

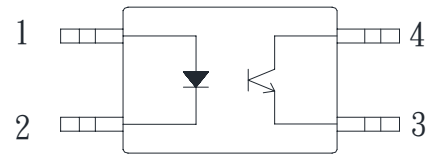
# KT101X Series

## 4PIN LSOP PHOTOTRANSISTOR PHOTOCOUPLER

### ● Description

The KT101X series consist of an infrared emitting diode, optically coupled to a phototransistor detector, and is incorporated in a 4 pin LSOP wide body package. It features a high current transfer ratio, low coupling capacitance and high isolation voltage.

### ● Schematic



- 1. Anode
- 2. Cathode
- 3. Emitter
- 4. Collector

### ● Features

1. Halogen free
2. Pb free and RoHS compliant
3. Temperature range -55°C to 115°C
4. High isolation voltage 5000Vrms
5. Opaque type, SMD low profile 4 lead package
6. Current transfer ratio  
(CTR : Min.50% at  $I_F=5mA$   $V_{CE}=5V$ )
7. 8mm outer creepage distance
8. DC input with transistor output
9. MSL class 1
10. Agency Approvals:
  - UL Approved (No. E169586): UL1577
  - c-UL Approved (No. E169586)
  - VDE Approved (No. 40031267): DIN EN60747-5-5
  - FIMKO Approved: EN60065, EN60950, EN60335, EN60601
  - CQC Approved: GB8898-2011, GB4943.1-2011

### ● Applications

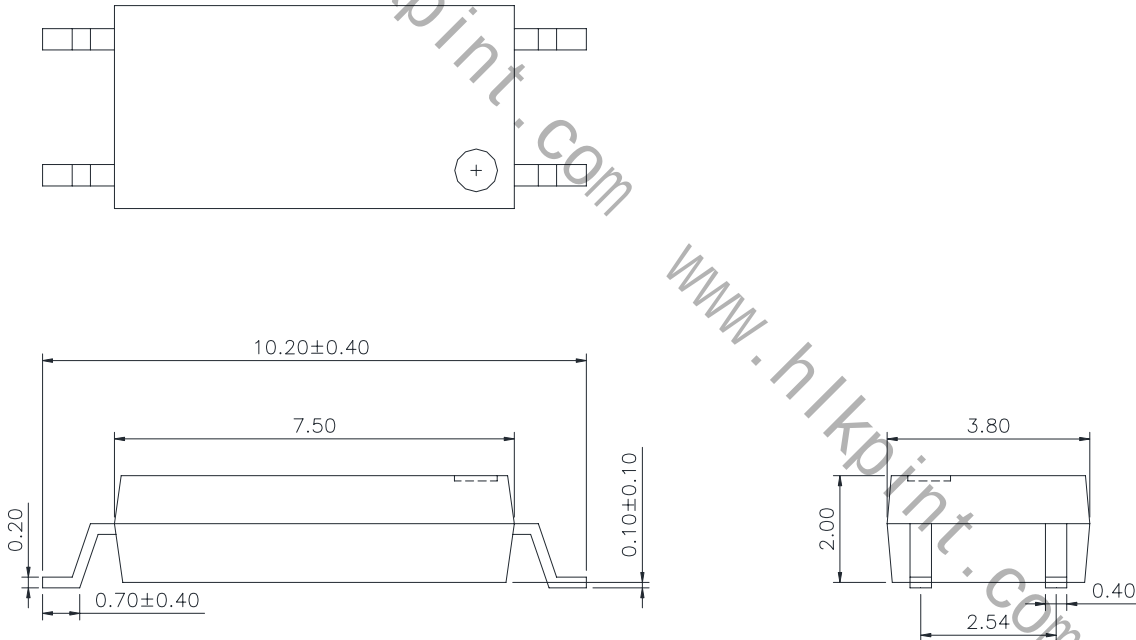
- Hybrid substrates that require high density mounting
- Programmable controllers
- Switch mode power supplies
- Microprocessor system interface

