



### DWDM-XFP-60.61-T-OPC

Cisco® DWDM-XFP-60.61 Compatible TAA 10GBase-DWDM 100GHz XFP Transceiver (SMF, 1560.61nm, 80km, LC, DOM)

#### Features

- INF-8077i Compliance
- Duplex LC Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



#### Applications:

- 10x Gigabit Ethernet over DWDM
- 8x/10x Fibre Channel
- Access, Metro and Enterprise

#### Product Description

This Cisco® DWDM-XFP-60.61 compatible XFP transceiver provides 10GBase-DWDM throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1560.61nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Cisco® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

OptioConnect's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products."



## Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

## Tunable XFP Channel Number and Wavelength

| Channel No. | Frequency (THz) | Center Wavelength | Channel No. | Frequency (THz) | Center Wavelength |
|-------------|-----------------|-------------------|-------------|-----------------|-------------------|
| 1           | 191.35          | 1566.723          | 49          | 193.75          | 1547.316          |
| 2           | 191.40          | 1566.314          | 50          | 193.80          | 1546.917          |
| 3           | 191.45          | 1565.905          | 51          | 193.85          | 1546.518          |
| 4           | 191.50          | 1565.496          | 52          | 193.90          | 1546.119          |
| 5           | 191.55          | 1565.087          | 53          | 193.95          | 1545.720          |
| 6           | 191.60          | 1564.679          | 54          | 194.00          | 1545.322          |
| 7           | 191.65          | 1564.271          | 55          | 194.05          | 1544.924          |
| 8           | 191.70          | 1563.863          | 56          | 194.10          | 1544.526          |
| 9           | 191.75          | 1563.455          | 57          | 194.15          | 1544.128          |
| 10          | 191.80          | 1563.047          | 58          | 194.20          | 1543.730          |
| 11          | 191.85          | 1562.640          | 59          | 194.25          | 1543.333          |
| 12          | 191.90          | 1562.233          | 60          | 194.30          | 1542.936          |
| 13          | 191.95          | 1561.826          | 61          | 194.35          | 1542.539          |
| 14          | 192.00          | 1561.419          | 62          | 194.40          | 1542.142          |
| 15          | 192.05          | 1561.013          | 63          | 194.45          | 1541.746          |
| 16          | 192.10          | 1560.606          | 64          | 194.50          | 1541.349          |
| 17          | 192.15          | 1560.200          | 65          | 194.55          | 1540.953          |
| 18          | 192.20          | 1559.794          | 66          | 194.60          | 1540.557          |
| 19          | 192.25          | 1559.389          | 67          | 194.65          | 1540.162          |
| 20          | 192.30          | 1558.983          | 68          | 194.70          | 1539.766          |
| 21          | 192.35          | 1558.578          | 69          | 194.75          | 1539.371          |
| 22          | 192.40          | 1558.173          | 70          | 194.80          | 1538.976          |
| 23          | 192.45          | 1557.768          | 71          | 194.85          | 1538.581          |
| 24          | 192.50          | 1557.363          | 72          | 194.90          | 1538.186          |
| 25          | 192.55          | 1556.959          | 73          | 194.95          | 1537.792          |
| 26          | 192.60          | 1556.555          | 74          | 195.00          | 1537.397          |
| 27          | 192.65          | 1556.151          | 75          | 195.05          | 1537.003          |

