

# 10Gbps XFP Optical Transceiver RTXM226-408

The RTXM226-408 is a hot pluggable 10Gbps small-form-factor transceiver module integrated with the high performance un-cooled 1310nm DFB laser and high sensitivity PIN receiver. It is compliant to INF-8077i XFP Multi-source Agreement(MSA). The module is a multirate optical transceiver, intended to support Telecom and Datacom applications.

## Specifications

(Tested under recommended operating conditions, unless otherwise noted)

| Parameter                           | Symbol         | Unit | Value |     |      |
|-------------------------------------|----------------|------|-------|-----|------|
|                                     |                |      | Min   | Typ | Max  |
| Optical Transmitter Characteristics |                |      |       |     |      |
| Data Rate                           | -              | Gbps | 9.95  | -   | 11.3 |
| Transmission Distace <sup>1</sup>   | L              | km   | -     | -   | 10   |
| Optical Power                       | P <sub>0</sub> | dBm  | -6    | -   | -1   |
| Center Wavelength Range             | λ <sub>c</sub> |      |       |     |      |

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## Ordering Information

| Part No.    | Specifications |           |            |               |          |             |         |       |          |
|-------------|----------------|-----------|------------|---------------|----------|-------------|---------|-------|----------|
|             | Package        | Data rate | Laser      | Optical Power | Detector | Sensitivity | Top     | Reach | Others   |
| RTXM226-408 | XFP            | 10G       | 1310nm DFB | -6 ~ -1dBm    | PIN      | <-14.4dBm   | -5~70°C | 10km  | DDM,RoHS |

## Block Diagram

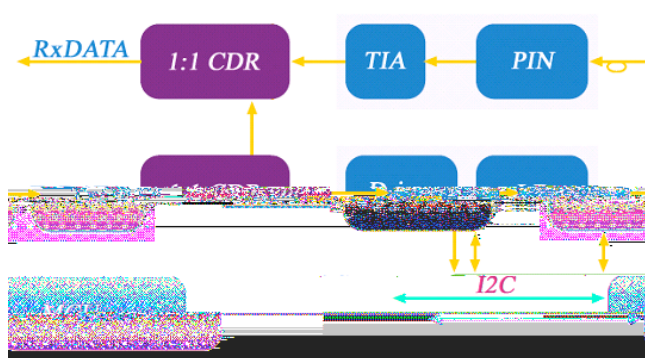


Figure Transceiver functional diagram

## Absolute Maximum Ratings

| Parameter                            | Symbol    | Unit | Min  | Max |
|--------------------------------------|-----------|------|------|-----|
| Supply Voltage                       | $V_{CC3}$ | V    | -0.5 | 4.0 |
| Storage Temperature                  | $T_s$     | °C   | -40  | 85  |
| Operating Case Temperature           | $T_c$     | °C   | -5   | 70  |
| Relative Humidity (Non condensation) | -         | %    | 5    | 90  |

## Recommended Operating Conditions

| Parameter                  | Symbol    | Unit | Min  | Typ | Max  |
|----------------------------|-----------|------|------|-----|------|
| Operating Case Temperature | $T_c$     | °C   | -5   | -   | 70   |
| Supply Voltage             | $V_{CC3}$ | V    | 3.13 | 3.3 | 3.47 |
| Supply Current             | $I_{CC3}$ | mA   | -    | -   | 650  |
| Power Dissipation          | -         | W    | -    | 1.7 | -    |

## Electrical Characteristics

(Tested under recommended operating conditions, unless otherwise noted)

