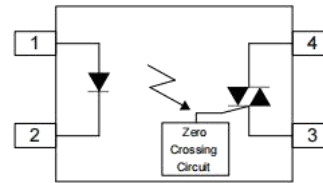


**DATASHEET****PHOTO COUPLER****■ Package**

Pin Configuration

- 1 Anode
- 2 Cathode
- 3 Terminal
- 4 Terminal

**■ Description**

The MOC304XMS, MOC306XMS, MOC308XMS, series devices are optocouplers composed of a GaAs infrared light emitting diode and a single-crystal silicon chip Zero-cross photoelectric bidirectional thyristor.

**■ Features**

- Peak breakdown voltage
  - MOC304XMS: Min.400V
  - MOC306XMS: Min.600V
  - MOC308XMS: Min.800V
- 4pin zero-cross optoisolators triac driver outp
- High input-output isolation voltage( $V_{iso} = 3,750V_{rms}$ )
- Operating Temperature:  $-40^{\circ}C \sim 110^{\circ}C$
- RoHS
- MSL1

**■ Applications**

- Lighting Control
- AC Motor Starter
- Static power switc
- Temperature Controls

**DATASHEET****PHOTO COUPLER**

---

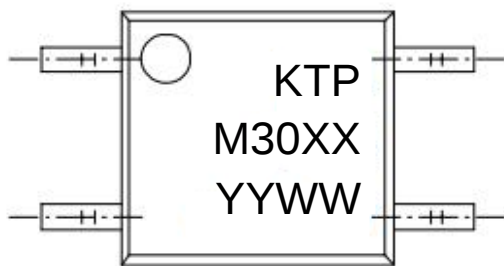
**■ Product Nomenclature**

The product name is designated as below:

MOC30XXMS

Designation:

MOC30XXMS=Product series(MOC304XMS/MOC306XMS/MOC308XMS,X:1/2/3)

**■ Marking Information**

Designation:

KTP denotes Brand LOGO  
M30XX denotes Device  
YY denotes year code  
WW denotes week code

### DATASHEET

#### PHOTO COUPLER

### ■ Maximum

| Parameter                            |                                                 | Symbol       | Values           | Unit    |
|--------------------------------------|-------------------------------------------------|--------------|------------------|---------|
| Input                                | Forward Current                                 | $I_F$        | 50               | mA      |
|                                      | Reverse Voltage                                 | $V_R$        | 6                | V       |
|                                      | Power Dissipation                               | $P$          | 120              | mW      |
|                                      | Junction Temperature                            | $T_J$        | 100              | °C      |
| Output                               | Off-State Output Terminal Voltage               | $V_{DRM}$    | MOC304XMS<br>400 | V       |
|                                      |                                                 |              | MOC306XMS<br>600 |         |
|                                      |                                                 |              | MOC308XMS<br>800 |         |
|                                      | On state RMS current                            | $I_{T(RMS)}$ | 100              | mA(RMS) |
|                                      | Peak Repetitive Surge Current (PW=1ms, 120 pps) | $I_{TSM}$    | 1                | A       |
|                                      | Junction Temperature                            | $T_J$        | 125              | °C      |
|                                      | Collector Power Dissipation                     | $P_C$        | 300              | mW      |
| Operating temperature range          |                                                 | $T_{op}$     | - 40 ~ 110       | ° C     |
| Storage temperature range            |                                                 | $T_{stg}$    | - 55 ~ 125       | ° C     |
| Total Power consumption              |                                                 | $P_{(W)}$    | 330              | mW      |
| Isolation Voltage <sup>(1)</sup>     |                                                 | $V_{ISO}$    | 5000             | Vrms    |
| Soldering Temperature <sup>(2)</sup> |                                                 | $T_{SOL}$    | 260              | ° C     |

Notes:

(1). AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 are shorted together, and pins 3, 4 are shorted together.

