

RTXM105I&105I-5&106I&115I&115I-5&116I



5V 2×9 155Mbps Transceiver Module

RTXM105I&105I-5&106I&115I&115I-5&116I

Features

- Duplex SC receptacle or FC pigtailed optical interface
- Standard 2×9 package
- Single +5V power supply
- -20 to 70°C operating temperature range
- Receiver optical input power monitor
- PECL compatible data input/output interface
- TTL transmitter laser shutdown
- PECL receiver signal-detected indication

Application

- SDH STM-1 S1.1 S1.2 and L1.1
- 100M Fast Ethernet

Standard

- Compliant with ITU-T G.957

RTXM105I & 105I-5 & 106I & 115I & 115I-5 & 116I

Absolute Maximum Ratings

| Parameter | Symbol | Unit | Min | Max |
|---------------------------------|----------|------|------|----------|
| Storage Temperature Range | T_s | °C | -40 | 85 |
| Relative Humidity | RH | % | 0 | 95 |
| Power Supply Voltage | V_{cc} | V | -0.5 | +6 |
| Lead Solder Temperature | - | °C | - | 260 |
| Lead Solder Duration | - | S | - | 10 |
| Voltage on any input/output pin | V_I | V | 0 | V_{cc} |

Recommended Operating Conditions

| Parameter | Symbol | Unit | Min | Typ | Max |
|-----------------------------|----------|------|------|--------|------|
| Operating Temperature Range | T_{op} | °C | -20 | - | 70 |
| Power Supply Voltage | V_{cc} | V | 4.75 | 5.0 | 5.25 |
| Operating Data Rate | - | Mbps | - | 155.52 | - |

Specifications (Top=-2 0 °C to 70oC and VCC=4.75V to 5.25V)

| Parameter | Symbol | Units | Min | Typ | Max | Notes |
|--|------------------|-------|------|------------|-------|-------|
| Electrical Characteristics | | | | | | |
| Supply Current | I_{cc} | mA | - | - | 250 | |
| Transmitter Differential Input Voltage | V_D | mV | 500 | - | 1800 | |
| Common-mode Input Voltage | $V_{com}-V_{CC}$ | V | -1.4 | - | -1.19 | |
| PECL Output Voltage-Low | $V_{OL}-V_{CC}$ | V | -1.8 | - | -1.6 | 1 |
| PECL Output Voltage-High | $V_{OH}-V_{CC}$ | V | -1.0 | - | -0.8 | 1 |
| Bias current monitor voltage | B_M | mV | | $10 * I_b$ | - | |
| Back facet monitor voltage | P_M | V | 0.6 | 1.2 | 2.0 | |
| Transmitter disable voltage | - | V | 2.0 | - | - | |
| Transmitter enable voltage | - | V | - | - | 0.8 | |

RTXM105I,RTXM115I

| Optical transmitter Characteristics | | | | | | |
|--|-------------------------------------|-----|------|------|------|---|
| Mean Launched power(avg.) | P_o | dBm | -15 | - | -8 | 2 |
| Center wavelength | λ_c | nm | 1261 | 1310 | 1360 | |
| Spectrum width(RMS) | $\Delta\lambda$ | nm | - | - | 7.7 | |
| Extinction ratio | E_R | dB | 8.2 | - | - | |
| Optical Rise Time | t_R | ns | - | - | 2.0 | 3 |
| Optical Fall Time | t_F | ns | - | - | 2.0 | 3 |
| Eye Diagram | ITU recommendation G.957 STM-1/OC-3 | | | | | |
| Optical receiver Characteristics | | | | | | |
| Receiver Sensitivity | S | dBm | - | - | -35 | 4 |

RTXM105I & 105I-5 & 106I & 115I & 115I-5 & 116I

| | | | | | | |
|--------------------------|-------------|-----|------|---|-----|---|
| Overload Input Power | P_{in} | dBm | -8 | - | - | 4 |
| Signal Detect-Deasserted | P_D | dBm | -50 | - | - | |
| Signal Detect-Asserted | P_A | dBm | - | - | -36 | |
| Signal Detect-Hysteresis | $P_A - P_D$ | dB | -0.5 | - | 6 | |

