

Technical Specification for 2.5Gbps Fiber Optic Transmitter Module

SDT9008-T_-__

<input type="checkbox"/> 155.52Mb/s	<input type="checkbox"/> 622.08Mb/s	<input checked="" type="checkbox"/> other <u>2488.32Mbps</u>
<input checked="" type="checkbox"/> Short Haul	<input type="checkbox"/> Long Haul	<input type="checkbox"/> other _____
<input checked="" type="checkbox"/> Intermediate Reach	<input type="checkbox"/> Long Reach	<input type="checkbox"/> other _____
<input checked="" type="checkbox"/> Single 5.0 V	<input type="checkbox"/> Single 3.3 V	<input type="checkbox"/> other _____
<input checked="" type="checkbox"/> 1.3 μ m	<input type="checkbox"/> 1.55 μ m	<input type="checkbox"/> other _____
<input checked="" type="checkbox"/> 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 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.

(SDT9008-T_-__)

1. General

The features of SDT9008-T_-- are listed below:

- * SDH STM-16 I-16 / SONET OC-48 IR-1 Compliant
- * Power Supply Voltage Single +5V (or -5V)
- * Low Power Supply Current 150mA (typ.)
- * Compact Package Size
- * Pin Configuration 24 pin Dual in Line, Multi Sourced Foot print
- * Uncooled Laser Diode with Automatic Optical Power Control Circuit
- * Laser Diode 1300nm DFB-LD
- * Optical Output Shut-down Function (Disable Function)
- * Laser Bias Current Alarm Function.
- * Laser Bias Monitor / Rear Facet Monitor Function.
- * Clocked / Non-clocked mode selector
- * Optical Connector Interface FC / SC connector

2. Block Diagram

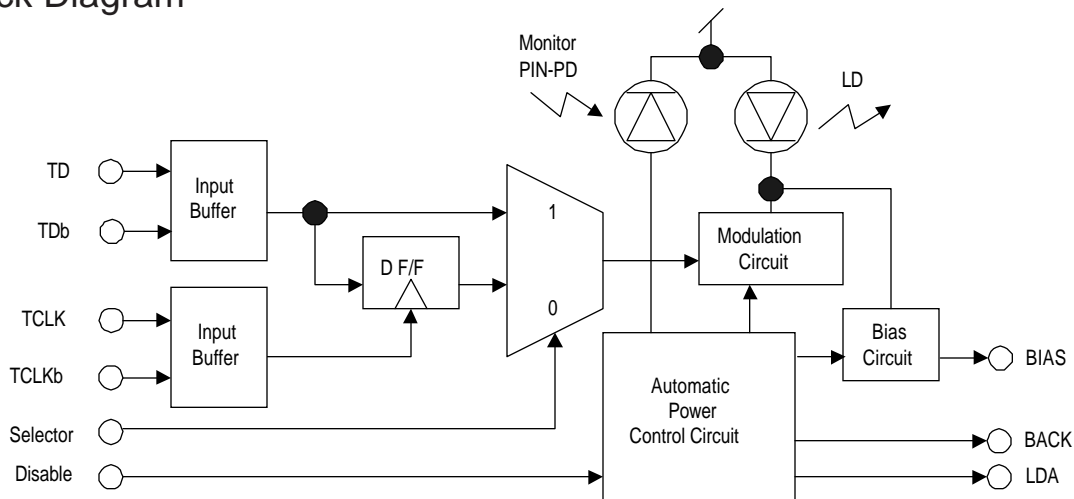


Figure 1 Block Diagram

*Clocked Operation Mode
(Vs=Vslct)

