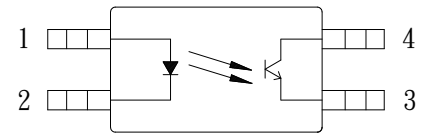


### ● Description

The KPS28010T 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

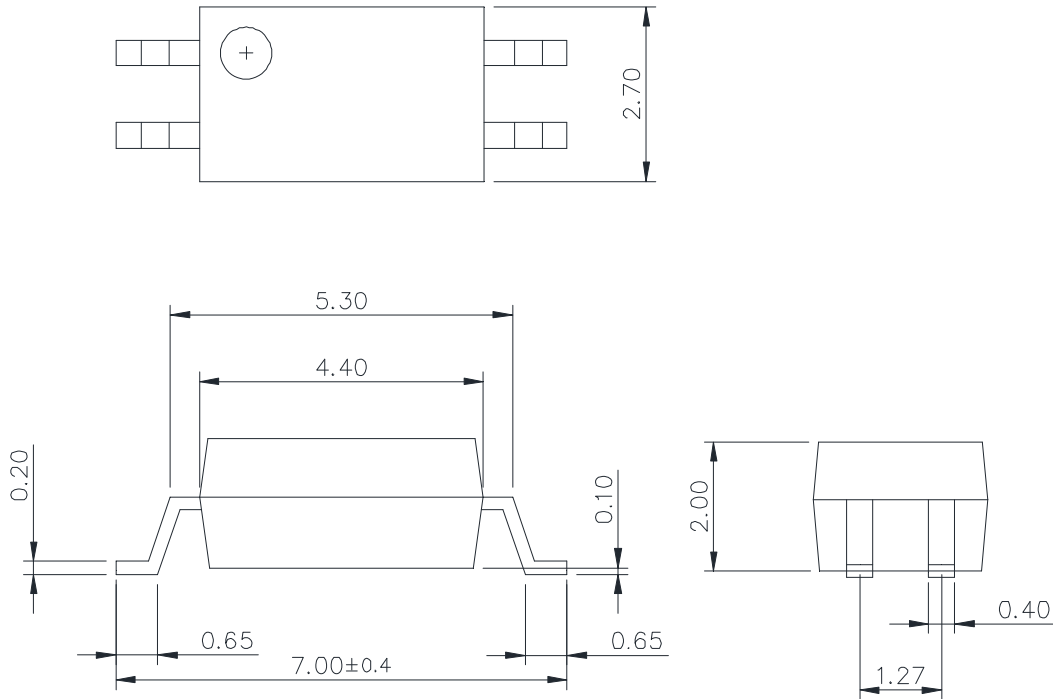
1. Pb free and RoHS compliant
2. High isolation voltage (Viso=3750Vrms)
3. Small and thin package (4pin SSOP, pin pitch 1.27mm)
4. Low input current type ( $I_F=1.0\text{mA}$ )
5. Current transfer ratio  
(CTR : 100~600% at  $I_F=1.0\text{mA}$ ,  $V_{ce}=5\text{V}$ ).
6. High collector to emitter voltage ( $V_{CEO}=80\text{V}$ ).
7. High-speed switching  $t_r=3\mu\text{s}$  (typ.),  $t_f=5\mu\text{s}$  (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

### ● 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)

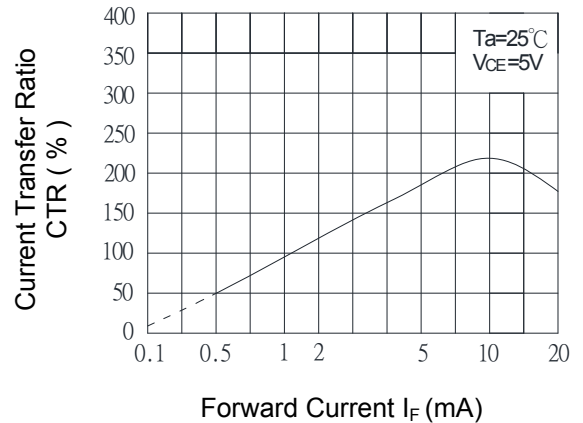
Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	$V_F$	$I_F=5mA$	-	1.1	1.4	V
	Reverse current	$I_R$	$V_R=5V$	-	-	5	μA
	Terminal capacitance	$C_t$	$V=0, f=1MHz$	-	60	-	pF
Output	Collector dark current	$I_{CEO}$	$V_{CE}=50V, I_F=0mA$	-	-	100	nA
Transfer characteristics	Current transfer ratio	CTR	$I_F=1mA, V_{CE}=5V$	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

