## 5311XP XGS-PON SFP+ ONT

### XGS-PON ONT for Bridging Applications in a Standard SFP Enclosure

### Features & Benefits

+ Compliant with ITU-T G.9807.1 XGS-PON Standard

+ Supports Symmetrical 10Gbps Data Rates.

+ MSA-Compliant SFP+ Footprint with SC/APC receptacle.

+ Ideal for FTTH, Mobile Backhaul, and Business Deployments

+ IEEE 1588v2 and Y.1731 Support

+ Triple-Play QoS and Multicast Video

The DZS 5311XP is a complete XGS-PON ONT in an SFP (Small Form-factor Pluggable) package. Bridging applications are now easier to deploy with this MSA-compliant XGS-PON SFP inserted into a suitable host device. The 5311XP SFP ONT delivers a full range of advanced IP voice, data, and video services over an all-optical broadband access network.

The 5311XP SFP ONT is ideal for converting the network side of a device from a legacy Ethernet connection to a high-speed XGS-PON link. Ethernet switches, routers, set-top boxes, and DZS V1 Velocity Ethernet access products are just some of the devices that may host the 5311XP SFP ONT in their on-board SFP port. The customer side presents a full-duplex 10Gb link with wire-speed throughput. No external power supply is required for the 5311XP SFP ONT.

Dying-Gasp support alerts the network operator of loss of power to the host device, or removal of the 5311XP SFP ONT, helpful for problem identification in remote areas. The 5311XP SFP ONT is hot-pluggable and easy to install. Its small footprint makes it ideal for use where space or physical access to AC power is difficult. Compliant with standard OMCI definitions, the 5311XP ONT is manageable at remote sites and supports the full range FCAPS functions including supervision, monitoring, and maintenance. Provisioning may be accomplished using Dynamic OMCI or DZS Xtreme Access Management System.

# 5311XP

## Service Scenario

The XGS-PON network consists of an Optical Line Termination (OLT) located at the Central Office, and a set of residential Single-Family Unit (SFU) and Multi Dwelling Unit (MDU) locations with Optical Network Terminals (ONTs). Between them is the optical distribution network (ODN) comprised of fibers, passive optical splitters, and couplers.

The 5311XP ONT supports 10 Gigabit symmetrical data using the XGS-PON standard. Services include High- Speed Internet (HIS), Packet Voice, IPTV, OTT video, and cloud-enabled services to multi-media devices.

## Key Service Attributes

+   FSAN ITU-T G.9807.1 XGS-PON compliant

+   10Gbps symmetrical services

+   MTU jumbo frame 9216-byte support

+   IPTV multicast, IGMPv2 and IGMPv3 services

+   Any-port, Any-service data model

+   Traffic management including Q-in-Q tagging, 802.1Q VLANs, multiple subscriber VLANs, per-port rate limiting

+   802.1p priority bits, DiffServ and priority queues based on services types.

+   IEEE 1588v2 and Y.1731 Support

+   Dying-gasp notification

# DZS

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## Product Specifications

### Dimensions
+ MSA-compliant SFP+ enclosure
+ 72mm L x 14mm W x 12mm H
+ Length beyond SFP cage: 24mm

### Weight
+ 31g (with dust cover)
+ 48g (packaged in giftbox)

### Power
+ Input: 3.3VDC +/- 5%, 900mA max.
+ Power Consumption (25C): 2.5W typ.

### Interfaces
+ WAN: XGS-PON SC/APC receptacle
+ System: 10G SFI, 1000BaseX, 2500BaseX

### XGS-PON
+ Compliant with ITU-T G.9807.1 XGS- PON Standard
+ Bi-directional 9.953Gbps
+ Transmitter: Burst-mode, 1270nm, +4.0 to +9 dBm launch power
+ Receiver: Continuous-mode,1577nm, -28 dBm sensitivity
+ Forward Error Correction (FEC) per G.989.3
+ Dying Gasp

### Quality of Service
+ HW-based internal IEEE 802.1p (CoS)
+ Strict Priority (SP)
+ 802.1Q (VLAN tag) QoS mapping ToS/CoS
+ 8 queues per port
+ Classified traffic can be tagged with VLAN ID and Ethernet Priority bit, and can be assigned to priority queues
+ Classify packets into different IEEE 802.1p priority queues according to DSCP values (RFC 2475)
+ The range of traffic shaping or rate- limit shall between 64 Kbps to the maximum port rate with 64kbps granularity. The accuracy error shall be less than ±10%.
+ DSCP IP CoS (RFC 2475)

