

## ● Description

The KAQV212G 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.

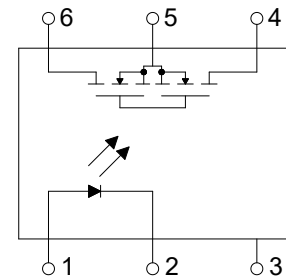
## ● Features

1. Normally open, single pole single throw
2. Control 60V AC or DC voltage
3. Switch 1.0A loads
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. Agency Approvals :
  - UL Approved
  - c-UL Approved
  - FIMKO Approved
  - VDE Approved

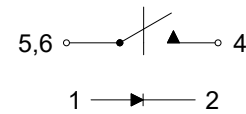
## ● Application

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

## ● Schematic



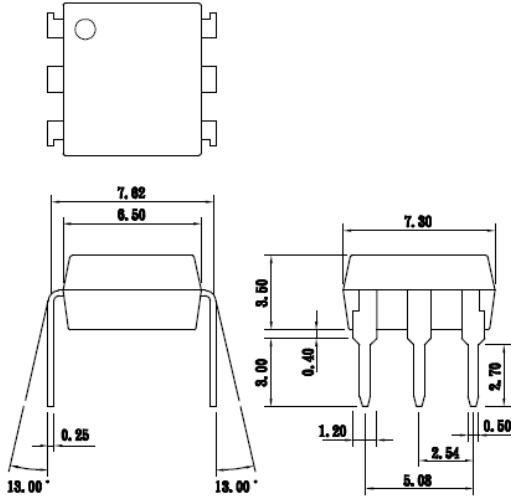
1 FORM A  
NORMALLY OPEN



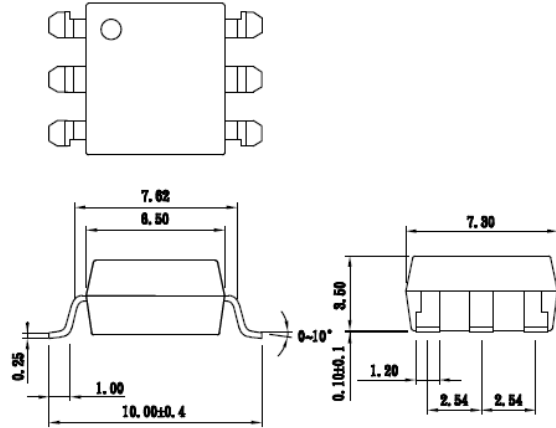
● **Outside Dimension**

Unit : mm

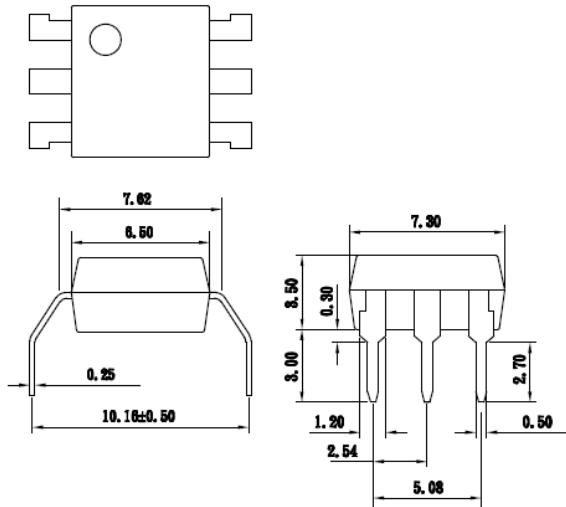
**1. Dual-in-line type.**



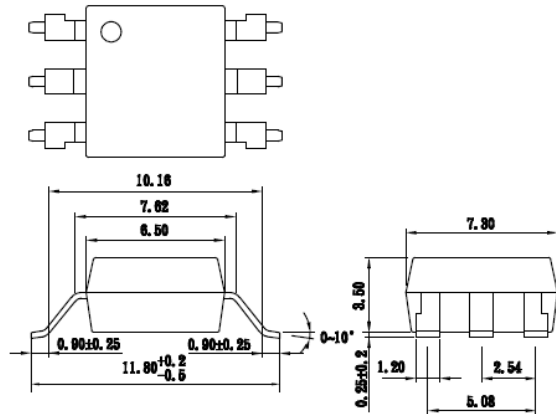
**2. Surface mount type.**



**3. Long creepage distance type**

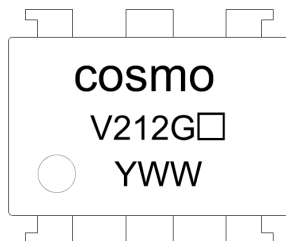


**4. Long creepage distance for surface mount type.**



**TOLERANCE: ±0.2mm**

● **Device Marking**



**Notes :**

- COSMO  
 V212G □(Blank): DIP or A: SMD  
 YWW Y : Year code / W : Week code

● **Absolute Maximum Ratings**

(Ta=25°C)

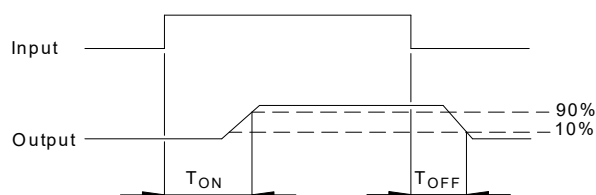
Parameter		Symbol	Rating	Unit
Input	Continuous forward current	$I_F$	50	mA
	Peak forward current	$I_{FP}$	1	A
