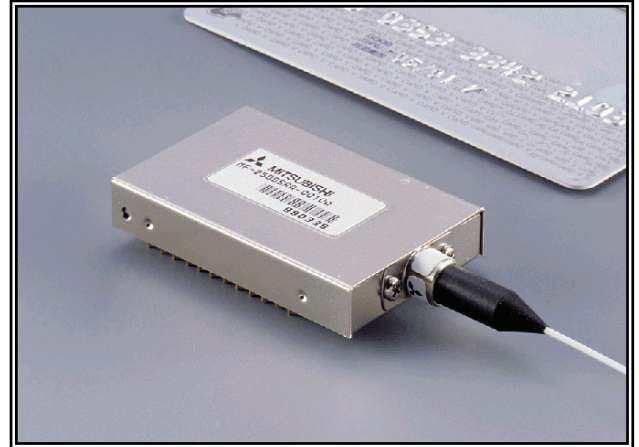


## DESCRIPTION

This product is designed to provide high optical performance for SDH STM-16 / SONET OC-48. Receiver uses APD pre-amp module and integrated circuits for re-shaping and re-generating (2R) optical signal.



## FEATURES

- Full SONET/SDH line up
- Multi rate (155Mb/s to 2.7Gb/s)
- Compact, low power
- +5V single power supply
- DC/DC converter built in
- Case Temperature Range: -5 to +75deg.C
- Multi Source Agreement

## APPLICATION

Short haul and long haul digital optical communication systems for SDH STM-16 / SONET OC-48.

SDH : L-16.1, L-16.2

SONET : LR-1, LR-2

## Absolute Maximum Ratings

Stress below listed absolute maximum rating may cause permanent damage to the module.

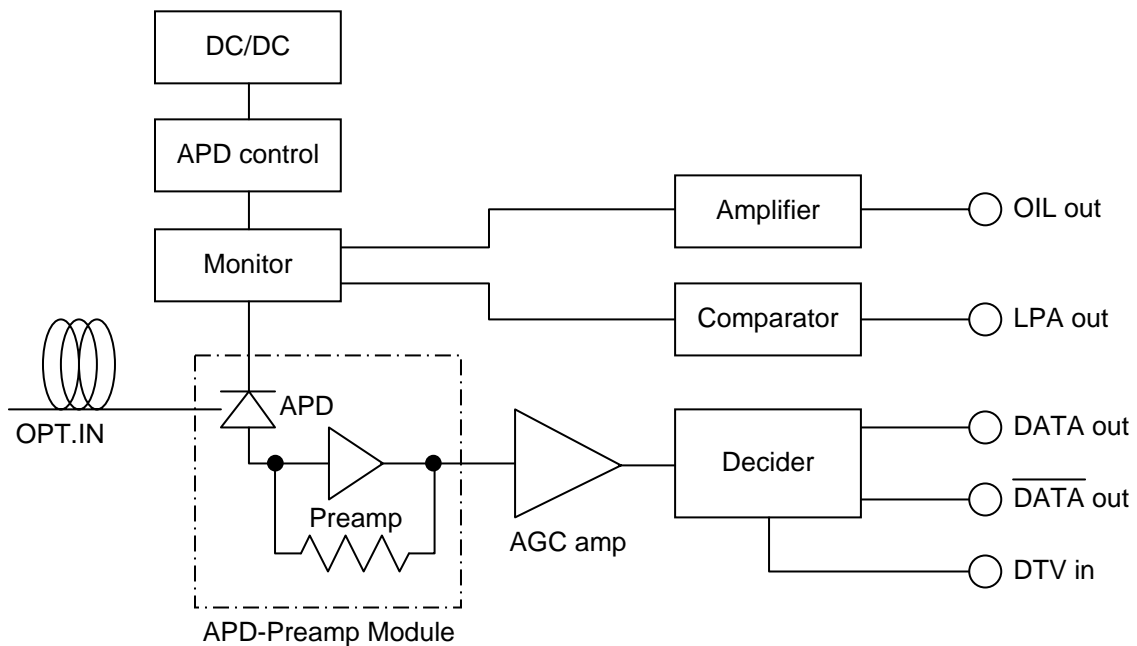
This is a stress only and functional operation of the module at these or any other conditions in excess of those given in the operational sections of this data sheet .

