

● Description

The KT1210 series consist of a photo darlington optically coupled to a gallium arsenide infrared-emitting diode in a 4 pin LSOP wide body package. It features a high current transfer ratio, low coupling capacitance and high isolation voltage.

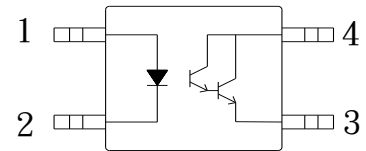
● Features

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. High current transfer ratio
($\text{CTR}=2000\%\text{TYP.}@ I_F=1 \text{ mA}, V_{CE}=2\text{V}$)
7. 8mm outer creepage distance
8. MSL class 1
9. 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

- System appliances, measuring instruments.
- Industrial robots.
- Copiers, automatic vending machines.
- Signal transmission between circuits of different potentials and impedances.
- Telephone sets.
- Copiers, facsimiles.
- Interface with various power supply circuits, power distribution boards.
- Numerical control machines.

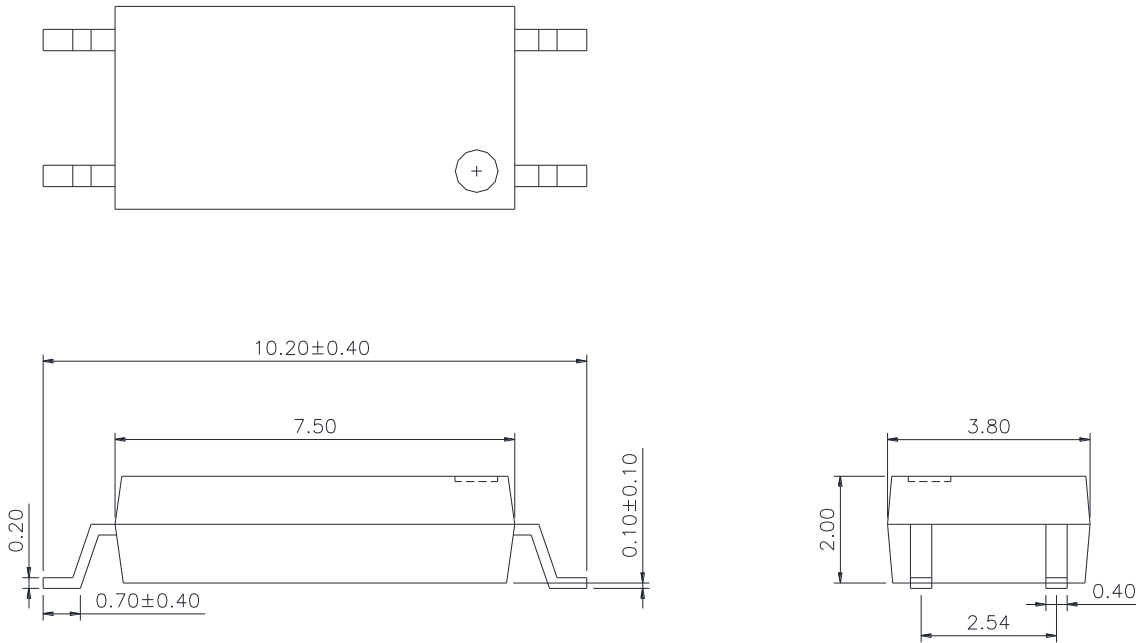
● Schematic



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

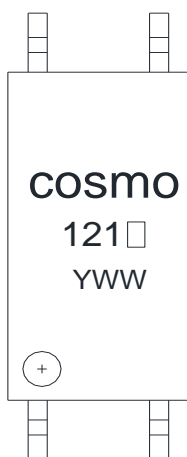
● **Outside Dimension**

Unit : mm



TOLERANCE : ± 0.2 mm

● **Device Marking**



Notes:

