

## ● Description

The KAQY212G 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, fabricated in a high-voltage dielectrically isolated technology, is comprised of a photodiode array, switch control circuitry and MOSFET switches.

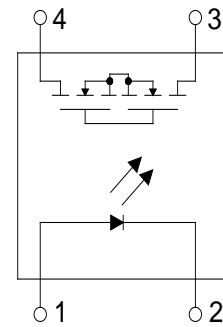
## ● Features

1. Normally open, single pole single throw
2. Control 60V AC or DC voltage
3. Switch 1A loads max.
4. Controls low-level analog signals
5. High sensitivity, low ON resistance
6. Low-level off-state leakage current
7. High isolation voltage 5KV (DIP / SMD)
8. Pb free and RoHS compliant
9. MSL class 1
10. Safety Approvals:  
CQC GB4943.1-2022

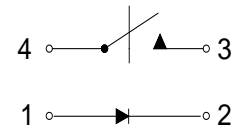
## ● Application

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

## ● Schematic



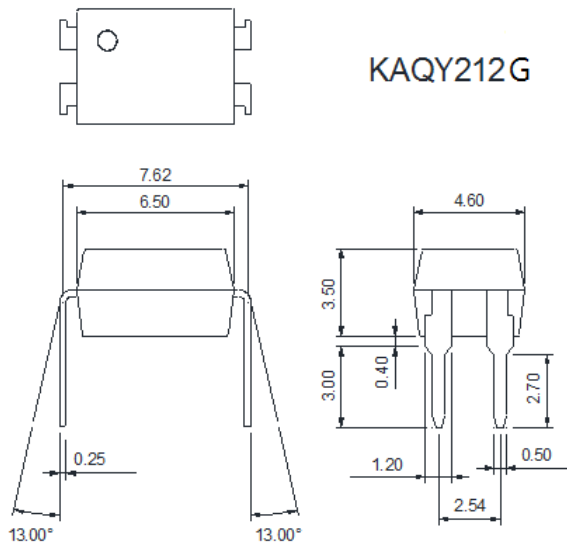
1 FORM A  
NORMALLY OPEN



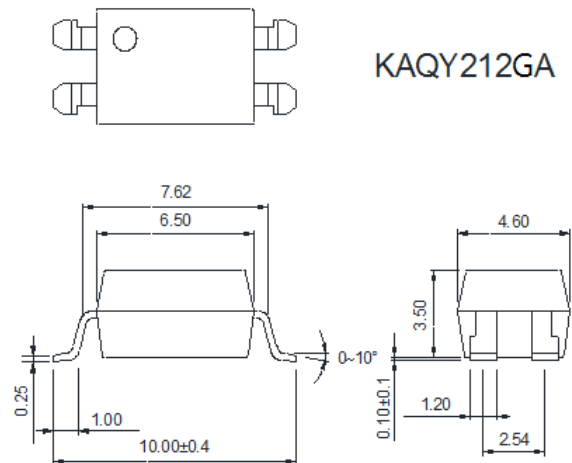
● **Outside Dimension**

Unit : mm

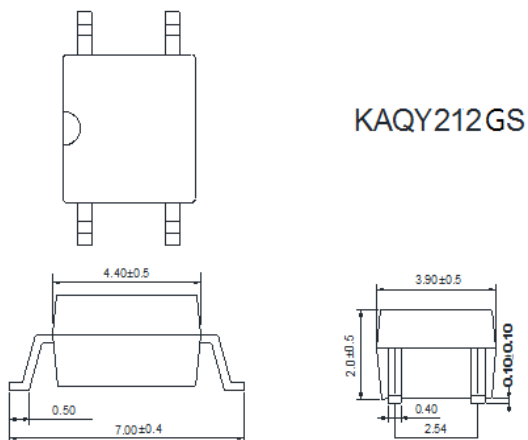
1. Dual-in-line type.



