

RTXM103&103-5&104&113&113-5&114



3.3V 2×9 622Mbps Transceiver Module

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Features

- *Duplex SC receptacle or FC pigtailed optical interface*
- *Standard 2×9 package*
- *Single +3.3V power supply*
- *-20 to 70°C operating temperature range*
- *LVPECL compatible data input/output interface*
- *TTL transmitter laser shutdown*
- *LVPECL receiver signal-detected indication*

Application

- *SDH STM-1 S4.1 and L4.1*

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Standard

- *Compliant with ITU-T G.957*

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	+4.5
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	3.13	3.3	3.47
Operating Data Rate		Mbps	-	622.08	-

Specifications ($T_{op} = -20\text{ }^{\circ}\text{C}$ to $70\text{ }^{\circ}\text{C}$ and $V_{CC} = 3.13\text{V}$ to 3.47V)

Parameter	Symbol	Units	Min	Typ	Max	Notes
Electrical Characteristics						
Supply Current	I_{cc}	mA	-	-	250	
Transmitter Differential Input Voltage	V_D	mV	200	-	1600	
Common-mode Input Voltage	$V_{com-VCC}$	V	-1.49	-	-0.40	
LVPECL Output Voltage-Low	V_{OL-VCC}	V	-1.89	-	-1.6	1
LVPECL Output Voltage-High	V_{OH-VCC}	V	-1.1	-	-0.9	1
Bias current monitor voltage	B_M	mV		$10 \cdot I_b$	-	
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	
RTXM103,RTXM113						
Optical transmitter Characteristics						
Mean Launched power(avg.)	P_o	dBm	-15	-	-8	2
Center wavelength	λ_c	nm	1274	1310	1356	
Spectrum width(RMS)	$\Delta\lambda$	nm	-	-	2.5	
Extinction ratio	E_R	dB	8.2	-	-	
Optical Rise Time	t_R	ns	-	-	0.5	3

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Optical Fall Time	t_F	ns	-	-	0.5	3
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Eye Diagram	ITU recommendation G.957 STM-4/OC-12					
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Optical receiver Characteristics

Receiver Sensitivity	S	dBm	-	-	-28	4
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Overload Input Power	P_{in}	dBm	-8	-	-	4
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Signal Detect-Deasserted	P_D	dBm	-42	-	-	
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Signal Detect-Asserted	P_A	dBm	-	-	-28	
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Signal Detect-Hysteresis	$P_A - P_D$	dB	0.5	-	6.0	
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RTXM103-5,RTXM113-5

Optical transmitter Characteristics

Mean Launched power(avg.)	P_o	dBm	-15	-	-8	2
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Center wavelength	λ_C	nm	1430	1550	1576	
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Spectrum width(RMS)	$\Delta\lambda$	nm	-	-	2.5	
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Extinction ratio	E_R	dB	8.2	-	-	
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Optical Rise Time	t_R	ns	-	-	0.5	3
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Optical Fall Time	t_F	ns	-	-	0.5	3
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Eye Diagram	ITU recommendation G.957 STM-4/OC-12					
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Optical receiver Characteristics

Receiver Sensitivity	S	dBm	-	-	-28	4
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Overload Input Power	P_{in}	dBm	-8	-	-	4
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Signal Detect-Deasserted	P_D	dBm	-42	-	-	
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Signal Detect-Asserted	P_A	dBm	-	-	-28	
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Signal Detect-Hysteresis	$P_A - P_D$	dB	0.5	-	6.0	
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RTXM104,RTXM114

Optical transmitter Characteristics

Mean Launched power(avg.)	P_o	dBm	-3	-	+2	2
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Center wavelength	λ_C	nm	1280	1310	1330	
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Spectrum width(RMS)	$\Delta\lambda$	nm	-	-	3	
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Extinction ratio	E_R	dB	10	-	-	
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Optical Rise Time	t_R	ns	-	-	0.5	3
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Optical Fall Time	t_F	ns	-	-	0.5	3
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Eye Diagram	ITU recommendation G.957 STM-4/OC-12					
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Optical receiver Characteristics

Receiver Sensitivity	S	dBm	-	-	-28	4
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Overload Input Power	P_{in}	dBm	-8	-	-	4
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Signal Detect-Deasserted	P_D	dBm	-42	-	-	
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Signal Detect-Asserted	P_A	dBm	-	-	-28	
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Signal Detect-Hysteresis	$P_A - P_D$	dB	0.5	-	6.0	
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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.

