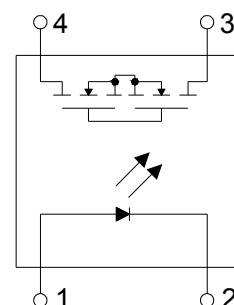


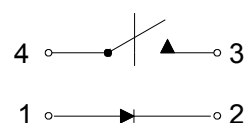
## ● Description

The KCP1008 series is robust, ideal for telecom and ground fault applications. It is a SPST normally open switch (1 Form A) that replaces electromechanical relays in many applications. It is constructed using a GaAlAs LED for actuation control and an integrated monolithic die for the switch output. The die is fabricated in a high-voltage dielectrically isolated technology and is comprised of a photodiode array, switch control circuitry and MOSFET switches.

## ● Schematic



1 FORM A  
NORMALLY OPEN



## ● Features

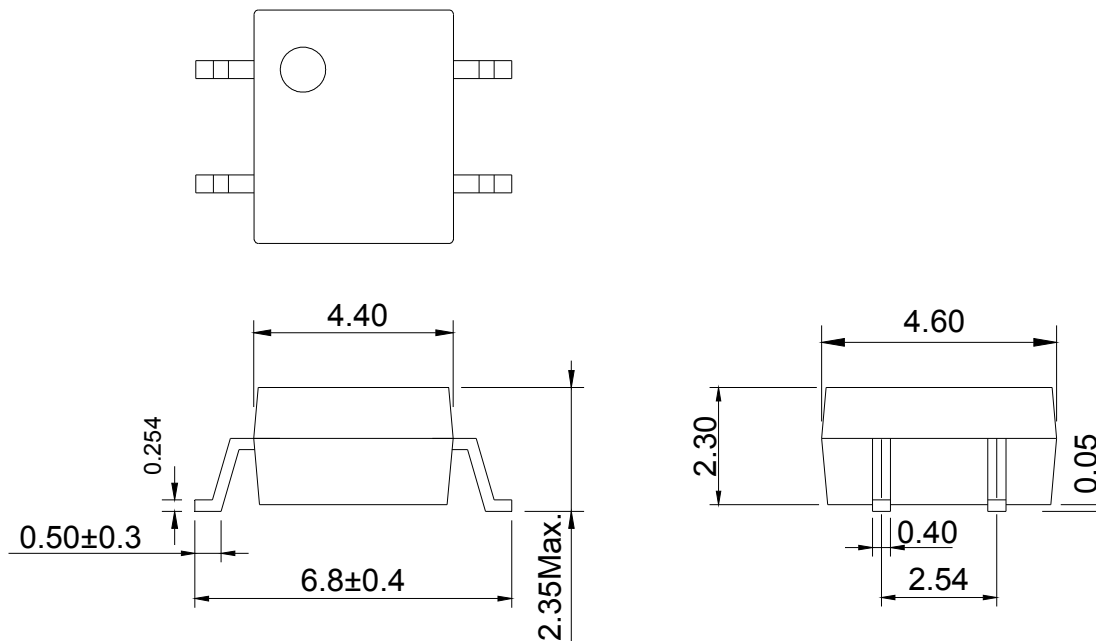
1. Normally open, single pole single throw
2. Control 100V AC or DC voltage
3. Switch 150mA loads
4. Controls low-level analog signals
5. High sensitivity, low ON resistance
6. Low-level off-state leakage current
7. High isolation voltage
8. Pb free and RoHS compliant
9. MSL class 1
10. Agency Approvals :
  - UL Approved (No. E108430): UL508
  - c-UL Approved (No. E108430)
  - FIMKO Approved: EN60065, EN60950

## ● Applications

- Telecommunications (PC, electronic notepad)
- Modem
- Telephone equipment
- Security equipment
- Sensors
- Measuring and testing equipment
- Factory automation equipment
- High speed inspection machines

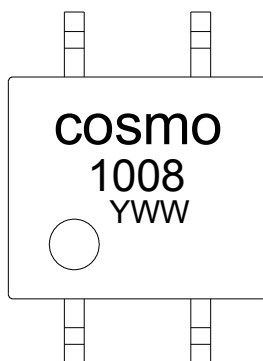
## ● Outside Dimension

Unit : mm



TOLERANCE : ±0.2mm

## ● Device Marking



### Notes :

cosmo  
1008  
YWW

Y : Year code / W : Week code

## ● Absolute Maximum Ratings

(Ta=25°C)

