

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

## ■ Features

1. Low jitter ( $\Delta t_j$  : 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

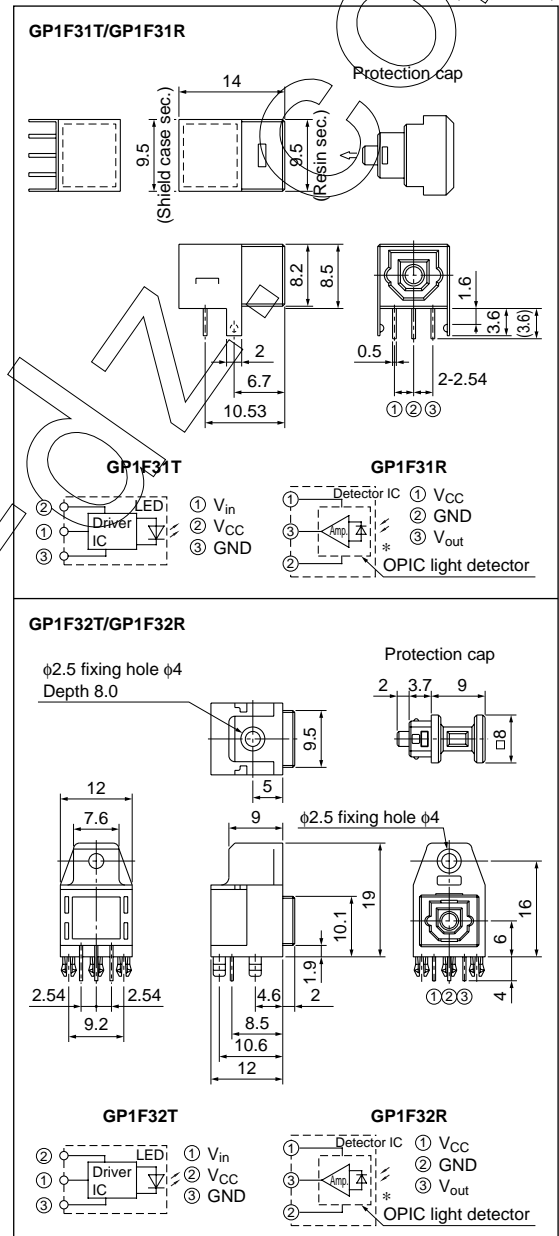
## ■ Applications

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)