2. Surface mount type.

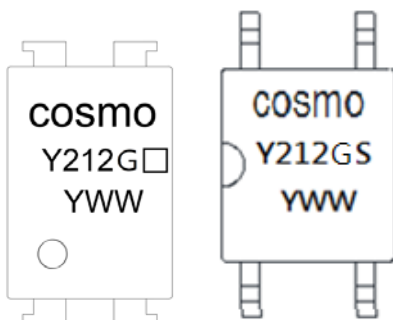


3. Small outline for surface mount type.



TOLERANCE : ±0.2mm

● **Device Marking**



**Notes :**

**COSMO**

Y212G

Part NO.

Y212GS

Part No. S : SOP

YWW

Y : Year code / W : Week code

● **Absolute Maximum Ratings**

(Ta=25°C)

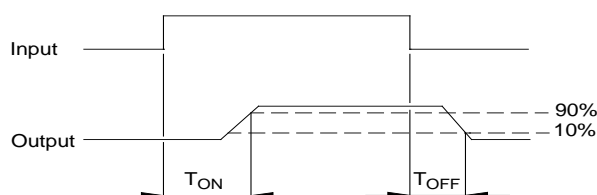
Item		Symbol	Rating		Unit
Input	Continuous forward current	$I_F$	50		mA
	Peak forward current	$I_{FP}$	1		A
	Reverse voltage	$V_R$	5		V
	Power dissipation	$P_{in}$	50		mW
	Derate linearly from 25°C	-	1.3		mW/°C
Output	Breakdown voltage	$V_B$	60		V
	Continuous load current	$I_L$	1		A
	Power dissipation	$P_{out}$	400		mW
Isolation voltage		$V_{iso}$	<b>KAQY212GS</b> 1500	<b>KAQY212G</b> 5000	Vrms
Isolation resistance (Vio=500V)		$R_{iso}$	$\geq 10^{10}$		$\Omega$
Total power dissipation		$P_t$	450		mW
Derate linearly from 25°C		-	4.5		mW/°C
Operating temperature		$T_{opr}$	-40 to +100		°C
Storage temperature		$T_{stg}$	-40 to +125		°C
Junction temperature		$T_j$	100		°C
Soldering temperature 10 seconds		$T_{sot}$	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	1.5	V
	Operation input current	$I_{FON}$	$V_L=20V, I_L=100mA$	-	-	3.0	mA
	Recovery input current	$I_{FOFF}$	$V_L=20V, I_L=100\mu A$	0.2	-	-	mA
Output	Breakdown voltage	$V_B$	$I_B=100\mu A$	60	-	-	V
	Off-state leakage current	$I_{LEAK}$	$V_L=60V, I_F=0mA$	-	0.1	1.0	$\mu A$
I/O capacitance		$C_{iso}$	$V_B=0V, f=1MHz$	-	6	-	pF
ON resistance		$R_{ON}$	$I_F=10mA, I_L=100mA$	-	0.2	0.7	$\Omega$
Turn-on time		$T_{ON}$	$I_F=5mA, V_L=20V$	-	1.0	1.5	ms
Turn-off time		$T_{OFF}$	$I_L=100mA, t=10ms$	-	0.1	0.5	ms

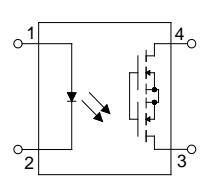
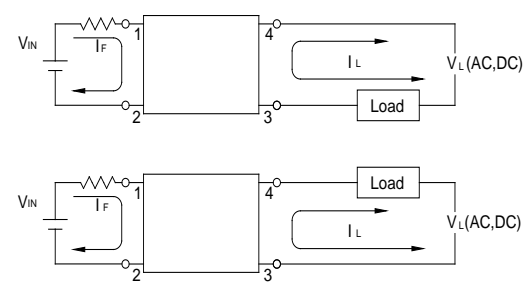
● **Turn-on / Turn-off Time**



● **Recommended operating conditions (Ambient temperature: 25°C)**

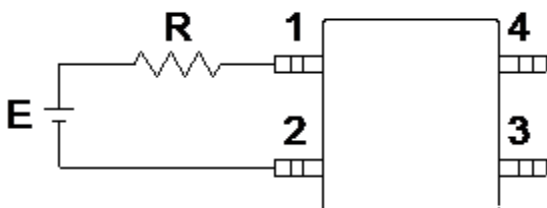
Item	Symbol	Min.	Max.	Unit
Operation input current	IFon	3	20	mA
Breakdown voltage	VB	-	48	V
Continuous load current	IL	-	1.0	A

