Technical Specification
for
156Mbps Plastic Molded Fiber Optic Receiver Module

SDT8801-R_-Q_

☑ 155.52Mb/s	☐ 622.08Mb/s	☐ other _____
☑ Short Haul Intermediate Reach	☑ Long Haul Long Reach	☐ other _____
☐ Single 5.0 V	☐ Single 3.3 V	☐ other _____
☐ 1.3 μm	☐ 1.55 μm	☐ other _____
☐ 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

SDT8801-R_-Q_ is a compact and high performance digital fiber optic receiver module ideally designed for high speed data communication systems or telecommunication transmission systems including SDH STM-1 S-1.1, S-1.2 / L-1.1, L1.2, L-1.3 and SONET OC-3 IR-1, IR-2 / LR-1, LR-2, LR-3. The device also meets Bellcore GR-253-CORE requirement and ITU-TS G.957 / G.958 recommendation.

* Application	SDH STM-1 S-1.1, S-1.2 / L-1.1, L-1.2, L-1.3
	SONET OC-3 IR-1, IR-2 / LR-1, LR-2, LR-3
* Data Rate	155.52 Mbps
* Power Supply Voltage	Single +5V
* Electrical Interface	PECL
* Photo Diode	InGaAs PIN-PD
* Connector Interface	FC / SC connector
* Pin Configuration	20 Pin Dual in Line

The features of SDT8801-R_-Q_ are listed below.

* FEATURES	Low Power Consumption
	Plastic Molded Package
	Wide Dynamic Range
	Built-in Clock Recovery
	Signal Detect (FLAG) Function
	Multi-sourced Footprint

2. Block Diagram

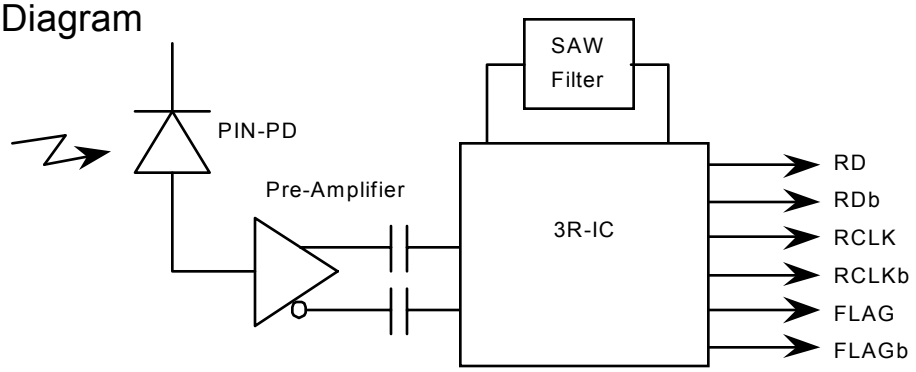


Figure 1. Block Diagram

3. Package Dimension

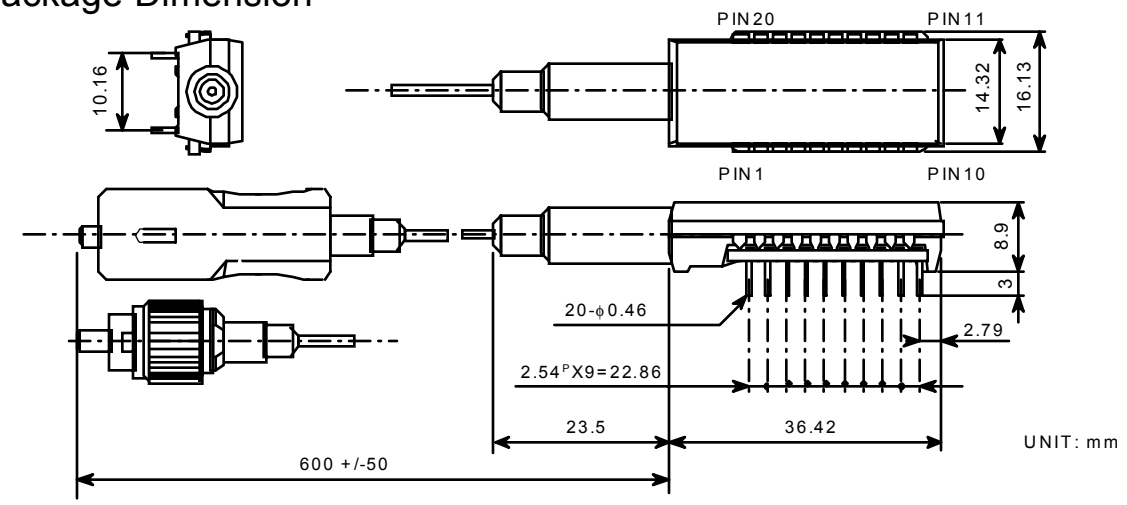


Figure 2. External View

⚠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

No.	Symbol	Function
1	GND	Ground
2	GND	Ground
3	GND	Ground
4	RCLK	Differential clock output (Positive)
5	RCLKb	Differential clock output (Negaive)
6	GND	Ground
7	RD	Differential data output (Positive)
8	GND	Ground
9	RDb	Differential data output (Negative)
10	NC	Not connected to the internal circuit

No.	Symbol	Function
11	Vcc	+5V
12	FLAG	Differential flag output (Positive)
13	GND	Ground
14	FLAGb	Differential flag output (Negative)
15	GND	Ground
16	GND	Ground
17	NC	Not connected to the internal circuit
18	NC	Not connected to the internal circuit
19	NC	Not connected to the internal circuit
20	NC	Not connected to the internal circuit

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, 2
			-40	85	°C	1, 3
Supply Voltage		Vcc-GND	0.0	7.0	V	
Lead Soldering	Temperature			260	°C	4
	Time			10	sec.	

