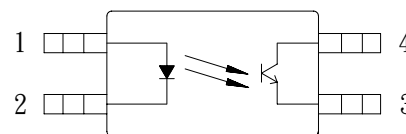


### ● Description

The KPS2801 series is DC-input single channel which contains a light emitting diode optically coupled to a phototransistor. It is packaged in a 4-pin SSOP package. The input-output isolation voltage is rated at 3750Vrms.

### ● Schematic



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

### ● Features

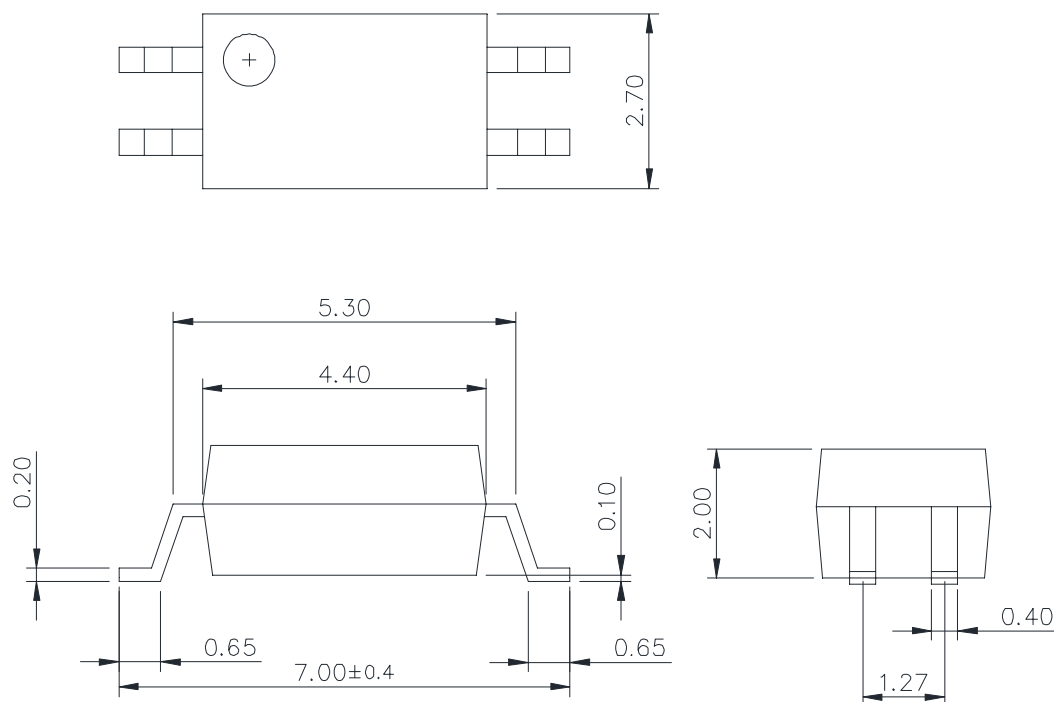
- 1. Halogen free
- 2. Pb free and RoHS compliant
- 3. High isolation voltage ( $V_{ISO}=3750V_{rms}$ )
- 4. Small and thin package(4pin SSOP, pin pitch 1.27mm)
- 5. High collector to emitter voltage( $V_{CEO}=80V$ )
- 6. High-speed switching  $t_r=3\mu s$  (typ.),  $t_f=5\mu s$  (typ.)
- 7. Agency Approvals:
  - UL1577 / CUL C22.2 No.1 & NTC No.5, File No. E169586
  - VDE EN 60747, File No.40010469
  - FIMKO EN 60065, EN 60950, File No. NCS/FI 24585 A2
  - CQC GB4943 / GB8898-2011, File No. CQC10001049555 / CQC08001023986

### ● Applications

- Programmable logic controllers
- Measuring instruments
- Power supply
- Hybrid IC

