

TOSHIBA PHOTOINTERRUPTER INFRARED LED + PHOTOTRANSISTOR

**TLP824, TLP825**

VCR, COMPACT DISK PLAYER  
 FLOPPY DISK DRIVE, FACSIMILE, PRINTER  
 VENDING MACHINE, TICKETING MACHINE  
 FOR VARIOUS POSITION DETECTION

The TLP824 and TLP825 are photointerrupters with a high radiant power GaAs infrared LED and a Si photo-transistor combined.

- Small package
- PWB direct mounting type : TLP824
- Side mounting type : TLP825
- Gap : 3mm
- Resolution : Slit width 0.5mm
- High current transfer ratio :  $I_C / I_F = 6\%$  (min) at  $I_F = 10\text{mA}$
- The detector side is of visible light cut type.
- Material of the package : Polycarbonate

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

| CHARACTERISTIC              |                                                                   | SYMBOL                        | RATING  | UNIT                  |
|-----------------------------|-------------------------------------------------------------------|-------------------------------|---------|-----------------------|
| LED                         | Forward Current                                                   | $I_F$                         | 50      | mA                    |
|                             | Forward Current Derating ( $T_a > 25^\circ\text{C}$ )             | $\Delta I_F / ^\circ\text{C}$ | -0.33   | mA / $^\circ\text{C}$ |
|                             | Reverse Voltage                                                   | $V_R$                         | 5       | V                     |
| DETECTOR                    | Collector-Emitter Voltage                                         | $V_{CEO}$                     | 35      | V                     |
|                             | Emitter-Collector Voltage                                         | $V_{ECO}$                     | 5       | V                     |
|                             | 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 / $^\circ\text{C}$ |
|                             | Collector Current                                                 | $I_C$                         | 50      | mA                    |
| Operating Temperature Range |                                                                   | $T_{opr}$                     | -25~85  | $^\circ\text{C}$      |
| Storage Temperature Range   |                                                                   | $T_{stg}$                     | -40~100 | $^\circ\text{C}$      |
| Soldering Temperature (5s.) |                                                                   | $T_{sol}$                     | 260     | $^\circ\text{C}$      |

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## RECOMMENDED OPERATING CONDITIONS

| CHARACTERISTIC        | SYMBOL    | MIN. | TYP. | MAX. | UNIT |
|-----------------------|-----------|------|------|------|------|
| Supply Voltage        | $V_{CC}$  | —    | 5    | 24   | V    |
| Forward Current       | $I_F$     | —    | 10   | 20   | mA   |
| Operating Temperature | $T_{opr}$ | -10  | —    | 75   | °C   |

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

| CHARACTERISTIC |                                      | SYMBOL                | TEST CONDITION                                                    | MIN. | TYP. | MAX. | UNIT          |
|----------------|--------------------------------------|-----------------------|-------------------------------------------------------------------|------|------|------|---------------|
| LED            | Forward Voltage                      | $V_F$                 | $I_F = 10\text{mA}$                                               | 1.00 | 1.15 | 1.30 | V             |
|                | Reverse Current                      | $I_R$                 | $V_R = 5\text{V}$                                                 | —    | —    | 10   | $\mu\text{A}$ |
|                | Peak Emission Wavelength             | $\lambda_P$           | $I_F = 10\text{mA}$                                               | —    | 940  | —    | nm            |
| DETECTOR       | Dark Current                         | $I_D (I_{CEO})$       | $V_{CE} = 24\text{V}, I_F = 0$                                    | —    | —    | 0.1  | $\mu\text{A}$ |
|                | Peak Sensitivity Wavelength          | $\lambda_P$           |                                                                   | —    | 870  | —    | nm            |
| COUPLED        | Current Transfer Ratio               | $I_C / I_F$           | $V_{CE} = 2\text{V}, I_F = 10\text{mA}$                           | 6    | —    | 90   | %             |
|                | Collector-Emitter Saturation Voltage | $V_{CE} (\text{sat})$ | $I_F = 20\text{mA}, I_C = 0.6\text{mA}$                           | —    | 0.1  | 0.4  | V             |
|                | Rise Time                            | $t_r$                 | $V_{CC} = 5\text{V}, I_C = 1\text{mA}$<br>$R_L = 1\text{k}\Omega$ | —    | 15   | 50   | $\mu\text{s}$ |
|                | Fall Time                            | $t_f$                 |                                                                   | —    | 15   | 50   |               |

## PRECAUTION

Please be careful of the followings.

