

# *iDFC™ Micro-OTDR SFP Transceiver*

## *Fast Fiber Fault Finder™*

*Optical Supervisory Channel (OSC),*
*CWDM and Point-to-Point Applications*
*Automatically Detects, Locates and Reports Optical Fiber Faults.*

## Major Features and Benefits

- Integral Micro-OTDR SFP Transceiver - ***iDFC™***
- Dual Fiber, Full Duplex, SFP
- -20°C to +70°C $T_{OP}$ Commercial
- -40°C to +85°C $T_{OP}$ Industrial *
- TIA-598-C ZonuColor™ Code
- Dead Zone of 50 meters or Less
- Resolution of 10 meters or Better
- Accuracy of ± 50 meters or Better
- Minimum 34 dB Link Budget for FE ZX Data Model
- Minimum 23 dB Link Budget for GbE ZX Data Model
- Typical 65 dB Dynamic Range for the *TxOTDR™*
- Automatically Measures ORL and Optical SNR
- Operates Anywhere Conventional SFPs Operate

* CWDM Operation Limited by Optical Mux/Dmux Pass-Band.

## Major Benefits

- Physical Layer Fault Detection
- Distributed Remote Fiber Monitoring
- Reduce Network Mean-Time-To-Repair (MTTR)
- No Additional Special Equipment
- Eliminates Fault Detection Delay

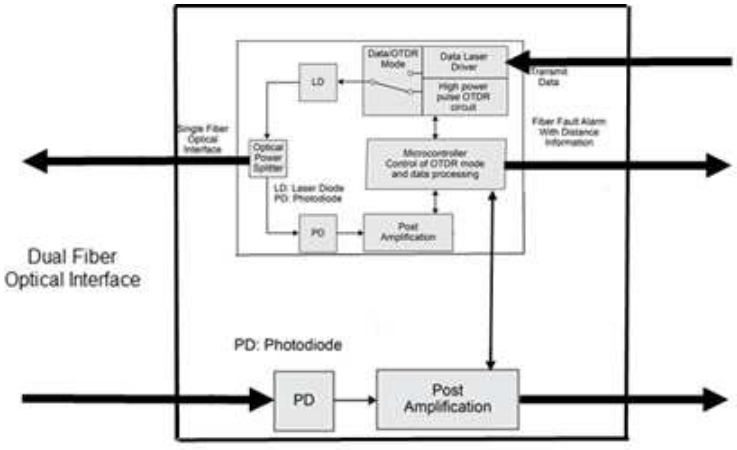
## Recommended Applications

- Optical Supervisory Channel (OSC)
- Network Monitoring
- Network Maintenance
- Business Class Service
- Metro-Ethernet Direct

***iDFC™ Series*** SFP Transceivers transmit and receive full duplex data over conventional two-fiber optical data links. Upon disruption of the optical fiber data link, or failure to connect, the Transmitter Section of the SFP unit switches into ***TxOTDR™*** Mode.

Optical fiber faults and intermittent connections present optical reflections of varying intensities. The reflection intensity of a fiber break has a known statistical distribution. Monitoring multiple fibers in the same cable trunk increases the detection probability (each fiber break reflects differently).

An optical fiber link may be monitored from one side, or both sides, when ring topology is utilized. (See Chart last page.)




**Model Selection Guide**
(See Performance Specifications on next page.)

| Reach Category: | Ultra-Long Reach 100 Km Class | Ultra-Long Reach 80 Km Class |
|---|---|---|
| Model Series: | S-Series (FastE / OC-3 / STM-1) | C-Series (GbE) |
| Part Nomenclature: | AF6-DxxFZ-LU | AF6-DxxGZ-LU |