|           |        |          |           |        |          |
|-----------|--------|----------|-----------|--------|----------|
| <b>28</b> | 192.70 | 1555.747 | <b>76</b> | 195.10 | 1536.609 |
| <b>29</b> | 192.75 | 1555.343 | <b>77</b> | 195.15 | 1536.216 |
| <b>30</b> | 192.80 | 1554.940 | <b>78</b> | 195.20 | 1535.822 |
| <b>31</b> | 192.85 | 1554.537 | <b>79</b> | 195.25 | 1535.429 |
| <b>32</b> | 192.90 | 1554.134 | <b>80</b> | 195.30 | 1535.036 |
| <b>33</b> | 192.95 | 1553.731 | <b>81</b> | 195.35 | 1534.643 |
| <b>34</b> | 193.00 | 1553.329 | <b>82</b> | 195.40 | 1534.250 |
| <b>35</b> | 193.05 | 1552.926 | <b>83</b> | 195.45 | 1533.858 |
| <b>36</b> | 193.10 | 1552.524 | <b>84</b> | 195.50 | 1533.465 |
| <b>37</b> | 193.15 | 1552.122 | <b>85</b> | 195.55 | 1533.073 |
| <b>38</b> | 193.20 | 1551.721 | <b>86</b> | 195.60 | 1532.681 |
| <b>39</b> | 193.25 | 1551.319 | <b>87</b> | 195.65 | 1532.290 |
| <b>40</b> | 193.30 | 1550.918 | <b>88</b> | 195.70 | 1531.898 |
| <b>41</b> | 193.35 | 1550.517 | <b>89</b> | 195.75 | 1531.507 |
| <b>42</b> | 193.40 | 1550.116 | <b>90</b> | 195.80 | 1531.116 |
| <b>43</b> | 193.45 | 1549.715 | <b>91</b> | 195.85 | 1530.725 |
| <b>44</b> | 193.50 | 1549.315 | <b>92</b> | 195.90 | 1530.334 |
| <b>45</b> | 193.55 | 1548.915 | <b>93</b> | 195.95 | 1529.944 |
| <b>46</b> | 193.60 | 1548.515 | <b>94</b> | 196.00 | 1529.553 |
| <b>47</b> | 193.65 | 1548.115 | <b>95</b> | 196.05 | 1529.163 |
| <b>48</b> | 193.70 | 1547.715 | <b>96</b> | 196.10 | 1528.773 |

## Absolute Maximum Ratings

| Parameter                    | Symbol | Min. | Typ. | Max. | Unit | Notes               |
|------------------------------|--------|------|------|------|------|---------------------|
| Storage Temperature          | Tstg   | -40  |      | 85   | °C   |                     |
| Case Temperature             |        | -5   |      | 70   | °C   |                     |
| ESD                          |        | 500  |      |      | V    | High Speed i/o pins |
|                              |        | 2000 |      |      |      | All other pins      |
| Receiver optical input power |        |      |      | +12  | dBm  |                     |

## Electrical Characteristics

| Parameter               | Symbol | Min. | Typ. | Max. | Unit  | Notes                            |
|-------------------------|--------|------|------|------|-------|----------------------------------|
| 1.8V Supply             | Vcc2   | 1.71 | 1.8  | 1.89 | V     | VPS not supported                |
| 3.3V Supply             | Vcc3   | 3.15 | 3.3  | 3.45 | V     |                                  |
| 5.0V Supply             | Vcc5   | 4.75 | 5.0  | 5.25 | V     |                                  |
| Supply Current, 1.8V    |        |      | 160  | 200  | mA    |                                  |
| Supply Current, 3.3V    |        |      | 310  | 400  | mA    |                                  |
| Supply Current, 5.0V    |        |      | 100  | 200  | mA    |                                  |
| Inrush current limit    |        |      |      | 100  | mA/μs |                                  |
| Total power consumption |        |      |      | 2.5  | W     | Power Level 2 MSA classification |

## System Performance

| Parameter         | Min       | Max       | OSNR  | BER   | Conditions                                                |
|-------------------|-----------|-----------|-------|-------|-----------------------------------------------------------|
| Noise Loaded      | -400ps/nm | 1500ps/nm | 19dB  | 1E-04 | 10.709Gb/s, -10 to -20dBm, 0.25nm filter, optimised RxDTV |
| Unamplified Links | 0ps/nm    | 1600ps/nm | >35dB | 1E-12 | 10.709Gb/s, -22dBm, 0.25nm filter, optimised RxDTV        |