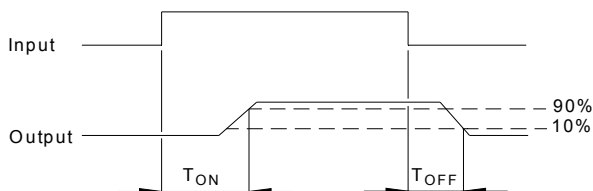
| Item                                   | Symbol                     | Rating    | Unit           |
|----------------------------------------|----------------------------|-----------|----------------|
| Input                                  | Continuous forward current | $I_F$     | 50             |
|                                        | Peak forward current       | $I_{FP}$  | 1              |
|                                        | Reverse voltage            | $V_R$     | 5              |
|                                        | Power dissipation          | $P_{in}$  | 100            |
|                                        | Derate linearly from 25°C  | -         | 1.3            |
| Output                                 | Breakdown voltage          | $V_B$     | 100            |
|                                        | Continuous load current    | $I_L$     | 150            |
|                                        | Power dissipation          | $P_{out}$ | 500            |
| Isolation voltage                      |                            | $V_{iso}$ | 1500           |
| Isolation resistance ( $V_{io}=500V$ ) |                            | $R_{iso}$ | $\geq 10^{10}$ |
| Total power dissipation                |                            | $P_t$     | 550            |
| Derate linearly from 25°C              |                            | -         | 2.5            |
| Operating temperature                  |                            | $T_{opr}$ | -40 to +85     |
| Storage temperature                    |                            | $T_{stg}$ | -40 to +125    |
| Junction temperature                   |                            | $T_j$     | 100            |
| Soldering temperature 10 seconds       |                            | $T_{sol}$ | 260            |

## ● Electro-optical Characteristics

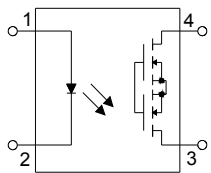
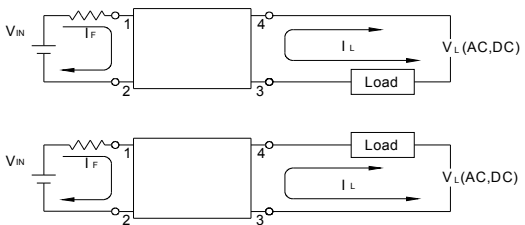
(Ta=25°C)

| Parameter       | Symbol                    | Conditions | Min.                       | Typ. | Max. | Unit |
|-----------------|---------------------------|------------|----------------------------|------|------|------|
| Input           | Forward voltage           | $V_F$      | $I_F=10mA$                 | -    | 1.2  | 1.5  |
|                 | Operation input current   | $I_{FON}$  | $V_L=20V, I_L=100mA$       | -    | -    | 2.0  |
|                 | Recovery input current    | $I_{FOFF}$ | $V_L=20V, I_L \leq 5\mu A$ | 0.2  | -    | -    |
| Output          | Breakdown voltage         | $V_B$      | $I_B=50\mu A$              | 100  | -    | -    |
|                 | Off-state leakage current | $I_{LEAK}$ | $V_L=100V, I_F=0mA$        | -    | 0.2  | 1.0  |
| I/O capacitance |                           | $C_{iso}$  | $V_B=0V, f=1MHz$           | -    | 6    | -    |
| ON resistance   |                           | $R_{ON}$   | $I_F=10mA, I_L=100mA$      | -    | 6    | 8    |
| Turn-on time    |                           | $T_{ON}$   | $I_F=10mA, V_L=20V$        | -    | 0.3  | 2.0  |
| Turn-off time   |                           | $T_{OFF}$  | $I_L=100mA, t=10ms$        | -    | 0.1  | 1.0  |