RTXM105I-5, RTXM115I-5 Optical transmitter Characteristics

| | | | | | | |
|---------------------------|-------------------------------------|-----|------|------|------|---|
| Mean Launched power(avg.) | P_o | dBm | -15 | - | -8 | 2 |
| Center wavelength | λ_c | nm | 1430 | 1550 | 1576 | |
| Spectrum width(RMS) | | nm | - | - | 2.5 | |
| Extinction ratio | E_R | dB | 8.2 | - | - | |
| Optical Rise Time | t_R | ns | - | - | 2.0 | 3 |
| Optical Fall Time | t_F | ns | - | - | 2.0 | 3 |
| Eye Diagram | ITU recommendation G.957 STM-1/OC-3 | | | | | |

Optical receiver Characteristics

| | | | | | | |
|--------------------------|-------------|-----|------|---|-----|---|
| Receiver Sensitivity | S | dBm | - | - | -35 | 4 |
| Overload Input Power | P_{in} | dBm | -8 | - | - | |
| Signal Detect-Deasserted | P_D | dBm | -50 | - | - | |
| Signal Detect-Asserted | P_A | dBm | - | - | -36 | |
| Signal Detect-Hysteresis | $P_A - P_D$ | dB | -0.5 | - | 6 | |

RTXM106I, RTXM116I Optical transmitter Characteristics

| | | | | | | |
|---------------------------|-------------------------------------|-----|------|------|------|---|
| Mean Launched power(avg.) | P_o | dBm | -5 | - | 0 | 2 |
| Center wavelength | λ_c | nm | 1263 | 1310 | 1360 | |
| Spectrum width(RMS) | $\Delta\lambda$ | nm | - | - | 3 | |
| Extinction ratio | E_R | dB | 10 | - | - | |
| Optical Rise Time | t_R | ns | - | - | 2.0 | 3 |
| Optical Fall Time | t_F | ns | - | - | 2.0 | 3 |
| Eye Diagram | ITU recommendation G.957 STM-1/OC-3 | | | | | |

Optical receiver Characteristics

| | | | | | | |
|--------------------------|-------------|-----|-----|---|-----|---|
| Receiver Sensitivity | S | dBm | - | - | -35 | 4 |
| Overload Input Power | P_{in} | dBm | -8 | - | - | 4 |
| Signal Detect-Deasserted | P_D | dBm | -50 | - | - | |
| Signal Detect-Asserted | P_A | dBm | - | - | -36 | |
| Signal Detect-Hysteresis | $P_A - P_D$ | dB | 0.5 | - | 6 | |

Note1: Terminated with 50Ω to $V_{CC} - 2V$.

Note2: Minimum output optical level is at end of life.

Note3: These are unfiltered 10~90% values.

Note4: Sensitivity and overload for $2^{23} - 1$ PRBS and Bit Error Rate better than or equal to $10E-10$.