### Software Features
+ IEEE802.1D and IEEE802.1Q
+ Address learning with auto aging-L2/BPDU Filter
+ Support 4096 MAC learning addresses
+ Multiple T-CONTs/GEM ports per device
+ Flexible mapping between GEM port and T-CONT
+ Priority queues and scheduling on upstream

+ Activation with automatic discovered serial Number and password
+ Multicast: IGMP v2, v3, IGMP snooping

### PtP and SLA
+ IEEE 1588v2
+ ITU-T Y.1731

### Environmental
+ Operating case and storage temperature: -40~185°F (-40~85°C)
+ Operating humidity 10 to 95% (non- condensing)
+ Altitude: –200 to 10,000 feet (–61 to 3,048 m) above sea level

### Management
+ ITU-T 984.1/G988 compliant OMCI interface
+ CLI over telnet
+ Web GUI

### Compliance
+ FCC Part 15 Class B
+ ICES-003 Class B
+ EN55022, EN55024
+ IEC 62368-1
+ FDA IEC 60825-1
+ RoHS 2015/863/EU

## Detailed Specifications

### Absolute Maximum Ratings

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Storage Temperature | Ts | -40 | | 85 | ℃ | |
| Storage Ambient Humidity | HA | 5 | | 85 | % | |
| Power Supply Voltage | VCC | -0.3 | | 3.7 | V | |
| Signal Input Voltage | | -0.3 | | Vcc+0.3 | V | |
| Receiver Damage Threshold | | +3 | | | dBm | |
| Lead Soldering Temperature | TSOLD | | | 260 | ℃ | |
| Lead Soldering Time | TSOLD | | | 10 | sec | |

### Recommended Operating Conditions

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Case Operating Temperature 1 | Tcase | -40 | | 85 | ℃ | I-TEMP |
| Ambient Humidity | HA | 5 | | 70 | % | Non-condensing |
| Power Supply Voltage | VCC | 3.13 | 3.3 | 3.47 | V | |
| Power Supply Current | ICC | | | 900 | mA | |
| Power Dissipation | | | | 3 | W | |
| Power Supply Noise Rejection | | | | 100 | mVp-p | 100Hzto 1MHz |
| DataRate | | | 9.953/9.953 | | Gbps | TxRate/RxRate |
| Transmission Distance | | | | 20 | km | |
| Coupled fiber | Single mode fiber | | | | | 9/125um |

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## Transmitter

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Average Launched Power | PO | 4 | | 9 | dBm | |
| Extinction Ratio | ER | 6 | | | dB | |
| Center Wavelength | λC | 1260 | 1270 | 1280 | nm | DFBLaser |
| Side mode suppression ratio | SMSR | 30 | | | dB | |
| Spectrum Bandwidth (-20dB) | | | | 1 | nm | |
| Transmitter OFF Output Power | POff | | | -45 | dBm | |
| TxBurstontime | Ton | | | 50 | ns | |
| TxBurstofftime | Toff | | | 50 | ns | |
| Differential line input Impedance | RIN | 90 | 100 | 110 | Ohm | |
| Differential Data Input Swing | VDT | 200 | | 1600 | mVp-p | |
| Input Common Mode Voltage | VCM | 1.4 | | Vcc-0.2 | V | |
| Output Eye Mask | Compliant With ITU-TG.987.2 | | | | | |

## Receiver

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Input Optical Wavelength | $\lambda_{IN}$ | 1575 | | 1580 | nm | CWAPD |
| Receiver Sensitivity | $P_{IN}$ | | | -28.5 | dBm | Note(1) |
| Input Saturation Power (Overload) | $P_{SAT}$ | -8 | | | dBm | |
| Signal Detect-Assert Power | PA | -42 | | | dBm | |
| Signal Detect-Deassert Power | PD | | | -29 | dBm | Note(2) |
| Signal Detect-Hysteresis | PA-PD | 0.5 | | 5 | dB | |
| Differential Data Output Swing | VDR | 350 | | 850 | mVp-p | AC-Coupled CML |
| Signal Detect Output Voltage-High | VLOSH | 2.4 | | VCC | V | LVTTL |
| Signal Detect Output Voltage-Low | VLOSL | 0 | | 0.4 | V | |
| Signal Detect-Assert/Deassert Time | | | | 100 | us | |
| RSSI range | | -29 | | -8 | dBm | Accuracy +/-3dB |

