

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

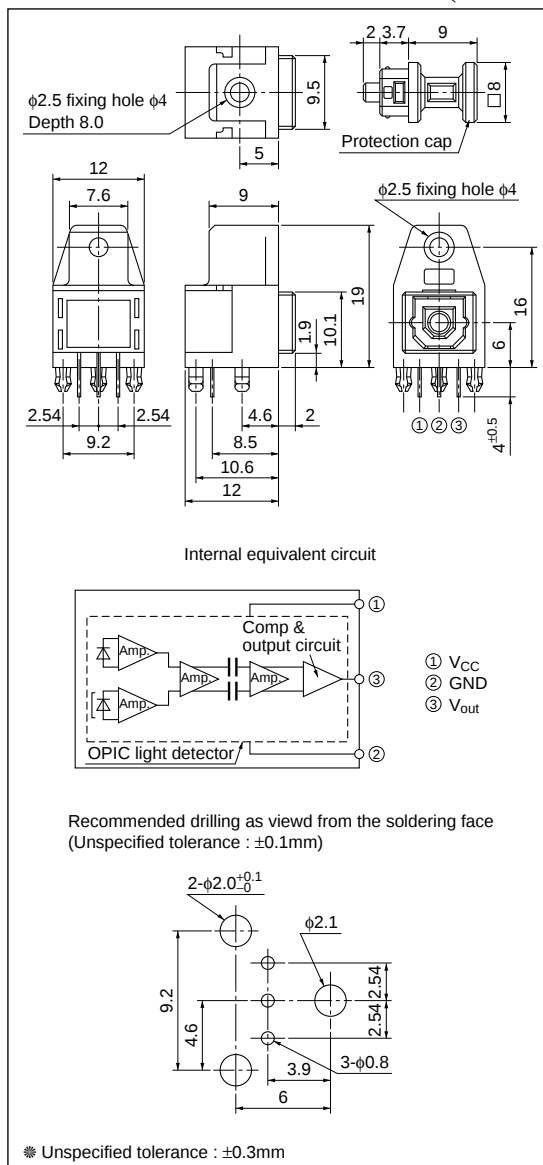
■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	-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 _{OH}	2 (source current)	mA
		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 _{CC}	4.75	5.0	V
	GP1F37R1		5.0	5.25	
	GP1F38R		2.7	3.0	
Operating transfer rate	GP1F37R	T	0.1	8	Mbps
	GP1F38R				
	GP1F37R1			12.5	
Receiver input optical power level	GP1F37R	P _C	-27	-14.5	dBm
	GP1F38R				
	GP1F37R1		-24.0		

(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)

(Ta=25°C, V_{CC}=5.0V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Peak sensitivity wavelength	λ_p	—	—	700	—	nm
Dissipation current	I _{CC}	Refer to Fig.1	—	15	25	mA
High level output voltage	V _{OH}	Refer to Fig.2	2.7	3.5	—	V
Low level output voltage	V _{OL}	Refer to Fig.2	—	0.2	0.4	V
Rise time	t _r	Refer to Fig.2	—	17	23	ns
Fall time	t _f	Refer to Fig.2	—	7	15	ns
Low → High delay time	t _{pLH}	Refer to Fig.2	—	—	180	ns
High → Low delay time	t _{pHL}	Refer to Fig.2	—	—	180	ns
Pulse width distortion	Δtw	Refer to Fig.2	-20	—	+20	ns
Jitter	Δtj	Refer to Fig.3, P _C = -14.5dBm	—	1	15	ns
		Refer to Fig.3, P _C = -24dBm	—	—	15	ns

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

(Ta=25°C, V_{CC}=5.0V (**GP1F37R/GP1F37R1**), V_{CC}=3.0V (**GP1F38R**))

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Peak sensitivity wavelength	λ_p	—	—	700	—	nm
Dissipation current	GP1F37R/GP1F37R1	I _{CC}	—	15	25	mA
	GP1F38R			12	15	
High level output voltage	GP1F37R/GP1F37R1	V _{OH}	2.7	3.5	—	V
	GP1F38R		2.1	—		
Low level output voltage	GP1F37R/GP1F37R1	V _{OL}	—	0.2	0.4	V
	GP1F38R			—		
Rise time	t _r	Refer to Fig.2	—	17	30	ns
Fall time	t _f	Refer to Fig.2	—	5	30	ns
Low → High delay time	t _{pLH}	Refer to Fig.2	—	—	180	ns
High → Low delay time	t _{pHL}	Refer to Fig.2	—	—	180	ns
Pulse width distortion	Δtw	Refer to Fig.2	-30	—	+30	ns
Jitter	Δtj	Refer to Fig.3, P _C = -14.5dBm	—	1	30	ns
		Refer to Fig.3, P _C = -27dBm	—	—	30	ns

