Technical Specification
for
2.5Gbps CWDM Receiver Module

SDT8994-R_-Q_

☐ 155.52Mb/s	☐ 622.08Mb/s	☑ other 2488.32Mbps
☐ Short Haul Intermediate Reach	☐ Long Haul Long Reach	☑ other 50km
☑ Single 5.0 V	☐ Single 3.3 V	☐ other _____
☐ 1.3 μm	☐ 1.55 μm	☑ other 1.47~1.61μm
☐ Transmitter	☑ Receiver	☐ Transceiver
	(☐ 2R / ☑ 3R)	(☐ 2R / ☐ 3R)

SUMITOMO ELECTRIC

Sumitomo Electric reserves the right to make changes in this specification without prior notice.

#Safety Precaution Symbols This specification uses various picture symbols to prevent possible injury to operator or other persons or damage to properties for appropriate use of the product. The symbols and definitions are as shown below. Be sure to be familiar with these symbols before reading this specification.

⚠ Warning	Wrong operation without following this instruction may lead to human death or serious injury.
⚠ Caution	Wrong operation without following this instruction may lead to human injury or property damage.

Example of picture symbols ❗ indicates prohibition of actions. Action details are explained thereafter.

⃠ indicates compulsory actions or instructions. Action details are explained thereafter.

1. General

The features of SDT8994-R_-Q_ are listed below:

* Power Supply Voltage +5V for Vcc
* Low Power Supply Current 300mA (typ.) for Vcc
* Compact Package Size 58.4 X 26.8 X 8.5 mm
* Built-in DC/DC Converter
* Built-in Clock Recovery (Phase Lock Loop)
* Optical Input Power Monitor
* Signal Detect (FLAG) Function
* Optical Connector Interface FC-PC / SC / LC

