

Technical Specification
for
156Mbps Plastic Molded Fiber Optic Transmitter Module
(SDT8201-T_-Q_)

- | | | |
|---|---|---|
| <input checked="" type="radio"/> 155.52 Mb/s | <input type="checkbox"/> 622.08 Mb/s | <input type="checkbox"/> other |
| <input checked="" type="radio"/> Short Haul
Intermediate Reach | <input type="checkbox"/> Long Haul
Long Reach | <input type="checkbox"/> other |
| <input checked="" type="radio"/> Transmitter | <input type="checkbox"/> Receiver | <input type="checkbox"/> Transceiver |
| | <input type="checkbox"/> 2R / <input type="checkbox"/> 3R | <input type="checkbox"/> 2R / <input type="checkbox"/> 3R |

SUMITOMO ELECTRIC INDUSTRIES, LTD.

SUMITOMO Electric reserves the right to make changes in the specification described hereinafter without prior notice.

1. General

SDT8201-T--Q- is a compact and high performance digital fiber optic transmitter module ideally designed for high speed data communication systems or telecommunication transmission systems including SDH STM-1 S-1.1 and SONET OC-3 IR-1. The device also meets Bellcore TA-TSY-000253 requirement and ITU-TS G.957 recommendation.

- Application SDH STM-1 S-1.1 / SONET OC-3 IR-1 Compliant
- Data Rate 155.52 Mbps
- Power Supply Voltage Single +5V (or -5V)
- Electrical Interface PECL (or ECL)
- Laser Diode 1300 nm InGaAsP / InP
- Connector Interface either FC, SC or ST pigtail
- Pin Configuration 20 pin dual in line

The features of SDT8201-T are listed below. These features provide many functions and advantages for the system which the SDT8201 is used in.

- Features
 - Low Power Consumption
 - Plastic Molded Package
 - Uncooled Laser with Automatic Optical Power Control Circuit
 - Optical Output Shut-down (Disable)
 - Laser Bias Monitor
 - Laser Rear Facet Monitor
 - Multi-sourced Footprint

