



## 3.3V 2×9 155Mbps Transceiver Module

### *RTXM104&114 Series*

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#### Features

- *Duplex SC receptacle or FC pigtailed optical interface*
- *1310nm or 1550nm DFB laser*
- *Standard 2×9 package*
- *Single +3.3V power supply*
- *0 to 70°C operating temperature*
- *range*
- *LVPECL compatible data input/output interface*
- *TTL transmitter laser shutdown*
- *LVPECL receiver signal-detected indication*

#### Application

- *SDH STM-4 L4.1 and L4.2*

#### 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	0	-	70
Power Supply Voltage	$V_{cc}$	V	3.13	3.3	3.47
Operating Data Rate	-	Mbps	-	622.08	-

## Specifications ( $T_{op} = 0^{\circ}C$ to $70^{\circ}C$ and $V_{CC} = 3.13V$ to $3.47V$ )

Parameter	Symbol	Unit	Min	Typ	Max	Note
<b>Electrical Characteristics</b>						
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	-1.10	-	-0.90	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	
<b>RTXM104D,RTXM114D</b>						
<b>Optical transmitter Characteristics</b>						
Mean Launched power(avg.)	$P_o$	dBm	-3	-	+2	2
Center wavelength	$\lambda_c$	nm	1280	1310	1335	
Spectral Width (-20dB)	$\Delta\lambda$	nm	-	-	1	
Side Mode Suppression Ratio	SMSR	dB	30	-	-	
Extinction ratio	$E_R$	dB	10	-	-	
Optical Rise Time	$t_R$	ns			0.5	3
Optical Fall Time	$t_F$	ns			0.5	3
Eye Diagram	ITU recommendation G.957 STM-4/OC-12					
<b>Optical receiver Characteristics</b>						
Receiver Sensitivity	$S$	dBm	-	-	-28	4

Overload Input Power	$P_{in}$	dBm	-8	-	-	4
Signal Detect-Deasserted	$P_D$	dBm	-45	-	-	
Signal Detect-Asserted	$P_A$	dBm	-	-	-28	
Signal Detect-Hysteresis	$P_A - P_D$	dB	0.5	-	6	
<b>RTXM104-DFB,RTXM114-DFB</b>						
<b>Optical transmitter Characteristics</b>						
Mean Launched power(avg.)	$P_o$	dBm	-3	-	+2	2
Center wavelength	$\lambda_c$	nm	1480	1550	1580	
Spectral Width (-20dB)	$\Delta\lambda$	nm	-	-	1	
Side Mode Suppression Ratio	SMSR	dB	30	-	-	
Extinction ratio	$E_R$	dB	10	-	-	
Optical Rise Time	$t_R$	ns			0.5	3
Optical Fall Time	$t_F$	ns			0.5	3
Eye Diagram	ITU recommendation G.957 STM-4/OC-12					
<b>Optical receiver Characteristics</b>						
Receiver Sensitivity	S	dBm	-	-	-28	4
Overload Input Power	$P_{in}$	dBm	-8	-	-	4
Signal Detect-Deasserted	$P_D$	dBm	-45	-	-	
Signal Detect-Asserted	$P_A$	dBm	-	-	-28	
Signal Detect-Hysteresis	$P_A - P_D$	dB	0.5	-	6.0	

**Note1:** Terminated with  $50\Omega$  to  $V_{CC} - 2V$ .

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

**Note3:** These are unfiltered 10~90% values.

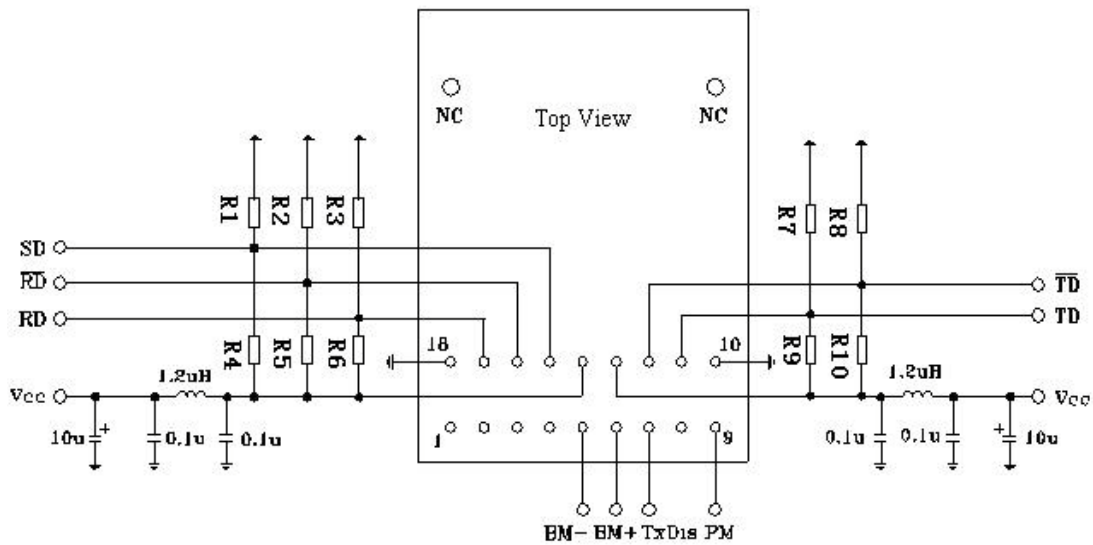
**Note4:** Sensitivity and overload for  $2^{23} - 1$  PRBS and Bit Error Rate better than or equal to  $10E-10$ .