Note

1. No condensation allowed.
2. For SDT8801-R*-QN (* : C or D)
3. For SDT8801-R*-QW (* : C or D)
4. Measured on leads-pin at 2mm (0.079inch) 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, Vcc-Vee = 4.75 to 5.25 V and all operating temparature shall apply.)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage		Vcc	4.75	5.00	5.25	V	
Supply Current		Idrx		145	220	mA	1
DATA & RCLK Output Voltage	High	Voh	Vcc-1.03		Vcc-0.88	V	2
	Low	Vol	Vcc-1.81		Vcc-1.62		
FLAG Output Voltage	High	Voh	Vcc-1.08		Vcc-0.83	V	3
	Low	Vol	Vcc-1.86		Vcc-1.57		
Clock Rise and Fall Time		Trc / Tfc			700	psec	4,5
Data Rise and Fall Time		Trd / Tfd			1000	psec	4,5
Clock Sampling Point		Tcsp	2.6	3.1	3.6	nsec	6

Note

1. Output current is not included. 155.52Mbps, PRBS(2^{23}-1)
2. Vcc=5.0V, Ta=25°C, Output load resistance Rl=50Ω to Vcc-2V for RD, RDb, RCLK and RCLKb
3. Vcc=5.0V, Ta=25°C, Output load resistance Rl=510Ω to Vee for FLAG and FLAGb
4. 20 - 80%
5. Input capacitance and stray capacitance of measuring devices should be less than 2pF.
6. Phase difference between rising edge of RD and rising edge of RCLK. Refer to Figure 3.

7. Optical Interface

(Unless otherwise specified, Vcc-Vee = 4.75 to 5.25 V and all operating temparature shall apply.)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Bit Rate Wavelength			155.52 +/- 50ppm		Mbps	
Center Wavelength		1260		1580	nm	
Minimum Sensitivity	Pmin			-34.0	dBm	1,2
Overload	Pmax	-8.0			dBm	
Clock Jitter (rms)	Tjc			64	psec	2,3,4
Clock Duty	Cduty	45	50	55	%	2,3,4
Data Jitter (rms)	Tjd			100	psec	2,3,4
Consecutive Identical Digit	CID	72	100		psec	5
FLAG Assert Level	Pa	-48.0	-37.0	-34.0	dBm	2
FLAG Deassert Level	Pd	-48.0	-39.0	-34.0	dBm	
FLAG Assert Time	Ta			100	psec	2,3,6
FLAG Deassert Time	Td			100	psec	

Note

1. BER = 10^{-10}
2. Measured at the bit rate of 155.52Mbps (2^{23}-1) PRBS NRZ
3. Optical Input Power : -34.0 ~ -8.0dBm
4. Output load registance for RD, RDb, RCLK and RCLKb : RI = 50Ω to Vcc-2V.
5. Duty 50% input signal
6. Refer to Figure 3.

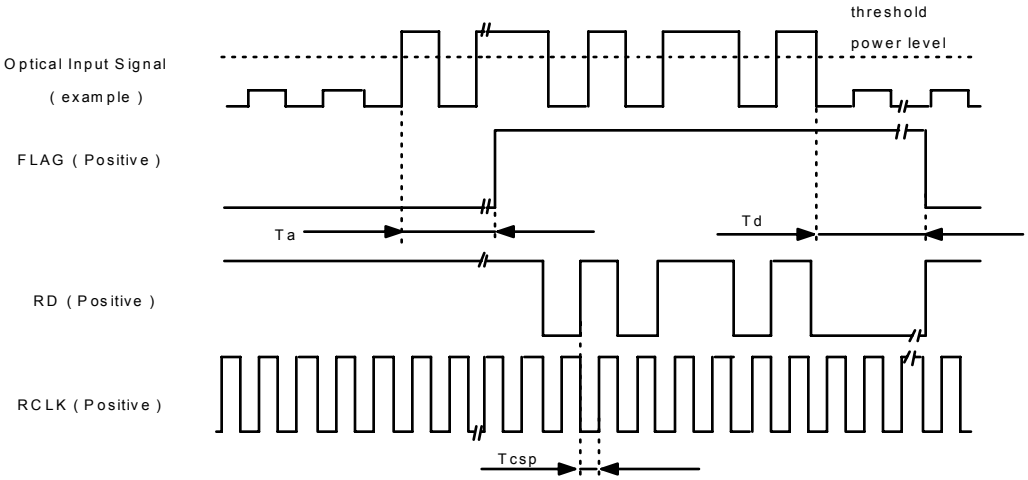


Figure 3. Timing Chart

8. Relation between Received Optical Signal and Data Output

Received	Data Output	
Optical Signal	RD	RDb
"H"	"H"	"L"
"L"	"L"	"H"