# KT101X Series

## 4PIN LSOP PHOTOTRANSISTOR PHOTOCOUPLER

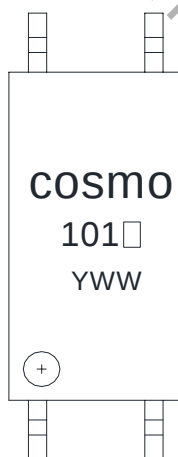
### ● Outside Dimension

Unit : mm



TOLERANCE:  $\pm 0.2$ mm

### ● Device Marking



#### Notes:

cosmo

101□

YWW

□: CTR rank

Y: Year code / WW: Week code

# KT101X Series

## 4PIN LSOP PHOTOTRANSISTOR PHOTOCOUPLER

### ● Absolute Maximum Ratings

(Ta=25°C)

| Parameter                        |                             | Symbol    | Rating      | Unit |
|----------------------------------|-----------------------------|-----------|-------------|------|
| Input                            | Forward current             | $I_F$     | 50          | mA   |
|                                  | Peak forward current        | $I_{FP}$  | 1           | A    |
|                                  | Reverse voltage             | $V_R$     | 6           | V    |
|                                  | Power dissipation           | $P_D$     | 100         | mW   |
| Output                           | Collector-Emitter voltage   | $V_{CEO}$ | 80          | V    |
|                                  | Emitter-Collector voltage   | $V_{ECO}$ | 7           | V    |
|                                  | Collector current           | $I_C$     | 50          | mA   |
|                                  | Collector power dissipation | $P_C$     | 150         | mW   |
| Total power dissipation          |                             | $P_{tot}$ | 250         | mW   |
| Isolation voltage 1 minute       |                             | $V_{iso}$ | 5000        | Vrms |
| Operating temperature            |                             | $T_{opr}$ | -55 to +115 | °C   |
| Storage temperature              |                             | $T_{stg}$ | -55 to +125 | °C   |
| Soldering temperature 10 seconds |                             | $T_{sol}$ | 260         | °C   |

### ● Electro-optical Characteristics

(Ta=25°C)

| Parameter                |                                      | Symbol        | Conditions                          | Min.               | Typ.      | Max. | Unit     |
|--------------------------|--------------------------------------|---------------|-------------------------------------|--------------------|-----------|------|----------|
| Input                    | Forward voltage                      | $V_F$         | $I_F=20mA$                          | -                  | 1.2       | 1.4  | V        |
|                          | Reverse current                      | $I_R$         | $V_R=4V$                            | -                  | -         | 10   | uA       |
|                          | Terminal capacitance                 | $C_t$         | $V=0, f=1KHz$                       | -                  | 30        | 250  | pF       |
| Output                   | Collector dark current               | $I_{CEO}$     | $V_{CE}=20V, I_F=0$                 | -                  | -         | 0.1  | uA       |
|                          | Collector-Emitter breakdown voltage  | $BV_{CEO}$    | $I_C=0.1mA, I_F=0$                  | 80                 | -         | -    | V        |
|                          | Emitter-Collector breakdown voltage  | $BV_{ECO}$    | $I_E=100uA, I_F=0$                  | 7                  | -         | -    | V        |
| Transfer characteristics | Current transfer ratio               | CTR           | $I_F=5mA, V_{CE}=5V$                | 50                 | -         | 600  | %        |
|                          |                                      |               | $I_F=1mA, V_{CE}=5V$                | 15                 | -         | -    | %        |
|                          | Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_F=10mA, I_C=1mA$                 | -                  | 0.1       | 0.3  | V        |
|                          | Isolation resistance                 | $R_{iso}$     | DC500V, 40 to 60%RH                 | $5 \times 10^{10}$ | $10^{11}$ | -    | $\Omega$ |
|                          | Floating capacitance                 | $C_f$         | $V=0, f=1MHz$                       | -                  | 0.6       | 1.0  | pF       |
|                          | Response time (Rise)                 | $t_r$         | $V_{CC}=2V, I_C=2mA, R_L=100\Omega$ | -                  | 5         | -    | us       |
|                          | Response time (Fall)                 | $t_f$         |                                     | -                  | 4         | -    | us       |

