

GP1FE500TK/ GP1FE500RK

■ Features

1. Optimum height for mounting on PC
(Center height:7mm)
2. The Optical receiver can judge optical or electrical signal and transmit optical/electrical signal
3. Unidirectional signal transmission for plastic optical fiber cables
4. The optical receiver can be directly connected with the TTL, due to the use of OPIC
5. For fiber-optic cables, use our **GP1C331/GP1C331A/GP1C335** cables

■ Applications

1. Personal computers
2. DVD players
3. CD players
4. MD players

■ Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	-0.5 to +7.0	V
Output current (GP1FE500RK)	I _{OH} I _{OL}	4 (Source current) 4 (Sink current)	mA
Input voltage (GP1FE500TK)	V _{IN}	-0.5 to V _{CC} +0.5	V
Operating temperature	T _{opr}	-20 to +70	°C
Storage temperature	T _{stg}	-30 to +80	°C
*1 Soldering temperature	T _{sol}	260	°C

*1 For 5s (2 times or less)

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

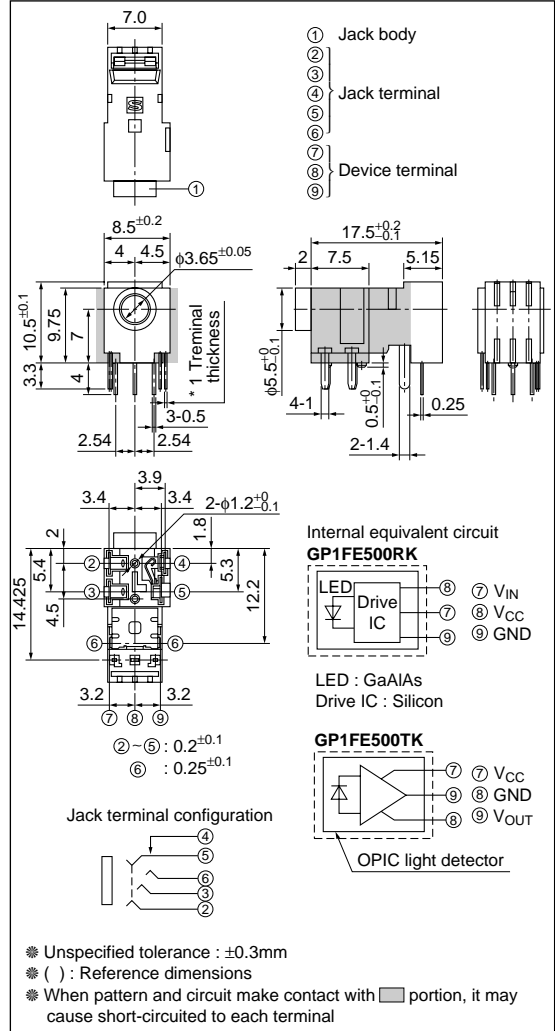
Parameter	Symbol	Rating	Unit
Total power dissipation	P _{tot}	D.C. 12V, 1A	-
Operating temperature	T _{opr}	-20 to +70	°C
Storage temperature	T _{stg}	-30 to +80	°C
*1 Soldering temperature	T _{sol}	260	°C
*2 Isolation voltage	V _{iso} (rms)	A.C. 500V	-

*2 For 1min

Fiber Optic Transmitter/Receiver (Optical Mini-Jack)

■ 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 single chip.

■ Recommended Operating Conditions (GP1FE500TK) (Ta=25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating supply voltage	V _{CC}	4.75	5.0	5.25	V
Operating transfer rate	T	–	–	8	Mbps

■ Recommended Operating Conditions (GP1FE500RK) (Ta=25°C)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating supply voltage	V _{CC}	4.75	5.0	5.25	V
Operating transfer rate	T	0.1	–	8	Mbps
Receiver input optical power level	P _C	–24.0	–	–14.5	dBm

■ Electro-optical Characteristics (GP1FE500TK)

(Ta=25°C, V_{CC}=5V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
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 delay time	t _{pLH}	Refer to Fig.3	–	–	100	ns
High→Low delay time	t _{pHL}	Refer to Fig.3	–	–	100	ns
Pulse width distortion	Δt_w	Refer to Fig.3	–25	–	+25	ns
Jitter	Δt_j	Refer to Fig.3	–	1	25	ns

