

TOSHIBA PHOTO TRANSISTOR SILICON NPN EPITAXIAL PLANAR

# TPS603A

PHOTO TRANSISTOR FOR PHOTO SENSOR

PHOTOELECTRIC COUNTER

VARIOUS KINDS OF READERS

POSITION DETECTION

CONTROLLER OF HOME ELECTRIC EQUIPMENT

DETECTOR FOR STOBOSCOPIC CONTROL

- $\phi 3\text{mm}$  resin package
- Wide half value angle facilitates setting.  $\theta_{\frac{1}{2}} = \pm 55^\circ$  (TYP.)
- The same size TLN103A is available as an infrared LED.

MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

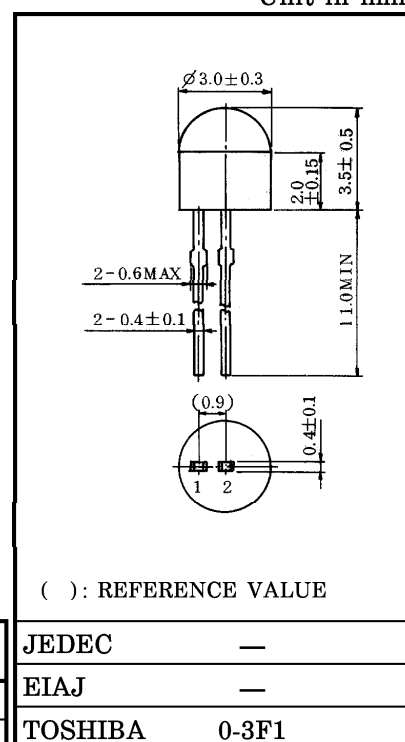
| CHARACTERISTIC                                                    | SYMBOL                        | RATING         | UNIT                  |
|-------------------------------------------------------------------|-------------------------------|----------------|-----------------------|
| Collector-Emitter Voltage                                         | $V_{CEO}$                     | 20             | V                     |
| Emitter-Collector Voltage                                         | $V_{ECO}$                     | 5              | V                     |
| Collector Current                                                 | $I_C$                         | 20             | mA                    |
| Collector Power Dissipation                                       | $P_C$                         | 75             | mW                    |
| Collector Power Dissipation Derating ( $T_a > 25^\circ\text{C}$ ) | $\Delta P_C / ^\circ\text{C}$ | -1             | mW / $^\circ\text{C}$ |
| Operating Temperature Range                                       | $T_{opr}$                     | $-20 \sim 75$  | $^\circ\text{C}$      |
| Storage Temperature Range                                         | $T_{stg}$                     | $-30 \sim 100$ | $^\circ\text{C}$      |

OPTO-ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

| CHARACTERISTIC                       | SYMBOL                 | TEST CONDITION                                                              | MIN. | TYP.     | MAX. | UNIT          |
|--------------------------------------|------------------------|-----------------------------------------------------------------------------|------|----------|------|---------------|
| Dark Current                         | $I_D (I_{CEO})$        | $V_{CE} = 10\text{V}, E = 0$                                                | —    | 0.01     | 0.1  | $\mu\text{A}$ |
| Light Current                        | $I_L (I_C)$            | $V_{CE} = 3\text{V}, E = 0.1\text{mW} / \text{cm}^2$<br>(Note)              | 6    | 20       | —    | $\mu\text{A}$ |
| Collector-Emitter Saturation Voltage | $V_{CE} (\text{sat})$  | $I_C = 1\mu\text{A}, E = 0.1\text{mW} / \text{cm}^2$<br>(Note)              | —    | 0.2      | 0.4  | V             |
| Switching Time                       | Rise Time              | $V_{CC} = 10\text{V}, I_C = 1\text{mA}$<br>$R_L = 1\text{k}\Omega$ (Fig. 1) | —    | 9        | —    | $\mu\text{s}$ |
|                                      | Fall Time              |                                                                             | —    | 10       | —    |               |
| Peak Sensitivity Wavelength          | $\lambda_P$            |                                                                             | —    | 720      | —    | nm            |
| Half Value Angle                     | $\theta_{\frac{1}{2}}$ |                                                                             | —    | $\pm 55$ | —    | $^\circ$      |

Note : Color temperature =  $2870^\circ\text{K}$ , Standard Tungsten Lamp.

