

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

■ Features

1. Low jitter (Δt_j : TYP. 1ns)
 2. High speed signal transmission
(8Mbps, NRZ signal)
 3. Directly connectable to modulation
/demodulation 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

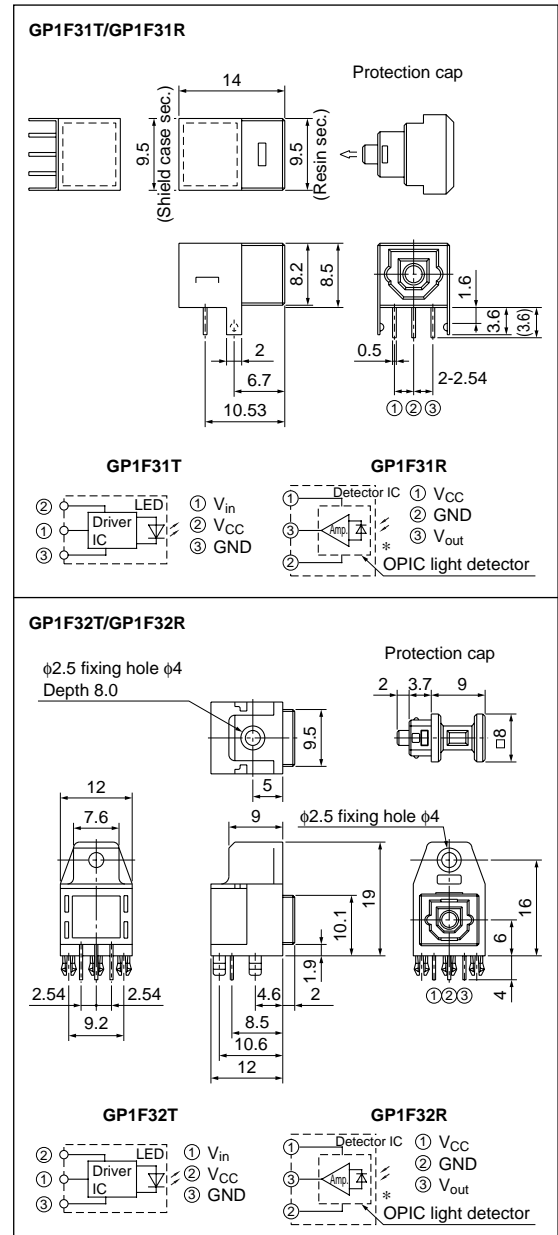
■ Applications

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

Fiber Optic Transmitting /Receiving Units

■ Outline Dimensions

(Unit : mm)



* "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)