■ Electro-optical Characteristics (GP1FE500RK)

(Ta=25°C, V_{CC}=5V)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Peak sensitivity wavelength	λ_p	–	–	700	–	nm
Dissipation current	I _{CC}	Refer to Fig.4	–	15	40	mA
High level output voltage	V _{OH}	Refer to Fig.5	2.7	3.5	–	V
Low level output voltage	V _{OL}	Refer to Fig.5	–	0.2	0.4	V
Rise time	t _r	Refer to Fig.5	–	12	30	ns
Fall time	t _f	Refer to Fig.5	–	4	30	ns
Low→High delay time	t _{pLH}	Refer to Fig.5	–	–	100	ns
High→Low delay time	t _{pHL}	Refer to Fig.5	–	–	100	ns
Pulse width distortion	Δt_w	Refer to Fig.5	–30	–	+30	ns
Jitter	Δt_j	Refer to Fig.6, P _C =–14.5dBm	–	1	30	ns
		Refer to Fig.6, P _C =–24dBm	–	–	30	ns

■ Mechanical and Electrical Characteristics (Jack)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Insertion force, withdrawal force	F _p	*3	5	–	35	N
Contact resistance	R _{con}	*4	–	–	30	mΩ
Isolation resistance	R _{iso}	D.C.500V, 1min.	100	–	–	MΩ

Note) This jack is designed for applicable to $\phi 3.5$ compact single head plug (JIS C6560).

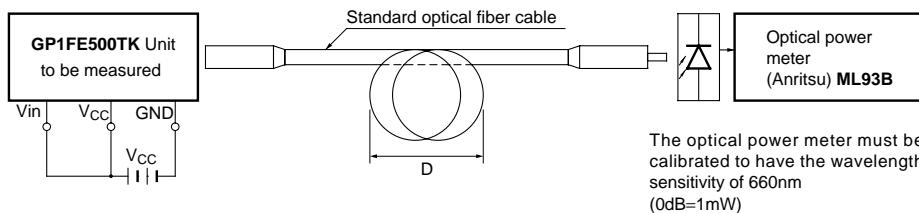
*3 Measuring method of insertion force and withdrawal force.

Insertion and withdrawal force shall be measured after inserting and withdrawing 3 times by using JIS C6560 standard plug for test.

*4 Measuring method of contact resistance.

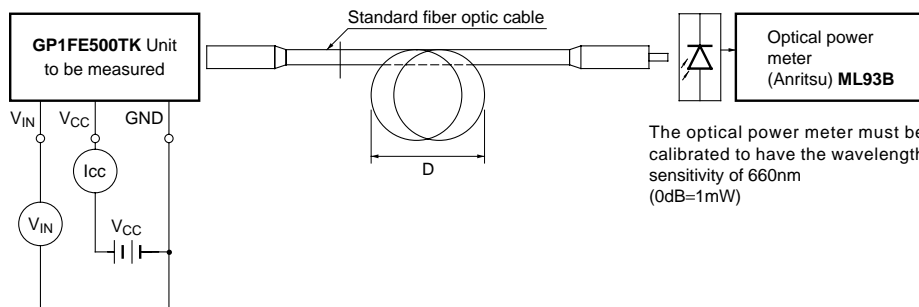
It measures at 100mA or less and 1 000Hz at the condition of inserting JIS C6560 standard plug for test in which movable contact terminal and contact point are described.

Fig.1 Measuring Method of Optical Output Coupling with Fiber



- Note (1) V_{CC} : 5.0V (State of operating)
 (2) To bundle up the standard fiber optic cable, make it into a loop with the diameter $D=10\text{cm}$ or more (The standard fiber optic cable will be specified elsewhere.)