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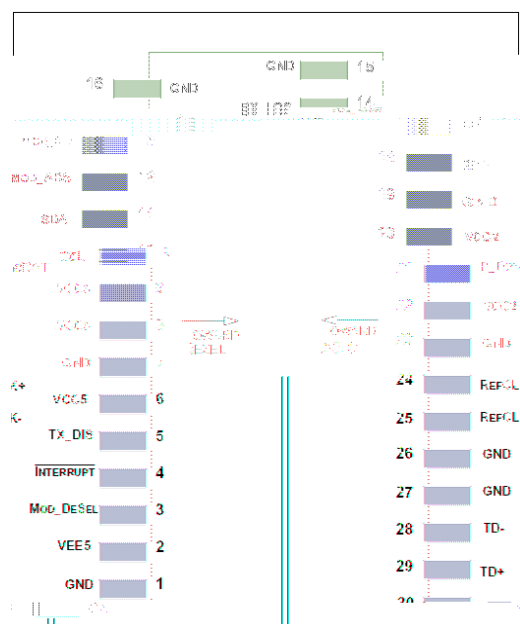
| Parameter                                              | Symbol  | Unit     | Min                   | Typ | Max              | Note |
|--------------------------------------------------------|---------|----------|-----------------------|-----|------------------|------|
| <b>Transmitter</b>                                     |         |          |                       |     |                  |      |
| Input Differential Impedance                           | Rin     | $\Omega$ | -                     | 100 | -                |      |
| Differential Data Input Swing                          | Vin,pp  | mV       | 120                   | -   | 1000             |      |
| Transmit Disable Voltage                               | VD      | V        | 2.0                   | -   | V <sub>cc3</sub> |      |
| Transmit Enable Voltage                                | VEN     | V        | 0                     | -   | +0.8             |      |
| Transmit Disable Assert Time                           | -       | $\mu$ s  | -                     | -   | 10               |      |
| <b>Receiver</b>                                        |         |          |                       |     |                  |      |
| Differential Data Output Swing                         | Vout,pp | mV       | 400                   | -   | 800              |      |
| Data Output Rise Time                                  | Tr      | ps       | 24                    | -   | -                |      |
| Data Output Fall Time                                  | Tf      | ps       | 24                    | -   | -                |      |
| LOS Fault                                              | -       | V        | V <sub>dd3</sub> -0.5 | -   | V <sub>dd3</sub> |      |
| LOS Normal                                             | -       | V        | 0                     | -   | +0.5             | 1    |
| Power Noise Output                                     | -       |          | -                     |     |                  | 2    |
| Note1: V <sub>dd3</sub> is host +3.3V power supply.    |         |          |                       |     |                  |      |
| Note2: Compliant with INF 8077i XFP MSA section 2.7.1. |         |          |                       |     |                  |      |

### Low Speed Electrical Interface

| Parameter                                           | Symbol          | Unit    | Min                   | Max                   | Note |
|-----------------------------------------------------|-----------------|---------|-----------------------|-----------------------|------|
| XFP Tx_Dis,P_Down/RST                               | V <sub>IH</sub> | V       | 2.0                   | V <sub>cc3</sub> +0.3 |      |
|                                                     | V <sub>IL</sub> | V       | -0.3                  | 0.8                   |      |
| XFP Interrupt,Mod_NR,Rx_Los                         | V <sub>OH</sub> | V       | V <sub>dd3</sub> -0.5 | V <sub>dd3</sub> +0.3 | 1    |
|                                                     | V <sub>OL</sub> | V       | 0.0                   | 0.4                   |      |
| XFP SCL and SDA Input                               | V <sub>IH</sub> | V       | V <sub>dd3</sub> *0.7 | V <sub>dd3</sub> +0.5 | 1    |
|                                                     | V <sub>IL</sub> | V       | -0.3                  | V <sub>dd3</sub> *0.3 |      |
| XFP SCL and SDA Output                              | V <sub>OH</sub> | V       | V <sub>dd3</sub> -0.5 | V <sub>dd3</sub> +0.3 |      |
|                                                     | V <sub>OL</sub> | V       | 0.0                   | 0.4                   |      |
| Leakage Current                                     | I <sub>L</sub>  | $\mu$ A | -10                   | 10                    |      |
| I <sup>2</sup> C Clock Rate                         | -               | KHz     | -                     | 400                   |      |
| Note1: V <sub>dd3</sub> is host +3.3V power supply. |                 |         |                       |                       |      |

### Pin Description

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F 2.

1:

| Pin | Logic   | Symbol             | Name/Description                                                                               | Note |
|-----|---------|--------------------|------------------------------------------------------------------------------------------------|------|
| 1   |         | GND                | Module Ground                                                                                  | 1    |
| 2   |         | VEE5               | Optional -5.2V Power Supply (Not Required)                                                     |      |
| 3   | LVTTL-I | Mod_DeSel          | Module De-select; When held low allows module to respond to 2-wire serial interface            |      |
| 4   | LVTTL-O | -----<br>Interrupt | -----<br>Interrupt; Indicates presence of an important condition which can be read over the 2- |      |

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|    |          |            |                                                                                                                                                                                                                                                                                                   |   |
|----|----------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 21 | LVTTTL-I | P_Down/RST | Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode.<br>Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle. |   |
| 22 |          | VCC2       | +1.8V Power Supply (Not Required)                                                                                                                                                                                                                                                                 |   |
| 23 |          | GND        | Module Ground                                                                                                                                                                                                                                                                                     | 1 |
| 24 | PECL-I   | RefCLK+    | Reference Clock Non-Inverted Input, AC coupled on the host board (Not Required)                                                                                                                                                                                                                   |   |
| 25 | PECL-I   | RefCLK-    | Reference Clock Inverted Input, AC coupled on the host board (Not Required)                                                                                                                                                                                                                       |   |
| 26 |          | GND        | Module Ground                                                                                                                                                                                                                                                                                     | 1 |
| 27 |          | GND        | Module Ground                                                                                                                                                                                                                                                                                     | 1 |
| 28 | CML-I    | TD-        | Transmitter Inverted Data Input                                                                                                                                                                                                                                                                   |   |
| 29 | CML-I    | TD+        | Transmitter Non-Inverted Data Input                                                                                                                                                                                                                                                               |   |
| 30 |          | GND        | Module Ground                                                                                                                                                                                                                                                                                     | 1 |