cosmo

121 □

YWW

□: CTR rank

Y: Year code / WW: Week code

● 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 | 70 | mW |
| Output | Collector-Emitter voltage | V_{CEO} | 35 | V |
| | Emitter-Collector voltage | V_{ECO} | 5 | V |
| | Collector current | I_C | 150 | mA |
| | Collector power dissipation | P_C | 150 | mW |
| Total power dissipation | | P_{tot} | 170 | 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 |
| | Peak forward voltage | V_{FP} | $I_{FP}=0.5A$ | - | - | 3.5 | V |
| | Reverse current | I_R | $V_R=4V$ | - | - | 10 | uA |
| | Terminal capacitance | C_t | $V=0, f=1KHz$ | - | 30 | - | pF |
| Output | Collector dark current | I_{CEO} | $V_{CE}=10V, I_F=0$ | - | - | 1.0 | uA |
| Transfer characteristics | Current transfer ratio | CTR | $I_F=1mA, V_{CE}=2V$ | 200 | 2000 | - | % |
| | Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_F=1mA, I_C=2mA$ | - | - | 1.0 | V |
| | Isolation resistance | Riso | DC500V, 40 to 60%RH | 5×10^{10} | 10^{11} | - | Ω |
| | Floating capacitance | C_f | $V=0, f=1MHz$ | - | 0.4 | - | pF |
| | Cut-off frequency | f_c | $V_{CC}=5V, I_C=2mA, R_L=100\Omega$ | - | 7 | - | KHz |
| | Response time (Rise) | t_r | $V_{CC}=5V, I_C=2mA, R_L=100\Omega$ | - | 200 | - | us |
| Response time (Fall) | t_f | - | | 200 | - | us | |

Classification table of current transfer ratio is shown below.

