Preliminary Technical Data (Rev. 0.3, June 8, 2000)

HITACHI

TRM5943AN

STM-16/OC-48 Optical Transmitter (for S-16.1/IR)

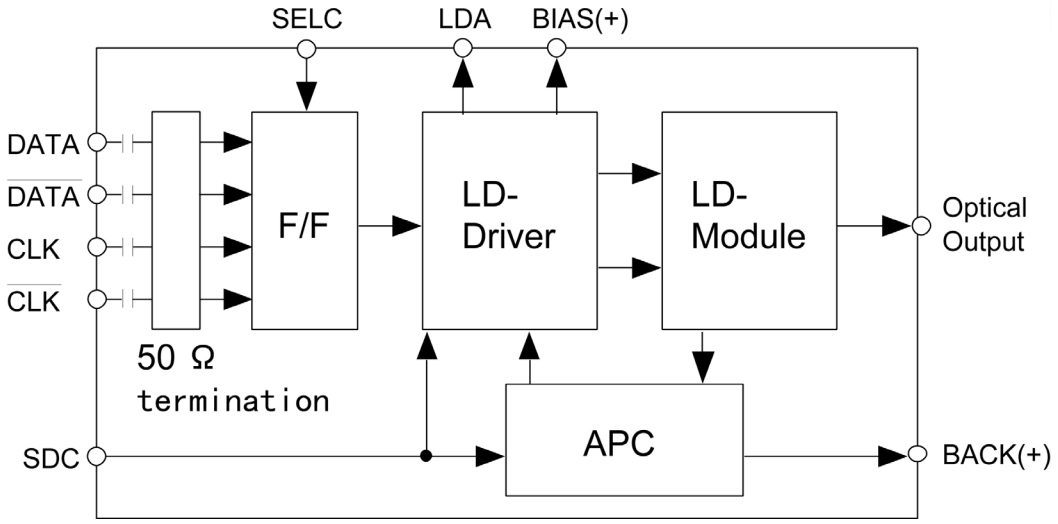
Preliminary Product Disclaimer

This preliminary data sheet is provided to assist you in the evaluation of functional samples of the products that are under development and for which a reliability test has not been completed. Until Hitachi, Ltd. releases these products for general sales, Hitachi, Ltd. reserves the right to change prices, features, functions, specifications, capabilities and release schedule.