● **Schematic and Wiring Diagrams**

Schematic	Output Configuration	Load	Connection	Wiring Diagrams
	1a	AC DC	-	

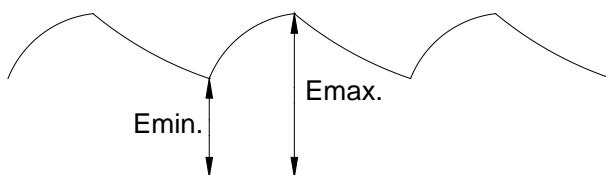
● **Using Methods**

Examples of resistance value to control LED forward current ( $I_F=5\text{mA}$ )

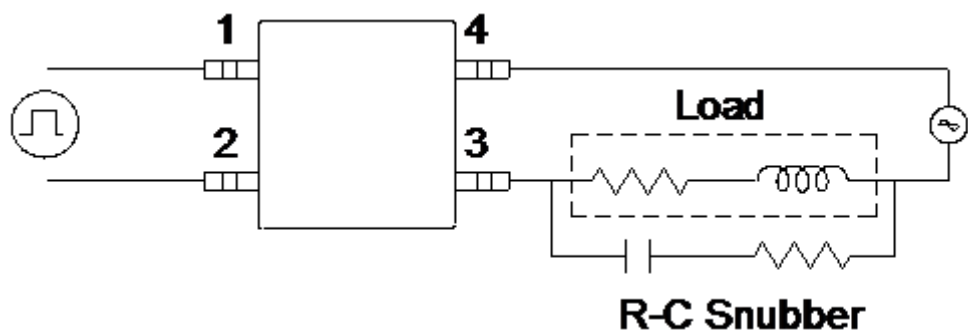
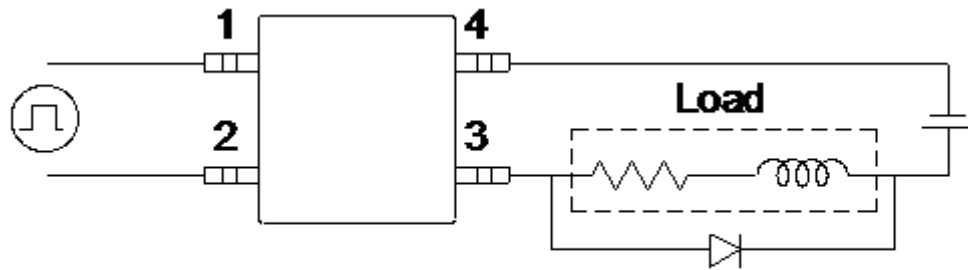