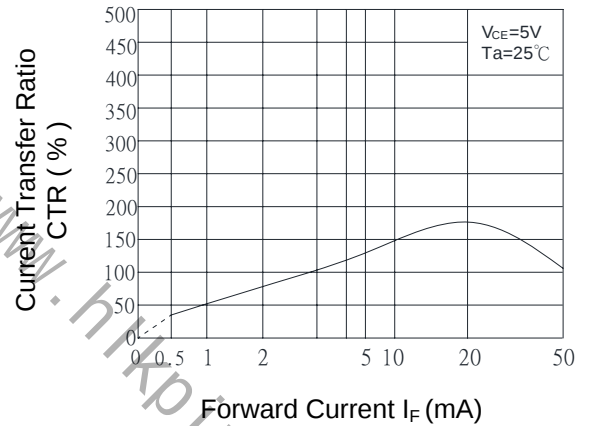
# KT101X Series

## 4PIN LSOP PHOTOTRANSISTOR PHOTOCOUPLER

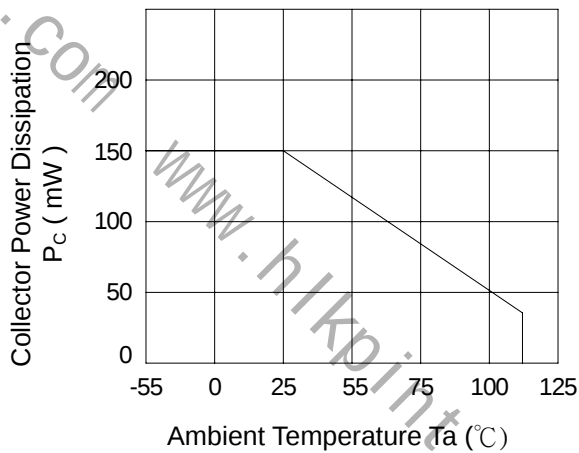
Classification table of current transfer ratio is shown below.

| CTR Rank | CTR ( % )  |
|----------|------------|
| KT1015   | 50 TO 150  |
| KT1016   | 100 TO 300 |
| KT1017   | 80 TO 160  |
| KT1018   | 130 TO 260 |
| KT1019   | 200 TO 400 |
| KT1010   | 50 TO 600  |

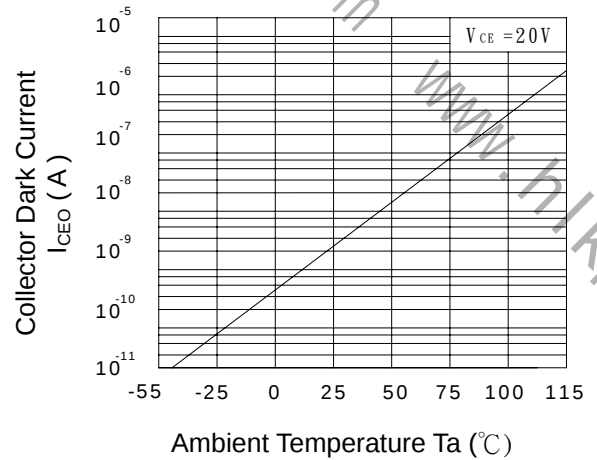
**Fig.1 Current Transfer Ratio vs. Forward Current**



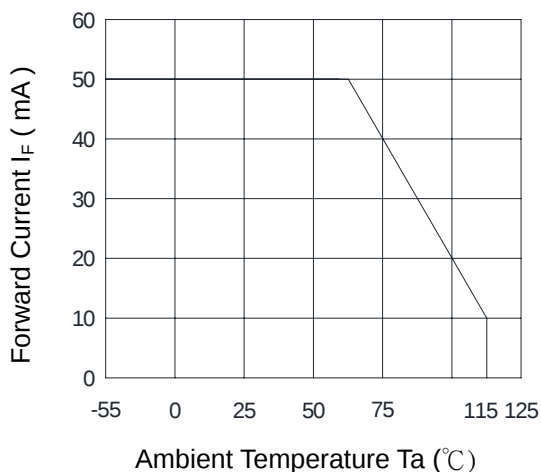
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



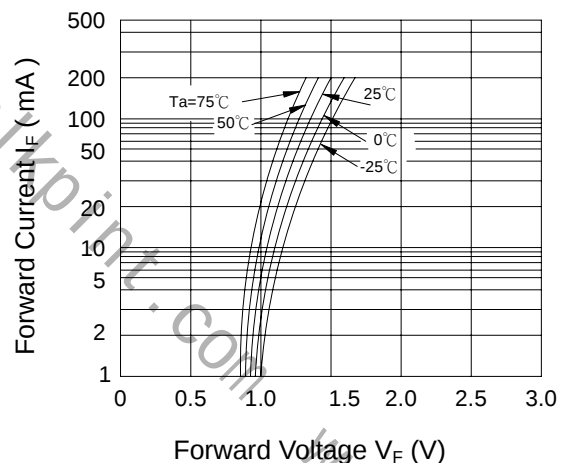
**Fig.3 Collector Dark Current vs. Ambient Temperature**