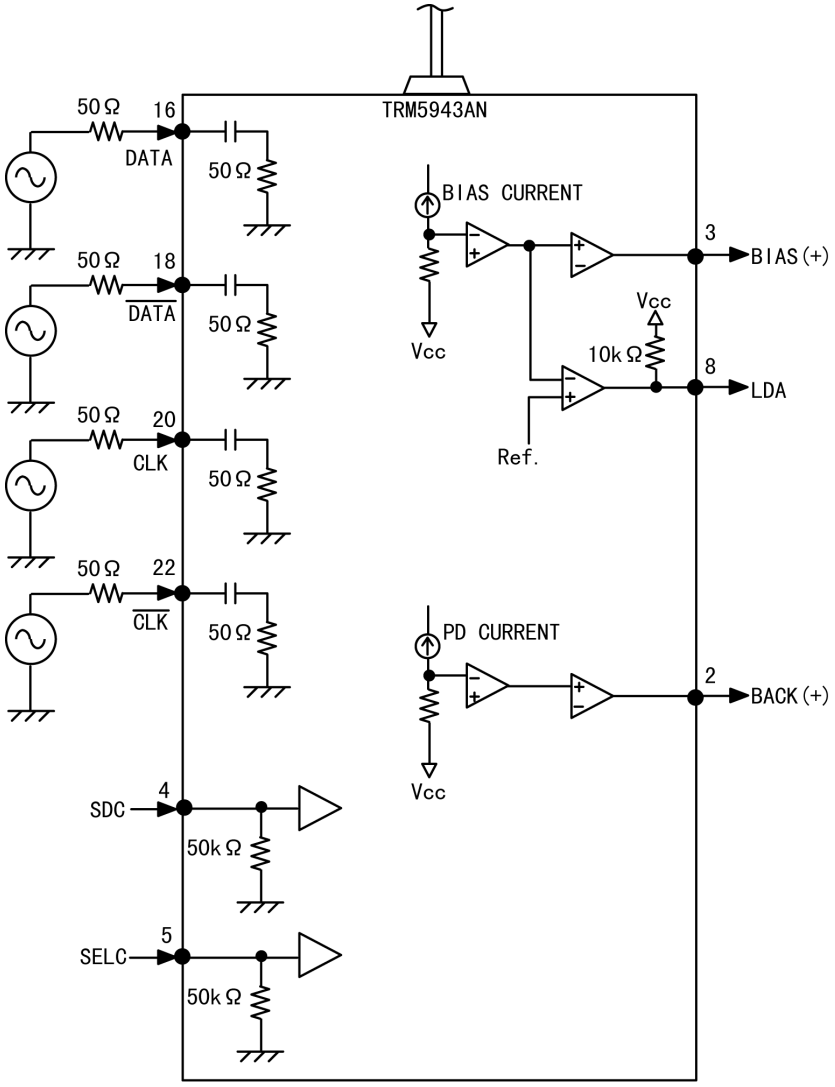
FEATURES

- **SDH/SONET compliant at STM-16/OC-48**
- **Multi-source compliant**
- **Uncooled, 1310 nm DFB-LD**
- **+5 V single power supply**
- **High performance in the operating case temperature range, -5 to +75°C**
- **Low jitter generation**
- **Clocked/Non-Clocked selectable**
- **Compact size (30.2 x 52 x 8.9 mm^3)**

Block Diagram



Recommended Circuit



PERFORMANCE SPECIFICATIONS

Table 1. Absolute Maximum Ratings

No.	Item	Symbol	Rated Value	Unit
1	Operating Case Temperature	Topr.	-5 to +75	°C
2	Storage Case Temperature	Tstg.	-20 to +75	°C
3	Lead Soldering Temperature (Max)	-	250	°C
4	Lead Soldering Time (Max)	-	10	s
5	DC Power Supply Voltage	Vcc	0 to 5.5	V

Table 2. DC Power Supply

No.	Item	Symbol	Min.	Typ.	Max.	Unit
1	Positive Supply Voltage	Vcc	+4.75	+5.00	+5.25	V
2	Positive Supply Current	Icc	-	-	400	mA
3	Power Consumption	Pc	-	-	2	W

Table 3. Optical Characteristics

No.	Item	Symbol	Min.	Typ.	Max.	Unit	Remarks (Note 1)
1	Average Power Output	Pf	-4.5	-	0	dBm	Beginning of life: -3.5 to 0 End of life: -4.5 to 0
2	Extinction Ratio	ER	8.2	10	-	dB	
3	Optical Waveform	-	Satisfying the Mask			-	Note 2
4	Optical Output at Shutdown	-	-	-	-40	dBm	
5	Peak Wavelength	W.L.p	1260	1310	1360	nm	
6	Spectral Width (-20 dB)	Sw	-	-	1	nm	
7	Side-mode Suppression Ratio	Sr	30	-	-	dB	
8	Jitter Generation (RMS)	Jg	ITU-T G812			ps	

Note 1. Transmit Data: NRZ at 2.488320 Gbit/s, Mark 50%, PRBS=2^{23}-1,
Power Supply Voltage: Vcc = 4.75 to 5.25 V, Tc = -5 to 75°C

Note 2.

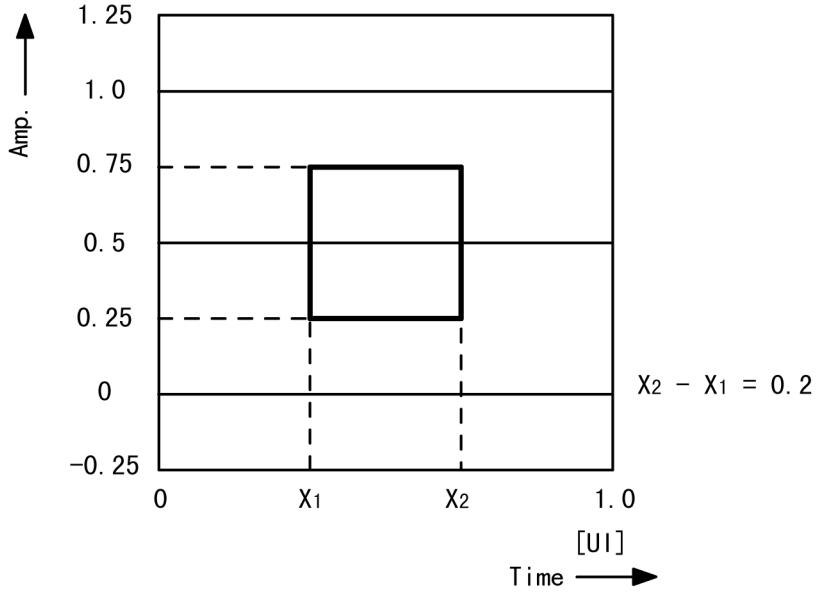


Fig. 4.1 Mask of Eye Diagram for the Optical Waveform through the 4th-order Bessel Filter According to ITU-T G957