2. Block Diagram

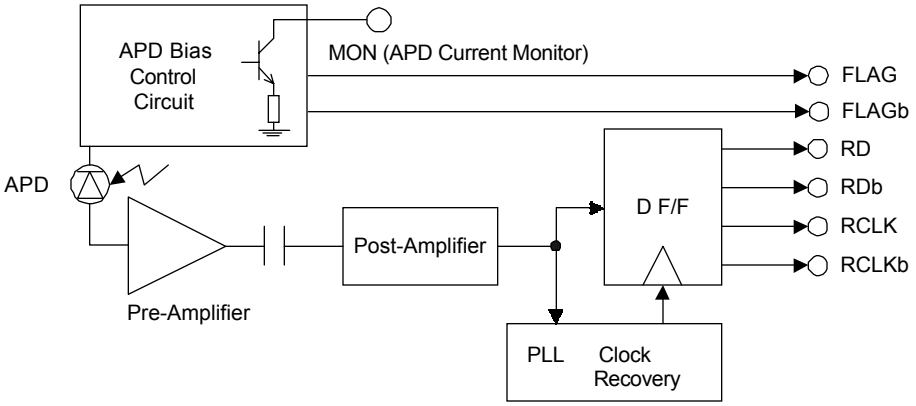


Figure 1 Block Diagram

3. Package Dimension

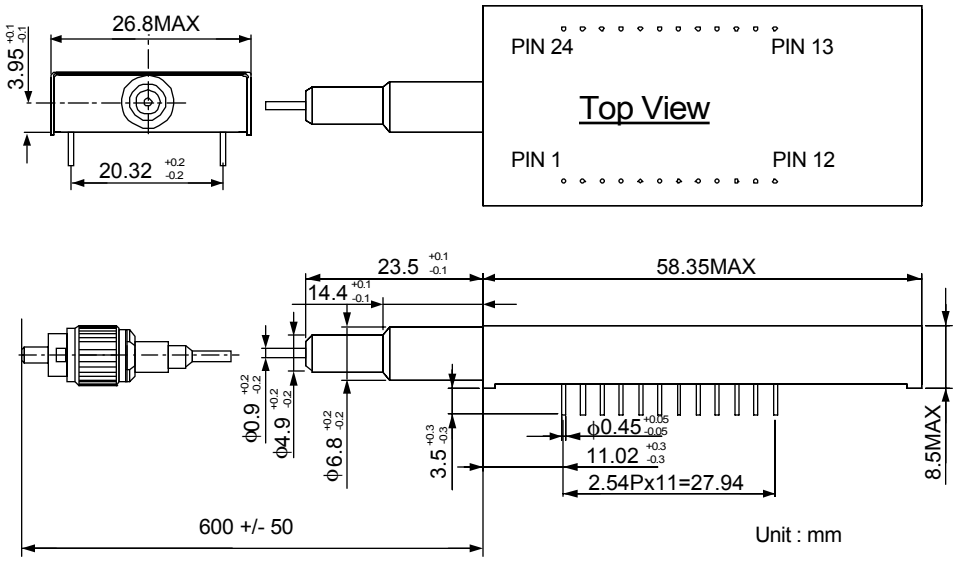


Figure 2. Package Dimension

⚠Caution

Do not disassemble this product. Otherwise, failure, electrical shock, overheating or fire may occur.
Handle the lead pins carefully. Use assisting tools or prospective aids as required. A lead pin may injure skin or human body

4. Pin Assignment

Pin	Symbol	I/O	Level	Description
1	NC		NC	Not connected internally
2	GND		GND	Negative power supply (GND)
3	MON		Vmon	Optical Input Power Monitor
4	GND		GND	Negative power supply (GND)
5	RDb	O	CML	Differential data output (negative)
6	RD	O	CML	Differential data output (positive)
7	GND		GND	Negative power supply (GND)
8	GND		GND	Negative power supply (GND)
9	RCLKb	O	CML	Differential clock output (negative)
10	RCLK	O	CML	Differential clock output (positive)
11	GND		GND	Negative power supply (GND)
12	GND		GND	Negative power supply (GND)
13	Vccd		+5V	Positive power supply for digital circuits
14	Vccd		+5V	Positive power supply for digital circuits
15	Vccd		+5V	Positive power supply for digital circuits
16	Vccd		+5V	Positive power supply for digital circuits
17	GND		GND	Negative power supply (GND)
18	GND		GND	Negative power supply (GND)
19	GND		GND	Negative power supply (GND)
20	GND		GND	Negative power supply (GND)
21	FLAG	O	CMOS	Flag for loss of signal (LOS), normal high and active (LOS) low
22	FLAGb	O	CMOS	Flag for loss of signal (LOS), normal low and active (LOS) high
23	Vcca		+5V	Positive power supply for analog circuits
24	Vcca		+5V	Positive power supply for analog circuits

Power Supply(+) Vapd, Vccd and Vcca are not connected each other.

5. Absolute Maximum Ratings

Parameter	Symbol	min.	Max	Unit	Note
Storage Case Temperature	Ts	-40	85	°C	1
Operating Case Temperature	Tc	0	70	°C	1
Supply Voltage	Vccd, Vcca	0.0	6.0	V	2
Optical Input Power	Pin, Vmon		-5.0	dBm	
Lead Soldering (Temperature)			260	°C	3
(Time)			10	sec.	

Note 1. No condensation allowed. 2. GND = 0.0V
3. Measured on lead pin at 2mm (0.079in.) off the package bottom

⚠ Warning

Use the product with the rated voltage described in the specification. If the voltage exceeds the maximum rating, overheating or fire may occur.

⚠ Caution

Do not store the product in the area where temperature exceeds the maximum rating, where there is too much moisture or dampness, where there is acid gas or corrosive gas, or other extreme conditions. Otherwise, failure, overheating or fire may occur.

