

MITSUBISHI (OPTICAL DEVICES)

# MF-10KDS-T12-06x/07x MF-10KDS-R13-06x/07x

SONET/SDH TRANSMITTER & RECIEVER

## DESCRIPTION

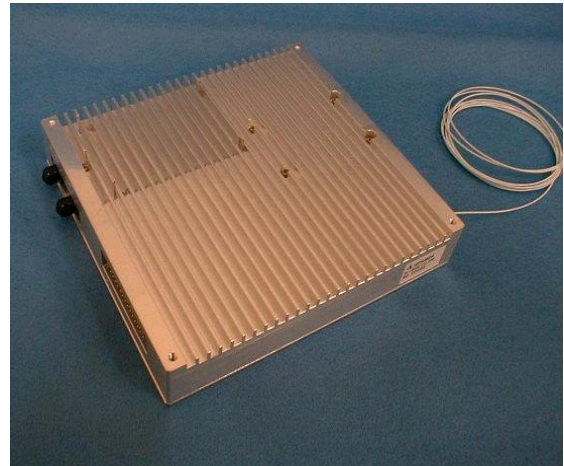
This product is designed to provide high optical performance for SDH STM-64/SONET OC-192. Transmitter uses cooled laser in a butterfly package module with driven by specific integrated circuit. Receiver uses PD preamp-module (butterfly package module) and integrated circuits for reshaping, retiming and regenerating optical signal.

## FEATURES

- Full SONET/SDH line up
- K connector interface
- -5.2V,+5V power supply target, -2.2V(TX only)
- Case Temp. Range: 10 to 65°C
- Clock recovery and digital alarm function.

## APPLICATION

Short haul and long haul telecommunication systems for SDH STM64 / SONET OC-192.



## ABSOLUTE MAXIMUM RATINGS

Stress below listed absolute maximum rating may cause permanent damage to the transmitter and receiver. This is a stress only and functional operation of the transceiver at these or any other conditions in excess of those given in the operational sections of this data sheet is not implied. Exposure to Absolute Maximum Rating for extended periods may affect transmitter and receiver reliability.

Tc=25°C

Parameters	Symbol	Ratings	Unit
Supply voltage	Vcc	+5.3	V
	Vee	-6.0	V
	Vtt	-2.4	V
Storage temperature	Tstg	-40 to 85	°C
Operating case temperature	Tc	10 to 65	°C
Relative humidity(non condensation)	-	10 to 80	%
Fiber bend radius	rF	32	mm

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**ELECTRICAL CHARACTERISTICS**

All parameters are specified over the operating case temperature.

Measurement conditions are at 9953.28Mb/s+/-20ppm, NRZ PN<sup>23</sup>-1 and 50%duty cycle data signal.

V<sub>cc</sub>=+5.0V+/-5%, V<sub>ee</sub>=-5.2V+/-5%, V<sub>tt</sub>=-2.2V+/-0.1V, T<sub>c</sub>=10 to 65 °C, Using a PRBS 2<sup>23</sup>-1 pattern with a 50%Mark ratio, unless otherwise noted.

**Transmitter**

Parameters	Condition	Symbol	Min.	Typ.	Max.	Unit
Supply voltage		V <sub>ee</sub>	-5.46	-5.2	-4.94	V
		V <sub>cc</sub>	4.75	5.0	5.25	V
		V <sub>tt</sub>	-2.3	-2.2	-2.1	V
Supply current		I <sub>ee</sub>	-	-	1.5	A
		I <sub>cc</sub>	-	-	1.0	A
		I <sub>tt</sub>	-	-	1.2	A
Data / Clock input voltage (DC:50ohm)	note 1	-	SCFL			-
Data / Clock relationship	note 5	T <sub>d</sub>	-20	-	+20	psec
Function	note 2,3	-	Shutdown, Laser Degradation, Power out of range Alarm, Laser Over Temperature Alarm			-