1. If chemical are used for cleaning, the soldered surface only shall be cleaned with chemicals avoiding the whole cleaning of the package.
2. The container is made of polycarbonate. Polycarbonate is usually stable with acid, alcohol, and aliphatic hydrocarbons however, with peroxide chemicals (such as benzene, toluene, and acetone), alkali, aromatic hydrocarbons, or chloric hydrocarbons, polycarbonate becomes cracked, swollen, or melted. Please take care when choosing a packaging material by referencing the table below.

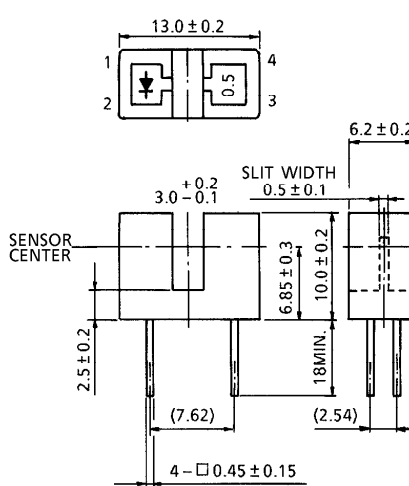
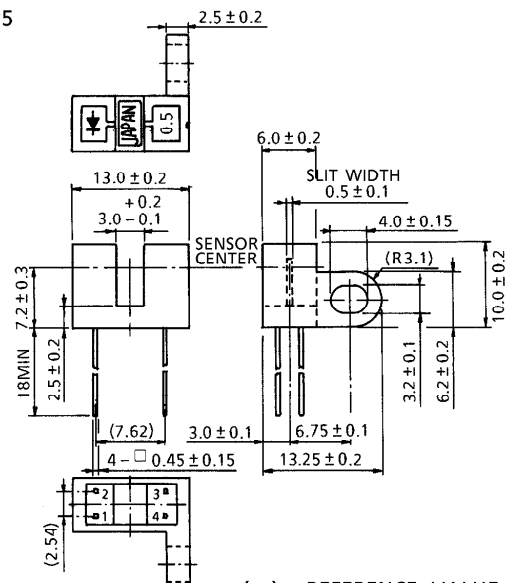
## &lt;Chemicals to avoid with polycarbonate&gt;

|   | PHENOMENON                        | CHEMICALS                                                                                                                                                                                                                                                                                                                                                                                                   |
|---|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | Little deterioration but staining | <ul style="list-style-type: none"> <li>• nitric acid (low concentration), hydrogen peroxide, chlorine</li> </ul>                                                                                                                                                                                                                                                                                            |
| B | Cracked, crazed, or swollen       | <ul style="list-style-type: none"> <li>• acetic acid (70% or more)</li> <li>• gasoline</li> <li>• methyl ethyl ketone, ethyl acetate, butyl acetate</li> <li>• ethyl methacrylate, ethyl ether, MEK</li> <li>• acetone, m-amino alcohol, carbon tetrachloride</li> <li>• carbon disulfide, trichloroethylene, cresol</li> <li>• thinners, oil of turpentine</li> <li>• triethanolamine, TCP, TBP</li> </ul> |
| C | Melted<br>{ } : Used as solvent.  | <ul style="list-style-type: none"> <li>• concentrated sulfuric acid</li> <li>• benzene</li> <li>• styrene, acrylonitrile, vinyl acetate</li> <li>• ethylenediamine, diethylenediamine</li> <li>• {chloroform, methyl chloride, tetrachloromethane, dioxane, 1, 2-dichloroethane}</li> </ul>                                                                                                                 |
| D | Decomposed                        | <ul style="list-style-type: none"> <li>• ammonia water</li> <li>• other alkali</li> </ul>                                                                                                                                                                                                                                                                                                                   |