■ Mechanical Characteristics

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

Fig.1 Dissipation Current

Input conditions				Measuring method
Supply voltage	GP1F37R $V_{CC}=5.0\pm0.05V$ GP1F37R1 $V_{CC}=5.0V$ GP1F38R $V_{CC}=3.0\pm0.05V$			Measured on an ammeter (DC average amperage)
Optical output coupling with fiber	$P_c=-14.5dBm$			
Standard transmitter input signal	GP1F37R/38R 6Mbps NRZ, Duty 50% or 3Mbps biphas mark PRBS signal GP1F37R1 12.5Mbps NRZ, Duty 50%, 6Mbps NRZ, Duty 50% or 6.25Mbps biphas mark PRBS signal, 3Mbps biphas mark PRBS signal			

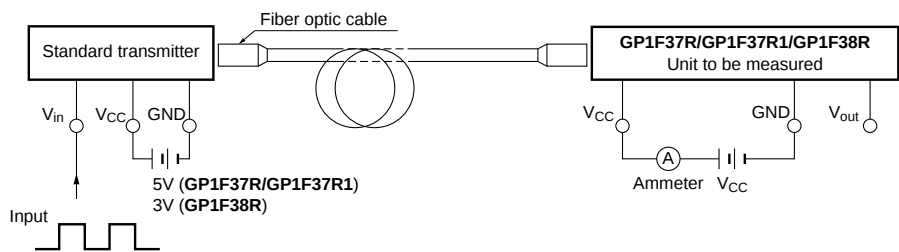
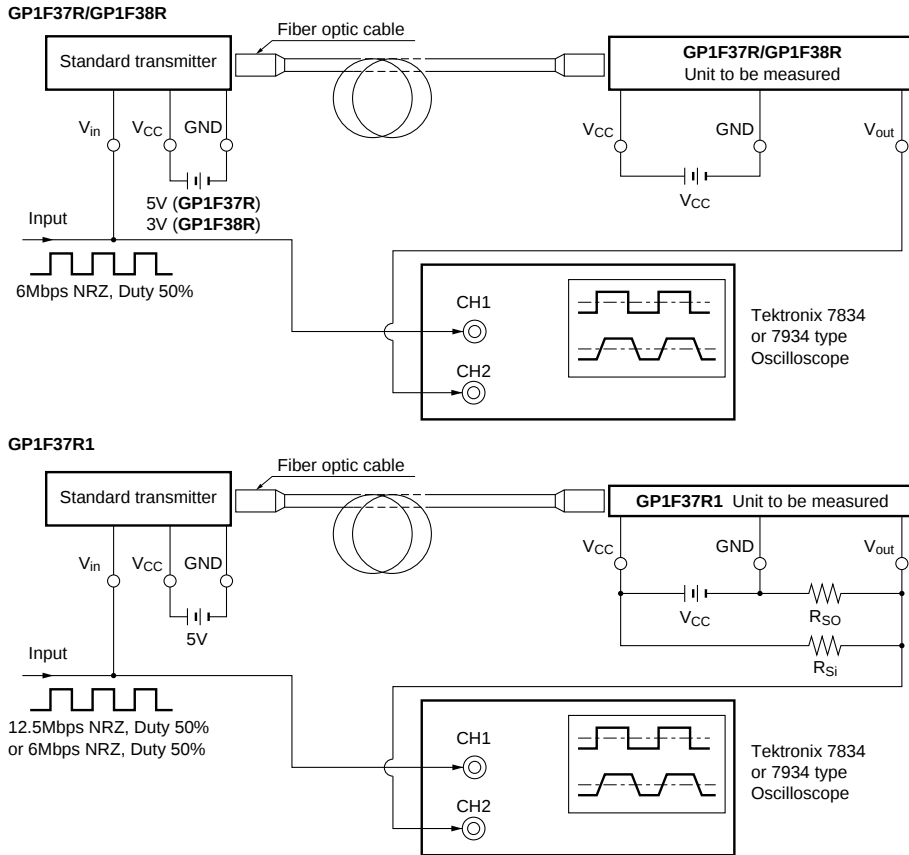


Fig.2 Measuring Method of Output Voltage and Pulse Response



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 $\Delta tw = t_{PHL} - t_{PLH}$	Δtw
High level output voltage	V_{OH}
Low level output voltage	V_{OL}

Notes (1) **GP1F37R** $V_{CC}=5.0\pm0.05V$ (State of operating)

