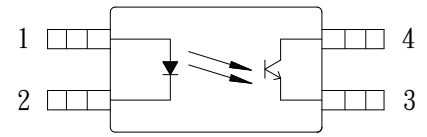


## ● Description

The KPS28010Z 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 3750 Vrms.

## ● Schematic



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

## ● Features

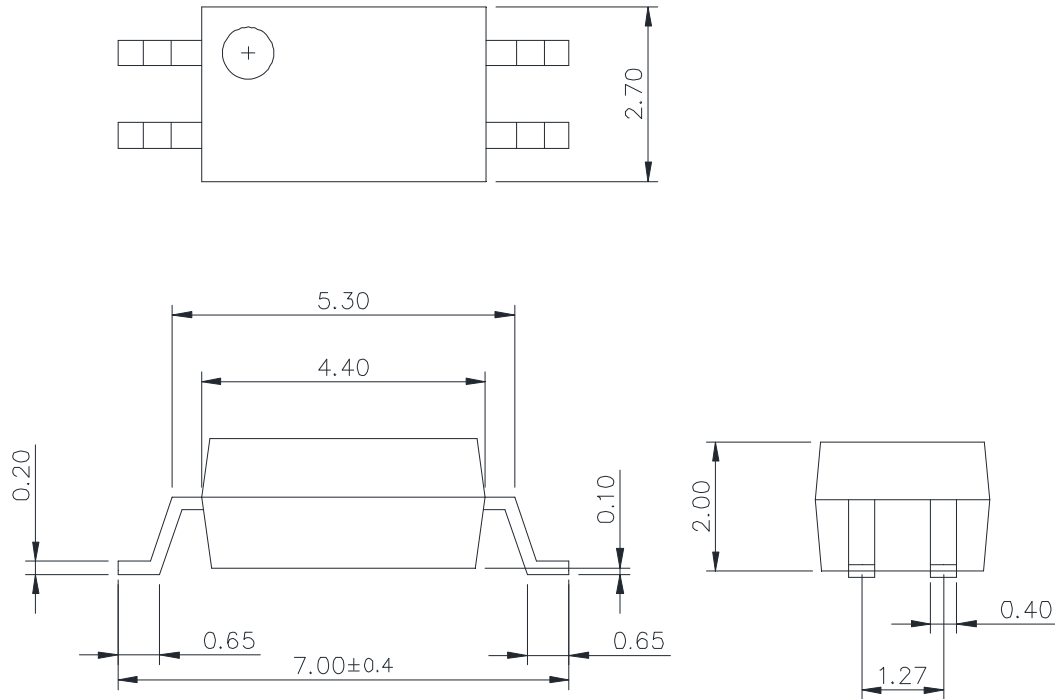
1. Pb free and RoHS compliant
2. High isolation voltage( $V_{iso}=3750V_{rms}$ )
3. Small and thin package(4pin SSOP, pin pitch 1.27mm)
4. Low input current type ( $I_F=0.1mA$ )
5. Current transfer ratio  
(CTR : 100~600% at  $I_F=0.1mA$   $V_{ce}=5V$ ).
6. High collector to emitter voltage ( $V_{CEO}=80V$ ).
7. High-speed switching  $t_r=3\mu s$  (typ.),  $t_f=5\mu s$  (typ.).
8. MSL class 1
9. Agency Approvals:
  - UL Approved (No. E169586): UL1577
  - c-UL Approved (No. E169586)
  - VDE Approved (No. 40010469): DIN EN60747-5-5
  - FIMKO Approved: EN62368-1, EN60601-1
  - CQC Approved: GB8898-2011, GB4943.1-2011

