

### ● Description

The KT1210 series consist of a photo darlington optically coupled to a gallium arsenide infrared-emitting diode in a 4 pin LSOP wide body package. It features a high current transfer ratio, low coupling capacitance and high isolation voltage.

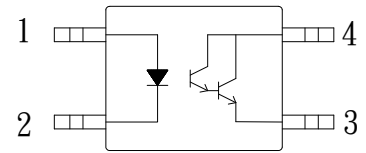
### ● Features

1. Pb free and RoHS compliant
2. Temperature range -55°C to 115°C
3. High isolation voltage 5000Vrms
4. Opaque type, SMD low profile 4 lead package
5. High current transfer ratio  
(CTR=2000%TYP.@  $I_F=1$  mA,  $V_{CE}=2$  V )
6. 8mm outer creepage distance
7. MSL class 1
8. Agency Approvals:
  - UL Approved (No. E169586): UL1577
  - c-UL Approved (No. E169586)
  - VDE Approved (No. 40031267): DIN EN60747-5-5
  - FIMKO Approved: EN62368-1, EN60601-1
  - CQC Approved: GB8898-2011, GB4943.1-2011

### ● Applications

- System appliances, measuring instruments.
- Industrial robots.
- Copiers, automatic vending machines.
- Signal transmission between circuits of different potentials and impedances.
- Telephone sets.
- Copiers, facsimiles.
- Interface with various power supply circuits, power distribution boards.
- Numerical control machines.

