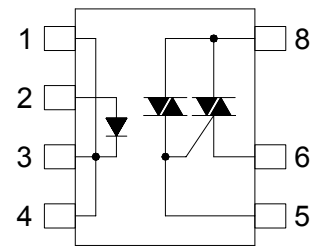


### ● Description

The KTLP3502 series consist of a GaAs infrared emitting diode optically coupled to an non-zero-crossing silicon bilateral TRIAC and a main output power TRIAC. These devices isolate low voltage logic from 115 VAC lines to provide random phase control of high current TRIACs or thyristors. These devices feature greatly enhanced static dv/dt capability to ensure stable switching performance of inductive loads.

### ● Schematic



- |            |         |
|------------|---------|
| 1. Cathode | 5. Gate |
| 2. Anode   | 6. T1   |
| 3. Cathode | 8. T2   |
| 4. Cathode |         |

### ● Features

1. Pb free and RoHS compliant
2. 400V peak blocking voltage
3. On-State R.M.S Current 0.5A.
4. Simplifies logic control of 115 VAC power
5. Non zero voltage crossing
6. Isolation voltage between input and output (Viso : 5300Vms)
7. MSL class 1
8. Agency Approvals :
  - UL Approved (No. E169586): UL1577
  - c-UL Approved (No. E169586)
  - VDE Approved (No. 40020973): DIN EN60747-5-5

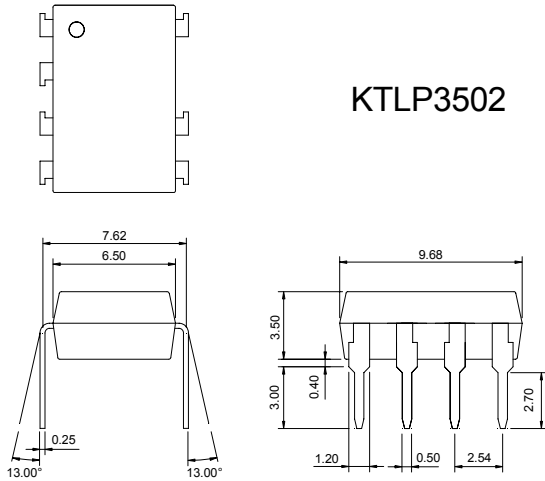
### ● Applications

- TRIAC driver
- Programmable controllers
- AC-output module
- Solid state relay
- Isolated interface between high voltage AC devices and lower voltage DC control circuitry
- Switching motors, fans, heaters, solenoids and valves
- Phase or power control in applications, such as lighting and temperature control equipment

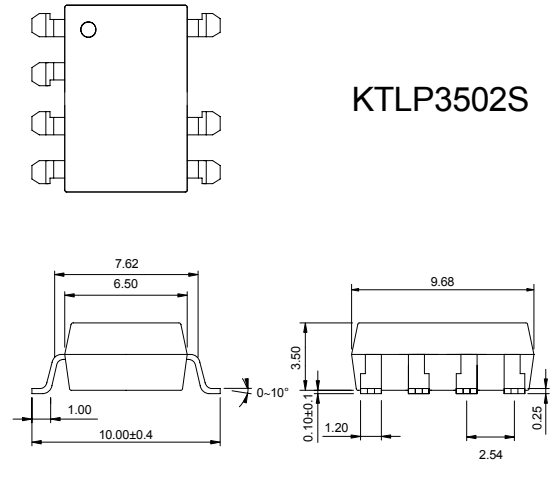
● Outside Dimension

Unit : mm

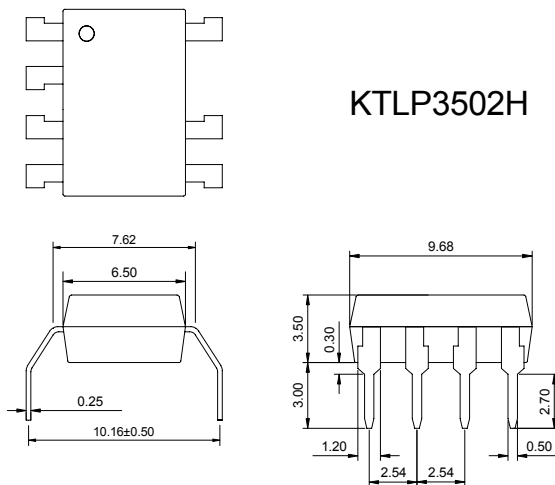
1. Dual-in-line type.