Exposure to Absolute Maximum Rating for extended periods may affect module reliability.

Tc=25deg.C.

Parameters	Symbol	Ratings	Unit
Supply voltage	Vcc	+6.0	V
LPA, OIL output current	-	+/- 20	mA
DTV input voltage	-	0 to Vcc	V
Storage temperature	Tstg	-40 to +85	deg.C.
Operating case temperature	Tc	-5 to +75	deg.C.
Soldering Temperature	-	+250	deg.C.
Soldering Time	-	10	sec
Relative humidity(non condensation)	-	10 to 80	%
Fiber bend radius	-	30	mm

## Block diagram



## Electrical and Optical characteristics

All parameters are specified over the operating case temperature.  
Measurement conditions are at NRZ PN2<sup>23</sup>-1 and 50% duty cycle data signal.

### Electrical characteristics

Parameters	Conditions	Symb	Min.	Typ.	Max.	Units
ITU-T/SONET			L-16.x / LR-x			
Positive supply voltage	-	Vcc	+4.75	+5.0	+5.25	V
Power consumption	-	P	-	1.5	2.5	W
Bit rate	-	-	0.155	-	2.7	Gb/s
Data output logic	Fig.1	-	5V PECL			-
Output data voltage	single ended	SV	0.25	0.4	1	Vpp
Output data voltage	differential	DV	0.5	0.8	2	Vpp
Output data rise and fall time	20-80%, Fig.2	Tr / Tf	-	130	180	ps
LPA activation time	-	Tact	-	-	1	ms
LPA de-activation time	-	Tdeact	-	-	5	ms
LPA output high voltage (LPA activate)	Fig.3	Voh	2.4	-	Vcc	V
LPA output low voltage (LPA de-activate)	Fig.4	Vol	0	-	0.5	V
OIL output high voltage	note 1, Fig.4	-	-	2000	-	mV
OIL output low voltage	note 2, Fig.4	-	-	80	-	mV

note 1 : Measured at -8dBm optical input power.

note 2 : Measured at -28dBm optical input power.

### Optical characteristics

Parts Number			MF-2700FRB-M02xx			MF-2700FRB-M03xx			
Parameters	Conditions	Symb.	Min.	Typ.	Max.	Min	Typ.	Max	Units
ITU-T/SONET	-	-	L-16.1/LR-1			L-16.2/LR-2			-
Optical budget	-	-	10	-	24	10	-	24	dB
Wavelength	-	-	1280	1310	1335	1500	1530	1580	nm
Optical fiber type	-	-	Single mode fiber			Single mode fiber			-
Receiver sensitivity	note 3	R <sub>sen</sub>	-	-29.5	-27.5	-	-30.5	-28.5	dBm
Receiver overload	note 3	R <sub>ovr</sub>	-8	-7	-	-8	-7	-	dBm
Path penalty	-	-	-	0.2	1	-	1.3	2	dB
LPA activation level	-	-	-	-36	-	-	-36	-	dBm
LPA hysteresis	-	-	No chattering			No chattering			-
Maximum reflectance	-	-	-	-	-27	-	-	-27	dB

note 3 : Measured at BER 10<sup>-10</sup>. DTV is left open for MF-2700FRB-M02xx / M03xx.

## Ordering information

L-16.1 / LR-1 : MF-2700FRB-M02MA (MU type optical connector)

L-16.2 / LR-2 : MF-2700FRB-M03MA (MU type optical connector)

## Pin Allocation

No.	Symbol	Description	No.	Symbol	Description
1	NIC	No internal connection	24	NUC	No user connection
2	NUC	No user connection	23	OIL	Optical Input Light Voltage
3	LPA	Loss of Power Alarm <sup>2)</sup>	22	VCC	Positive power supply
4	GND	Ground <sup>1)</sup>	21	NUC	No user connection
5	NIC	No internal connection	20	GND	Ground <sup>1)</sup>
6	NIC	No internal connection	19	GND	Ground <sup>1)</sup>
7	GND	Ground <sup>1)</sup>	18	NIC	No internal connection
8	VCC	Positive power supply	17	GND	Ground <sup>1)</sup>
9	GND	Ground	16	GND	Ground <sup>1)</sup>
10	Do+	True data output	15	GND	Ground <sup>1)</sup>
11	Do-	False data output	14	GND	Ground <sup>1)</sup>
12	GND	Ground <sup>1)</sup>	13	DTV / NIC	Decision Threshold Voltage <sup>3)</sup>