(2). For 10 seconds

### DATASHEET

#### PHOTO COUPLER

### ■ Electronic Optical Characteristics

(TA = 25°C)

| Parameter                |                                                                         |           | Symbol     | Min. | Typ. | Max. | Unit             | Conditon                                                                |
|--------------------------|-------------------------------------------------------------------------|-----------|------------|------|------|------|------------------|-------------------------------------------------------------------------|
| Input                    | Forward Voltage                                                         |           | $V_F$      | -    | 1.2  | 1.6  | V                | $I_F=10\text{mA}$                                                       |
|                          | Reverse Current                                                         |           | $I_R$      | -    | -    | 5    | $\mu\text{A}$    | $V_R=6\text{V}$                                                         |
| Output                   | Peak Blocking Current, Either Direction <sup>(1)</sup>                  |           | $I_{DRM}$  | -    | 10   | 100  | nA               | $V_{DRM} = \text{Rated } V_{DRM}$                                       |
|                          | Inhibit Voltage (MT1-MT2 voltage above which device will not trigger)   |           | $V_{INH}$  | -    | -    | 20   | -                | $I_F = \text{Rated } I_F$                                               |
|                          | Peak On-State Voltage, Either Dire                                      |           | $V_{TM}$   | -    | -    | 3    | V                | $I_{TM}=100\text{mA}$<br>Peak                                           |
|                          | Critical rate of Rise of Off-State Voltage <sup>(2)</sup>               |           | dv/dt      | 1000 | -    | -    | V/ $\mu\text{s}$ | $V_{in}=240\text{Vrms}$                                                 |
| Transfer Characteristics | Led Trigger Current, Current Required to Latch Output, Either Direction | MOC3041MS | $I_{FT}$   | -    | -    | 15   | mA               | Main Terminal Voltage = 3V                                              |
|                          |                                                                         | MOC3061MS |            | -    | -    | 15   |                  |                                                                         |
|                          |                                                                         | MOC3081MS |            | -    | -    | 15   |                  |                                                                         |
|                          | Holding Current, Either Direction                                       | MOC3041MS | $I_H$      | -    | -    | 10   | mA               | Main Terminal Voltage = 3V                                              |
|                          |                                                                         | MOC3062MS |            | -    | -    | 10   |                  |                                                                         |
|                          |                                                                         | MOC3082MS |            | -    | -    | 10   |                  |                                                                         |
|                          | Leakage in Inhibited State                                              | MOC3041MS | $I_{DRM2}$ | -    | -    | 5    | $\mu\text{A}$    | $I_F = \text{Rated } I_{FT}, \text{ Rated } V_{DRM}, \text{ Off State}$ |
|                          |                                                                         | MOC3063MS |            | -    | -    | 5    |                  |                                                                         |
|                          | Holding Current, Either Direction                                       |           | $I_H$      | -    | 280  | -    | $\mu\text{A}$    |                                                                         |
| ZERO CROSSING            | Leakage in Inhibited State                                              |           | $I_{DRM2}$ | -    | -    | 500  | $\mu\text{A}$    | $I_F = \text{Rated } I_{FT}, \text{ Rated } V_{DRM}, \text{ Off State}$ |

(1) Test voltage must be applied within dv/dt rating.

(2) This is static dv/dt. Commutating dv/dt is a function of the load-driving thyristor(s) only.