	Reverse voltage	$V_R$	5	V
	Power dissipation	$P_{in}$	100	mW
	Derate linearly from 25°C	-	1.3m	mW/°C
Output	Breakdown voltage	$V_B$	60	V
	Continuous load current	$I_L$	1	A
	Power dissipation	$P_{out}$	500	mW
Isolation voltage		$V_{iso}$	5000	Vrms
Isolation resistance (Vio=500V)		$R_{iso}$	$\geq 10^{10}$	$\Omega$
Total power dissipation		$P_t$	550	mW
Derate linearly from 25°C		-	2.5m	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**

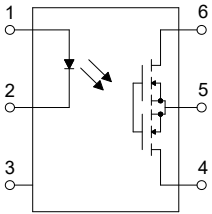
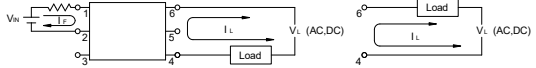
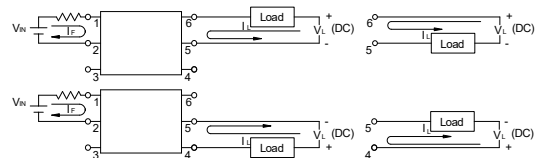
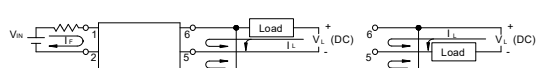
(Ta=25°C)

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	$I_{FOFF}$	$V_L=20V, I_L \leq 100\mu A$	0.2	-	-	mA	
Output	Breakdown voltage	$V_B$	$I_B=100\mu A$	60	-	-	V	
	Off-state leakage current	$I_{LEAK}$	$V_L=60V, I_F=0mA$	-	0.2	1.0	$\mu A$	
I/O capacitance		$C_{iso}$	$V_B=0V, f=1MHz$	-	6	-	pF	
ON resistance	connection	A	$R_{ON}$	$I_F=10mA, I_L=100mA$	-	0.25	0.7	$\Omega$
		B			-	0.13	0.25	
		C			-	0.07	0.15	
Turn-on time		$T_{ON}$	$I_F=10mA, V_L=20V$	-	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**

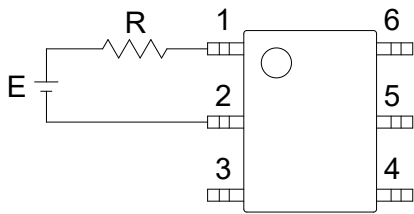


● Schematic and Wiring Diagrams

Schematic	Output Configuration	Load	Connection	Wiring Diagrams
	1a	AC DC	A	
		DC	B	
		DC	C	

