Chipsmall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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Contact us

GP1F31T/R, GP1F32T/R, GP1F33TT/RR/RT, GP1C331/331A/332/333/334/335

Fiber Optic Transmitting /Receiving Units

■ Features

1. Low jitter (Δtj : TYP. 1ns)
2. High speed signal transmission
   (8Mbps, NRZ signal)
3. Directly connectable to modulation
   /demoduration IC for digital audio equipment
   ·Fiber optic transmitter ... Built-in light emitting diode
   driving circuit
   ·Fiber optic receiver ... Built-in signal processing circuit
4. With two fixing holes for easy mounting on set panel
   (**GP1F32T/GP1F32R/GP1F33RR/**
   GP1F33TT/33RT)
5. 2-channel type
   (**GP1F33RR/GP1F33TT/GP1F33RT**)

* Sharp's optical fiber cables,
   (**GP1C331, GP1C331A, GP1C332, GP1C333,**
   GP1C334, GP1C335) are recommended

   The model marked with ▲ may not be available in the
   near future. Contact Sharp sales personnel for details
   before use

■ Applications

1. CD players
2. BS tuners
3. Digital amplifiers

■ Outline Dimensions

(Unit : mm)

GP1F31T/GP1F31R

GP1F32T/GP1F32R
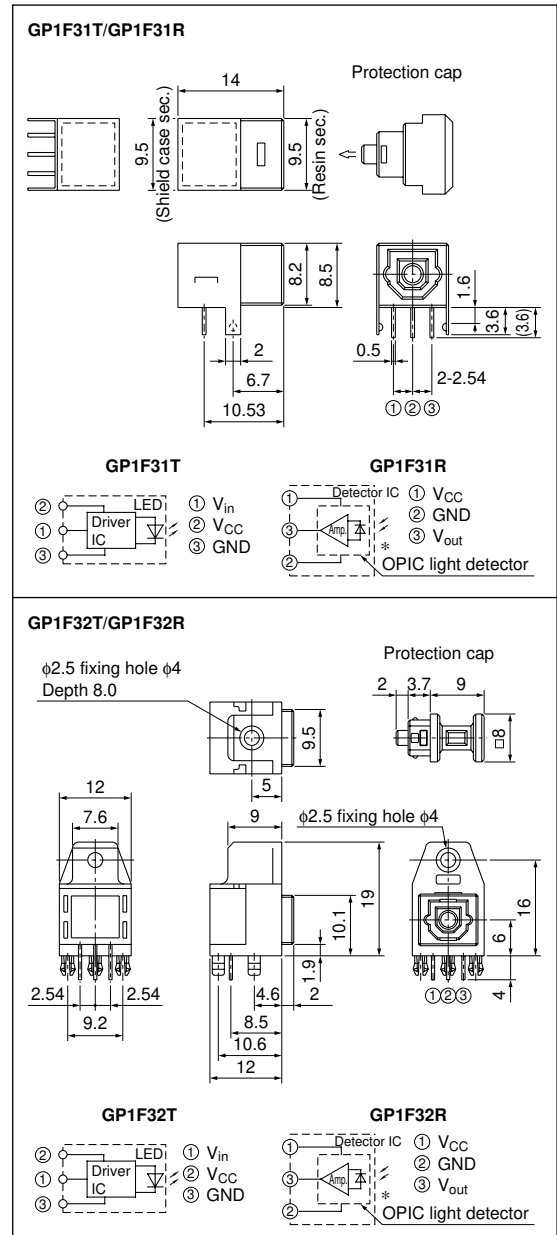
* "OPIC"(Optical IC) is a trademark of the SHARP Corporation.
  An OPIC consists of a light-detecting element and signal-
  processing circuit integrated onto a signal chip.