3. TLP824, TLP825 shall be mounted on unwarped surface.
4. Screw shall be tightened to clamping torque of 0.59N·m. (TLP825)

OUTLINE DRAWINGS

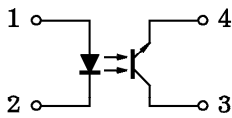
Unit in mm

|                                                                                                                                                                                                                                                        |         |   |      |   |         |         |                                                                                                                                                                                                                                                         |       |   |      |   |         |         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---|------|---|---------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---|------|---|---------|---------|
| <p>TLP824</p>  <p>( ) : REFERENCE VALUE</p> <table><tr><td>JEDEC</td><td>—</td></tr><tr><td>EIAJ</td><td>—</td></tr><tr><td>TOSHIBA</td><td>11-13K1</td></tr></table> | JEDEC   | — | EIAJ | — | TOSHIBA | 11-13K1 | <p>TLP825</p>  <p>( ) : REFERENCE VALUE</p> <table><tr><td>JEDEC</td><td>—</td></tr><tr><td>EIAJ</td><td>—</td></tr><tr><td>TOSHIBA</td><td>11-13M1</td></tr></table> | JEDEC | — | EIAJ | — | TOSHIBA | 11-13M1 |
| JEDEC                                                                                                                                                                                                                                                  | —       |   |      |   |         |         |                                                                                                                                                                                                                                                         |       |   |      |   |         |         |
| EIAJ                                                                                                                                                                                                                                                   | —       |   |      |   |         |         |                                                                                                                                                                                                                                                         |       |   |      |   |         |         |
| TOSHIBA                                                                                                                                                                                                                                                | 11-13K1 |   |      |   |         |         |                                                                                                                                                                                                                                                         |       |   |      |   |         |         |
| JEDEC                                                                                                                                                                                                                                                  | —       |   |      |   |         |         |                                                                                                                                                                                                                                                         |       |   |      |   |         |         |
| EIAJ                                                                                                                                                                                                                                                   | —       |   |      |   |         |         |                                                                                                                                                                                                                                                         |       |   |      |   |         |         |
| TOSHIBA                                                                                                                                                                                                                                                | 11-13M1 |   |      |   |         |         |                                                                                                                                                                                                                                                         |       |   |      |   |         |         |

Weight : 0.81g (typ.)

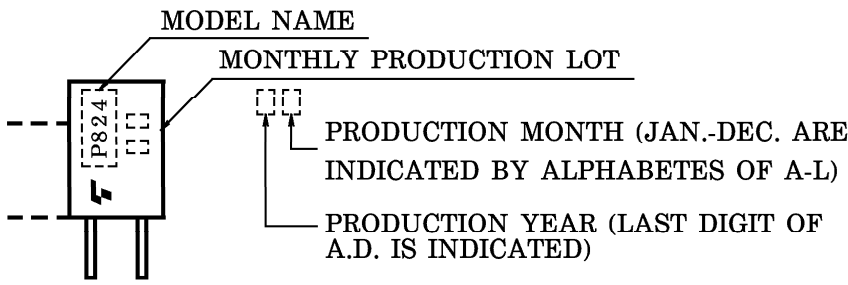
Weight : 0.82g (typ.)

