KPS28010T Series

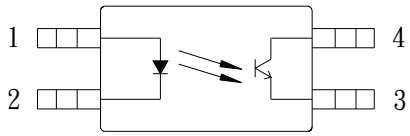
4PIN SSOP LOW INPUT CURRENT PHOTOCOUPLER

cosmo

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. Halogen free
2. Pb free and RoHS compliant
3. High isolation voltage (Viso=3750Vrms)
4. Small and thin package (4pin SSOP, pin pitch 1.27mm)
5. Low input current type (I_F=1.0mA)
6. Current transfer ratio

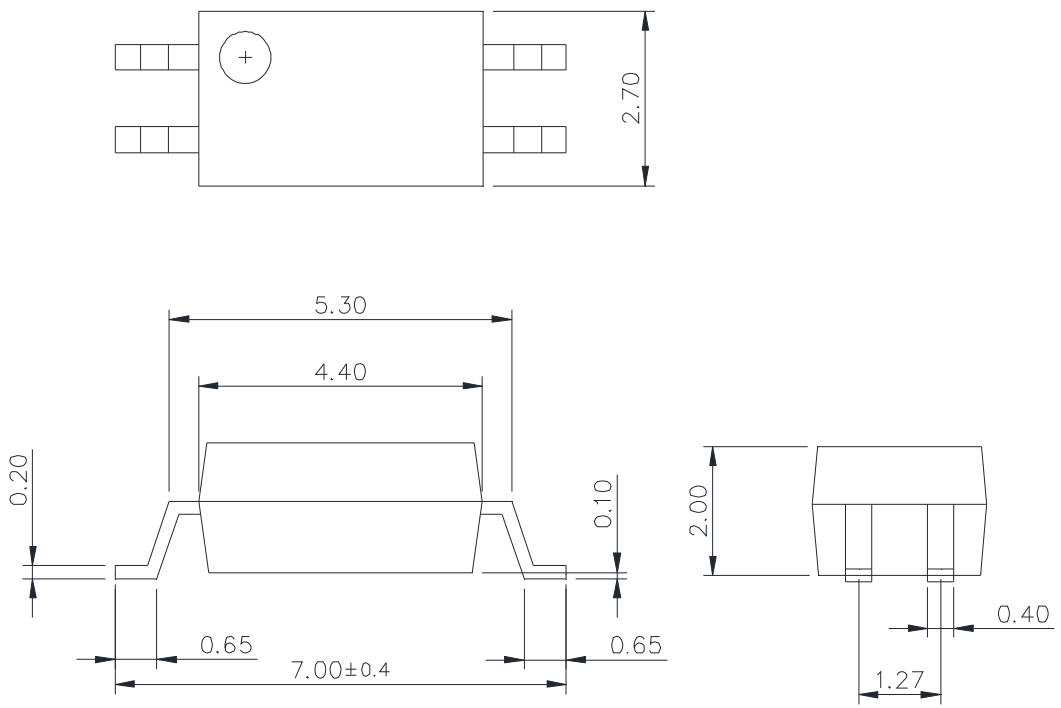
   (CTR : 100~600% at I_F=1.0mA, Vce=5V).
7. High collector to emitter voltage (V_{CEO}=80V).
8. High-speed switching tr =3μs (typ.), tf =5μs (typ.).
9. MSL class 1
10. Agency Approvals:
    - UL Approved (No. E169586): UL1577
    - c-UL Approved (No. E169586)
    - VDE Approved (No. 40010469): DIN EN60747-5-5
    - FIMKO Approved: EN60065, EN60950
    - SEMKO Approved: EN60065, EN60950
    - 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℃)

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/℃	0.6	mW/℃
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/℃	1.2	mW/℃
Isolation voltage 1 minute(*2)		Viso	3750	Vrms
Operating temperature		Topr	-55 to +115	℃
Storage temperature		Tstg	-55 to +125	℃

*1 PW=100μs,Duty Cycle=1%.
*2 AC voltage for 1minute at T =25℃,RH=60% between input and output.