■ Model Line-ups

Model No.	Internal Constitution
GP1F31T	Fiber optic transmitter
GP1F31R	Fiber optic receiver
GP1F32T	Fiber optic transmitter
GP1F32R	Fiber optic receiver
GP1F33TT	Fiber optic transmitter (2-channel)
GP1F33RR	Fiber optic receiver (2-channel)
GP1F33RT	Fiber optic transmitter/receiver
GP1C331	Fiber optic cable (1m)
GP1C331A	Fiber optic cable (0.6m)
GP1C332	Fiber optic cable (2m)
GP1C333	Fiber optic cable (3m)
GP1C334	Fiber optic cable (4m)
GP1C335	Fiber optic cable (5m)

■ Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Supply voltage		V_{cc}	−0.5 to +7	V
Input voltage	*4	V_{in}	−0.5 to V_{cc}+0.5	V
Power dissipation	*4	P	125	mW
[*1] High level output current	*5	I_{OH}	4	mA
[*2] Low level output current	*5	I_{OL}	4	mA
Operating temperature	*6	T_{opr}	−10 to +60	°C
	*7		−20 to +70	°C
Storage temperature		T_{stg}	−30 to +80	°C
[*3] Soldering temperature		T_{sol}	260	°C

*1 Source current
*2 Sink current
*3 5 seconds/2 times or less
*4 **GP1F31T/GP1F32T/GP1F33TT**/Transmitting portion of **GP1F33RT**
*5 **GP1F31R/GP1F32R/GP1F33RR**/Receiving portion of **GP1F33RT**
*6 **GP1F31T/GP1F31R**
*7 **GP1F32T/GP1F32R/GP1F33TT, GP1F33RR, GP1F33RT**

Fiber Optic Cable
(GP1C331, GP1C331A, GP1C332, GP1C333, GP1C334, GP1C335) (Ta=25°C)

Parameter		Symbol	Rating	Unit
Tension	Plug & optical fiber	T_{pf}	40	N
	Optical fiber	T_f	40	N
Bending radius		R	MIN. 25	mm
Operating temperature		T_{opr}	−30 to +70	°C
Storage temperature		T_{stg}	−30 to +70	°C

■ Outline Dimensions

GP1F33TT/GP1F33RR GP1F33RT

P=2.54 (Lead root dimension)

Terminal arrangement	
GP1F33TT	Transmitting portion
①,④ V_{in} / ②,⑤ V_{CC} / ③,⑥ GND	LED ; GaAlAs Drive IC ; silicon
GP1F33RR	Receiving portion
①,④ V_{CC} / ②,⑤ GND / ③,⑥ V_{out}	Internal equivalent circuit OPIC light detector
GP1F33RT	Receiving portion | Transmitting portion
① V_{CC} ④ V_{in} / ② GND ⑤ V_{CC} / ③ V_{out} ⑥ GND	Receiver OPIC light detector | Transmitter LED ; GaAlAs Drive IC ; silicon

Fiber optic cable **(GP1C331)**

VIEW A 2/1

Model No.	※Dimensions
GP1C331	1 000
GP1C331A	600
GP1C332	2 000
GP1C333	3 000
GP1C334	4 000
GP1C335	5 000

■ Electro-optical Characteristics(1) Transmitter
GP1F31T/GP1F32T/GP1F33TT/Transmitting portion of GP1F33RT
(Ta=25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Operating voltage	V_{CC}	–	4.75	5.00	5.25	V
Peak emission wavelength	λp	–	630	660	690	nm
Optical power output coupling with fiber	P_C	Refer to Fig.1	−21	−17	−15	dBm
Dissipation current	I_{CC}	Refer to Fig.2	–	4	10	mA
High level input voltage	V_{iH}	Refer to Fig.2	2	–	–	V
Low level input voltage	V_{iL}	Refer to Fig.2	–	–	0.8	V
Low → High propagation delay time	t_{pLH}	Refer to Fig.3	–	–	100	ns
High → Low propagation delay time	t_{pHL}	Refer to Fig.3	–	–	100	ns
Pulse width distortion	Δtw	Refer to Fig.3	−25(−30)**	–	+25(+30)**	ns
Jitter	Δtj	Refer to Fig.4	–	1	25(30)**	ns
Operating transfer rate	T	–	–	–	8	Mbps

