

# GP1F37R/GP1F37R1/GP1F38R

## Uni-directional Fiber Optic Receiver

### ■ Features

1. Uni-directional data transmission using plastic fiber  
(Applicable to JIS C6560 square connector)
2. Signal transmission speed  
: MAX. 8Mbps (NRZ signal)(**GP1F37R/GP1F38R**)  
: MAX. 12.5Mbps (NRZ signal) (**GP1F37R1**)
3. Low voltage drive  
Operating voltage : 2.7 to 3.6 V (**GP1F38R**)
4. Minimum input optical power  
: -27dBm (EIAJ) (**GP1F37R/GP1F38R**)
5. TTL compatible by OPIC
6. **GP1F38T2** is recommended for the transmitter side of **GP1F37R1**.

### ■ Applications

1. CD players
2. MD players

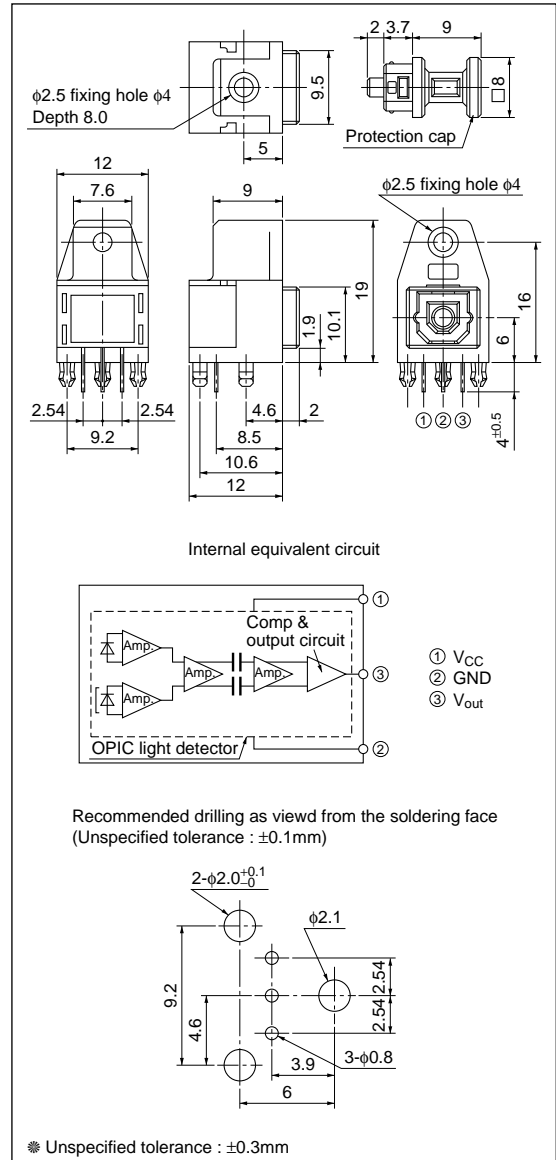
### ■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit	
Supply voltage	V <sub>CC</sub>	-0.5 to +7.0	V	
Operating temperature	Topr	-20 to +70	°C	
Storage temperature	Tstg	-30 to +80	°C	
*1 Soldering temperature	Tsol	260	°C	
Output current	I <sub>OH</sub>	2 (source current)	mA	
		I <sub>OL</sub>		10 (Sink current)
				2 (Sink current)

\*1 For 5s (2 times or less)

### ■ 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.

## ■ Recommended Operating Conditions

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	
Operating supply voltage	GP1F37R	V <sub>CC</sub>	4.75	5.0	5.25	V
	GP1F37R1					
	GP1F38R					
Operating transfer rate	GP1F37R	T	0.1	-	8	Mbps
	GP1F38R					
	GP1F37R1					
Receiver input optical power level	GP1F37R	P <sub>c</sub>	-27	-	-14.5	dBm
	GP1F38R					
	GP1F37R1					

(1) The above operating transfer rate is the value when NRZ signal, "0101.." continuous signal of duty 50% is transmitted.

(2) The output (H/L level) of GP1F37R are not fixed constantly when it receives the modulating light (including DC light, no input light) less than 0.1Mbps.