## DATASHEET

## PHOTO COUPLER

### ■ Characteristics Curves

Fig.1 Forward current vs Ambient temperature

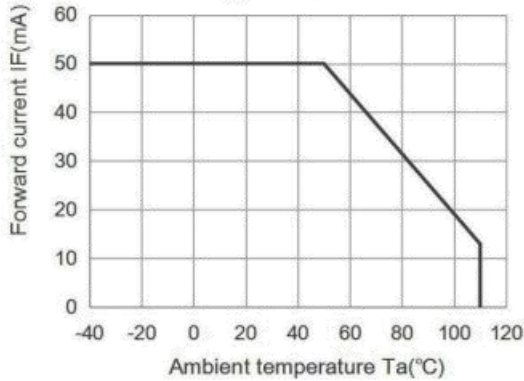


Fig.2 On-state current ITM (A) vs Ambient temperature

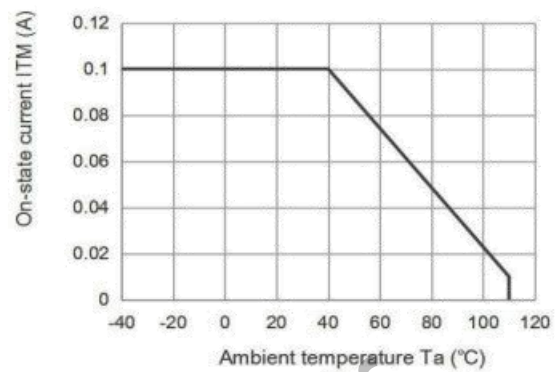


Fig.3 Minimum Trigger Current vs Ambient temperature

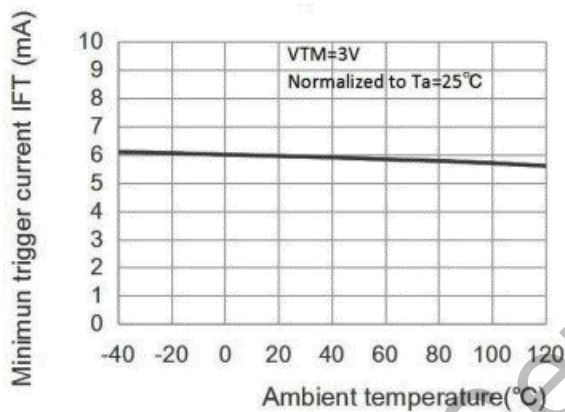


Fig.4 Forward current vs Forward Voltage

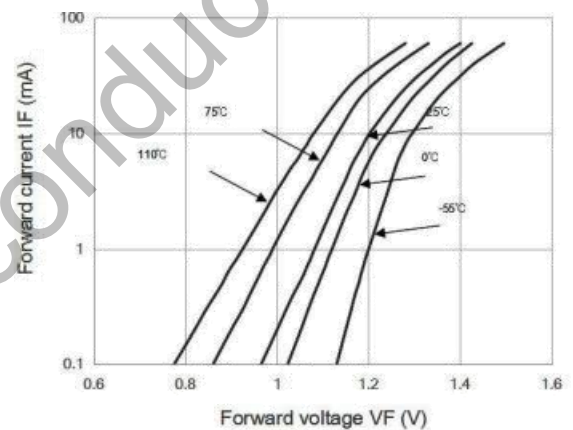


Fig.5 On-state voltage vs Ambient temperature

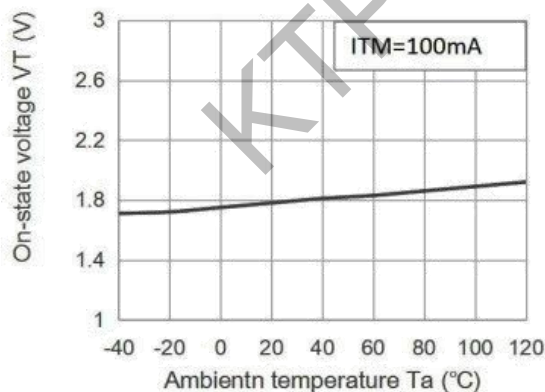
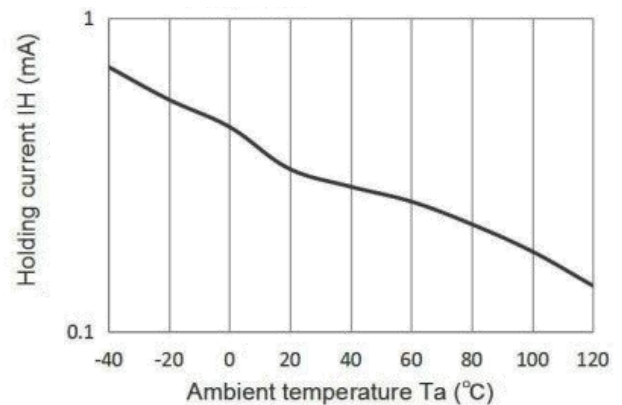