Data Input				Optical
TD	TDb	TCLK	TCLKb	Output
H	L	↗	↘	H
L	H	↗	↘	L
φ	φ	L	H	Q0

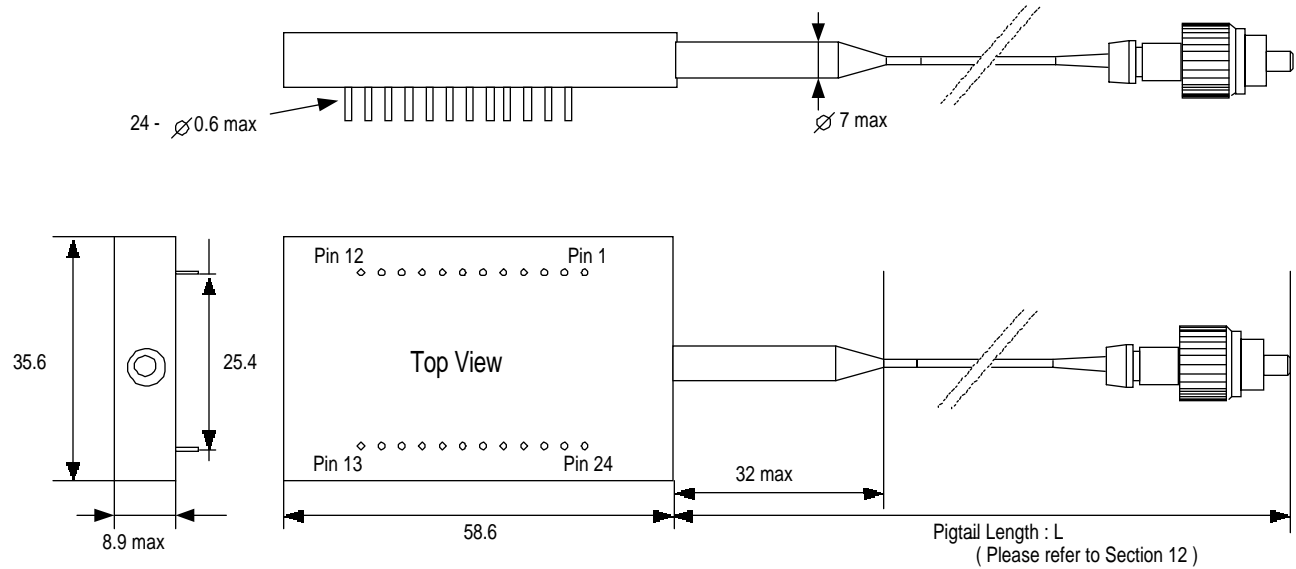
H:High Level, L:Low Level, φ:H or L
Q0:Previous optical output status
before data input condition defined

*Non-Clocked Operation Mode
(Vs=Vnslct)

Data Input		Optical
TD	TDb	Output
H	L	H
L	H	L

H:High Level, L:Low Level

3. 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

No.	Symbol	Function
1	Vee	Negative power supply
2	BACK	Monitoring for back facet PD current
3	BIAS	Monitoring for LD current
4	SDC	Shut Down Command
5	SELC	Clock mode select
6	GND	Ground
7	NUC	No User Connection
8	LDA	Laser Degrade Alarm
9	NUC	No User Connection
10	NUC	No User Connection
11	GND	Ground
12	Vee	Negative power supply

No.	Symbol	Function
24	Vcc	Positive power supply
23	GND	Ground
22	TCLKb	False clock input
21	GND	Ground
20	TCLK	True clock input
19	GND	Ground
18	TDb	False data input
17	GND	Ground
16	TD	True data input
15	GND	Ground
14	NUC	No User Connection
13	Vcc	Positive power supply

5. Absolute Maximum Ratings

Parameter	Symbol	min.	Max	Unit	Note
Storage Case Temperature	Ts	-40	85	°C	1
Operating Case Temperature	Tc	-40	85	°C	1, 2
		-5	75	°C	1, 3
Supply Voltage	Vcc-Vee	0.0	6.0	V	4
Input Voltage	Vi	Vee	Vcc	V	5
Lead Soldering (Temperature)			260	°C	6
(Time)			10	sec.	