## ■ Electro-optical Characteristics 1 (Signal transmission speed 0.1 to 12.5Mb/s) (GP1F37R1)

(T<sub>a</sub>=25°C, V<sub>CC</sub>=5.0V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Peak sensitivity wavelength	$\lambda_p$	—————	-	700	-	nm
Dissipation current	I <sub>CC</sub>	Refer to Fig.1	-	15	25	mA
High level output voltage	V <sub>OH</sub>	Refer to Fig.2	2.7	3.5	-	V
Low level output voltage	V <sub>OL</sub>	Refer to Fig.2	-	0.2	0.4	V
Rise time	t <sub>r</sub>	Refer to Fig.2	-	17	23	ns
Fall time	t <sub>f</sub>	Refer to Fig.2	-	7	15	ns
Low → High delay time	t <sub>pLH</sub>	Refer to Fig.2	-	-	180	ns
High → Low delay time	t <sub>pHL</sub>	Refer to Fig.2	-	-	180	ns
Pulse width distortion	$\Delta tw$	Refer to Fig.2	-20	-	+20	ns
Jitter	$\Delta tj$	Refer to Fig.3, P <sub>c</sub> = -14.5dBm	-	1	15	ns
		Refer to Fig.3, P <sub>c</sub> = -24dBm	-	-	15	ns

## ■ Electro-optical Characteristics 2 (Signal transmission speed 0.1 to 8Mb/s)

(T<sub>a</sub>=25°C, V<sub>CC</sub>=5.0V (GP1F37R/GP1F37R1), V<sub>CC</sub>=3.0V (GP1F38R))

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Peak sensitivity wavelength	$\lambda_p$	—————	-	700	-	nm	
Dissipation current	GP1F37R/GP1F37R1	I <sub>CC</sub>	Refer to Fig.1	-	15	25	mA
	GP1F38R			12	15		
High level output voltage	GP1F37R/GP1F37R1	V <sub>OH</sub>	Refer to Fig.2	2.7	3.5	-	V
	GP1F38R			2.1	-		
Low level output voltage	GP1F37R/GP1F37R1	V <sub>OL</sub>	Refer to Fig.2	-	0.2	0.4	V
	GP1F38R			-	-		
Rise time	t <sub>r</sub>	Refer to Fig.2	-	17	30	ns	
Fall time	t <sub>f</sub>	Refer to Fig.2	-	5	30	ns	
Low → High delay time	t <sub>pLH</sub>	Refer to Fig.2	-	-	180	ns	
High → Low delay time	t <sub>pHL</sub>	Refer to Fig.2	-	-	180	ns	
Pulse width distortion	$\Delta tw$	Refer to Fig.2	-30	-	+30	ns	
Jitter	$\Delta tj$	Refer to Fig.3, P <sub>c</sub> = -14.5dBm	-	1	30	ns	
		Refer to Fig.3, P <sub>c</sub> = -27dBm	-	-	30	ns	

## ■ Mechanical Characteristics

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Conditions
Insertion force, with drawal force	—	6	—	40	N	Initial value when a <b>GP1C331</b> is used.

### Fig.1 Dissipation Current

	Input conditions	Measuring method
Supply voltage	<b>GP1F37R</b> $V_{CC}=5.0\pm 0.05V$ <b>GP1F37R1</b> $V_{CC}=5.0V$ <b>GP1F38R</b> $V_{CC}=3.0\pm 0.05V$	Measured on an ammeter (DC average amperage)
Optical output coupling with fiber	$P_c=-14.5dBm$	
Standard transmitter input signal	<b>GP1F37R/38R</b> 6Mbps NRZ, Duty 50% or 3Mbps biphase mark PRBS signal <b>GP1F37R1</b> 12.5Mbps NRZ, Duty 50%, 6Mbps NRZ, Duty 50% or 6.25Mbps biphase mark PRBS signal, 3Mbps biphase mark PRBS signal	