## ● Outside Dimension

Unit : mm



TOLERANCE : ±0.2mm

## ● Device Marking



### Notes:

2801

YWW

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(*1)             | $I_{FP}$             | 1           | A     |
|                                | Reverse voltage                      | $V_R$                | 6           | V     |
|                                | Power dissipation                    | $P_D$                | 60          | mW    |
|                                | Power dissipation derating           | $P_D/^\circ\text{C}$ | 0.6         | mW/°C |
| Output                         | Collector-Emitter voltage            | $V_{CEO}$            | 80          | V     |
|                                | Emitter-Collector voltage            | $V_{ECO}$            | 6           | V     |
|                                | Collector current                    | $I_C$                | 50          | mA    |
|                                | Collector power dissipation          | $P_C$                | 160         | mW    |
|                                | Collector power dissipation derating | $P_C/^\circ\text{C}$ | 1.2         | mW/°C |
| Isolation voltage 1 minute(*2) |                                      | Viso                 | 3750        | Vrms  |
| Operating temperature          |                                      | Topr                 | -55 to +115 | °C    |
| Storage temperature            |                                      | Tstg                 | -55 to +125 | °C    |

\*1 PW=100μs,Duty Cycle=1%.

\*2 AC voltage for 1minute at T =25°C, RH=60% between input and output.

### ● Electro-optical Characteristics

(Ta=25°C)

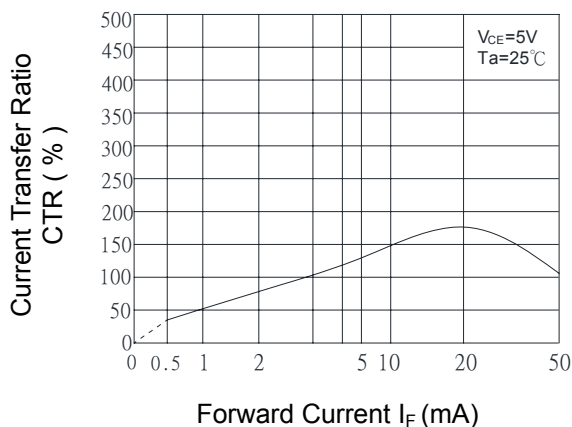
| Parameter                |                                      | Symbol        | Conditions                                        | Min.               | Typ.      | Max. | Unit |
|--------------------------|--------------------------------------|---------------|---------------------------------------------------|--------------------|-----------|------|------|
| Input                    | Forward voltage                      | $V_F$         | $I_F=5\text{mA}$                                  | -                  | 1.1       | 1.4  | V    |
|                          | Reverse current                      | $I_R$         | $V_R=5\text{V}$                                   | -                  | -         | 5    | μA   |
|                          | Terminal capacitance                 | $C_t$         | $V=0, f=1\text{MHz}$                              | -                  | 60        | -    | pF   |
| Output                   | Collector dark current               | $I_{CEO}$     | $V_{CE}=80\text{V}, I_F=0\text{mA}$               | -                  | -         | 100  | nA   |
| Transfer characteristics | Current transfer ratio               | CTR           | $I_F=5\text{mA}, V_{CE}=5\text{V}$                | 50                 | -         | 600  | %    |
|                          |                                      |               | $I_F=1\text{mA}, V_{CE}=5\text{V}$                | 15                 | -         | -    | %    |
|                          | Collector-Emitter saturation voltage | $V_{CE(sat)}$ | $I_F=10\text{mA}, I_C=2\text{mA}$                 | -                  | 0.1       | 0.3  | V    |
|                          | Isolation resistance                 | Riso          | DC500V                                            | $5 \times 10^{10}$ | $10^{11}$ | -    | Ω    |
|                          | Floating capacitance                 | $C_f$         | $V=0, f=1\text{MHz}$                              | -                  | 0.4       | -    | pF   |
|                          | Response time (Rise)(*3)             | $t_r$         | $V_{CE}=5\text{V}, I_C=2\text{mA}, R_L=100\Omega$ | -                  | 3         | 18   | μs   |
|                          | Response time (Fall) (*3)            | $t_f$         |                                                   | -                  | 5         | 18   | μs   |