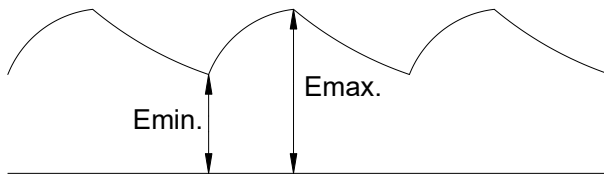
## ● Using Methods

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

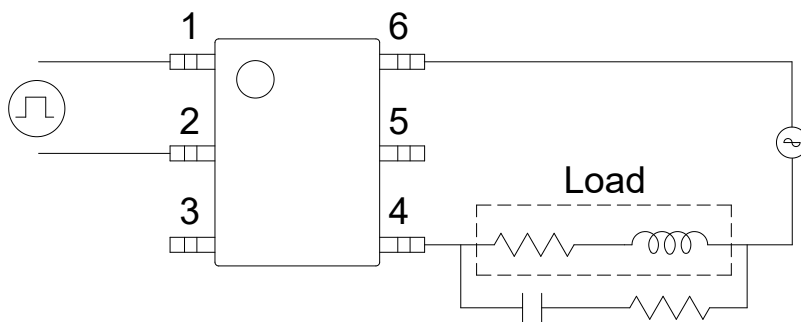
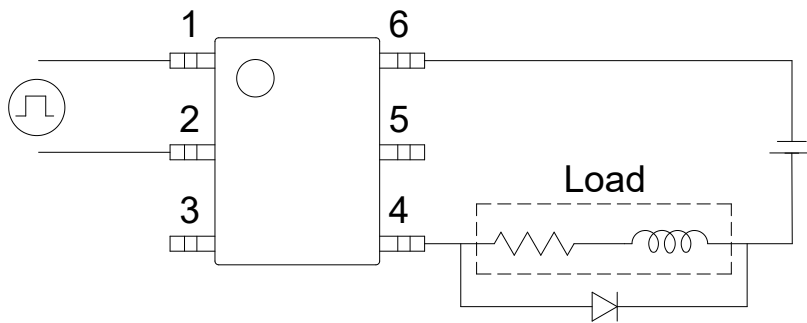


E	R
3.3V	Approx. 330 $\Omega$
5V	Approx. 640 $\Omega$
12V	Approx. 1.9K $\Omega$
15V	Approx. 2.5K $\Omega$
24V	Approx. 4.1K $\Omega$