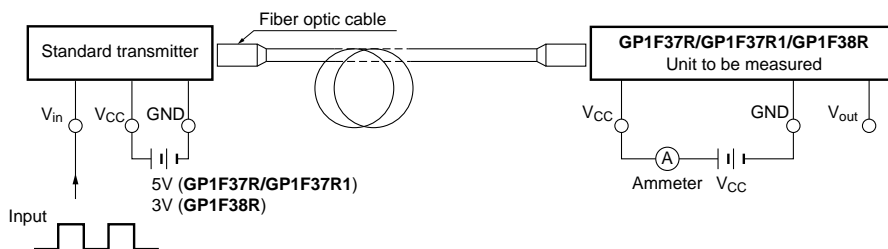
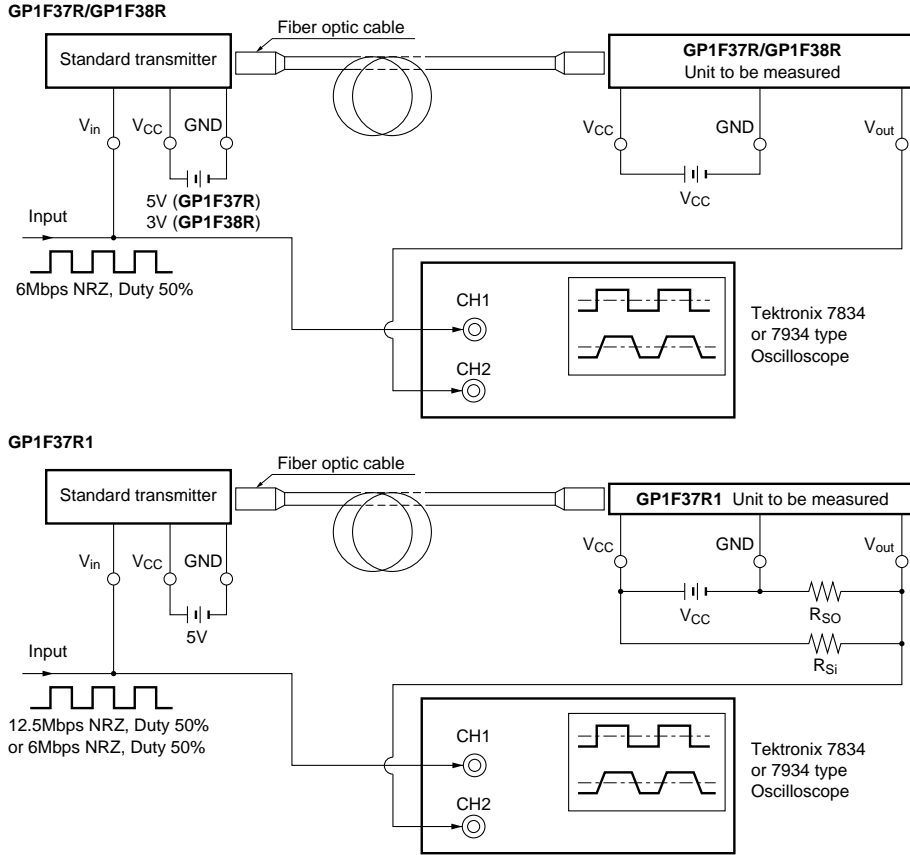


Fig.2 Measuring Method of Output Voltage and Pulse Response



Test item

Test item	Symbol
Low → High pulse delay time	$t_{PLH}$
High → Low pulse delay time	$t_{PHL}$
Rise time	$t_r$
Fall time	$t_f$
Pulse width distortion $\Delta tw = t_{PHL} - t_{PLH}$	$\Delta tw$
High level output voltage	$V_{OH}$
Low level output voltage	$V_{OL}$

- Notes (1) **GP1F37R**  $V_{CC}=5.0\pm 0.05V$  (State of operating)  
**GP1F37R1**  $V_{CC}=5.0V$  (State of operating)  
**GP1F38R**  $V_{CC}=3.0\pm 0.05V$  (State of operating)
- (2) The fiber coupling light output set at  $-14.5dBm/-27.0dBm$ .
- (3) The probe for the oscilloscope must be more than  $1M\Omega$  and less than  $10pF$ .
- (4) The output (H/L level) of **GP1F37R/GP1F37R1/GP1F38R** are not fixed constantly when it receives the modulating light (including DC light, no input light) less than 0.1Mbps.
- (5) **GP1F37R1**  $R_{Si}$ ,  $R_{So}$  : Standard load resistance ( $R_{Si}$  :  $3.3k\Omega$ ,  $R_{So}$  :  $2.2k\Omega$ )