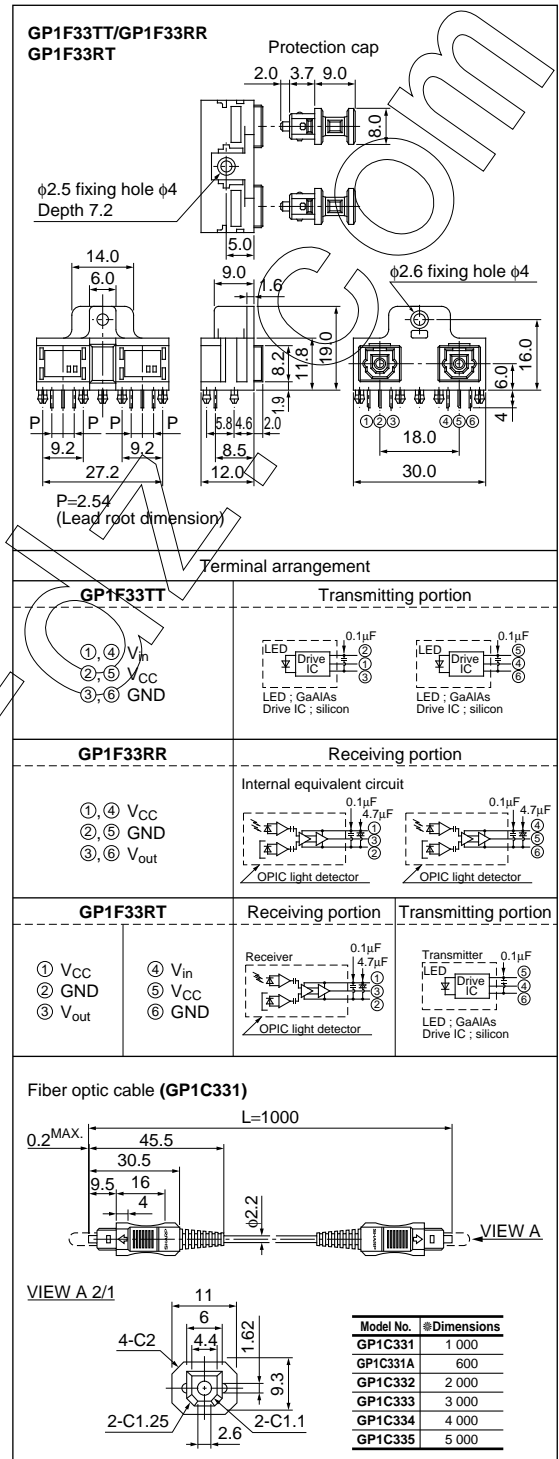
Parameter	Symbol	Rating	Unit
Supply voltage	V <sub>cc</sub>	-0.5 to +7	V
Input voltage	*4 V <sub>in</sub>	-0.5 to V <sub>cc</sub> +0.5	V
Power dissipation	*4 P	125	mW
<sup>#1</sup> High level output current	*5 I <sub>OH</sub>	4	mA
<sup>#2</sup> Low level output current	*5 I <sub>OL</sub>	4	mA
Operating temperature	*6 T <sub>opr</sub>	-10 to +60	°C
		-20 to +70	°C
Storage temperature	T <sub>stg</sub>	-30 to +80	°C
<sup>#3</sup> Soldering temperature	T <sub>sol</sub>	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 <sub>pf</sub>	40 N
	Optical fiber	T <sub>f</sub>	40 N
Bending radius	R	MIN. 25	mm
Operating temperature	T <sub>opr</sub>	-30 to +70	°C
Storage temperature	T <sub>stg</sub>	-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 <sub>CC</sub>	-	4.75	5.00	5.25	V
Peak emission wavelength	λ <sub>p</sub>	-	630	660	690	nm
Optical power output coupling with fiber	P <sub>c</sub>	Refer to Fig.1	-21	-17	-15	dBm
Dissipation current	I <sub>CC</sub>	Refer to Fig.2	-	4	10	mA
High level input voltage	V <sub>IH</sub>	Refer to Fig.2	2	-	-	V
Low level input voltage	V <sub>IL</sub>	Refer to Fig.2	-	-	0.8	V
Low → High propagation delay time	t <sub>pLH</sub>	Refer to Fig.3	-	-	100	ns
High → Low propagation delay time	t <sub>pHL</sub>	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 <sub>CC</sub>	-	4.75	5.00	5.25	V
Peak sensitivity wavelength	λ <sub>p</sub>	-	-	700	-	nm
Maximum input optical power level for receiving unit	P <sub>C</sub> MAX	Refer to Fig.5	-14.5	-	-	dBm
Minimum input optical power level for receiving unit	P <sub>C</sub> MIN	Refer to Fig.5	-	-	-24	dBm
Dissipation current	I <sub>CC</sub>	Refer to Fig.6	-	15	40	mA
High level output voltage	V <sub>OH</sub>	Refer to Fig.7	2.7	3.5	-	V
Low level output voltage	V <sub>OL</sub>	Refer to Fig.7	-	0.2	0.4	V
Rise time	t <sub>r</sub>	Refer to Fig.7	-	12	30	ns
Fall time	t <sub>f</sub>	Refer to Fig.7	-	4	30	ns
Low → High propagation delay time	t <sub>pLH</sub>	Refer to Fig.7	-	-	100	ns
High → Low propagation delay time	t <sub>pHL</sub>	Refer to Fig.7	-	-	100	ns
Pulse width distortion	Δtw	Refer to Fig.7	-30	-	+30	ns
Jitter	Δtj	Refer to Fig.8, P <sub>c</sub> =-15dBm	-	1	30	ns
		Refer to Fig.8, P <sub>c</sub> =-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 <sub>c</sub>	-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

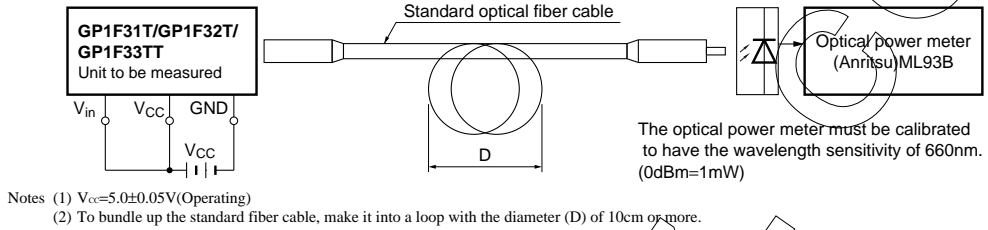
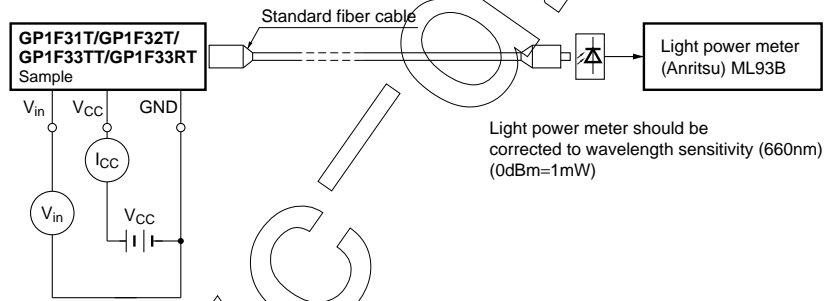