**Receiver**

Parameters	Condition	Symbol	Min.	Typ.	Max.	Unit
Supply voltage		V <sub>ee</sub>	-5.46	-5.2	-4.94	V
		V <sub>cc</sub>	4.75	5.0	5.25	V
Supply current		I <sub>ee</sub>	-	-	1.5	A
		I <sub>cc</sub>	-	-	1.5	A
Data output voltage (DC:50ohm)	note 4	-	SCFL			-
Clock output voltage (AC:50ohm)	note 4		0.5	-	1.5	V <sub>pp</sub>
Data / Clock relationship	note 5	T <sub>d</sub>	-25	-	+25	psec
Jitter		-	TBD			-
Function	note 6	-	Loss of Signal Alarm			-

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**OPTICAL CHARACTERISTICS**

Parameter	Symbol	Specification				Unit
ITU code	-	S-64.2		S-64.3		-
-	-	Min.	Max.	Min.	Max.	-
Dispersion	-	-800	+800	-130	+130	ps/nm
Optical path penalty	Pp	-	2	-	1	dB
<b>Transmitter</b>						
Wavelength	-	1530	1565	1530	1565	-
Optical output power	Pout	-3	+3	-2	+3	dBm
Spectral width(-20dB)	-	-	0.5	-	0.5	nm
SMSR	-	30	-	30	-	dB
Extinction Ratio	Ex	8.2	-	8.2	-	dB
<b>Receiver</b>						
Sensitivity	-	-	-14	-	-13	dBm
Overload	-	-3	-	-3	-	dBm

note : Bit Rate 9953.28Mb/s, PRBS<sup>23</sup>-1, BER ≤ 10<sup>-12</sup>

**ORDERING INFORMATION**

**Transmitter**

Part number	ITU-code	Optical connector type
MF-10KDS-T12-060	S-64.2	FC
MF-10KDS-T12-061	S-64.2	SC
MF-10KDS-T12-070	S-64.3	FC
MF-10KDS-T12-071	S-64.3	SC

**Receiver**

Part number	ITU-code	Optical connector type
MF-10KDS-R13-060	S-64.2	FC
MF-10KDS-R13-061	S-64.2	SC
MF-10KDS-R13-070	S-64.3	FC
MF-10KDS-R13-071	S-64.3	SC

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**TRANSMITTER PIN ALLOCATION**

No.	Symbol	Description	No.	Symbol	Description
1	-2.2V	Supply voltage for cooler	2	-2.2V	Supply voltage for cooler
3	GND	Ground	4	NUC	No user connection
5	LDMON	Laser Bias Monitor	6	PDMON	Laser Backface Monitor
7	DEG	Laser Degradation Alarm	8	ORA	Power Out of Range Alarm
9	LOT	Laser Over Temperature Alarm	10	SDC	Shut Down Command
11	GND	Ground	12	GND	Ground
13	GND	Ground	14	GND	Ground
15	+5V	Supply voltage	16	+5V	Supply voltage
17	+5V	Supply voltage	18	+5V	Supply voltage
19	GND	Ground	20	GND	Ground
21	GND	Ground	22	GND	Ground
23	-5.2V	Supply voltage	24	-5.2V	Supply voltage
25	-5.2V	Supply voltage	26	-5.2V	Supply voltage
27	GND	Ground	28	GND	Ground
29	GND	Ground	30	GND	Ground