Fig.6 Holding current IH (mA) vs Ambient temperature



### DATASHEET

### PHOTO COUPLER

Fig.7 Repetitive peak off-state current vs Temperature

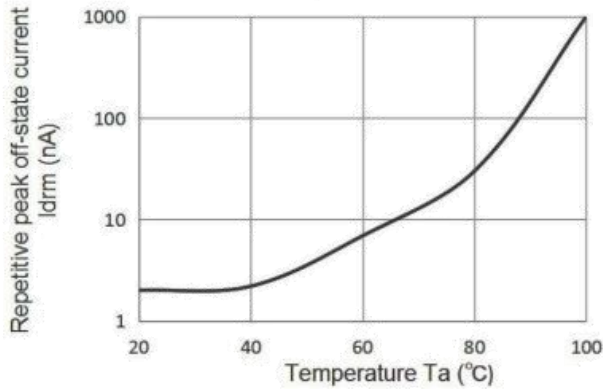


Fig.8 On-state current vs On-state voltage

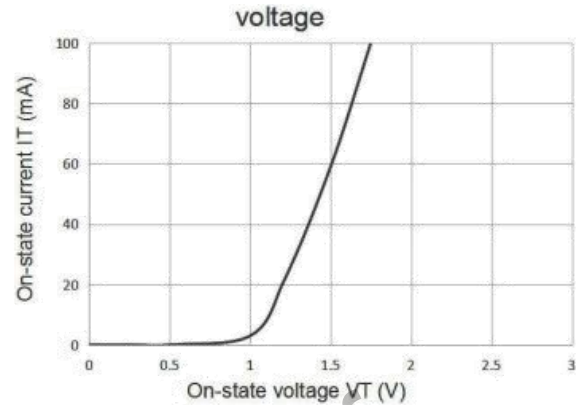


Fig.9 Basic Operation Circuit Medium/High Power Triac Drive Circuit

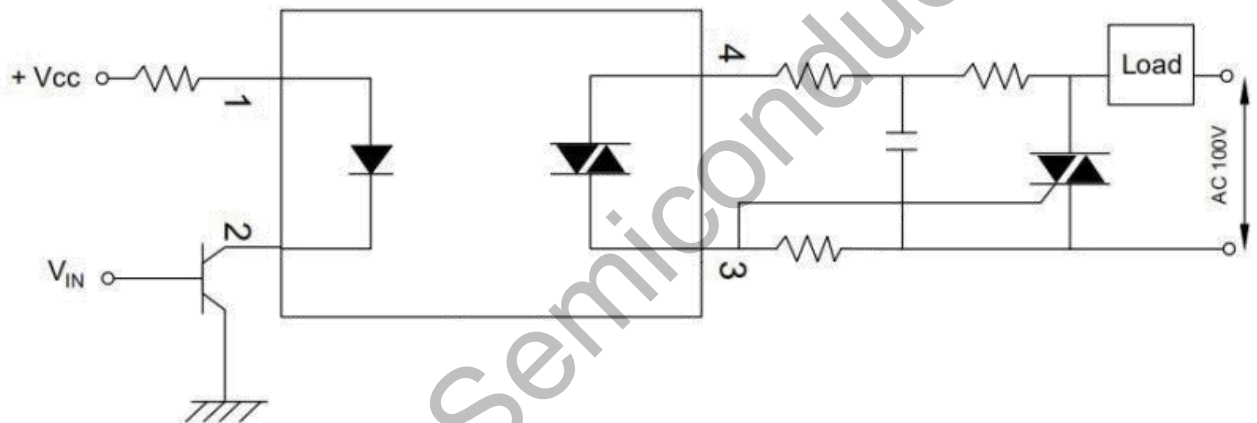
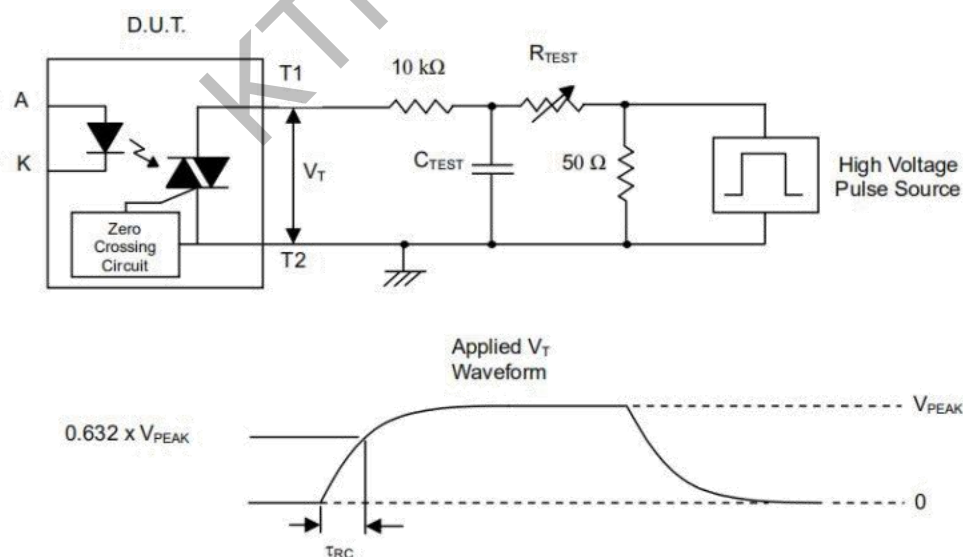