Fig.2 Input Voltage/Power Dissipation Measuring method



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

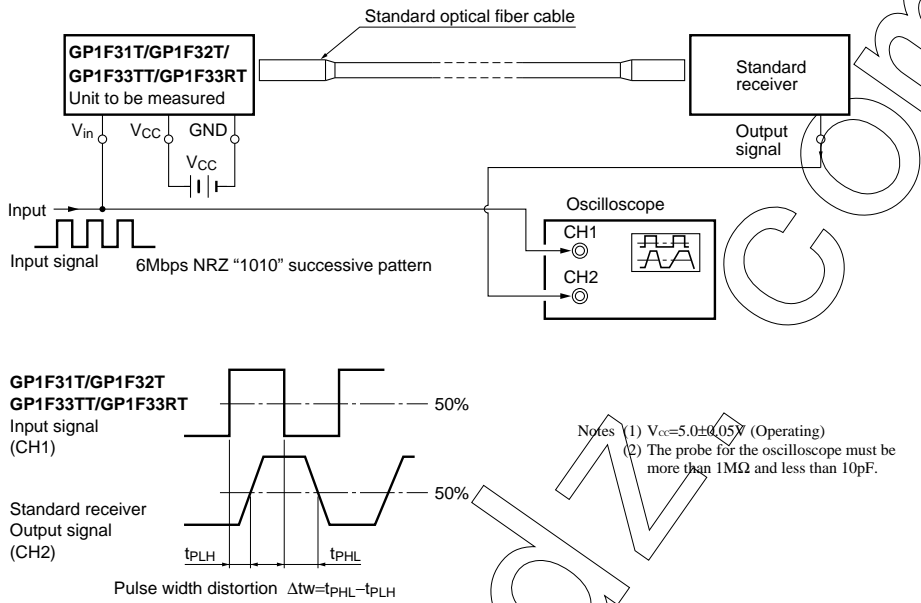
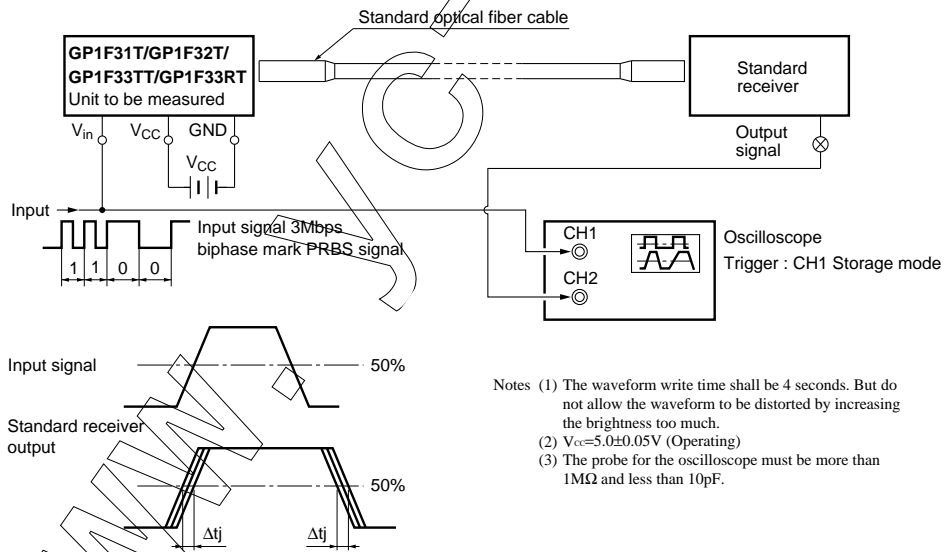
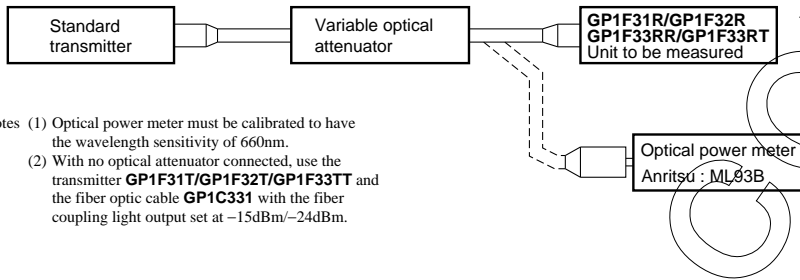


