

SHARP ELEK/ MELEC DIV

Absolute Maximum Ratings

(Ta=25°C)

T-41-73

| Parameter | Symbol | Rating | Unit |
|--------------------------|-----------------------------|---------------|--------------|
| Input | Forward current | I_F | 50 mA |
| | Reverse voltage | V_R | 6 V |
| | Power dissipation | P_D | 75 mW |
| Output | Collector-emitter voltage | V_{CE0} | 35 V |
| | Emitter-collector voltage | V_{ECO} | 6 V |
| | Collector current | I_C | 20 mA |
| | Collector power dissipation | P_C | 75 mW |
| | Total power dissipation | P_{tot} | 100 mW |
| | Operating temperature | T_{opr} | -25 ~ +85 °C |
| Storage temperature | T_{stg} | -40 ~ +100 °C | |
| *1 Soldering temperature | T_{sol} | 260 °C | |

*1 Within 5 seconds (Soldering areas for each model are shown below.)

GP2S04, GP2S09

Soldering area
The hatched area more than 1mm² away from the lower edge of package as shown in the figure below.

GP2S06

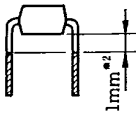
Soldering area
The hatched area more than 2.0mm away from the both edges of package as shown in the figure below.

GP2S07

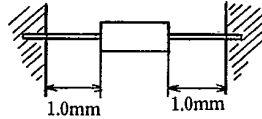
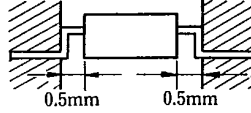
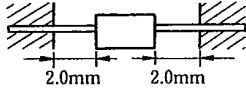
Soldering area
The hatched area more than 0.5mm away from the both edges of package as shown in the figure below.

GP2S10

Soldering area
The hatched area more than 1.0mm away from the both edges of package as shown in the figure below.



*2 GP2S09 : 4mm



Electro-optical Characteristics

(Ta=25°C)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|--------------------------|------------------------|---------------------------|------|--------------------|--------------------|---------|
| Input | Forward voltage | $I_F=20mA$ | — | 1.2 | 1.4 | V |
| | Reverse current | $V_R=6V$ | — | — | 10 | μA |
| Output | Collector dark current | $V_{CE}=20V$ | — | 1×10^{-9} | 1×10^{-7} | A |
| | *3 Collector current | $I_F=4mA, V_{CE}=2V$ | 20 | 45 | 120 | μA |
| Transfer characteristics | Response time (Rise) | $V_{CE}=2V, I_C=100\mu A$ | — | 20 | 100 | μs |
| | Response time (Fall) | $R_L=1k\Omega, d=1mm$ | — | 20 | 100 | μs |
| | *4 Leak current | $I_F=4mA, V_{CE}=2V$ | — | — | 0.1 | μA |

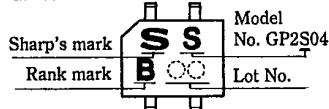
*3 The condition and arrangement of the reflective object are shown in the right drawing.

*4 Without reflective object

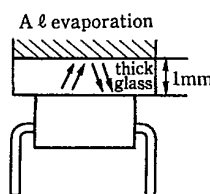
The ranking of collector current shall be classified into the following 6 ranks.
(GP2S04, GP2S06, GP2S07, GP2S09)

| Rank | $I_C (\mu A)$ | Rank mark |
|-----------|---------------|-----------|
| A | 20~42 | A |
| B | 34~71 | B |
| C | 58~120 | C |
| A or B | 20~71 | A or B |
| B or C | 34~120 | B or C |
| A, B or C | 20~120 | A, B or C |

Marking example
GP2S04



Test Condition and Arrangement for Collector Current



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Fig. 1 Forward Current vs. Ambient Temperature