## *iDFC™* SFP Transceiver Characteristics

| **Specific Characteristics** (-20°C to +70°C) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Reach Category:** | | **Ultra-Long Reach 100 Km Class** | | | **Ultra-Long Reach 80 Km Class** | | | |
| **Model Series:** | | **S-Series (FastE / OC-3 / STM-1)** | | | **C-Series (FastE / GbE)** | | | |
| **Part Nomenclature:** | **Duplex LC/UPC Receptacle:** | **AF6-DxxFZ-LU** | | | **AF6-DxxGZ-LU** | | | |
| **Transmitter** | | | | | | | | |
| **Parameter** | **Sym** | **Min** | **Typ** | **Max** | **Min** | **Typ** | **Max** | **Units** |
| Average Optical Output Power – FastE | $P_O$ | -2 | 0 | 1 | -2 | 0 | 1 | dBm |
| Output Eye Conformance | | IEEE 802.3-2008<br>SONET OC-3<br>SDH STM-1 | | | IEEE 802.3-2008 | | | |
| **Receiver** (Ethernet Sensitivity/Overload referenced to BER < 10E-12 with 2^7-1 PRBS; SONET/SDH Sensitivity and Overload referenced to BER < 10E-10 with 2^23-1 PRBS.) | | | | | | | | |
| **Parameter** | **Sym** | **Min** | **Typ** | **Max** | **Min** | **Typ** | **Max** | **Units** |
| Average Optical Input Power – FastE | $P_{Min}$ | - | - | -35 | - | - | -27 | dBm |
| Loss Of Signal De-Asserted – FastE | $P_D$ | - | -34 | - | - | -26 | - | dBm |
| Loss Of Signal Asserted – FastE | $P_A$ | - | -35 | - | - | -27 | - | dBm |
| Output Eye Conformance | | IEEE 802.3-2008<br>SONET OC-3<br>SDH STM-1 | | | IEEE 802.3-2008 | | | |
| **Link** (* Note: For optimized FastE order AF6-DxxFZ-LU.) | | | | | | | | |
| **Parameter at Specified Bit Rate (Mbps)** | **Sym** | **125** | **-** | **156** | **125** | **-** | **1250** | **Units** |
| Minimum Data Sheet Optical Power Budget | | 33 | - | 33 | 25 | - | 25 | dB |
| Minimum Planning Optical Power Budget | | 31 | - | 31 | 23 | - | 23 | dB |

| **Micro-OTDR Mode Characteristics** (-20°C to +70°C) | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Sym** | **Min** | **Typ** | **Max** | **Units** |
| Dynamic Range | DR | - | 65 | - | dB |
| Dead Zone | | - | - | 30 | m |
| Resolution | | - | - | 10 | m |
| Accuracy | | - | - | 50 | m |

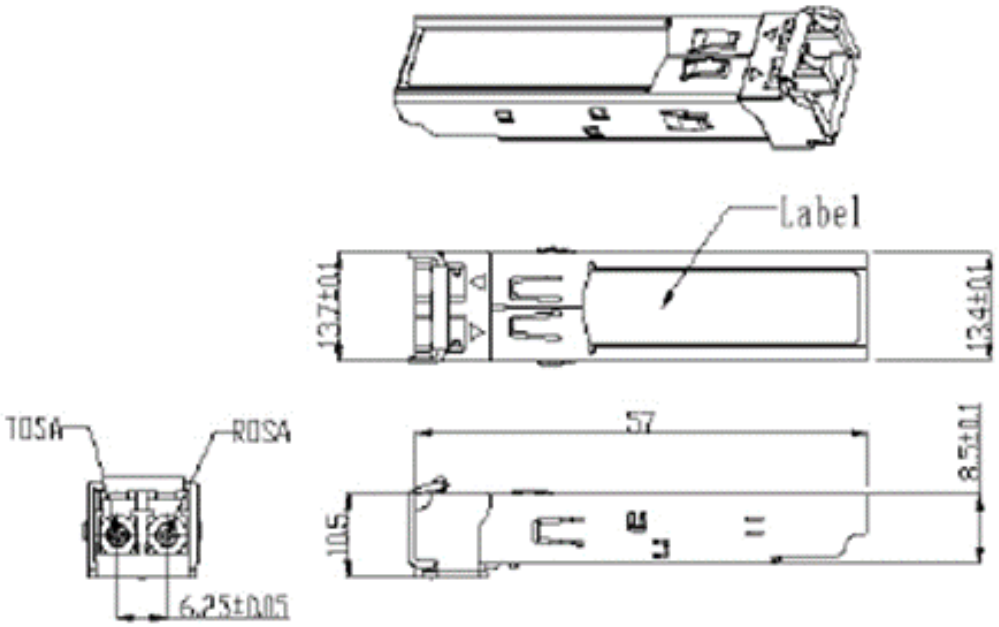
| **Absolute Maximum Ratings** | | | | |
|---|---|---|---|---|
| **Parameter** | **Sym** | **Min** | **Max** | **Units** |
| Storage Temperature (Case) | $T_S$ | -40 | +85 | °C |
| Operating Temperature (Case) | $T_O$ | -20 | +70 | °C |
| Relative Humidity | RH | 5 | 95 | % |
| Power Supply Voltage | Vcc | 0 | 3.6 | V |
| Input Voltage | | GND | Vcc | V |