GP1F37R1 $V_{CC}=5.0V$ (State of operating)

GP1F38R $V_{CC}=3.0\pm0.05V$ (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} : $2.2k\Omega$)

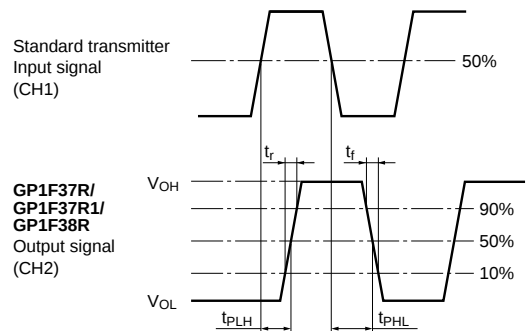
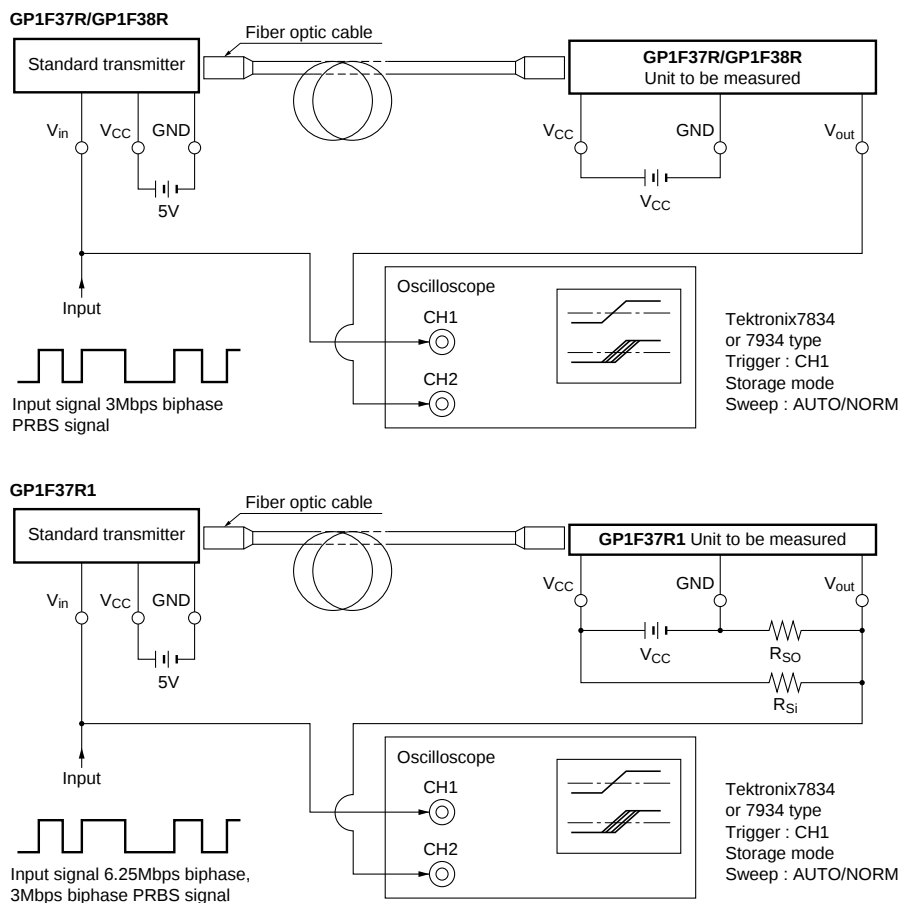


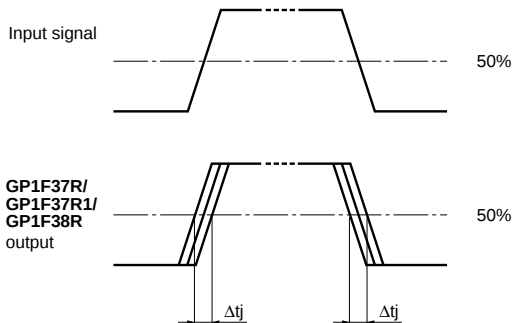
Fig.3 Measuring Method of Jitter



Test item

Test item	Symbol	Test condition
Jitter	Δt_j	Set the trigger on the rise of input signal to measure the jitter of the rise of output
Jitter	Δt_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** $V_{CC}=5.0\pm0.05\text{V}$ (State of operating)
GP1F38R $V_{CC}=3.0\pm0.05\text{V}$ (State of operating)
 - (4) The probe for the oscilloscope must be more than $1\text{M}\Omega$ and less than 10pF .



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