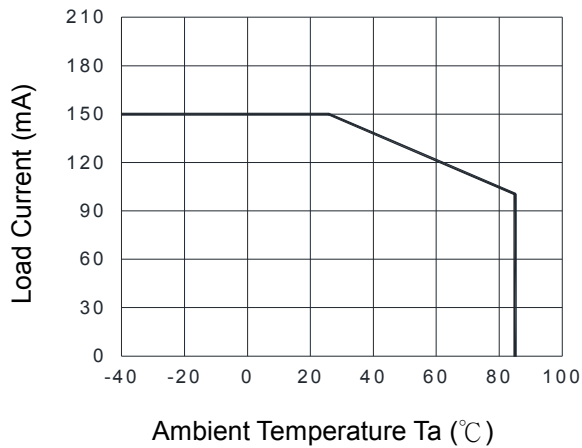
## ● Turn-on / Turn-off Time



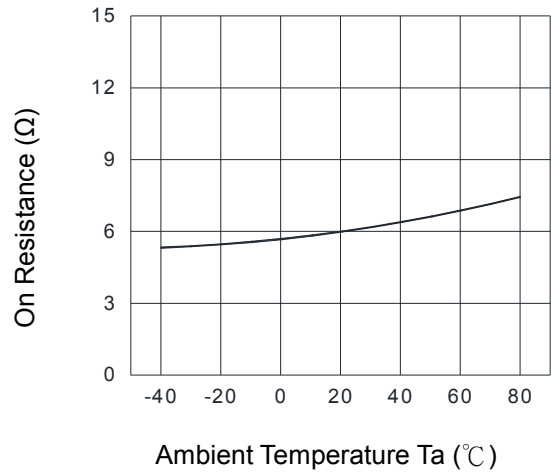
## ● Schematic and Wiring Diagrams

| Schematic                                                                         | Output Configuration | Load     | Connection | Wiring Diagrams                                                                    |
|-----------------------------------------------------------------------------------|----------------------|----------|------------|------------------------------------------------------------------------------------|
|  | 1a                   | AC<br>DC | -          |  |

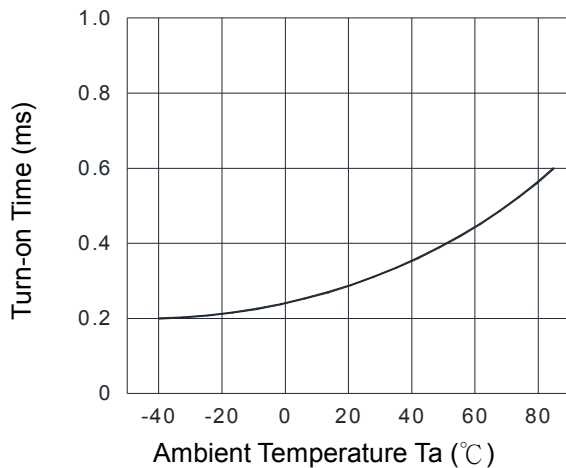
**Fig.1 Load Current vs. Ambient Temperature**



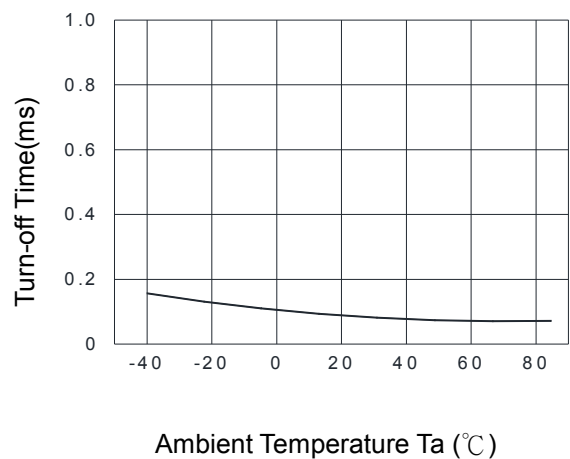
**Fig.2 On Resistance vs. Ambient Temperature**



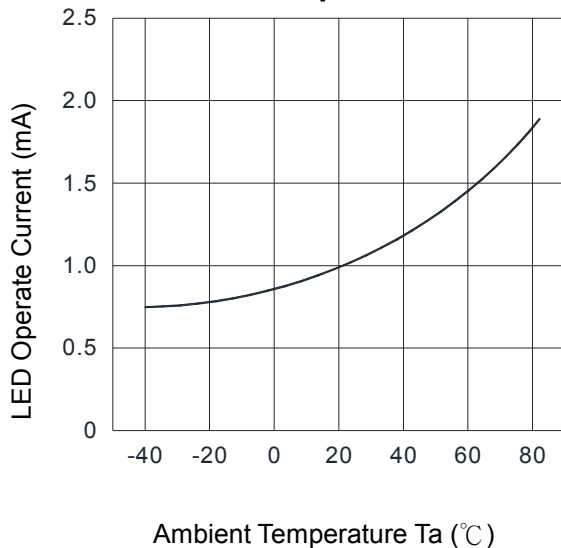
**Fig.3 Turn-on Time vs. Ambient Temperature**