| **Common Characteristics** (-20°C to +70°C) | | | | | |
|---|---|---|---|---|---|
| **Transmitter** | | | | | |
| **Parameter** | **Sym** | **Min** | **Typ** | **Max** | **Units** |
| Power Supply Voltage | $Vcc_{TX}$ | 3.15 | 3.3 | 3.45 | V |
| Power Supply Current | $Icc_{TX}$ | - | - | 140 | mA |
| Operating Wavelength | l | - | CC | - | nm |
| Spectral Width (RMS) | $\Delta\lambda_{RMS}$ | - | - | 0.1 | nm |
| Optical Power When Disabled | $Po_{DISABLE}$ | - | - | -30 | dBm |
| TX Enable Timing | | - | - | 0.1 | ms |
| TX Enable Voltage | | - | $Vcc_{TX}$ | - | V |
| TX Disable Voltage | | 0 | - | 0.8 | V |
| TX Alarm Voltage (No Alarm Condition) | | 0 | - | 0.8 | V |
| TX Alarm Voltage (Alarm Condition) | | - | $Vcc_{TX}$ | - | V |
| Optical Extinction Ratio | $E_R$ | 9 | - | - | dB |
| Total Jitter | $T_J$ | - | - | 0.3 | UI |

| **Laser Δλ = 0.1 nm per °C** | | | |
|---|---|---|---|
| **$T_{OP}$** | **°C** | **$\Delta\lambda_C$ (nm)** | **Δλ (nm)** |
| High | + 85 | $\lambda_C$ + 6.0 | + 6.0 |
| Room | + 25 | $\lambda_C$ | - |
| Low | - 40 | $\lambda_C$ – 6.5 | - 6.5 |

| **Common Characteristics** (-20°C to +70°C) | | | | | |
|---|---|---|---|---|---|
| **Receiver** | | | | | |
| **Parameter** | **Sym** | **Min** | **Typ** | **Max** | **Units** |
| Power Supply Voltage | $Vcc_{RX}$ | 3.15 | 3.3 | 3.45 | V |
| Power Supply Current | $Icc_{RX}$ | - | - | 110 | mA |
| Operating Wavelength | λ | 1260 | - | 1635 | nm |
| Average Maximum Input Power | $P_{MAX}$ | 1 | - | - | dBm |
| Loss Of Signal Hysteresis | $P_D – P_A$ | 1 | - | - | dB |
| CML Data Output Level HIGH | $R_D$ | $Vcc_{RX}$-0.020 | $Vcc_{RX}$-0.005 | $Vcc_{RX}$ | V |
| CML Data Output Level LOW | $R_D$ | $Vcc_{RX}$-0.475 | $Vcc_{RX}$-0.400 | $Vcc_{RX}$-0.350 | V |
| Total Jitter | $T_J$ | - | - | 0.35 | UI |