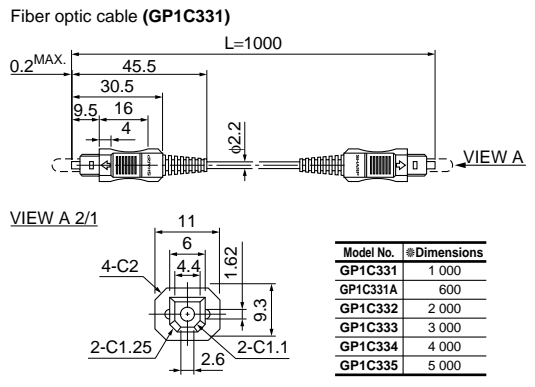
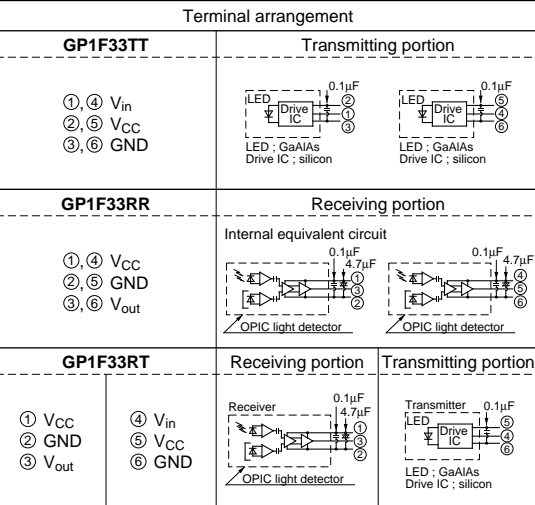
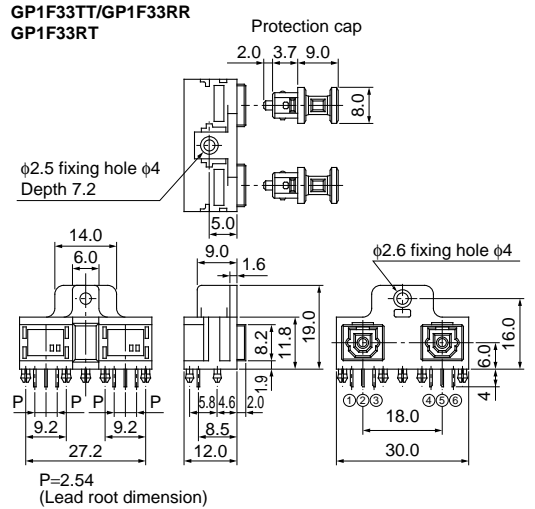
| Parameter | Symbol | Rating | Unit |
|------------------------------|---------------------|------------------------------|------|
| Supply voltage | V _{cc} | -0.5 to +7 | V |
| Input voltage | *4 V _{in} | -0.5 to V _{cc} +0.5 | V |
| Power dissipation | *4 P | 125 | mW |
| *1 High level output current | *5 I _{OH} | 4 | mA |
| *2 Low level output current | *5 I _{OL} | 4 | mA |
| Operating temperature | *6 T _{opr} | -10 to +60 | °C |
| | | -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



■ 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 | λ _p | – | 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 | Δt _j | 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 | λ _p | – | – | 700 | – | nm |
| Maximum input optical power level for receiving unit | P _C MAX | Refer to Fig.5 | –14.5 | – | – | dBm |
| Minimum input optical power level for receiving unit | P _C MIN | 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 | Δt _j | Refer to Fig.8, P _c = –15dBm | – | 1 | 30 | ns |
| | | Refer to Fig.8, P _c = –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

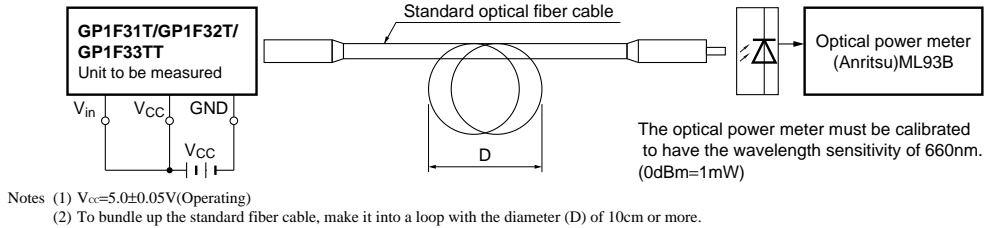
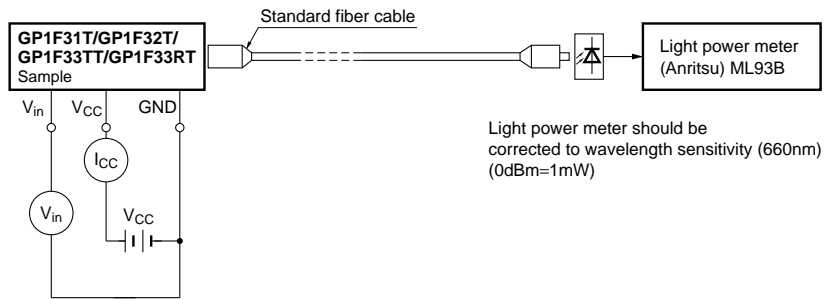


Fig.2 Input Voltage/Power Dissipation Measuring method



Input condition and measuring method

| Input condition | Measuring method |
|--------------------------|--|
| $V_{in}=2.0V$ or more | $-21 \leq P_c \leq -15dBm$, $I_{cc}=10mA$ or less |
| $V_{in}=0.8V$ or less | $P_c \leq -36dBm$, $I_{cc}=10mA$ or less |