Table 4 Input/Output Signal Interface

No.	Item		Min.	Typ.	Max.	Unit	Remarks (Note 1)
1	Data Input		50Ω, AC-coupled			-	
2	Input Data Voltage	Single	250	-	1000	mV	Peak to peak
		Differential	250	-	1000		
3	Clock Input		50Ω, AC-coupled			-	
4	Input Clock Voltage	Single	250	-	1000	mV	Peak to peak
		Differential	250	-	1000		
5	Input Clock Duty Cycle		40	-	65	%	
6	Setup and Hold time		-	-	55	ps	Note 2
7	Shutdown Command Interface		TTL Level Active High			-	Note 3
8	Shutdown activation time		-	-	5	ms	
9	Shutdown deactivation time		-	-	250	ms	
10	Clock Mode Select Interface		TTL Level:	High: Non-clocked mode Low: Clocked mode		-	Note 4
11	Laser Degrade Alarm		TTL Level Active Low			-	Notes 5 and 6
12	Monitoring for LD bias current (BIAS(+))		-	20	-	mV/mA	
13	Monitoring for back facet PD current (BACK(+))		450	500	550	mV	Note 7

Note 1. Transmit Data: NRZ at 2.488320 Gbit/s, Mark 50%, PRBS=2^{23}-1,
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Note 2.

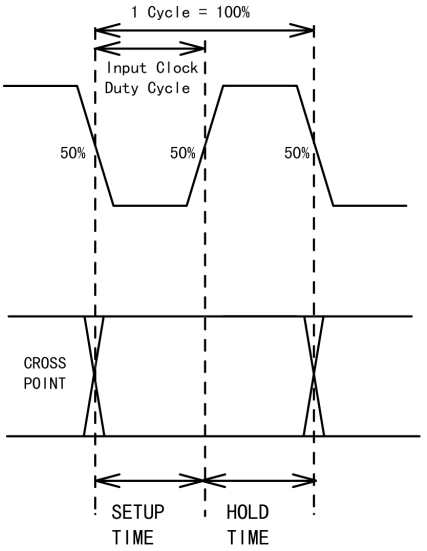


Fig. 5.1 Setup Time and Hold Time

Note 3.

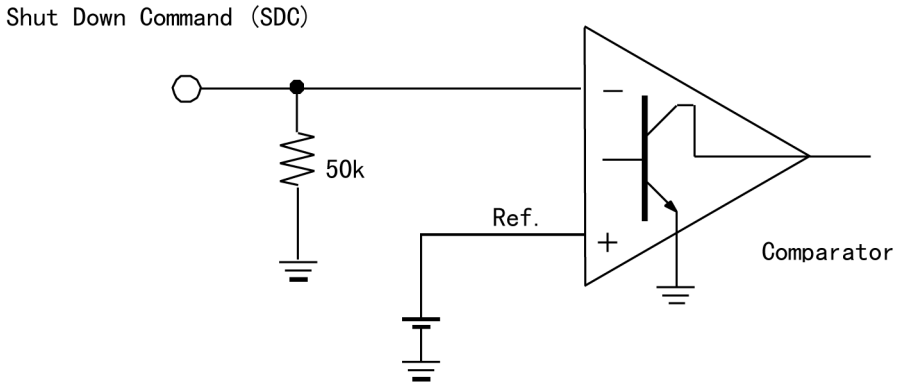


Fig. 5.2 Shutdown Command Interface

Note 4.

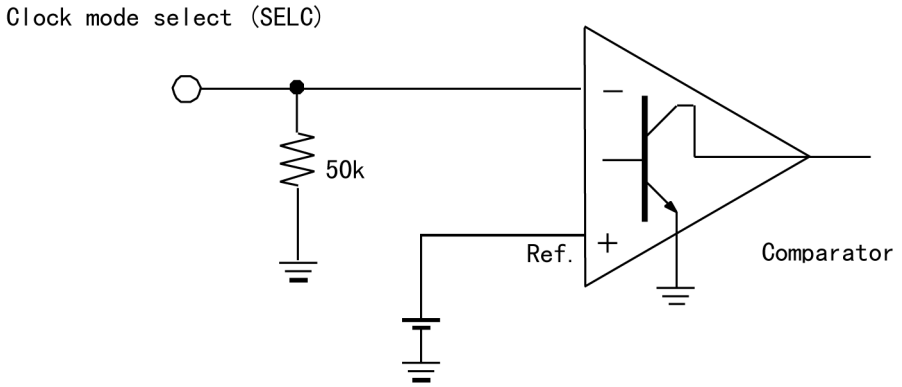


Fig. 5.3 Clock Mode Select Interface

Note 5.

