Technical Data Sheet

February 2002

SAMSUNG ELECTRONICS

FIBEROPTICS DIVISION

TX47T2A
2.5 Gbps Cooled Laser DWDM Transmitter Module

Features

➢ Multisource agreement (MSA) compatible

➢ Operates at SONET OC-48 rates as well as
  at ITU-T SDH rates of STM-16

➢ Wide operating case temperature range :
  from -15 °C to +75 °C

➢ High performance MQW distributed feedback
   laser

➢ Power supply : + 5.0 V and + 3.3 V

➢ Clocked or nonclocked operation selectable
   with single-ended or differential

➢ ITU-T wavelengths avaliable from 1528.77 nm
   to 1563.86nm

➢ Laser back-facet monitor voltage output

➢ Laser degrade alarm

Applications

➢ High speed data communication

➢ Telecommunications

  ✓ SONET/SDH

  ✓ metropolitan area networks

  ✓ wide area networks

Product Code

Product Code	Laser Type	Dipersion Performance
TX47T2A-B35B4	1550 nm cooled DFB-LD	1800 ps/nm(100 km)
TX47T2A-D37B4	1550 nm cooled DFB-LD	3000 ps/nm(170 km)

Description

The TX47T2A 2.5 Gbps cooled laser DWDM transmitter module is designed for use in high speed data communication and telecommunication systems. The transmitter operates at SONET OC-48 rate as well as at ITU-T SDH rate.

The TX47T2A transmitter meets all GR-253-CORE requirements and the ITU-T G.957 and G.958 recommendations. The transmitter is compatible with the MSA specification, which has a space-saving 24-pin DIP package.

The TX47T2A transmitter incorporates a 1550 nm MQW distributed feedback laser and silicon bipolar laser driver. The transmitter has wide operating case temperature range from –15 °C to +75 °C with clocked or nonclocked operation and wavelength selection capability.

Pin information

TX47T2A			
Pin	Definition	Pin	Definition
1	Ground (GND$_{TEC}$)	13	Positive Power Supply(V$_{CC}$)
2	Back-facet Monitor(LD$_{POWER}$)	14	TEC Supply Voltage(V$_{TEC}$)
3	Laser Degrade Alarm(LDALM)	15	Ground(GND)
4	Laser Disable(TX DIS)	16	True Data Input(DATA)
5	Clock Selection(CKL SLEC)	17	Ground(GND)
6	Ground (GND)	18	False Data Input(/DATA)
7	Wavelength Deviation Alarm (λ DALM)	19	Ground(GND)
8	Clock I^{2}C bus (SCL [1])	20	True Clock Input(CLOCK)
9	Data I^{2}C bus (SDA [2])	21	Ground(GND)
10	Wavelength Selection (λ SEL)	22	False Clock Input(/CLOCK)
11	Ground (GND)	23	Gound(GND)
12	No Internal Connection (NIC)	24	Positive Power Supply(V$_{CC}$)

[1][2] No user connection. Pins must not be tied to ground or any other circuit.
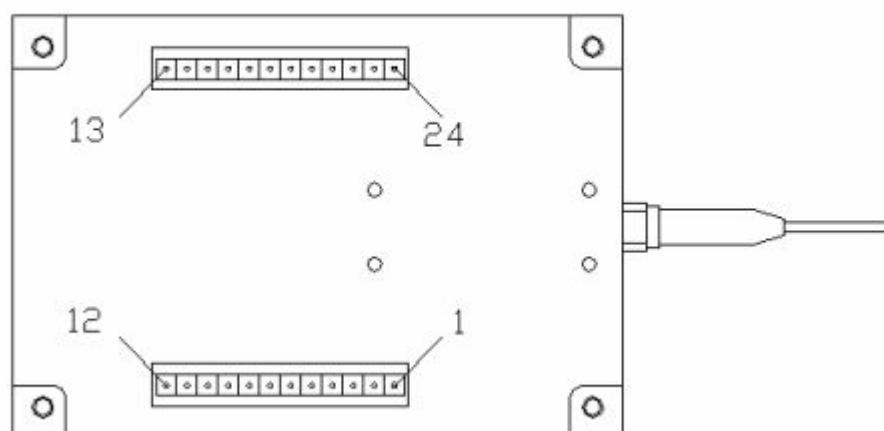
Module Performance Characteristics