| CTR RANK | CTR (%) |
|----------|---------|
| KT1210 | Min.200 |

Fig.1 Current Transfer Ratio vs. Forward Current

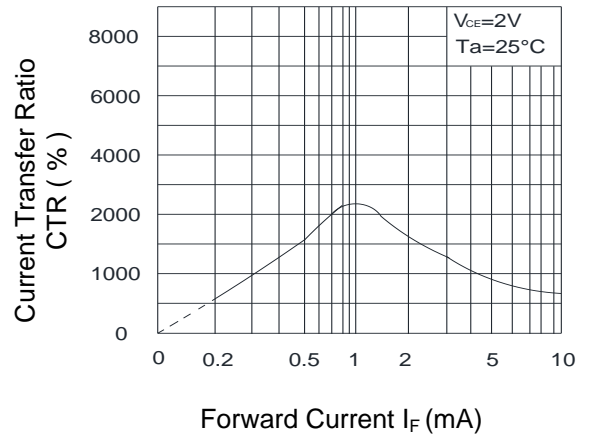


Fig.2 Collector Power Dissipation vs. Ambient Temperature

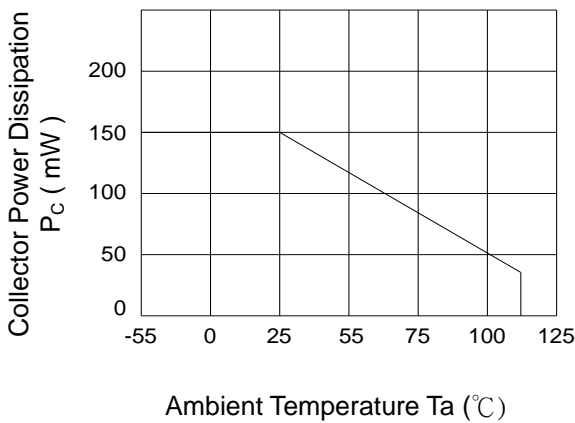


Fig.3 Collector Dark Current vs. Ambient Temperature

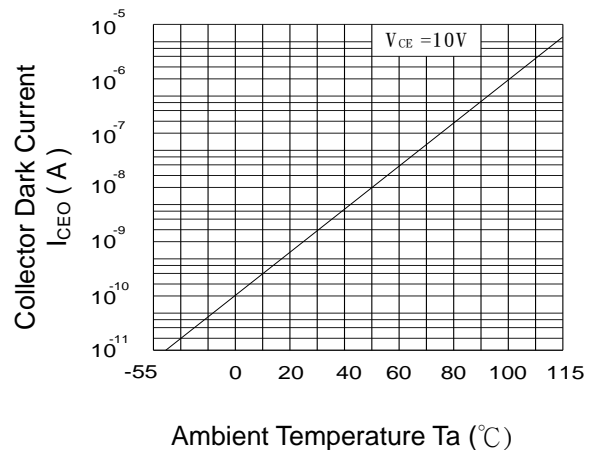


Fig.4 Forward Current vs. Ambient Temperature

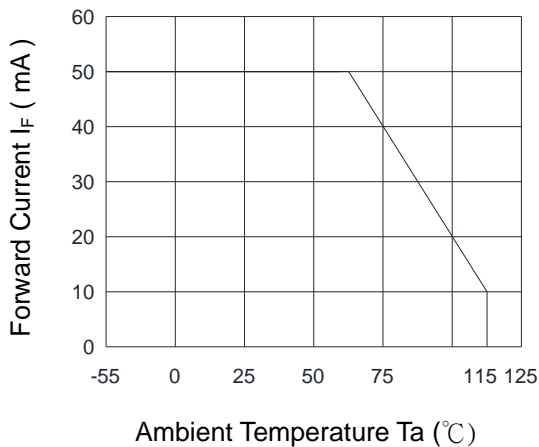


Fig.5 Forward Current vs. Forward Voltage

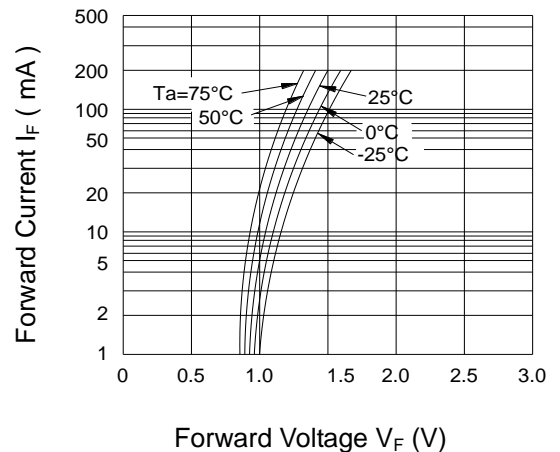


Fig.6 Collector Current vs. Collector-Emitter Voltage