Fig.2 Measuring Method of Input Voltage and Supply Current

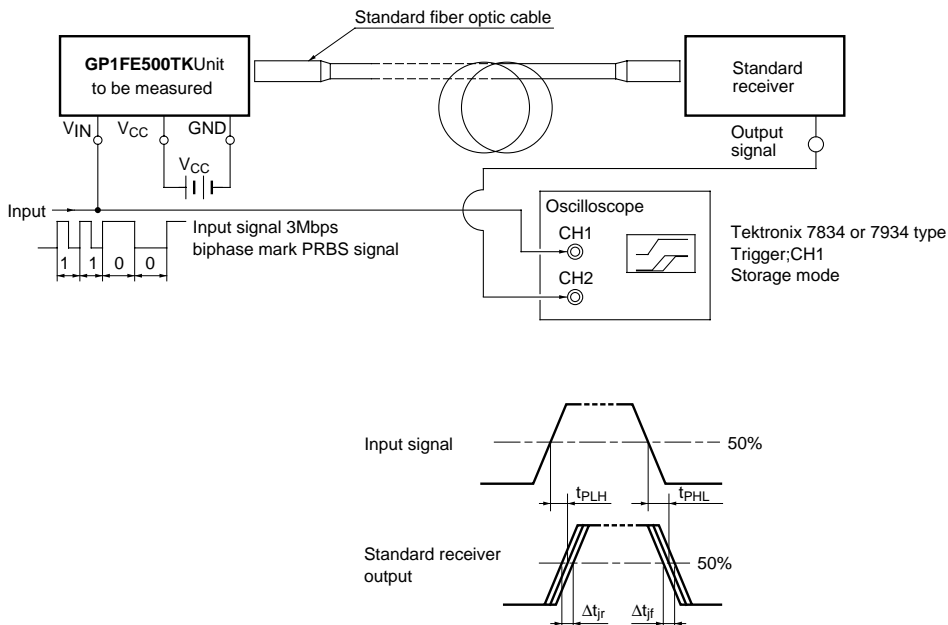


Input conditions and judgement method

Conditions	Judgement method
$V_{IN}=2.0\text{V}$ or more	$-21 \leq P_c \leq -15\text{dBm}$, $I_{cc}=10\text{mA}$ or less
$V_{IN}=0.8\text{V}$ or less	$P_c \leq -36\text{dBm}$, $I_{cc}=10\text{mA}$ or less

Note $V_{CC}=5.0\text{V}$ (State of operating)

Fig.3 Measuring Method of Pulse Response and Jitter



Parameter	Symbol	Conditions
Low→High delay time	t_{pLH}	Refer to the above mentioned prescription
High→Low delay time	t_{pHL}	Refer to the above mentioned prescription
Pulse width distortion	Δt_w	$\Delta t_w = t_{pHL} - t_{pLH}$
Low→High jitter	Δt_{jr}	Set the trigger on the rise of input signal to measure the jitter of the rise of output
High→Low jitter	Δt_{jf}	Set the trigger on the fall of input signal to measure the jitter of the fall of output

Notes (1) The waveform write time shall be 4s. But do not allow the waveform to be distorted by increasing the brightness too much

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

(3) The probe for the oscilloscope must be more than $1M\Omega$ and less than $10pF$

Fig.4 Supply Current

Input conditions		Measuring method
Supply voltage	$V_{CC}=5.0V$	Measured on an ammeter (DC average amperage)
Fiber coupling light output	$P_c=-14.5dBm$	
Standard transmitter input signal	6Mbps NRZ, Duty 50% or 3Mbps biphasic mark PRBS signal	

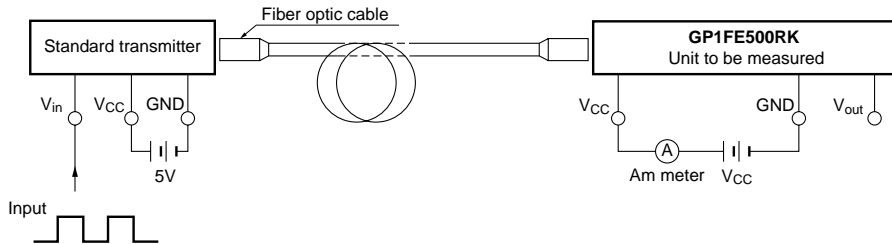
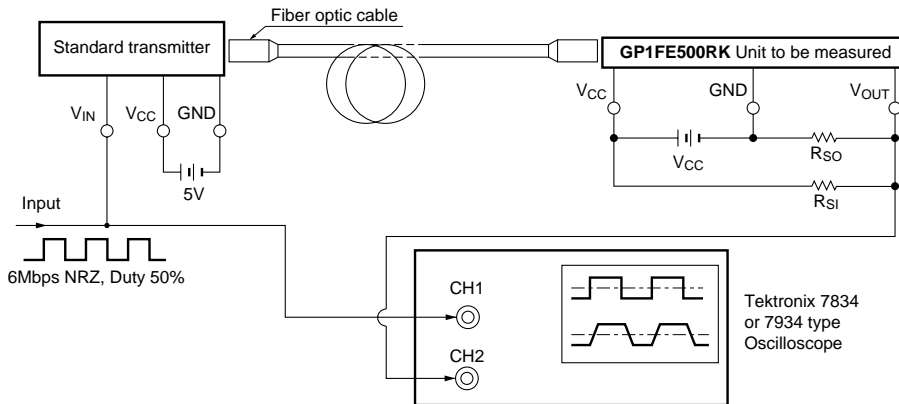