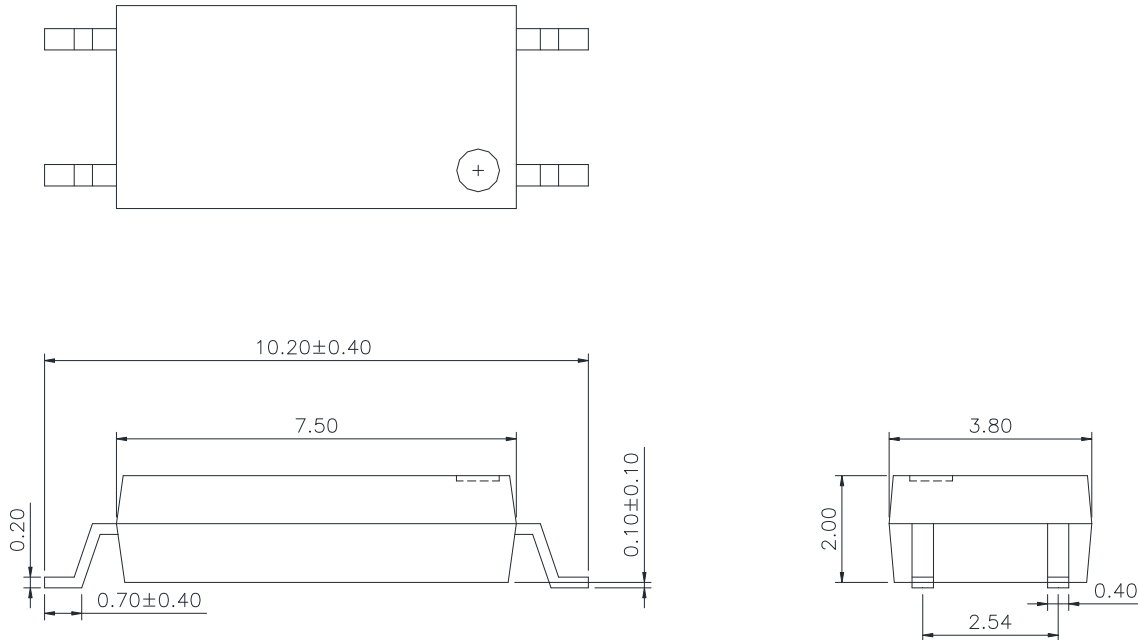
### ● Schematic



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

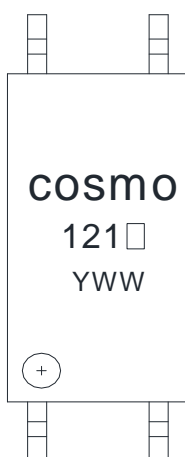
● **Outside Dimension**

Unit : mm



TOLERANCE :  $\pm 0.2$ mm

● **Device Marking**



**Notes:**

cosmo

121 □

YWW

□: CTR rank

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	$I_{FP}$	1	A
	Reverse voltage	$V_R$	6	V
	Power dissipation	$P_D$	70	mW
Output	Collector-Emitter voltage	$V_{CEO}$	35	V
	Emitter-Collector voltage	$V_{ECO}$	5	V
	Collector current	$I_C$	150	mA
	Collector power dissipation	$P_C$	150	mW
Total power dissipation		$P_{tot}$	170	mW
Isolation voltage 1 minute		$V_{iso}$	5000	Vrms
Operating temperature		$T_{opr}$	-55 to +115	°C
Storage temperature		$T_{stg}$	-55 to +125	°C
Soldering temperature 10 seconds		$T_{sol}$	260	°C

**● Electro-optical Characteristics**

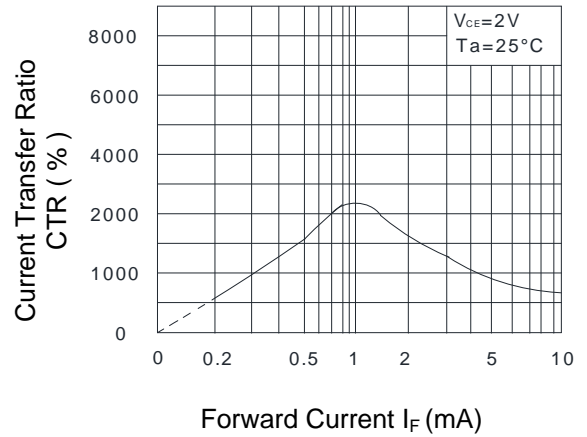
(Ta=25°C)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	$V_F$	$I_F=20mA$	-	1.2	1.4	V
	Peak forward voltage	$V_{FP}$	$I_{FP}=0.5A$	-	-	3.5	V
	Reverse current	$I_R$	$V_R=4V$	-	-	10	uA
	Terminal capacitance	$C_t$	$V=0, f=1KHz$	-	30	-	pF
Output	Collector dark current	$I_{CEO}$	$V_{CE}=10V, I_F=0$	-	-	1.0	uA
Transfer characteristics	Current transfer ratio	CTR	$I_F=1mA, V_{CE}=2V$	200	2000	-	%
	Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_F=1mA, I_C=2mA$	-	-	1.0	V
	Isolation resistance	Riso	DC500V, 40 to 60%RH	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$
	Floating capacitance	$C_f$	$V=0, f=1MHz$	-	0.4	-	pF
	Cut-off frequency	$f_c$	$V_{CC}=5V, I_C=2mA, R_L=100\Omega$	-	7	-	KHz
	Response time (Rise)	$t_r$	$V_{CC}=5V, I_C=2mA, R_L=100\Omega$	-	200	-	us
Response time (Fall)	$t_f$	-		200	-	us	

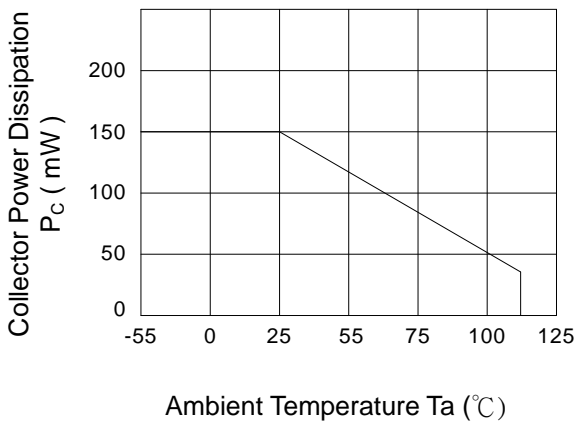
Classification table of current transfer ratio is shown below.