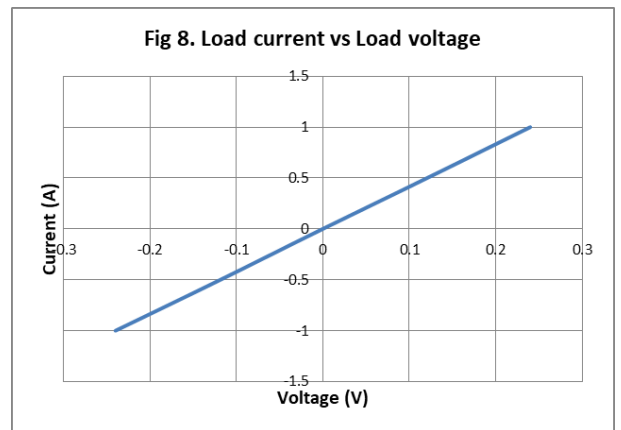
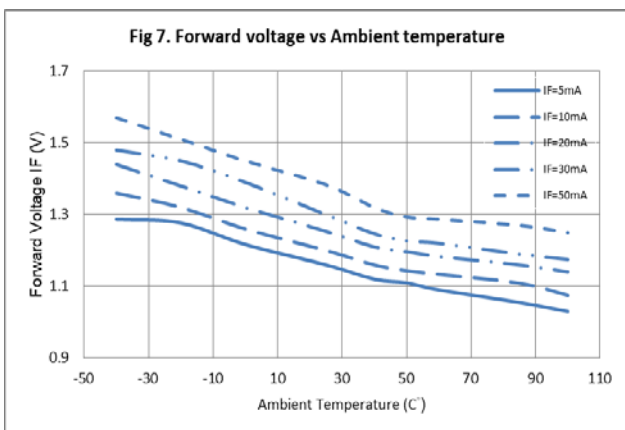
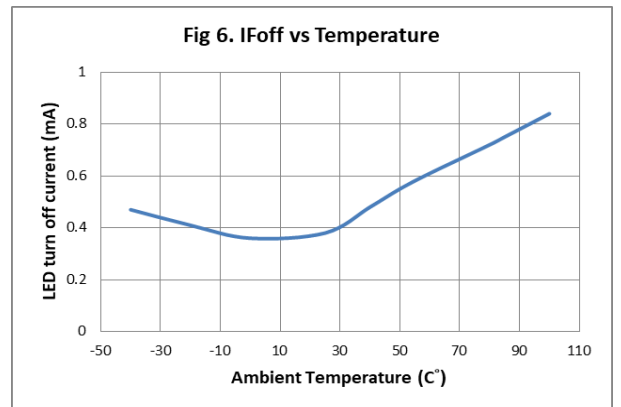
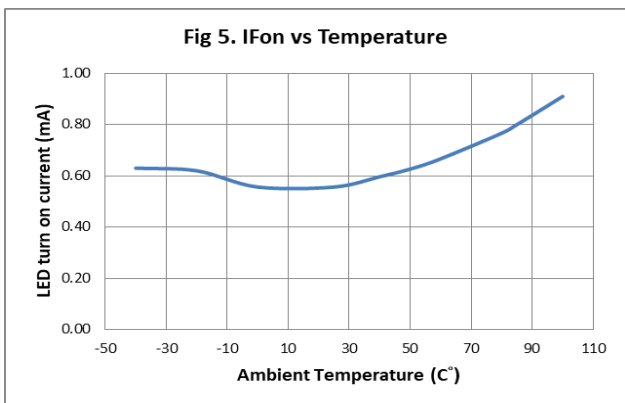
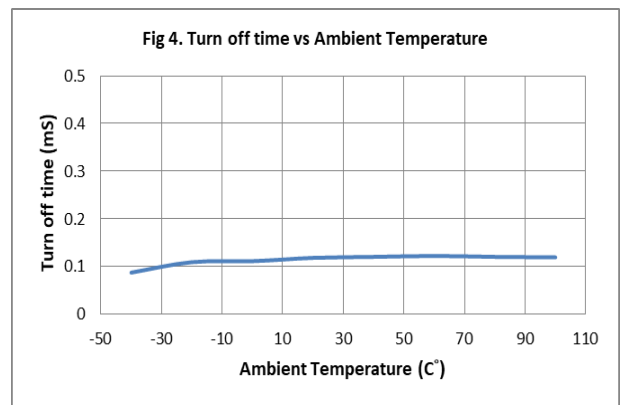
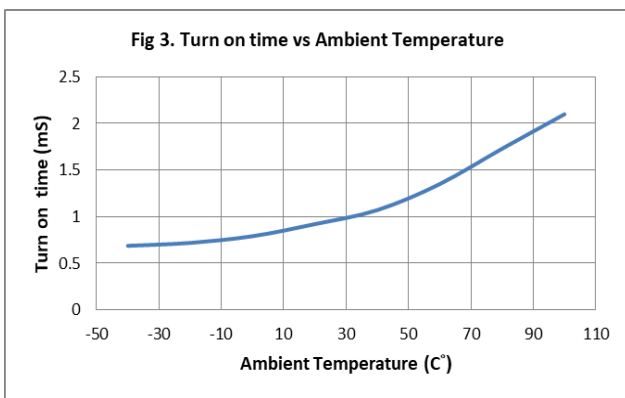
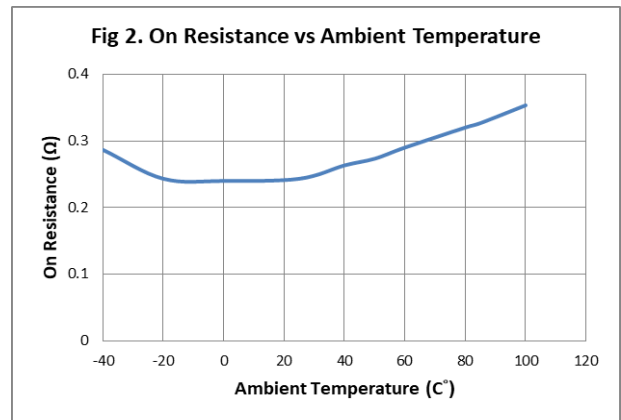
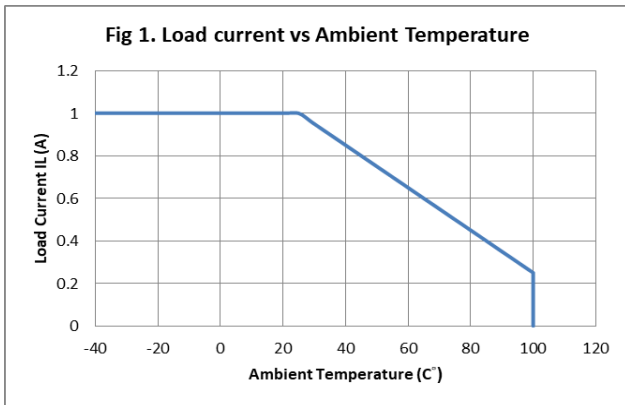
E	R
3.3V	Approx. 330 Ω
5V	Approx. 640 Ω
12V	Approx. 1.9K Ω
15V	Approx. 2.5K Ω
24V	Approx. 4.1K Ω