## ● 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



# KPS28010Z Series

## 4PIN SSOP LOW INPUT CURRENT PHOTOCOUPLER

### ● 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	$P_D/^\circ C$	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	$P_C/^\circ C$	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	$V_F$	$I_F=5mA$	-	1.1	1.8	V
	Reverse current	$I_R$	$V_R=5V$	-	-	5	μA
	Terminal capacitance	$C_t$	$V=0, f=1MHz$	-	60	-	pF
Output	Collector dark current	$I_{CEO}$	$V_{CE}=50V, I_F=0mA$	-	-	100	nA
Transfer characteristics	Current transfer ratio	CTR	$I_F=0.1mA, V_{CE}=5V$	100	-	600	%
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	$I_F=10mA, I_C=2mA$	-	0.1	0.2	V
	Isolation resistance	Riso	DC500V	$5 \times 10^{10}$	$10^{11}$	-	Ω
	Floating capacitance	$C_f$	$V=0, f=1MHz$	-	0.4	-	pF
	Response time (Rise)(*3)	tr	$V_{ce}=5V, I_C=2mA, R_L=100\Omega$	-	4	18	μs
	Response time (Fall) (*3)	tf		-	3	18	μs

Classification table of current transfer ratio is shown below.

CTR Rank.	CTR ( % )
KPS28010ZA	100 TO 600
KPS28010ZB	200 TO 500
KPS28010ZC	160 TO 400
KPS28010ZD	120 TO 300
KPS28010ZE	100 TO 200