**Duplex LC Receptacle Configuration: AF6-DxxFZ-LU and AF6-DxxGZ-LU:**



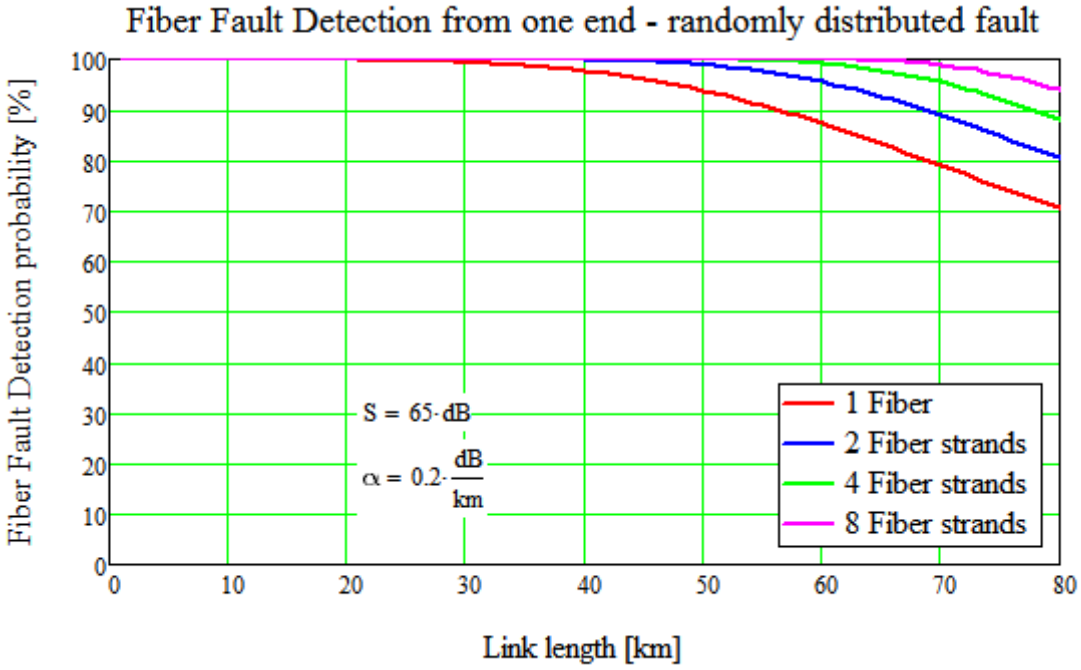

**Ordering Information: Part Numbers and ZonuColor™ Code – CWDM:**

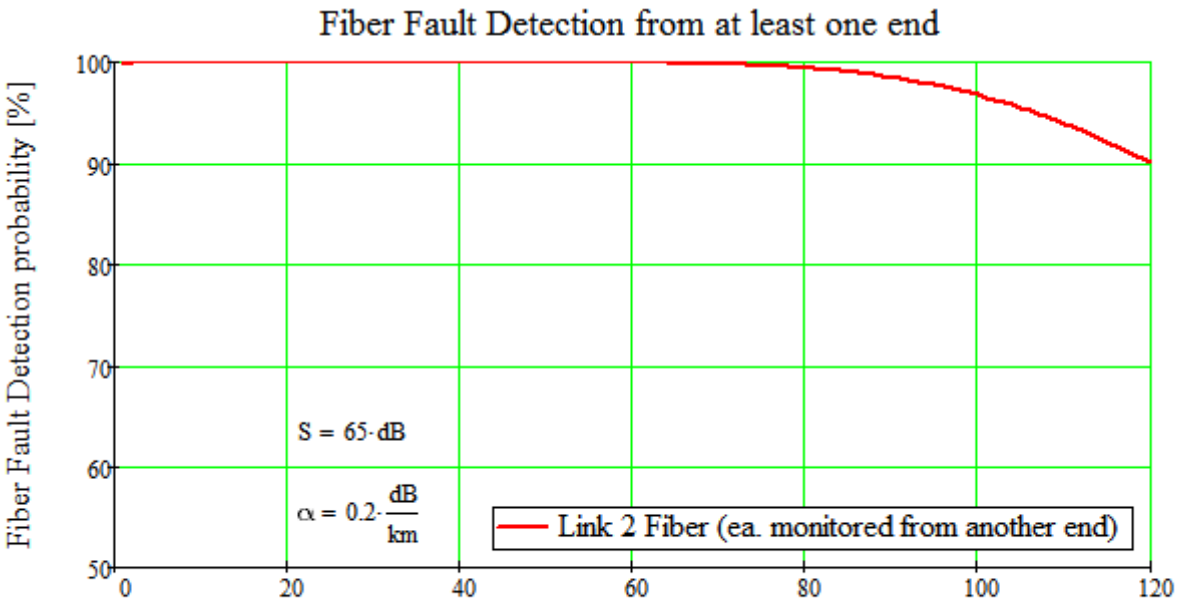
| ITU Ch | λc nm | OZC PN | Color | Verbal | Laser |
|---|---|---|---|---|---|
| | | | | | |
| - | 1625 | AF6-D62xZ-LU | MA | Magenta | DFB |
| 18 | 1611 | AF6-D61xZ-LU | BR | Brown | DFB |
| 17 | 1591 | AF6-D59xZ-LU | YL | Yellow | DFB |
| 16 | 1571 | AF6-D57xZ-LU | OR | Orange | DFB |
| 15 | 1551 | AF6-D55xZ-LU | BK | Black | DFB |
| 14 | 1531 | AF6-D53xZ-LU | RD | Red | DFB |
| 13 | 1511 | AF6-D51xZ-LU | WH | White | DFB |
| 12 | 1491 | AF6-D49xZ-LU | BL | Blue | DFB |
| 11 | 1471 | AF6-D47xZ-LU | SL | Slate | DFB |
| 10 | 1451 | AF6-D45xZ-LU | GR | Green w Black Tracer | DFB |
| 9 | 1431 | AF6-D43xZ-LU | BR | Brown w Black Tracer | DFB |
| 8 | 1411 | AF6-D41xZ-LU | YL | Yellow w Black Tracer | DFB |
| 7 | 1391 | AF6-D39xZ-LU | OR | Orange w Black Tracer | DFB |
| 6 | 1371 | AF6-D37xZ-LU | BK | Black w Yellow Tracer | DFB |
| 5 | 1351 | AF6-D35xZ-LU | RD | Red w Black Tracer | DFB |
| 4 | 1331 | AF6-D33xZ-LU | WH | White w Black Tracer | DFB |
| 3 | 1311 | AF6-D31xZ-LU | GR | Green | DFB |
| 2 | 1291 | AF6-D29xZ-LU | BL | Blue w Black Tracer | DFB |
| 1 | 1271 | AF6-D27xZ-LU | SL | Slate w Black Tracer | DFB |