\*3 Test Circuit for Switching Time

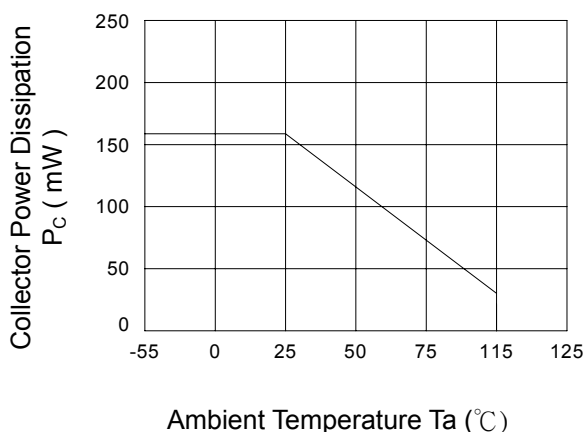
Classification table of current transfer ratio is shown below.

| CTR Rank. | CTR ( % )  |
|-----------|------------|
| KPS28010A | 80 TO 160  |
| KPS28010B | 130 TO 260 |
| KPS28010C | 200 TO 400 |
| KPS28010D | 300 TO 600 |
| KPS28010E | 50 TO 600  |

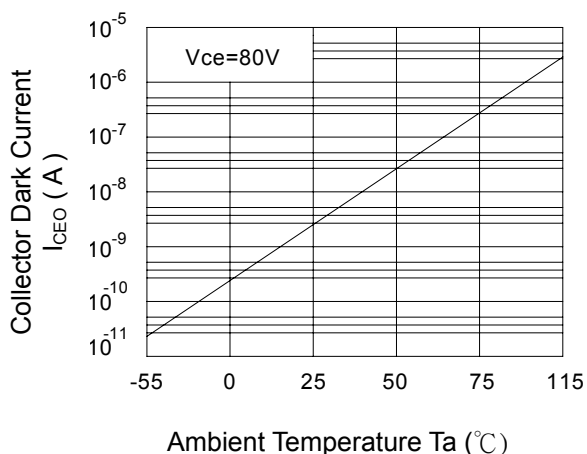
**Fig.1 Current Transfer Ratio  
vs. Forward Current**



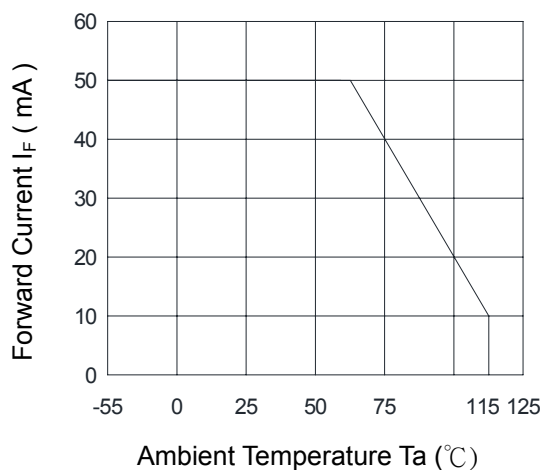
**Fig.2 Collector Power Dissipation  
vs. Ambient Temperature**



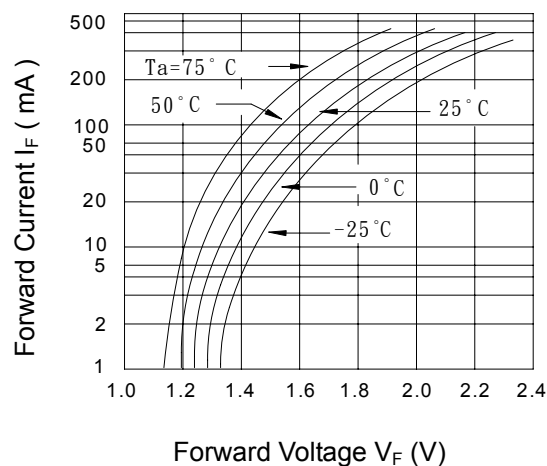
**Fig.3 Collector Dark Current  
vs. Ambient Temperature**