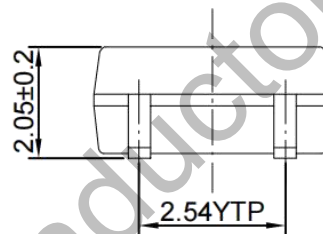
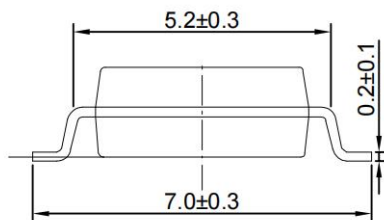
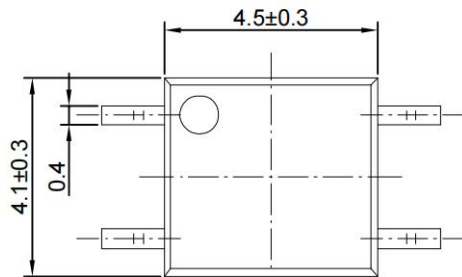
Fig10. Static dv/dt Test Circuit & Wave form



### DATASHEET

### PHOTO COUPLER

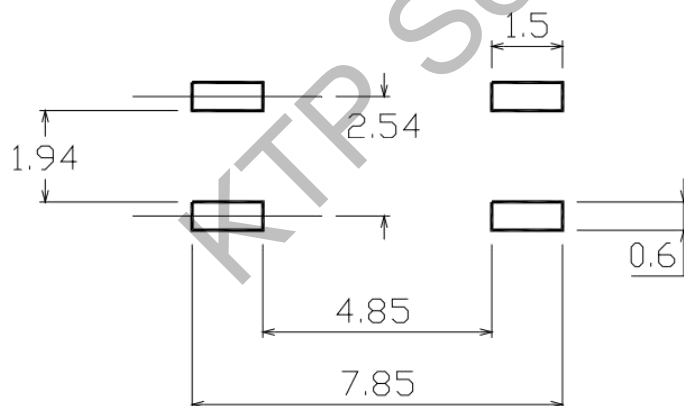
## ■ Outline Dimension



Unit: mm

Tolerance:  $\pm 0.1$  mm

## ■ Recommended solder pad Design



Unit: mm

Tolerance:  $\pm 0.1$  mm

## DATASHEET

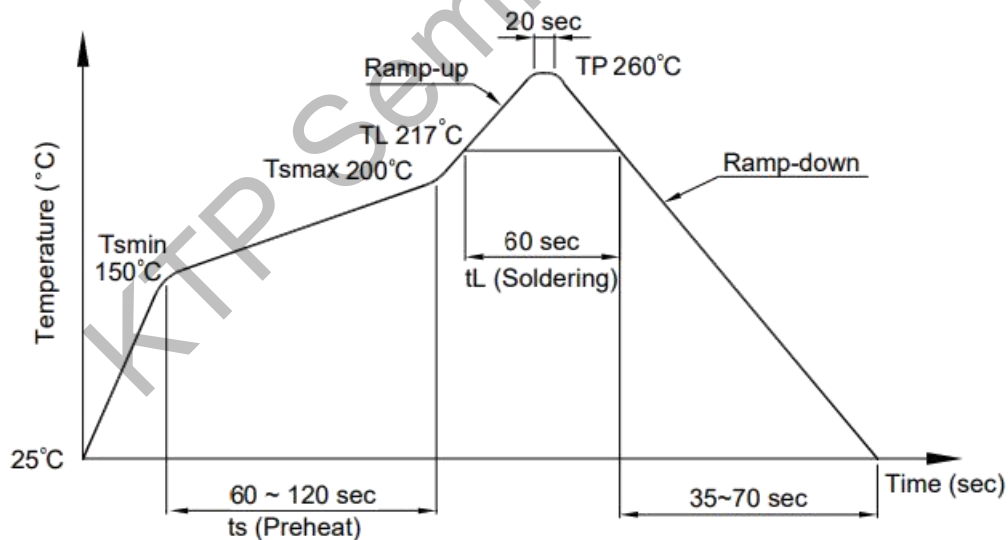
### PHOTO COUPLER

## ■ Temperature Profile Of Soldering

### 1. IR Reflow soldering

**(JEDEC-STD-020 compliant)**

| Profile item             | Conditon      |
|--------------------------|---------------|
| Preheat                  | 150°C         |
| -Temperature Min (TSmin) | 200°C         |