## 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 <sub>CC</sub>		Positive power of receiver section
15	SD	LVPECL	Optical alarm of receiver section, High level when normal, low level when no light
16	RD-	LVPECL	Reverse data output of receiver section
17	RD+	LVPECL	Data output of receiver section
18	V <sub>EE</sub>		Negative power of receiver section, normally grounded

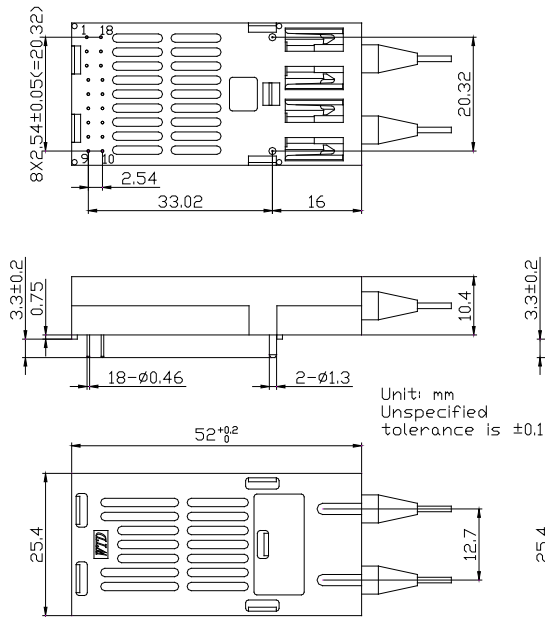
## Typical application circuit



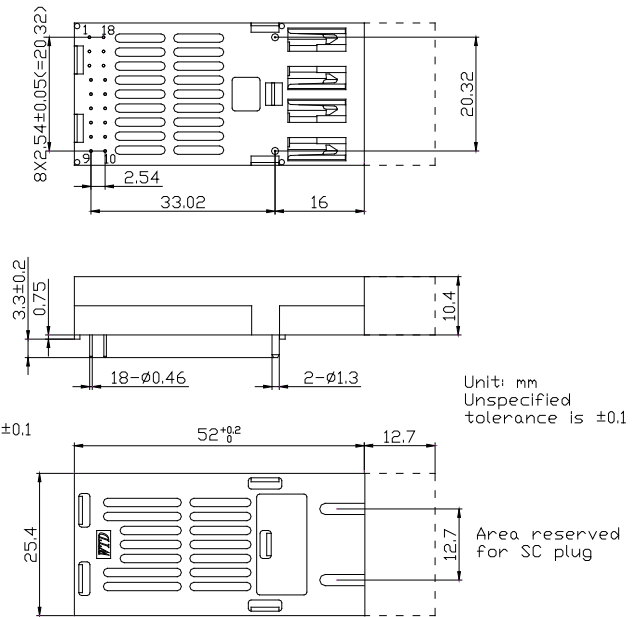
**Note:**  $R1=R2=R3=R7=R8=82\ \Omega$ ;  $R4=R5=R6=R9=R10=130\ \Omega$

**Package outline** (unit: mm)

FC pigtail optical interface



Duplex SC receptacle optical interface



**Regulatory Compliance**

Feature	Test Method	Performance
Electrostatic Discharge (ESD) to the Electrical Method 3015.7	MIL-STD-883E	Class 1 (>1.5kV) – Human Body Model
Pins 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									Application code
	Package	Data rate	Laser	Optical Power	Detector	Sensitivity	Temp	Reach	Interface	
RTXM104D*	2X9	622Mb/s	1310nm DFB-LD	-3~+2dBm	PIN+TIA	-28dBm(max)	0~70°C	40km	FC pigtail	SDH L-4.1
RTXM104-DFB*	2X9	622Mb/s	1550nm DFB-LD	-3~+2dBm	PIN+TIA	-28dBm(max)	0~70°C	80km	FC pigtail	SDH L-4.2
RTXM114D*	2X9	622Mb/s	1310nm DFB-LD	-3~+2dBm	PIN+TIA	-28dBm(max)	0~70°C	40km	Duplex SC	SDH L-4.1
RTXM114-DFB	2X9	622Mb/s	1550nm DFB-LD	-3~+2dBm	PIN+TIA	-28dBm(max)	0~70°C	80km	Duplex SC	SDH L-4.2

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

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