Electrical characteristics					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**
DC power supply voltage	V_{CC}	4.75	5.0	5.25	V
DC power supply current	I_{CC}		160	250	mA
Power dissipation	P_{DIS}		0.8	1.25	W
Input data/clock voltage swing [1]					
Single-ended input	V_{IN}	150	800	1000	mV_{P-P}
Differential input	V_{IN}	75	400	500	mV_{P-P}
Nonclock/Clock selection voltage [2]					
Clocked operation	$V_{SEL-CLK}$	0		1	V
Nonclocked operation	$V_{DIS-CLK}$	2		Vcc	V
Tx disable voltage [3]	V_{DIS}	2		Vcc	V
Tx enable voltage	V_{EN}	0		0.8	V
Wavelength (λ_N) selection voltage	$V_{\lambda N}$	0		0.8	V
Wavelength (λ_{N-1}) selection voltage	$V_{\lambda N-1}$	2		Vcc	V
Wavelength deviation alarm					
Deactive voltage level	$V_{NO-\lambda ALM}$	0		0.3	V
Active voltage level	$V_{\lambda ALM}$	4.5		Vcc	V
Wavelength deviation setting	λ_{ALM}	-100		100	pm
Laser degrade alarm (Active low)					
Levels V_{OL}	V_{ALM}	0		0.3	V
Levels V_{OH}	$V_{NO-\lambda ALM}$	4.5		Vcc	V
Setting	LD_{ALM}		50		mA
Laser back-facet monitor voltage [4]	V_{BF}		500		mV/mW
Clock duty cycle	C_{DC}	40	50	60	%
TEC voltage	V_{TEC}	3	3.3	3.6	V
TEC current	I_{TEC}		0.6	0.9	A

[1] Internally, AC coupled with 50Ω internal termination. If single-ended input is driven, the unused pin must be terminated in 50Ω.

[2] When low(or open) the module operates in the clocked mode.

[3] When high, the module operates in the Tx disable mode.

[4] This voltage is measured from pin 2 to GND.

Optical characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Average optical power output	P_{AVE}		1	+2.0	dBm
Output power variation over temp.	ΔP	-0.5		+0.5	dBm
Center wavelength range	λ_C	1528.77		1563.86	nm
Variation in center wavelength over temperature [1]	$\Delta\lambda_T$	-50		+50	pm
Center Wavelength aging [2]	–	-50		+50	pm
Wavelength tuning coefficient	$\Delta\lambda_C/\Delta T_{LD}$		0.09		nm/°C
Spectral width fulll width at –3 dB full width at –20 dB	$\Delta\lambda$		0.11 0.3	0.2 0.5	nm nm
Side-mode suppression ratio	SMSR	30			DB
Generated jitter [2]	-			0.15	UI_{P-P}
Extinction ratio	ER	8.5			dB
Optical rising/fall time(20%~80%)	t_R/t_F			130	ps
Maximum return loss(optical)	RL			24	dB
Dispersion penalty 1800 ps/nm 3000 ps/nm	DP			2 2	dB dB

[1] At operating case temperature , -15 °C to +75 °C
[2] Measurement max value is 0.15UIp-p in a bandwidth form 5kHz ~ 20MHz.

Absolute Maximum Ratings

These are absolute maximum ratings only. Higher stress than these ratings may adversely affect device reliability or cause permanent damage to the device.

Parameter	Unit	Symbol	Min	Max
Supply voltage	V			5.25
TEC voltage	V	V_{TEC}		3.5
Operating case temperature range	°C	T_C	-15	75
Storage case temperature range	°C	T_{STG}	-40	85
Relative humidity	%	RH		85
Lead soldering temperature/time	°C/sec			260/10
Fiber bend radius	mm		30	