## Optical Characteristics

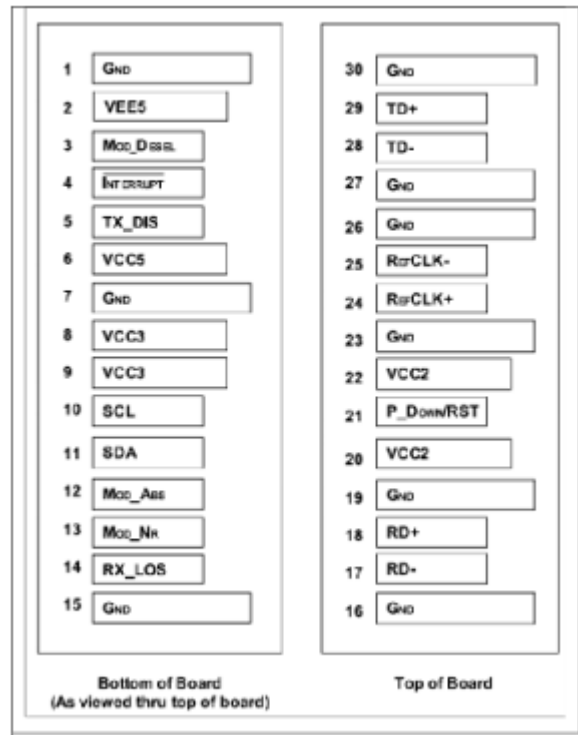
| Parameter                      | Symbol              | Min.   | Typ. | Max.   | Unit | Conditions                                           |
|--------------------------------|---------------------|--------|------|--------|------|------------------------------------------------------|
| Transmitter                    |                     |        |      |        |      |                                                      |
| Data Rate                      |                     | 9.95   |      | 11.35  | Gb/s | NRZ                                                  |
| Frequency range                |                     | 191.35 |      | 196.10 | THz  | 50GHz grid, 96 channels                              |
| Frequency accuracy             |                     | -2.5   |      | +2.5   | GHz  | EOL                                                  |
| Optical transmit power         | P <sub>o</sub>      |        | +0.5 |        | dBm  | SOL, 25°C                                            |
| Optical transmit power         | P <sub>o</sub>      | -1     |      | +3.0   | dBm  | EOL                                                  |
| Shuttered output power         |                     |        | -45  | -40    | dBm  |                                                      |
| Optical power stability        | ΔP <sub>out</sub>   | -1.0   |      | +1.0   | dB   | All channels, SOL                                    |
| Side mode suppression          | SMSR                | 35     |      |        | dB   | ±2.5nm, modulated                                    |
| Spectral width                 | Δλ                  |        | 0.3  | 0.5    | nm   | -20dB, modulated                                     |
| Extinction ratio               | ER                  | 9.5    |      |        | dB   | Filtered, 10.709Gb/s                                 |
| Eye diagram compliance         | GR-253, ITU-T G.691 |        |      |        |      |                                                      |
| Mask margin                    |                     | 10     |      |        | %    |                                                      |
| OSNR                           |                     | 50     | 55   |        | dB   | 0.1nm RBW                                            |
| SBS threshold                  |                     | 18     |      |        | dBm  | 50km SMF                                             |
| Tuning speed                   |                     |        |      | 50     | ms   |                                                      |
| Laser enable (turn on) time    |                     |        |      | 50     | ms   | To >90% power                                        |
| Laser disable (turn off) time  |                     |        |      | 10     | μs   | To <10% power                                        |
| Module initialization time     |                     |        |      | 20     | s    |                                                      |
| Receiver                       |                     |        |      |        |      |                                                      |
| Data rate                      |                     | 9.95   |      | 11.35  | Gb/s | NRZ                                                  |
| Input operating wavelength     | λ                   | 1525   |      | 1575   | nm   |                                                      |
| Receiver Sensitivity           |                     |        | -26  |        | dBm  | 10.709 Gb/s, IE-12,<br>OSNR>35dB, optimized<br>RxDTV |
| Maximum input power (overload) | P <sub>in</sub> MAX | -5     |      |        | dBm  |                                                      |
| LOS assert                     | PA                  | -33    |      | -28.5  | dBm  |                                                      |
| LOS de-assert                  | PD                  | -32.5  |      | -26.5  | dBm  |                                                      |
| LOS Hysteresis                 | PD - PA             | 0.5    |      | 4      | dB   |                                                      |
| LOS assert time                | T <sub>A</sub>      |        |      | 100    | μs   |                                                      |
| LOS de-assert time             | T <sub>D</sub>      |        |      | 100    | μs   |                                                      |