**RECEIVER PIN ALLOCATION**

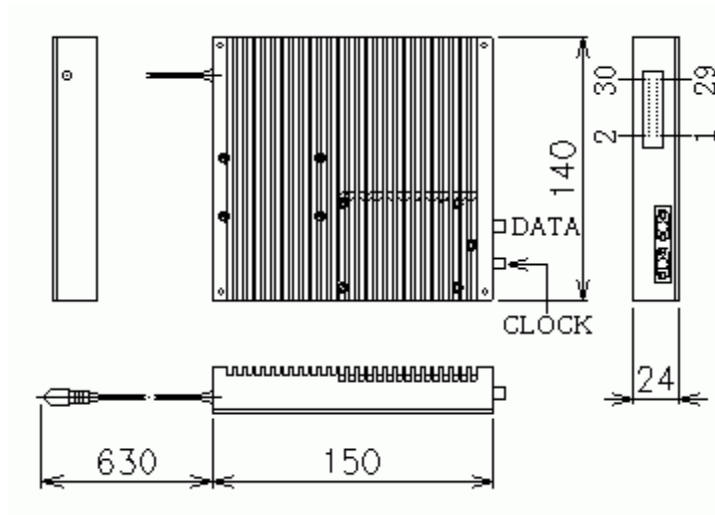
No.	Symbol	Description	No.	Symbol	Description
1	GND	Ground	2	GND	Ground
3	GND	Ground	4	LOS	Loss of signal alarm
5	NUC	No user connection	6	NUC	No user connection
7	NUC	No user connection	8	NUC	No user connection
9	NUC	No user connection	10	NUC	No user connection
11	GND	Ground	12	GND	Ground
13	GND	Ground	14	GND	Ground
15	+5V	Supply voltage	16	+5V	Supply voltage
17	+5V	Supply voltage	18	+5V	Supply voltage
19	GND	Ground	20	GND	Ground
21	GND	Ground	22	GND	Ground
23	-5.2V	Supply voltage	24	-5.2V	Supply voltage
25	-5.2V	Supply voltage	26	-5.2V	Supply voltage
27	GND	Ground	28	GND	Ground
29	GND	Ground	30	GND	Ground

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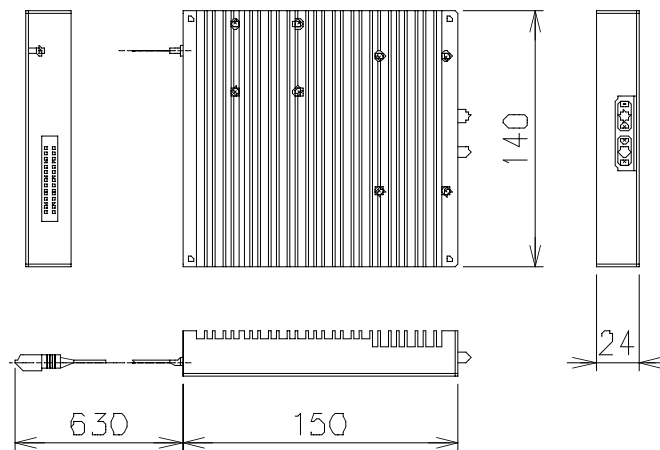
**GENERAL OUTLINE DRAWING**