6. Electrical Interface

(Unless otherwise specified, Vcca, Vccd = 4.75 to 5.25 V, @2488.32Mbps, PRBS2^23-1,50% duty and all operating temperature shall apply.)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage		Vcca, Vccd	4.75	5.00	5.25	V	
Supply Voltage for MON		Vmon	3.00	5.00	5.25	V	
Supply Current (Vcca and Vccd)		Idrx		300	350	mA	1, 2
Output Voltage Swing (RD, RDb)		Vord	0.30		0.80	V	3, 4
Output Voltage Swing (RCLK, RCLKb)		Vorc	0.30		0.80	V	3, 4
Output Voltage (FLAG, FLAGb)	High	Voflgh	Vcc-0.20		Vcc	V	3
	Low	Voflgl	0		0.20	V	
Output Signal Rise / Fall Time (RD, RDb, 20% - 80%)		Trd/Tfd		120	180	ps	
Output Signal Rise / Fall Time (RCLK, RCLKb, 20% - 80%)		Trc/Tfc		120	180	ps	
Clock / Data Output Skew		Tskew	160	200	270	ps	5
Output Clock Duty		Cduty	45	50	55	%	6
Clock Jitter (RMS)		Tjc			0.010	UI	6
Optical Input Power Monitor Current		Imon	180	300	460	µA	7
			9.0	14.5	22.0	µA	8

1. 2488.32Mbps, PRBS 2^23-1 2. Output current is not included. 3. Vccd, Vcca = 5.0V, Tc = 25°C 4. Rl = 50Ω, Single end out. 5. Please refer to Figure 4.
6. 2488.32Mbps, PRBS 2^23-1, NRZ 7. Pin=-9dBm 8. Pin=-28dBm

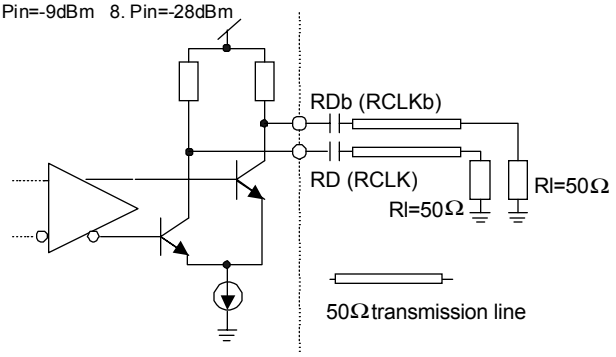
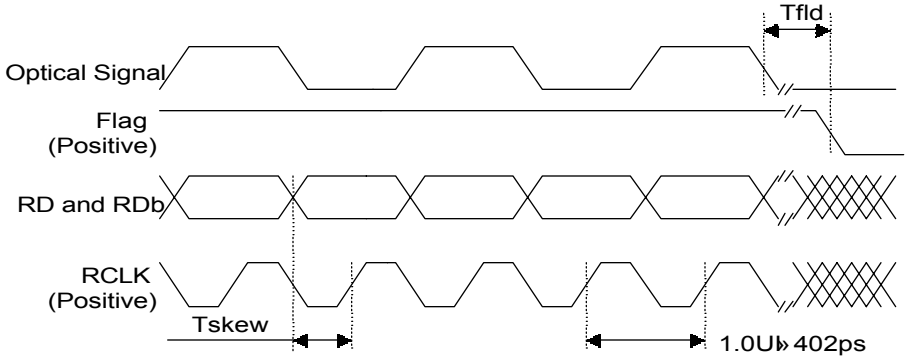


Figure 3 Data and Clock Output Interface (CML Interface)



Optical Input	Data Output	
	RD	RDb
"H"	"H"	"L"
"L"	"L"	"H"