● Electro-optical Characteristics

(Ta=25℃)

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	Ct	V=0, f=1MHz	-	60	-	pF
Output	Collector dark current	I_{CEO}	V_{CE}=50V,I_F=0mA	-	-	100	nA
Transfer charac-teristics	Current transfer ratio	CTR	I_F=1mA, V_{CE}=5V	100	-	600	%
	Collector-Emitter saturation voltage	V_{CE}(sat)	I_F=10mA, Ic=2mA	-	0.1	0.2	V
	Isolation resistance	Riso	DC500V	$5x10^{10}$	10^{11}	-	Ω
	Floating capacitance	Cf	V=0, f=1MHz	-	0.4	-	pF
	Response time (Rise) (*3)	tr	Vce=5V,Ic=2mA,R_L=100Ω	-	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

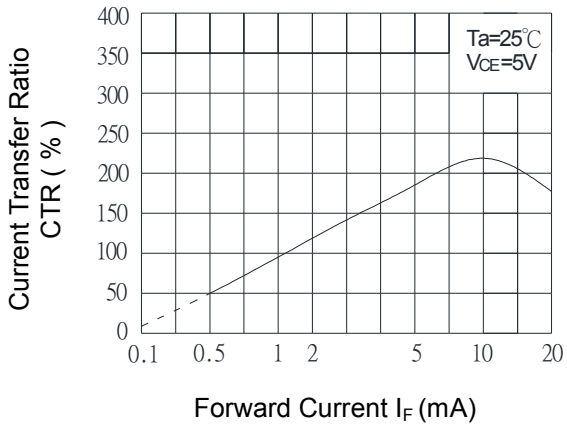


Fig.2 Collector Power Dissipation vs. Ambient Temperature

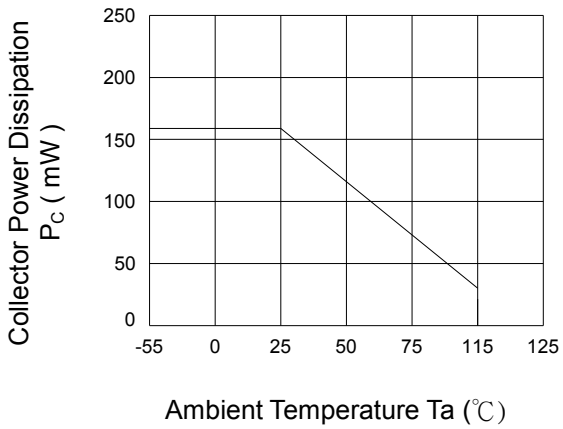


Fig.3 Collector Dark Current vs. Ambient Temperature

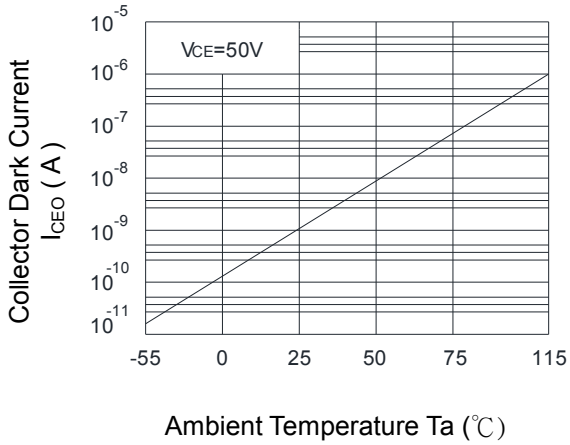


Fig.4 Forward Current vs. Ambient Temperature

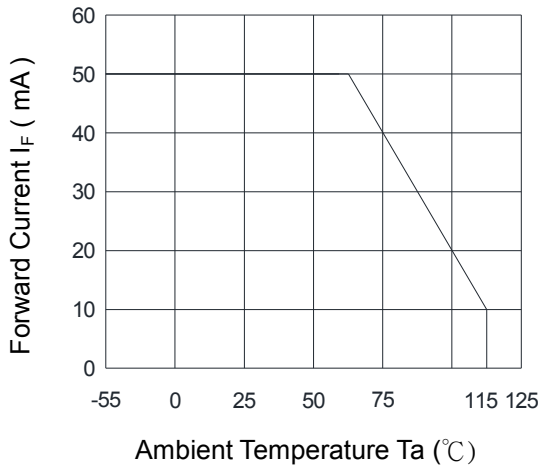


Fig.5 Forward Current vs. Forward Voltage

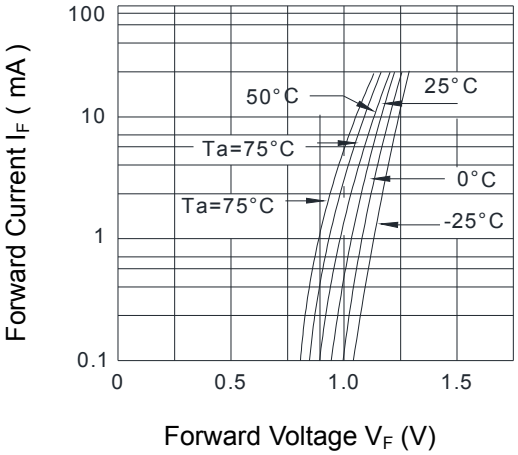


Fig.6 Collector Current vs. Collector-Emitter Voltage