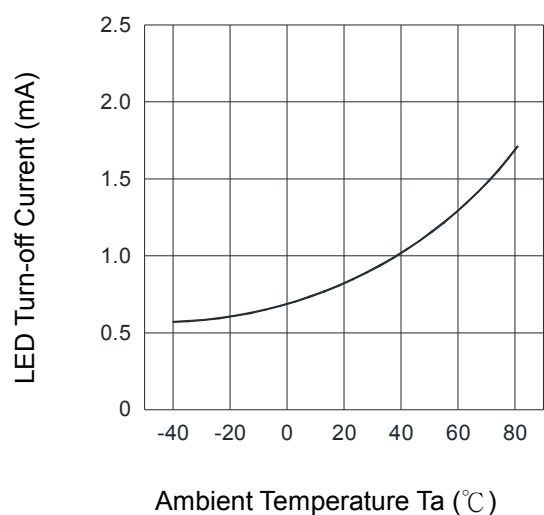
**Fig.4 Turn-off Time vs. Ambient Temperature**



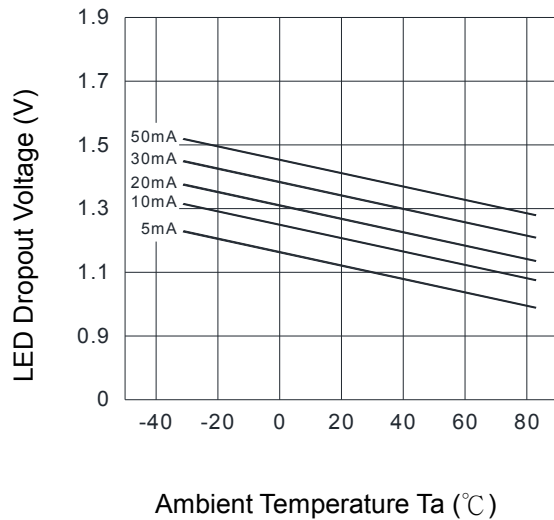
**Fig.5 LED Operate Current vs. Ambient Temperature**



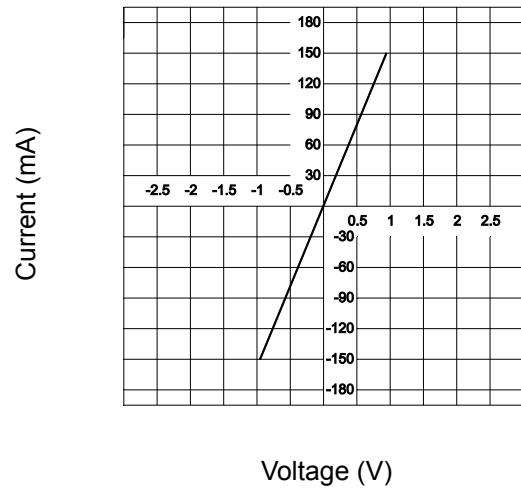
**Fig.6 LED Turn-off Current vs. Ambient Temperature**



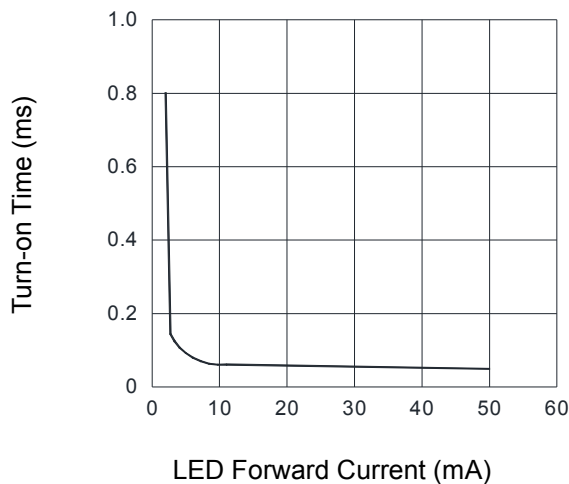
**Fig.7 LED Dropout Voltage vs. Ambient Temperature**