Fig.1 Current Transfer Ratio vs. Forward Current

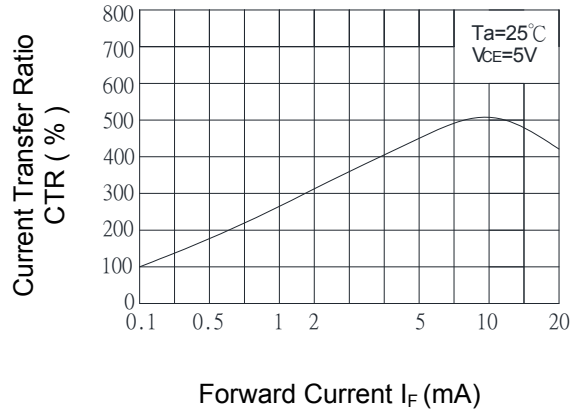


Fig.2 Collector Power Dissipation vs. Ambient Temperature

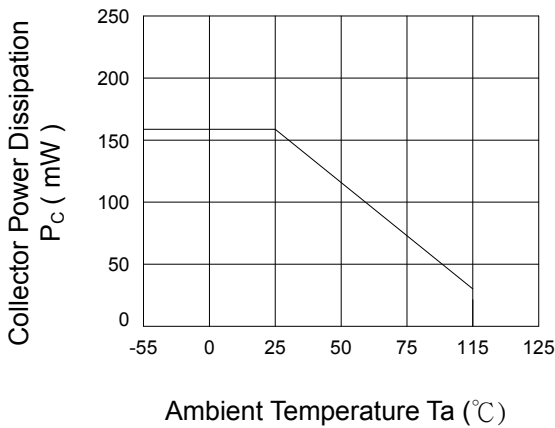


Fig.3 Collector Dark Current vs. Ambient Temperature

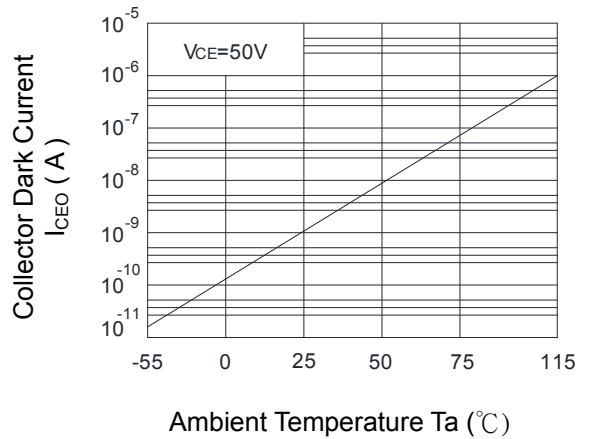


Fig.4 Forward Current vs. Ambient Temperature

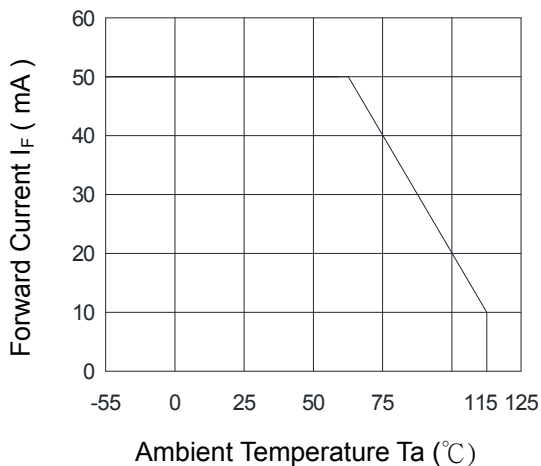
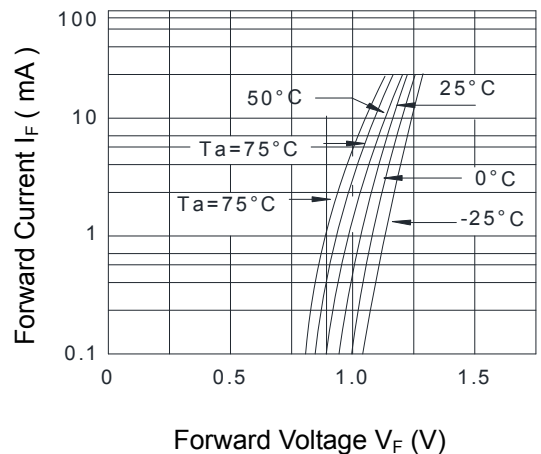
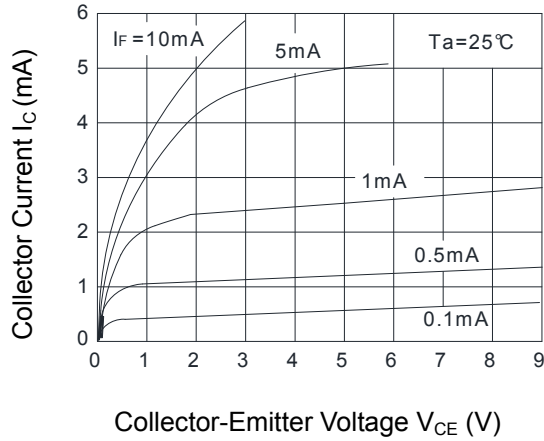


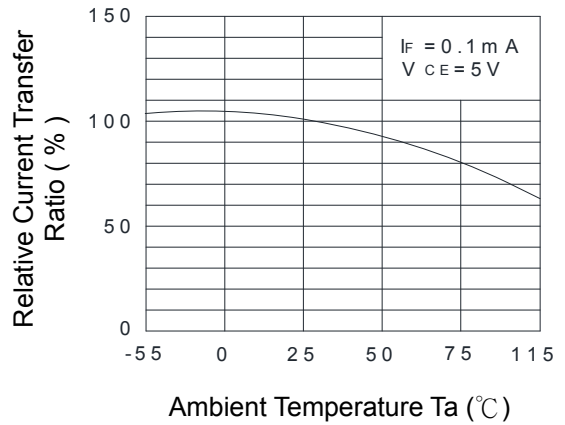
Fig.5 Forward Current vs. Forward Voltage



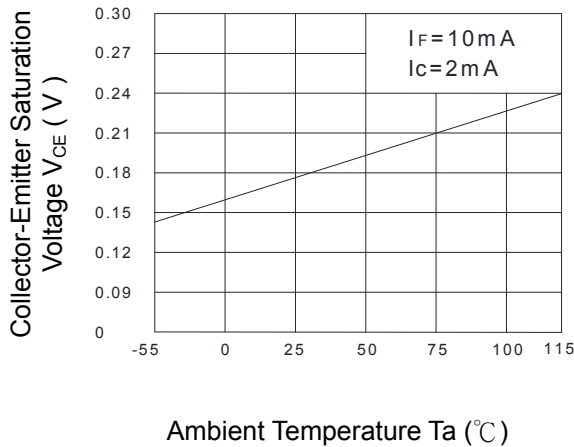
**Fig.6 Collector Current vs. Collector-Emitter Voltage**



