

GP1S11 Linear Output Type Photointerrupter

Features

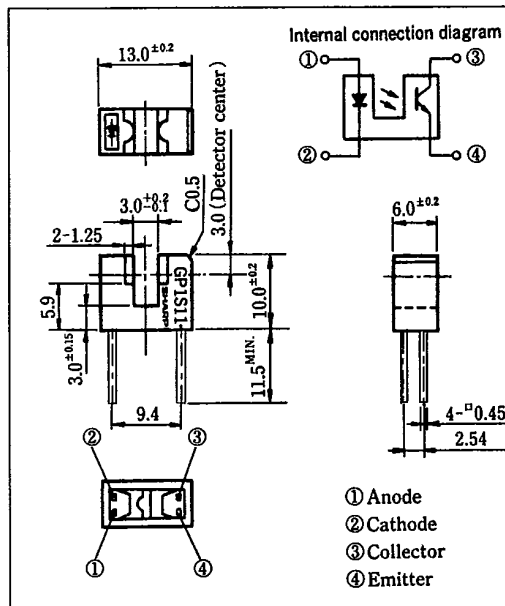
1. Long linear detection distance
2. High speed response (t_r : TYP. $3\mu s$ at $R_L = 100\Omega$)
3. PWB direct mounting type package

Applications

1. Record players

Outline Dimensions

(Unit : mm)



Absolute Maximum Ratings

(Ta = 25°C)

| | Parameter | Symbol | Rating | Unit |
|--------|-----------------------------|-----------|------------|------|
| Input | Forward current | I_F | 50 | mA |
| | *1 Peak forward current | I_{FM} | 1 | A |
| | Reverse voltage | V_R | 6 | V |
| | Power dissipation | P | 75 | mW |
| Output | Collector-emitter voltage | V_{CEO} | 35 | V |
| | Emitter-collector voltage | V_{ECO} | 6 | V |
| | Collector current | I_C | 20 | mA |
| | Collector power dissipation | P_C | 75 | mW |
| | Operating temperature | T_{opr} | -25 ~ +85 | °C |
| | Storage temperature | T_{stg} | -40 ~ +100 | °C |
| | *2 Soldering temperature | T_{sol} | 260 | °C |

*1 Pulse width $\leq 100\mu s$, Duty ratio = 0.01

*2 For 5 seconds

SHARP

Electro-optical Characteristics

| Parameter | | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|--------------------------|--------------------------------------|---------------|---|------|-----------|-----------|---------------|
| Input | Forward voltage | V_F | $I_F=20\text{mA}$ | — | 1.2 | 1.4 | V |
| | Peak forward voltage | V_{FM} | $I_{FM}=0.5\text{A}$ | — | 3 | 4 | V |
| | Reverse current | I_R | $V_R=3\text{V}$ | — | — | 10 | μA |
| Output | Collector dark current | I_{CEO} | $V_{CE}=20\text{V}$ | — | 10^{-9} | 10^{-7} | A |
| Transfer characteristics | Current transfer ratio | CTR | $I_F=20\text{mA}, V_{CE}=5\text{V}$ | 11.5 | — | 100 | % |
| | Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_F=40\text{mA}, I_C=0.5\text{mA}$ | — | — | 0.4 | V |
| | Response time (Rise) | t_r | $V_{CE}=2\text{V}, I_C=2\text{mA}, R_L=100\Omega$ | — | 3 | 15 | μs |
| | Response time (Fall) | t_f | | — | 4 | 20 | μs |
| | *3 Linear distance | | $I_F=20\text{mA}, V_{CE}=5\text{V}$ | 1.26 | — | 1.95 | mm |

*3 moving distance during collector current (I_C) changes 90% to 10% of the initial value.

(Note)

The housing is made of resin that cuts off visible light and transmits infrared light. Take into due consideration the effects that external disturbing lights might have on these characteristics when mounting as the output current will increase resulting in liner characteristics errors if a light containing long wavelength ingredient (such as sunlight or tungsten lamp light) enters as an external disturbing light.