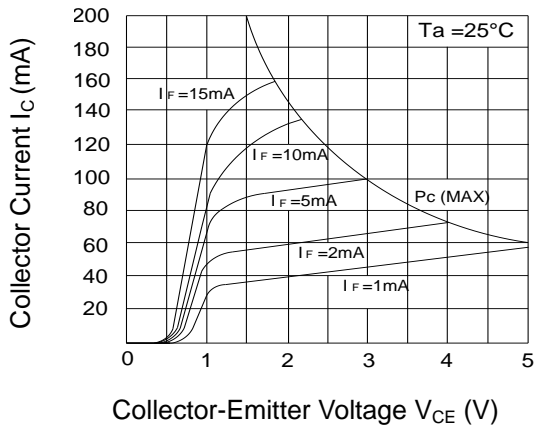


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

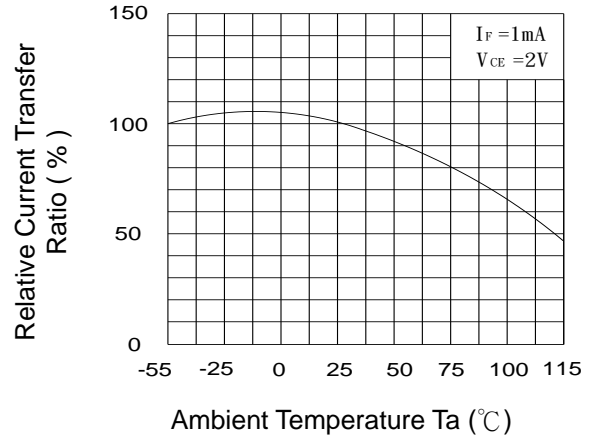


Fig.8 Collector-Emitter Saturation Voltage vs. Forward Current

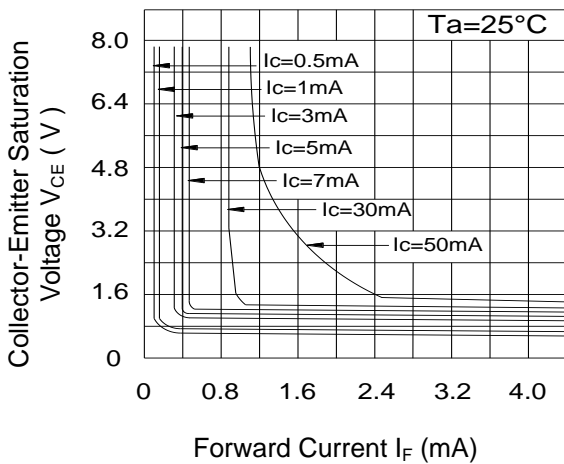
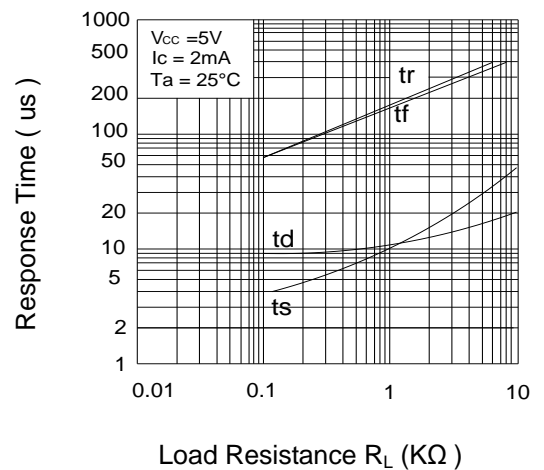
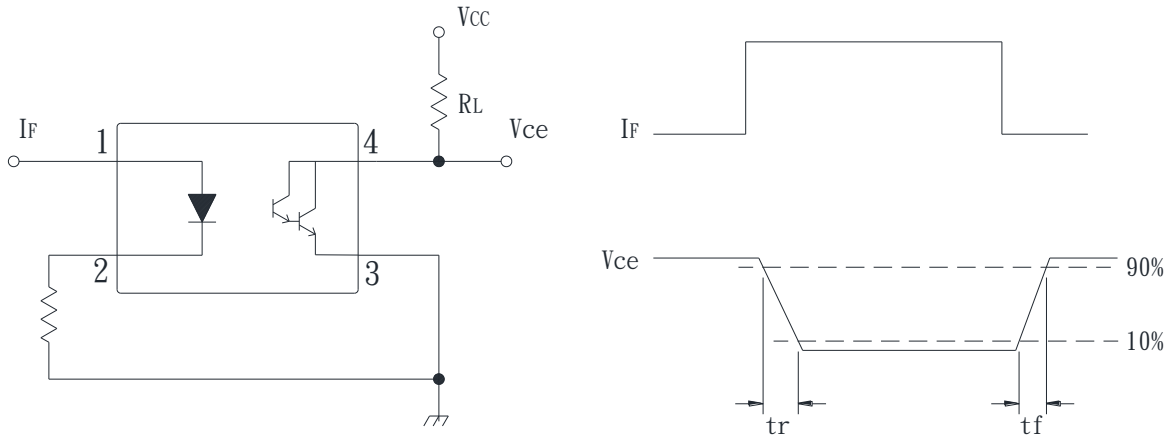


Fig.9 Response Time vs. Load Resistance



● **Test Circuit for Response Time**

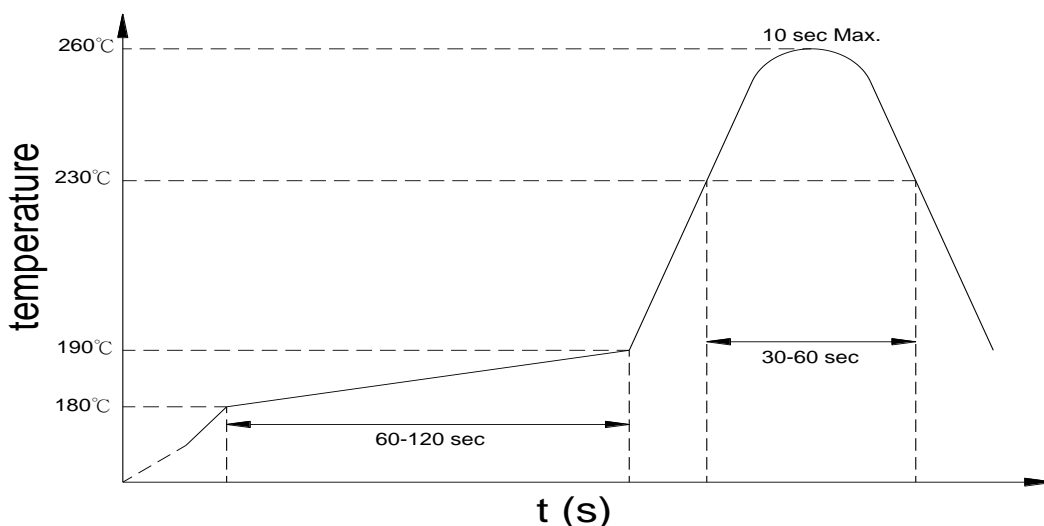


● Recommended Soldering Conditions

(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.