2. Block Diagram

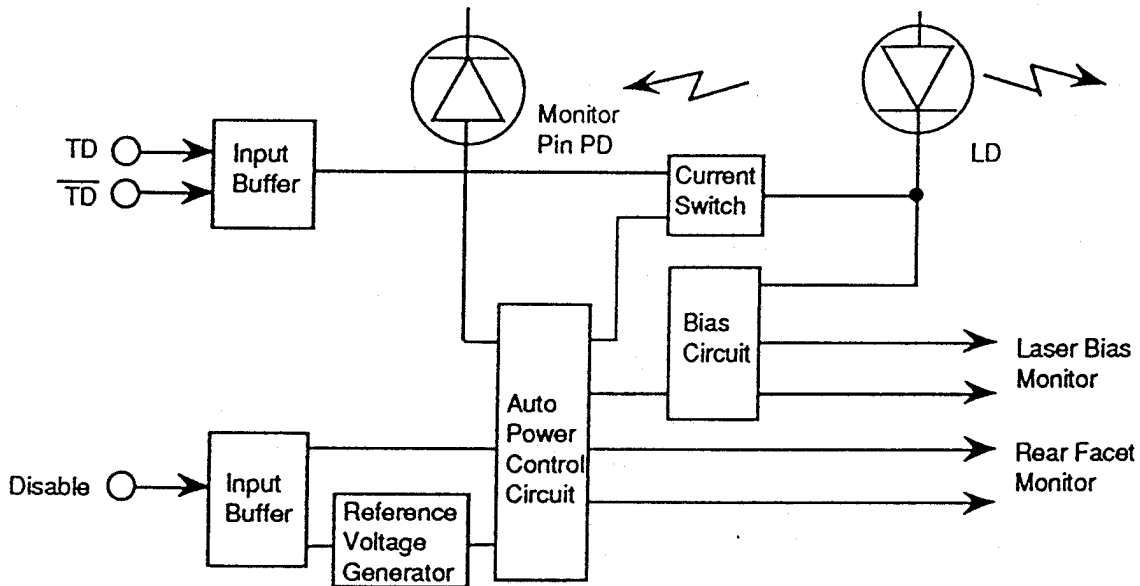


Figure 1 Block Diagram

3. Package Dimensions.

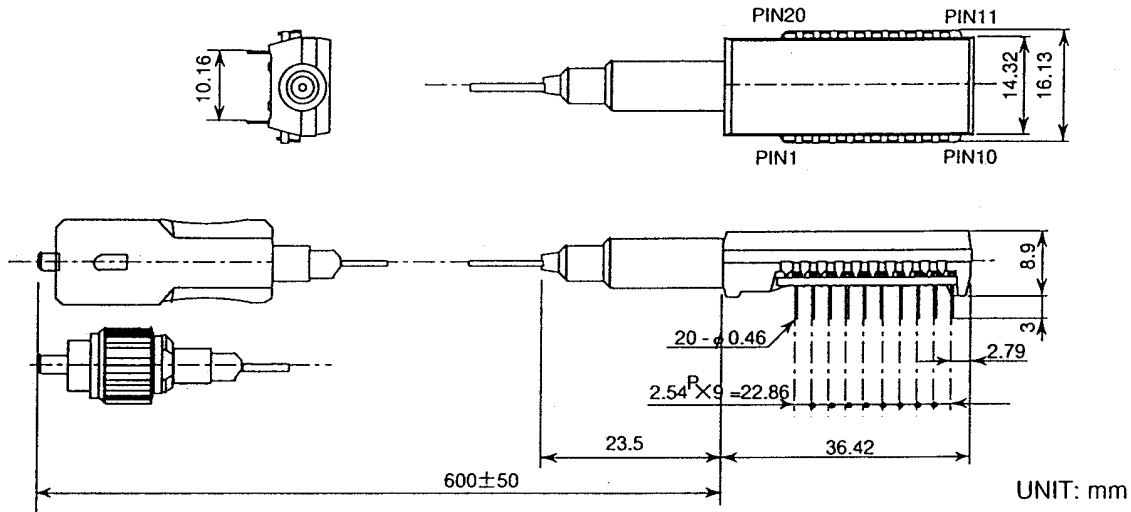


Figure 2. External View

4. Pin Assignment

No.	Symbol	Function
1	NC	Non Connection.
2	BM (+)	Monitoring Pin for LD Bias Current (Refer to Figure 3)
3	NC	Non Connection.
4	BM (-)	Monitoring Pin for LD Bias Current (Refer to Figure 3)
5	Vee	Power Supply (-): Vee=GND for Vcc=+5V or Vee = -5V for Vcc = GND
6	Vcc	Power Supply (+): Vcc=+5V for Vee=GND or Vcc =GND for Vee=-5V
7	Disable	LD Disable Input (Refer to 9. Relation between Disable Input Voltage and Optical Output Power)
8	Vcc	Power Supply (+): Vcc=+5V for Vee=GND or Vcc =GND for Vee=-5V
9	Vcc	Power Supply (+): Vcc=+5V for Vee=GND or Vcc =GND for Vee=-5V
10	NC	Non Connection.
11	NG	Non Connection.
12	Vcc	Power Supply (+): Vcc=+5V for Vee=GND or Vcc =GND for Vee=-5V
13	NC	Non Connection.
14	Vee	Power Supply (-): Vee=GND for Vcc=+5V or Vee = -5V for Vcc = GND
15	TD-	Negative Data Input (Refer to 6. Bectrical Interface)
16	TD+	Positive Data Input (Refer to 6. Electrical Interface)
17	RFM (-)	Monitoring pin for Rear Facet Monitor Current (Refer to Figure 3
18	Vcc	Power Supply (+): Vcc=+5V for Vee=GND or Vcc =GND for Vee=-5V
19	RFM (+)	Monitoring pin for Rear Facet Monitor Current (Refer to Figure 3)
20	NC	Non Connection.

NG pins should be left open for additional functions in the future.

5. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Storage Case Temperature	TS	-40	85	°C	1
Operating Ambient Temperature	Ta	0	70	°C	1,2
		-40	85		1,3
Supply Voltage	Vcc-Vee	0	7	V	4
Input Voltage	Vi	Vee	Vcc	V	5
Lead Soldering (Temperature) (Time)			260 10	°C sec.	6

Note 1. No condensation allowed. 2. For SDT8201-T*-QN (*:C or D) 3. For SDT8201-T*-QW (*: C or D)
4. Vcc>Vee, Vee=GND for Vcc=+5V or Vcc=GND for Vee=-5V. 5. TD+, TD-, and Disable.
6. Measured on leads-pin at 2mm (0.079inches) off the package bottom

6. Electrical Interface

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	Vcc - Vee	4.75	5.00	5.25	V	
Supply Current	Idtx		60	130	mA	1, 2, 3
Input Voltage TD+, TD-	High	Vih	Vcc-1.17	Vcc-0.73	V	4,5
	Low	Vil	Vcc-1.95	Vcc-1.45	V	
Transmitter Disable Voltage	Vd	Vcc-2		Vcc	V	6
Transmitter Enable Voltage	Ven	Vee		Vee+0.4	V	6
LD Bias Monitor Voltage	Vbm	0.01		0.45	V	5,7
Rear Facet Voltage	Vrfm	0.01		0.20	V	2,7

Note

- Input bias current is not included in Supply Current.
- 50% duty cycle data
- 155.52Mbps
- Vcc-Vee=5V
- Ta=25°C
- The transmitter is enabled as default state and requires an external voltage only to disable.
(Refer to 9. Relation between Disable Input Voltage and Optical Output Power)
- The Laser Bias and Rear Facet Monitor currents are calculated as ratios of the corresponding voltages to their current-sensing resistors, 10 Ω and 200 Ω, respectively (See Figure 3). Upon measuring or utilizing these values, use a device whose input impedance is high enough (>1MΩ) compared with those resistors.

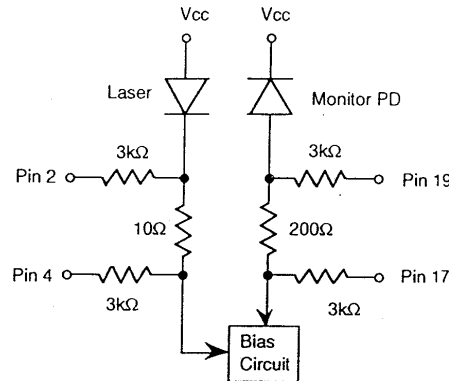


Figure 3 Monitor Circuit Schematic Diagram

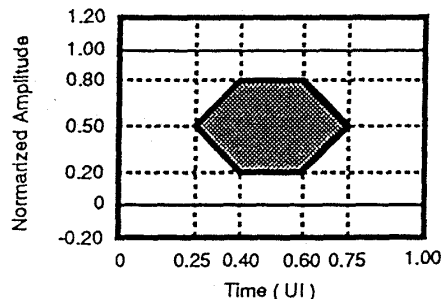


Figure 4 Eye Mask for Optical Output with Fourth Order Bessel-Thomson Filter Specified in ITU-TS G.957

7. Optical Interface

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Average Output Power	Po	-15	-11	-8	dBm	1
Extinction Ratio	Er	8.2			dB	2
Center Wavelength	λ_c	1261		1360	nm	
Spectral Width (RMS)	$\Delta\lambda$			7.7	nm	
Eye Mask for Optical Output	Refer to figure 4					

Note

1. Measured at the bit rate of 155.52Mbps (2^{23-1}) PRBS NRZ
2. 50% duty cycle data

8. Relation between Input Signal and Optical Output Power

Input Signal		Optical Output Power
TD+	TD-	
"H"	"L"	ON ("H")
"L"	"H"	OFF ("L")
"H"	"H"	undefined
"L"	"L"	undefined

9. Relation between Disable Input Voltage and Optical Output Power

Disable Input Voltage [V]	Optical Output Power
"L" (Vee ~ Vee+0.4)	Enabled
"H" (Vcc-2 ~ Vcc)	Disabled (< -45dBm)