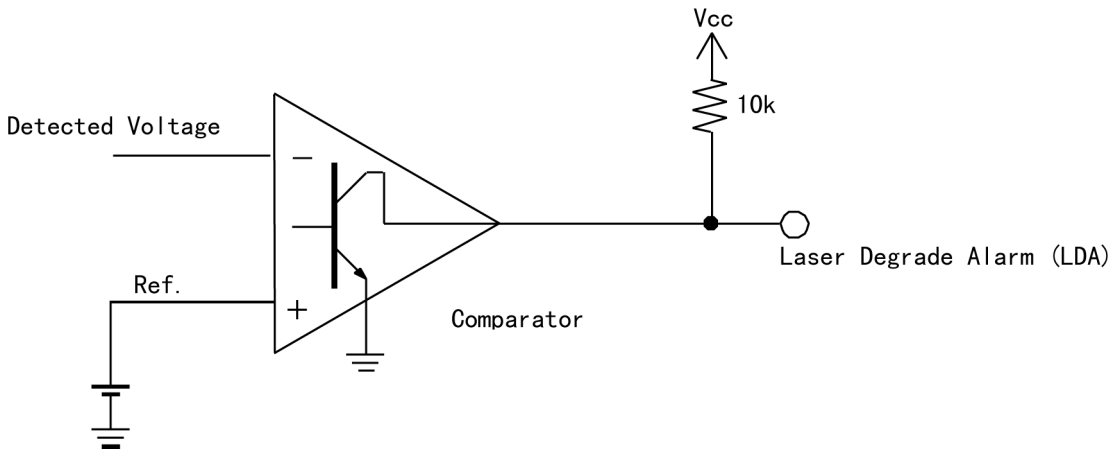


Fig. 5.4 Laser Degrade Alarm Interface

Note 6.

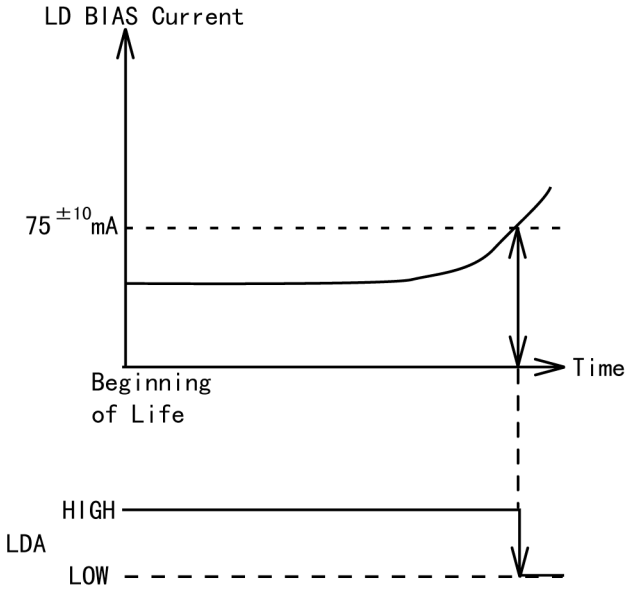


Fig. 5.5 Laser Degrade Alarm Activation

Note 7.

