

## Features

- Supports 8.5Gb/s to 11.35Gb/s
- -300 to +1600 ps/nm Dispersion Tolerance
- Supports 50GHz ITU-based channel spacing (C-Band) with a wavelength locker
- Monolithic MZM Tunable TOSA
- Temperature range: -5°C to 70°C
- RoHS-6 Compliant (lead-free)
- Power dissipation <3.5W
- Built-in digital diagnostic functions
- High performance APD Receiver
- Adjustable receiver threshold with option for automatic optimization through FEC feedback



## Applications

- DWDM 10Gb/s SONET/SDH
- DWDM 10Gb/s Ethernet & 10Gb/s Fibre Channel
- DWDM 10Gb/s SONET/SDH w/FEC
- DWDM 10Gb/s Ethernet and 10Gb/s Fibre Channel w/FEC

## Absolute Maximum Ratings

| Parameter                  | Symbol            | Min  | Max | Unit |
|----------------------------|-------------------|------|-----|------|
| Maximum Supply Voltage #1  | Vcc3              | -0.5 | 4.0 | V    |
| Maximum Supply Voltage #2  | Vcc2              | -0.5 | 6.0 | V    |
| Storage Temperature        | T <sub>s</sub>    | -40  | 85  | °C   |
| Case Operating Temperature | T <sub>OP</sub>   | -5   | 70  | °C   |
| Receiver Damage Threshold  | P <sub>Rdmg</sub> | +3   |     | dBm  |

## Electrical Characteristics (TOP = -5 to 70 °C, VCC5 = 4.75 to 5.25 Volts)

| Parameter                                | Symbol                 | Min       | Typ | Max                 | Unit | Ref. |
|--|------------------------|-----------|-----|---------------------|------|------|
| Supply Voltage #1                        | Vcc3                   | 3.13      |     | 3.46                | V    |      |
| Supply Voltage #2                        | Vcc5                   | 4.75      |     | 5.25                | V    |      |
| Supply Current – Vcc5 supply             | Icc5                   |           |     | 500                 | mA   |      |
| Supply Current – Vcc3 supply Temperature | Icc3                   |           |     | 750                 | mA   |      |
| Module total power dissipation           | P                      |           |     | 3.5                 | W    | 1    |
| <b>Transmitter</b>                       |                        |           |     |                     |      |      |
| Input differential impedance             | R <sub>in</sub>        |           | 100 |                     | Ω    | 2    |
| Differential data input swing            | V <sub>in,pp</sub>     | 120       |     | 820                 | mV   |      |
| Transmit Disable Voltage                 | V <sub>D</sub>         | 2.0       |     | Vcc                 | V    | 3    |
| Transmit Enable Voltage                  | V <sub>EN</sub>        | GND       |     | GND+0.8             | V    |      |
| <b>Receiver</b>                          |                        |           |     |                     |      |      |
| Differential data output swing           | V <sub>out,pp</sub>    |           | 500 | 850                 | mV   | 4    |
| Data output rise time                    | t <sub>r</sub>         |           |     | 35                  | ps   | 5    |
| Data output fall time                    | t <sub>f</sub>         |           |     | 35                  | ps   | 5    |
| LOS Fault                                | V <sub>LOS fault</sub> | Vcc – 0.5 |     | V <sub>CCHOST</sub> | V    | 6    |

|   |                   |                  |    |         |     |   |
|---|-------------------|------------------|----|---------|-----|---|
| LOS Normal                              | VLOS norm         | GND              |    | GND+0.5 | V   | 6 |
| Power Supply Rejection                  | PSR               | See Note 7 below |    |         |     | 7 |
| <b>Reference Clock (AC-Coupled)</b>     |                   |                  |    |         |     |   |
| Single-ended peak to peak voltage swing | V <sub>SEPP</sub> | 200              |    | 900     | mV  |   |
| Single-ended resistance                 | RL                | 40               | 50 | 60      |     |   |
| Frequency clock tolerance               | Δf                | -100             |    | +100    | ppm |   |
| Duty cycle                              |                   | 40               |    | 60      | %   |   |

Notes:

1. Maximum total power value is specified across the full temperature and voltage range.
2. After internal AC coupling.
3. Or open circuit.
4. Into 100 ohms differential termination.
5. 20 – 80 %
6. Loss Of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
7. Per Section 2.7.1. in the XFP MSA Specification1.