Unit in mm

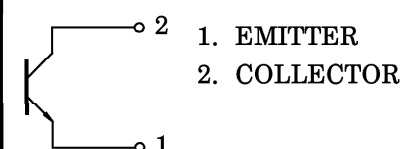


( ) : REFERENCE VALUE

|         |       |
|---------|-------|
| JEDEC   | —     |
| EIAJ    | —     |
| TOSHIBA | 0-3F1 |

Weight : 0.08g (TYP.)

## PIN CONNECTION



961001EAA2

● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

**PRECAUTION**

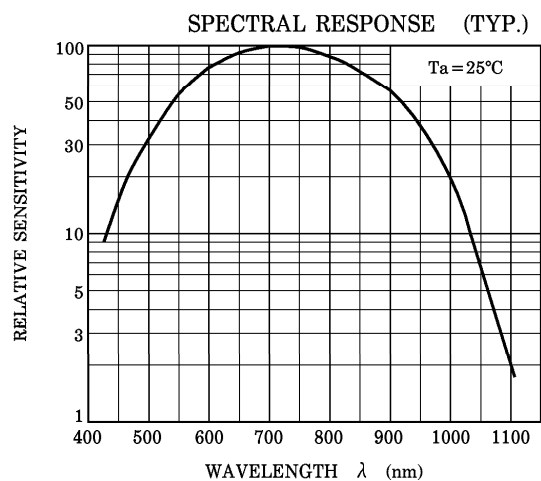
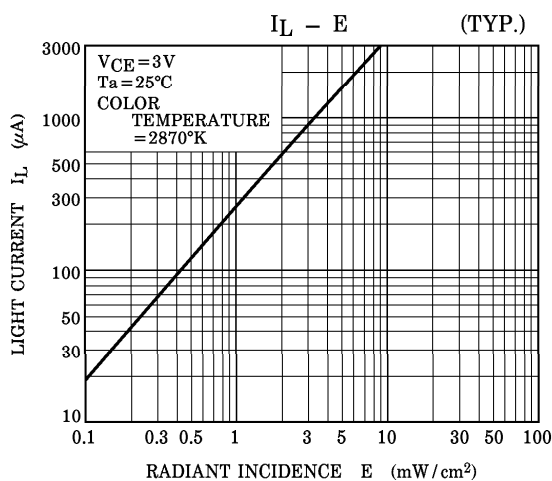
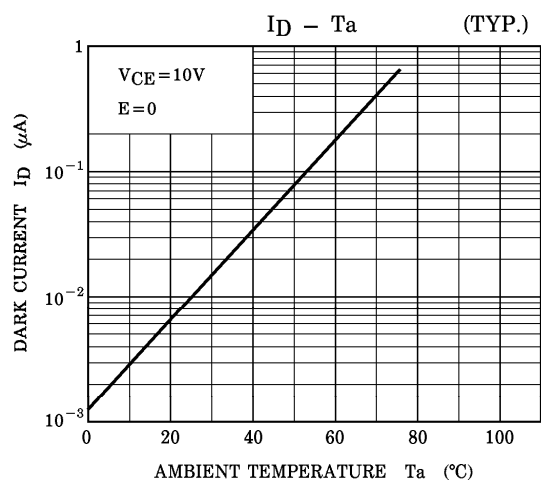
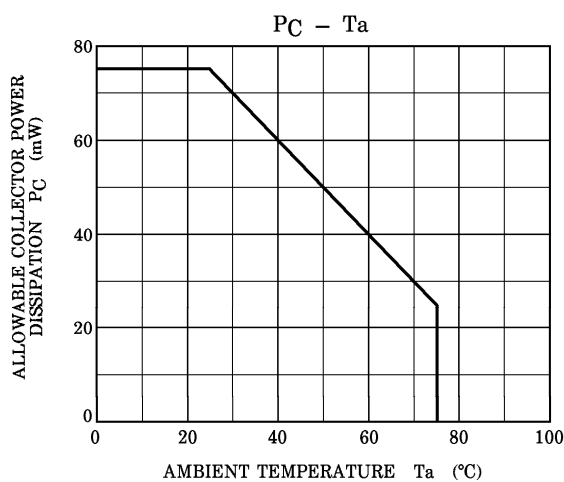
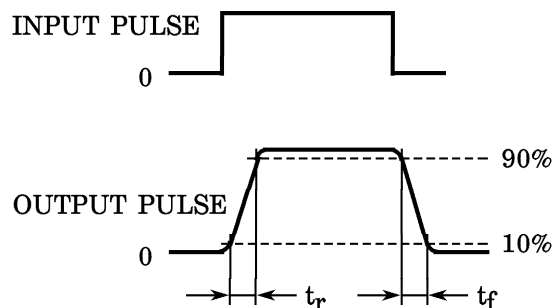
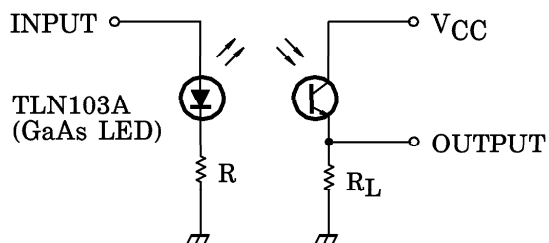
Please be careful of the followings.