CTR RANK	CTR (%)
KT1210	Min.200

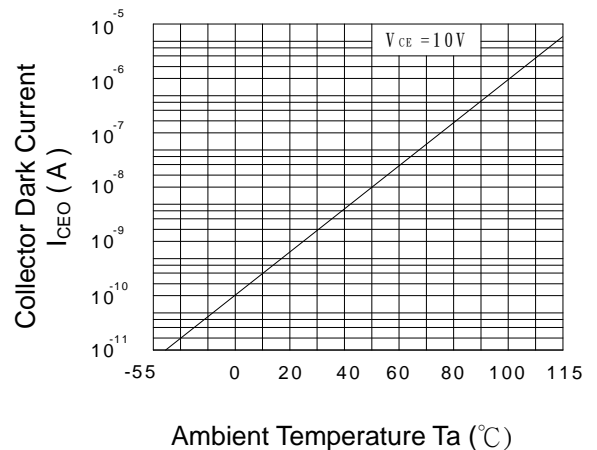
**Fig.1 Current Transfer Ratio vs. Forward Current**



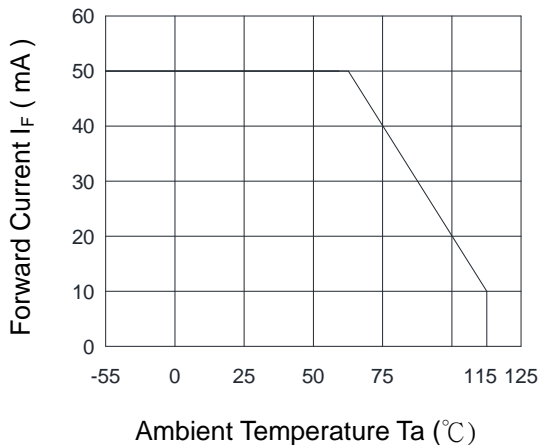
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



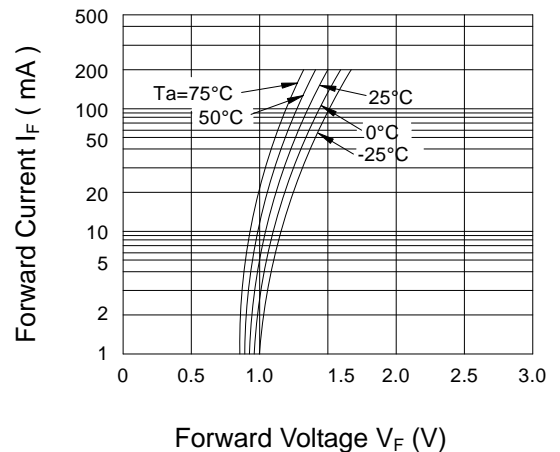
**Fig.3 Collector Dark Current vs. Ambient Temperature**



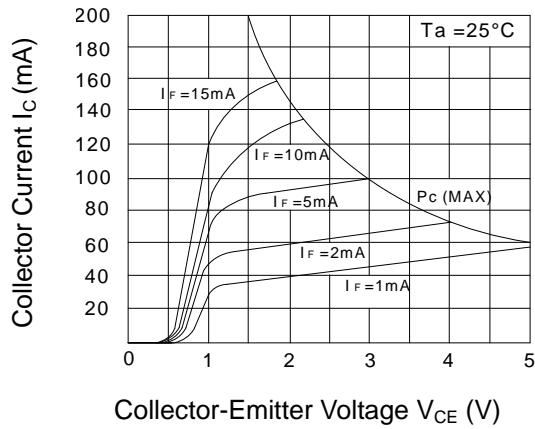
**Fig.4 Forward Current vs. Ambient Temperature**



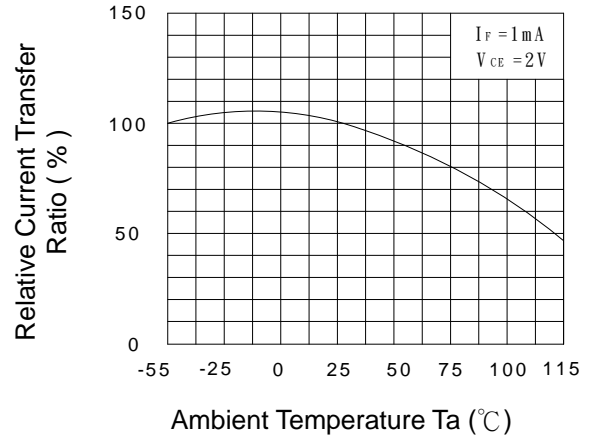
**Fig.5 Forward Current vs. Forward Voltage**