### Optical Characteristics (EOL, TOP = -5 to 70°C, VCC5 = 4.75 to 5.25 Volts)

| Transmitter  |                  |                     |                |                     |       |      |
|--|------------------|---------------------|----------------|---------------------|-------|------|
| Parameter  | Symbol           | Min                 | Typ            | Max                 | Unit  | Ref. |
| Output Opt. Pwr: 9/125 SMF                               | P <sub>OUT</sub> | -1                  |                | +3.0                | dBm   |      |
| Optical Extinction Ratio                                 | ER               | 10                  | 11             |                     | dB    |      |
| Wavelength range (ITU Grid)                              | Λ                | 1528.77             |                | 1563.86             | nm    |      |
| Crossing Ratio   |                  | 40                  |                | 60                  | %     |      |
| Center Wavelength Spacing                                |                  |                     | 50             |                     | GHz   | 1    |
| Transmitter Center Wavelength – End Of Life              | λ <sub>c</sub>   | λ <sub>c</sub> -2.5 | λ <sub>c</sub> | λ <sub>c</sub> +2.5 | GHz   | 2    |
| Side Mode Suppression Ratio                              | SMSR             | 35                  |                |                     | dB    |      |
| Wavelength tuning (Cold Start)                           |                  |                     |                | 30                  | s     |      |
| Wavelength tuning (Warm)                                 |                  |                     | 0.5            | 2                   | s     |      |
| Tx Jitter (SONET) 20kHz80MHz                             | T <sub>xj1</sub> |                     |                | 0.3                 | UI    | 3    |
| Tx Jitter (SONET) 4MHz – 80MHz                           | T <sub>xj2</sub> |                     |                | 0.1                 | UI    | 4    |
| Relative Intensity Noise                                 | RIN              |                     |                | -135                | dB/Hz |      |
| SBS threshold (1% of launch power reflected) – Dither On |                  | +16                 |                |                     | dBm   |      |
| Receiver   |                  |                     |                |                     |       |      |
| Overload   | P <sub>MAX</sub> | -6                  |                |                     | dBm   |      |
| Optical Center Wavelength                                | λ <sub>c</sub>   | 1270                |                | 1615                | nm    |      |
| Receiver Reflectance                                     | R <sub>rx</sub>  |                     |                | -27                 | dB    |      |
| LOS De-Assert  | LOS <sub>D</sub> |                     |                | -30                 | dBm   |      |

|                |                  |     |  |  |     |  |
|----------------|------------------|-----|--|--|-----|--|
| LOS Assert     | LOS <sub>A</sub> | -37 |  |  | dBm |  |
| LOS Hysteresis |                  | 0.5 |  |  | dB  |  |

Notes:

1. Corresponds to approximately 0.4 nm.
2.  $\lambda_c$  = Specified ITU Grid wavelength. Wavelength stability is achieved within 30 seconds of power up.
3. Measured with a host jitter of 50 mUI peak-to-peak.
4. Measured with a host jitter of 7 mUI RMS.

### DWDM Wavelength Guide

| ITU Channel Product Code | Frequency (THz) | Center Wavelength(nm) | ITU Channel Product Code | Frequency (THz) | Center Wavelength(nm) |
|--------------------------|-----------------|-----------------------|--------------------------|-----------------|-----------------------|
| 17                       | 191.7           | 1563.86               | 40                       | 194.0           | 1545.32               |
| 18                       | 191.8           | 1563.05               | 41                       | 194.1           | 1544.53               |
| 19                       | 191.9           | 1562.23               | 42                       | 194.2           | 1543.73               |
| 20                       | 192.0           | 1561.42               | 43                       | 194.3           | 1542.94               |
| 21                       | 192.1           | 1560.61               | 44                       | 194.4           | 1542.14               |
| 22                       | 192.2           | 1559.79               | 45                       | 194.5           | 1541.35               |
| 23                       | 192.3           | 1558.98               | 46                       | 194.6           | 1540.56               |
| 24                       | 192.4           | 1558.17               | 47                       | 194.7           | 1539.77               |
| 25                       | 192.5           | 1557.36               | 48                       | 194.8           | 1538.98               |
| 26                       | 192.6           | 1556.55               | 49                       | 194.9           | 1538.19               |
| 27                       | 192.7           | 1555.75               | 50                       | 195.0           | 1537.40               |
| 28                       | 192.8           | 1554.94               | 51                       | 195.1           | 1536.61               |
| 29                       | 192.9           | 1554.13               | 52                       | 195.2           | 1535.82               |
| 30                       | 193.0           | 1553.33               | 53                       | 195.3           | 1535.04               |
| 31                       | 193.1           | 1552.52               | 54                       | 195.4           | 1534.25               |
| 32                       | 193.2           | 1551.72               | 55                       | 195.5           | 1533.47               |
| 33                       | 193.3           | 1550.92               | 56                       | 195.6           | 1532.68               |
| 34                       | 193.4           | 1550.12               | 57                       | 195.7           | 1531.90               |
| 35                       | 193.5           | 1549.32               | 58                       | 195.8           | 1531.12               |
| 36                       | 193.6           | 1548.51               | 59                       | 195.9           | 1530.33               |
| 37                       | 193.7           | 1547.72               | 60                       | 196.0           | 1529.55               |
| 38                       | 193.8           | 1546.92               | 61                       | 196.1           | 1528.77               |
| 39                       | 193.9           | 1546.12               |                          |                 |                       |

### Ordering Information

| Part number   | Description  | TX Power (dBm) | RX Sens. (dBm) | Fiber Budget (dB) | Distance (km) | DDM |
|---------------|--|----------------|----------------|-------------------|---------------|-----|
| SV-XFP-ZXD8DT | Starview XFP module Multi-rate 9.95Gbps to 11.3Gbps supporting OC-192/ STM-64/ 10G LAN/ 10G FC and OC192 Tunable C-Band DWDM 50GHz spacing with Digital Diagnostic Monitoring (DDM) c/w wavelength locker, distance up to 80km | -1 to 3        | -27 to -6      | 26                | 80            | YES |