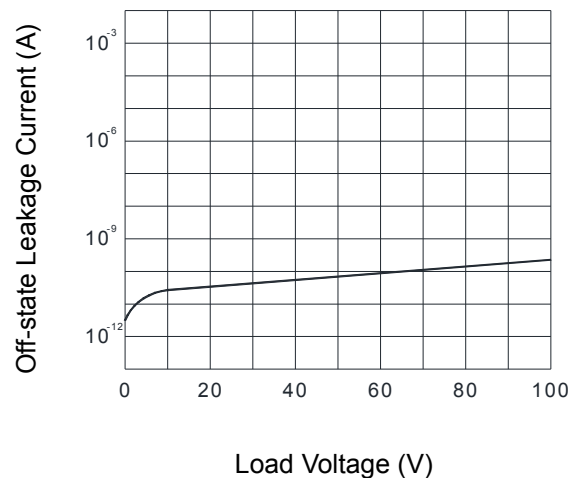
**Fig.8 Voltage vs. Current Characteristics of Output at MOSFET Portion**



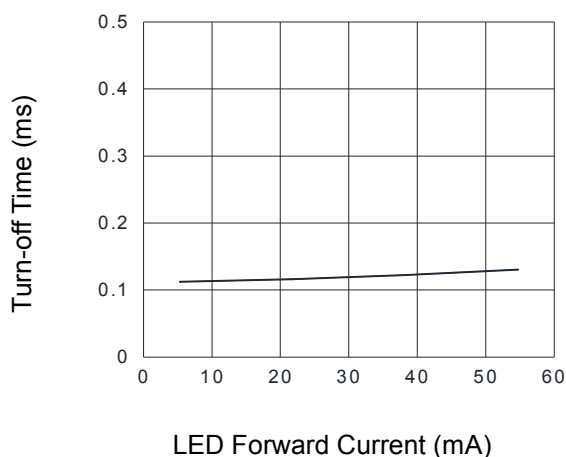
**Fig.9 Turn-on Time vs. LED Forward Current**



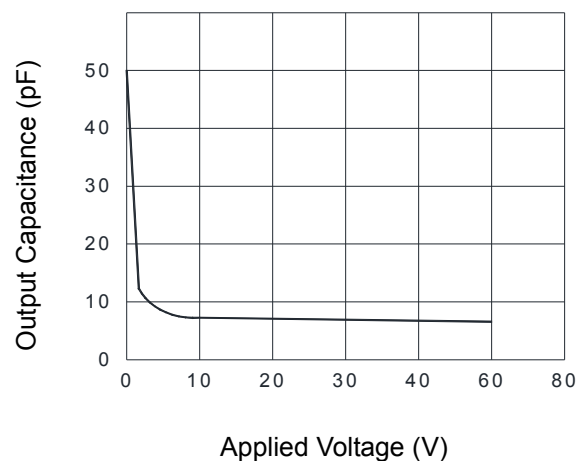
**Fig.10 Off-state Leakage Current vs. Load Voltage**



**Fig.11 Turn-off Time vs. LED Forward Current**

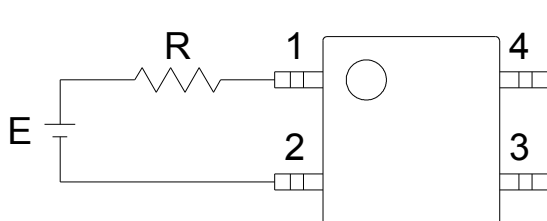


**Fig.12 Output Capacitance vs. Applied Voltage**



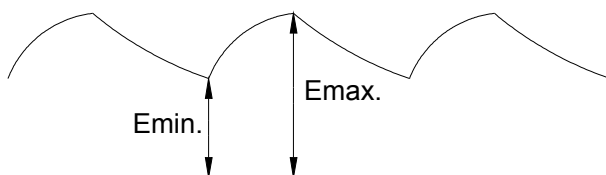
## ● Using Methods

Examples of resistance value to control LED forward current ( $I_F=2\text{mA}$ )