** Value in parenthesis : **GP1F31T**

■ Electro-optical Characteristics(2) Receiver
GP1F31R/GP1F32R/GP1F33RR/Receiving portion of GP1F33RT
(Ta=25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Operating voltage	V_{CC}	–	4.75	5.00	5.25	V
Peak sensitivity wavelength	λp	–	–	700	–	nm
Maximum input optical power level for receiving unit	P_{CMAX}	Refer to Fig.5	−14.5	–	–	dBm
Minimum input optical power level for receiving unit	P_{CMIN}	Refer to Fig.5	–	–	−24	dBm
Dissipation current	I_{CC}	Refer to Fig.6	–	15	40	mA
High level output voltage	V_{OH}	Refer to Fig.7	2.7	3.5	–	V
Low level output voltage	V_{OL}	Refer to Fig.7	–	0.2	0.4	V
Rise time	t_r	Refer to Fig.7	–	12	30	ns
Fall time	t_f	Refer to Fig.7	–	4	30	ns
Low → High propagation delay time	t_{pLH}	Refer to Fig.7	–	–	100	ns
High → Low propagation delay time	t_{pHL}	Refer to Fig.7	–	–	100	ns
Pulse width distortion	Δtw	Refer to Fig.7	−30	–	+30	ns
Jitter	Δtj	Refer to Fig.8, Pc=−15dBm	–	1	30	ns
		Refer to Fig.8, Pc=−24dBm	–	–	30	ns
Operating transfer rate	T	NRZ. duty 50% input	0.1	–	8	Mbps

■ Electro-optical Characteristics(3) Fiber Optic Cable

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Optical output coupling fiber	P_C	−17	–	–	dBm
Refracting ratio distribution	–		Step index		–

■ Mechanical Characteristics

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Insertion force, withdrawal force	–	In compliance with EIAJ RC-5720 Initial value when a square connector in used.	6	–	40	N

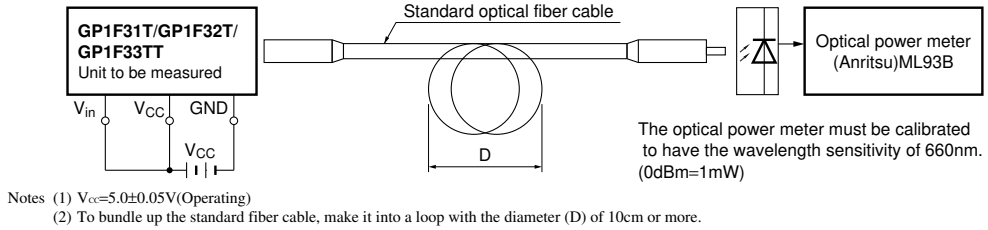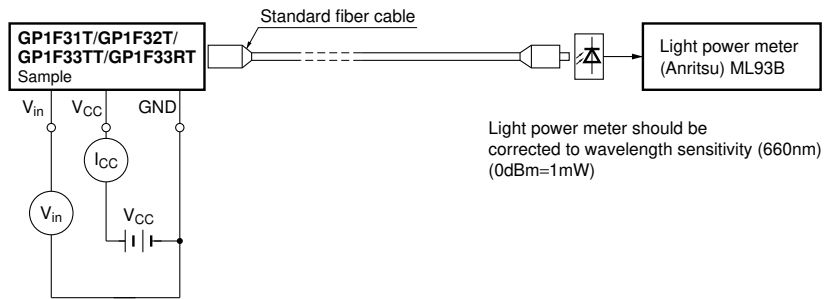## Fig.1 Measuring Method of Optical Output Coupling With Fiber

GP1F31T/GP1F32T/ GP1F33TT
Unit to be measured

V_{in} V_{CC} GND

V_{CC}

Standard optical fiber cable

D

Optical power meter (Anritsu)ML93B

The optical power meter must be calibrated to have the wavelength sensitivity of 660nm. (0dBm=1mW)

Notes (1) V_{cc}=5.0±0.05V(Operating)
      (2) To bundle up the standard fiber cable, make it into a loop with the diameter (D) of 10cm or more.