| | | | | | |

| Pin Assignments | | |
|---|---|---|
| **Pin #** | **Pin Name** | **Pin Function** |
| 1 | VeeT | Transmitter Ground |
| 2 | TX Fault | Transmitter Fault Indication |
| 3 | TX Disable | Transmitter Disable |
| 4 | MOD-DEF2 | Module Definition 2 |
| 5 | MOD-DEF1 | Module Definition 1 |
| 6 | MOD_DEF0 | Module Definition 0 |
| 7 | NC | (No Connection) |
| 8 | LOS | Loss of Signal |
| 9 | VeeR | Receiver Ground |
| 10 | VeeR | Receiver Ground |
| 11 | VeeR | Receiver Ground |
| 12 | RD- | Inverted Received Data Out |
| 13 | RD+ | Received Data Out |
| 14 | VeeR | Received Ground |
| 15 | VccR | Receive Power |
| 16 | VccT | Transmitter Power |
| 17 | VeeT | Transmitter Ground |
| 18 | TD+ | Transmitted Data In |
| 19 | TD- | Inverted Transmit Data In |
| 20 | VeeT | Transmitter Ground |

***Note**: Below -30 dBm input optical power, DDM Measured Rx Input Power readings in Byte 104 and Byte 105 of Page A2h become inaccurate and unusable.*

## Fiber Fault Detection – Randomly Distributed Faults




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**For More Information**

Contact us or visit:

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CSA Group


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***Fast Fiber Fault Finder™***

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