1. Soldering temperature : 260°C MAX. Soldering time : 3s MAX.  
(Soldering portion of lead : above 1.5mm from the body of the device)
2. If the lead is formed, the lead should be formed at a distance of 2mm from the body of the device.  
Soldering shall be performed after lead forming.

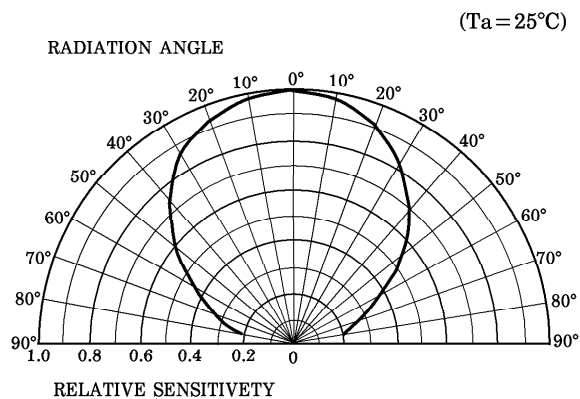
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- The information contained herein is subject to change without notice.

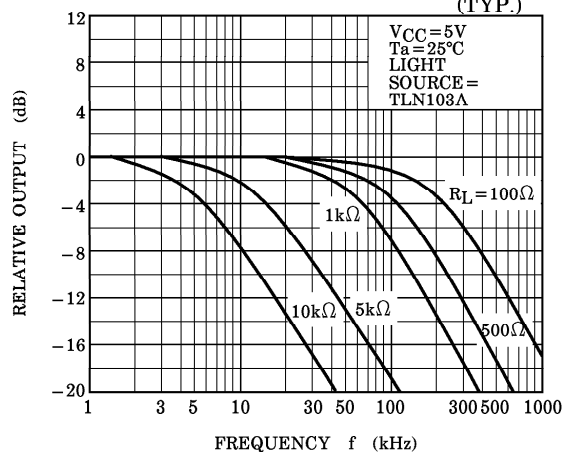
Fig. 1 SWITCHING TIME TEST CIRCUIT



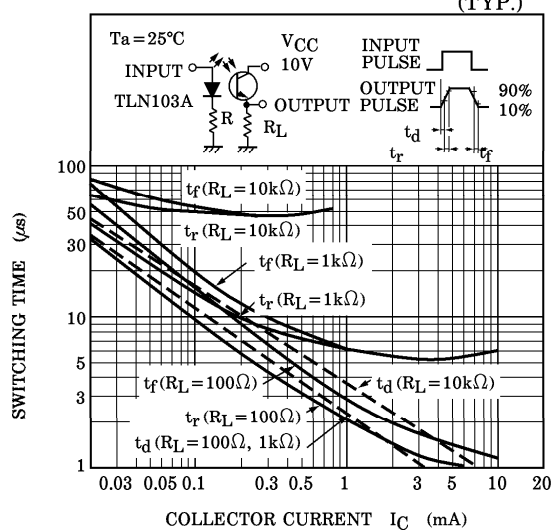
### DECTIONAL SENSITIVITY CHARACTERISTIC (TYP.)



### FREQUENCY CHARACTERISTICS (TYP.)



### SWITCHING CHARACTERISTICS (TYP.)



### RELATIVE $I_L$ - Ta (TYP.)

