# SFDxx0404F0D – SFP Dual Fibre DWDM

ITU DWDM / 40km / 4x Fibre Channel.

*For your product safety, please read the following information carefully before any manipulation of the transceiver:*

*ESD*

*This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.*

*LASER SAFETY*

*This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).*

*The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.*

## 1. Overview

SFDxx0404F0D is a high performance transceiver module for 4x Fibre Channel data links over a singlemode fibre pair. The maximum reach is 40km, for a 14dB end of life (EOL) power budget. The emitter is a DWDM DFB laser, the receiver a PIN photodiode.

This transceiver module is compliant with the Small Form-factor Pluggable (SFP) Multisource Agreement (MSA) and hot pluggable. Always contact Skylane Optics commercial agents for compatibility with different equipment platforms.

## 2. Features

- SFP Multi-Source Agreement compliant *[INF-8074]*
- Hot pluggable SFP footprint
- Serial ID functionality supported according to [SFF-8472]
- Class 1 laser safety standard IEC 60825 compliant
- Dual LC connector
- DWDM DFB transmitter
- 40km point-to-point transmission on singlemode fibre
- 4x Fibre Channel compliant
- 2x Fibre Channel compliant
- 1x Fibre Channel compliant
- Gigabit Ethernet compatible
- Operating temperature range 0°C to 70°C
- Low power dissipation (<1W)
- Digital diagnostic monitoring (DDM)

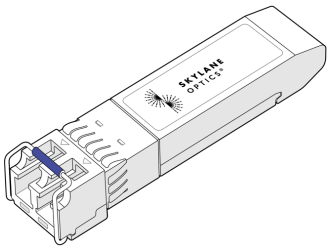

Figure 1. SFP Dual Fibre ITU DWDM
(non-binding illustration)

## 3. Applications

- Gigabit Ethernet
- Storage

## 4. Optical Interface

| P/N | Wavelength [nm] | Output Optical Power[2] [dBm] | Optical Receiver Sensitivity[3] [dBm] | Optical Receiver Overload[4] [dBm] | Power Budget[2] [dB] |
|---|---|---|---|---|---|
| **SFDxx0404F0D** | ITU DWDM | 0 to 5 | ≤ -14 | -3 | ≥ 14 |

1. Distance is estimated assuming typical optical losses after decent quality fiber deployment; Only optical budget value is guaranteed.
2. EOL, over operating temperature range
3. Measured at 4x Fibre Channel
4. The optical input to the receiver should not exceed this value. Transmitters must never be directly connected to receivers (optical loop back) before ensuring that proper optical attenuation is used.

## 5. Technical Parameters

| 5.1. Recommended Operating Conditions | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Min** | **Typ** | **Max** | **Units** | **Notes** |
| Storage temperature | -40 | | 85 | °C | |
| Operating Case Temperature | 0 | | 70 | °C | |
| Relative Humidity | 5 | | 95 | % | Non condensing |
| Power Supply Voltage | 3.15 | 3.3 | 3.45 | V | |
| Power Supply Current | | | 300 | mA | |

| 5.2. Transmitter Optical Specifications | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Min** | **Typ** | **Max** | **Units** | **Notes** |
| Average Output Power | 0 | | 5 | dBm | 5 |
| Center Wavelength spacing | | 100 | | GHz | |
| Wavelength of Operation | According to order information | | | nm | |
| Optical Extinction Ratio ER | 4.5 | | | dB | |
| Spectral Width | | | 0.3 | nm | |

5. Output power coupled into a 9/125 µm single-mode fibre

| 5.3. Receiver Optical Specifications | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Min** | **Typ** | **Max** | **Units** | **Notes** |
| Sensitivity | | | -14 | dBm | 6 |
| Receiver Overload | -3 | | | dBm | |
| Wavelength of Operation | 1528 | | 1564 | nm | |