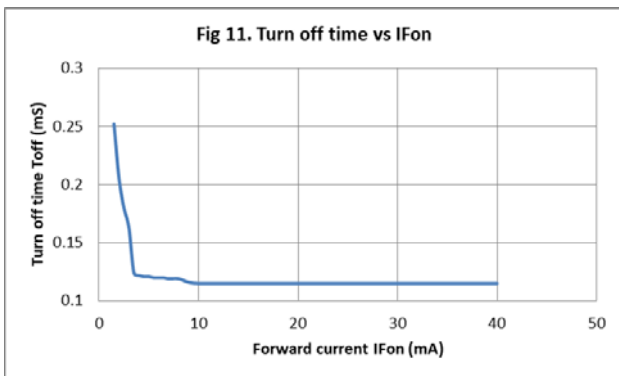
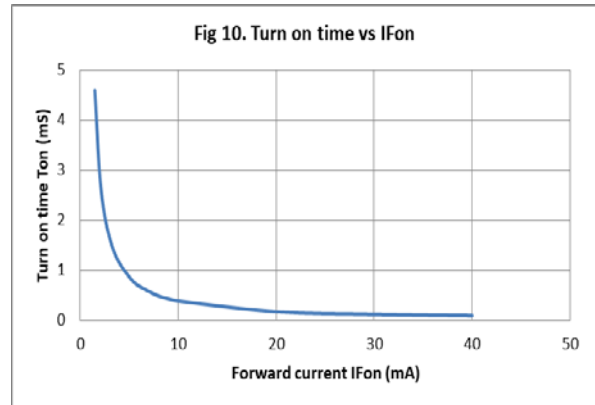
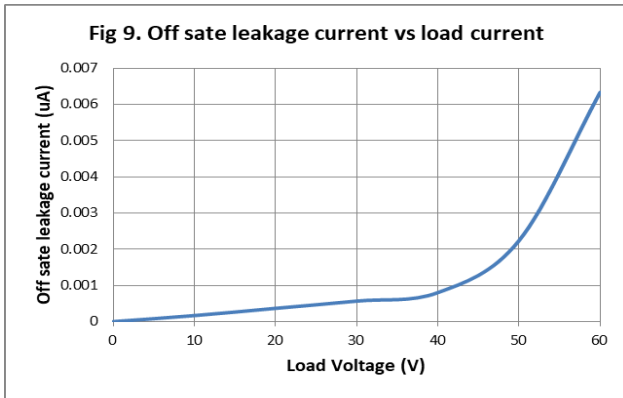
1. LED forward current must be more than 5mA · at E min.
2. LED forward current must be less than 50mA · at E max.