Fig.2 Input Voltage/Power Dissipation Measuring method

GP1F31T/GP1F32T/ GP1F33TT/GP1F33RT
Sample

V_{in} V_{CC} GND

I_{CC}

V_{in} V_{CC}

Standard fiber cable

Light power meter (Anritsu) ML93B

Light power meter should be corrected to wavelength sensitivity (660nm) (0dBm=1mW)

Input condition and measuring method

Input condition	Measuring method
V_{in}=2.0V or more	−21<=Pc<=−15dBm, I_{cc}=10mA or less
V_{in}=0.8V or less	Pc<=−36dBm, I_{cc}=10mA or less

Note   (1) V_{cc}=5.0±0.05V (ON-State)
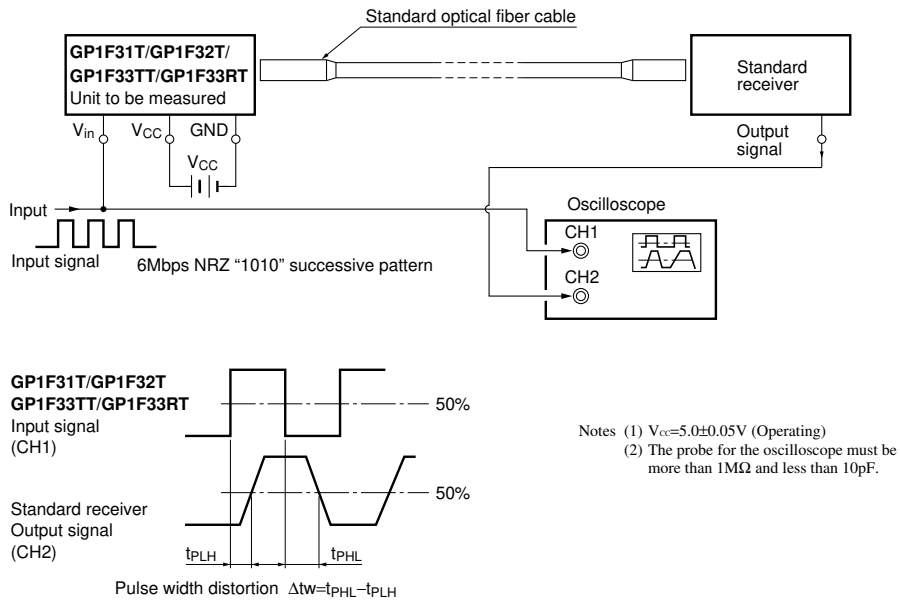
Fig.3 Pulse Response Measuring Method

GP1F31T/GP1F32T/GP1F33TT/GP1F33RT
Unit to be measured

V_{in} V_{CC} GND

V_{CC}

Standard optical fiber cable

Standard receiver

Output signal

Input

Input signal   6Mbps NRZ "1010" successive pattern

Oscilloscope
CH1
CH2

GP1F31T/GP1F32T GP1F33TT/GP1F33RT
Input signal (CH1)

Standard receiver Output signal (CH2)

50%

50%

t_{PLH} t_{PHL}

Pulse width distortion $\Delta tw = t_{PHL} - t_{PLH}$

Notes (1) $V_{CC} = 5.0 \pm 0.05V$ (Operating)
(2) The probe for the oscilloscope must be more than 1MΩ and less than 10pF.

Fig.4 Measuring Method of Jitter

GP1F31T/GP1F32T/GP1F33TT/GP1F33RT
Unit to be measured

V_{in} V_{CC} GND

V_{CC}

Standard optical fiber cable

Standard receiver

Output signal

Input

Input signal 3Mbps biphase mark PRBS signal

1   1   0   0

CH1
CH2

Oscilloscope
Trigger : CH1 Storage mode

Input signal

50%

Standard receiver output

50%

Δtj Δtj

Notes (1) The waveform write time shall be 4 seconds. But do not allow the waveform to be distorted by increasing the brightness too much.
(2) $V_{CC} = 5.0 \pm 0.05V$ (Operating)
(3) The probe for the oscilloscope must be more than 1MΩ and less than 10pF.