6. With BER better than or equal to $1x10^{-12}$, measured in the center of the eye opening with $2^{31}$-1 PRBS

## 6. Transceiver Electrical Pad Layout

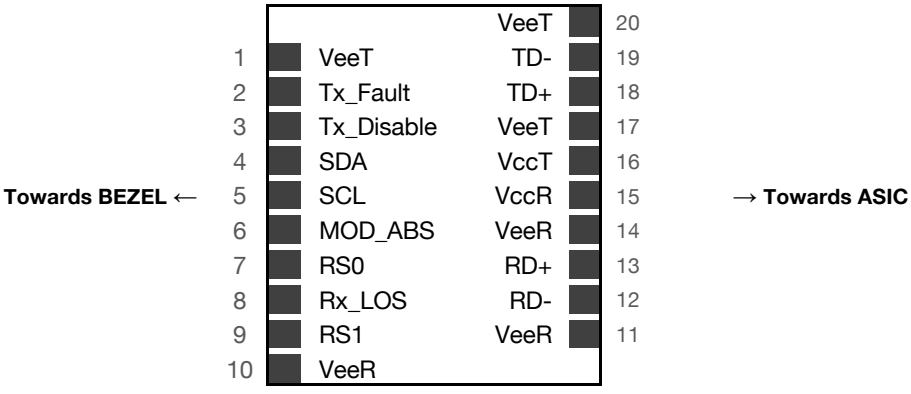


Figure 2. Transceiver Electrical Pad Layout

## 7. Module Electrical Pin Definition

| Pin Number | Name | Function |
|---|---|---|
| 1 | VeeT | Transmitter Ground |
| 2 | TX_Fault | Transmitter Fault Indication |
| 3 | TX_ Disable | Transmitter Disable |
| 4 | SDA | 2-Wire Serial Interface Data (SDA) |
| 5 | SCL | 2-Wire Serial Interface Clock (SCL) |
| 6 | MOD_ABS | Function Not available |
| 7 | RS0 | Rate Select 0 grounded |
| 8 | Rx_LOS | Loss of signal |
| 9 | RS1 | Rate select 1 grounded |
| 10 | VeeR | Receiver Ground |
| 11 | VeeR | Receiver Ground |
| 12 | RD- | Inverted received data output |
| 13 | RD+ | Received data output |
| 14 | VeeR | Receiver Ground |
| 15 | VccR | Receiver Power |
| 16 | VccT | Transmitter Power |
| 17 | VeeT | Transmitter Ground |
| 18 | TD+ | Transmit data input |
| 19 | TD- | Inverted transmit data input |
| 20 | VeeT | Transmitter Ground |

## 8. EEPROM

SFP+ MSA [SFF-8431]