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





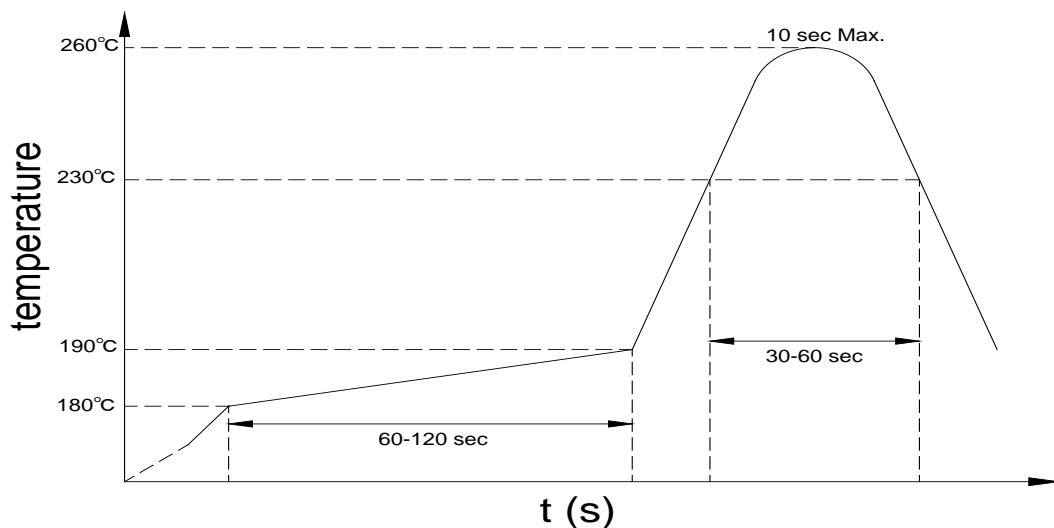


## ● Recommended Soldering Conditions

### (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
- Number of reflows : 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)
- Number of times : 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**

## KAQY212G X (Y)

**Note :**

KAQY212G = Part No.

X = Lead form option ( blank · S or A )

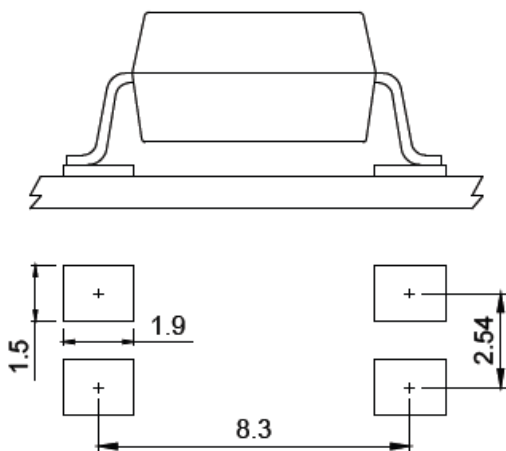
Y = Tape and reel option ( TLD · TRU )

Option	Description	Packing quantity
A (TLD)	surface mount type package + TLD tape & reel option	2000 units per reel
A (TRU)	surface mount type package + TRU tape & reel option	2000 units per reel
S (TLD)	small outline for surface mount type package + TLD tape & reel option	3000 units per reel
S (TRU)	small outline for surface mount type package + TRU tape & reel option	3000 units per reel

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

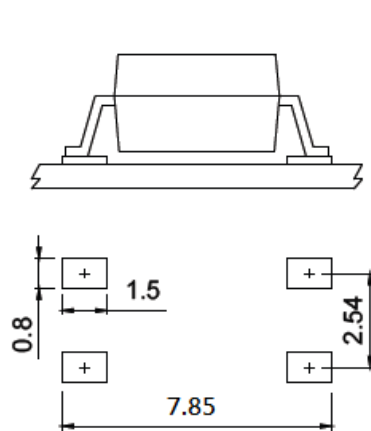
### 1. Surface mount type.