## Pin Descriptions

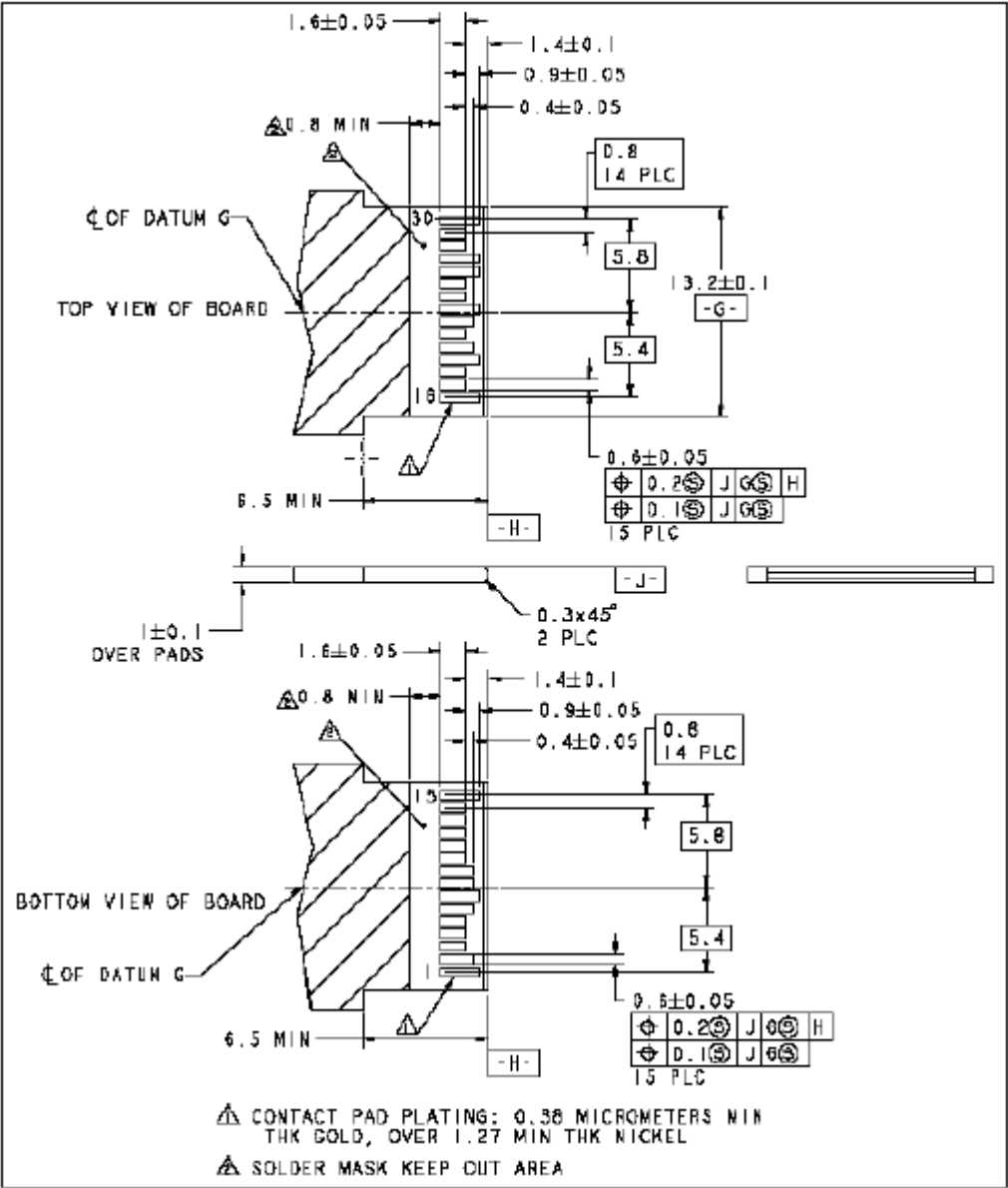
| Pin | Logic     | Symbol     | Name/Descriptions                                                                                                                                                                                                                                                                                | Notes |
|-----|-----------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1   |           | GND        | Module Ground                                                                                                                                                                                                                                                                                    | 1     |
| 2   |           | VEE5       | Optional -5.2V Power Supply                                                                                                                                                                                                                                                                      |       |
| 3   | LVTTL-I   | Mod-Desel  | Module De-select, when held low allows the module to respond to 2-wire serial interface commands                                                                                                                                                                                                 |       |
| 4   | LVTTL-O   | Interrupt  | Interrupt; Indicates presence of an important condition which can be read over the serial 2-wire interface                                                                                                                                                                                       | 2     |
| 5   | LVTTL-I   | TX_DIS     | Transmitter Disable; Turns off transmitter laser output                                                                                                                                                                                                                                          |       |
| 6   |           | VCC5       | +5V Power Supply                                                                                                                                                                                                                                                                                 |       |
| 7   |           | GND        | Module Ground                                                                                                                                                                                                                                                                                    | 1     |
| 8   |           | VCC3       | +3.3V Power Supply                                                                                                                                                                                                                                                                               |       |
| 9   |           | VCC3       | +3.3V Power Supply                                                                                                                                                                                                                                                                               |       |
| 10  | LVTTL-I/O | SCL        | 2-wire Serial interface clock                                                                                                                                                                                                                                                                    | 2     |
| 11  | LVTTL-I/O | SDA        | 2-wire Serial interface data line                                                                                                                                                                                                                                                                | 2     |
| 12  | LVTTL-O   | Mod_Abs    | Indicates Module is not present. Grounded in the Module                                                                                                                                                                                                                                          | 2     |
| 13  | LVTTL-O   | Mod_NR     | Module Not Ready; Indicating Module Operational Fault                                                                                                                                                                                                                                            | 2     |
| 14  | LVTTL-O   | RX_LOS     | Receiver Loss Of Signal Indicator                                                                                                                                                                                                                                                                | 2     |