Outline Diagram

Dimensions are in millimeters (inches).
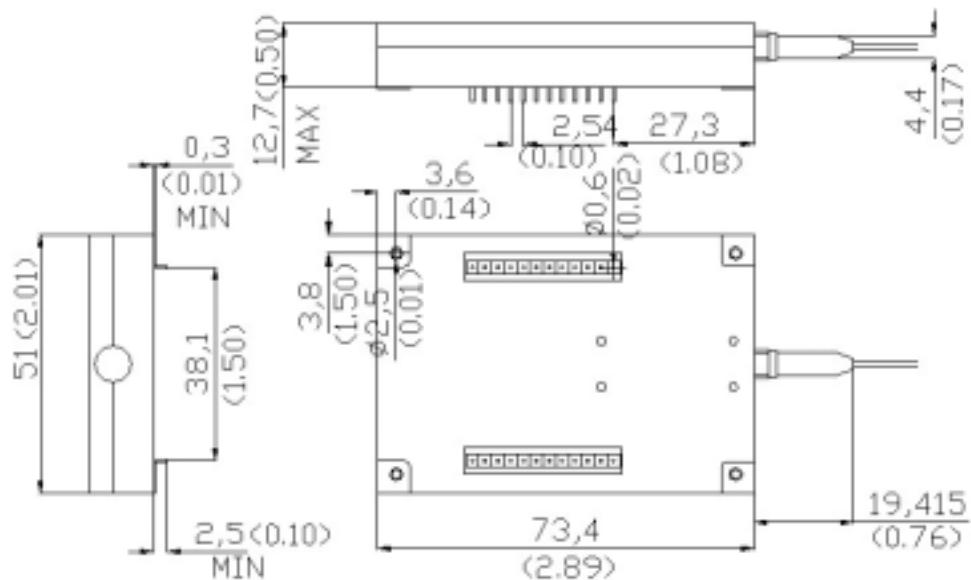
Performance Characteristics

1. BER *vs.* Received Optical Power

Ordering Information

| T | X | 4 | 7 | T | 2 | A | — | | | | | |

Dispersion performance :
B : 1800ps/nm(100km at 18ps/nm km)
D : 3000ps/nm(170km at 18ps/nm km)

DWDM wavelength

See table on SEC code for DWDM wavelength

Fiber length :
See table on fiber length

Connector type :
See table on fiber connector

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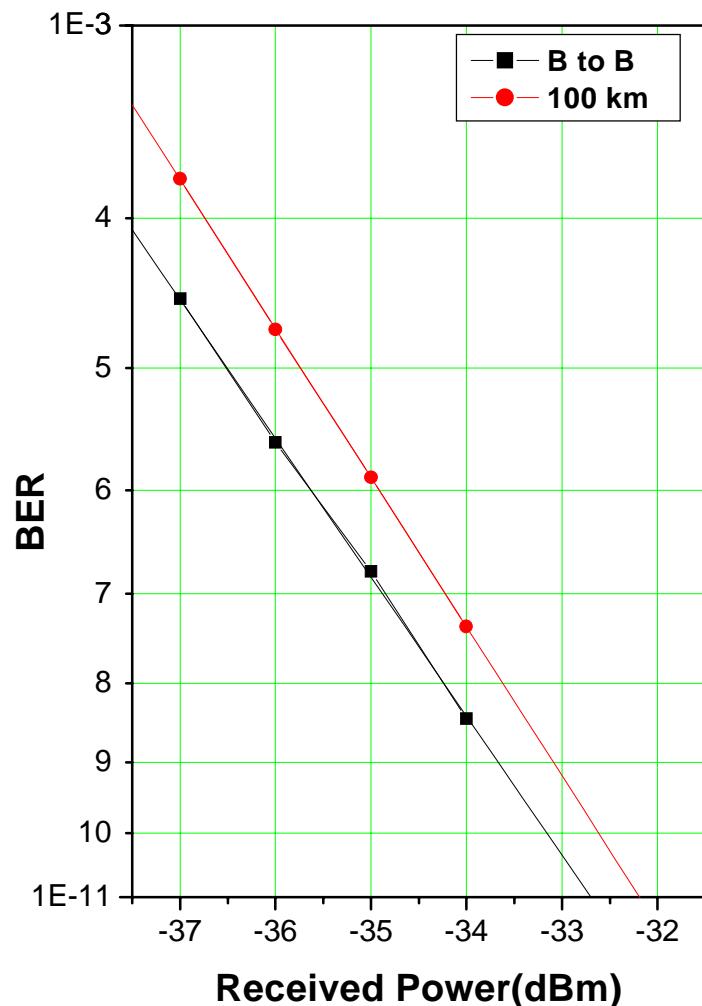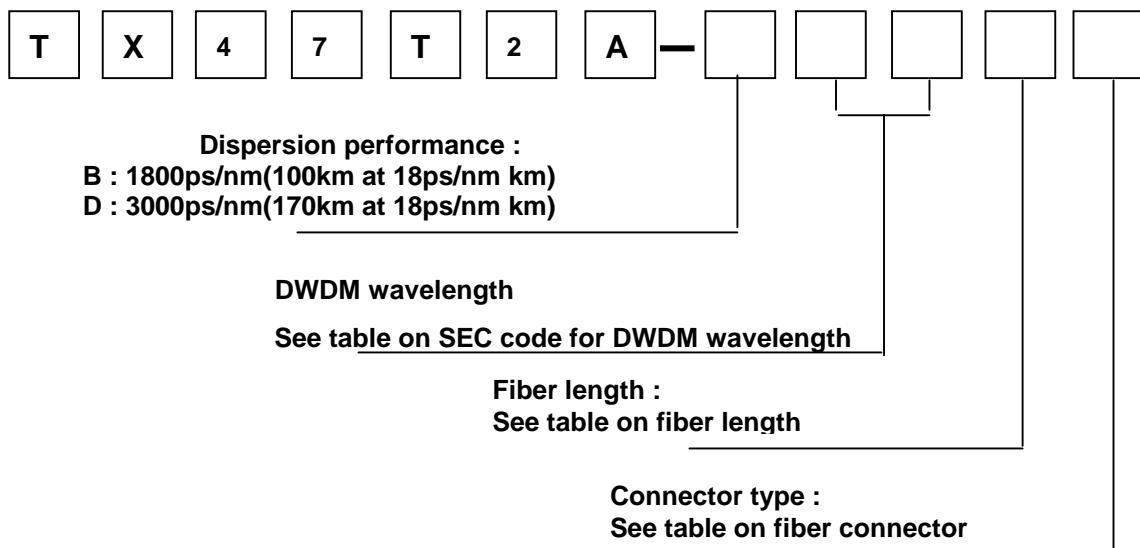
Dispersion Performance