Note 1. No condensation allowed. 2. SDT9008-T_ _W 3. SDT9008-T_ _N 4. Vcc>Vee, Vcc=+5.0V for Vee=GND

5. Data, Clock, Disable and Selector 6. Measured on lead pins 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, $V_{cc}-V_{ee} = 4.75$ to 5.25 V @2488.32Mbps, PRBS2²³-1, 50% duty and all operating temperature shall apply.)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	$V_{cc}-V_{ee}$	4.75	5.00	5.25	V	
Supply Current	I_d		150	220	mA	1
Input Impedance (Data and Clock)	R_{in}		50		Ω	2
Input Voltage (Data and Clock, for ECL or PECL interface)	High	V_{IH}	$V_{cc}-1.00$	$V_{cc}-0.90$	V	
	Low	V_{IL}	$V_{cc}-1.90$	$V_{cc}-1.70$	V	
Differential Input Voltage Swing for AC coupled interface	V_{in}	0.45	0.80	1.20	V _{p-p}	
Input Signal Rise Time (20% - 80%)	T_r		100	120	ps	
Input Signal Fall Time (20% - 80%)	T_f		100	120	ps	
Set up Time (for clocked mode)	T_{set}	140			ps	3
Hold Time (for clocked mode)	T_{hold}	70			ps	3
Disable Input Voltage	Enable	V_{disbl}	$V_{ee}+2.00$	V_{cc}	V	4
	Disable	V_{enbl}	V_{ee}	$V_{ee}+0.8$	V	
Selector Input Voltage	Clocked	V_{slct}	V_{ee}	$V_{ee}+1.5$	V	5
	Non Clocked	V_{nclct}	$V_{cc}-1.5$	V_{cc}	V	
LD Bias Alarm Output Voltage	Abnormal	V_{almi}	V_{ee}	$V_{ee}+0.5$	V	6
	Normal	V_{almh}	$V_{cc}-1.00$	V_{cc}	V	
LD Bias Monitor Voltage	V_{bm}	0.01	0.20	1.00	V	
Optical Output Monitor	Low level	V_{tpm}		0.2	V	7
	Normal		0.6			
	High level		1.1			

1. Termination current is not included. 2. Measured between each signal input and V_{ee} . Refer to Figure 3.

3. Refer to Figure 4. 4. Default (Open) normal operation. 5. Default (Open) clocked mode. 6. Alarm will be launched when LD bias current exceeds 70mA typ. 7. Refer to Figure 6

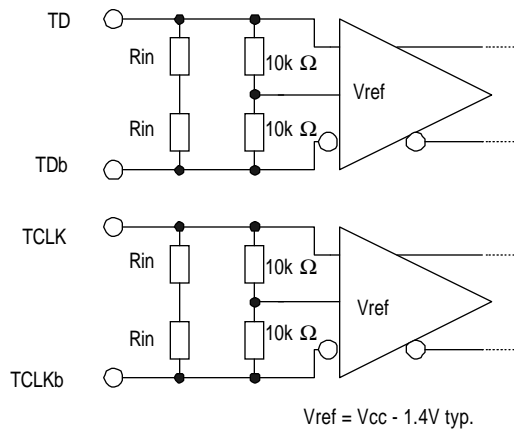


Figure 3 Data and Clock Input Interface

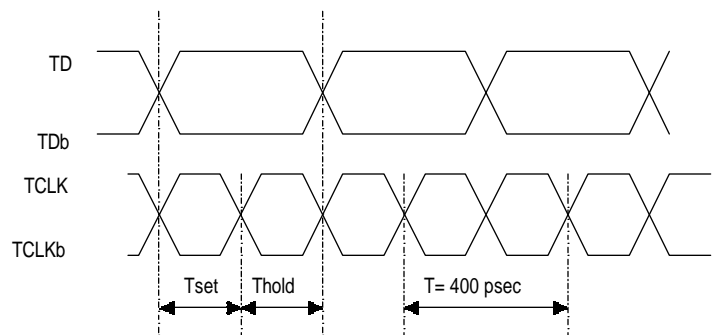
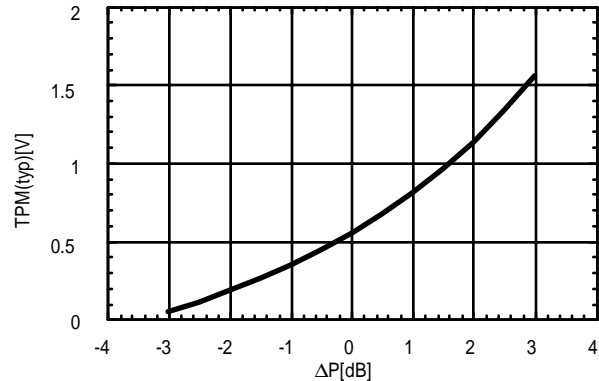
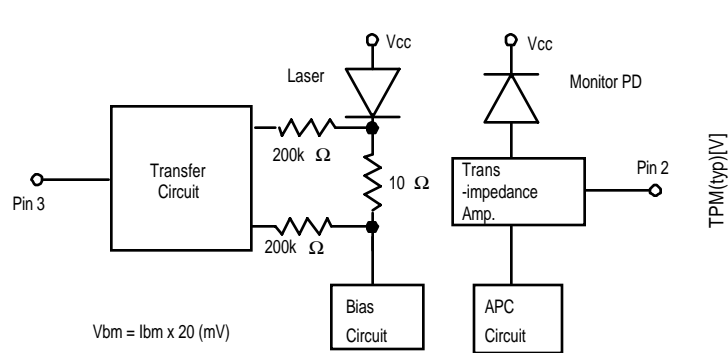