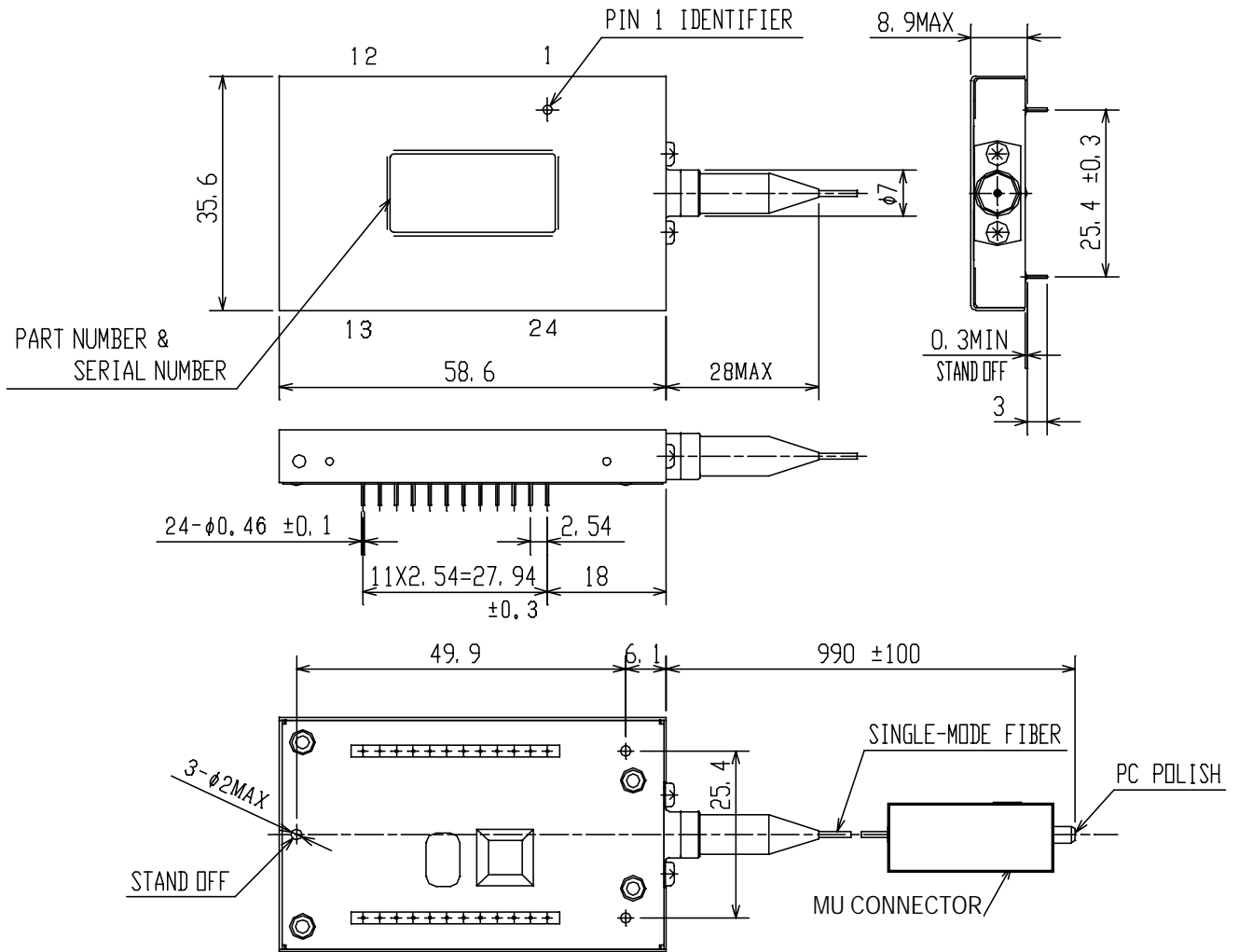
1) : Package is at same potential as GND .