**4-pin SMD**



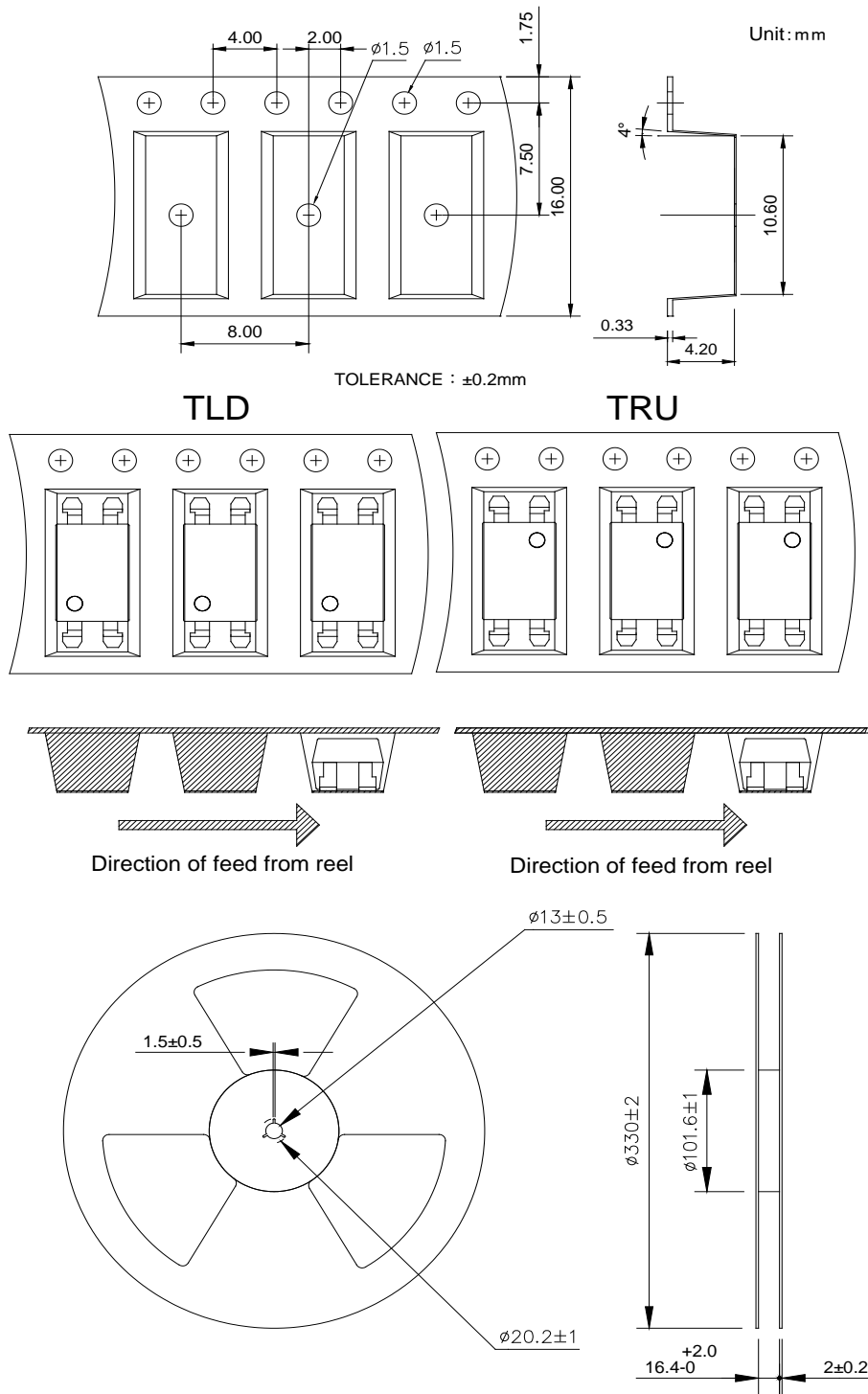
### 2. Small outline for surface mount type.