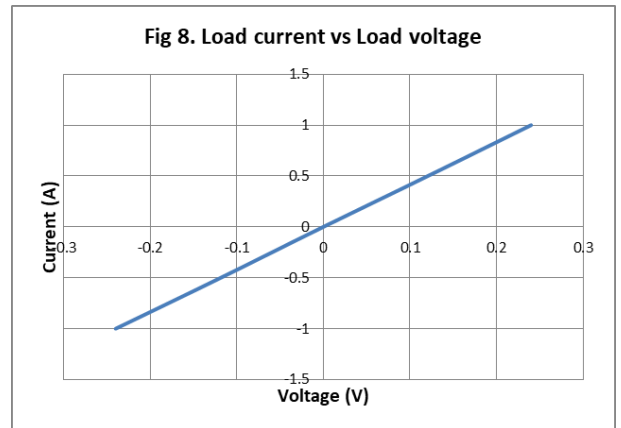
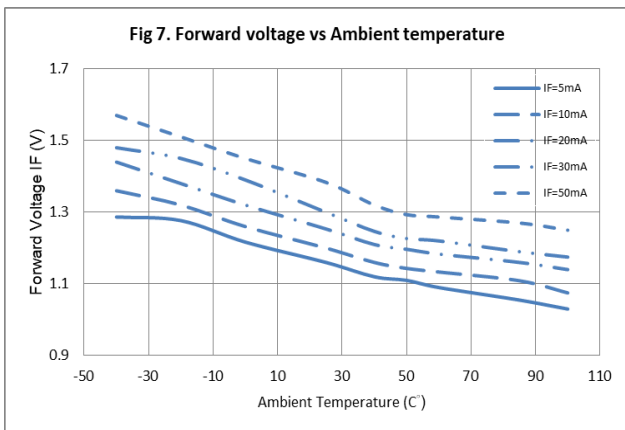
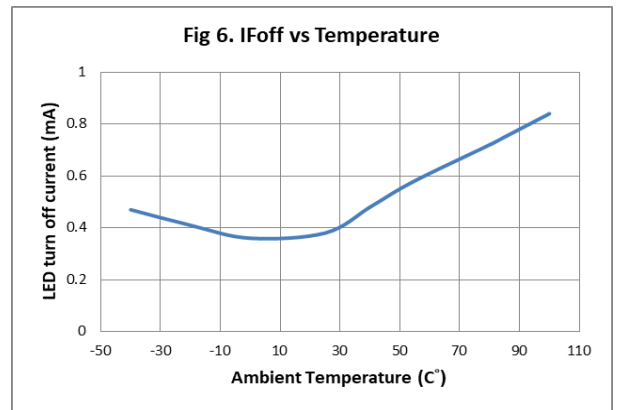
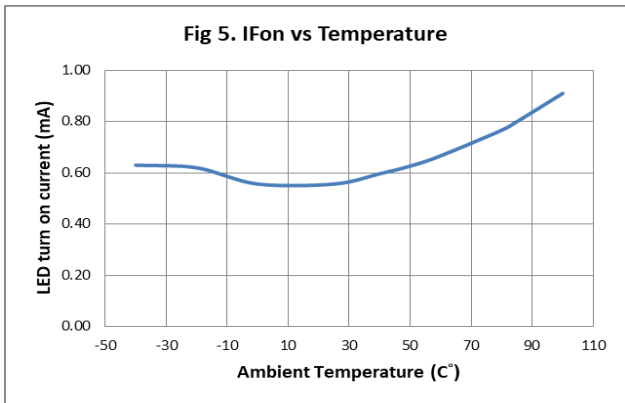
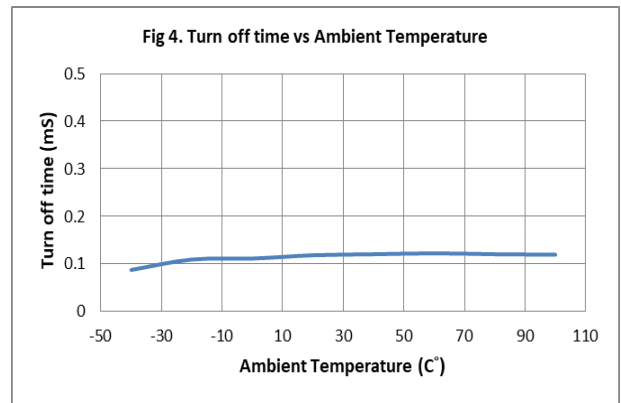
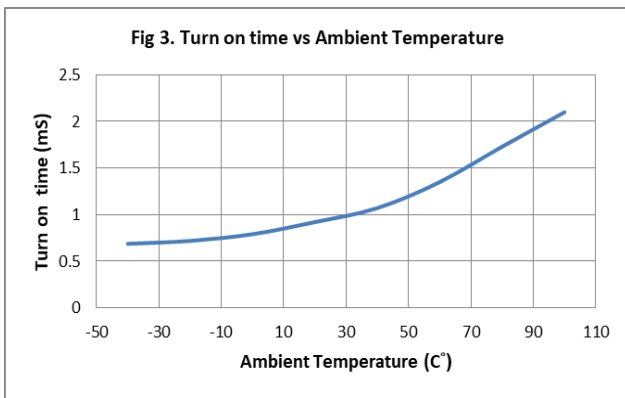
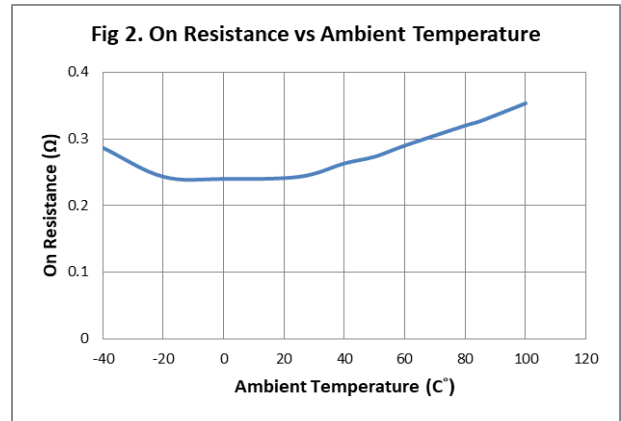
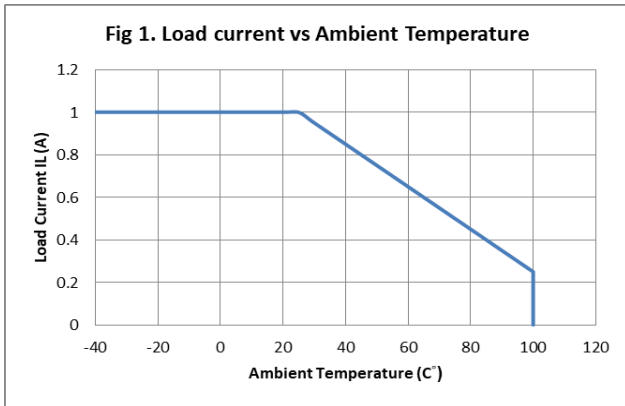
1. LED forward current must be more than 5mA , at E min.
2. LED forward current must be less than 50mA , at E max.