| -Temperature Max (TSmax) | 90 ± 30 sec   |
| -Time (min to max) (ts)  |               |
| Soldering zone           | 217°C         |
| -Temperature (TL)        | 60 sec        |
| -Time (tL)               |               |
| Peak Temperature (TP)    | 260°C         |
| Ramp-up rate             | 3°C / sec max |
| Ramp-down rate           | 3~6°C/ sec    |



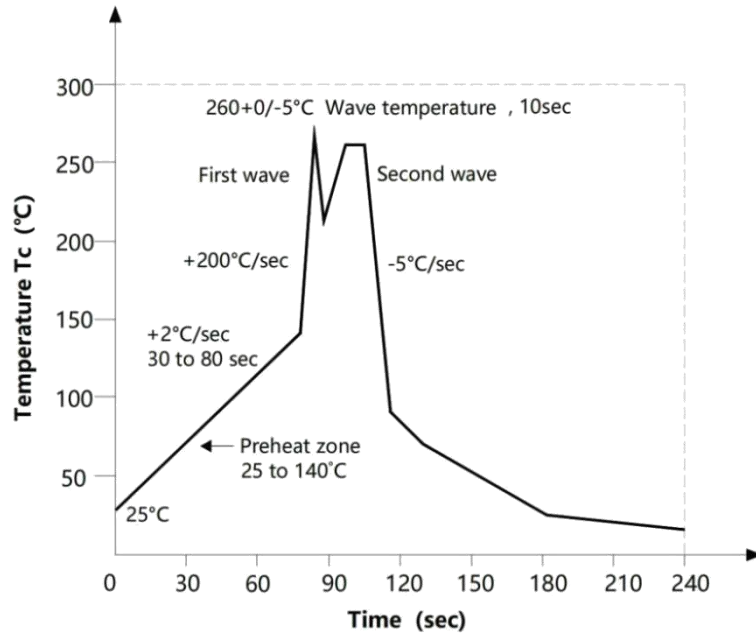
#### Notes:

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

### DATASHEET

### PHOTO COUPLER

#### 2. Wave soldering (JEDEC22A111 compliant)



#### 3. Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

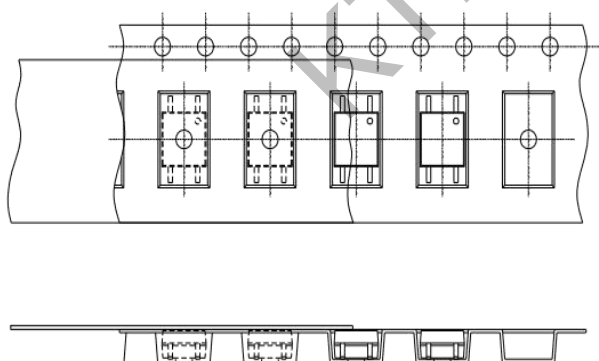
Temperature: 380±0/-5°C

Time: 3 sec max.