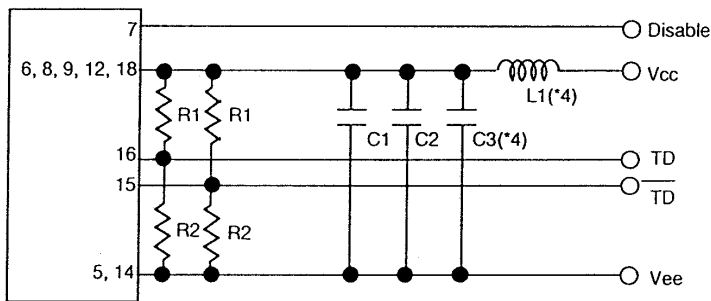
Note

1. Enabled for no Disable input (Pin 7 opened)
2. Refer to Figure 6, If Interface condition is not suitable.

10. Fiber Pigtail Specification

Parameter	Min.	Typ.	Max	Unit	Note
Mode Field Diameter		9.5		μm	
Cladding Diameter		125		μm	
Fiber Diameter		0.9		mm	
Optical Fiber Tensile Break Strength			9.8	N	
Bend Radius	30			mm	

11. Recommended User Interface

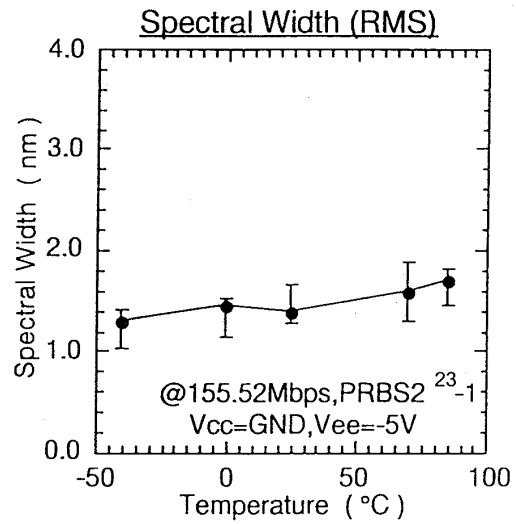
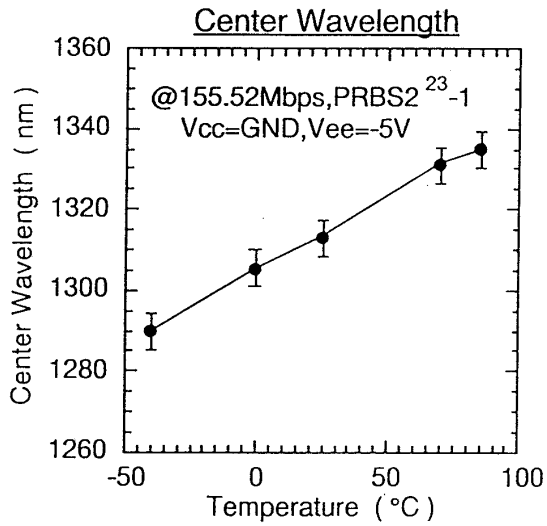
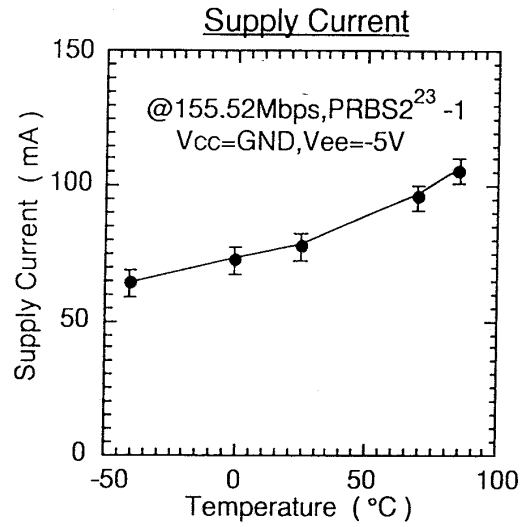