Fig.4 Measuring Method of Jitter

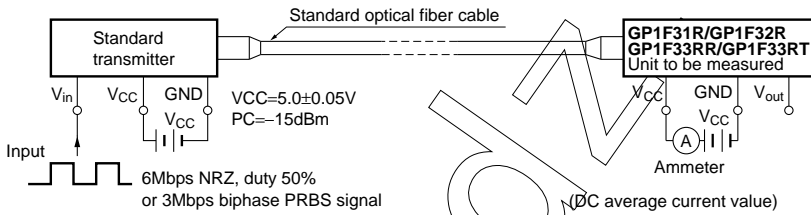


**Fig.5 Maximum Input Optical Power Level/Minimum Input Optical Power Level Measuring Method of Receiving Unit**

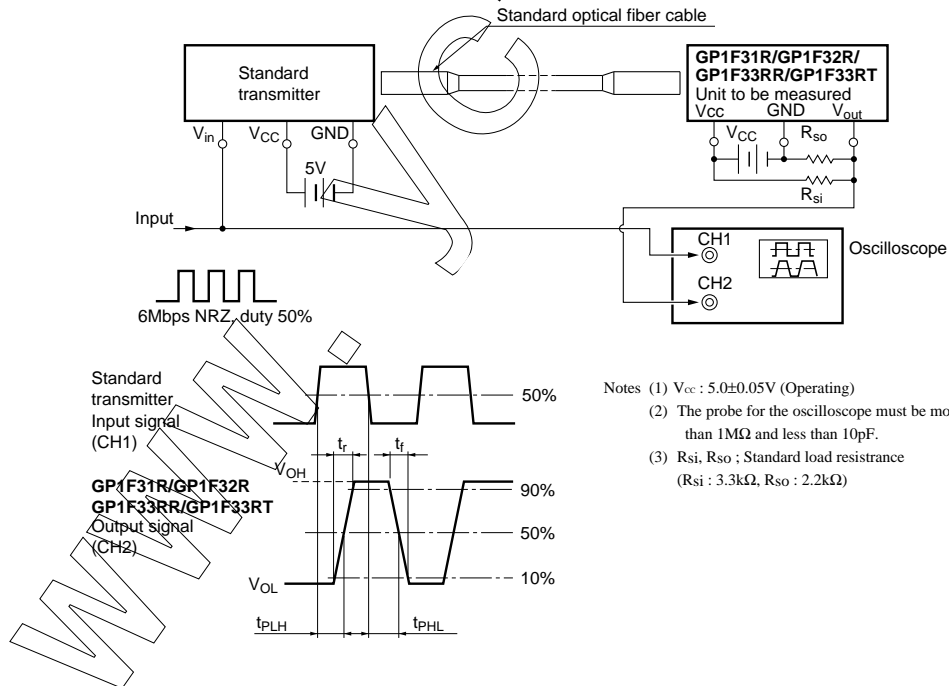


- Notes (1) Optical power meter must be calibrated to have the wavelength sensitivity of 660nm.  
 (2) With no optical attenuator connected, use the transmitter GP1F31T/GP1F32T/GP1F33TT and the fiber optic cable GP1C331 with the fiber coupling light output set at -15dBm/-24dBm.

**Fig.6 Measuring Method of Dissipation Current**



**Fig.7 Measuring Method of Output Voltage and Pulse**



- Notes (1) V<sub>cc</sub> : 5.0±0.05V (Operating)  
 (2) The probe for the oscilloscope must be more than 1MΩ and less than 10pF.  
 (3) R<sub>si</sub>, R<sub>so</sub> ; Standard load resistance  
 (R<sub>si</sub> : 3.3kΩ, R<sub>so</sub> : 2.2kΩ)