Note (1) $V_{CC}=5.0\pm 0.05V$ (ON-State)

Fig.3 Pulse Response Measuring Method

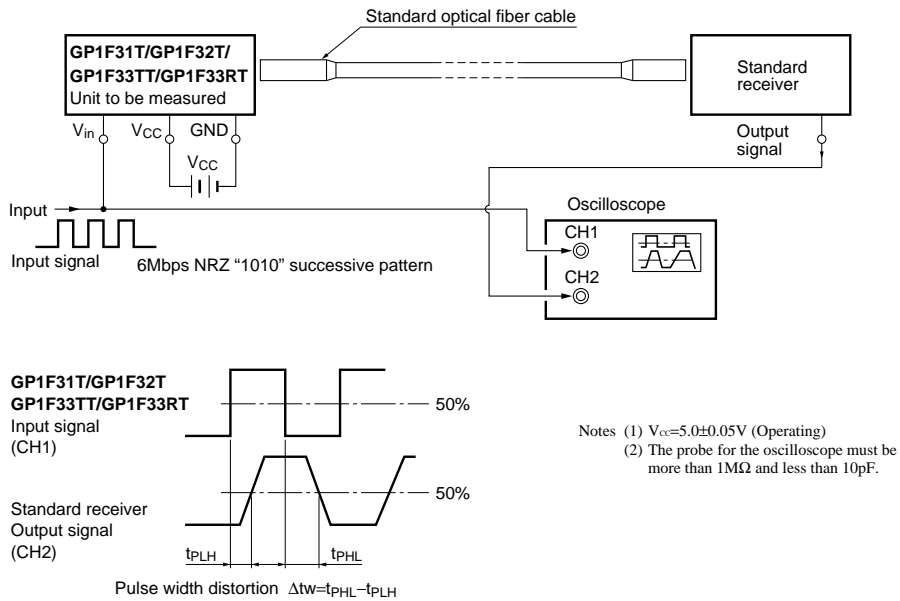


Fig.4 Measuring Method of Jitter

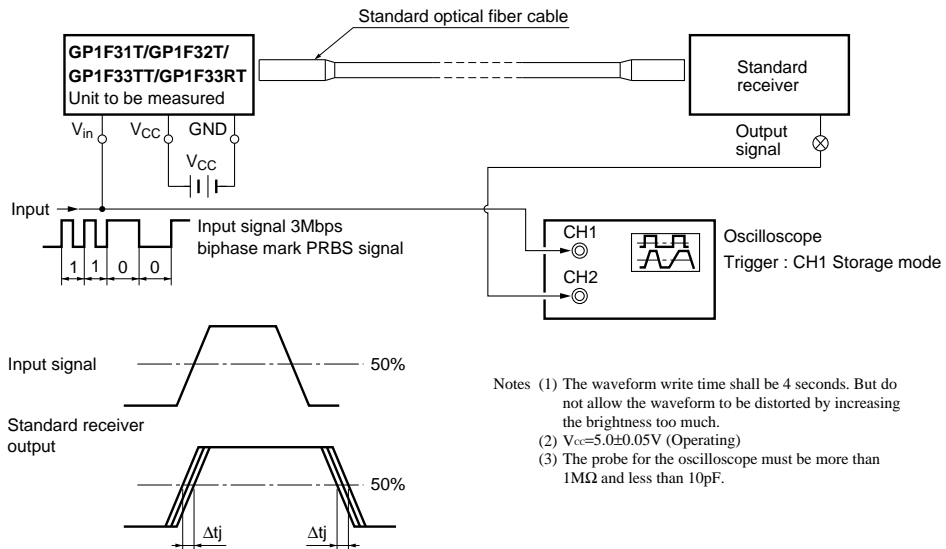
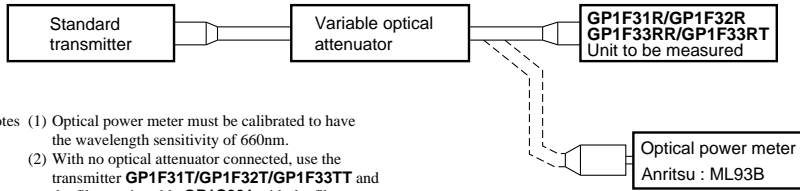


Fig.5 Maximum Input Optical Power Level/Minimum Input Optical Power Level Measuring Method of Receiving Unit



- 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 $-15\text{dBm}/-24\text{dBm}$.