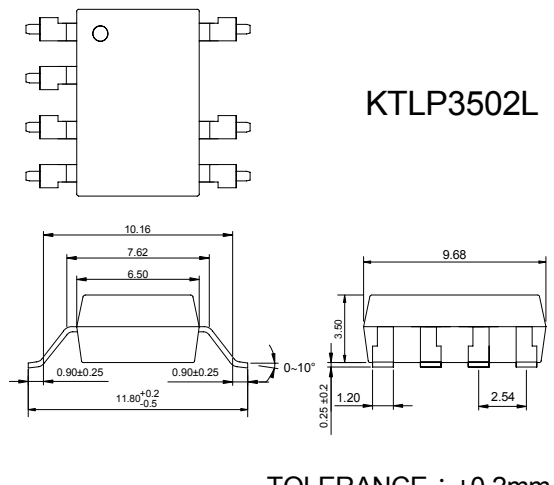
2. Surface mount type.



3. Long creepage distance type.

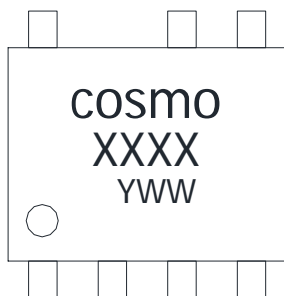


4. Long creepage distance for surface mount type.



TOLERANCE : ±0.2mm

● Device Marking



Notes :

cosmo

XXXX XXXX : 3616 or 3506 or 3502

YWW Y : Year code / W : Week code

**● Absolute Maximum Ratings**

(Ta=25°C)

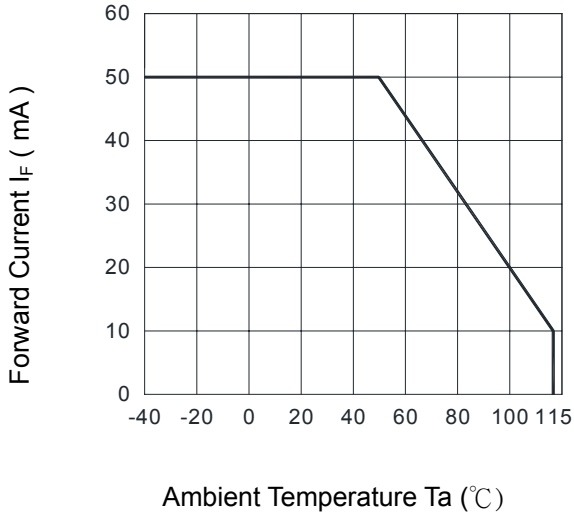
| Parameter                        |   | Symbol       | Rating      | Unit       |
|----------------------------------|---|--------------|-------------|------------|
| Input                            | Forward current                             | $I_F$        | 50          | mA         |
|                                  | Peak forward current                        | $I_{FM}$     | 1           | A          |
|                                  | Reverse voltage                             | $V_R$        | 6           | V          |
|                                  | Power dissipation                           | $P_D$        | 70          | mW         |
| Output                           | Off-state output terminal voltage           | $V_{DRM}$    | 400         | $V_{PEAK}$ |
|                                  | On-state R.M.S. current                     | $I_{T(RMS)}$ | 0.5         | A          |
|                                  | Peak repetitive surge current (60Hz , Peak) | $I_{TSM}$    | 5           | A          |
| Isolation voltage 1 minute       |   | $V_{iso}$    | 5300        | $V_{rms}$  |
| Operating temperature            |   | $T_{opr}$    | -40 to +115 | °C         |
| Storage temperature              |   | $T_{stg}$    | -50 to +125 | °C         |
| Soldering temperature 10 seconds |   | $T_{sol}$    | 260         | °C         |