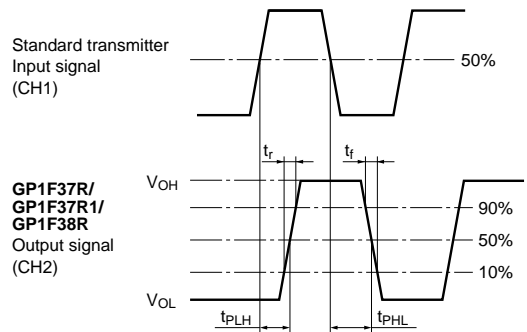
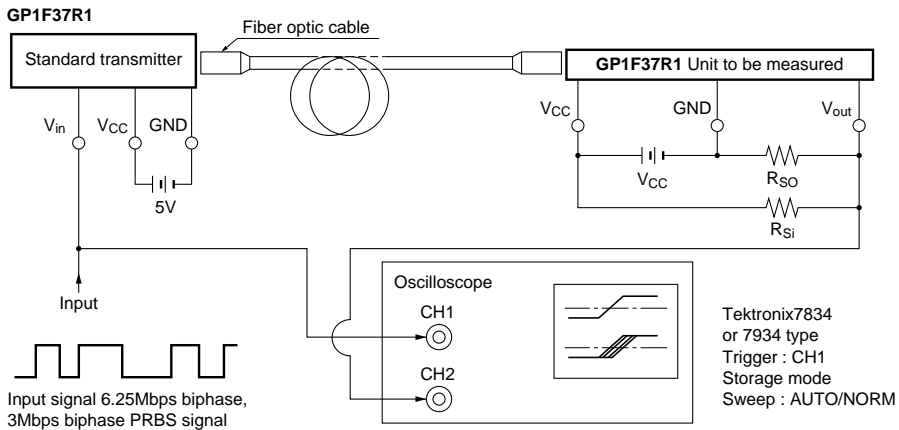
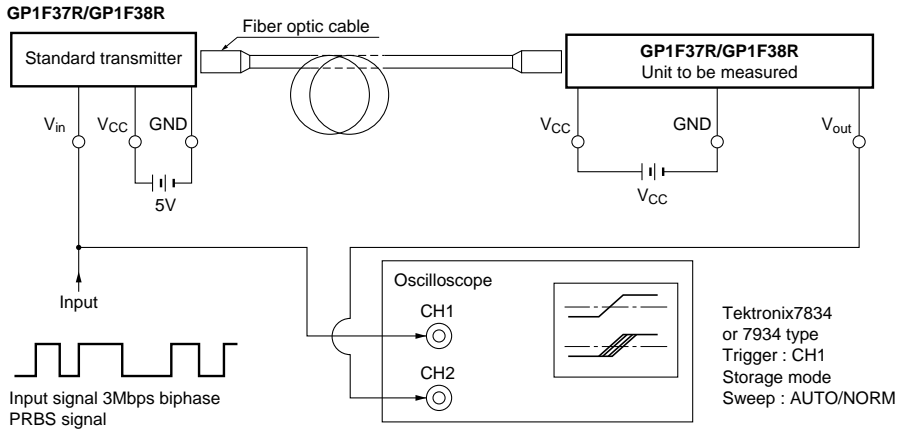


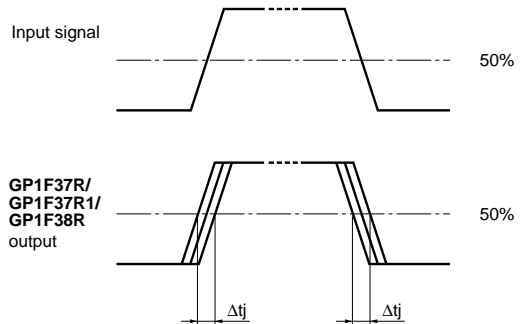
Fig.3 Measuring Method of Jitter



Test item

Test item	Symbol	Test condition
Jitter	$\Delta t_j$	Set the trigger on the rise of input signal to measure the jitter of the rise of output
Jitter	$\Delta t_j$	Set the trigger on the fall of input signal to measure the jitter of the fall of output

- Notes (1) The fiber coupling light output set at  $-14.5\text{dBm}/-27.0\text{dBm}$ .  
 (2) The waveform write time shall be 3 seconds. But do not allow the waveform to be distorted by increasing the brightness too much.  
 (3) **GP1F37R/GP1F37R1**  $V_{cc}=5.0\pm 0.05\text{V}$  (State of operating)  
**GP1F38R**  $V_{cc}=3.0\pm 0.05\text{V}$  (State of operating)  
 (4) The probe for the oscilloscope must be more than  $1\text{M}\Omega$  and less than  $10\text{pF}$ .



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