**Fig.4 Forward Current vs. Ambient Temperature**



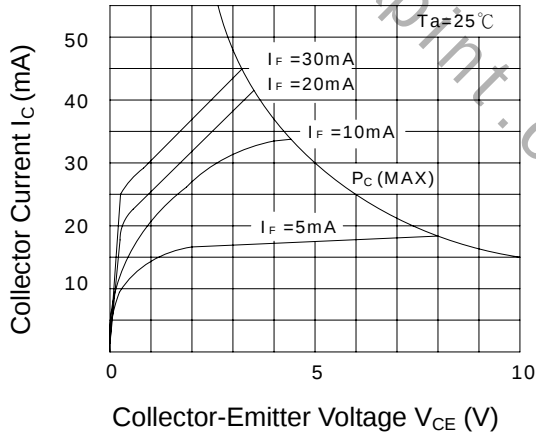
**Fig.5 Forward Current vs. Forward Voltage**



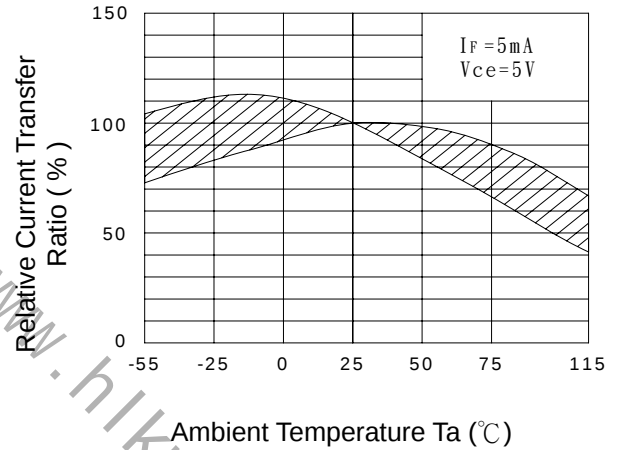
# KT101X Series

## 4PIN LSOP PHOTOTRANSISTOR PHOTOCOUPLER

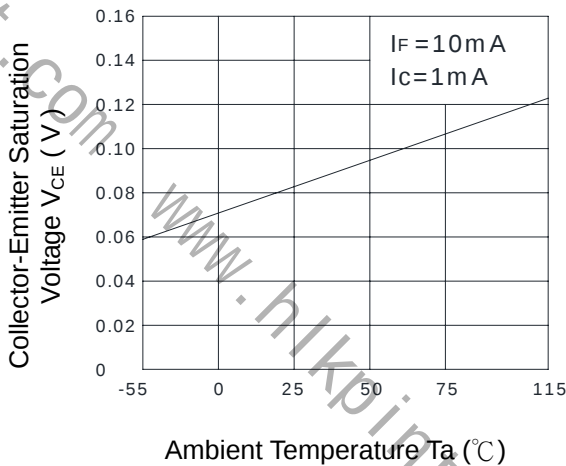
**Fig.6 Collector Current vs. Collector-Emitter Voltage**



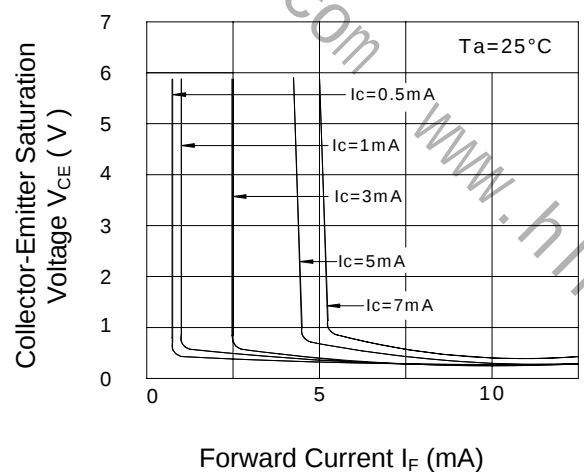
**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**