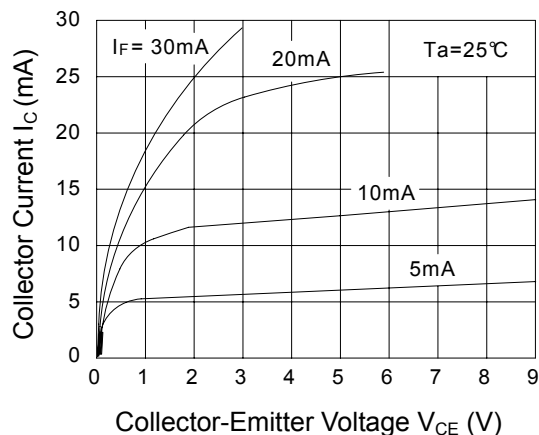
**Fig.4 Forward Current  
vs. Ambient Temperature**



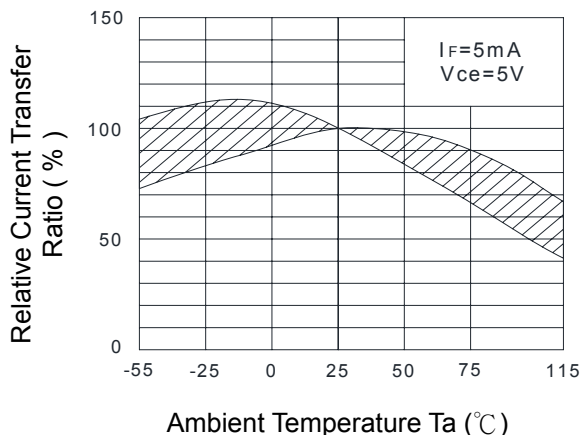
**Fig.5 Forward Current  
vs. Forward Voltage**



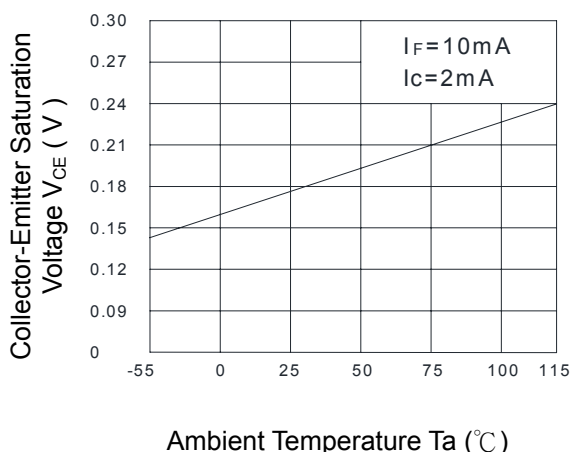
**Fig.6 Collector Current vs. Collector-Emitter Voltage**



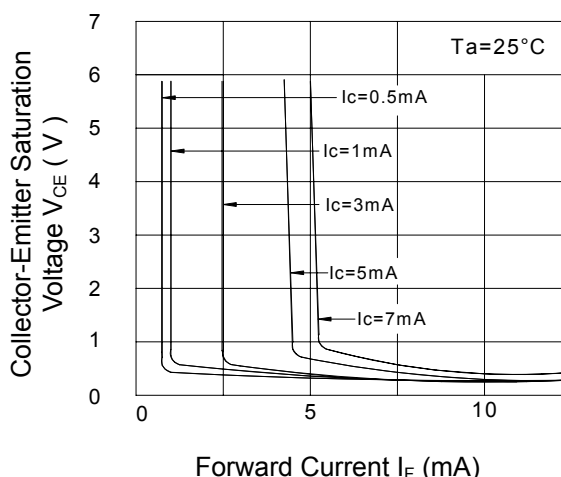
**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**



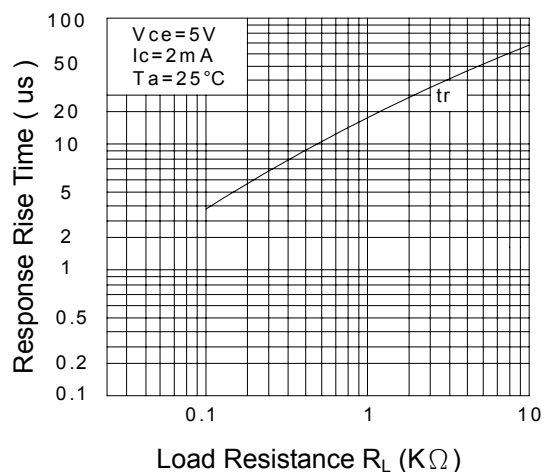
**Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature**