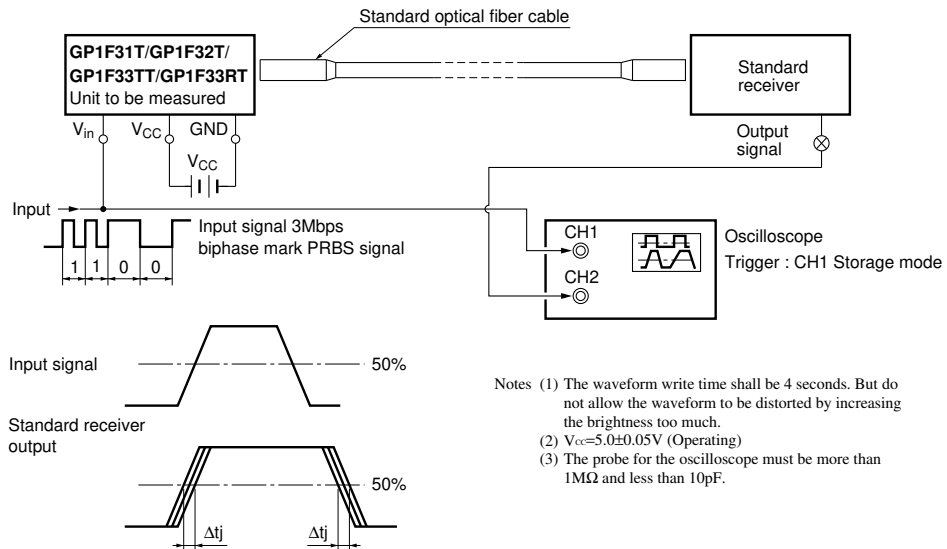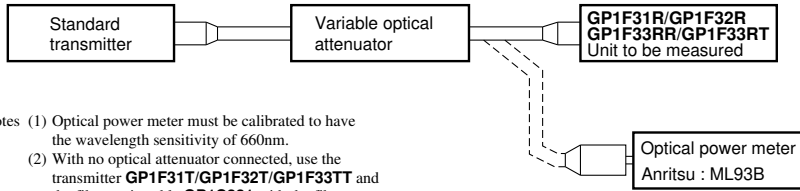## Fig.5 Muximum Input Optical Power Level/Minimum Input Optical Power Level Measuring Method of Receiving Unit

| Standard transmitter | | Variable optical attenuator | | **GP1F31R/GP1F32R GP1F33RR/GP1F33RT** Unit to be measured |

Notes (1) Optical power meter must be calibrated to have the wavelength sensitivity of 660nm.
(2) With no optical attenuator connected, use the transmitter **GP1F31T/GP1F32T/GP1F33TT** and the fiber optic cable **GP1C331** with the fiber coupling light output set at −15dBm/−24dBm.