Fig.6 Measuring Method of Dissipation Current

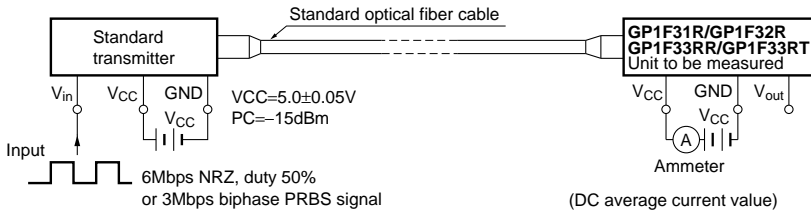
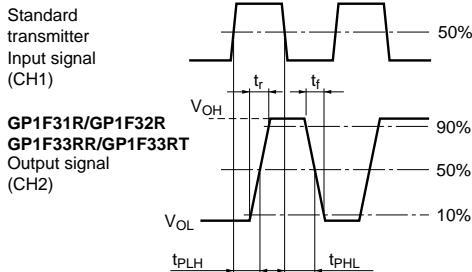
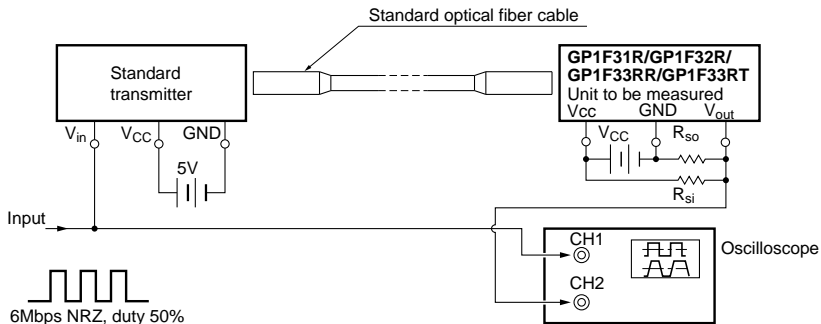


Fig.7 Measuring Method of Output Voltage and Pulse



- Notes (1) $V_{CC} : 5.0\pm 0.05\text{V}$ (Operating)
 (2) The probe for the oscilloscope must be more than $1\text{M}\Omega$ and less than 10pF .
 (3) R_{si} , R_{so} ; Standard load resistance
 ($R_{si} : 3.3\text{k}\Omega$, $R_{so} : 2.2\text{k}\Omega$)

