

Features

- Compliant with QSFP28 Standard: SFF-8661 Rev 2.5, SFF-8636 Rev 2.10a
- High speed I/O electrical interface (CAUI-4) compliant with IEEE 802.3bm-2015
- 100GBASE-ZR4 point-to-point Ethernet links
- Rx sensitivity of -28dBm with enabled KR4 FEC in host for up to 80km SMF
- Single 3.3V Supply Voltage
- Maximum power consumption 6W
- 0-70 °C Case Operating Temperature
- LAN WDM EML laser and SOA+PIN Receiver
- Universal QSFP28 MSA package with duplex LC connector
- Two Wire Serial Interface with Digital Diagnostic Monitoring
- Complies with EU Directive 2011/65/EU (RoHS compliant)
- Class 1 Laser



1. Absolute Maximum Ratings

| Parameter | Symbol | Min. | Max. | Unit |
|------------------------------------|-------------|------|---------|------|
| Storage Temperature | TS | -40 | 85 | °C |
| Supply Voltage | VCC | -0.5 | 3.6 | V |
| Relative Humidity (non-condensing) | RH | 5 | 95 | % |
| Data Input Voltage Differential | IVDIP-VDINI | - | 1 | V |
| Control Input Voltage | VI | -0.3 | VCC+0.5 | V |
| Control Output Current | IO | -20 | 20 | mA |

2. Recommended Operating Conditions

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|---|--------|-------|---------|-------|------|
| Operating Case Temperature | TOPR | 0 | - | 70 | °C |
| Power Supply Voltage | VCC | 3.135 | 3.3 | 3.465 | V |
| Instantaneous peak current at hot plug ¹ | ICC_IP | - | - | 2000 | mA |
| Sustained peak current at hot plug | ICC_SP | - | - | 1650 | mA |

| | | | | | |
|--|------|---------|---------|---------|------|
| Maximum Power Dissipation | PD | - | - | 6 | W |
| Maximum Power Dissipation, Low Power Mode | PDLP | - | - | 1.5 | W |
| Aggregate Bit Rate | ABR | - | 103.125 | - | Gb/s |
| Data Rate per Lane | DRL | - | 25.78 | - | Gb/s |
| Control Input Voltage High | VIH | VCC*0.7 | - | VCC+0.3 | V |
| Control Input Voltage Low | VIL | -0.3 | - | VCC*0.3 | V |
| Two Wire Serial Interface Clock Rate | - | - | - | 400 | kHz |
| Module power supply noise tolerance 10 Hz - 10 MHz (peak-to-peak) | - | - | - | 66 | mVpp |
| Rx Differential Data Output Load | - | - | 100 | - | ohms |
| Operating Distance ¹ | - | 2 | - | 80,000 | m |

Note: 40km without FEC and 80km with FEC.

3. Functional Characteristics (Optical)

The following tables list the performance specifications for the various functional blocks of the integrated optical transceiver module.

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|---|-----------------|---------|---------|---------|------|
| Wavelength L0 | λ_{C0} | 1294.53 | 1295.56 | 1296.59 | nm |
| Wavelength L1 | λ_{C1} | 1299.02 | 1300.05 | 1301.09 | nm |
| Wavelength L2 | λ_{C2} | 1303.54 | 1304.58 | 1305.63 | nm |
| Wavelength L3 | λ_{C3} | 1308.09 | 1309.14 | 1310.19 | nm |
| Side-mode suppression ratio | SMSR | 30 | | | dB |
| Total Average Optical Launch Power | POUT | - | - | 12.5 | dBm |
| Average Launch Power Tx_Off (Each Lane) | POUT_ OFF | - | - | -30 | dBm |
| Average Optical Launch Power (Each Lane) | POUTL | 2 | - | 6.5 | dBm |
| Extinction Ratio | ER | 6 | - | - | dB |
| Spectral Width | $\Delta\lambda$ | - | - | 1 | nm |
| Optical Modulation Amplitude (Each Lane) | OMA | 2.5 | - | 7 | dBm |
| Transmitter and Dispersion Penalty (Each Lane) | TDP | - | - | 2.2 | dB |
| Launch Power in OMA minus TDP (Each Lane) | OMA- TDP | 1.5 | - | - | dBm |

| | | | | | |
|--|--------|---|---|------|-------|
| Difference in launch power between any two lanes (OMA) | DT_OMA | - | - | 4 | dB |
| Optical Return Loss Tolerance | ORLT | - | - | 20 | dB |
| RIN20OMA | RIN | - | - | -130 | dB/Hz |
| Transmitter Reflectance | TR | - | - | -26 | dB |
| Transmitter Eye Mask Definition | - | IEEE 802.3bs-2010 {0.25, 0.4, 0.45, 0.25, 0.28, 0.4} | | | - |