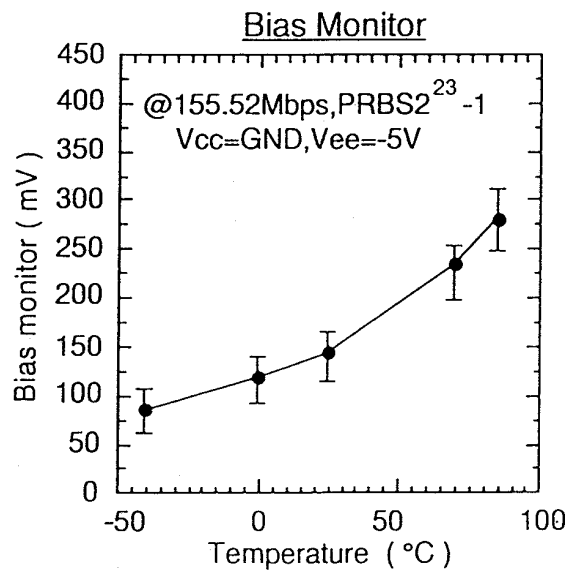
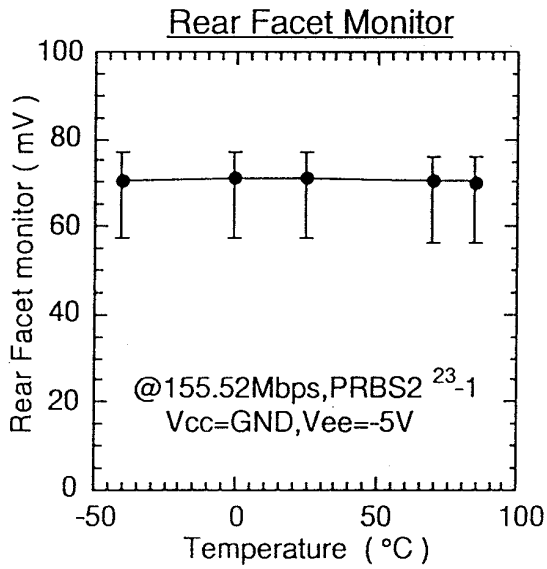
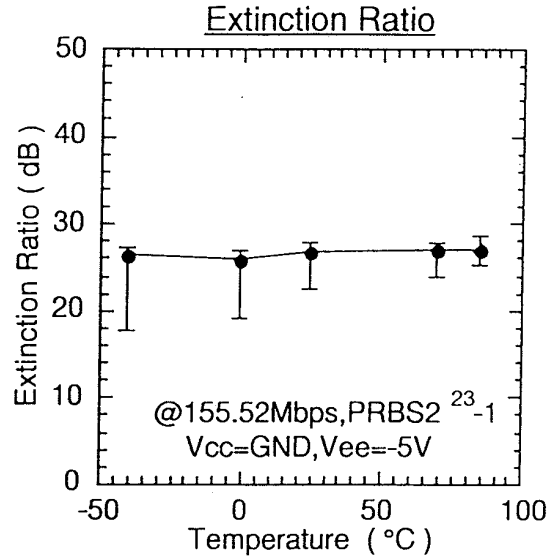
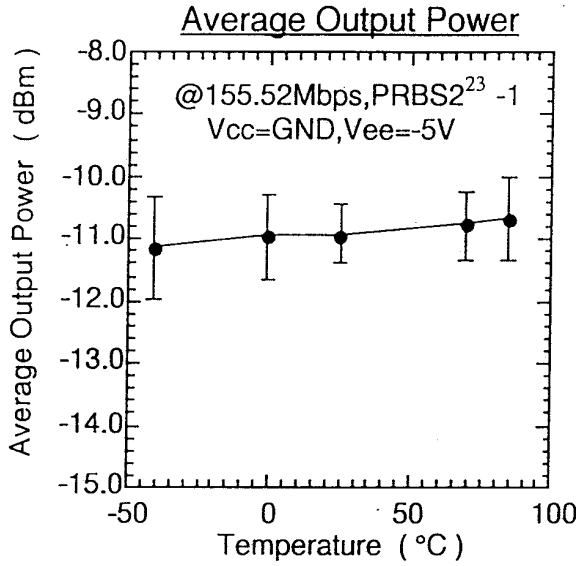
C1 = 0.022 μF / 25V (Ceramic Chip Capacitor)
 C2 = 1 μF / 25V (Ceramic Chip Capacitor)
 R1 = 82 Ω ($\geq 1 / 8 \text{ W}$)
 R2 = 130 Ω ($\geq 1 / 8 \text{ W}$)

- Note :
1. Terminated resistors (R1, R2) should be located as close to the module as possible.
 2. 50 Ω impedance lines are recommended for TD and $\overline{\text{TD}}$.
 3. Please refer to Figure 3 for Pin 2, 4, 17 19.
 4. C3 = 470 μF , L1 = 100 μH are effective when ripple of power supply is large.

