



Technical Specification for 2.5Gbps Cooled Laser Transmitter Module

SDT9997-T

Data Rate:	OC-3	OC-48	Other _____
Application:	DWDM	SupervisoryChannel	Other _____
Wavelength:	Fixed	2 Channel-Selectable	Other _____
Output Power:	+1dBm	+7dBm	Other _____
Dispersion:	1600ps/nm	3200ps/nm	Other _____
Supply Voltage:	Single 5.0 V	Single 3.3 V	Other <u>5.0V and 3.3V</u>
Function:	Transceiver	Transmitter	Other _____
Package:	Original	MSA	Other _____



Sumitomo Electric reserves the right to make changes in the 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.

(SDT9997-T)

1. General

The features of SDT9997-T are listed below:

- * 2 Wavelengths selectable ITU-T G.692 ; 100GHz grid
- * High Optical Output Power ; +7dBm(typ.)
- * Power Supply Voltage +5V and +3.3V
- * Low Power Consumption 4.0W (typ.) 24pin Metal Package
- * Wavelength Selection Comand (WSC)
- * Optical Output Shut-down Function (SDC)
- * Laser Degrade Alarm. (LDA)
- * Laser / Rear Facet Monitor Function. (BACK)
- * Clocked / Non-clocked mode selector (SELc)
- * Optical Connector Interface SC, MU-J, MU connector

2. Block Diagram

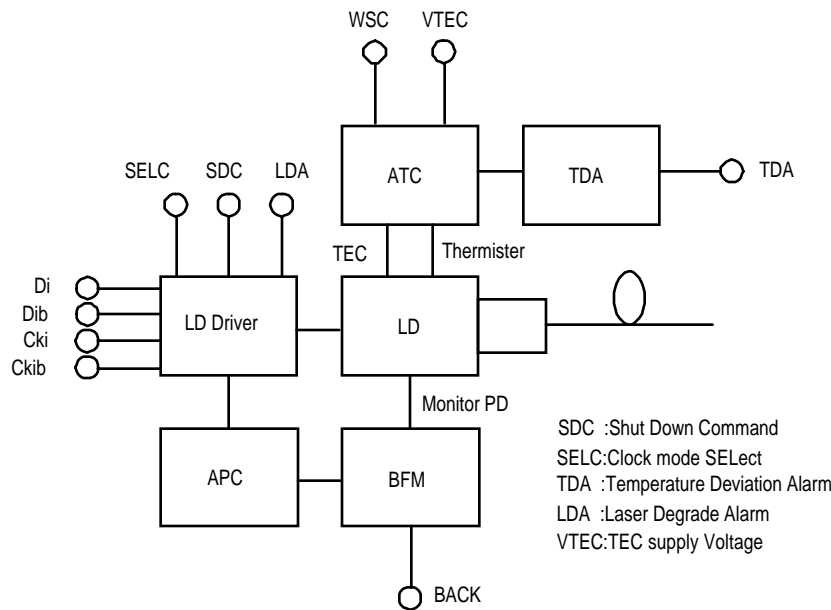


Figure 1 Block Diagram

*Clocked Operation Mode

Data Input				Optical Output
Di	DiB	CKi	CKib	
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

Data Input		Optical Output
Di	DiB	
H	L	H
L	H	L

H:High Level, L:Low Level

*WSC Operation Mode

WSC	Channel Wavelength
H	n-1
L	nominal n

H:High Level, L:Low Level

(Example) n : F600

n-1 : F590

(*)refer to Table1

⚠ 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

Function	Symbol	No.	No.	Symbol	Function
Ground (TEC)	GND	1	24	Vcc	Positive power supply
Monitoring for back facet PD current	BACK (+)	2	23	GND	Ground
Laser Degrade Alarm (*1)	LDA	3	22	Ckib	False clock input
Shut Down Command (*2)	SDC	4	21	GND	Ground
Clock mode select (*3)	SELC	5	20	Cki	True clock input
Ground	GND	6	19	GND	Ground
Temperature Deviation Alarm (*4)	TDA	7	18	Dib	False data input
No User Connection	NUC	8	17	GND	Ground
No User Connection	NUC	9	16	Di	True data input
Wavelength Selection Command (*5)	WSC	10	15	GND	Ground
Ground	GND	11	14	VTEC	TEC supply voltage
No Internal Connection	NIC	12	13	Vcc	Positive power supply