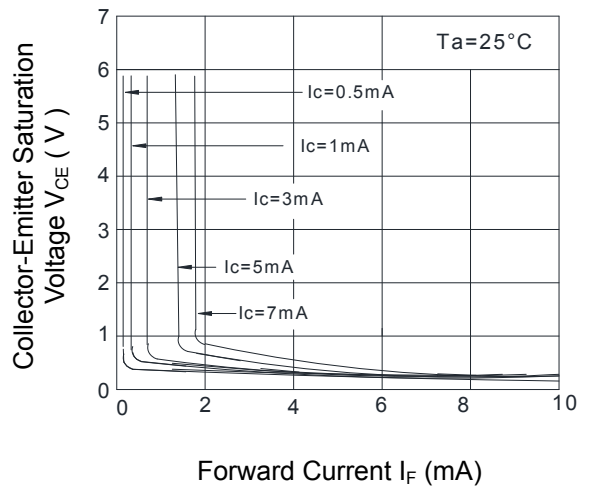
**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**



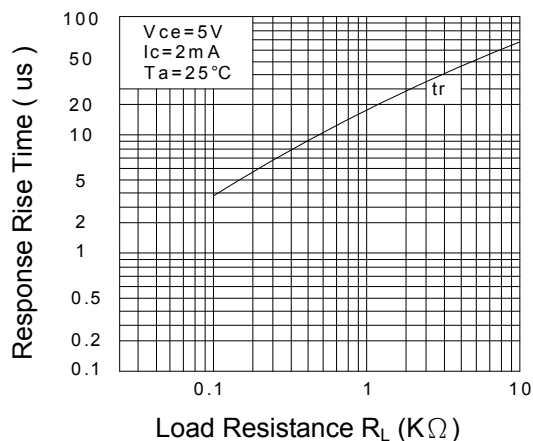
**Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature**



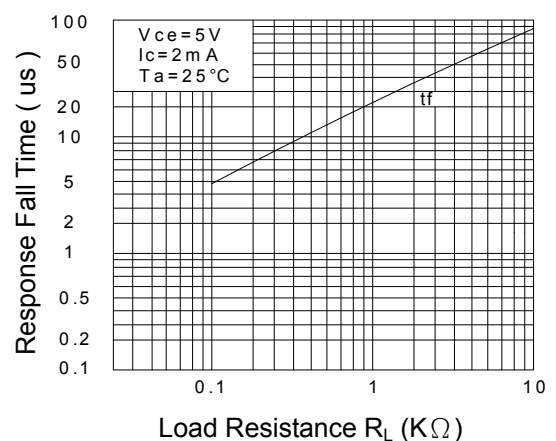
**Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current**



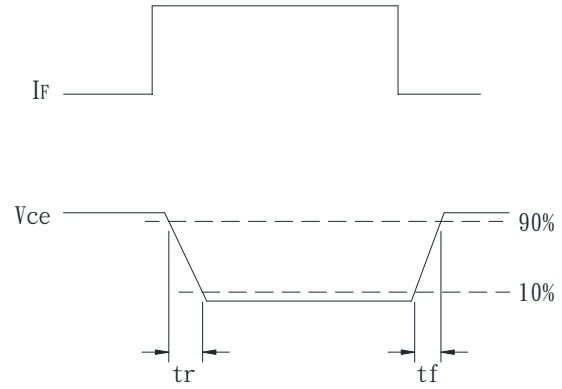
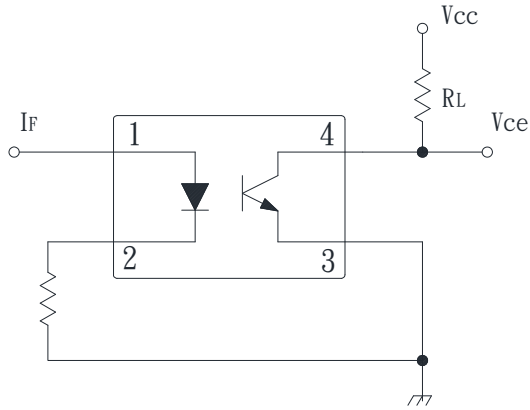
**Fig.10 Response Time (Rise) vs. Load Resistance**