Fig. 1 Forward Current vs. Ambient Temperature

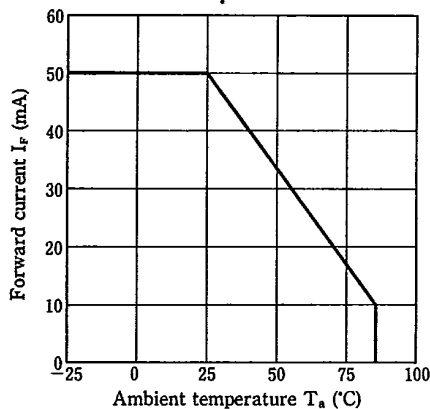


Fig. 2 Collector Power Dissipation vs. Ambient Temperature

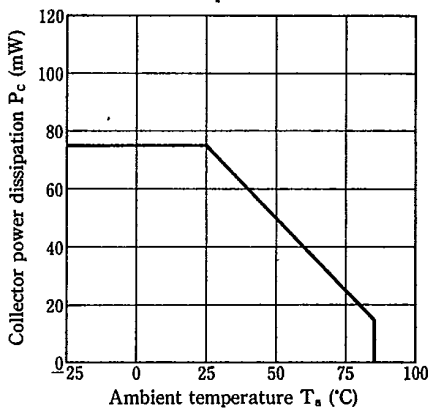


Fig. 3 Peak Forward Current vs. Duty Ratio

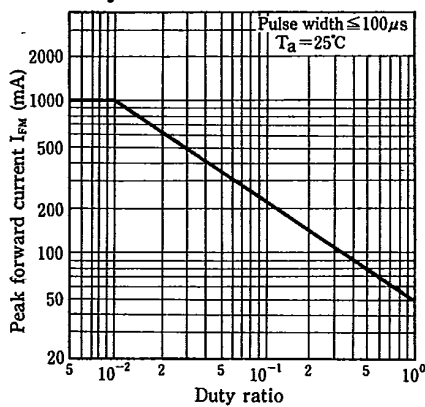


Fig. 4 Forward Current vs. Forward Voltage

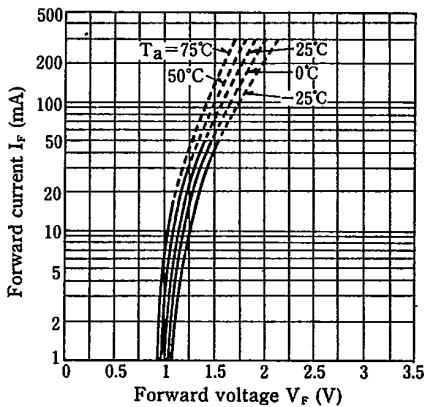


Fig. 5 Collector Current vs. Forward Current

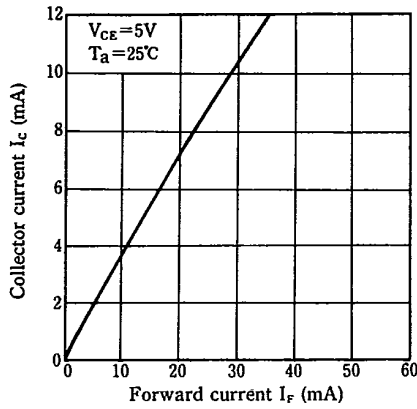


Fig. 6 Collector Current vs. Collector-emitter Voltage

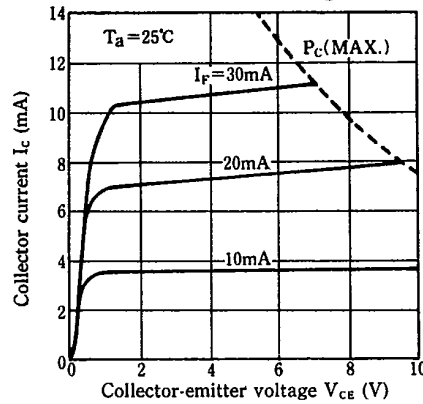


Fig. 7 Collector Current vs. Ambient Temperature

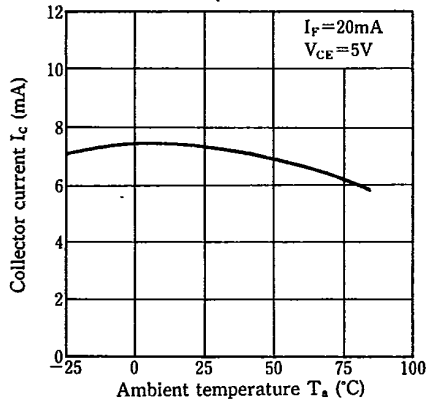