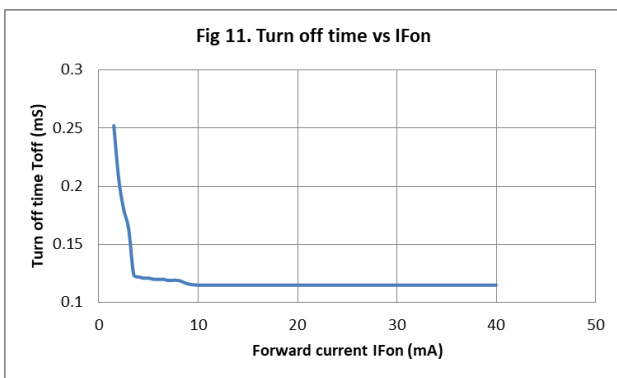
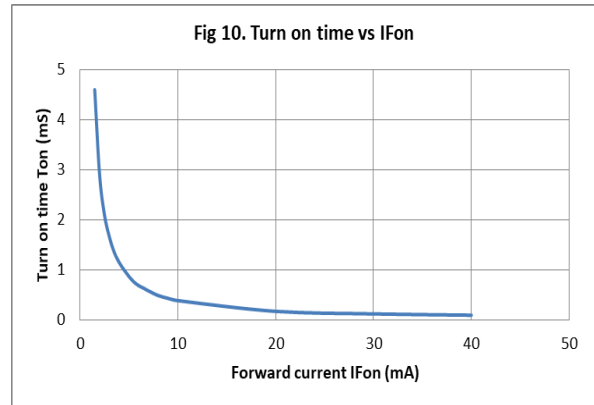
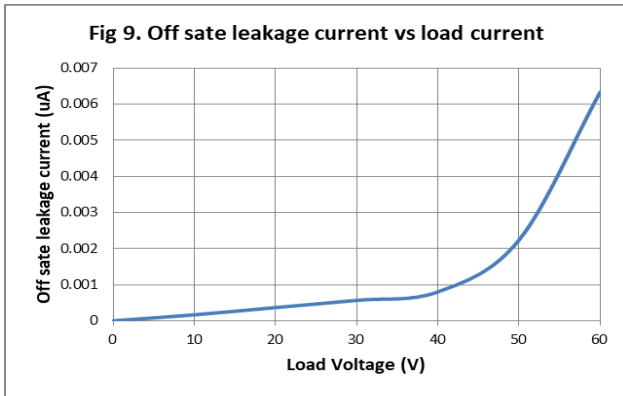