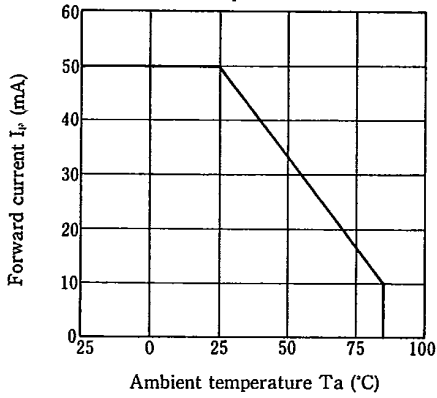


Fig. 2 Power Dissipation vs. Ambient Temperature

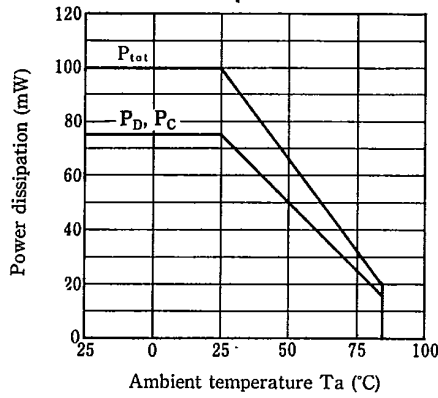


Fig. 3 Forward Current vs. Forward Voltage

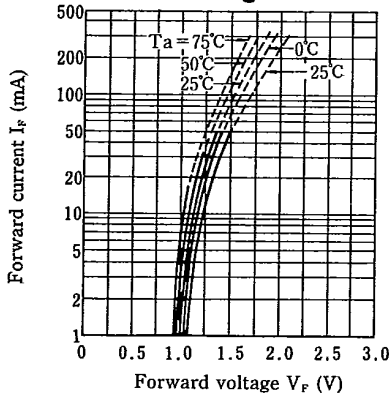


Fig. 4 Collector Current vs. Forward Voltage

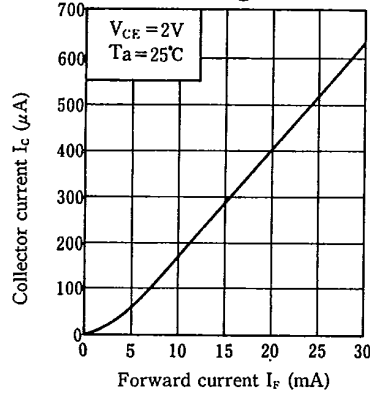
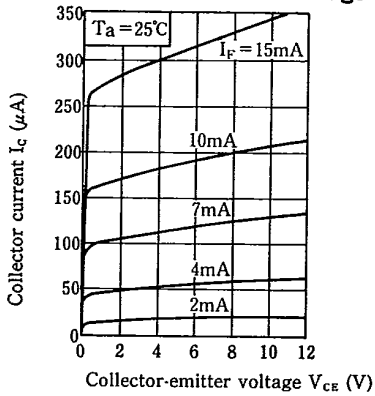


Fig. 5 Collector Current vs. Collector-emitter Voltage



Photointerrupters

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Fig. 6 Relative Collector Current vs. Ambient Temperature

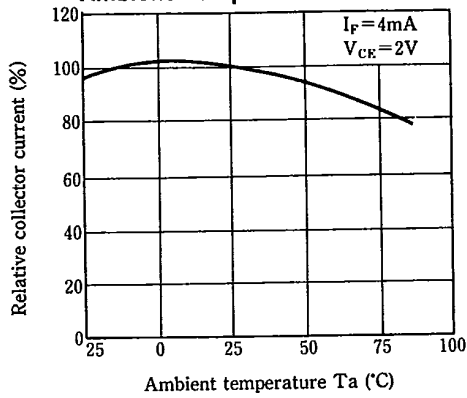


Fig. 7 Collector Dark Current vs. Ambient Temperature

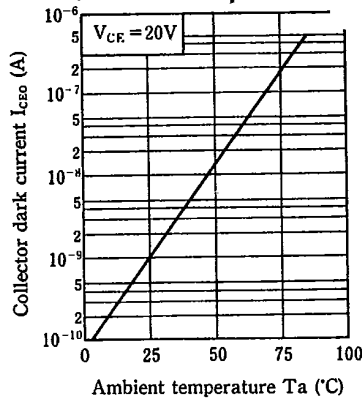
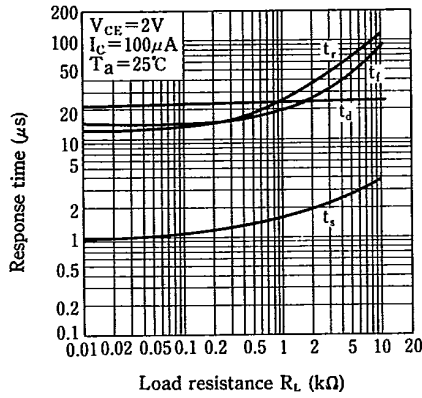