Figure 5 Recommended User Interface

12. Typical Characteristics Information

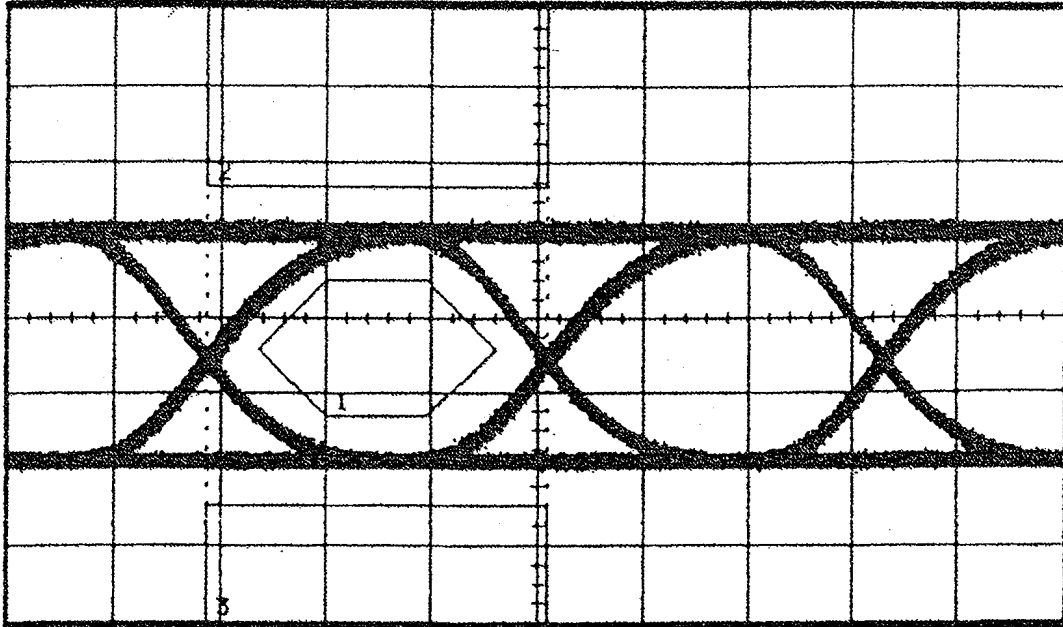




Typical Output Waveform

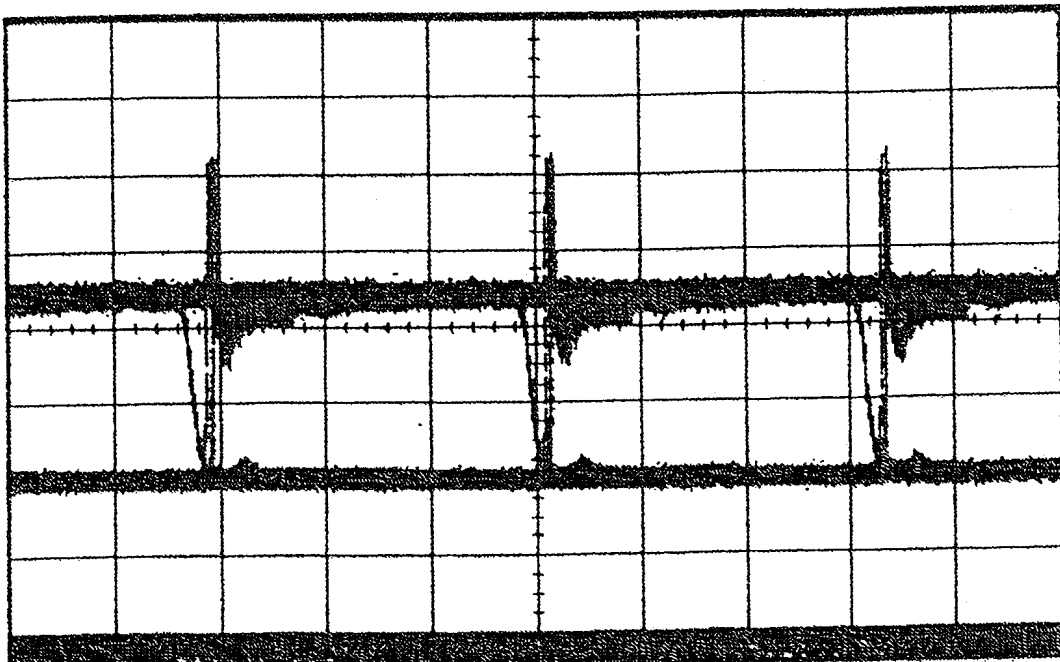
@155.52Mbps, PRBS $2^{23}-1$, $V_{cc}=GND$, $V_{ee}=-5V$, $25^{\circ}C$