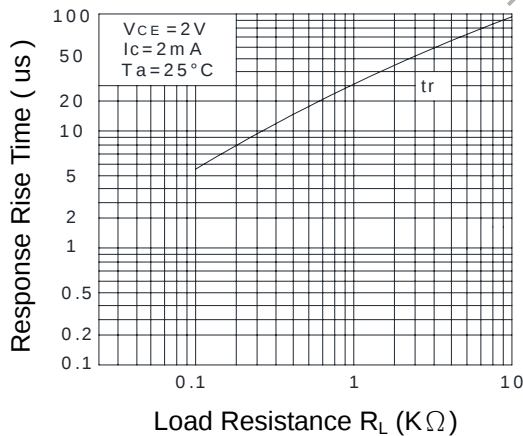
**Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature**



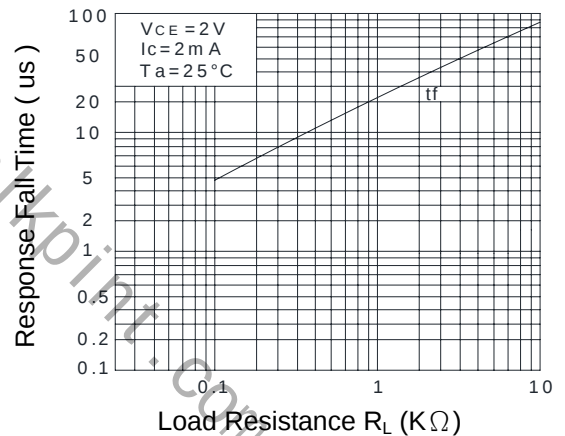
**Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current**



**Fig.10 Response Time (Rise) vs. Load Resistance**



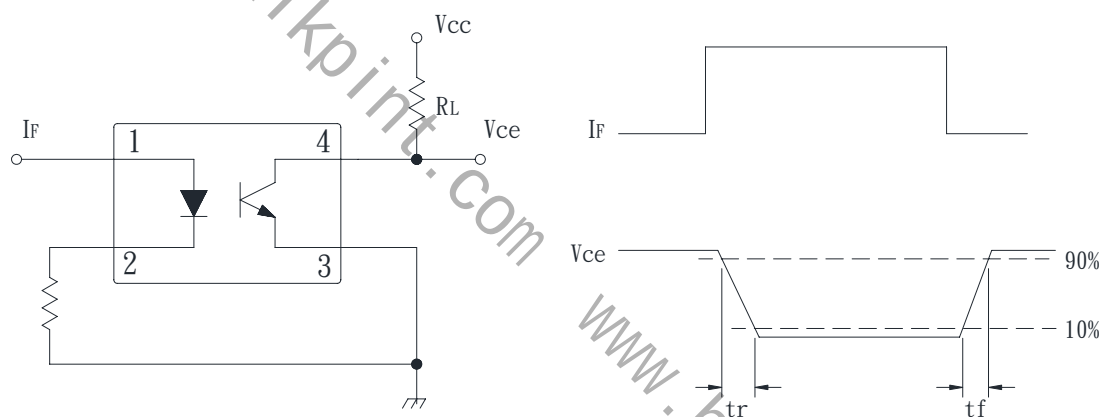
**Fig.11 Response Time (Fall) vs. Load Resistance**



# KT101X Series

## 4PIN LSOP PHOTOTRANSISTOR PHOTOCOUPLER

### ● Test Circuit for Response Time



# KT101X Series

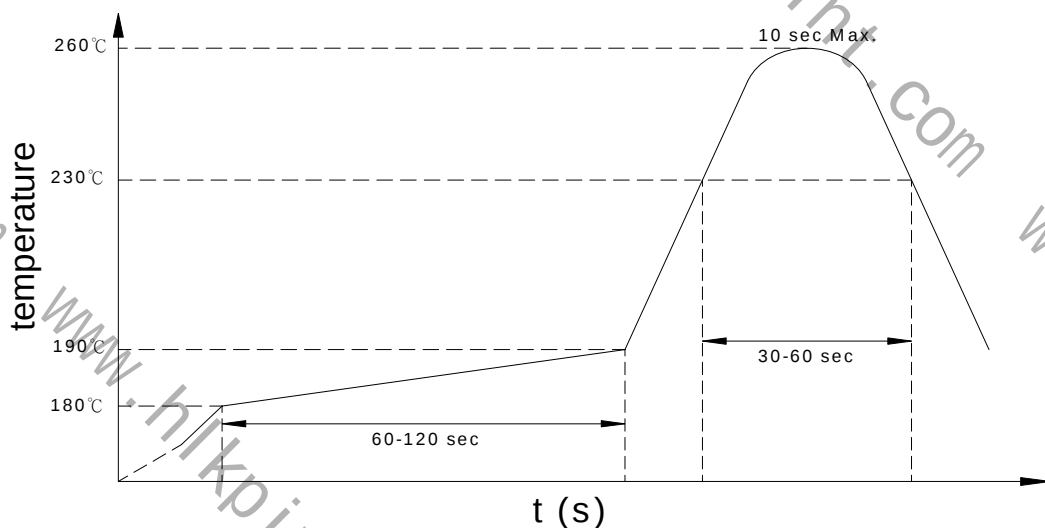
## 4PIN LSOP PHOTOTRANSISTOR PHOTOCOUPLER