4. Receiver Optical Specifications

| Parameter | Symbol | Min. | Typical | Max. | Unit |
|---|--------------|---------|---------|---------|------|
| Wavelength L0 | $\lambda C0$ | 1294.53 | 1295.56 | 1296.59 | nm |
| Wavelength L1 | $\lambda C1$ | 1299.02 | 1300.05 | 1301.09 | nm |
| Wavelength L2 | $\lambda C2$ | 1303.54 | 1304.58 | 1305.63 | nm |
| Wavelength L3 | $\lambda C3$ | 1308.09 | 1309.14 | 1310.19 | nm |
| Receiver Sensitivity (OMA) per Lane ¹ | | | | -27.5 | dBm |
| Stressed Receiver Sensitivity in OMA (Each Lane) | - | - | - | TBD | dBm |
| Stressed Receiver Sensitivity Test Conditions: | | | | | |
| Stressed Eye J2 Jitter (Each Lane) | - | - | 0.33 | - | UI |
| Stressed Eye J9 Jitter (Each Lane) | - | - | 0.48 | - | UI |
| Vertical Eye Closure Penalty | - | - | 2 | - | dB |
| Damage Threshold for Receiver | Pin, damage | TBD | - | - | dBm |
| Average Receive Power (Each Lane) ¹ | - | -28 | - | -5 | dBm |
| Receive Power in OMA (Each Lane), Overload | OMA | - | - | -4.5 | dBm |
| Receiver Reflectance | RXR | - | - | -26 | dB |
| LOS Assert | LOSA | -40 | - | - | dBm |
| LOS De-assert | LOSD | - | - | -30 | dBm |
| LOS hysteresis | LOSH | 0.5 | - | - | dB |

Note 1: Measured with conformance test signal at TP3 for the BER = 5×10^{-5}

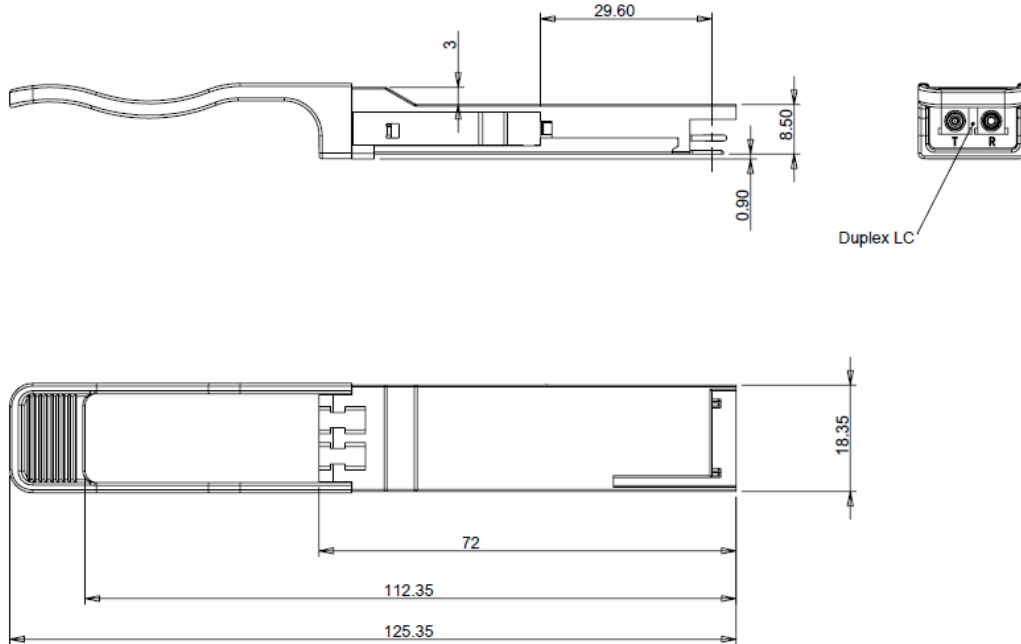
5. Electrical Specification

High-Speed Signal: Compliant to IEEE802.3 CAUI-4 C2M

Low-Speed Signal: Compliant to SFF-8679

| Parameter | Symbol | Min. | Typical | Max. | Unit | Notes |
|------------------------------------|-----------|---------|---------|---------|------|----------|
| Receiver (Module Output) | | | | | | |
| Differential Data Input Amplitude | VIN,P-P | 95 | - | 900 | mVpp | |
| Differential Termination Mismatch | | - | - | 10 | % | |
| LPMode, Reset and ModSelL | VIL | -0.3 | - | 0.8 | V | |
| | VIH | 2 | - | VCC+0.3 | V | |
| Transmitter (Module Input) | | | | | | |
| Differential Data Output Amplitude | VOUT-,P-P | - | - | 900 | mVpp | |
| Differential Termination Mismatch | | - | - | 10 | % | |
| Output Rise/Fall Time, 20%~80% | TR | 12 | - | - | ps | |
| ModPrsL and IntL | VOL | 0 | - | 0.4 | V | IOL=4mA |
| | VOH | VCC-0.5 | - | VCC+0.3 | V | IOL=-4mA |

6. Mechanical Diagram



Note: External physical characteristics are subject to variation. This may include, but is not limited to, external case designs, pull tab colors and/or shapes, removal latch styles or colors, and label sizes and placement. These variations do not affect the function or characteristics of the transceivers.

7. Ordering Information

| OEM | Part Number | OEM | Part Number |
|---------|--------------------|------------------|---------------------|
| Alcatel | 3HE11239AA-ZR-C1 | Juniper | JNP-QSFP-100G-ZR4-A |
| Arista | QSFP-100G-ZR4-A | Juniper | QSFP-100G-ZR4-C1 |
| Calix | 100-04997-ZR4-A | MSA Champion ONE | 100GQSFP28E-ZR4 |
| Ciena | XCVR-Q30V31-80KM-A | MSA Champion ONE | 100GQSFP28E-ZR4-C |
| Cisco | QSFP-100G-ZR4L-S-A | MSA Generic | AN-QSFP28-ZR4 |
| Cisco | QSFP-100G-ZR4L-S-A | MSA OnePort | OP-QSFP28-ZR4 |
| Extreme | 10403-ZR4-A | Nokia | 3HE16558AA-A |
| | | Nokia | 100GQSFP28E-ZR4-N |

8. Contact Information

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