Fig. 8 Collector-emitter Saturation Voltage vs. Ambient Temperature

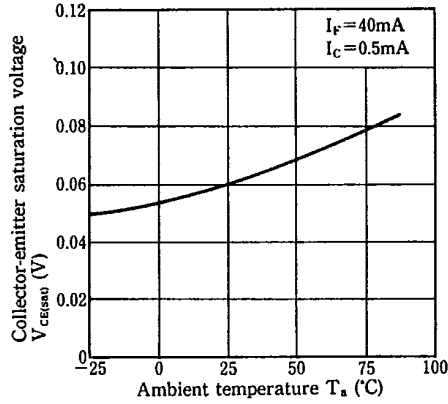
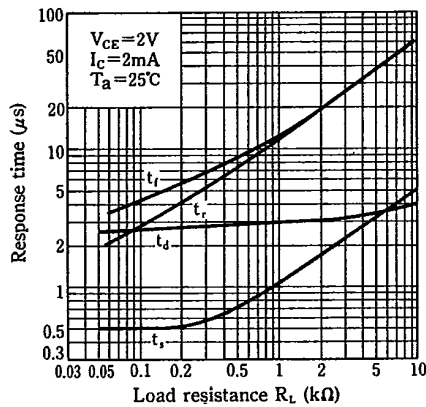


Fig. 9 Response Time vs. Load Resistance



Test Circuit for Response Time

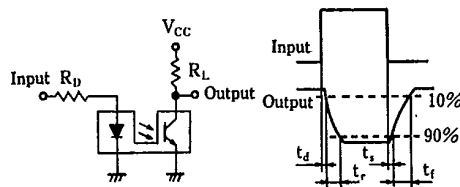


Fig. 10 Frequency Response

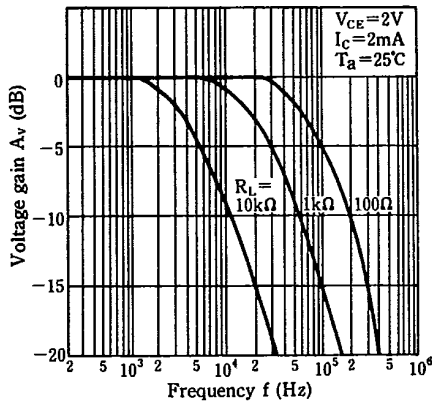


Fig. 11 Collector Dark Current vs. Ambient Temperature

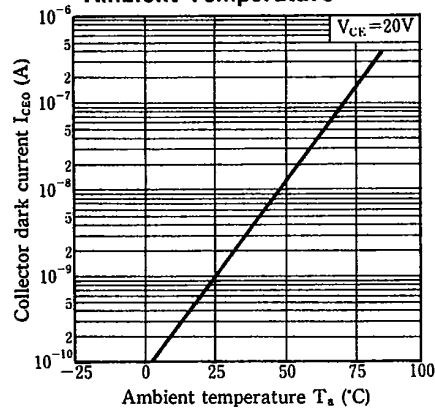


Fig. 12 Relative Collector Current vs. Shield Distance (1)

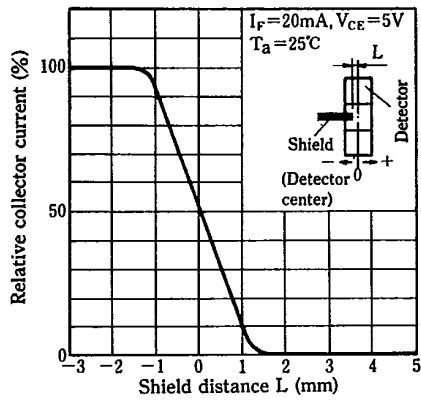
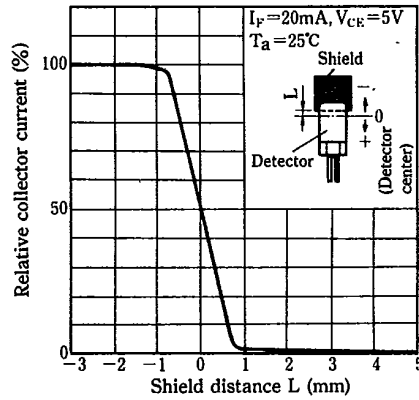


Fig. 13 Relative Collector Current vs. Shield Distance (2)



7