Figure 4 Input Data and Clock Timing

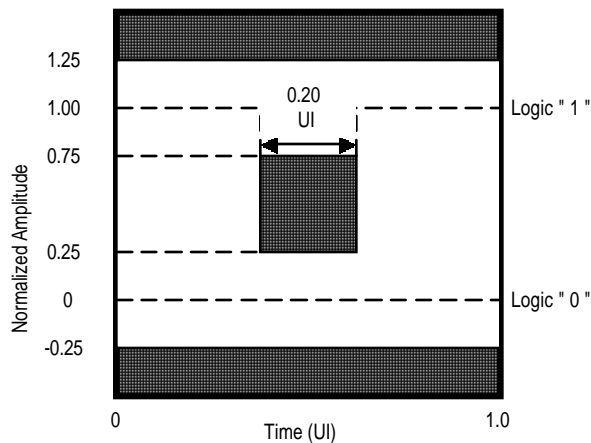


7. Optical Interface

(Unless otherwise specified, $V_{cc}-V_{ee} = 4.75$ to 5.25 V @2488.32Mbps, PRBS2²³-1, 50% duty and all operating temperature shall apply.)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Optical Output Power	Po	-4.0		0.0	dBm	
Optical Output Power (disable)	Podis			-45.0	dBm	
Extinction Ratio	Er	8.2			dB	
Center Wavelength	λ_c	1260		1360	nm	
Spectral Width (-20dB)	$\Delta\lambda_{20}$			1.0	nm	
Side Mode Suppression Ratio	Sr	30.0			dB	
Output Eye Diagram	Compliant with Bellcore G-253 CORE and ITU G957					1

Note1. Refer to Figure 7 for the eye diagram mask



Warning

Do not look at the laser beam projection area (e.g. end of optical connector) with naked eyes or through optical equipment while the power is supplied to this product. Otherwise, your eyes may be injured.