Regulate the spike voltage generated on the inductive load as follows :



R-C Snubber



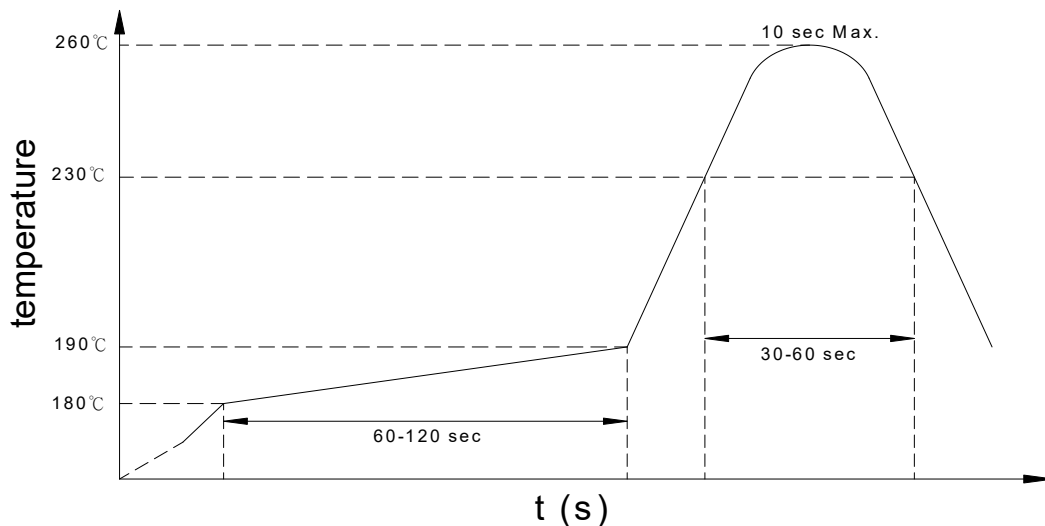


● **Recommended Soldering Conditions**

(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.

● **Recommended Soldering Conditions**

(a) **Infrared reflow soldering :**



- **Numbering System**

## KAQV212G X (Y)

**Notes:**

KAQV212G = Part No.

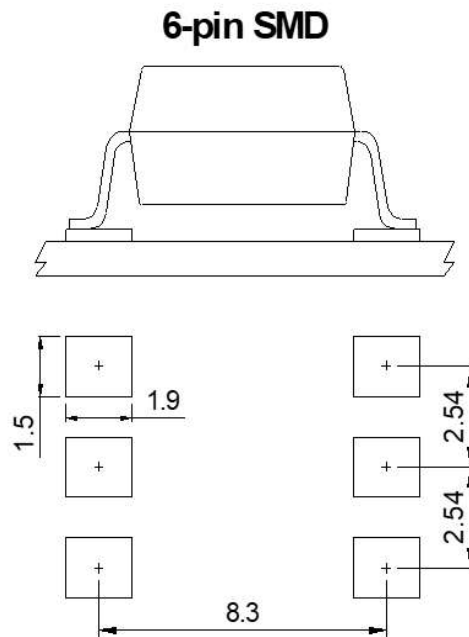
X = Lead form option ( blank or A )

Y = Tape and reel option ( TL · TR )

Option	Description	Packing quantity
A (TL)	surface mount type package + TL tape & reel option	1000 units per reel
A (TR)	surface mount type package + TR tape & reel option	1000 units per reel