**● Electro-optical Characteristics**

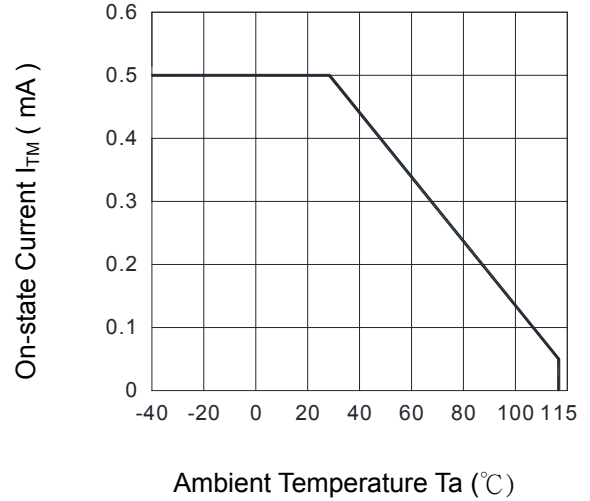
(Ta=25°C)

| Parameter                |  | Symbol    | Conditions                   | Min.               | Typ. | Max. | Unit       |
|--------------------------|--|-----------|------------------------------|--------------------|------|------|------------|
| Input                    | Forward voltage                            | $V_F$     | $I_F=10mA$                   | -                  | 1.2  | 1.4  | V          |
|                          | Reverse current                            | $I_R$     | $V_R=4V$                     | -                  | -    | 10   | $\mu A$    |
| Output                   | Peak blocking current                      | $I_{DRM}$ | $V_{DRM}$ Rated              | -                  | -    | 100  | $\mu A$    |
|                          | On-state voltage                           | $V_{TM}$  | $I_{TM}=0.5A$                | -                  | -    | 3    | V          |
| Transfer characteristics | Holding current                            | $I_H$     |                              | -                  | -    | 25   | mA         |
|                          | Critical rate of rise of off-state voltage | dv/dt     | $V_{DRM}=(1/\sqrt{2})*Rated$ | -                  | 1000 | -    | V/ $\mu s$ |
|                          | Isolation resistance                       | $R_{iso}$ | DC500V                       | $5 \times 10^{10}$ | -    | -    | $\Omega$   |
|                          | Minimum trigger current                    | $I_{FT}$  | Main terminal voltage=3V     | -                  | -    | 10   | mA         |

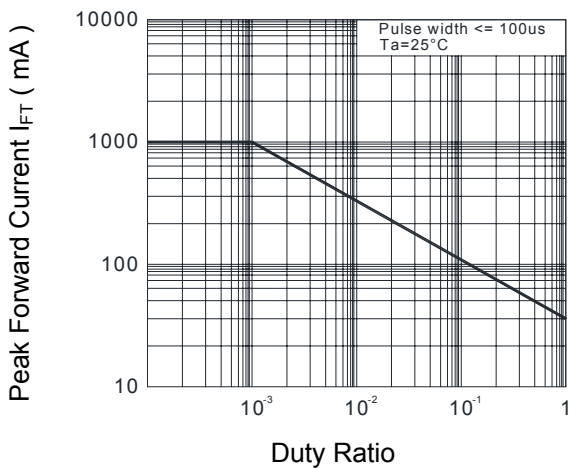
**Fig.1 Forward Current  $I_F$  vs. Ambient Temperature**



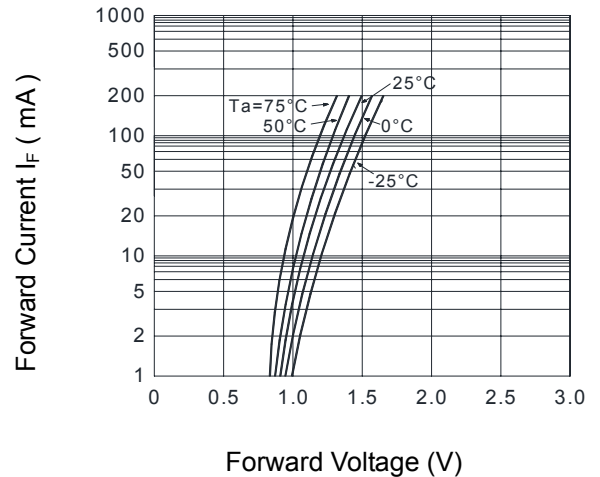
**Fig.2 On-State R.M.S. Current  $I_{RM}$  vs. Ambient Temperature**



