

# Light Optics

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## LO-SP-10G-2S3-20

10Gbps SFP+ Bi-Directional Transceiver, 20km Reach  
1270/1330nm TX / 1330/1270 nm RX

### Features

- ◆ Supports 9.95Gb/s to 10.3Gb/s data rates
- ◆ Simplex LC Connector Bi-Directional SFP+ Optical Transceiver
- ◆ Single 3.3V Supply
- ◆ Up to 20km on 9/125um SMF
- ◆ A:1270nm DFB Laser transmitter,1330nm receiver  
B:1330nm DFB Laser transmitter,1270nm receiver
- ◆ Compliant with IEEE 802.3ae 10GBASE-LR  
and 10GBASE-LW
- ◆ SFP+ MSA SFF-8431 Compliant
- ◆ Digital Diagnostic SFF-8472 Compliant
- ◆ RoHS compliant and Lead Free
- ◆ Operating case temperature:  
Standard: 0 ~ 70 °C

### Applications

- ◆ 10GBASE-LR at 10.3125Gbps
- ◆ 10GBASE-LW at 9.953Gbps
- ◆ Other Optical Links

### Ordering information

| Part Number      | Product Description                     |
|------------------|---|
| LO-SP-10G-2S3-20 | SFP+ BIDI SM 1270nm/1330nm LC 20km 10Gb |
| LO-SP-10G-3S2-20 | SFP+ BIDI SM 1330nm/1270nm LC 20km 10Gb |

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### Absolute maximum rating

| Parameters                 | Symbol   | Min. | Max. | Unit |
|----------------------------|----------|------|------|------|
| Supply Voltage             | $V_{CC}$ | -0.5 | +3.6 | V    |
| Storage Temperature        | $T_C$    | -40  | +85  | °C   |
| Operating Case Temperature | $T_C$    | 0    | +70  | °C   |
| Relative Humidity          | RH       | 0    | 85   | %    |

### Recommended operating environment

| Parameter                  | Symbol   | Min. | Typical | Max | Unit |
|----------------------------|----------|------|---------|-----|------|
| Supply Voltage             | $V_{CC}$ | 3.0  | 3.3     | 3.6 | V    |
| Supply Current             | $I_{CC}$ |      | 200     | 300 | mA   |
| Operating Case Temperature | $T_C$    | 0    | 25      | 70  | °C   |
| Module Power Dissipation   | $P_m$    | -    | 0.7     | 1.1 | W    |

### Electrical characteristics

| Parameter                      | Symbol           | Min. | Typical | Max             | Unit     | Ref. |
|--------------------------------|------------------|------|---------|-----------------|----------|------|
| Supply Voltage                 | $V_{CC}$         | 3.00 |         | 3.60            | V        |      |
| Supply Current                 | $I_{CC}$         |      | 200     | 300             | mA       |      |
| <b>Transmitter</b>             |                  |      |         |                 |          |      |
| Input differential impedance   | $R_{in}$         |      | 100     |                 | $\Omega$ |      |
| Single ended data input swing  | $V_{in,pp}$      | 150  |         | 1200            | mVpp     |      |
| Transmit Disable Voltage       | $V_D$            | 2    |         | $V_{CC}$        | V        |      |
| Transmit Enable Voltage        | $V_{EN}$         | Vee  |         | Vee+0.8         | V        |      |
| <b>Receiver</b>                |                  |      |         |                 |          |      |
| Output differential impedance  | $R_{out}$        |      | 100     |                 | $\Omega$ |      |
| Single ended data output swing | $V_{out,pp}$     | 300  |         | 700             | mV       |      |
| LOS Fault                      | $V_{LOS\ fault}$ | 2    |         | $V_{CC_{HOST}}$ | V        |      |
| LOS Normal                     | $V_{LOS\ norm}$  | Vee  |         | Vee+0.8         | V        |      |

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### Optical characteristics (LO-SP-10G-2S3-20, 1270 DFB & PIN/TIA)

| Parameter                          | Symbol          | Min.                      | Typical | Max   | Unit  | Ref. |
|------------------------------------|-----------------|---------------------------|---------|-------|-------|------|
| <b>Transmitter</b>                 |                 |                           |         |       |       |      |
| Optical Wavelength                 | $\lambda_c$     | 1260                      | 1270    | 1280  | nm    |      |
| Side Mode Suppress Ratio           | SMSR            | 30                        |         |       | dB    |      |
| Spectral Width(-20dB)              | $\Delta\lambda$ |                           |         | 1     | nm    |      |
| Average Output Power               | $P_{op}$        | -2                        |         | 2     | dBm   |      |
| Extinction Ratio                   | ER              | 3.5                       |         |       | dB    |      |
| Eye Mask                           |                 | Compliant with IEEE 802.3 |         |       |       |      |
| Transmitter and Dispersion Penalty | TDP             |                           |         | 3.2   | dB    |      |
| Average Power of OFF Transmitter   |                 |                           |         | -30   | dBm   |      |
| Relative Intensity Noise           | RIN             |                           |         | -128  | dB/Hz |      |
| <b>Receiver</b>                    |                 |                           |         |       |       |      |
| Average Receiver Power             | RSENS           |                           |         | -14.1 | dBm   |      |
| Receiver Overload                  | $P_{MAX}$       |                           |         | +0.5  | dBm   |      |
| Centre Wavelength                  | $\lambda_C$     | 1320                      |         | 1340  | nm    |      |
| LOS De-Assert                      | $LOS_D$         |                           |         | -15   | dBm   |      |
| LOS Assert                         | $LOS_A$         | -30                       |         |       | dBm   |      |
| LOS Hysteresis                     |                 | 0.5                       |         |       | dB    |      |

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**(LO-SP-10G-3S2-20, 1330 DFB & PIN/TIA)**

| Parameter                          | Symbol          | Min.                      | Typical | Max   | Unit  | Ref. |
|------------------------------------|-----------------|---------------------------|---------|-------|-------|------|
| <b>Transmitter</b>                 |                 |                           |         |       |       |      |
| Optical Wavelength                 | $\lambda_c$     | 1320                      | 1330    | 1340  | nm    |      |
| Side Mode Suppress Ratio           | SMSR            | 30                        |         |       | dB    |      |
| Spectral Width(-20dB)              | $\Delta\lambda$ |                           |         | 1     | nm    |      |
| Average Output Power               | $P_{op}$        | -2                        |         | 2     | dBm   |      |
| Extinction Ratio                   | ER              | 3.5                       |         |       | dB    |      |
| Eye Mask                           |                 | Compliant with IEEE 802.3 |         |       |       |      |
| Transmitter and Dispersion Penalty | TDP             |                           |         | 3.2   | dB    |      |
| Average Power of OFF Transmitter   |                 |                           |         | -30   | dBm   |      |
| Relative Intensity Noise           | RIN             |                           |         | -128  | dB/Hz |      |
| <b>Receiver</b>                    |                 |                           |         |       |       |      |
| Average Receiver Power             | RSENS           |                           |         | -14.1 | dBm   |      |
| Receiver Overload                  | $P_{MAX}$       |                           |         | +0.5  | dBm   |      |
| Centre Wavelength                  | $\lambda_C$     | 1260                      |         | 1270  | nm    |      |
| LOS De-Assert                      | $LOS_D$         |                           |         | -15   | dBm   |      |
| LOS Assert                         | $LOS_A$         | -30                       |         |       | dBm   |      |
| LOS Hysteresis                     |                 | 0.5                       |         |       | dB    |      |

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## Mechanical Dimensions