\*3 Test Circuit for Switching Time

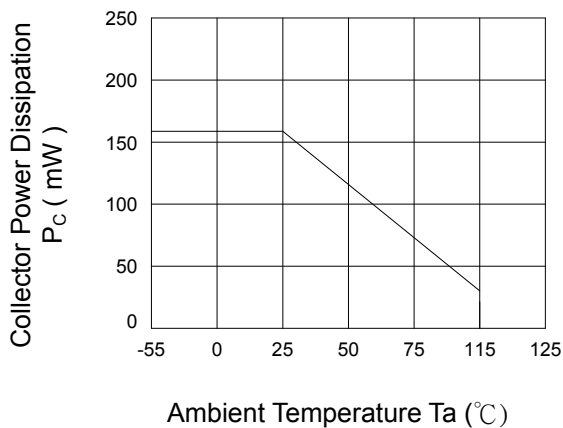
Classification table of current transfer ratio is shown below.

CTR Rank.	CTR ( % )
KPS28010TA	100 TO 600
KPS28010TB	200 TO 500
KPS28010TC	160 TO 400
KPS28010TD	120 TO 300
KPS28010TE	100 TO 200

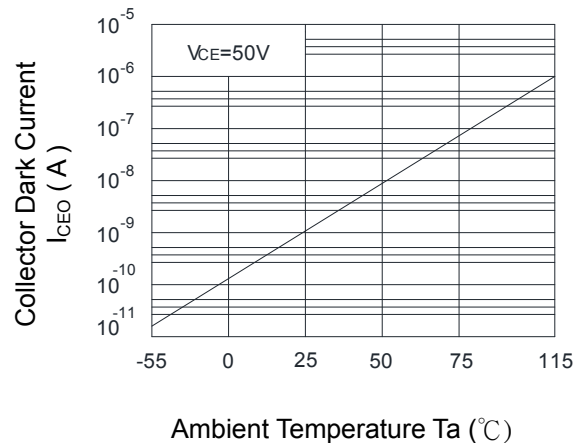
**Fig.1 Current Transfer Ratio vs. Forward Current**



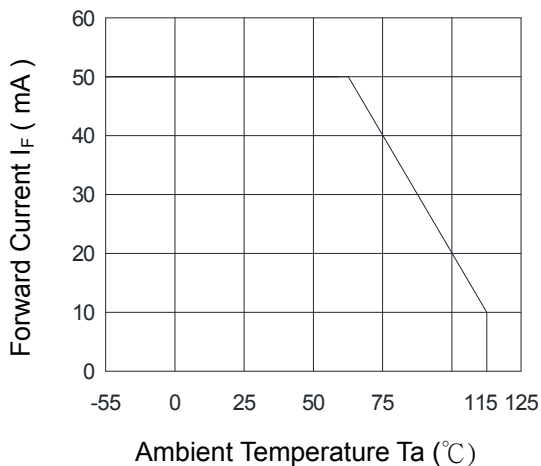
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