**4-pin SOP**



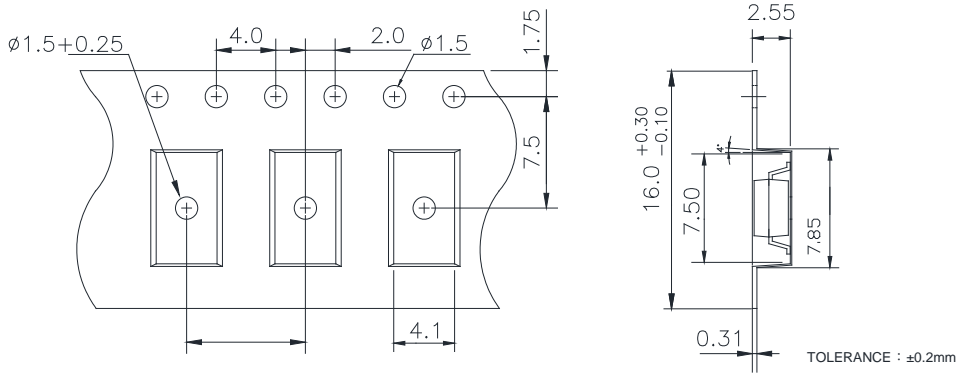
Unit : mm

● 4-pin SMD Carrier Tape & Reel



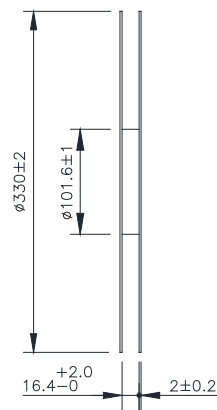
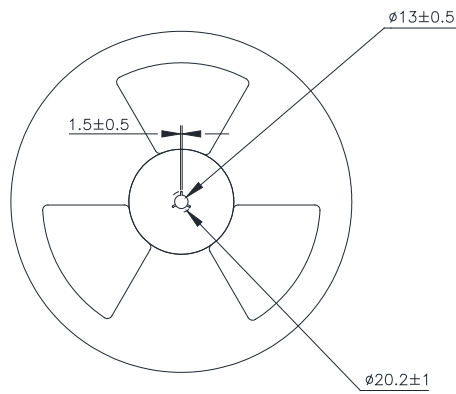
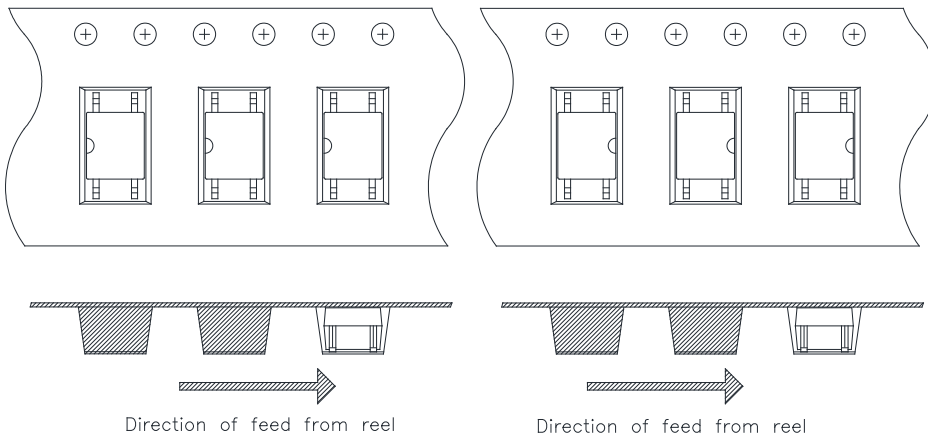
● 4-pin SOP Carrier Tape & Reel

Unit: mm



TLD

TRU



## ● Application Notice

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