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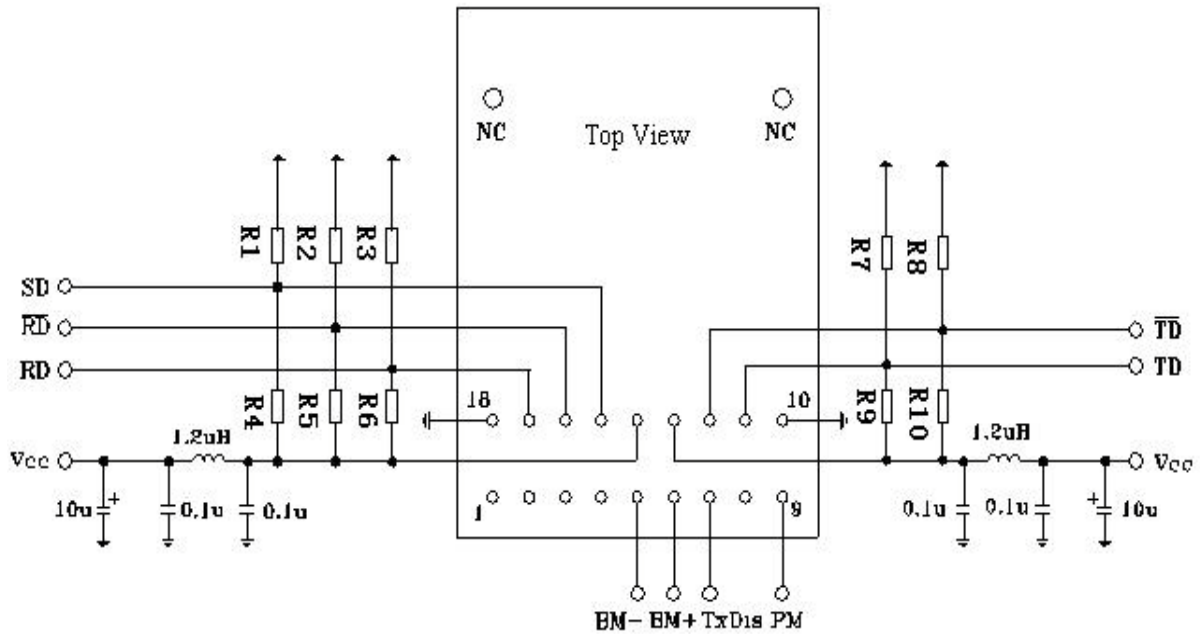
Note4: Sensitivity and overload for $2^{23}-1$ PRBS and Bit Error Rate better than or equal to $10E-10$.

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	NC		Pin not connected
9	PM		Back facet monitor voltage. Normally 1.2V
10	V _{EE}		Negative power of transmitter section, normally grounded
11	TD+	LVPECL	Data input of transmitter section
12	TD-	LVPECL	Reverse data input of transmitter section
13	V _{CC}		Positive power of transmitter section
14	V _{CC}		Positive power of receiver section
15	SD	LVPECL	Optical alarm of receiver section, High level when normal, low level when no light
16	RDn	LVPECL	Reverse data output of receiver section
17	RD	LVPECL	Data output of receiver section
18	V _{EE}		Negative power of receiver section, normally grounded