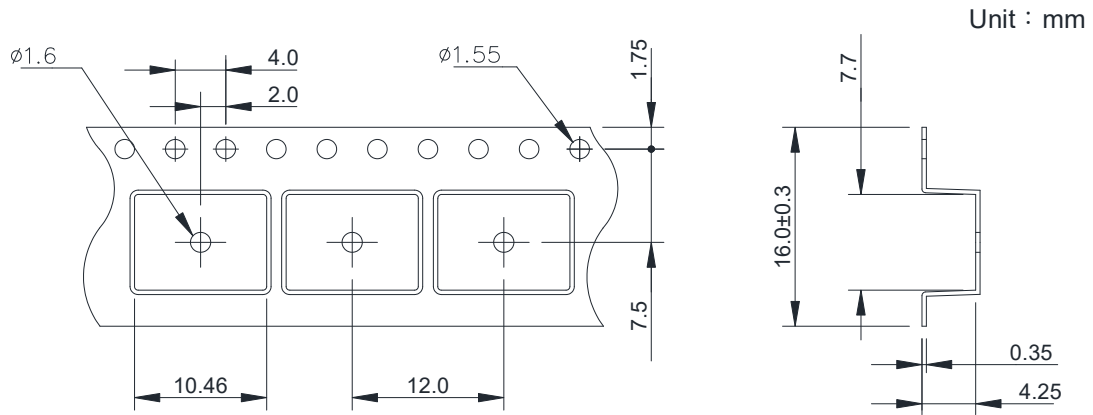
- **Recommended Pad Layout for Surface Mount Lead Form**

### 1. Surface mount type.

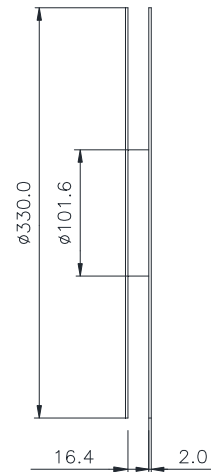
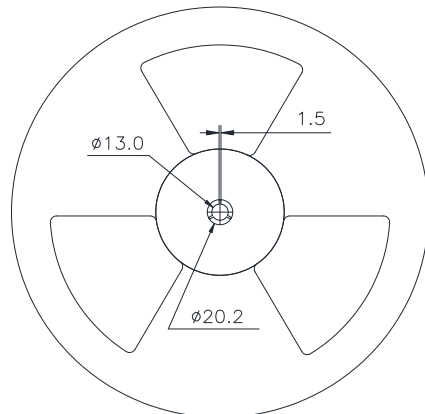
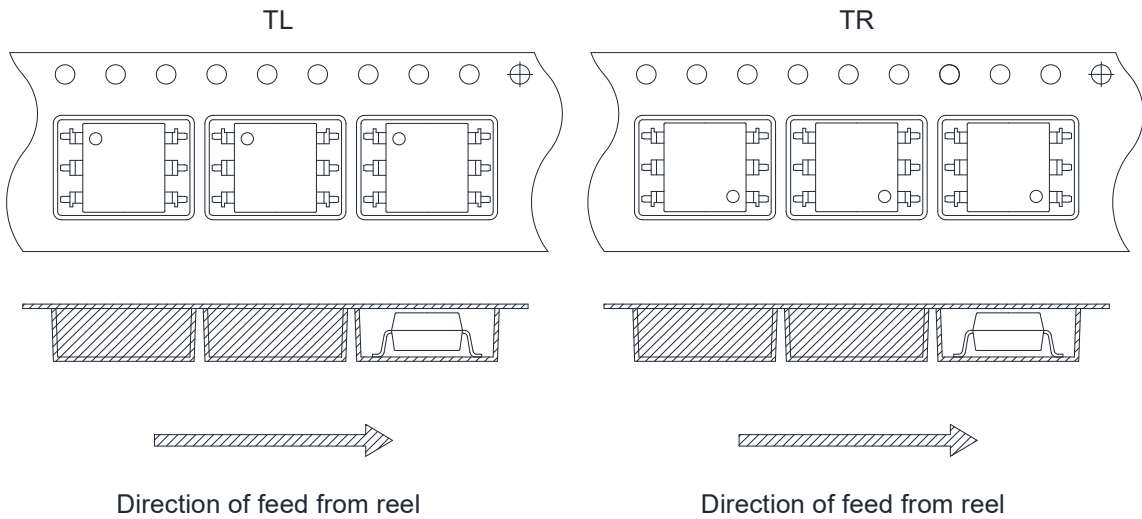


Unit : mm

● 6-pin SMD Carrier Tape & Reel



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



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