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



● Test Circuit for Response Time

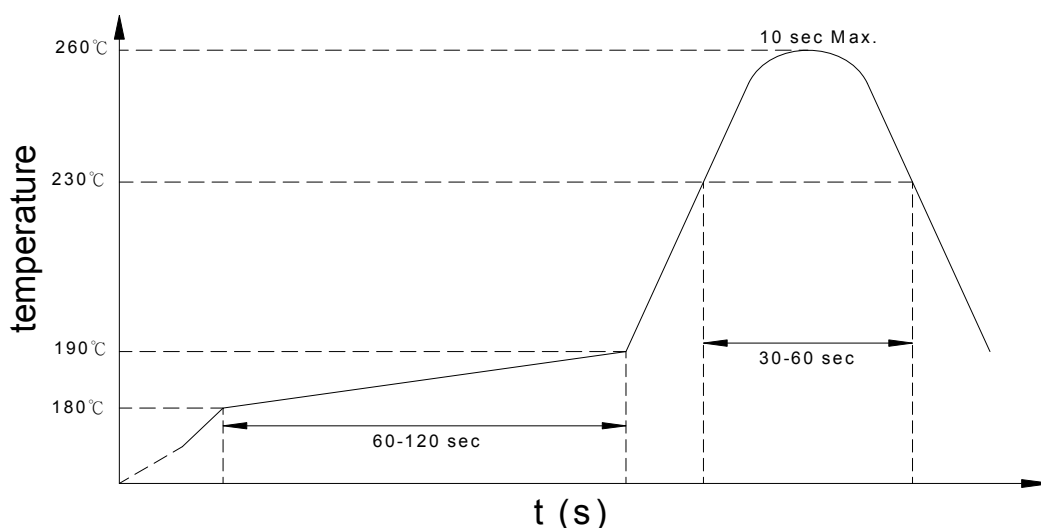


● **Recommended Soldering Conditions**

**(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**

## KPS28010Z Y (Z)

**Notes:**

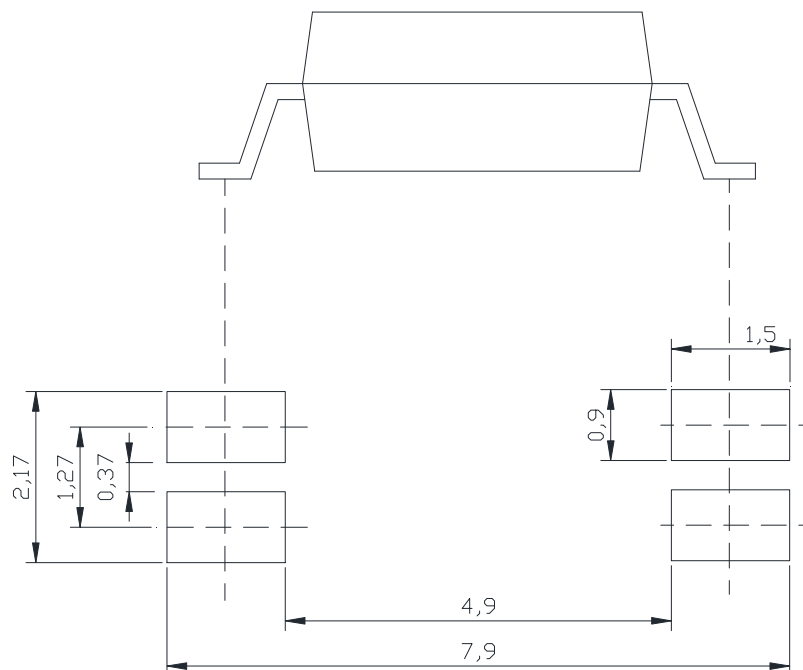
KPS28010Z = Part No.