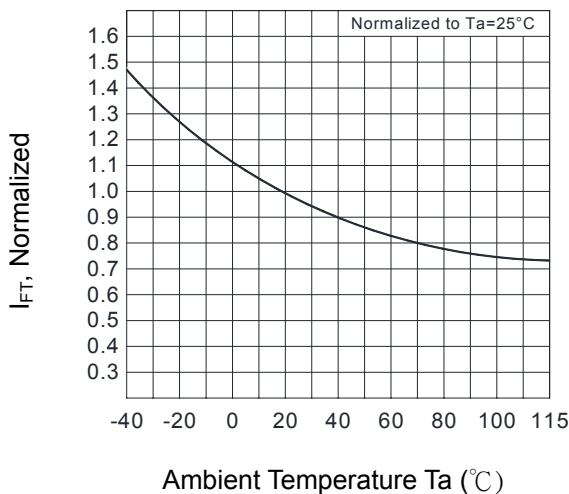
**Fig.3 Peak Forward Current  $I_{FT}$  vs. Duty Ratio**



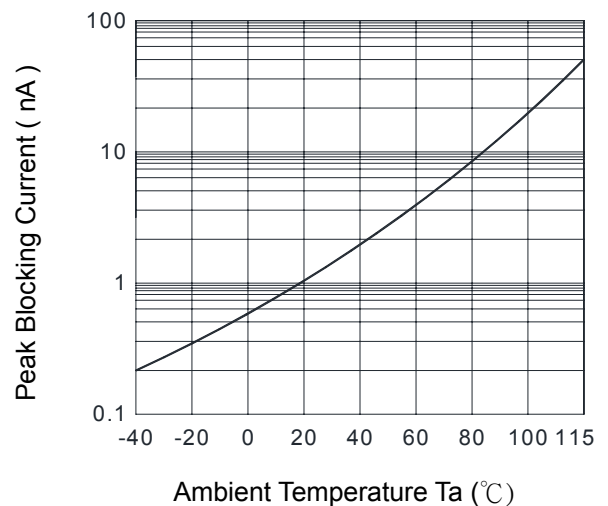
**Fig.4 Forward Current  $I_F$  vs. Forward Voltage**



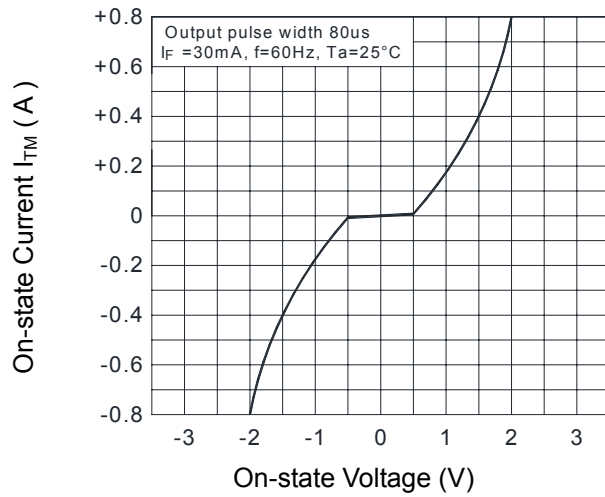
**Fig.5 Trigger Current vs. Ambient Temperature**