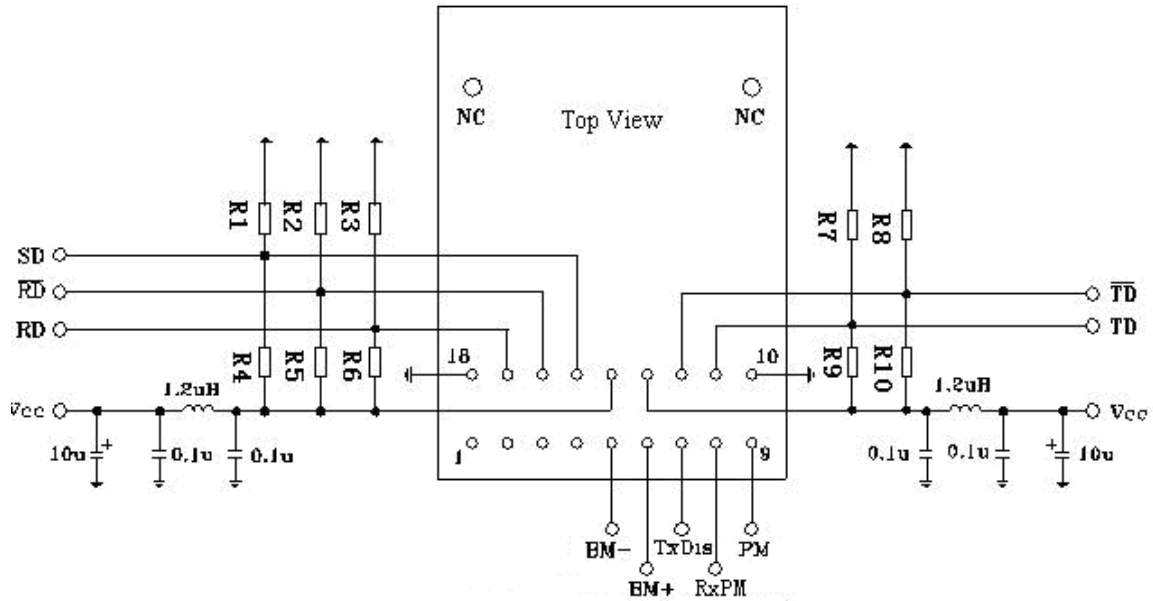
RTXM105I & 105I-5 & 106I & 115I & 115I-5 & 116I

Pin Description

| Pin | Name | Level | Description |
|-----|-----------------|-------|--|
| 1 | NC | | Pin not connected |
| 2 | NC | | Pin not connected |
| 3 | NC | | Pin not connected |
| 4 | NC | | Pin not connected |
| 5 | BM- | | Negative bias current monitor voltage |
| 6 | BM+ | | Positive bias current monitor voltage |
| 7 | TxDIs | TTL | Transmitter disable input. A low level switches laser on, a high level switches laser off |
| 8 | RxPM | | Receiver optical input power monitor. It's proportional to the optical input. It outputs about 2.7V@-20dBm and 2.0V@-40dBm |
| 9 | PM | | Back facet monitor voltage. Normally 1.2V |
| 10 | V _{EE} | | Negative power of transmitter section, normally grounded |
| 11 | TD | PECL | Data input of transmitter section |
| 12 | TD- | PECL | Reverse data input of transmitter section |
| 13 | V _{CC} | | Positive power of transmitter section |
| 14 | V _{CC} | | Positive power of receiver section |
| 15 | SD | PECL | Optical alarm of receiver section, High level when normal, low level when no light |
| 16 | RD- | PECL | Reverse data output of receiver section |
| 17 | RD+ | PECL | Data output of receiver section |
| 18 | V _{EE} | | Negative power of receiver section, normally grounded |

RTXM105I & 105I-5 & 106I & 115I & 115I-5 & 116I

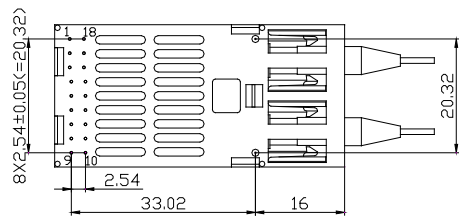
Typical application circuit



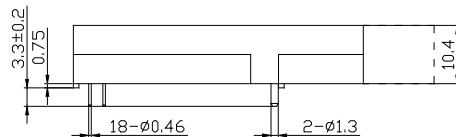
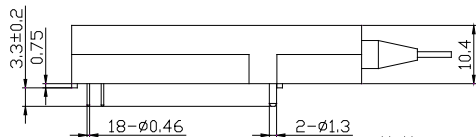
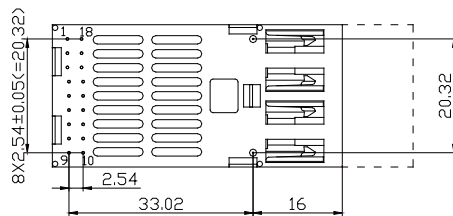
Note: $R1=R2=R3=R7=R8=130\Omega$; $R4=R5=R6=R9=R10=82\Omega$;