8. Recommended User Interface

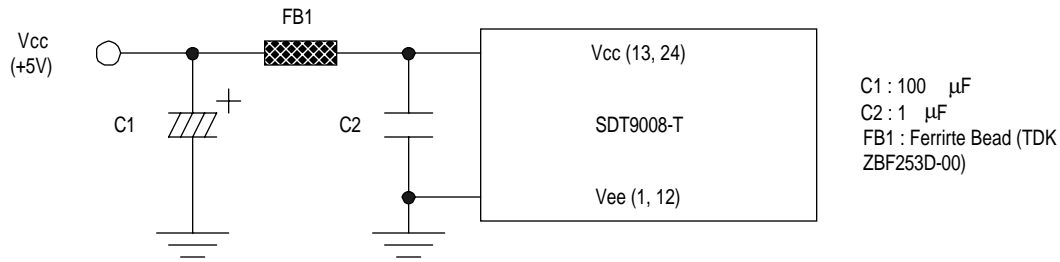


Figure 8 Recommended Power Supply Filtering

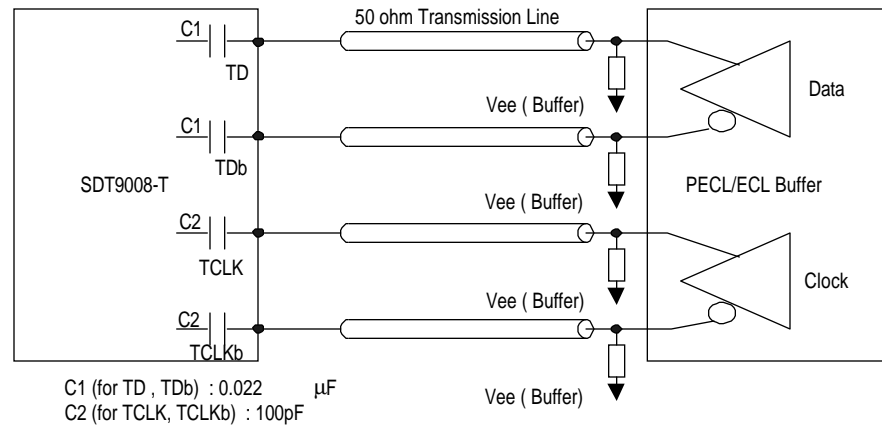


Figure 9 Data and Clock Interface with PECL/ECL Device (AC coupled Interface)

9. Fiber Pigtail Specification

Parameter	Min.	Typ.	Max.	Unit	Note
Core Diameter		9.5		μ m	
Cladding Diameter		125		μ m	
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 (Plan)

Bellcore TA-NWT-000983 Issue 2, December 1993								
Heading	Test	Reference	Condition	Sampling			SEI Result	
				LTPD	SS	C	SS	F/C
Mechanical Integrity	Mechanical Shock	MIL-STD-883 Method 2002	Condition B					
			5 times/axis					
	Vibration	MIL-STD-883 Method 2007	500G, 1.0 ms	20%	11	0	---	---
			1,500G, 0.5ms	20%	11	0	11	0
			Condition A	20%	11	0	11	0
			20 G					
			20-2,000 Hz					
			4 min/cycle; 4 cycles/axis					
Endurance	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	---	---
	Accel. Aging (High Temp.)	(R)-453 Section 5.18	+85°C; rated power	---	25	---	25	0
	High Temp. Storage	-----	>5,000hrs.	---	10	---	---	---
			>10,000hrs.	---	10	---	---	---
	Low Temp. Storage	-----	max. storage T (T=85°C)	20%	11	0	---	---
	Temperature Cycling	Section 5.20	>2,000	20%	11	0	11	0
			min. storage T (T=-40°C)	20%	11	0	11	0
			>2,000					
			- 40°C to +85°C					
	Damp Heat (if using epoxy)	MIL-STD-202 M103 or IEC 68-2-3	400 times pass/fail	20%	11	0	---	---
			500 times for info.	---	11	---	---	---
			500 times pass/fail	20%	11	0	11	0
Special Tests	Internal Moisture	MIL-STD-883 Method 1018	1000 times for info.	---	11	---	11	0
	Flammability	TR357:Sec. 4.4.2.5	40°C , 95%, 56days	20%	11	0	11	0
	ESD Threshold	Section 5.22	or 85°C /85%RH 2,000hrs.	20%	11	0	---	---

11. Laser Safety

This product uses a semiconductor laser system and is a laser class 1 product acc. FDA, complies with 21CFR1040. 10 and 1040.11.

Also this product is a laser class 1 product acc. IEC 825-1.

Class 1 Laser Product

⚠ Caution



If this product is used under conditions not recommended in the specification or this product is used with unauthorized revision, classification for laser product safety standard is invalid. Classify the product again at your responsibility and take appropriate actions.

12. Ordering Information




Connector	Pigtail Length : L	Tc = -40 ~ 85°C	Tc = -5 ~ 75°C
SC Connector	600 +/- 50	SDT9008-TC-QW	SDT9008-TC-QN
SC Connector	990 +/- 100	SDT9008-TC-YW	SDT9008-TC-YN
FC / PC Connector	600 +/- 50	SDT9008-TD-QW	SDT9008-TD-QN
FC / PC Connector	990 +/- 100	SDT9008-TD-YW	SDT9008-TD-YN




13. 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 contains 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.

14. For More Information

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