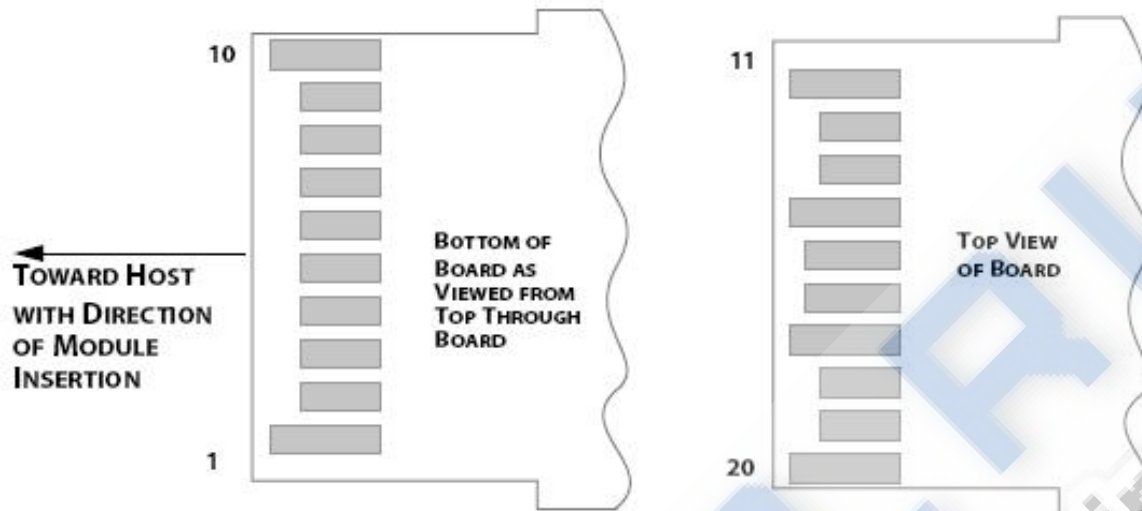
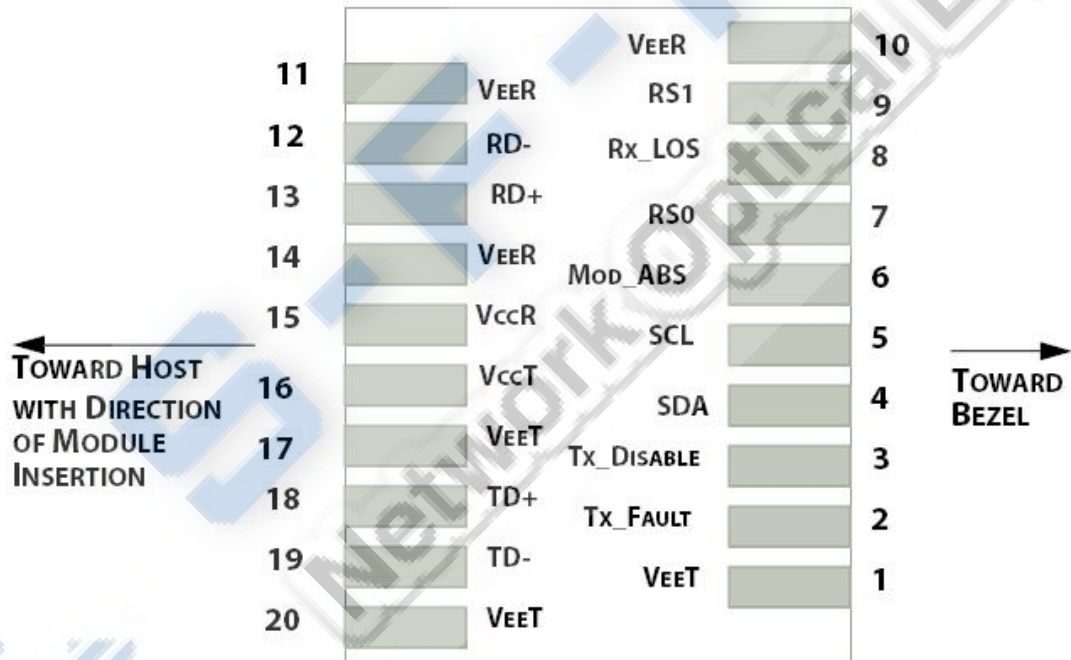