2) : LPA output is a logic level that indicates the presence or absence of a sufficient optical input level.  
 A logical high level indicates an input optical level is too low.

3) : DTV (0.5 to 3.5V). This pin is left open if the amplitude decision threshold is not made adjustable.

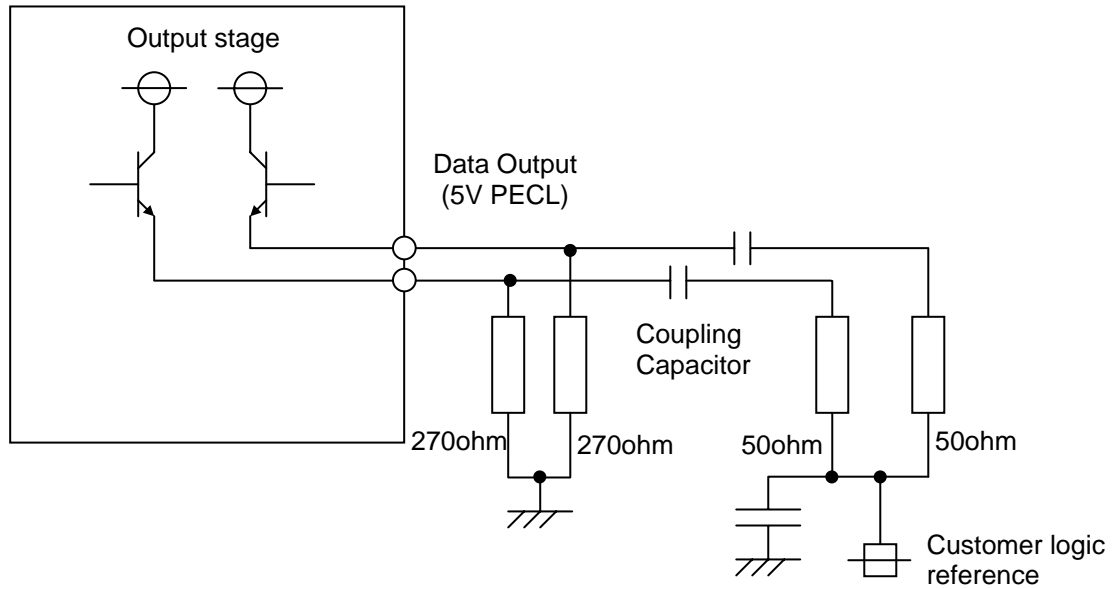
### General Outline Drawing

NOTE : DIMENSIONS ARE IN MILLIMETERS  
 NOTE : TOLERANCES UNLESS NOTED +/- 0.5 mm  
 NOTE : THIS DRAWING IS IN CASE OF FC CONNECTOR.