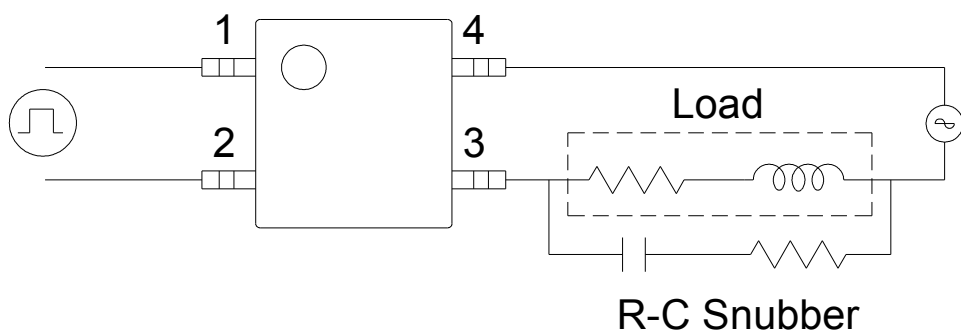
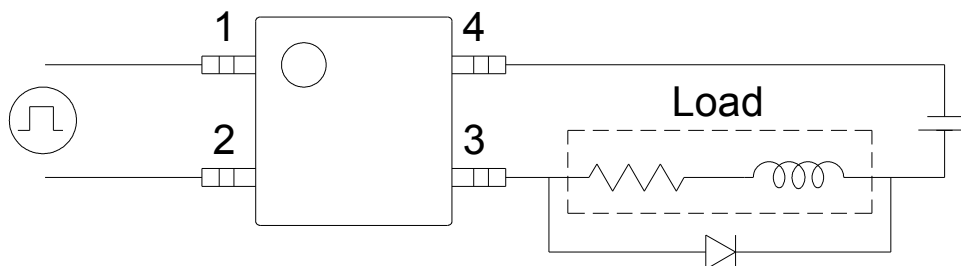


| E    | R                     |
|------|-----------------------|
| 3.3V | Approx. 720 $\Omega$  |
| 5V   | Approx. 1.5K $\Omega$ |
| 12V  | Approx. 4.5K $\Omega$ |
| 15V  | Approx. 6.0K $\Omega$ |
| 24V  | Approx. 9.5K $\Omega$ |

1. LED forward current must be more than 2mA , at E min.
2. LED forward current must be less than 50mA , at E max.



Regulate the spike voltage generated on the inductive load as follows :