- **Numbering System**

KT1210 (Z)

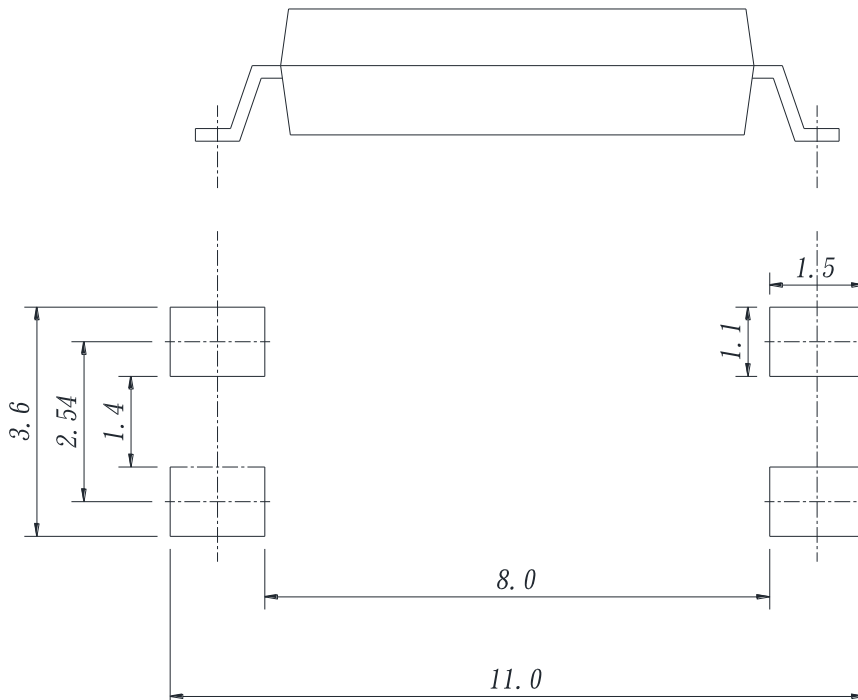
Notes:

KT1210 = Part No.

Z = Tape and reel option (TLD · TRU)

