

TOSHIBA PHOTO DARLINGTON TRANSISTOR SILICON NPN EPITAXIAL PLANAR

# TPS605, TPS605 (LB)

HOME ELECTRIC EQUIPMENT SUCH AS AUDIO, VCR, ETC.

OA EQUIPMENT SUCH AS COPYING MACHINE, PRINTER, ETC.

## OPTICAL SWITCH

- Micro-package (epoxy resin package)
  - Double end type : TPS605
  - DIP type : TPS605 (LB)
- Mountable at a 2.5mm pitch
- High sensitivity :  $I_L=0.2\text{mA}$  (Min.)
- Half value angle :  $\theta_{\frac{1}{2}}=\pm 20^\circ$  (TYP.)
- Maximum distance when used as an optical switch
  - TLN104 at DC drive  $\approx 100\text{mm}$  at TPS605  $I_L \approx 500\mu\text{A}$

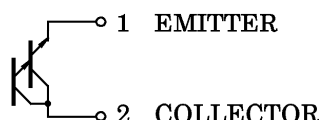
MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC                                                       | SYMBOL                        | RATING         | UNIT                  |
|----------------------------------------------------------------------|-------------------------------|----------------|-----------------------|
| Collector-Emitter Voltage                                            | $V_{CEO}$                     | 30             | V                     |
| Emitter-Collector Voltage                                            | $V_{ECO}$                     | 5              | V                     |
| Collector Current                                                    | $I_C$                         | 40             | mA                    |
| Collector Power Dissipation                                          | $P_C$                         | 75             | mW                    |
| Collector Power Dissipation<br>Derating ( $T_a > 25^\circ\text{C}$ ) | $\Delta P_C / ^\circ\text{C}$ | -1             | mW / $^\circ\text{C}$ |
| Operating Temperature Range                                          | $T_{opr}$                     | $-25 \sim 85$  | $^\circ\text{C}$      |
| Storage Temperature Range                                            | $T_{stg}$                     | $-30 \sim 100$ | $^\circ\text{C}$      |
| Soldering Temperature (3s)                                           | $T_{sol}$                     | 260            | $^\circ\text{C}$      |

## RECOMMENDED OPERATING CONDITIONS

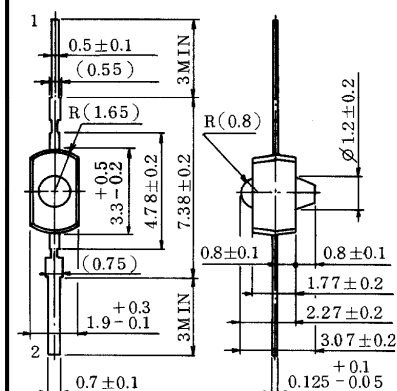
| CHARACTERISTIC        | SYMBOL           | MIN. | TYP. | MAX. | UNIT |
|-----------------------|------------------|------|------|------|------|
| Supply Voltage        | V <sub>CC</sub>  | —    | 5    | 16   | V    |
| Operating Temperature | T <sub>opr</sub> | 0    | —    | 70   | °C   |

## PIN CONNECTION



Unit in mm

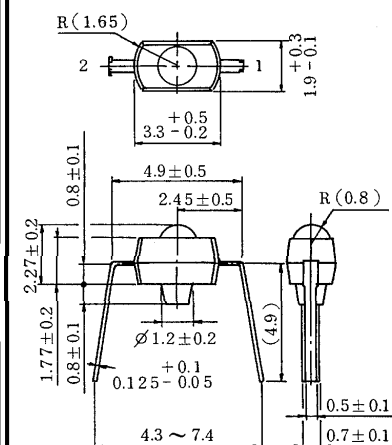
## TPS605



( ) : REFERENCE VALUE

|         |       |
|---------|-------|
| JEDEC   | —     |
| EIAJ    | —     |
| TOSHIBA | 0-2C1 |

## TPS605 (LB)



( ) : REFERENCE VALUE

|         |         |
|---------|---------|
| JEDEC   | —       |
| EIAJ    | —       |
| TOSHIBA | 0-2C101 |

Weight : 0.08g (TYP.)

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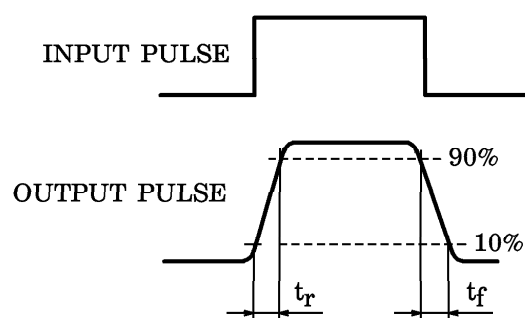
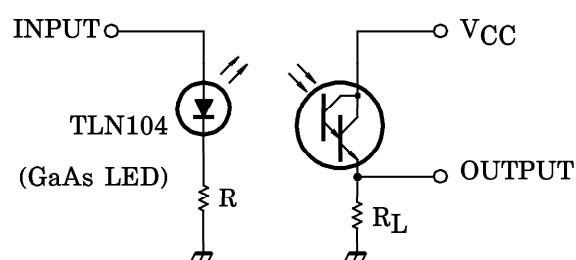
## OPTO-ELECTRICAL CHARACTERISTICS (Ta = 25°C)

| CHARACTERISTIC                       | SYMBOL                 | TEST CONDITION                                          | MIN. | TYP.     | MAX. | UNIT    |
|--------------------------------------|------------------------|---------------------------------------------------------|------|----------|------|---------|
| Dark Current                         | $I_D (I_{CEO})$        | $V_{CE} = 16V, E = 0$                                   | —    | 0.03     | 0.25 | $\mu A$ |
| Light Current (Note 1)               | $I_L$                  | $V_{CE} = 3V, E = 0.01mW/cm^2$<br>(Note 2)              | 0.2  | 1        | —    | mA      |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$          | $I_C = 0.08mA, E = 0.01mW/cm^2$                         | —    | 0.9      | 12   | V       |
| Peak Sensitivity Wavelength          | $\lambda_P$            | —                                                       | —    | 720      | —    | nm      |
| Half Vaule Angle                     | $\theta_{\frac{1}{2}}$ | —                                                       | —    | $\pm 20$ | —    | °       |
| Switching Time                       | Rise time              | $V_{CC} = 5V, I_C = 10mA$<br>$R_L = 100\Omega$ (Note 3) | —    | 200      | —    | $\mu s$ |
|                                      | Fall Time              |                                                         | —    | 150      | —    |         |

Note 1.  $I_L$  Classification A : 0.2~1.2mA, B : 0.8~4.8mA

2. Color temperature = 2870°K, Standard Tungsten Lamp

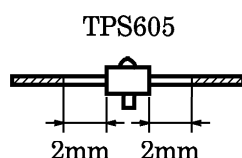
3. Switching time test circuit



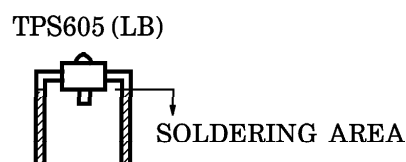
## PRECAUTION

Please be careful of the followings.

1. If the lead is formed, the lead should be formed at a distance of 0.8mm from the body of the device. Soldering shall be performed after lead forming. However, in case of TPS605 (LB), no lead forming shall be performed.
2. Soldering shall be performed within the range show below.



AREA 2mm AWAY FROM  
THE PACKAGE ENDS



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