Figure2.Electrical Pin-out Details

## Pin Descriptions



| Pin | Symbol       | Name/Description                                             |
|-----|--------------|--------------------------------------------------------------|
| 1   | VEET [1]     | Transmitter Ground                                           |
| 2   | Tx_FAULT [2] | Transmitter Fault                                            |
| 3   | Tx_DIS [3]   | Transmitter Disable. Laser output disabled on high or open   |
| 4   | SDA [2]      | 2-wire Serial Interface Data Line                            |
| 5   | SCL [2]      | 2-wire Serial Interface Clock Line                           |
| 6   | MOD_ABS [4]  | Module Absent. Grounded within the module                    |
| 7   | RS0 [5]      | RS0 for Rate Select: Open or Low = Module supports ≤4.25Gbps |

|    |            | High = Module supports 9.95 Gb/s to 10.3125 Gb/s              |
|----|------------|---------------------------------------------------------------|
| 8  | RX_LOS [2] | Loss of Signal indication. Logic 0 indicates normal operation |
| 9  | RS1 [5]    | No connection required                                        |
| 10 | VEER [1]   | Receiver Ground                                               |
| 11 | VEER [1]   | Receiver Ground                                               |
| 12 | RD-        | Receiver Inverted DATA out. AC Coupled                        |
| 13 | RD+        | Receiver DATA out. AC Coupled                                 |
| 14 | VEER [1]   | Receiver Ground                                               |
| 15 | VCCR       | Receiver Power Supply                                         |
| 16 | VCCT       | Transmitter Power Supply                                      |
| 17 | VEET [1]   | Transmitter Ground                                            |
| 18 | TD+        | Transmitter DATA in. AC Coupled                               |
| 19 | TD-        | Transmitter Inverted DATA in. AC Coupled                      |
| 20 | VEET [1]   | Transmitter Ground                                            |

#### Notes:

- [1] Module circuit ground is isolated from module chassis ground within the module.
- [2].should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.
- [3]Tx\_Disable is an input contact with a 4.7 k $\Omega$  to 10 k $\Omega$  pullup to VccT inside the module.
- [4]Mod\_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc\_Host with a resistor in the range 4.7 k $\Omega$  to 10 k $\Omega$ .Mod\_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.
- [5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 k $\Omega$  resistors in the module.