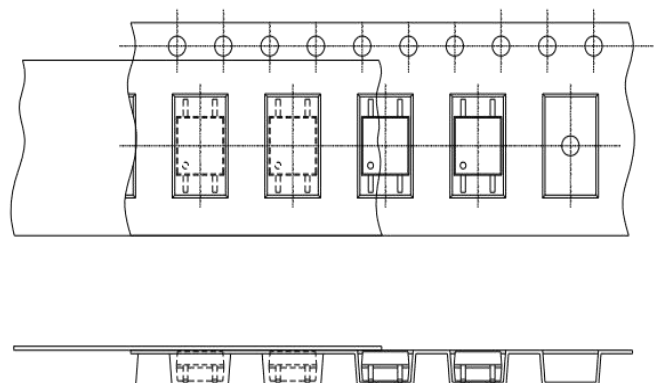
### ■ Packing

#### Tape and Reel

##### Option TP:

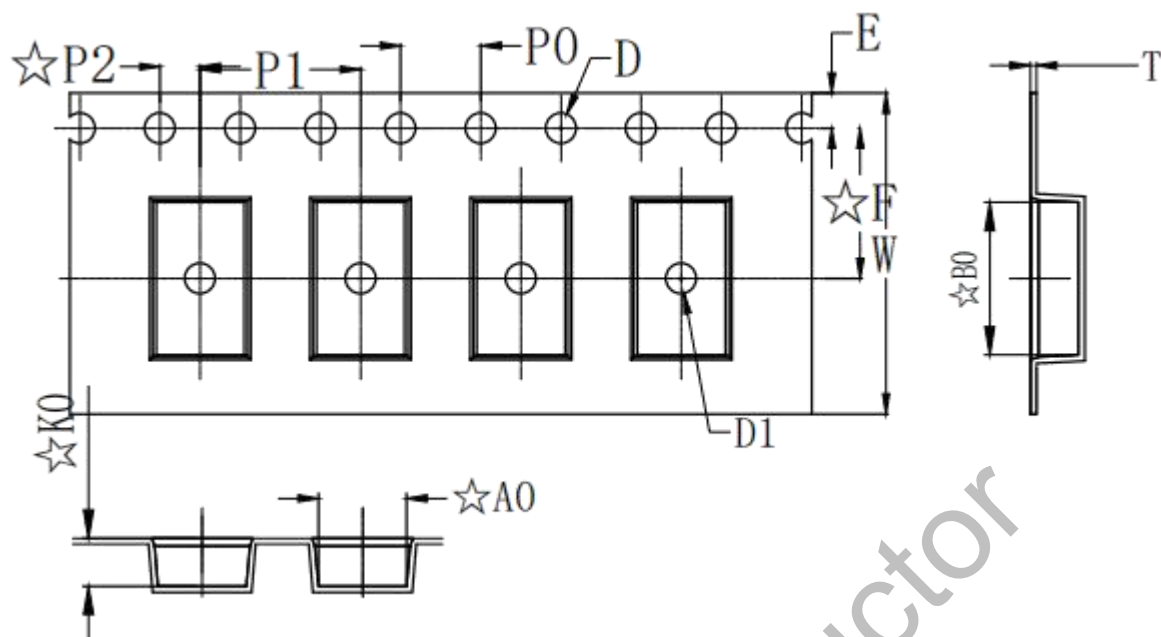


##### Option TP1:



### DATASHEET

#### PHOTO COUPLER



| Deminsion/mm  | W            | E              | F             | P0          | P1          | P2          |
|---------------|--------------|----------------|---------------|-------------|-------------|-------------|
| Packagetype:S | $16 \pm 0.2$ | $1.75 \pm 0.1$ | $7.5 \pm 0.1$ | $4 \pm 0.1$ | $8 \pm 0.1$ | $2 \pm 0.1$ |

| Deminsion/mm  | A0            | B0            | D0            | D1            | K0            |
|---------------|---------------|---------------|---------------|---------------|---------------|
| Packagetype:S | $4.4 \pm 0.1$ | $7.6 \pm 0.1$ | $1.5 \pm 0.1$ | $1.5 \pm 0.1$ | $2.4 \pm 0.1$ |

| Packagetype:S | Reel    | Inner carton | Outer carton |
|---------------|---------|--------------|--------------|
| QTY/PCS       | 1K/reel | 2K(2 reels)  | 20K          |

**DATASHEET****PHOTO COUPLER**

---

**■ Attention:**

- KTP is continually improving the quality, reliability, function or design and KTP reserves the right to make changes without further notices.
- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- For equipment/devices where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc, please contact our sales representatives.
- When requiring a device for any "specific" application, please contact our sales in advice.
- If there are any questions about the contents of this publication, please contact us at your convenience.