Figure 4 Output Timing Chart

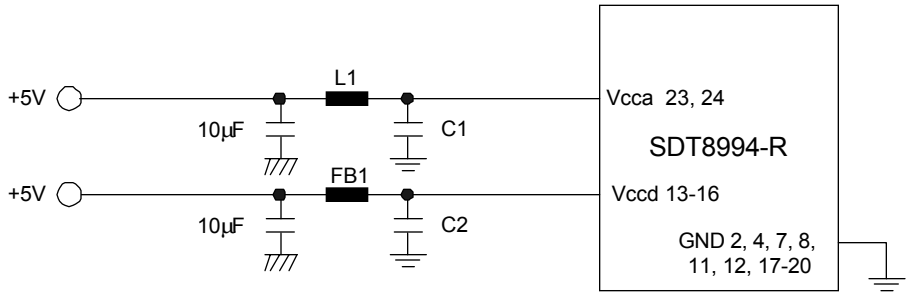
7. Optical Interface

(Unless otherwise specified, Vcca, Vccd = 4.75 to 5.25 V, Vapd = 90V, @2488.32Mbps, PRBS2^23-1,50% duty and all operating temperature shall apply.)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Bit Rate Range		2488.32 +/-50ppm			Mbps	
Center Wavelength Range	λc	1464.5		1617.5	nm	
Minimum Sensitivity	Pmin			-28.0	dBm	1
Overload	Pmax	-9.0			dBm	1
Dispersion Penalty	Dp			2.0	dB	2
Input Jitter Tolerance	Compliant with Bellcore 253-CORE and ITU G-958					
Consecutive Identical Digit	CID	72	100		bits	
Flag Assert Level	Pa	-48.0	-42.0	-28.0	dBm	3
Flag Deaasert Level	Pd	-48.0	-43.0	-28.0	dBm	3
Flag Deassertion Time	Tfld	2.3		100	µsec	4
Optical Reflectance	Or			-27.0	dB	

1. BER = 10^-10 2. Less than 2dB penalty is guaranteed when connected to SDT8083-T@-@@@@.
Maximum transmission distance is 50km. 3. 2488.32Mbps, PRBS 2^23-1, NRZ 4. Please refer to Figure 4

8. Recommended User Interface



C1, C2 : 10μF (Panasonic EEFCD1B100R)
L1 : 100μH (TDK SLF7045T-101MR50), Series Resistance < 3Ω, Imax > 120mA
FB1 : Ferrite Bead (TDK ZBF253D-00), Series Resistance < 0.1Ω, Imax > 1A

Figure 5 Recommended Power Supply Filtering

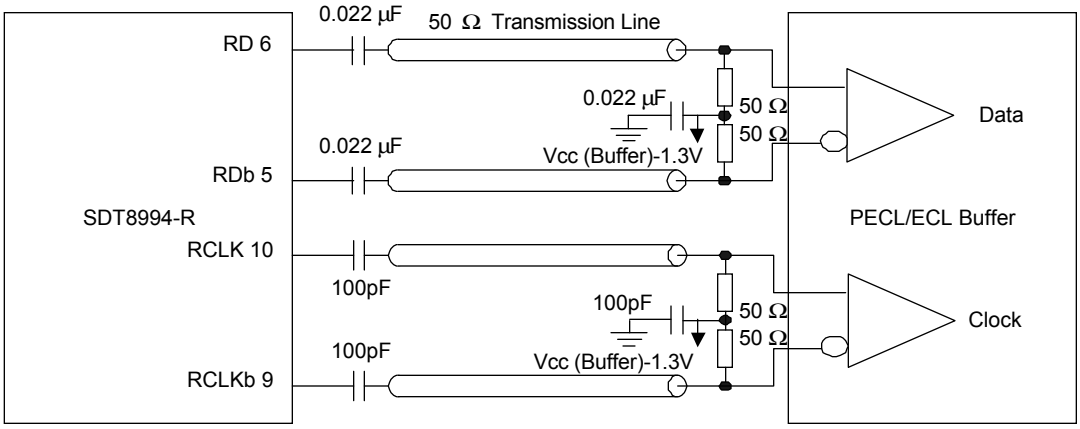


Figure 6 Recommended interface with PECL / ECL Device

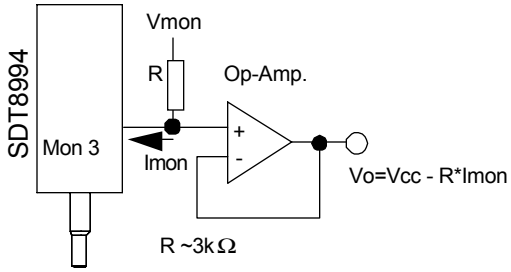


Figure 7 Optical Input Power Monitor Interface

9. Fiber Pigtail Specification

Parameter	Min.	Typ.	Max.	Unit	Note
Core Diameter		9.5		μm	
Cladding Diameter		125		μm	
Outer Diameter		0.9		mm	
Optical Cord Tensile Beak Strength			9.8	N	
Bend Radius	30			mm	