with fourth order Bessel-Thomson Filter specified in ITU-T G.957



Horizontal Axis : 2.0nsec / div.
Vertical Axis : 10mV / div.

without fourth order Bessel-Thomson Filter specified in ITU-T G.957



Horizontal Axis : 2.0nsec / div.
Vertical Axis : 10mV / div.

13. Reliability Tests

Bellcore TA-NWT-000983								
Heading	Test	Reference	Condition	Sampling Plan			SEI Results	
				LTPD	SS	C	SS	F/C
Mechanical Integrity	Mechanical Shock	NHL-STD-883 Method 2002	Condition B 500 G 0.5-ms 5 times/axis	20%	11	0	11	0
	Vibration	MH--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 10 11	AT=1000C	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	20%	11	0	11	0
Endurance	Accelerated Aging (High Temp.)	(R)-453 Section 5.18	+85°C;>2Vop or 100uA >5,000 hrs.		10	-	25	0
	High Temp. Storage		+ 85°C ; > 2,000hrs.	20%	11	0	11	0
	Low Temp.		-40°C ; > 2,000hrs.	20%	11	0	11	0
	Temperature Cycling	Section 5.20	-40°C to +85°C 500 times pass/fail 1000 times for info.		11	0	11	0
	Damp Heat (if using epoxy)	MIL-STD-202 M103 or IEC 68-2-3	40°C, 95%, 56days; or 85°C/85%RH 2,000hrs	20%	11	0	11	0
	Cyclic Moisture Resistance	Section 5.23		20%	11	0	11	0
Special Tests	Internal Moisture	MIL-STD-883 M1018	<5,000ppm Water vapor	20%	11	0	11	0
	Flammability	TR357:Sec.3.4.2.4		--	---	-	--	OK
	ESD Threshold	Section 9.17						0

14. Laser Safety

- This transmitter is a laser class 1 product acc. FDA, complies with 21CFR1040. 10 and 1040.11
- This transmitter is a laser class 1 product acc. IEC 825-1.

15. Precaution

The components should be handled in the same manner as ordinary semiconductor devices to prevent the electrostatic damages. For safe keeping and carrying, the components should be packaged with ESD proof material. To assemble the components on PCB, the workbench, the soldering iron and the human body should be grounded.

To eliminate ft ripple noise to supply voltage, a ripple filter should be placed as close to the component as possible.

The signal input and output terminals should not be short-circuited to supply voltage or ground.

The accessory cap should be attached to the connector part while the optical connector is not in use, because dust on the optical interface port may let the optical power or sensitivity degrade.

The stress to the fiber pigtail may cause the damage on the performance. The fiber pigtail may snap-off by dropping the module.

Please pay special attention to the atmosphere condition of the components because the dew on the module may cause some electrical damages.

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.

16. Ordering Information

Connector type	Ordering Number	
	Ta=0~70°C	Ta=-40~85°C
FC - PC	SDT8201-TD-QN	SDT8201-TD-OW
SC - PC	SDT8201-TC-QN	SDT8201-TC-OW

17. For More Information

USA

Sumitomo Electric Lightwave Corp.
78 Alexander Drive
Research Triangle Park, NC 27709
U.S.A.
Tel. (919)541-8100
Fax. (919)541-8376

EUROPE

Sumitomo Electric Europe S. A.
Unit 11. Magnolia House
Spring Villa Park, Spring Villa Road
Edgware, Middlesex. HA8 7EB
United Kingdom
Tel. (081)905-6160
Fax. (081)905-6195

JAPAN

Sumitomo Electric Industries, Ltd.
(International Business Division)
3-12, Moto-Akasaka 1-chome
Minato-ku Tokyo 107
Japan
Tel. (03)3423-5771
Fax. (03)3423-5099