9. Fiber Pigtail Specification

Parameter	Min.	Typ.	Max.	Unit	Note
Core Diameter		62.5		μm	
Cladding Diameter		125		μm	
Outer Jacket Diameter		0.9		mm	
Optical Cord Tensile Break Strength			9.8	N	1
Bend Radius	30			mm	

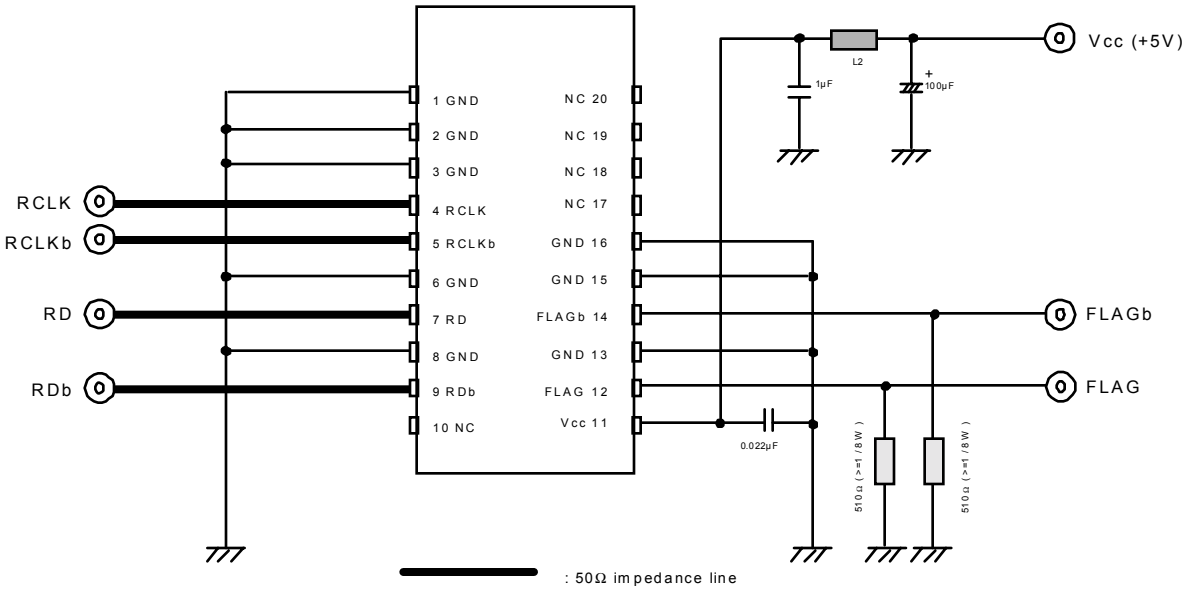
Note

1. Strength between receiver body and optical fiber should be less than 9.8N.

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

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

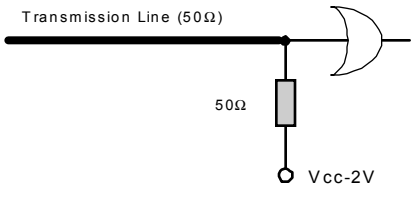
10. Recommended User Interface



50 impedance lines are recommended for RD, RDb, RCLK and RCLKb.
Ripple filter should be located as close to the module as possible.
L1, L2 : Ferrite Bead ZBF253D-00 (TDK)
Example for Termination Condition

Signal outputs (RD, RDb, RCLK and RCLKb) are required to be terminated with resistors as shown below, because these outputs are open emitter circuits.

1)



2)

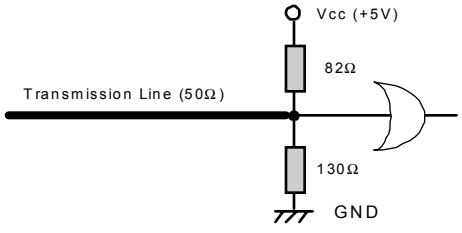


Figure 4. Recommended User Interface

⚠ 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.

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

11. Reliability Test

Bellcore TA-NWT-000983 Issue 2, December 1993								
Heading	Test	Reference	Condition	Sampling			SEI Results	
				LTPD	SS	C	SS	F/C
Mechanical Integrity	Mechanical Shock	MIL-STD-883 Method 2002	Condition B 5 times/axis	20%	11	0	---	---
			500G, 1.0 ms	20%	11	0	---	---
			1,500G, 0.5ms	20%	11	0	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	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	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	---		
	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

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.

13. Ordering Information

Connector type	Operating Temperature Range	
	0 ~ 70°C	-40 ~ 85°C
FC / PC	SDT8801-RD-QN	SDT8801-RD-QW
SC	SDT8801-RC-QN	SDT8801-RC-QW

14. For More Information

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