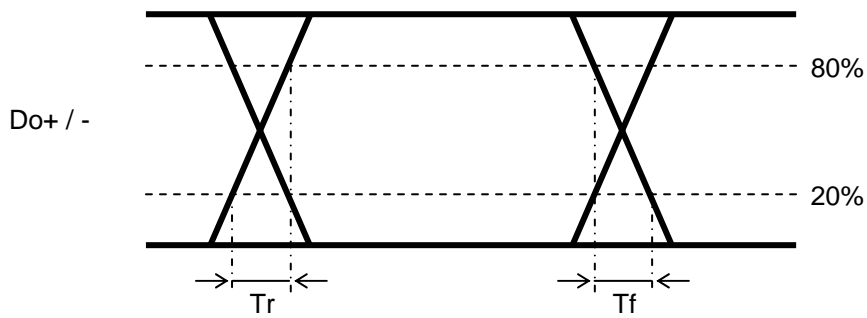


## APPLICATION NOTES

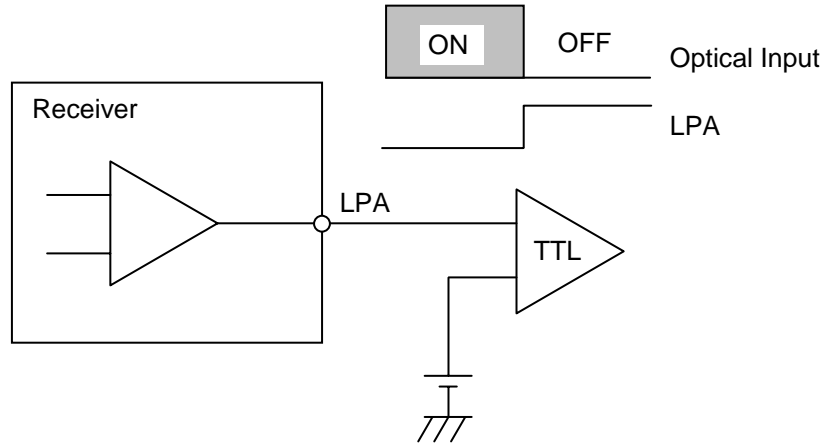
● Fig.1 : Data Output interface



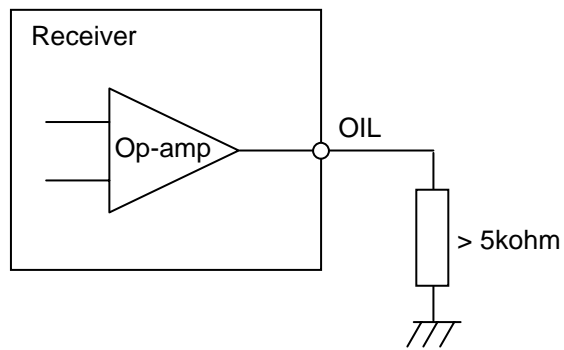
● Fig.2 : Data Output Rise / Fall Time



● Fig.3 : Loss of Power Alarm interface

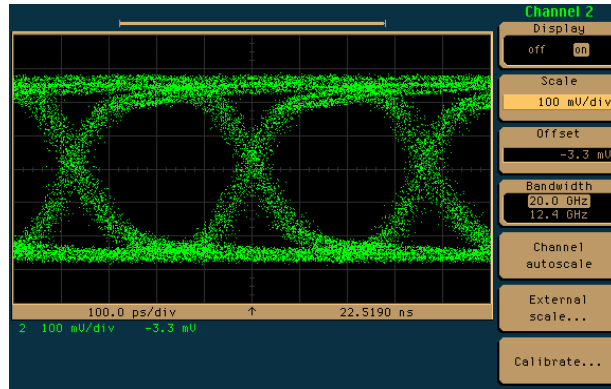


● Fig.4 : Optical Input Light Voltage interface

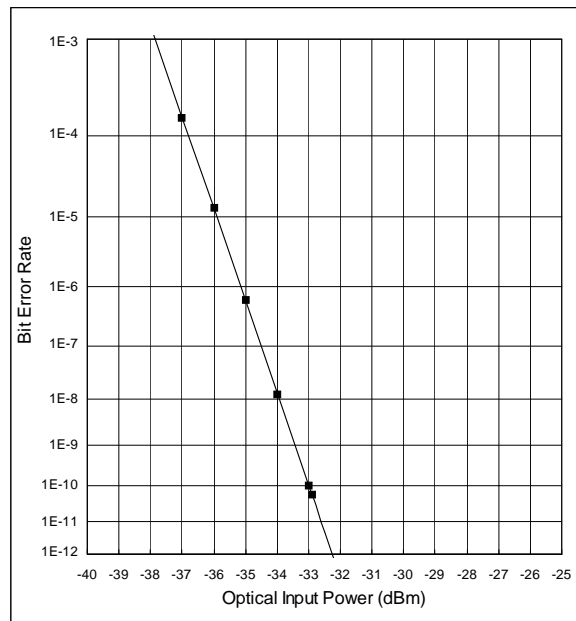


## Typical performance

- Data Output Waveforms (2.7Gb/s)



- BER Curve (2.7Gb/s, L16.2/LR-2)



This product is sensitive to electrostatic discharge. Take precautions to prevent ESD; use wrist straps, grounded work surfaces and recognized anti-static techniques when handling.

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