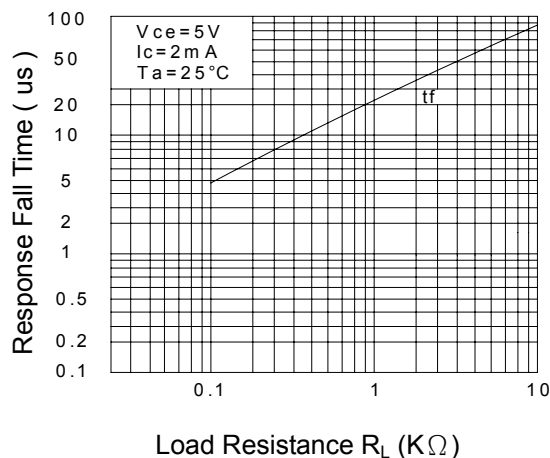
**Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current**



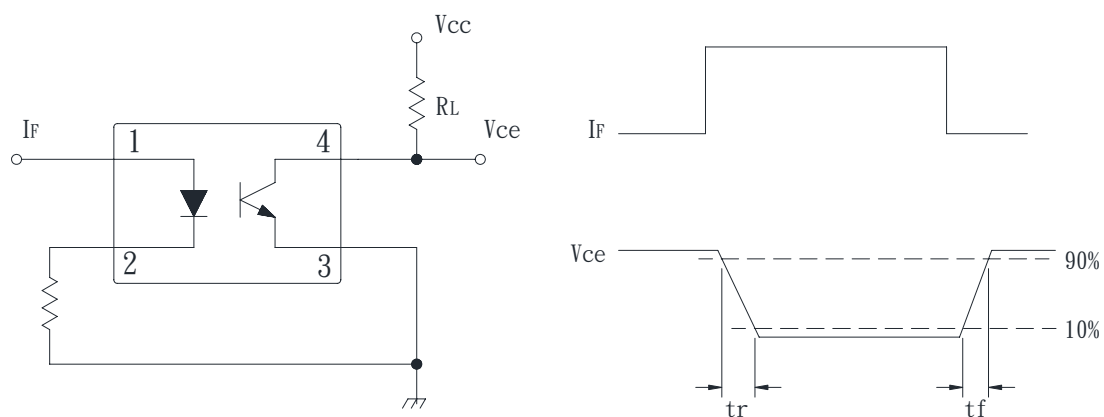
**Fig.10 Response Time (Rise) vs. Load Resistance**