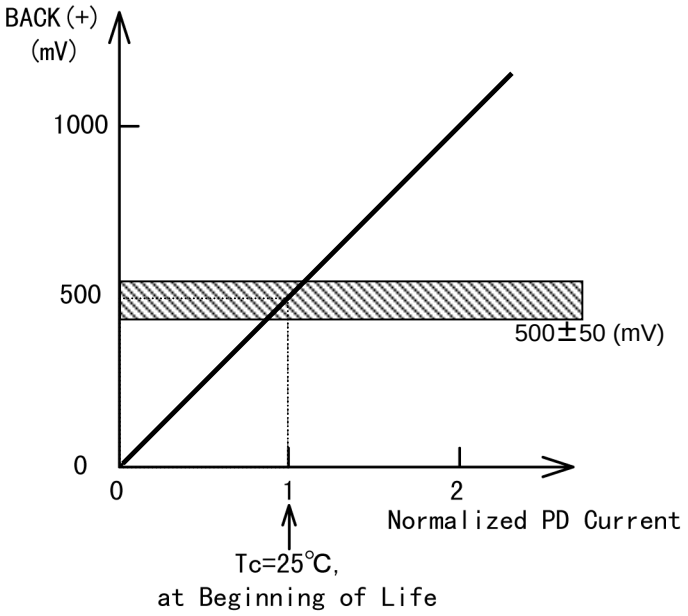


Fig. 5.6 Monitoring for Back Facet PD Current

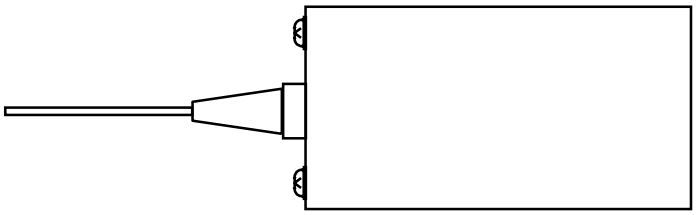
Table 5. Pin Configuration

Pin #	Symbol	I/O	Logic	Description	Remarks
1	GND			Ground	
2	BACK(+)			Monitoring for back facet PD current	
3	BIAS(+)			Monitoring for LD bias current	
4	SDC			Shutdown 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	GND			Ground	
13	Vcc			Positive power supply	
14	NIC			Not Internal Connection	
15	GND			Ground	
16	DATA			True data input	
17	GND			Ground	
18	$\overline{\text{DATA}}$			False data input	
19	GND			Ground	
20	CLK			True clock input	
21	GND			Ground	
22	$\overline{\text{CLK}}$			False clock input	
23	GND			Ground	
24	Vcc			Positive power supply	
				Metal Case is at GND.	

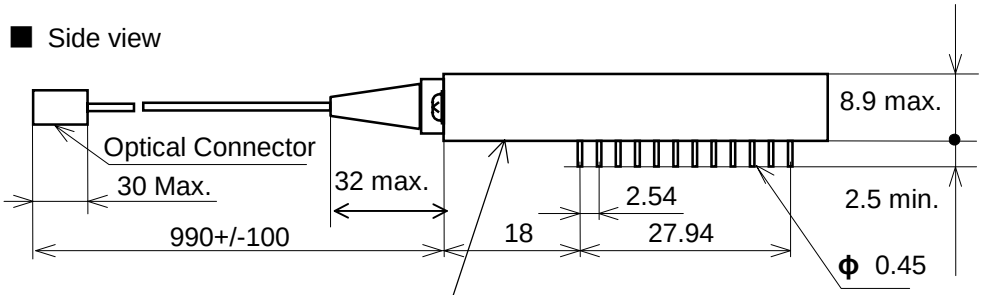
Mechanical Dimensions

Dimensions: mm
Tolerance : ±0.5 mm

■ Top view



■ Side view



■ Bottom view

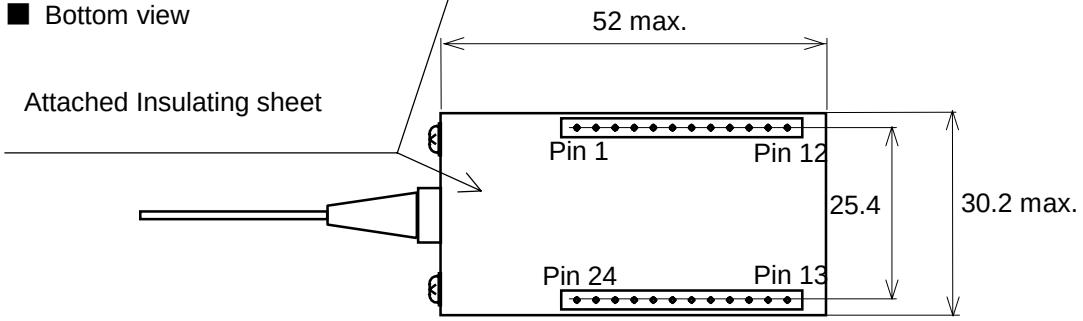


Table 6. Optical Fiber

No.	Item	Specifications
1	Type	SMF
2	Mode Field Diameter	9.5 ±1
3	Cladding Diameter	125 ±3
4	Minimum Bending Radius	30
5	Outer Diameter of Secondary Coating	0.9 ±0.1

USER INFORMATION

Handling Precautions

CAUTION: Take proper electrostatic-discharge (ESD) precautions while handling these devices. These devices are sensitive to ESD.

Laser Safety

This product complies with IEC 60825-1 Class 1.

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Revision History

Rev.	Date	Page/Line/Fig/Table	Modification	Note
0.3	June 8, 2000	-	-	