| Optical power meter |
| Anritsu : ML93B |

Fig.6 Measuring Method of Dissipation Current

Standard optical fiber cable

| Standard transmitter |

| **GP1F31R/GP1F32R GP1F33RR/GP1F33RT** Unit to be measured |

V_{in} V_{CC} GND

V_{CC}

VCC=5.0±0.05V
PC=−15dBm

V_{CC} GND V_{out}

V_{CC}

(A) Ammeter

Input

6Mbps NRZ, duty 50%
or 3Mbps biphase PRBS signal

(DC average current value)
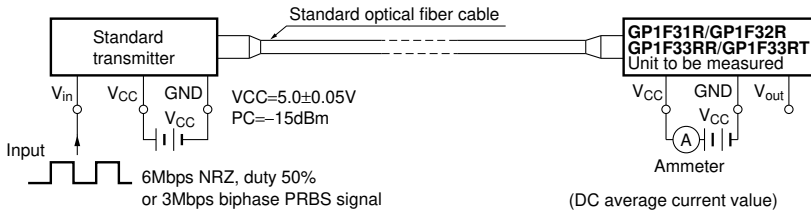
Fig.7 Measuring Method of Output Voltage and Pulse
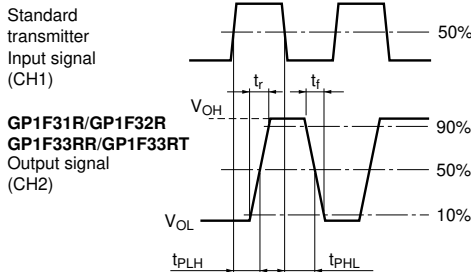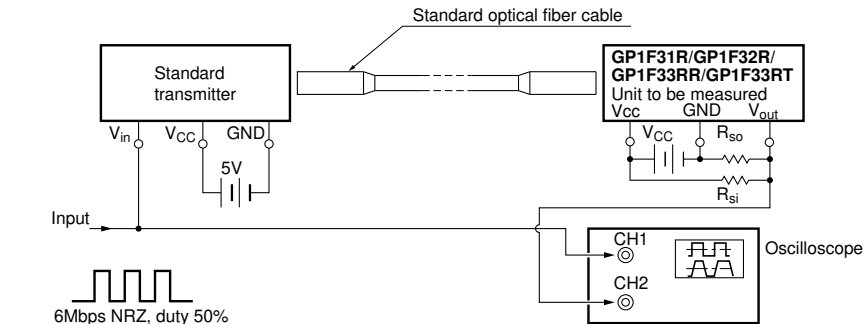
Standard optical fiber cable

| Standard transmitter |

| **GP1F31R/GP1F32R/ GP1F33RR/GP1F33RT** Unit to be measured |
Vcc   GND V_{out}

V_{in} V_{CC} GND

5V

V_{CC} R_{so}

R_{si}

Input

CH1

Oscilloscope

CH2

6Mbps NRZ, duty 50%

Standard transmitter Input signal (CH1)

GP1F31R/GP1F32R GP1F33RR/GP1F33RT Output signal (CH2)

50%

t_r t_f

V_{OH}

90%

50%

V_{OL}

10%

t_{PLH} t_{PHL}

Notes (1) V_{cc} : 5.0±0.05V (Operating)
(2) The probe for the oscilloscope must be more than 1MΩ and less than 10pF.
(3) R_{si}, R_{so} ; Standard load resistance
(R_{si} : 3.3kΩ, R_{so} : 2.2kΩ)

Fig.8 Measuring Method of Jitter

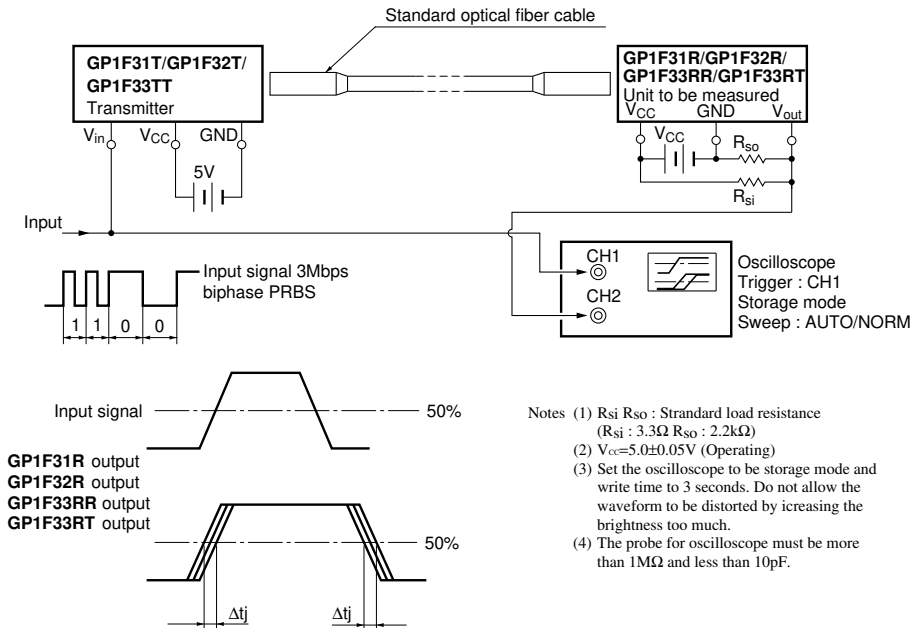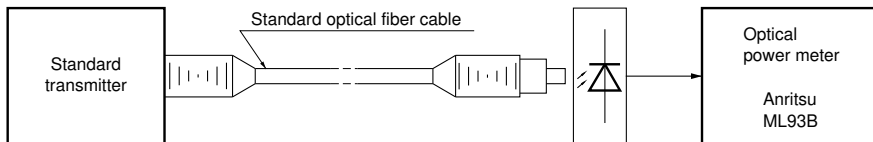| GP1F31T/GP1F32T/ GP1F33TT Transmitter | | | Standard optical fiber cable | | GP1F31R/GP1F32R/ GP1F33RR/GP1F33RT Unit to be measured |