**Fig.6 Leakage with LED off vs. Ambient Temperature**



**Fig.7 On-state Characteristics**

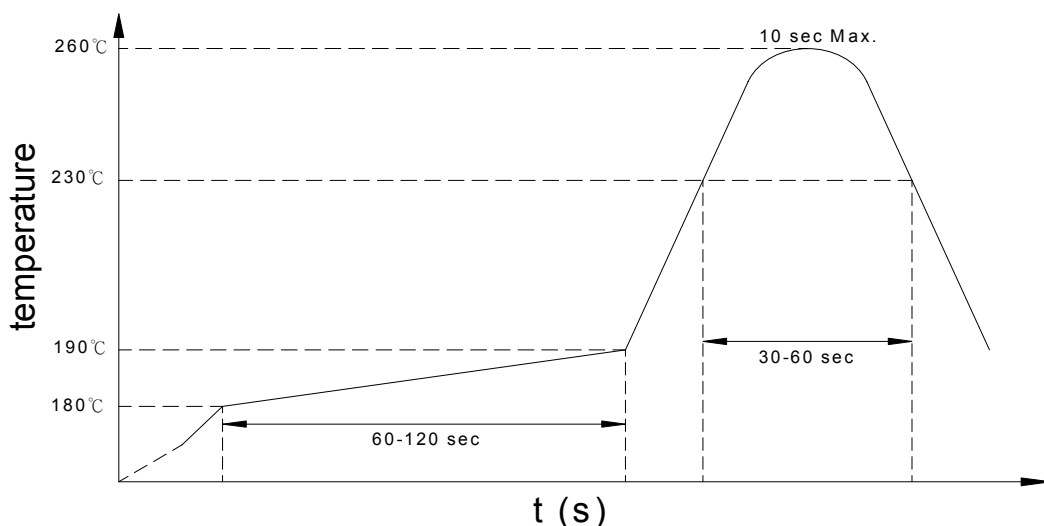


### ● Recommended Soldering Conditions

#### (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



#### (a) 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.)

#### (a) Cautions :

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

● **Numbering System**

## KTLP3502 X (Y)

**Notes:**

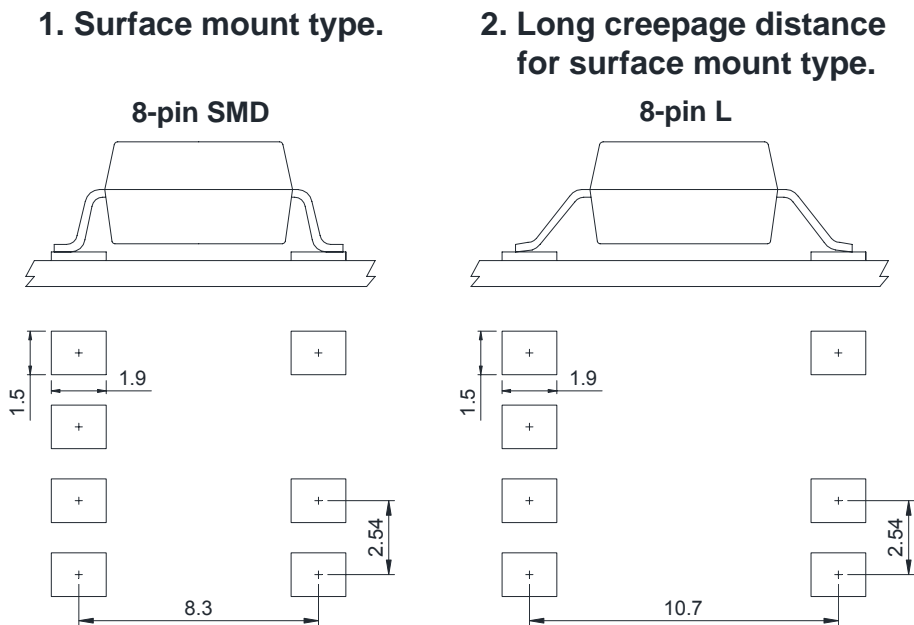
KTLP3502 = Part No.

X = Lead form option ( blank · S · H · L )

Y = Tape and reel option ( TL · TR · TLD · TRU )