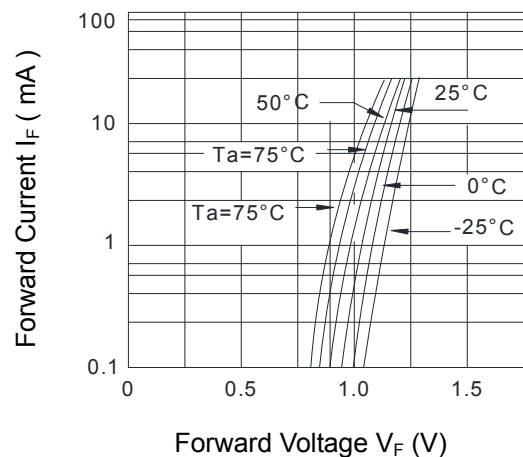
**Fig.3 Collector Dark Current vs. Ambient Temperature**



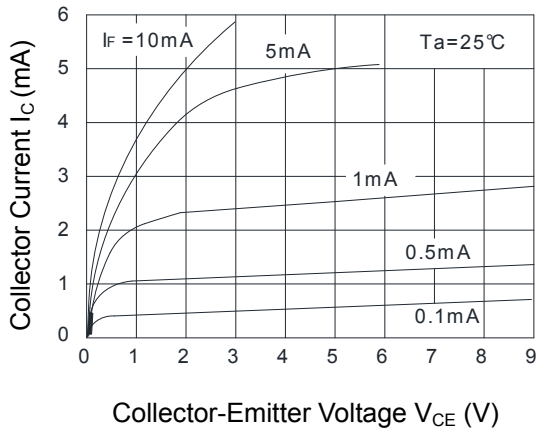
**Fig.4 Forward Current vs. Ambient Temperature**



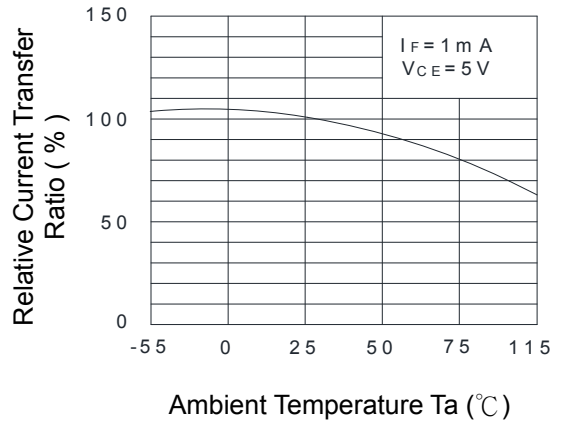
**Fig.5 Forward Current vs. Forward Voltage**



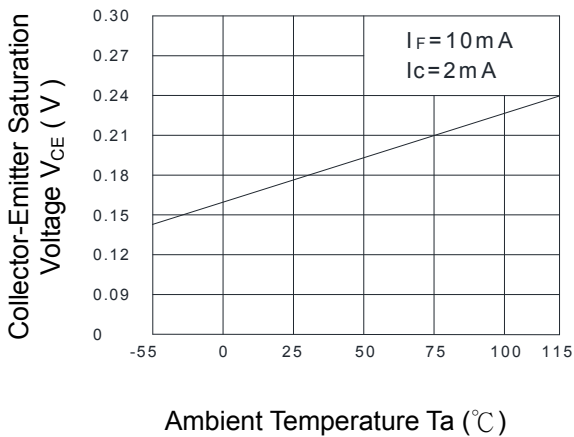
**Fig.6 Collector Current vs. Collector-Emitter Voltage**



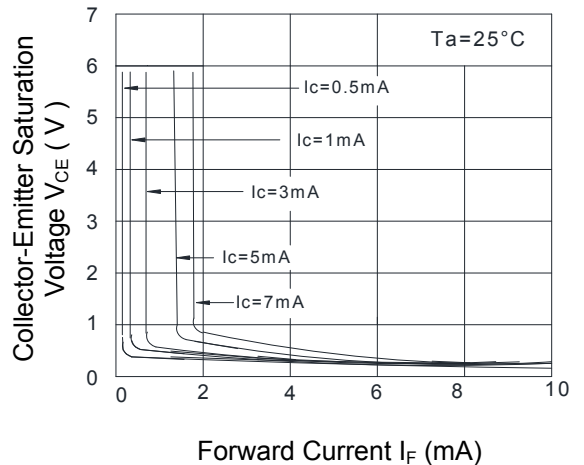
**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**