Fig. 8 Response Time vs. Load Resistance



Test Circuit for Response Time

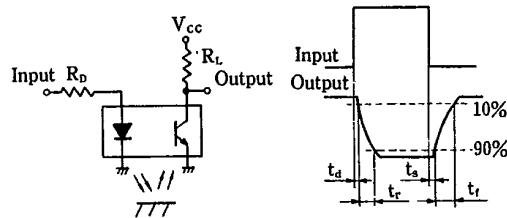


Fig. 9 Relative Collector Current vs. Distance between GP2S04 and Card

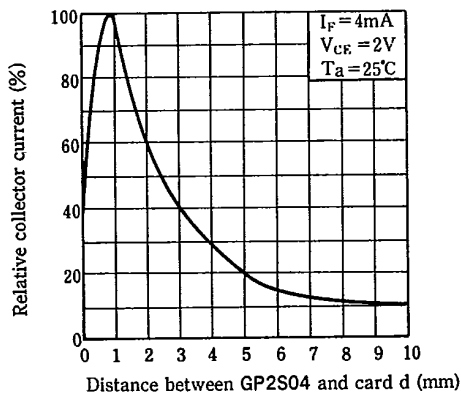
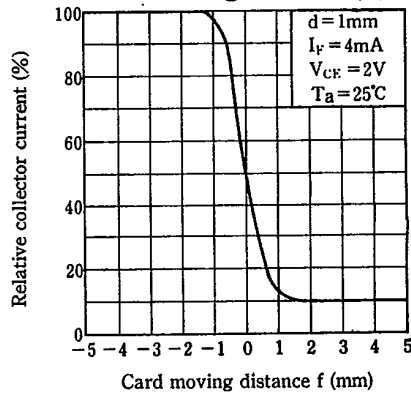
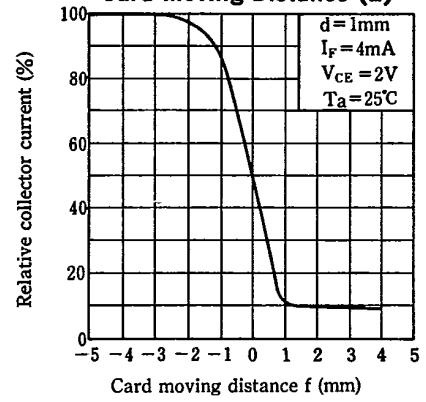


Fig. 10 Relative Collector Current vs. Card Moving Distance (1)



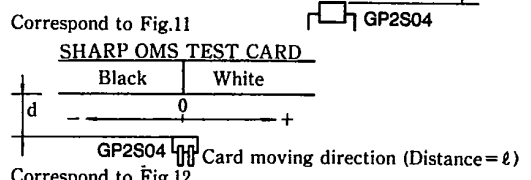
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Fig. 11 Relative Collector Current vs. Card Moving Distance (2)



Test Condition for Distance & Detecting Position Characteristics

Correspond to Fig.10
 SHARP OMS TEST CARD (White) *T-41-73*



Correspond to Fig.12
 SHARP OMS TEST CARD

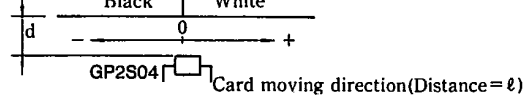


Fig. 12 Frequency Response

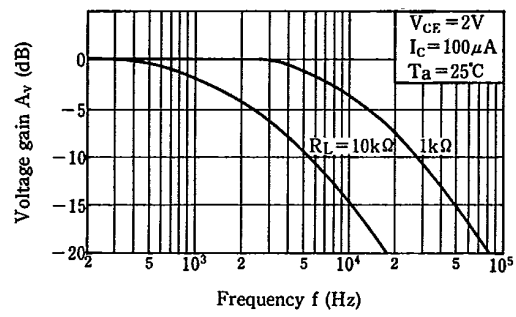


Fig. 13 Spectral Sensitivity (Detecting Side)