⚠ Caution

⃠ Do not give undue force or impact to the optical fiber pigtail. A broken optical fiber may injure skin or human body, or a strong laser beam may cause eye injury. Operate the equipment carefully. Use assisting tools or prospective aids as required.

10. Reliability Test (Under Qualification)

Bellcore TA-NWT-000983 Issue 2, December 1993								
Heading	Test	Reference	Condition	Sampling			SEI Plan	
				LTPD	SS	C	SS	F/C
Mechanical Integrity	Mechanical Shock	MIL-STD-883 Method 2002	Condition B 5 times/axis					
			500G, 1.0 ms	20%	11	0	11	0
			1,500G, 0.5ms	20%	11	0	---	---
	Vibration	MIL-STD-883 Method 2007	Condition A 20 G 20-2,000 Hz 4 min/cycle; 4 cycles/axis	20%	11	0	11	0
	Thermal Shock	MIL-STD-883 Method 1011	ΔT=100°C	20%	11	0	11	0
	Solderability	MIL-STD-883 Method 2003	(steam aging not required)	20%	11	0	11	0
	Fiber Pull		1 Kg; 3 times;5sec.	20%	11	0	---	---
			2 Kg; 3 times; 5sec.	20%	11	0	---	---
Endurance	Accel. Aging (High Temp.)	(R)-453 Section 5.18	+85C; rated power >5,000hrs.	---	25	---	25	0
			>10,000hrs.	---	10	---	---	---
	High Temp. Storage	----------	max. storage T (T=85°C) >2,000	20%	11	0	---	---
	Low Temp. Storage	----------	min. storage T (T=-40°C) >2,000	20%	11	0	11	0
	Temperature Cycling	Section 5.20	- 40°C to +85°C					
			400 times pass/fail	20%	11	0	---	---
			500 times for info.	---	11	---	---	---
			500 times pass/fail	20%	11	0	11	0
			1000 times for info.	---	11	---	11	0
	Damp Heat (if using epoxy)	MIL-STD-202 M103 or IEC 68-2-3	40°C , 95%, 56days	20%	11	0	11	0
			or 85°C /85%RH 2,000hrs.	20%	11	0	---	---
	Cyclic Moisture Resistance	Section 5.23	----------	20%	11	0	11	0
Special Tests	Internal Moisture	MIL-STD-883 Method 1018	< 5,000 ppm water vapor	20%	11	0	11	0
	Flammability	TR357:Sec. 4.4.2.5	----------	----	----	---	----	OK
	ESD Threshold	Section 5.22	----------	----	6	---	6	0

11. Ordering Information

Ordering Number	Connector type
SDT8994-RC-QN	SC
SDT8994-RD-QN	FC / PC
SDT8994-RL-QN	LC

12. Other Precaution

Under such a strong vibration environment as in automobile, the performance and reliability are not guaranteed.

The governmental approval is required to export this product to other countries. To dispose of these components, the appropriate procedure should be taken to prevent illegal exportation.

This module must be handled, used and disposed of according to your company's safe working practice.

⚠ Warning

Be sure to carry out correct soldering for connection to peripheral circuits in order to prevent contact failure or short-circuit. Otherwise, a strong laser beam may cause eye injury, overheating or fire.

Do not put this product or components of this product into your mouth. This product contaions material harmful to health.

⚠ Caution

Be sure to turn the power off when you touch this product connected to the printed circuit boards. Otherwise, electric shock may occur.

Dispose this product or equipment including this product properly as an industrial waste according to the regulations.

13. For More Information

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