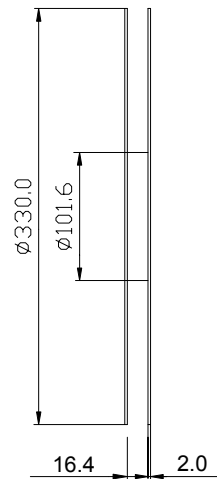
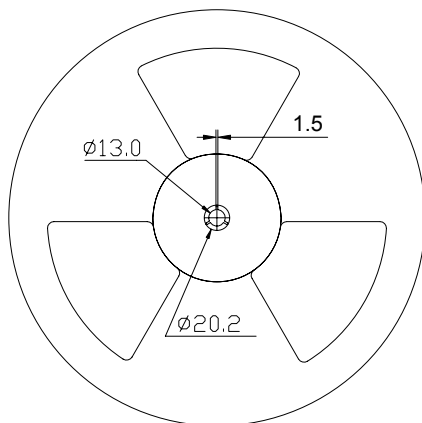
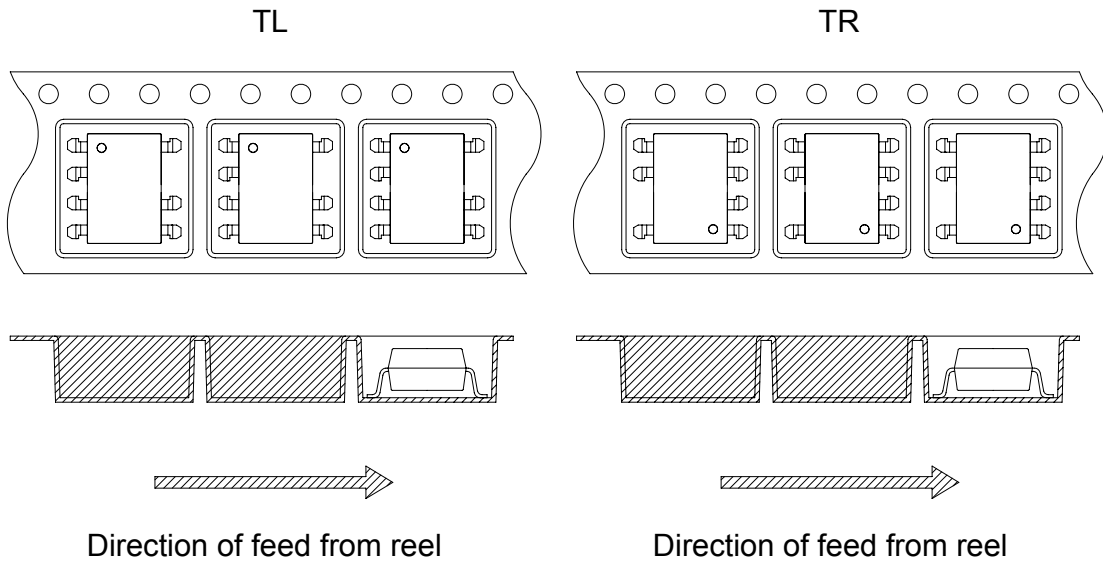
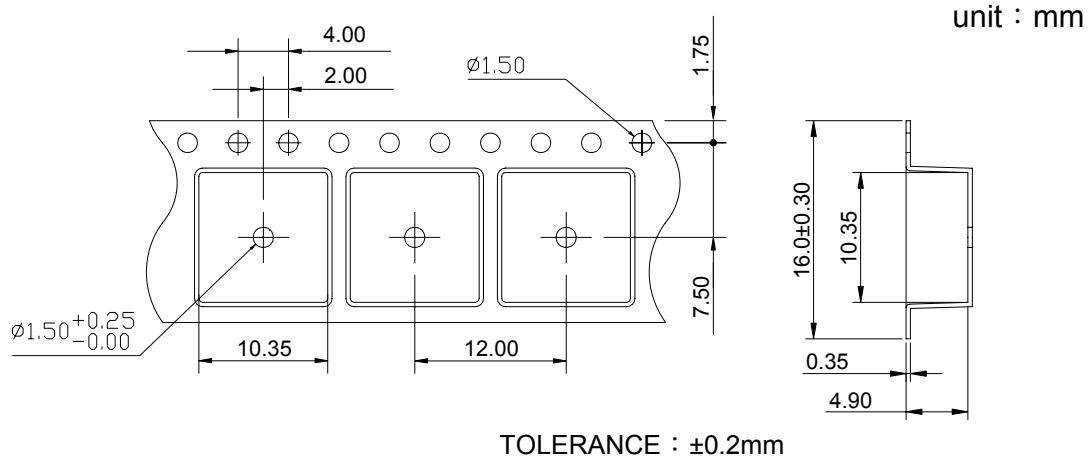
| Option  | Description  | Packing quantity    |
|---------|--|---------------------|
| S (TL)  | surface mount type package + TL tape & reel option                             | 1000 units per reel |
| S (TR)  | surface mount type package + TR tape & reel option                             | 1000 units per reel |
| L (TLD) | long creepage distance for surface mount type package + TLD tape & reel option | 800 units per reel  |
| L (TRU) | long creepage distance for surface mount type package + TRU tape & reel option | 800 units per reel  |