Code	Dispersion Performance
B	1800ps/nm(100km)
D	3000ps/nm(170km)

Fiber Length

Code	Fiber Length
A	0.5m
B	1.0m
C	1.5m
D	2.0m
E	2.5m

Fiber Connector Type

Code	Connector Type
1	FC/PC
2	FC/APC
3	ST/PC
4	SC/PC
5	Biconic
6	No Connector

SEC Code for DWDMWavelength

ITU Frequency (THz)	DWDM Wavelength Code	Center Wavelength(nm)	Wavelength Tolerance
191.7	17	1563.86	± 0.4nm
191.8	18	1563.05	± 0.4nm
191.9	19	1562.23	± 0.4nm
192.0	20	1561.42	± 0.4nm
192.1	21	1560.61	± 0.4nm
192.2	22	1559.79	± 0.4nm
192.3	23	1558.98	± 0.4nm
192.4	24	1558.17	± 0.4nm
192.5	25	1557.36	± 0.4nm
192.6	26	1556.55	± 0.4nm
192.7	27	1555.75	± 0.4nm
192.8	28	1554.94	± 0.4nm
192.9	29	1554.13	± 0.4nm
193.0	30	1553.33	± 0.4nm
193.1	31	1552.52	± 0.4nm
193.2	32	1551.72	± 0.4nm
193.3	33	1550.92	± 0.4nm
193.4	34	1550.12	± 0.4nm
193.5	35	1549.32	± 0.4nm
193.6	36	1548.51	± 0.4nm
193.7	37	1547.72	± 0.4nm
193.8	38	1546.92	± 0.4nm
193.9	39	1546.12	± 0.4nm
194.0	40	1545.32	± 0.4nm
194.1	41	1544.53	± 0.4nm
194.2	42	1543.73	± 0.4nm
194.3	43	1542.94	± 0.4nm
194.4	44	1542.14	± 0.4nm
194.5	45	1541.35	± 0.4nm
194.6	46	1540.56	± 0.4nm
194.7	47	1539.77	± 0.4nm
194.8	48	1538.98	± 0.4nm
194.9	49	1538.19	± 0.4nm
195.0	50	1537.40	± 0.4nm
195.1	51	1536.61	± 0.4nm
195.2	52	1535.82	± 0.4nm
195.3	53	1535.04	± 0.4nm
195.4	54	1534.25	± 0.4nm
195.5	55	1533.47	± 0.4nm
195.6	56	1532.68	± 0.4nm
195.7	57	1531.90	± 0.4nm
195.8	58	1531.12	± 0.4nm
195.9	59	1530.33	± 0.4nm
196.0	60	1529.55	± 0.4nm
196.1	61	1528.77	± 0.4nm

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