Fig.5 Measuring Method of Output Voltage and Pulse Response



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 $\Delta t_w = t_{pHL} - t_{pLH}$	Δt_w
High level output voltage	V_{OH}
Low level output voltage	V_{OL}

- Notes (1) $V_{CC}=5.0V$ (State of operating)
 (2) The fiber coupling light output set at $-14.5dBm/-24dBm$
 (3) The probe for the oscilloscope must be more than $1M\Omega$ and less than $10pF$
 (4) R_{SI} , R_{SO} : Standard load resistance ($R_{SI}:3.3k\Omega$, $R_{SO}:2.2k\Omega$)
 (5) The output (H/L level) of GP1FE500RK are not fixed constantly when it receives the modulating light (including DC light, no input light) less than 0.1Mbps

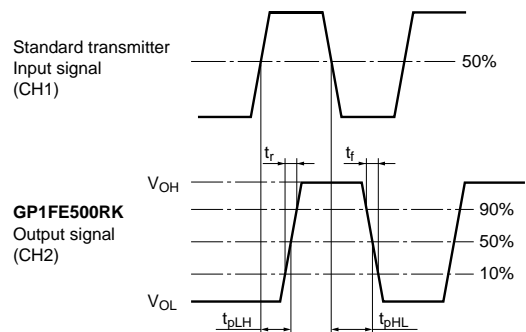
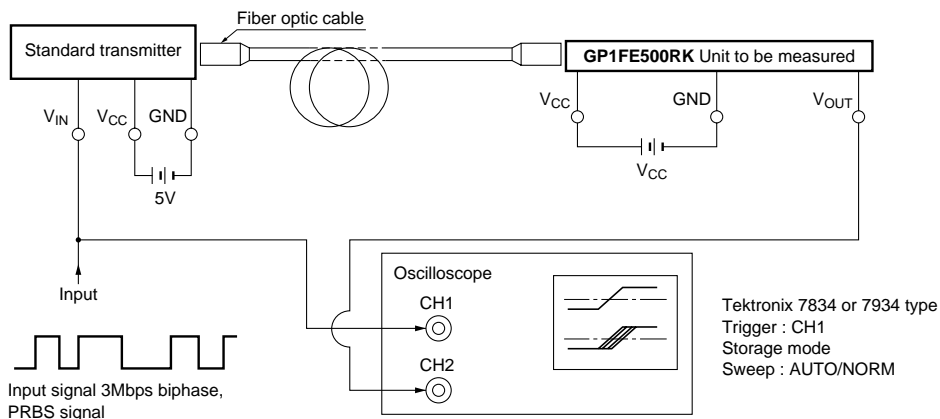


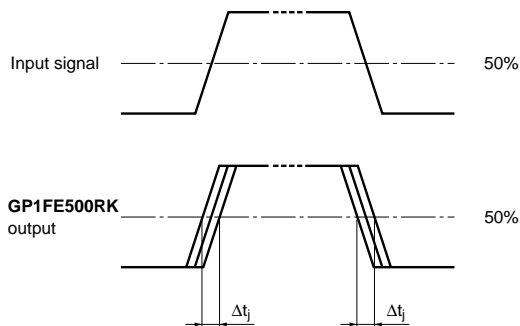
Fig.6 Measuring Method of Jitter



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 $-14.5\text{dBm}/-24\text{dBm}$
 - (2) R_{S1}, R_{S0} : Standard load resistance ($R_{S1}: 3.3\text{k}\Omega, R_{S0}: 2.2\text{k}\Omega$)
 - (3) The waveform write time shall be 3s. But do not allow the waveform to be distorted by increasing the brightness too much
 - (4) $V_{CC}=5.0\text{V}$ (State of operating)
 - (5) The probe for the oscilloscope must be more than $1\text{M}\Omega$ and less than 10pF



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