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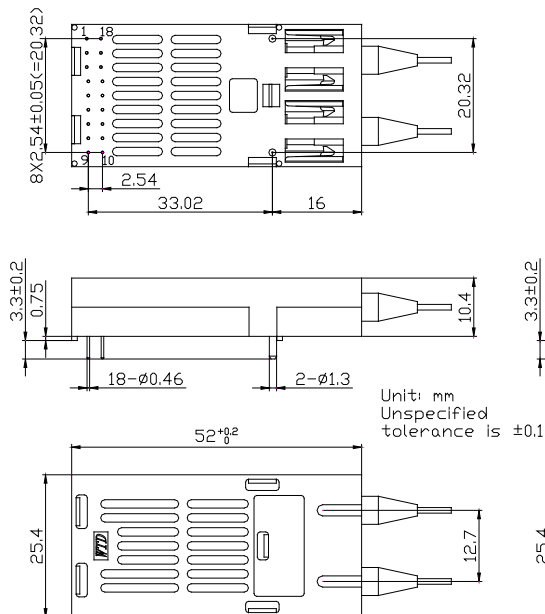
Typical application circuit



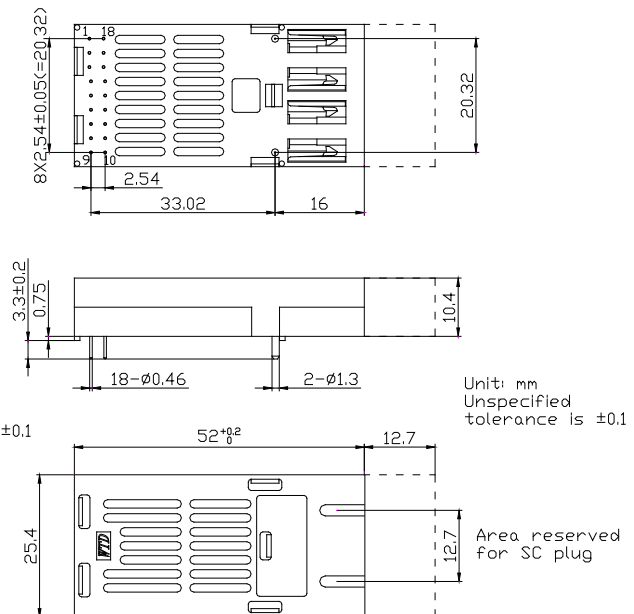
Note: $R1=R2=R3=R7=R8=82\ \Omega$; $R4=R5=R6=R9=R10=130\ \Omega$

Package outline (unit: mm)

FC pigtail optical interface



Duplex SC receptacle optical interface



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Regulatory Compliance

Feature	Test Method	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	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 UL TUV EN 60825-1	Compliant with Class 1 laser product UL No. E239070

Ordering Information

Part No.	Specification								
	Package	Data rate	Laser	Optical Power	Detector	Sensitivity	Temp	Reach	Interface
RTXM103*	2X9	622Mb/s	1310nm FP-LD	-15~-8dBm	PIN+TIA	-28dBm(max)	-20~70°C	15km	FC pigtail
RTXM103-5*	2X9	622Mb/s	1550nm FP-LD	-15~-8dBm	PIN+TIA	-28dBm(max)	-20~70°C	15km	FC pigtail
RTXM104*	2X9	622Mb/s	1310nm FP-LD	-3~+2dBm	PIN+TIA	-28dBm(max)	-20~70°C	40km	FC pigtail
RTXM113	2X9	622Mb/s	1310nm FP-LD	-15~-8dBm	PIN+TIA	-28dBm(max)	-20~70°C	15km	Duplex SC
RTXM113-5*	2X9	622Mb/s	1550nm FP-LD	-15~-8dBm	PIN+TIA	-28dBm(max)	-20~70°C	15km	Duplex SC
RTXM114	2X9	622Mb/s	1310nm FP-LD	-3~+2dBm	PIN+TIA	-28dBm(max)	-20~70°C	40km	Duplex SC

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

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