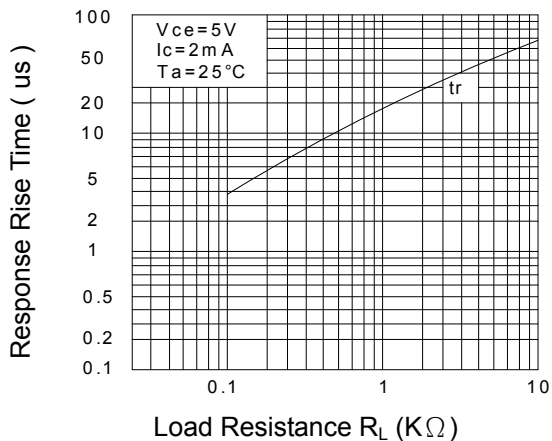
**Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature**



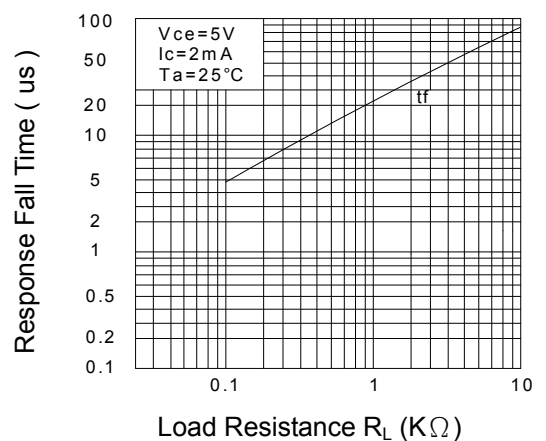
**Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current**



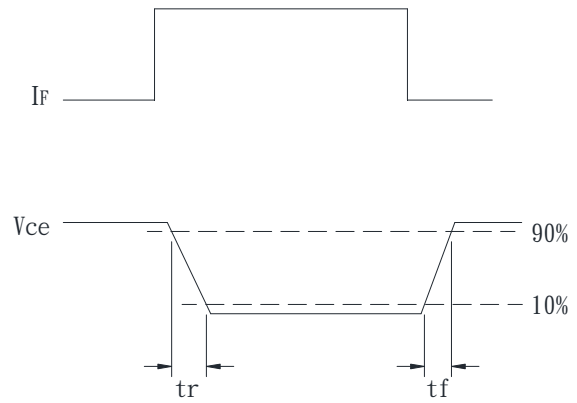
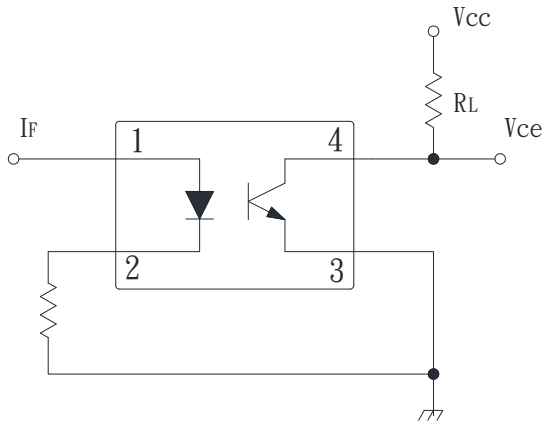
**Fig.10 Response Time (Rise) vs. Load Resistance**