### ● Recommended Soldering Conditions

#### (a) Infrared reflow soldering :

- Peak reflow soldering : 260°C or below (package surface temperature)
- Time of peak reflow temperature : 10 sec
- Time of temperature higher than 230°C : 30-60 sec
- Time to preheat temperature from 180~190°C : 60-120 sec
- Time(s) of reflow : Two
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

#### Recommended Temperature Profile of Infrared Reflow



#### (b) Wave soldering :

- Temperature : 260°C or below (molten solder temperature)
- Time : 10 seconds or less
- Preheating conditions : 120°C or below (package surface temperature)
- Time(s) of reflow : One
- Flux : Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

#### (c) Cautions :

- Fluxes : Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.
- Avoid shorting between portion of frame and leads.

# KT101X Series

## 4PIN LSOP PHOTOTRANSISTOR PHOTOCOUPLER

### ● Numbering System

KT101 Y (Z)

#### Notes:

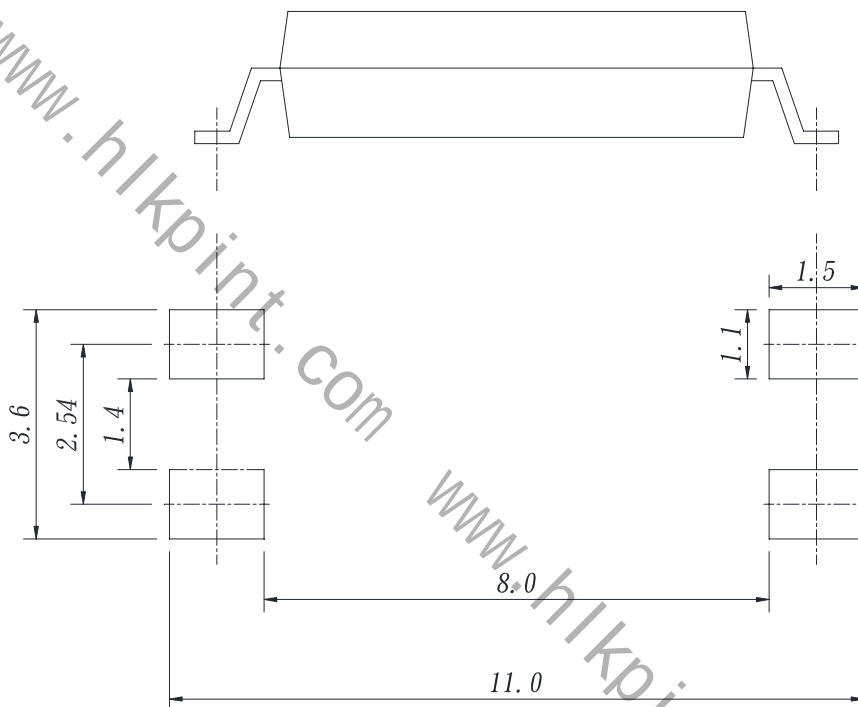
KT101 = Part No.

Y = CTR rank option (5 ~ 10)

Z = Tape and reel option (TLD 、 TRU)

| Option | Description            | Packing quantity    |
|--------|------------------------|---------------------|
| TLD    | TLD tape & reel option | 3000 units per reel |
| TRU    | TRU tape & reel option | 3000 units per reel |

### ● Recommended Pad Layout for Surface Mount Lead Form



Unit : mm

# KT101X Series

## 4PIN LSOP PHOTOTRANSISTOR PHOTOCOUPLER

### ● 4-pin LSOP Carrier Tape & Reel