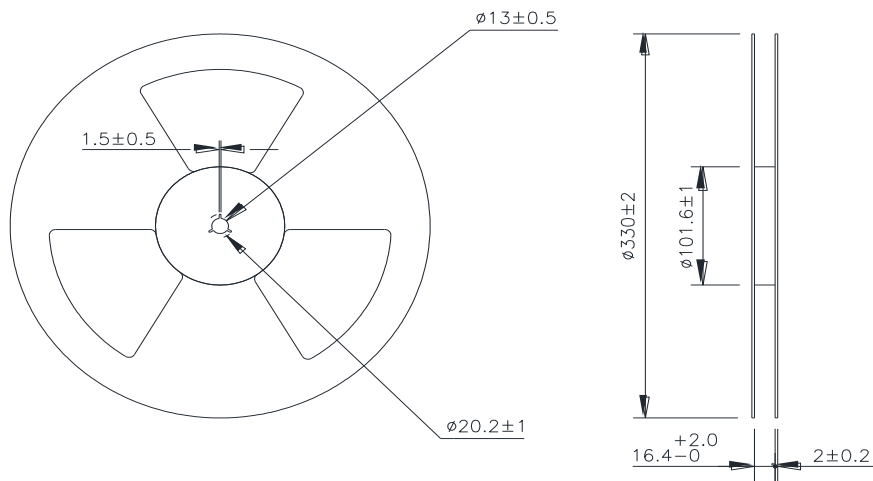
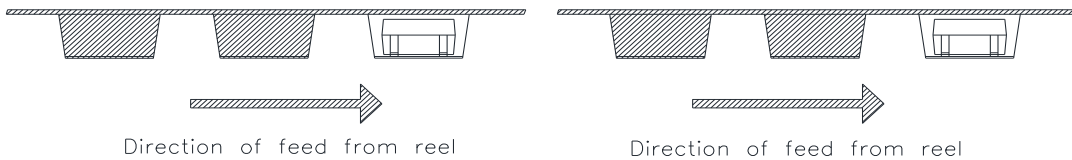
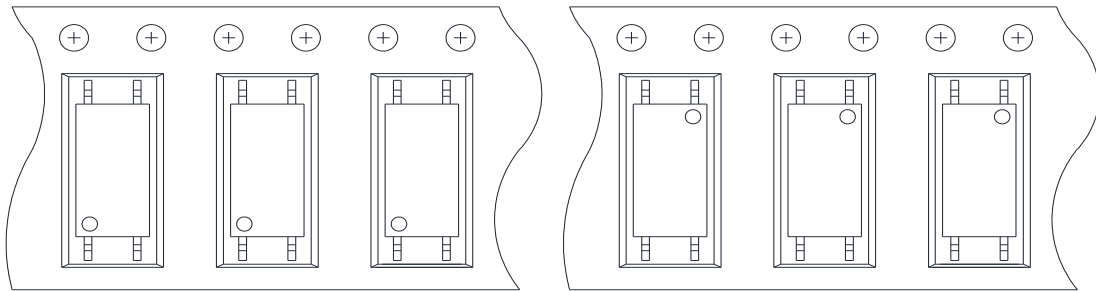
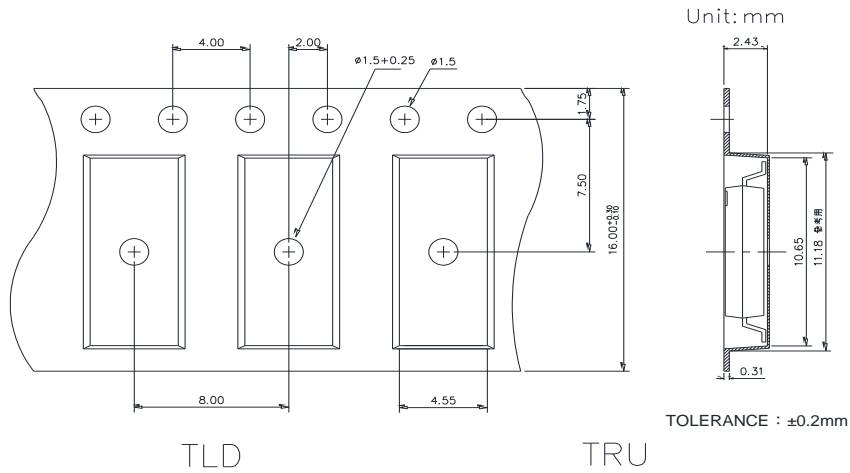
| Option | Description | Packing quantity |
|--------|------------------------|---------------------|
| TLD | TLD tape & reel option | 3000 units per reel |
| TRU | TRU tape & reel option | 3000 units per reel |

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



Unit : mm

● 4-pin LSOP Carrier Tape & Reel





KT1210 Series

4PIN LSOP PHOTODARLINGTON PHOTOCOUPLER

● Application Notice

The content of datasheet is the guidance for product use only. cosmo takes no responsibility to the accuracy of the information provided here. For continuously improving all of products, including quality, reliability, function...etc., cosmo reserves the right to change the specification, characteristics, data, materials, and structure of products without notice. Please contact with cosmo to obtain the latest specification.

It would be required to comply with the absolute maximum ratings listed in the specification. cosmo has no liability and responsibility to the damage caused by improper use of the products.

cosmo products are intended to be designed for use in general electronics application list below:

- a. Personal computer
- b. OA machine
- c. Audio / Video
- d. Instrumentation
- e. Electrical application
- f. Measurement equipment
- g. Consumer electronics
- h. Telecommunication

cosmo devices shall not be used or related with equipment requiring higher level of quality / reliability, or malfunction, or failure which may cause loss of human life, bodily injury, includes, without limitation:

- a. Medical and other life supporting equipments
- b. Space application
- c. Telecommunication equipment (trunk lines)
- d. Nuclear power control
- e. Equipment used for automotive vehicles, trains, ships...etc.

This publication is the property of cosmo. No part of this publication may be reproduced or copied in any form or any means electronically or mechanically for any purpose, in whole or in part without any written permission expressed from cosmo.