

## F-tone Networks 10Gbps 2km SFP+ Optical Transceiver FTCS-131X-02DXX

### Features

- ◆ Optical interface compliant to IEEE 802.3ae 10GBASE-LR
- ◆ Electrical interface compliant to SFF-8431
- ◆ Hot Pluggable
- ◆ Supports rate up to 10.3 Gb/s bit rates
- ◆ 1G/2G/4G/ 8G/10G Fiber Channel applications.
- ◆ 1310nm FP transmitter, PIN photo-detector
- ◆ Low power consumption
- ◆ Applicable for 2km SMF connection
- ◆ All-metal housing for superior EMI performance
- ◆ Advanced firmware allow customer system encryption information to be stored in transceiver
- ◆ Cost effective SFP+ solution, enables higher port densities and greater bandwidth
- ◆ For the OBSAI application, the rates are 6.144Gb/s, 3.072 Gb/s, 1.536 Gb/s and 0.768 Gb/s.
- ◆ For the CPRI application, the rates are 6.144Gb/s, 3.072 Gb/s, 2.4576 Gb/s, 1.2288 Gb/s, 0.6144 Gb/s.
- ◆ RoHS6 compliant (lead free)
- ◆ Operating case temperature:
  - Standard : 0 to +70°C
  - Industrial : -40 to +85°C

### Applications

- ◆ 10GBASE-LR at 10.3125Gbps
- ◆ Other optical links

The module provides differential termination and reduce differential to common mode conversion for quality signal termination and low EMI. SFI typically operates over 200 mm of improved FR4 material or up to about 150mm of standard FR4 with one connector.

## Absolute maximum rating

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

| Parameters                 | Symbol           | Min. | Max. | Unit |
|----------------------------|------------------|------|------|------|
| Power Supply Voltage       | V <sub>CC</sub>  | 0    | +3.6 | V    |
| Storage Temperature        | T <sub>c</sub>   | -40  | +85  | °C   |
| Operating Case Temperature | T <sub>c</sub>   | 0    | +70  | °C   |
| Relative Humidity          | RH               | 5    | 95   | %    |
| RX Input Average Power     | P <sub>max</sub> | -    | 0    | dBm  |

## Recommended operating environment

Recommended Operating Environment specifies parameters for which the electrical and optical characteristics hold unless otherwise noted.

| Parameter                  | Symbol          | Min.  | Typical | Max   | Unit |
|----------------------------|-----------------|-------|---------|-------|------|
| Power Supply Voltage       | V <sub>CC</sub> | 3.135 | 3.300   | 3.465 | V    |
| Operating Case Temperature | T <sub>c</sub>  | 0     | 25      | 70    | °C   |

## Low Speed Characteristics

| Parameter         | Symbol | Min.         | Typical | Max          | Unit |
|-------------------|--------|--------------|---------|--------------|------|
| Power Consumption |        |              |         | 1            | W    |
| TX_Fault,RX_LOS   | VOL    | 0            |         | 0.4          | V    |
|                   | VOH    | Host_Vcc-0.5 |         | Host_Vcc+0.3 | V    |
| TX_DIS            | VIL    | -0.3         |         | 0.8          | V    |
|                   | VIH    | 2.0          |         | VCCT+0.3     | V    |
| RS0,RS1           | VIL    | -0.3         |         | 0.8          | V    |
|                   | VIH    | 2.0          |         | VCCT+0.3     | V    |



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unless otherwise specified.

| Parameter                             | Symbol | Min. | Typical | Max  | Unit | Notes      |
|---------------------------------------|--------|------|---------|------|------|------------|
| Data Rate                             |        | -    | 10.3125 | -    | Gbps |            |
| Power Consumption                     |        | -    | 1200    | 1500 | mW   |            |
| <b>Transmitter</b>                    |        |      |         |      |      |            |
| Single Ended Output Voltage Tolerance |        | -0.3 | -       | 4.0  | V    |            |
| C common mode voltage tolerance       |        | 15   | -       | -    | mV   |            |
| Tx Input Diff Voltage                 | VI     | 400  |         | 1600 | mV   |            |
| Tx Fault                              | VoL    | -0.3 |         | 0.4  | V    | At 0.7mA   |
| Data Dependent Input Jitter           | DDJ    |      |         | 0.10 | UI   |            |
| Data Input Total Jitter               | TJ     |      |         | 0.28 | UI   |            |
| <b>Receiver</b>                       |        |      |         |      |      |            |
| Single Ended Output Voltage Tolerance |        | -0.3 | -       | 4.0  | V    |            |
| Rx Output Diff Voltage                | Vo     | 300  |         | 850  | mV   |            |
| Rx Output Rise and Fall Time          | Tr/Tf  | 30   |         |      | ps   | 20% to 80% |
| Total Jitter                          | TJ     |      |         | 0.70 | UI   |            |
| Deterministic Jitter                  | DJ     |      |         | 0.42 | UI   |            |



Figure 1: Interface to Host PCB



Figure 2: Module Contact Assignment

## Pin definition



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## Ordering information

| Part Number    | Product Description               |
|----------------|-----------------------------------|
| FTCS-131X-02D  | 1310nm, 10Gbps, 2km, 0°C ~ +70°C  |
| FTCS-131X-02DI | 1310nm, 10Gbps, 2km, -40 to +85°C |

## References

1. "Specifications for Enhanced Small Form Factor Pluggable Module SFP+", SFF-8431, Rev 4.1, July 6, 2009.
2. "Improved Pluggable Formfactor", SFF-8432, Rev 4.2, Apr 18, 2007
3. IEEE802.3ae – 2002
4. "Diagnostic Monitoring Interface for Optical Transceivers" SFF-8472, Rev 10.3, Dec 1, 2007

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