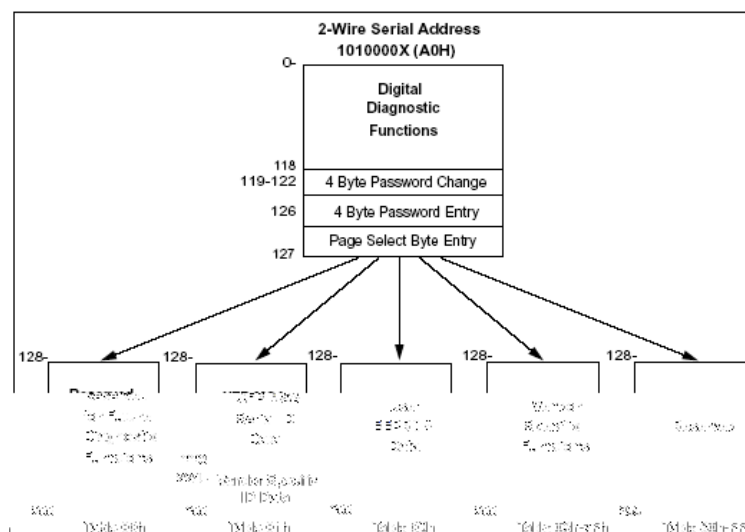
Note1: Module ground pins GND are isolated from the module case and chassis ground within the module.

Note2: Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

## Digital Diagnostic Functions

As defined by the XFP MSA, digital diagnostic functions are provided via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver Temperature
- Tx Bias Current
- Tx Optical Power
- RX Received Optical Power
- Transceiver +3.3V Supply Voltage

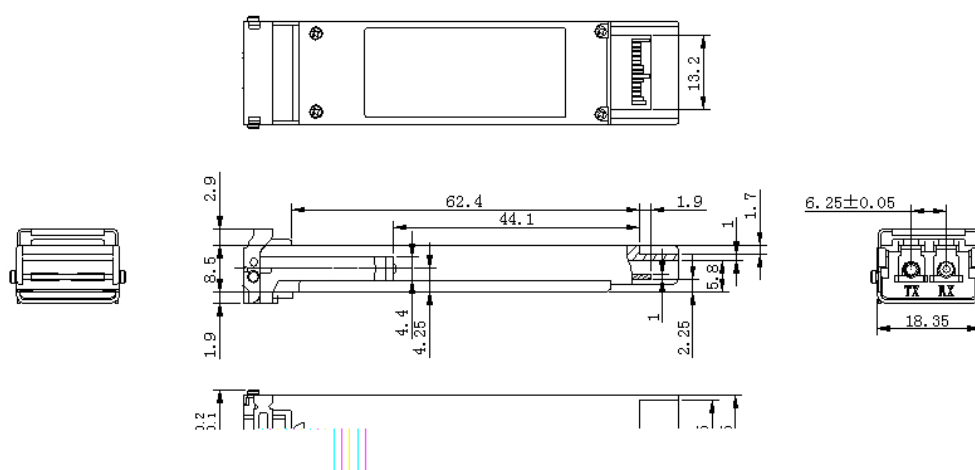


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## Typical Application Circuit for Power Supply



## Package Outline



## Regulatory Compliance

| Feature          | Test Method                                                                                                                                 | Performance                             |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Laser Eye Safety | FDA 21 CFR 1040.10 and 1040.11<br>IEC 60825-1: 1994+ A11: 1996+ A2: 2001<br>IEC 60825-2: 2004 + A1: 2006<br>EN 60825-1:1994+A1:2002+A2:2001 | Compliant with Class 1<br>laser product |

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|                                                      |                                                                                                                 |                          |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------|
|                                                      | EN 60825-2: 2004                                                                                                |                          |
| Electrostatic Discharge (ESD) to the Electrical Pins | MIL-STD-883E Method 3015.7<br>Human Body Model                                                                  | Class 1 (>1.5kV)         |
| Electrostatic Discharge (ESD) Immunity               | IEC 61000-4-2: 2001                                                                                             | Class 2 (>4.0kV)         |
| Electromagnetic Interference (EMI)                   | FCC Part 15 Subpart J Class B<br>CISPR22:1997+A1:2000+A2:2002, Class B<br>EN55022:1998+A1:2000+A2:2003, Class B | Compliant with standards |