NOTE: TOLERANCES UNLESS NOTED +/-0.5  
 DIMENSIONS ARE IN MILLIMETERS

**Transmitter**

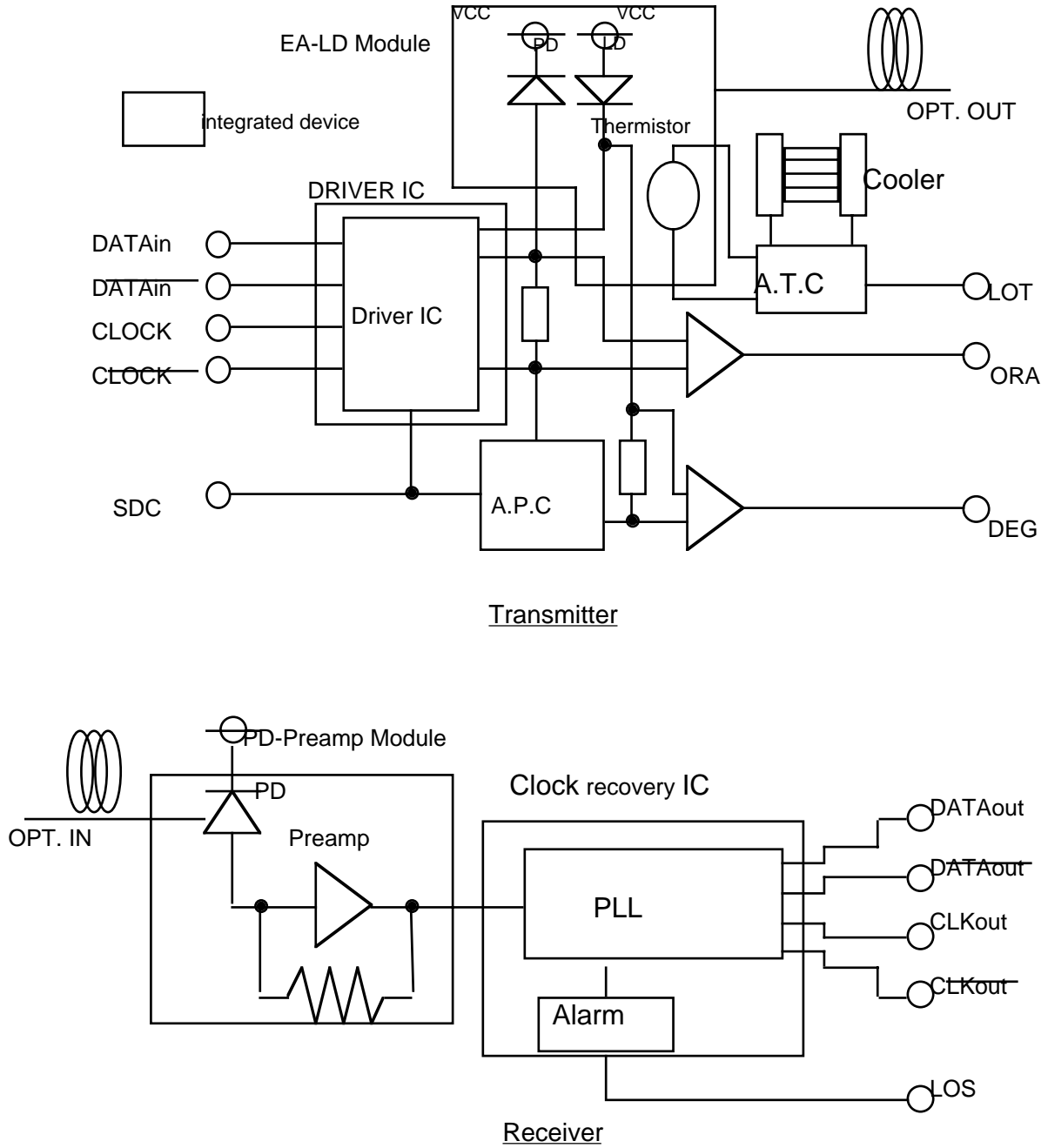


**Receiver**



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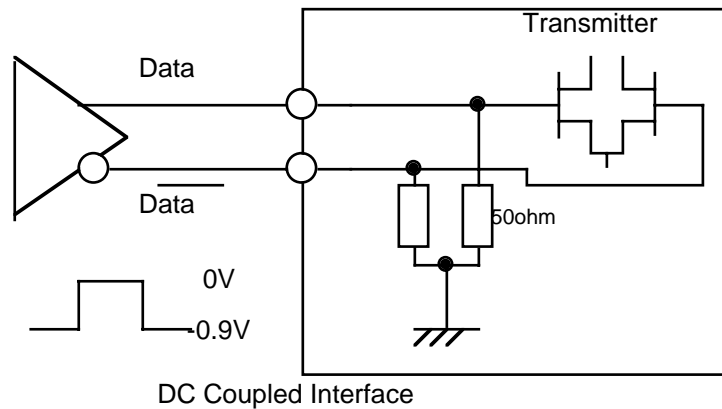
**BLOCK DIAGRAM**