*1	LDA	H	normal
		L	Laser end of life condition
*2	SDC	H	shut down mode
		L	operating mode (default)
*3	SELC	H	non clocked mode
		L	clocked mode (default)
*4	TDA	H	temperature deviation alarm
		L	normal
*5	WSC	H	(n-1) ITU-T channel
		L	(n) ITU-T channel (default)

NOTE: When SDC, SELC and WSC are left open, they are default state respectively.

Pins designated NUC (No User Connection) must not be tied to GND or any other circuit potential.

Table 1 Logic state descriptions

5. Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device.

Parameters	Symbol	Min.	Max.	Unit	Note
Storage Case Temperature	Ts	-40	85	degC	
Operating Case Temperature	Tc	-5	70	degC	1
Supply Voltage	Vcc	0	6.0	V	
TEC Supply Voltage	Vtec	0	3.5	V	
TEC Supply Current	Itec	0	1.3	A	
input Voltage	Vi	0	Vcc+0.5	V	
Lead Soldering	temperature	-	260	degC	
	time	-	10	sec	

⚠ 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, $V_{cc} = 4.75$ to 5.25 V $V_{tec} = 3.1$ to 3.5 V @2488.32Mbps, PRBS2²³-1, 50% duty and all operating temperature shall apply.)

Parameters		Symbol	Min.	Typ.	Max.	Unit	Note
Supply voltage		Vcc	4.75	5.0	5.25	V	
Supply current		Icc			300	mA	1
TEC supply voltage		Vtec	3.1	3.3	3.5	V	
TEC supply current		Itec			1300	mA	
Power dissipation				4.0	6.0	W	
Input Voltage DATA & CLOCK (single)			0.5	0.8	1.0	Vp-p	
Clock duty cycle			40		60	%	
Bit rate					2.5	Gb/s	
Normalized back face voltage				500		mV	
Normalized back face accuracy			-10		10	%	
Setup Time		ts		100		ps	2
Hold Time		th		0		ps	2
Input current			-20		400	μA	3
Command Logic Level (TTL Input)	High		2.0		Vcc	V	3
	Low		0.0		0.8		
Alarm Logic Level (CMOS Output)	High		4.4		Vcc	V	4
	Low		0.0		0.6		

Note1. Termination Current is not Included.

Note2. Refer to Figure 3

Note3. SDC, SELC, WSC

Note4. LDA, TDA

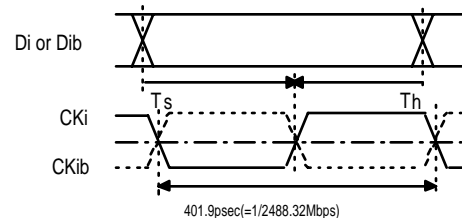


Figure 3 Input Data and Clock Timing

7. Optical Interface

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

Parameters	Symbol	Min.	Typ.	Max.	Unit	Note
Center Wavelength Range		1528.77		1563.86	nm	
Wavelength deviation (BOL)		-50		50	pm	1
Wavelength deviation (EOL)		-100		100	pm	1
Average Optical output power (BOL)		5		10	dBm	
Average Optical output power (EOL)		4	7	10	dBm	
Shutdown optical power			-50	-40	dBm	
Spectral width (at 20dB down)			0.3	0.5	nm	
SMSR		30			dB	
Extinction ratio	ER	8.2			dB	
Dispersion		3200			ps/nm	
Return loss				24	dB	