Package outline (unit: mm)

FC pigtail optical interface

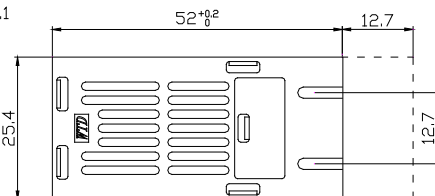
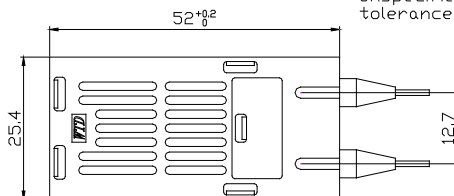


Duplex SC receptacle optical interface



Unit: mm
Unspecified tolerance is ±0.1

Unit: mm
Unspecified tolerance is ±0.1



Area reserved for SC plug

RTXM105I & 105I-5 & 106I & 115I & 115I-5 & 116I

Regulatory Compliance

| Feature | Test Method | Performance |
|--|--|--|
| Electrostatic Discharge (ESD) to the Electrical Pins Method 3015.7 | MIL-STD-883E | Class 1 (>1.5kV) – Human Body Model |
| Electrostatic Discharge (ESD) Immunity | IEC61000-4-2 | Class 2(>4.0kV) |
| Electromagnetic Interference (EMI) | CISPR22 ITE Class B EN55022 Class B | Compliant with standards |
| Immunity | IEC61000-4-3 Class 2 EN55024 | Typically show no measurable effect from a 3V/m field swept from 80 to 1000MHz applied to the transceiver without a chassis enclosure. |
| Eye Safety | FDA 21 CFR 1040.10 and 1040.11 | Compliant with Class 1 laser product UL No. E239070 |
| | UL | |
| | TUV EN 60825-1 | |

Update Information

From datasheet V3.0 to datasheet V3.1

- Revise the parameter “sensitivity” (in “Specifications” table, page2) from “-31dBm” or “-36dBm” to “-35dBm”.
- Revise the parameter “Signal Detect-Asserted” (in “Specifications” table, page2) from “-31dBm” to “-36dBm”.

RTXM105I & 105I-5 & 106I & 115I & 115I-5 & 116I

Ordering Information

| Part No. | Specification | | | | | | | | | Application code |
|-------------|---------------|-----------|--------------|---------------|----------|-------------|-----------|-------|------------|------------------|
| | Package | Data rate | Laser | Optical Power | Detector | Sensitivity | Temp | Reach | Interface | |
| RTXM105I | 2X9 | 155Mb/s | 1310nm FP-LD | -15~-8dBm | PIN+TIA | -35dBm(max) | -20~70 °C | 15km | FC pigtail | SDH S-1.1 |
| RTXM105I-5* | 2X9 | 155Mb/s | 1550nm FP-LD | -15~-8dBm | PIN+TIA | -35dBm(max) | -20~70 °C | 15km | FC pigtail | SDH S-1.2 |
| RTXM106I | 2X9 | 155Mb/s | 1310nm FP-LD | -5~0dBm | PIN+TIA | -35dBm(max) | -20~70 °C | 40km | FC pigtail | SDH L-1.1 |
| RTXM115I* | 2X9 | 155Mb/s | 1310nm FP-LD | -15~-8dBm | PIN+TIA | -35dBm(max) | -20~70 °C | 15km | Duplex SC | SDH S-1.1 |
| RTXM115I-5* | 2X9 | 155Mb/s | 1550nm FP-LD | -15~-8dBm | PIN+TIA | -35dBm(max) | -20~70 °C | 15km | Duplex SC | SDH S-1.2 |
| RTXM116I | 2X9 | 155Mb/s | 1310nm FP-LD | -5~0dBm | PIN+TIA | -35dBm(max) | -20~70 °C | 40km | Duplex SC | SDH L-1.1 |

*: The product marked with * is not available at present

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Edition 2009-12-01

Published by Wuhan Telecommunication Devices Co.,Ltd.

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