PIN CONNECTION



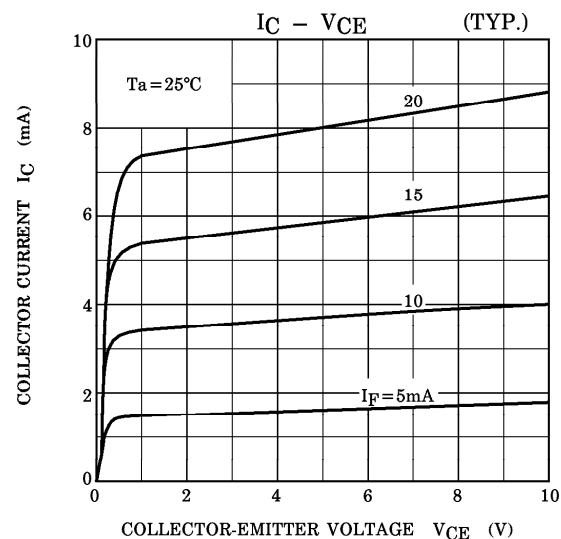
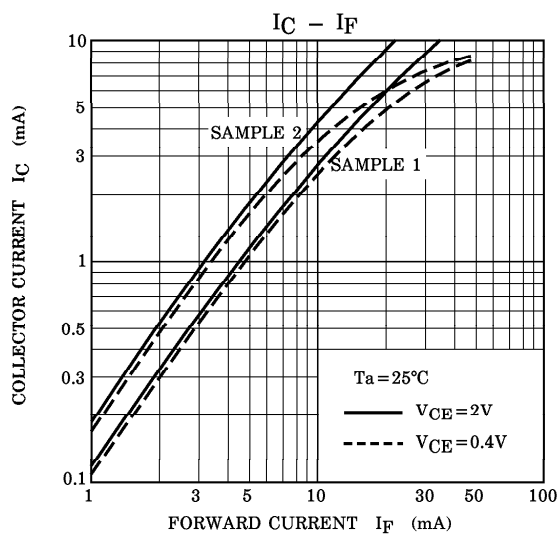
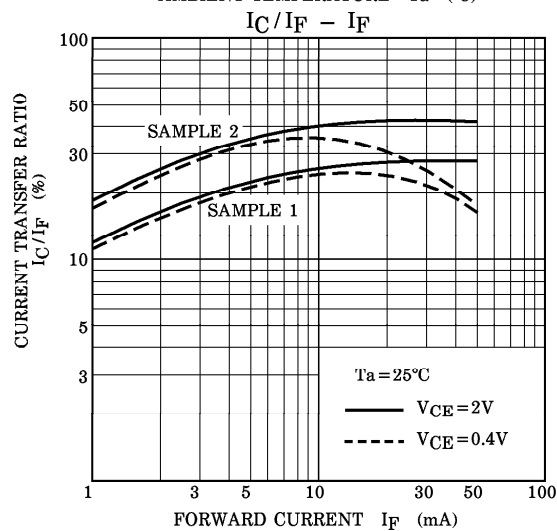
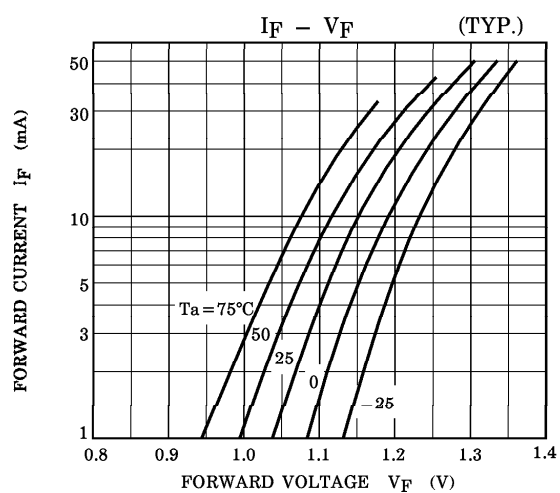
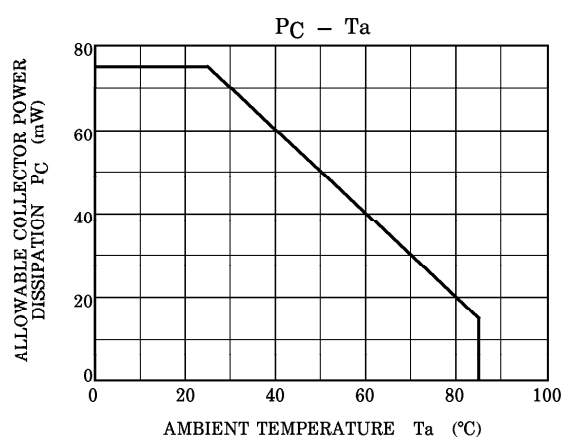
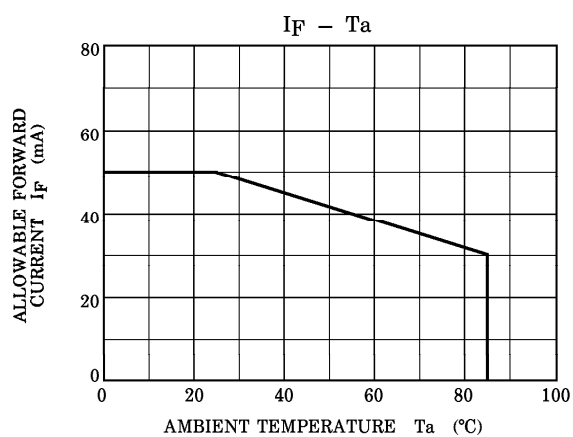
- 1. ANODE
- 2. CATHODE
- 3. COLLECTOR
- 4. EMITTER