#### Recommended

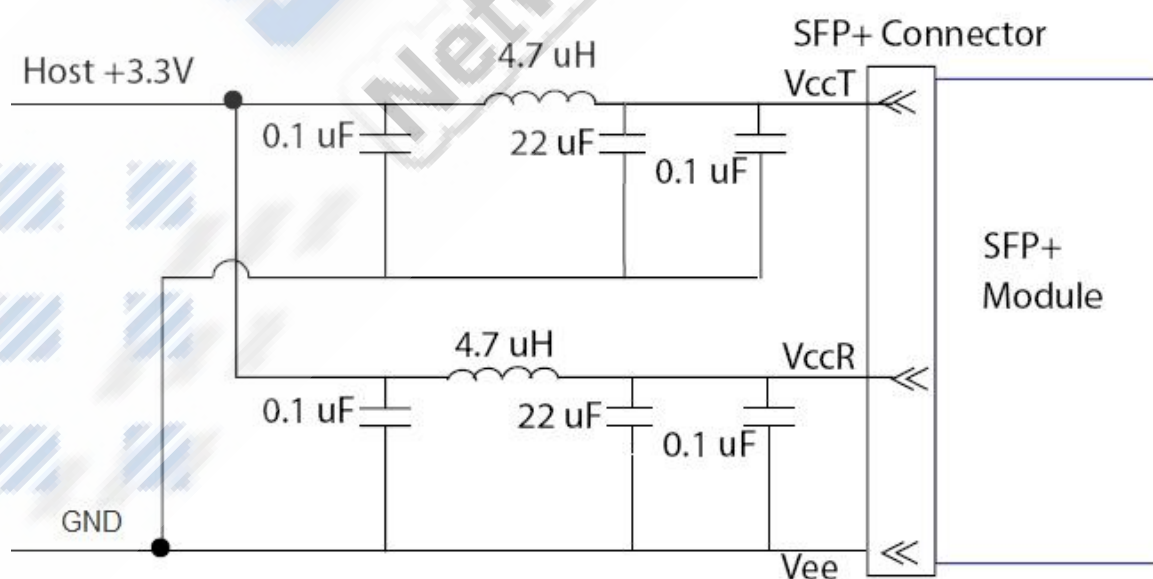


Figure3. Host Board Power Supply Filters Circuit

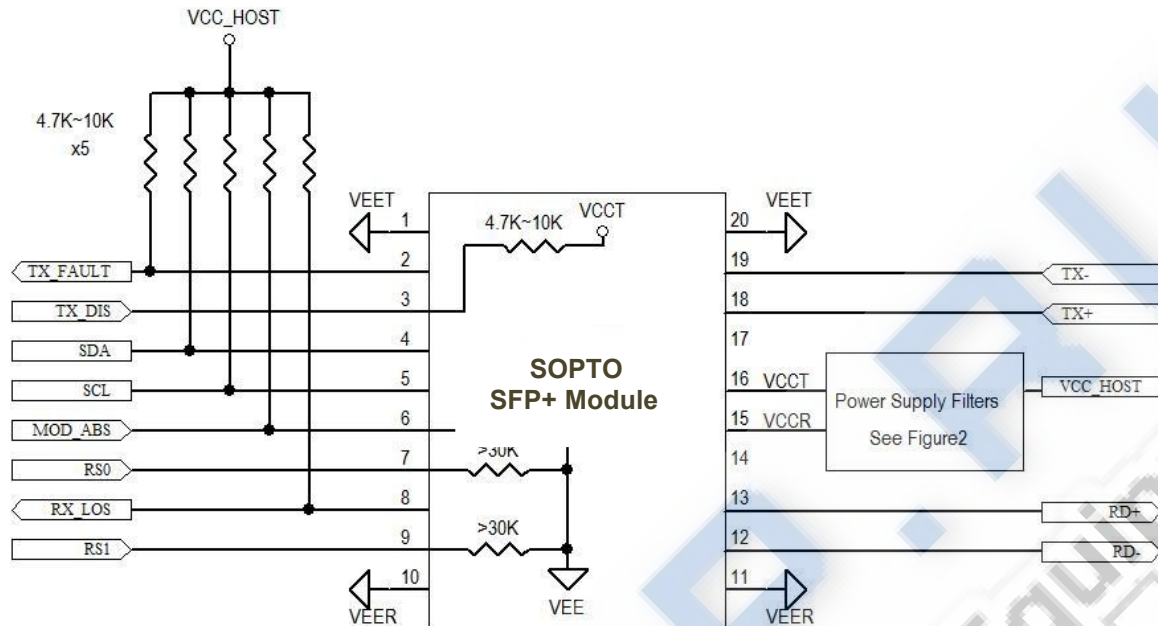
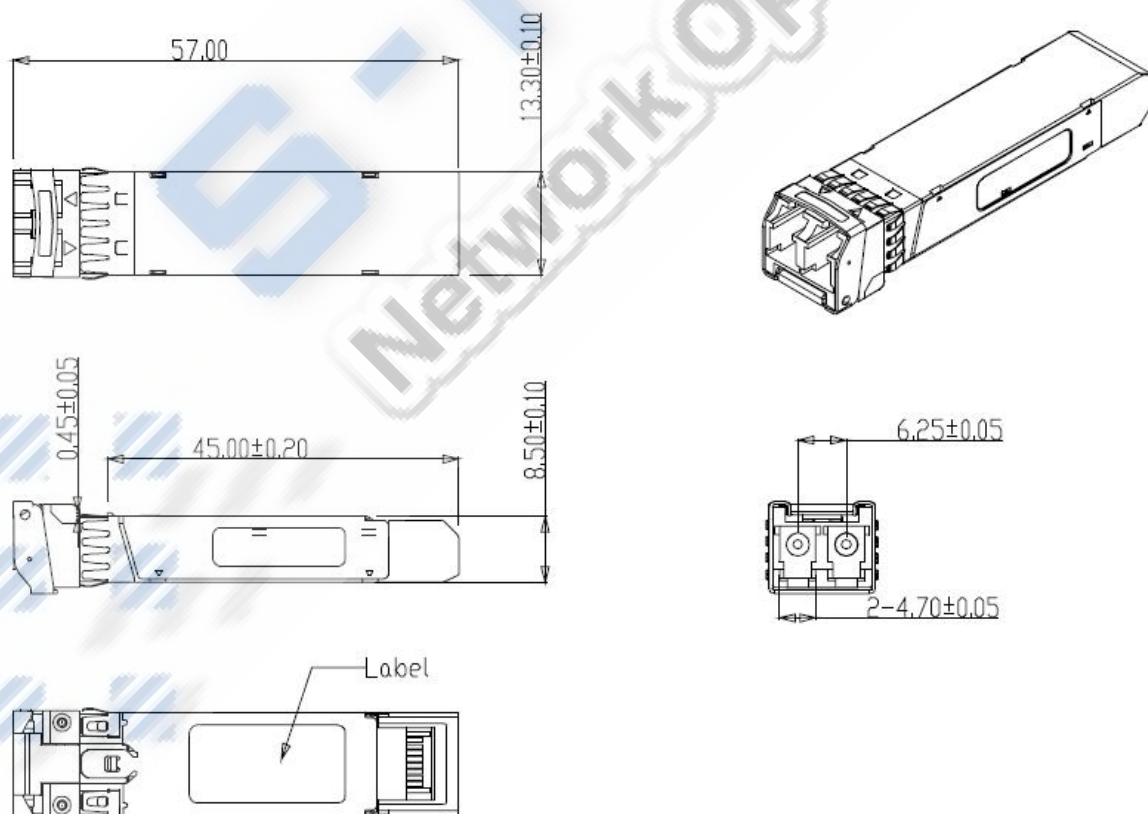


Figure4. Host-Module Interface

## Mechanical Dimensions



Unit:mm

Figure 5. Mechanical Specifications



## Ordering information

| Part Number   | Product Description                           |
|---------------|-----------------------------------------------|
| SPT-P556G-80D | 1550nm, 4.9G/6.144Gbs, 80km, 0°C ~ +70°C, DDM |

Note: If you need more customized services, please contact us.

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