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

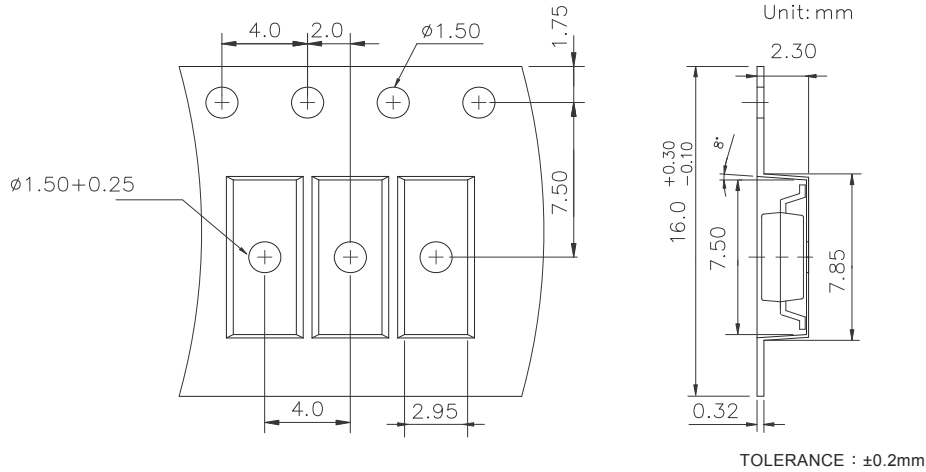
- **Recommended Pad Layout for Surface Mount Lead Form**



Unit : mm

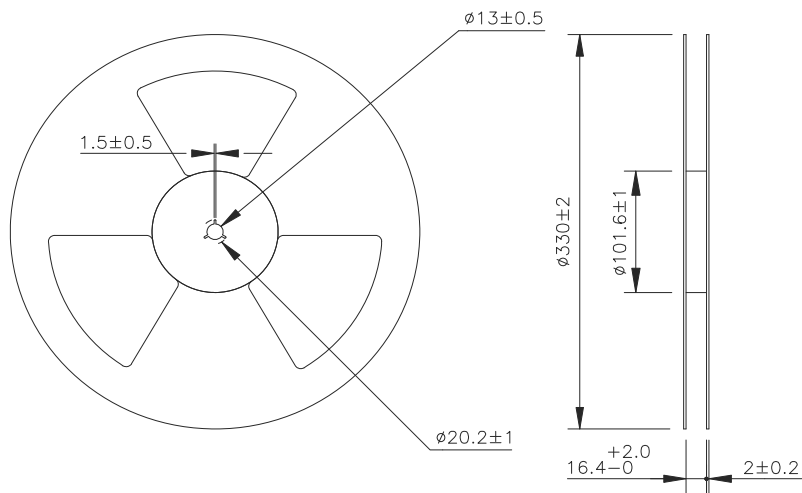
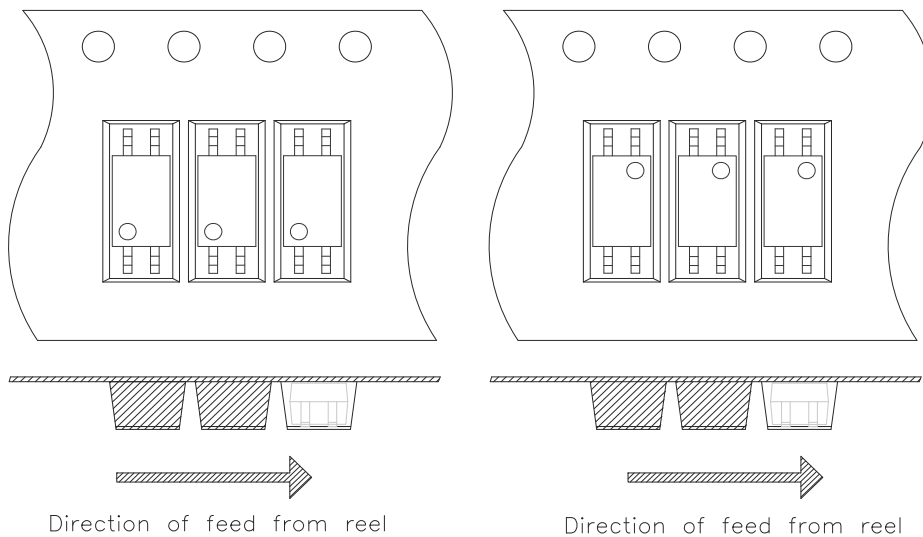


● 4-pin SSOP Carrier Tape & Reel



TLD

TRU





● **Application Notice**

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