*Note (1): Measured with PRBS 2^31-1 test pattern @9.953Gbit/s, BER ≤1×10-3.*
*Note (2): When SD de-asserted, the data output is signal output.*

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## Digital Diagnostic Monitor Interface (DDMI) Description

| DDMI | Monitorscope | MonitorError |
|---|---|---|
| TXpower | 4dBm~9dBm | ±2dBm |
| RXpower | -8dBm~-29dBm | ±3dBm |
| Bias | 0mA~90mA | ±10% |
| Temperature | -40°C~85°C | ±3°C |
| Vcc | 3.0V~3.6V | ±3% |

## Pin Definitions and Description

| Pin No. | Pin Name | Description |
|---|---|---|
| 1 | VeeT | Tx Ground |
| 2 | SFP_Uart_Tx | SFP_Uart_Tx |
| 3 | Tx_Dis | LVTTL input. The default setting is that laser output is disabled when this pin is asserted HIGH and laser output is enabled when this pin is LOW. |
| 4 | MOD_DEF(2) | 2-Wire Serial Data I/O Pin. (SDA) |
| 5 | MOD_DEF(1) | 2-Wire Serial Clock Input. (SCL) |
| 6 | MOD_DEF(0) | Internally Grounded |
| 7 | Dying Gasp / Uart_Rx | Dying Gasp or SFP Uart Rx (controlled by software) |
| 8 | LOS/SD | Set LOS is that active high when signal is detected (LVTTL) |
| 9 | SFP_1PPS | 1PPS |
| 10 | NC | NC |
| 11 | VeeR | RxGround |
| 12 | RXD- | Inverted Receiver Data Output (AC-Coupled internally) |
| 13 | RXD+ | Non-Inverted Receiver Data Output (AC-Coupled internally) |
| 14 | VeeR | RxGround |
| 15 | Vcc_RX | RxVcc |
| 16 | Vcc_TX | TxVcc |
| 17 | Veet | TxGround |
| 18 | TXD+ | Non-Inverted Transmitter Data Input (AC-Coupled) |
| 19 | TXD- | Inverted Transmitter Data Input (AC-Coupled) |
| 20 | Veet | TxGround |