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



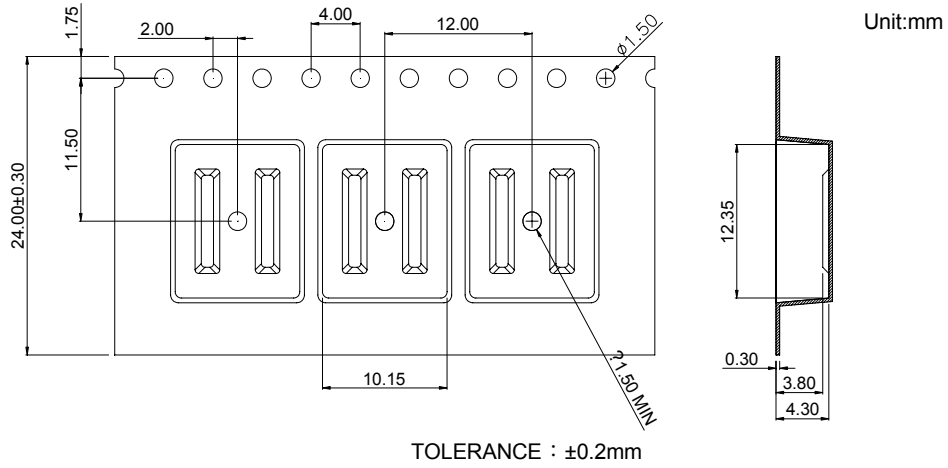
Unit : mm

● SMD Carrier Tape & Reel



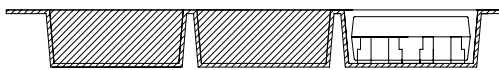
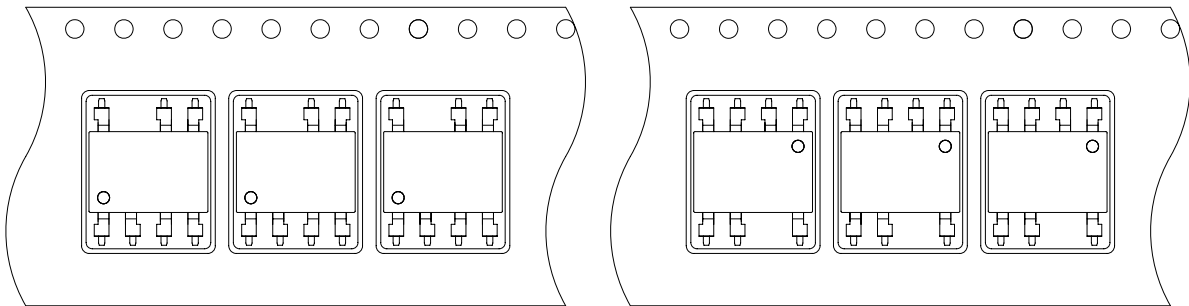


● L Carrier Tape & Reel

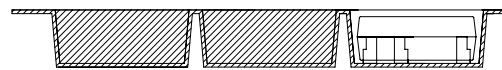


TLD

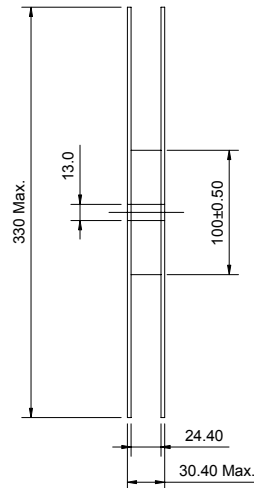
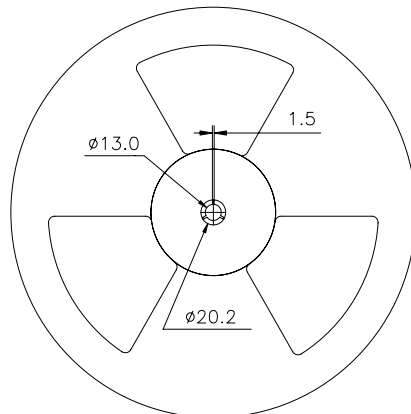
TRU



Direction of feed from reel



Direction of feed from reel





# KTLP3616 (3506), (3502) Series

## 8PIN RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

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### ● Application Notice

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- c. Audio / Video
- d. Instrumentation
- e. Electrical application
- f. Measurement equipment
- g. Consumer electronics
- h. Telecommunication

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- d. Nuclear power control
- e. Equipment used for automotive vehicles, trains, ships...etc.

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