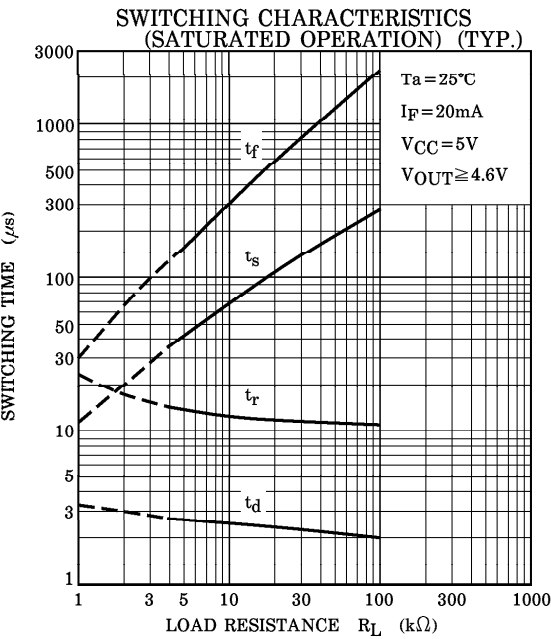
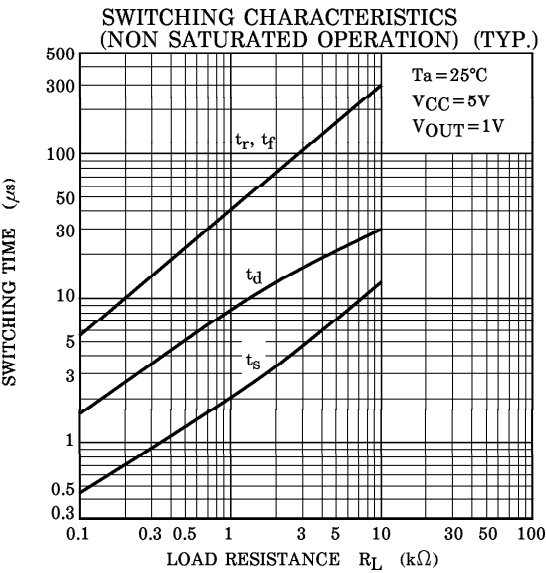
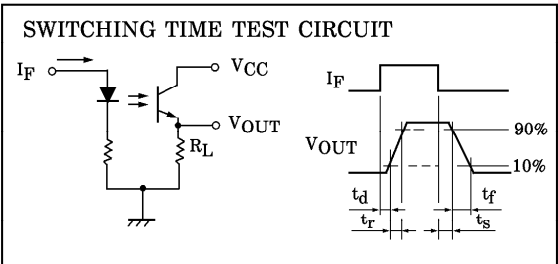
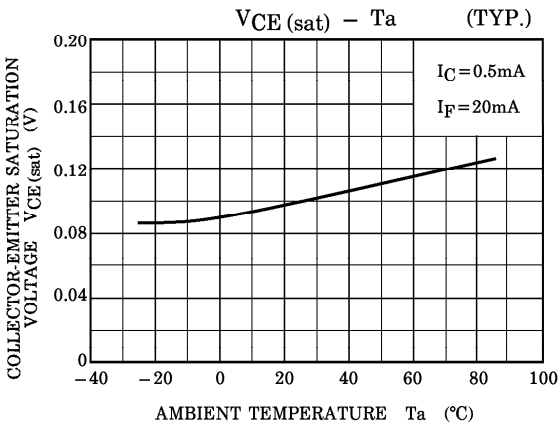
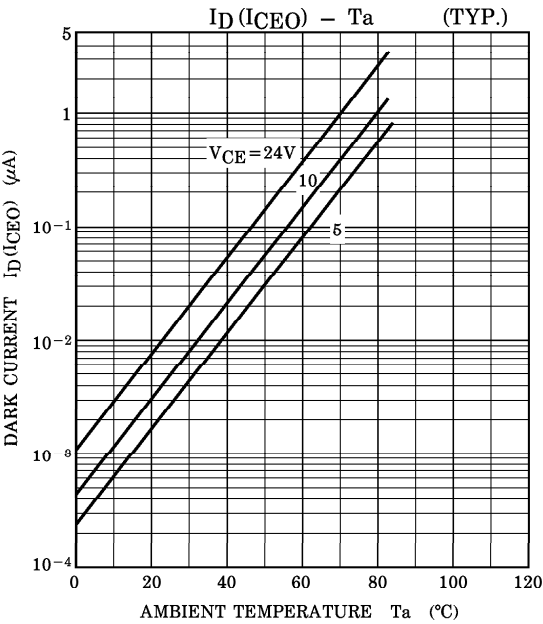
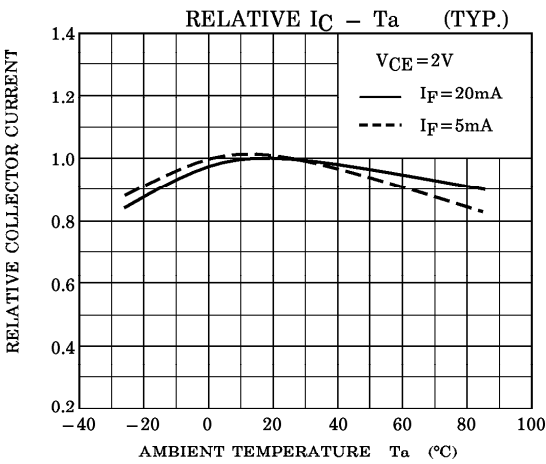
PRODUCT INDICATION