## Digital Diagnostic Memory Map
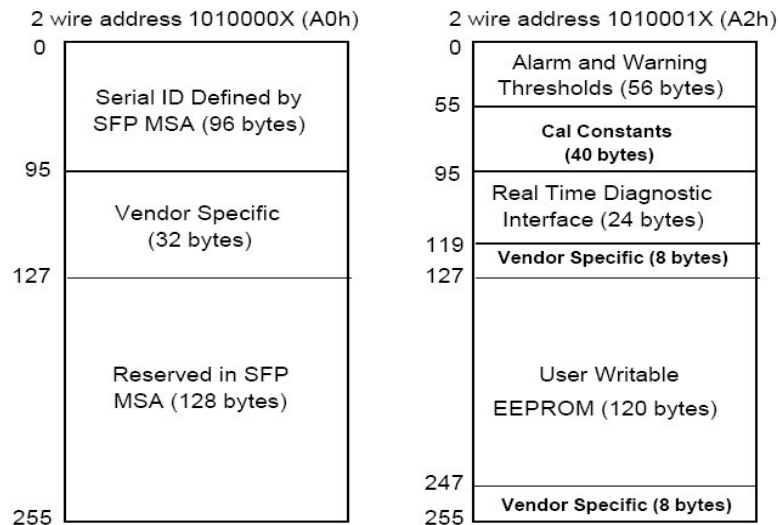


| Addr. | Size (Bytes) | Name of Field | Hex | Description |
|---|---|---|---|---|
| 0 | 1 | Identifier | 03 | SFP |
| 1 | 1 | Ext. Identifier | 04 | SFP function is defined by serial ID only |
| 2 | 1 | Connector | 01 | SCConnector |
| 3-10 | 8 | Transceiver | 000000 0000000000 | TransceiverCodes |
| 11 | 1 | Encoding | 03 | NRZ |
| 12 | 1 | BR, Nominal | 63 | 99*100MBd |
| 13 | 1 | Rate Identifier | 00 | Unspecified |
| 14 | 1 | Length (9um) km | 14 | Transceivertransmitdistance |
| 15 | 1 | Length (9um) 100m | C8 | Transceivertransmitdistance |
| 16 | 1 | Length (50um OM2) | 00 | |
| 17 | 1 | Length (62.5um)10m | 00 | Transceivertransmitdistance |
| 18 | 1 | Length (Copper) | 00 | Notcompliant |
| 19 | 1 | Length (50um OM3) | 00 | |
| 20-35 | 16 | Vendor name | 435A542020202020 2020 20202020 20 | VendorName(ASCII) |
| 36 | 1 | Reserved | 00 | |
| 37-39 | 3 | Vendor OUI | 000000 | er |
| 40-55 | 16 | Vendor PN | 20 2020 20202020 20 20 2020 20202020 20 | VendorPartNumber |
| 56-59 | 4 | Vendor rev | 56312E30 | "V1.0"(ASCII) |

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| Addr. | Size (Bytes) | Name of Field | Hex | Description |
|---|---|---|---|---|
| 60-61 | 2 | Wavelength | 04F6 | 1270nm |
| 62 | 1 | Reserved | 00 | |
| 63 | 1 | CC_BASE | D9 | Check code for Base ID Fields |
| 64-65 | 2 | Options | 001A | TX_DISABLE, TX_FAULT and Loss of Signal implemented. |
| 66 | 1 | BR, MAX | 14 | Not Specified |
| 67 | 1 | BR, MIN | 14 | Not Specified |
| 68-83 | 16 | Vendor SN | SN (Variable) | Serial Number of transceiver (ASCII). |
| 84-91 | 8 | Date code | DC (Variable) | Manufactory Date Code. |
| 92 | 1 | Diagnostic Monitoring Type | 68 | Digital diagnostic monitoring implemented, "Internally calibrated" is implemented |
| 93 | 1 | Enhanced Options | F0 | Optional Soft TX Disable control and monitoring implemented, Optional Soft TX_FAULT monitoring implemented, Optional Soft RX_LOS monitoring implemented |
| 94 | 1 | SFF_8472 Compliance | 03 | Includes functionality described in Rev10.2 SFF-8472 |
| 95 | 1 | CC_EXT | CS (Variable) | Check sum for Extended ID Field. |
| 96-127 | 32 | Vendor Specific | Read only | Programmed by Factory |
| 128-255 | 128 | Reserved | Read only | Programmed by Factory |

## Mechanical
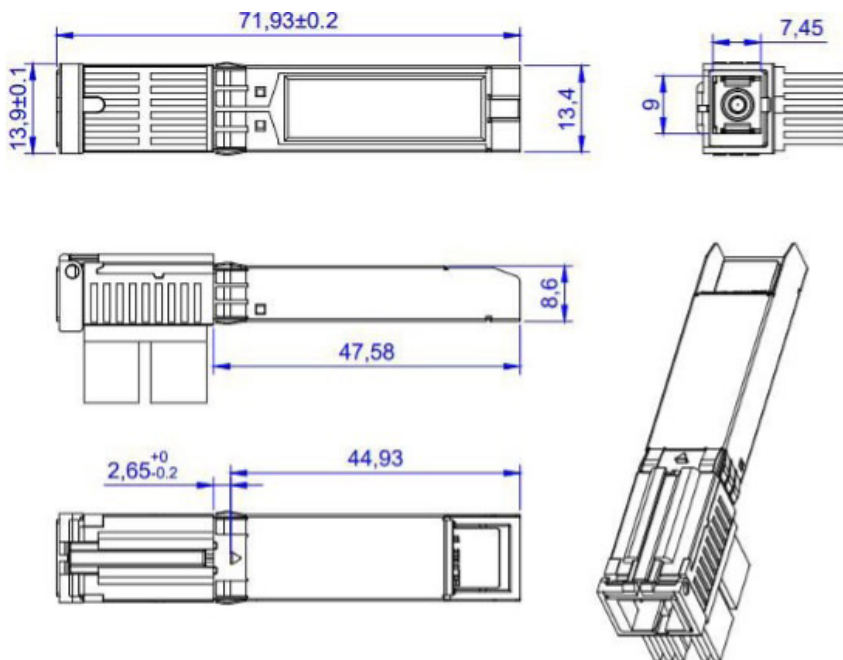
## Ordering Information

| Model | |
|---|---|
| HX-5311XP | XGSPON SFP+ ONT, SC/APC receptacle, 10Gbit SerDes Framer Interface, Indoor, 3.3V, -40/+85C |

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