Fig.8 Measuring Method of Jitter

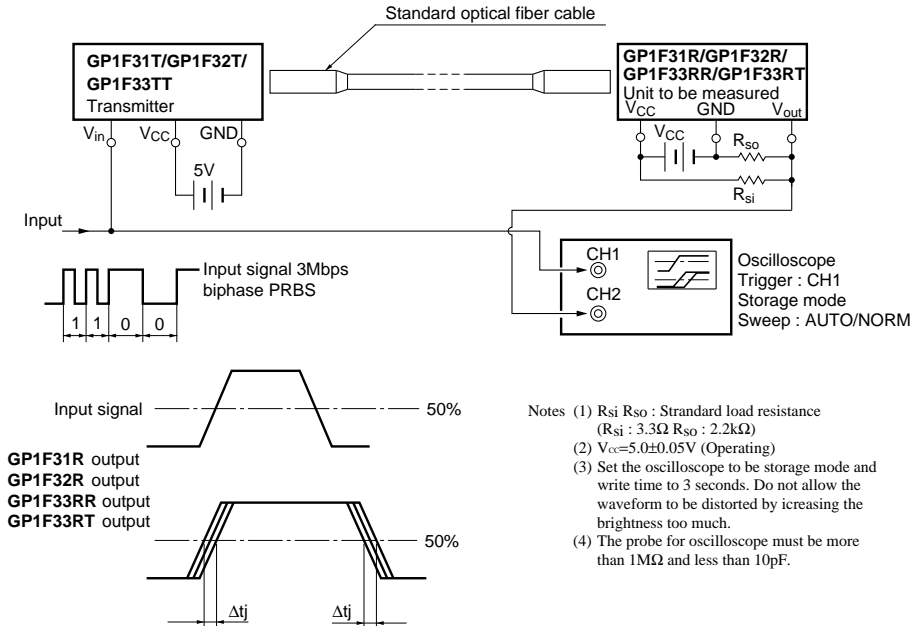
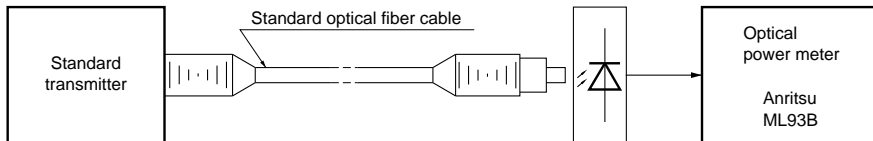
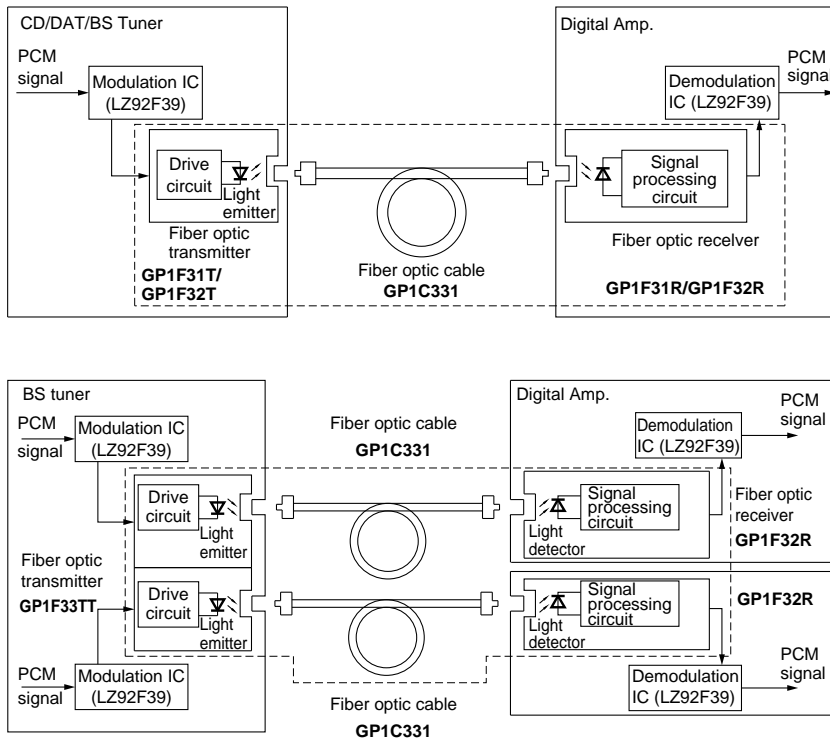


Fig.9 Measuring Method of Optical Output Coupling With Fiber



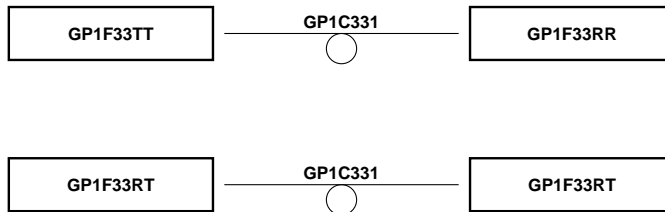
Standard light transmitter : Light transmitter that provides the fiber-end optical output of $-15dBm \pm 0.3dBm$ when the standard fiber optic cable is connected.

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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