Input signal 3Mbps biphase PRBS

1 1 0 0

Input signal ———— 50%

GP1F31R output
GP1F32R output
GP1F33RR output
GP1F33RT output

50%

Δtj Δtj

Notes (1) R_{si} R_{so} : Strandard load resistance
(R_{si} : 3.3Ω R_{so} : 2.2kΩ)
(2) V_{cc}=5.0±0.05V (Operating)
(3) Set the oscilloscope to be storage mode and write time to 3 seconds. Do not allow the waveform to be distorted by icreasing the brightness too much.
(4) The probe for oscilloscope must be more than 1MΩ and less than 10pF.

Fig.9 Measuring Method of Optical Output Coupling With Fiber

Standard light transmitter : Light transmitter that provides the fiber-end optical output of −15dBm±0.3dBm when the standard fiber optic cable is connected.

Fig.10 System Configuration Example
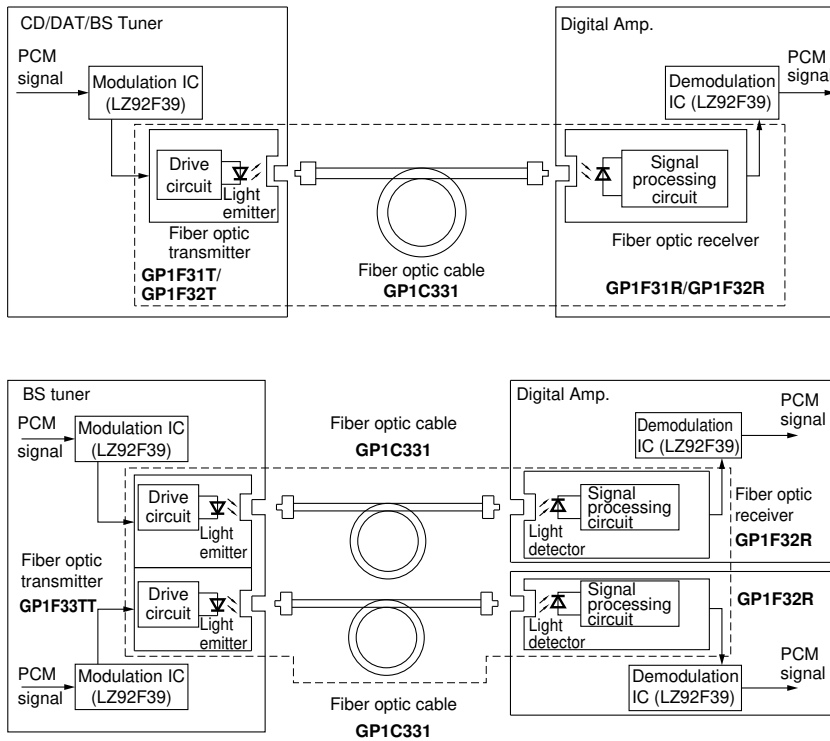
∗LZ92F39 is Sharp's modulation/demodulation IC.

In addition, you can also choose the following system configuration according to your application.
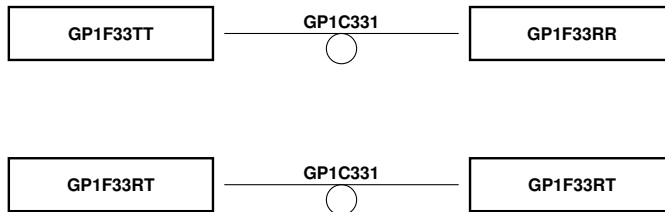
■ Precautions for Use

Please refer to the chapter "Precautions for Use"

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