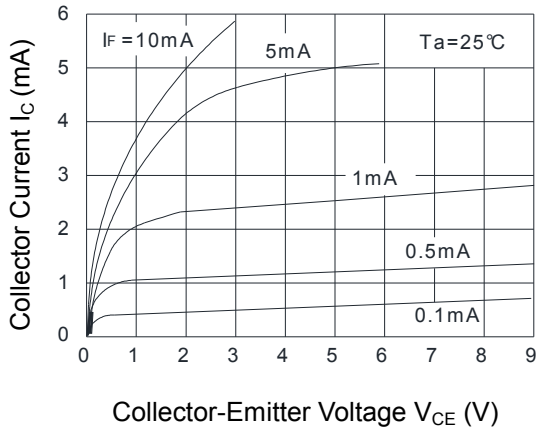


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

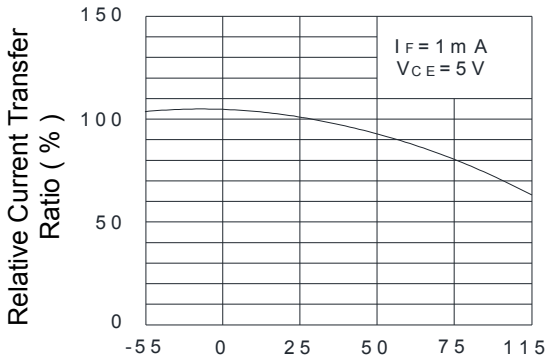


Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature

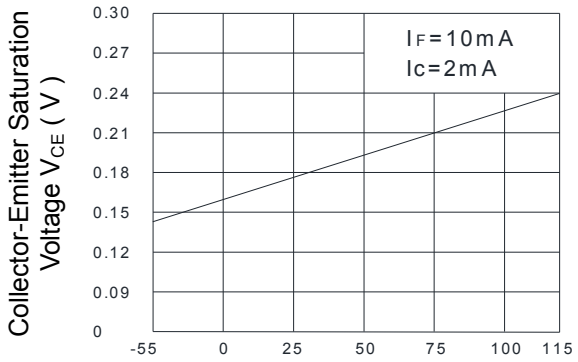


Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current

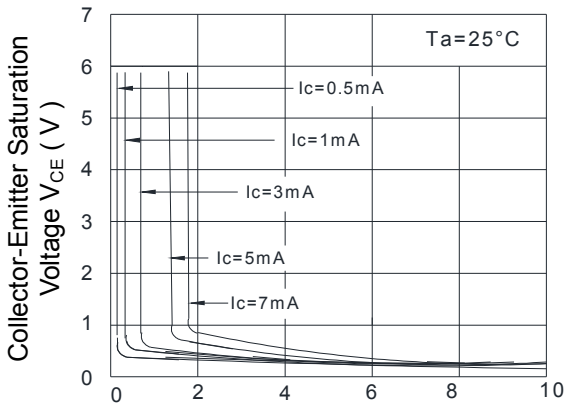


Fig.10 Response Time (Rise) vs. Load Resistance

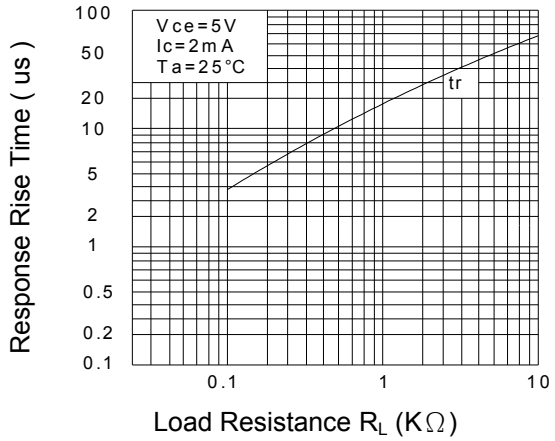
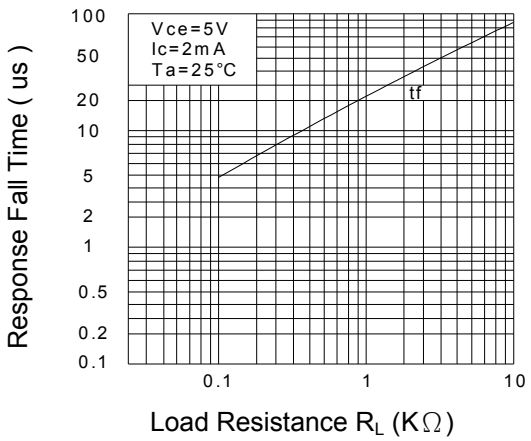
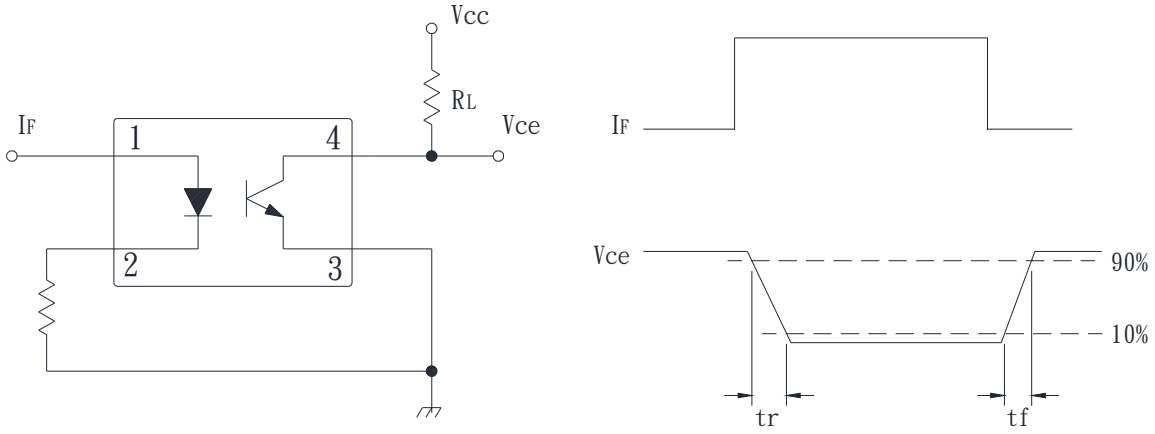