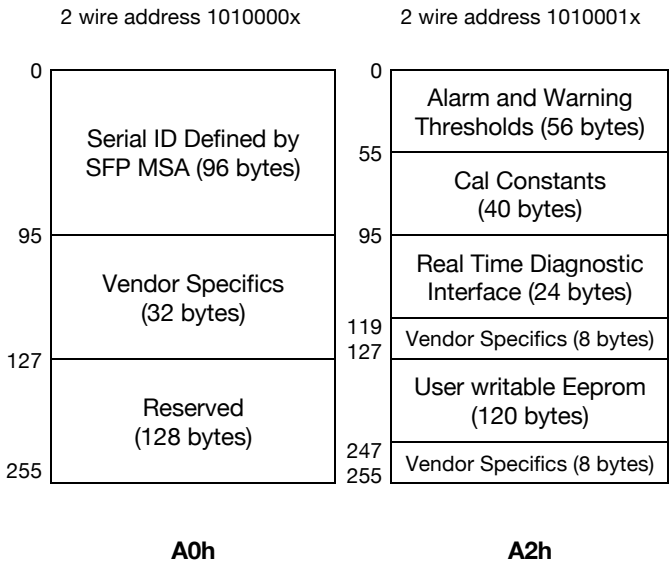


Figure 3. EEPROM of a an SFP

## 9. Ordering Information

| Part Number | Description |
|---|---|
| **SFD170404F0D** | SFP dual fibre DWDM, Tx **1563.86nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD180404F0D** | SFP dual fibre DWDM, Tx **1563.05nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD190404F0D** | SFP dual fibre DWDM, Tx **1562.23nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD200404F0D** | SFP dual fibre DWDM, Tx **1561.42nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD210404F0D** | SFP dual fibre DWDM, Tx **1560.61nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD220404F0D** | SFP dual fibre DWDM, Tx **1559.79nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD230404F0D** | SFP dual fibre DWDM, Tx **1558.98nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD240404F0D** | SFP dual fibre DWDM, Tx **1558.17nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD250404F0D** | SFP dual fibre DWDM, Tx **1557.36nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD260404F0D** | SFP dual fibre DWDM, Tx **1556.56nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD270404F0D** | SFP dual fibre DWDM, Tx **1555.75nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD280404F0D** | SFP dual fibre DWDM, Tx **1554.94nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD290404F0D** | SFP dual fibre DWDM, Tx **1554.13nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD300404F0D** | SFP dual fibre DWDM, Tx **1553.33nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD310404F0D** | SFP dual fibre DWDM, Tx **1552.52nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD320404F0D** | SFP dual fibre DWDM, Tx **1551.72nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD330404F0D** | SFP dual fibre DWDM, Tx **1550.92nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD340404F0D** | SFP dual fibre DWDM, Tx **1550.12nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD350404F0D** | SFP dual fibre DWDM, Tx **1549.32nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD360404F0D** | SFP dual fibre DWDM, Tx **1548.52nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD370404F0D** | SFP dual fibre DWDM, Tx **1547.72nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD380404F0D** | SFP dual fibre DWDM, Tx **1546.92nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD390404F0D** | SFP dual fibre DWDM, Tx **1546.12nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD400404F0D** | SFP dual fibre DWDM, Tx **1545.32nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD410404F0D** | SFP dual fibre DWDM, Tx **1544.53nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD420404F0D** | SFP dual fibre DWDM, Tx **1543.73nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD430404F0D** | SFP dual fibre DWDM, Tx **1542.94nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD440404F0D** | SFP dual fibre DWDM, Tx **1542.14nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD450404F0D** | SFP dual fibre DWDM, Tx **1541.35nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD460404F0D** | SFP dual fibre DWDM, Tx **1540.56nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD470404F0D** | SFP dual fibre DWDM, Tx **1539.77nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD480404F0D** | SFP dual fibre DWDM, Tx **1538.98nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD490404F0D** | SFP dual fibre DWDM, Tx **1538.19nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |

| | |
|---|---|
| **SFD500404F0D** | SFP dual fibre DWDM, Tx **1537.4nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD510404F0D** | SFP dual fibre DWDM, Tx **1536.61nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD520404F0D** | SFP dual fibre DWDM, Tx **1535.82nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD530404F0D** | SFP dual fibre DWDM, Tx **1535.04nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD540404F0D** | SFP dual fibre DWDM, Tx **1534.25nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD550404F0D** | SFP dual fibre DWDM, Tx **1533.47nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD560404F0D** | SFP dual fibre DWDM, Tx **1532.68nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD570404F0D** | SFP dual fibre DWDM, Tx **1531.9nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD580404F0D** | SFP dual fibre DWDM, Tx **1531.12nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD590404F0D** | SFP dual fibre DWDM, Tx **1530.33nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD600404F0D** | SFP dual fibre DWDM, Tx **1529.55nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |
| **SFD610404F0D** | SFP dual fibre DWDM, Tx **1528.77nm** (DWDM DFB), Rx (PIN), maximum distance 40km, power budget 14dB, 4x Fibre Channel, LC connector, 0°C to 70°C, DDM |

## 10. Document Revision Information

| Revision | Description |
|---|---|
| **A** | Initial release |

Skylane Optics® supplies a broad range of optical transceivers. Our engineers work closely with our customers to find the best solutions for every application. We are committed to provide high quality products and services to our customers.

For questions on this product please contact:
**support@skylaneoptics.com**