| 15  |           | GND        | Module Ground                                                                                                                                                                                                                                                                                    | 1     |
| 16  |           | GND        | Module Ground                                                                                                                                                                                                                                                                                    | 1     |
| 17  | CML-O     | RD-        | Receiver Inverted Data Output                                                                                                                                                                                                                                                                    |       |
| 18  | CML-O     | RD+        | Receiver Non-Inverted Data Output                                                                                                                                                                                                                                                                |       |
| 19  |           | GND        | Module Ground                                                                                                                                                                                                                                                                                    | 1     |
| 20  |           | VCC2       | +1.8V Power Supply                                                                                                                                                                                                                                                                               | 3     |
| 21  | LVTTL-I   | P Down/RST | Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode.<br>Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle |       |
| 22  |           | VCC2       | +1.8V Power Supply                                                                                                                                                                                                                                                                               | 3     |
| 23  |           | GND        | Module Ground                                                                                                                                                                                                                                                                                    | 1     |
| 24  | PECL-I    | RefCLK+    | Not required                                                                                                                                                                                                                                                                                     |       |
| 25  | PECL-I    | RefCLK-    | Not required                                                                                                                                                                                                                                                                                     |       |
| 26  |           | GND        | Module Ground                                                                                                                                                                                                                                                                                    | 1     |
| 27  |           | GND        | Module Ground                                                                                                                                                                                                                                                                                    | 1     |
| 28  | CML-I     | TD-        | Transmitter Inverted Data Input                                                                                                                                                                                                                                                                  |       |
| 29  | CML-I     | TD+        | Transmitter Non-Inverted Data Input                                                                                                                                                                                                                                                              |       |
| 30  |           | GND        | Module Ground                                                                                                                                                                                                                                                                                    | 1     |