Fig.11 Response Time (Fall) vs. Load Resistance



- **Test Circuit for Response Time**

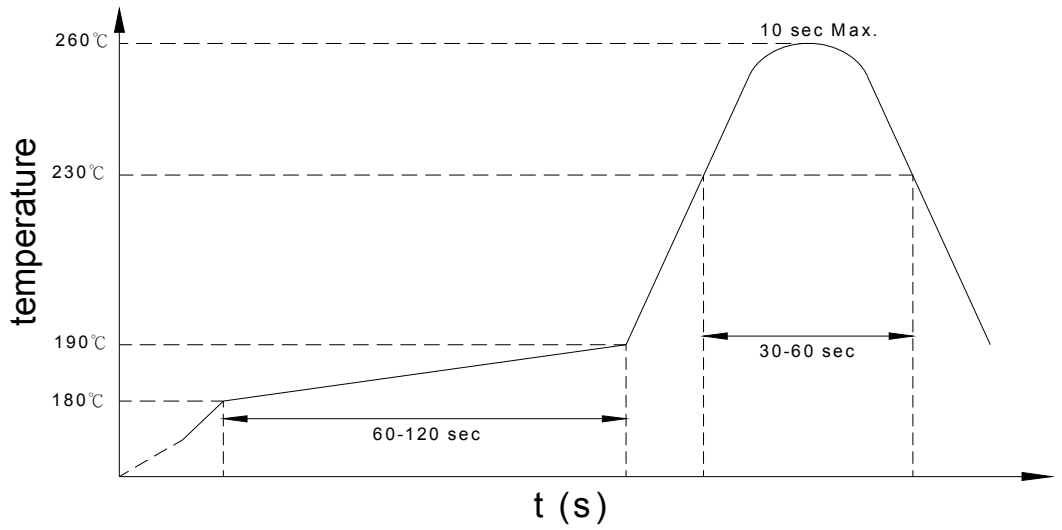


Recommended Soldering Conditions

(a) Infrared reflow soldering：

- Peak reflow soldering： 260℃ or below (package surface temperature)
- Time of peak reflow temperature： 10 sec
- Time of temperature higher than 230℃： 30-60 sec
- Time to preheat temperature from 180~190℃： 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℃ or below (molten solder temperature)
- Time： 10 seconds or less
- Preheating conditions： 120℃ 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:

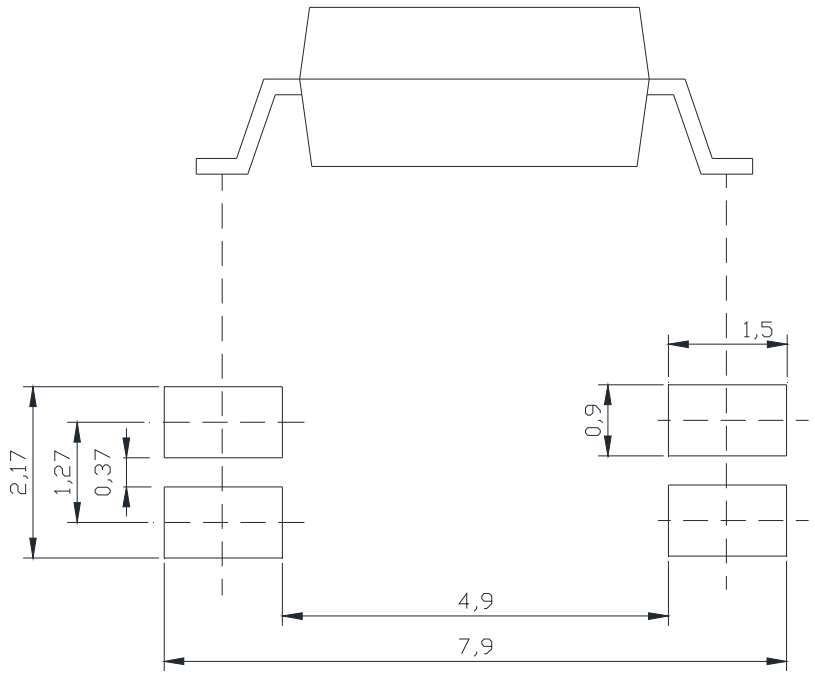
KPS28010T = Part No.

Y = CTR rank option (A ~ E)

Z = Tape and reel option (TLD、TRU)