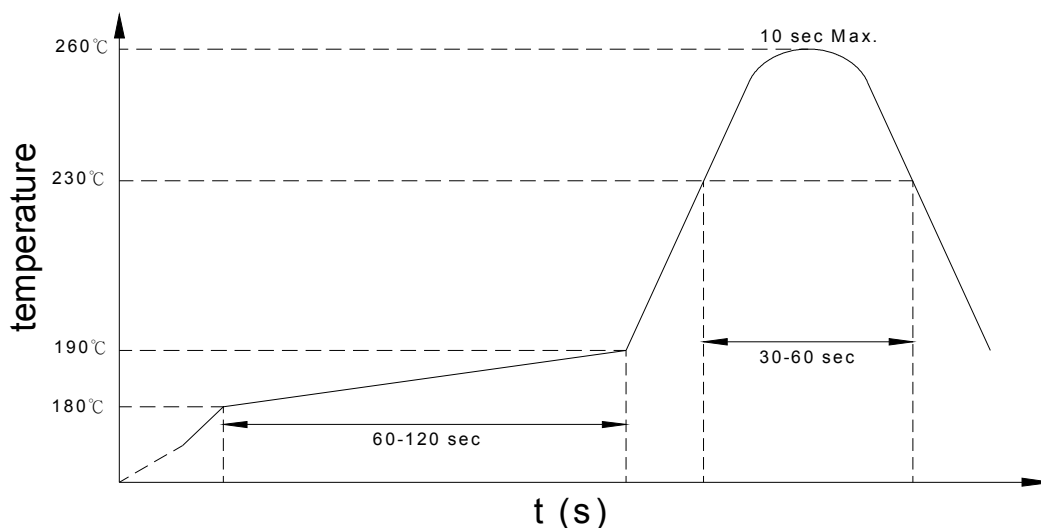


## ● Recommended Soldering Conditions

### (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

### KCP1008 (X)

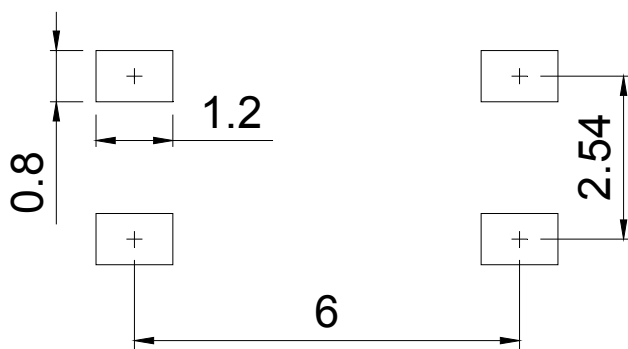
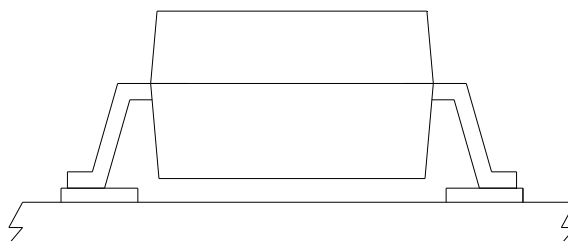
#### Notes :

KCP1008 = Part No.

X = Tape and reel option ( TL 、 TR )

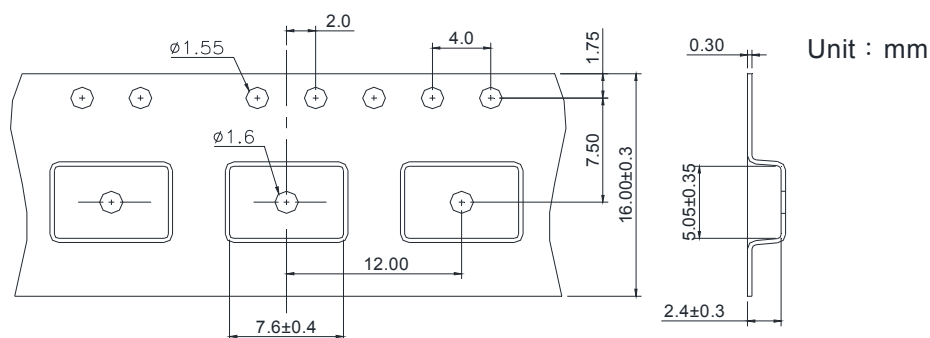
| Option | Description                                                             | Packing quantity    |
|--------|-------------------------------------------------------------------------|---------------------|
| TL     | small outline for surface mount type package +<br>TL tape & reel option | 2000 units per reel |
| TR     | small outline for surface mount type package +<br>TR tape & reel option | 2000 units per reel |

## ● Recommended Pad Layout for Surface Mount Lead Form



Unit : mm

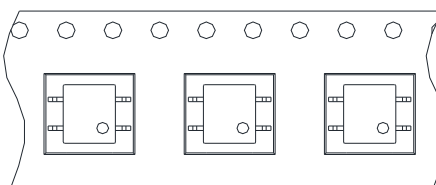
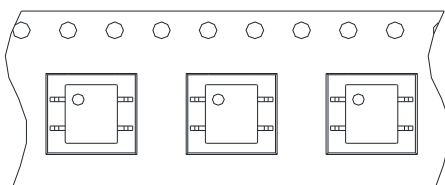
## ● 4-pin SOP Carrier Tape & Reel



TOLERANCE :  $\pm 0.2\text{mm}$

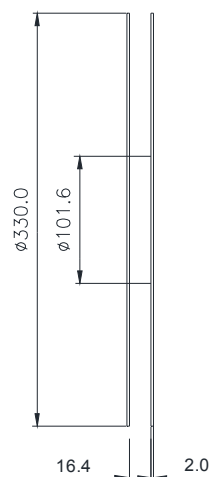
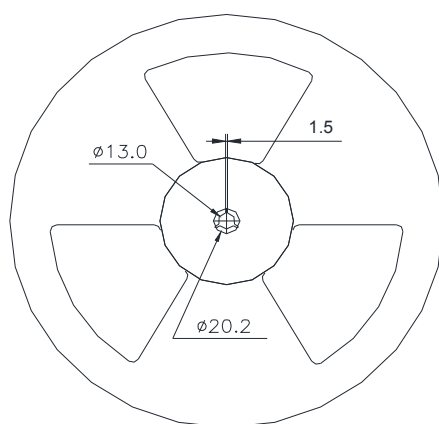
TL

TR



Direction of feed from reel

Direction of feed from reel



## ● Application Notice

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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.

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

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- c. Telecommunication equipment (trunk lines)
- d. Nuclear power control
- e. Equipment used for automotive vehicles, trains, ships...etc.

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