**Notes:**

1. Module ground pins (GND) are isolated from the module case and chassis ground within the module.
2. Shall be pulled up with 4.7K-10kOhms to a voltage between 3.15V and 3.45V on the host board.
3. Variable Power Supply (VPS) function is not supported.



Recommended Pattern Layout





## Power Supply Noise Tolerance

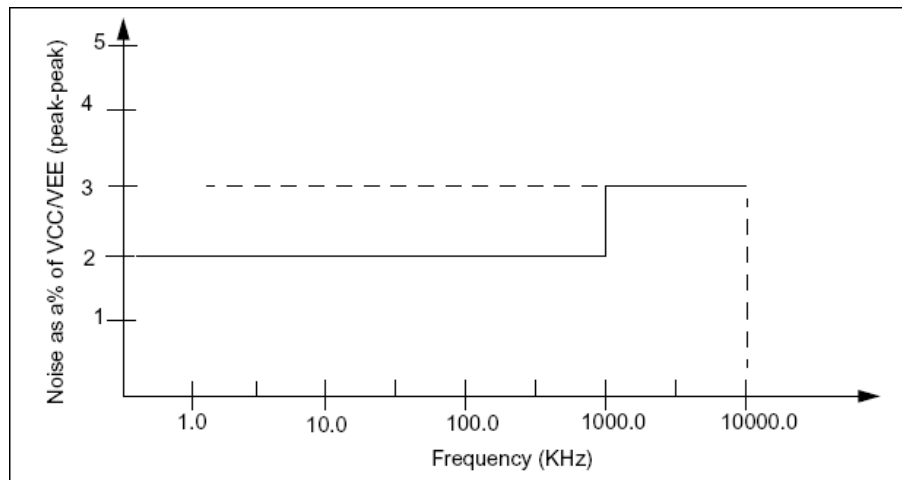
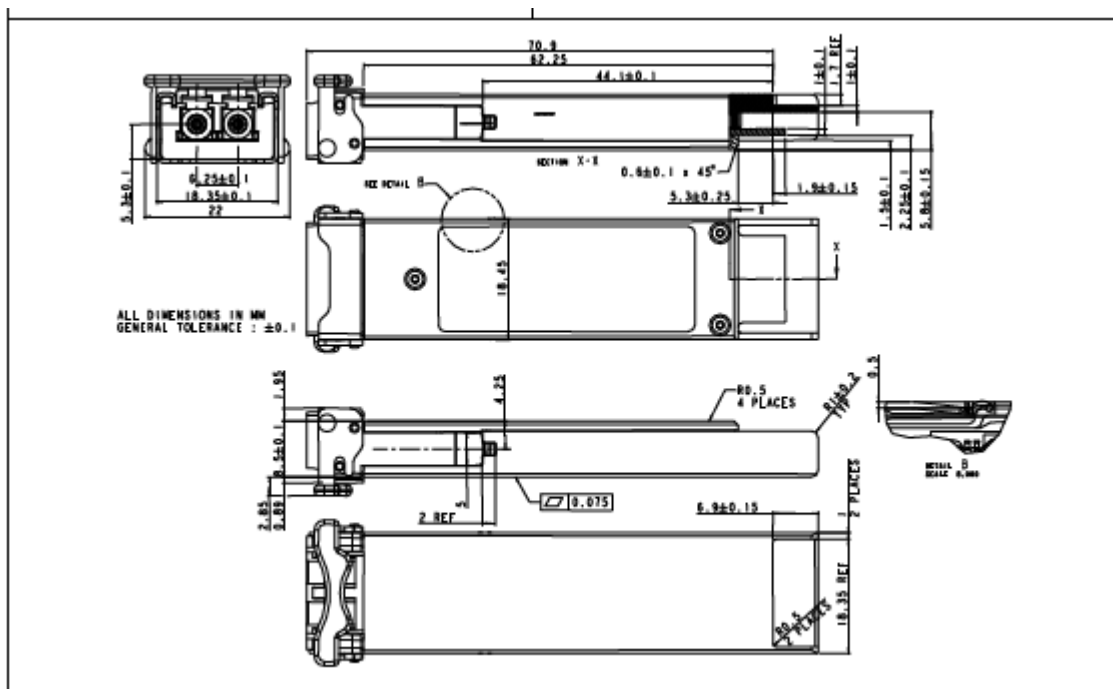


Figure 2 Power Noise Requirement

## Mechanical Specifications



## **OptioConnect**

### **Innovation for the Future of High-Speed Networking**

#### **Who We Are**

OptioConnect is reshaping the landscape of communication and high-speed networking through intelligent technology. With a core focus on cutting edge technology, we deliver smarter fiber optic solutions for enterprise networks, data centers, and next-gen telecom infrastructures.

#### **What We Do**

At OptioConnect, we fuse advanced engineering with intelligent automation to drive the future of networking. Our AI-integrated solutions are designed to optimize performance and streamline operations with:

- Superior Performance
- Network and traffic optimization
- Intelligent energy management
- Seamless OEM compatibility
- Scalable cost-efficiency

#### **Smarter Networks by Design**

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Our engineers, data scientists, and network architects bring decades of experience and a future-focused mindset. We provide hands-on support with intelligent insights that turn complex challenges into simple solutions.

#### **Our Mission**

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