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



● Test Circuit for Response Time

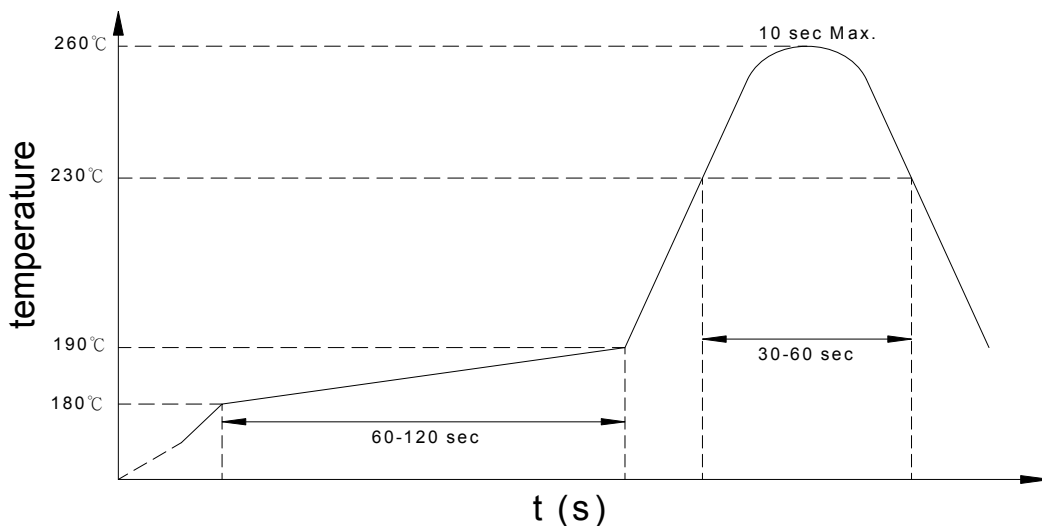


● **Recommended Soldering Conditions**

**(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**

**KPS28010T Y (Z)**

**Notes:**

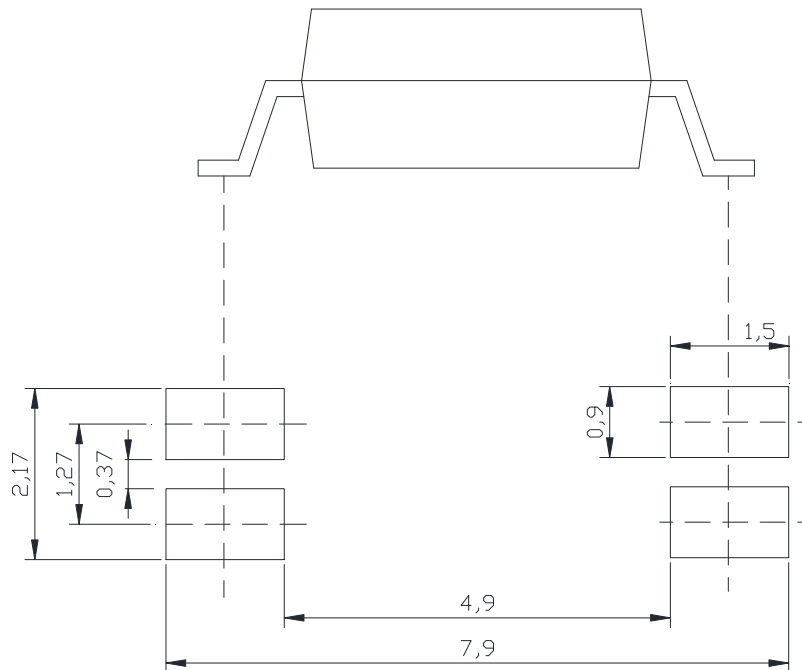
KPS28010T = Part No.