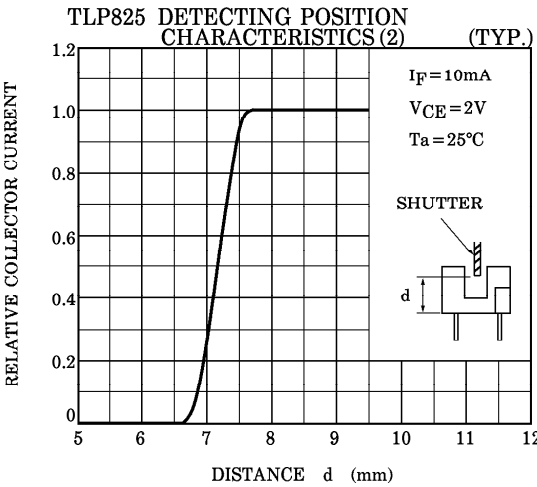
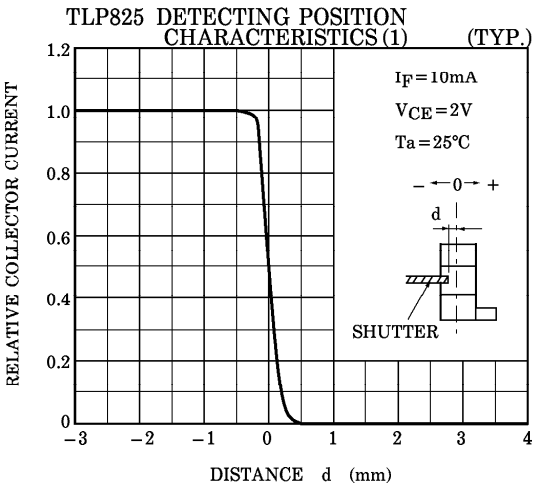
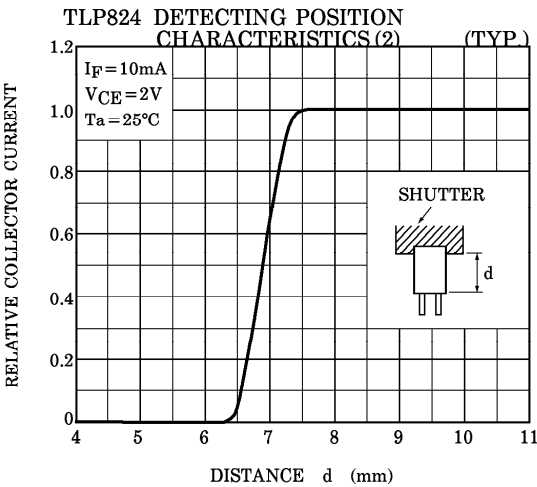
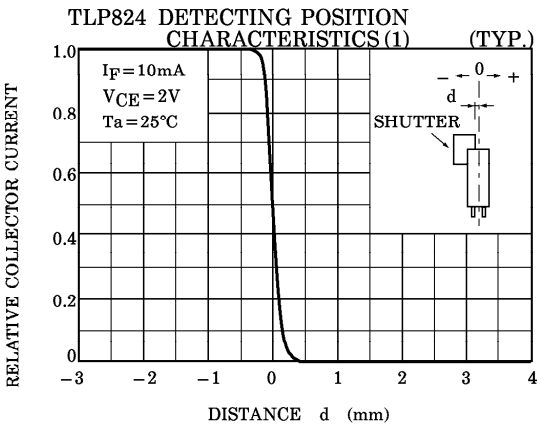