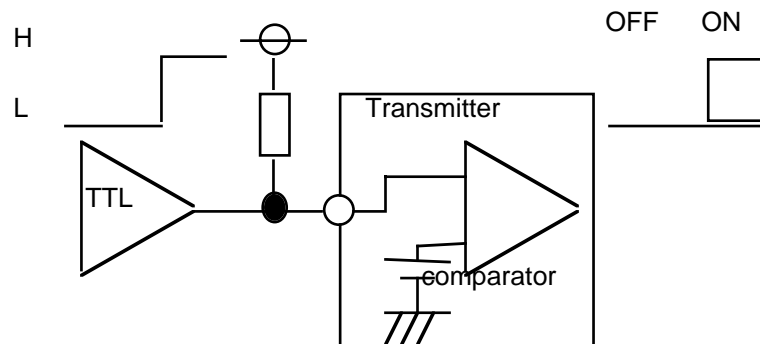
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**NOTE**

**NOTE1: Input interface**



**NOTE2: Shut down interface**



**NOTE3: Laser Degradation Alarm / Power out of range Alarm / LD temperature out of range Alarm**

Laser Degradation Alarm (DEG) sets when the bias current is at least 70% higher than the maximum initial value allowed .

Alarm active: TTL LOW

Power out of range Alarm (ORA), sets when the output optical output power is 3dB(typ.) less than the initial optical output level.

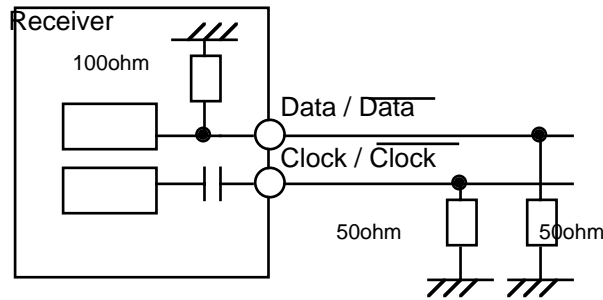
Alarm active: TTL LOW

Laser Over Temperature Alarm (LOT), sets when the temperature of LD increase or decrease more than 15deg.C from the initial temperature.

Alarm active: TTL LOW

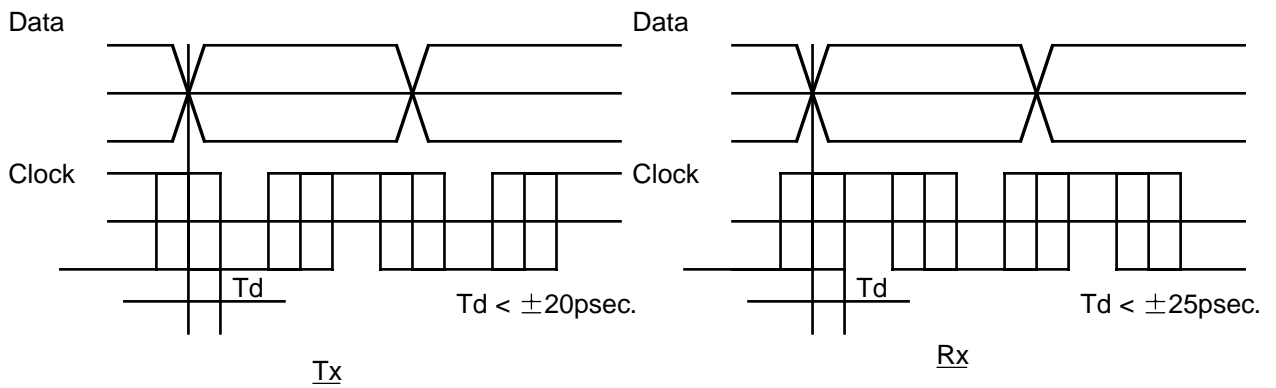
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**NOTE4: LVPECL Output interface**



note:DC Couple for Data  
 AC Couple for Clock

**NOTE5: Data and Clock relationship**



**NOTE6: LOS of signal interface**