Fig.8 Measuring Method of Jitter

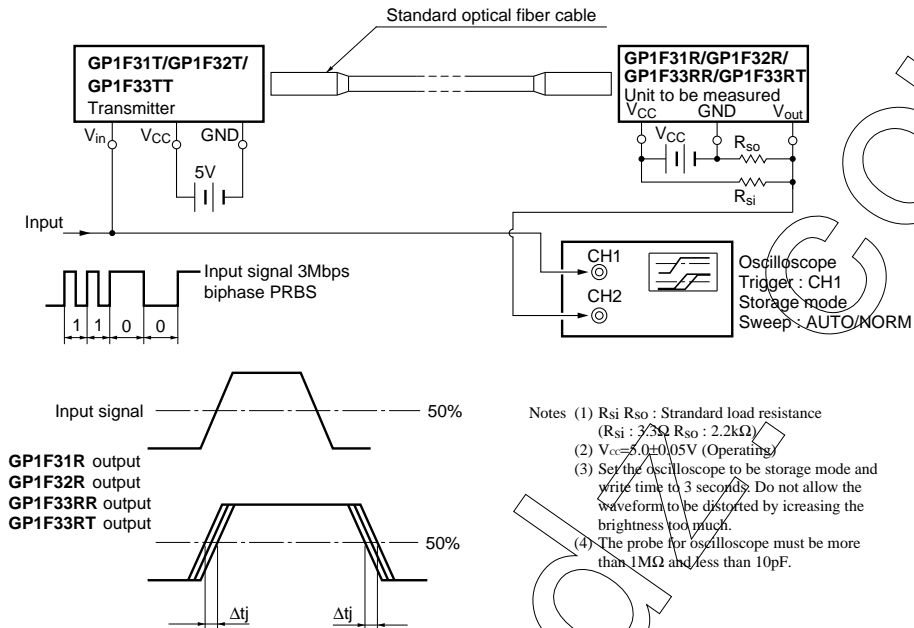
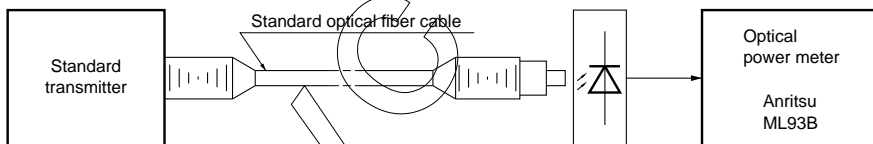
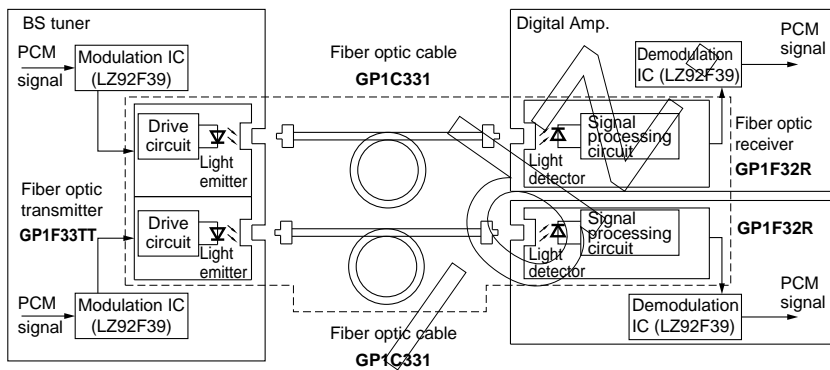
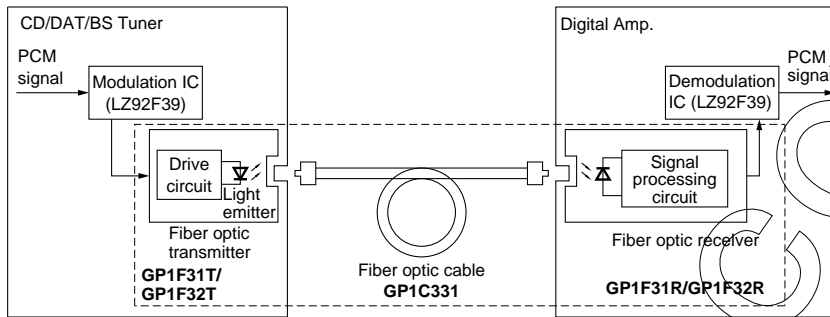


Fig.9 Measuring Method of Optical Output Coupling With Fiber



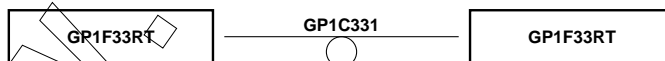
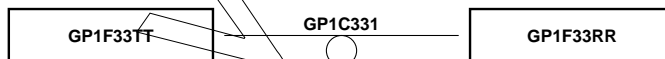
Standard light transmitter : Light transmitter that provides the fiber-end optical output of  $-15\text{dBm} \pm 0.3\text{dBm}$  when the standard fiber optic cable is connected.

**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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