Note1 Clocked-mode, Mark Ratio 50%

⚠ 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

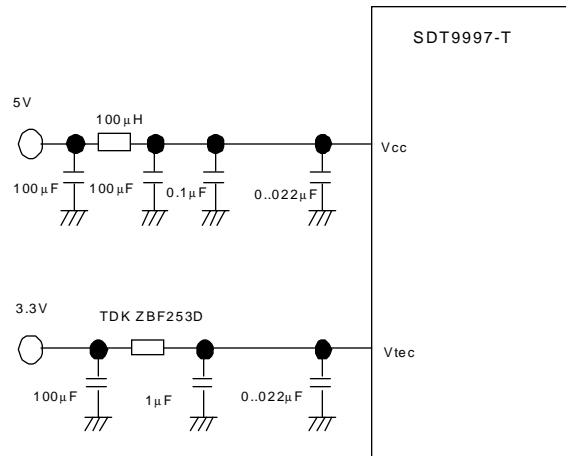


Figure 4 Recommended Power Supply Filtering

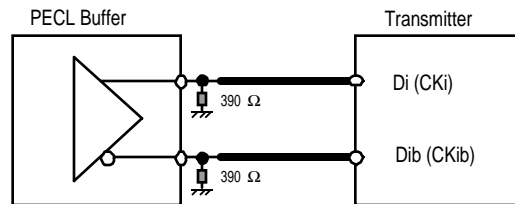


Figure 5 Data and Clock Interface with PECL Device

9. Fiber Pigtail Specification

Parameter	Min.	Typ.	Max.	Unit	Note
Core Diameter		9.5		µm	
Cladding Diameter		125		µm	
Outer Diameter		0.9		mm	
Fiber Length	890	990	1090	mm	
Optical Cord Tensile Break Strength			9.8	N	
Bend Radius	30			mm	

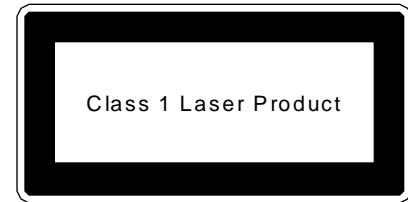
⚠ Caution



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. 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.



⚠ 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.

11. Ordering Information

Operating Case Temperature	Tc = -5~70°C		
Connector Type	SC	MU - J	MU
Ordering Number	SDT9997 - TC - XXXX	SDT9997 - TM - XXXX	SDT9997 - TU - XXXX

XXXX : Refer to Channel No. in Table 2

Channel No.	Frequency (THz)	Wavelength (nm)	Channel No.	Frequency (THz)	Wavelength (nm)
F610	196.10	1528.773	F390	193.90	1546.119
F600	196.00	1529.553	F380	193.80	1546.917
F590	195.90	1530.334	F370	193.70	1547.715
F580	195.80	1531.116	F360	193.60	1548.515
F570	195.70	1531.898	F350	193.50	1549.315
F560	195.60	1532.681	F340	193.40	1550.116
F550	195.50	1533.465	F330	193.30	1550.918
F540	195.40	1534.250	F320	193.20	1551.721
F530	195.30	1535.036	F310	193.10	1552.524
F520	195.20	1535.822	F300	193.00	1553.329
F510	195.10	1536.609	F290	192.90	1554.134
F500	195.00	1537.397	F280	192.80	1554.940
F490	194.90	1538.186	F270	192.70	1555.747
F480	194.80	1538.976	F260	192.60	1556.555
F470	194.70	1539.766	F250	192.50	1557.363
F460	194.60	1540.557	F240	192.40	1558.173
F450	194.50	1541.349	F230	192.30	1558.983
F440	194.40	1542.142	F220	192.20	1559.794
F430	194.30	1542.936	F210	192.10	1560.606
F420	194.20	1543.730	F200	192.00	1561.419
F410	194.10	1544.526	F190	191.90	1562.233
F400	194.00	1545.322	F180	191.80	1563.047
			F170	191.70	1563.863

Table 2


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 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.

13. For More Information

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