| ABBREVIATION | TYPE   |
|--------------|--------|
| P824         | TLP824 |
| P825         | TLP825 |

STAMP COLOR : SILVER





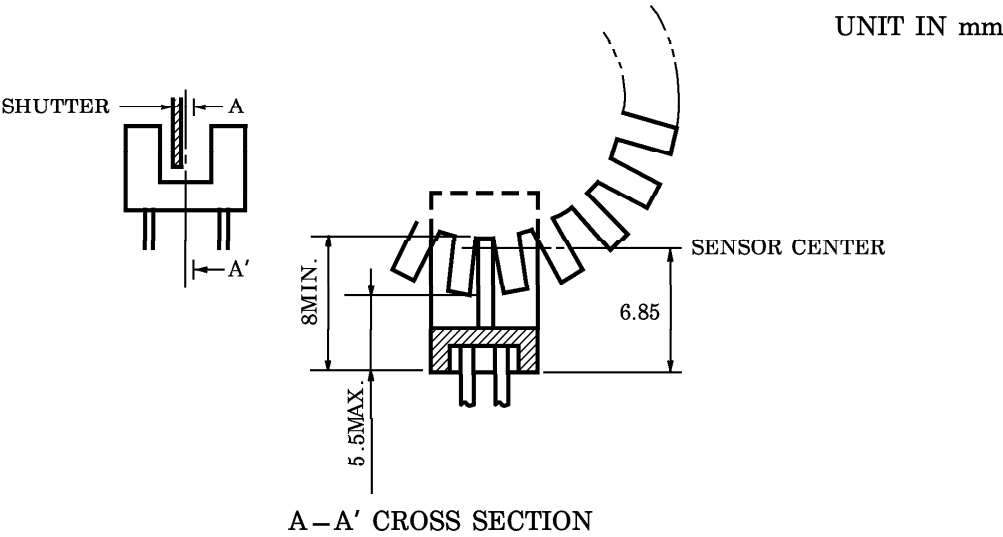


POSITIONING OF SHUTTER AND DEVICE

To operate correctly, make sure that the shutter and the device are positioned as shown in the figure below.

The shit pitch of the shutter must be set wider than the slit width of the device.  
Determine the width taking the switching time into consideration.

TLP824



TLP825