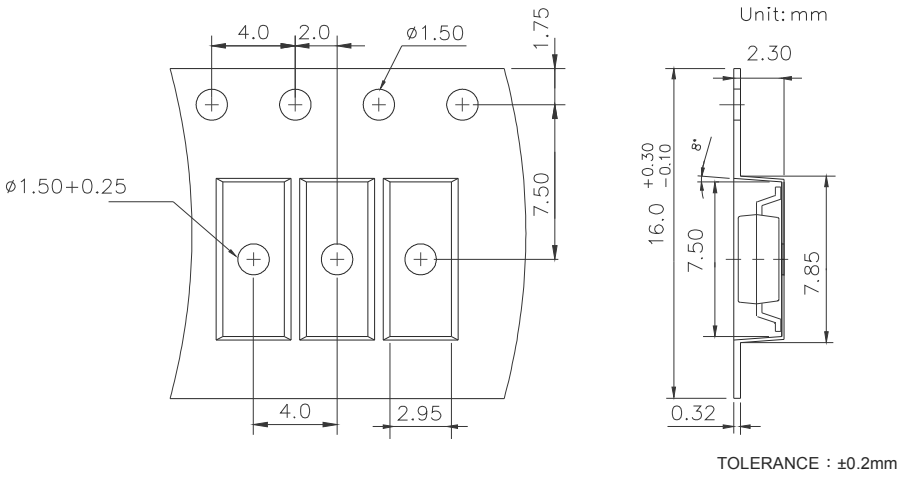
Option	Description	Packing quantity
TLD	TLD tape & reel option	3000 units per reel
TRU	TRU tape & reel option	3000 units per reel

Recommended Pad Layout for Surface Mount Lead Form

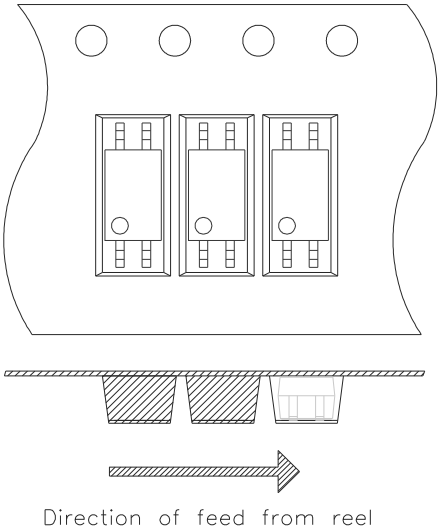


Unit :mm

- **4-pin SSOP Carrier Tape & Reel**

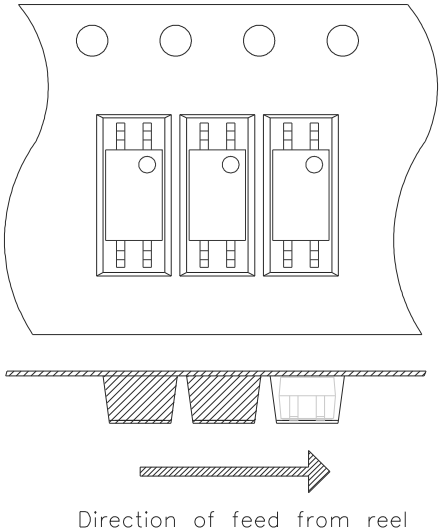


TLD

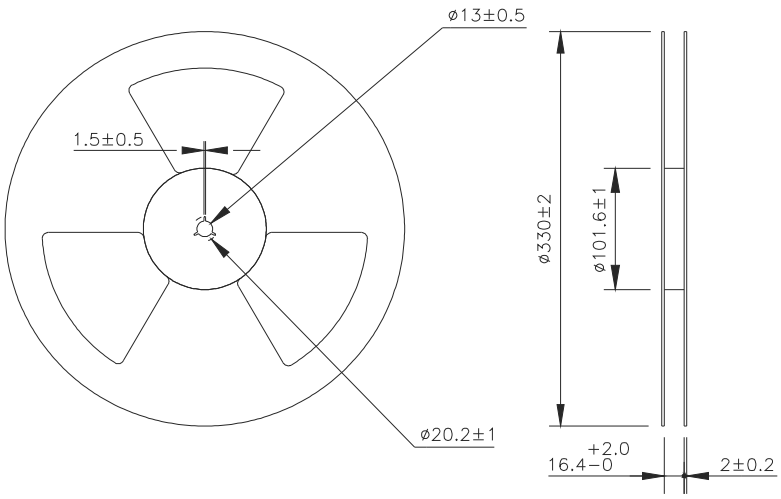


Direction of feed from reel

TRU



Direction of feed from reel



Application Notice

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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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