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

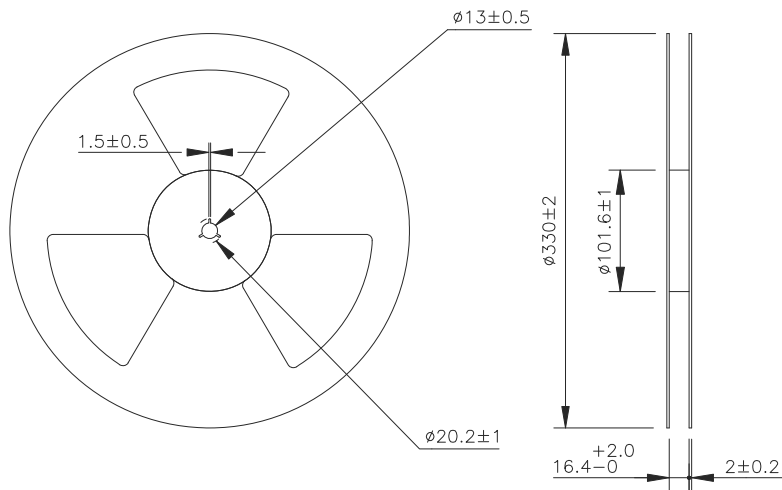
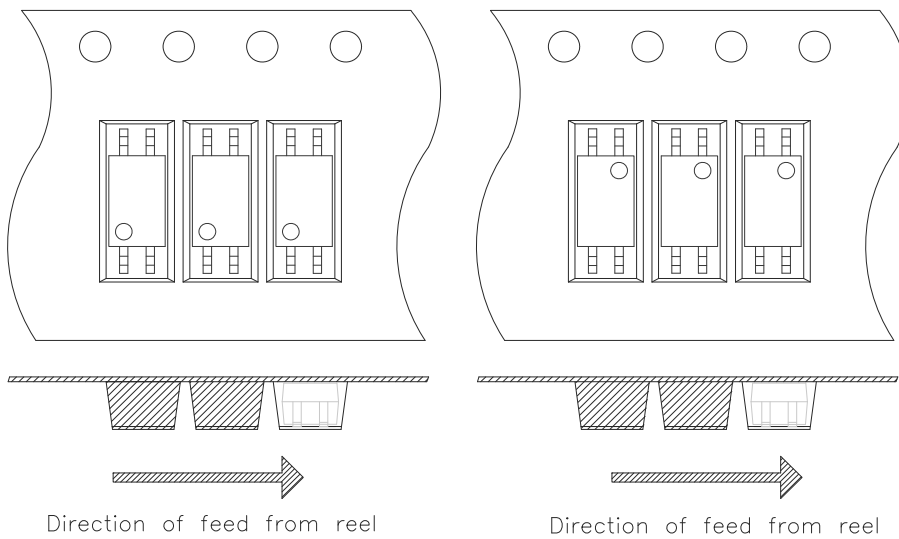
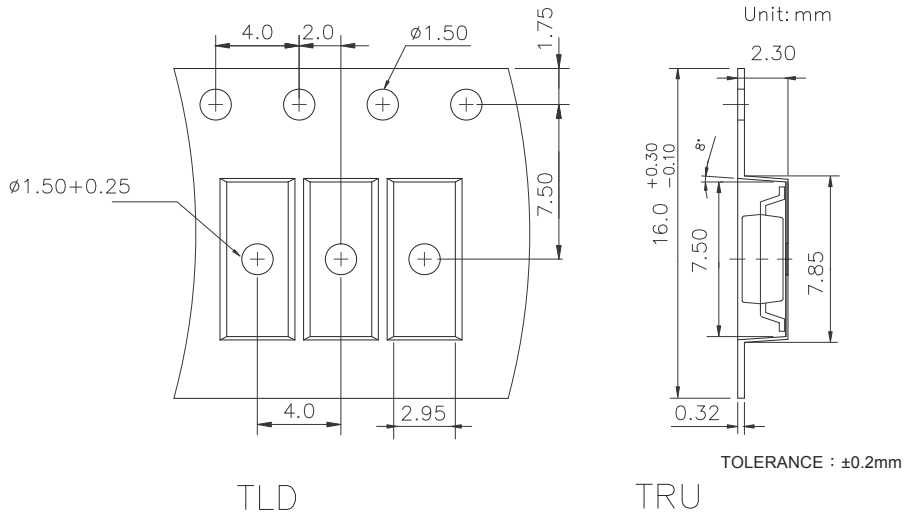
● **Recommended Pad Layout for Surface Mount Lead Form**



Unit :mm



● 4-pin SSOP Carrier Tape & Reel





# KPS28010T Series

## 4PIN SSOP LOW INPUT CURRENT PHOTOCOUPLER

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### ● Application Notice

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