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



## ● Test Circuit for Response Time

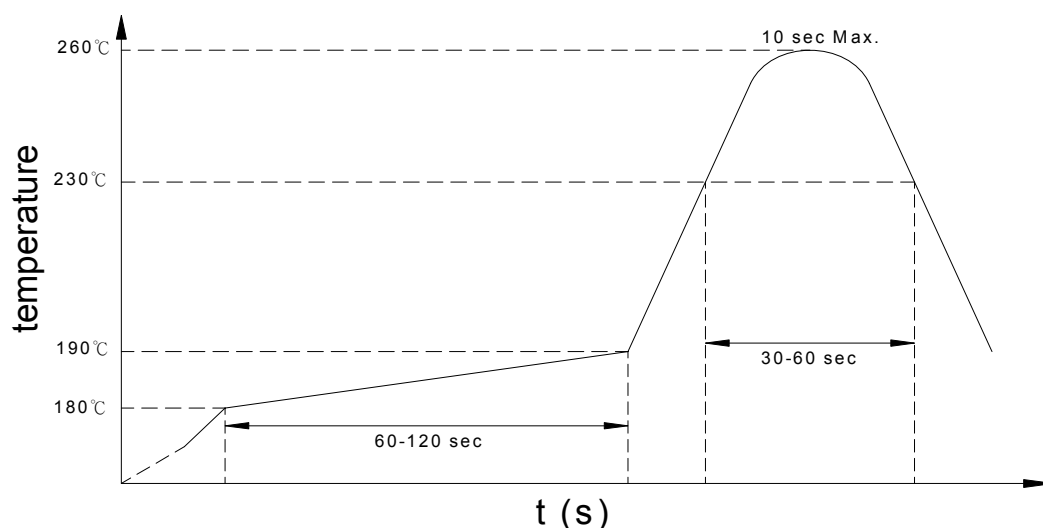


### ● Recommended Soldering Conditions

#### (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

### KPS2801 Y (Z)

#### Notes:

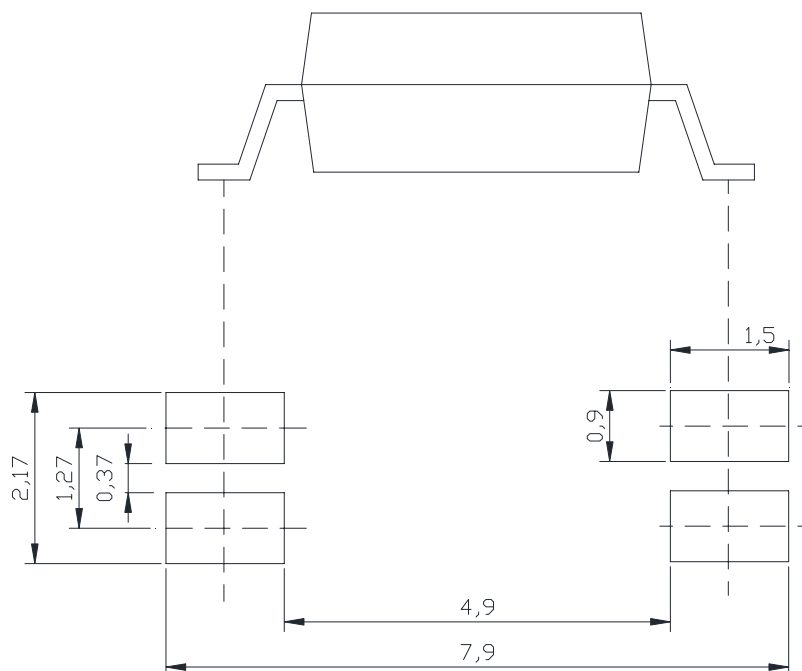
KPS2801 = Part No.

Y = CTR rank option (A ~ E)

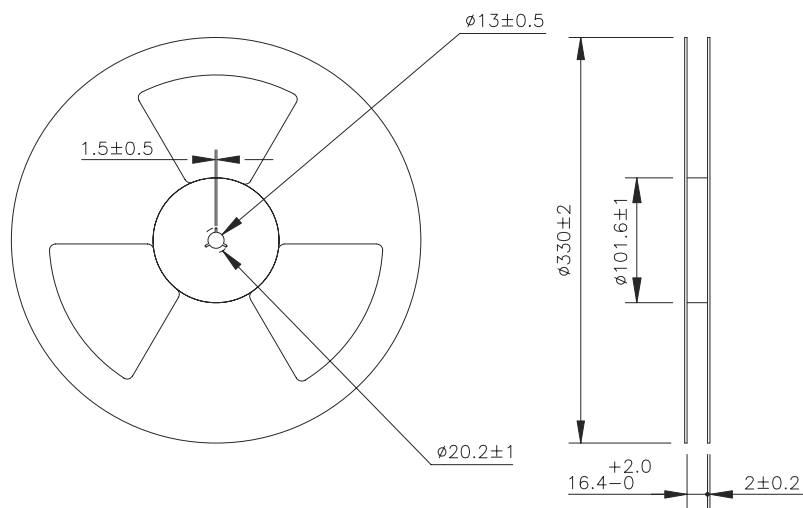
Z = Tape and reel option (TLD 、TRU)

| 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



## ● 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.