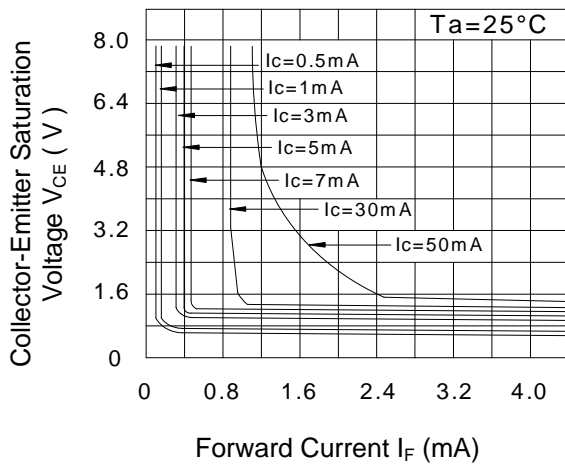
**Fig.6 Collector Current vs. Collector-Emitter Voltage**



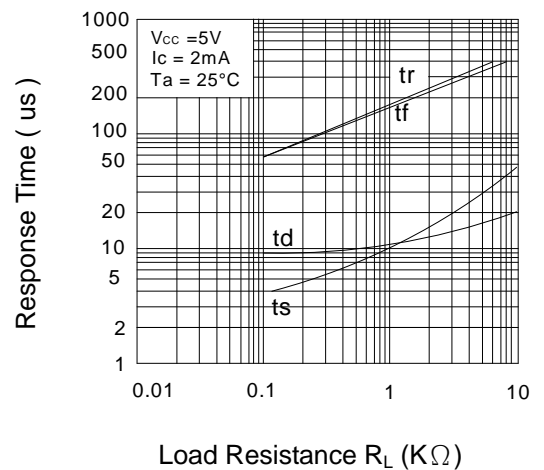
**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**



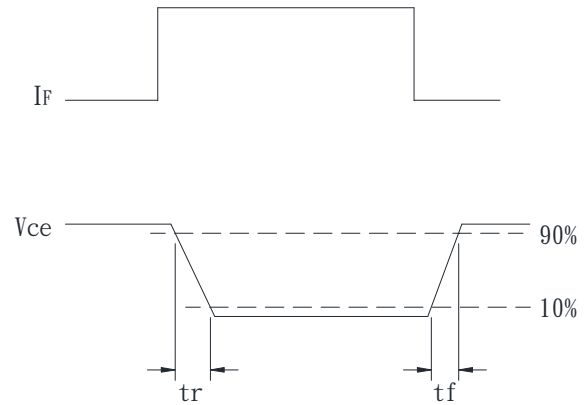
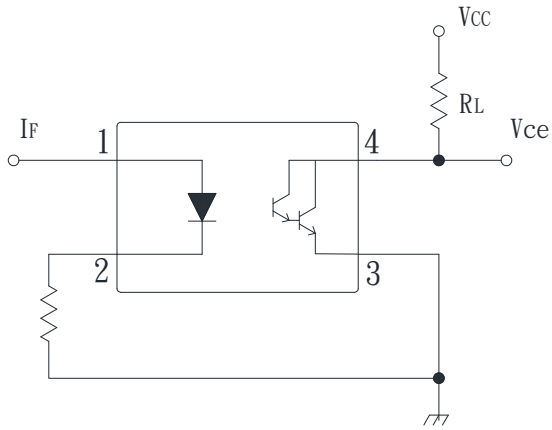
**Fig.8 Collector-Emitter Saturation Voltage vs. Forward Current**



**Fig.9 Response Time vs. Load Resistance**



- Test Circuit for Response Time

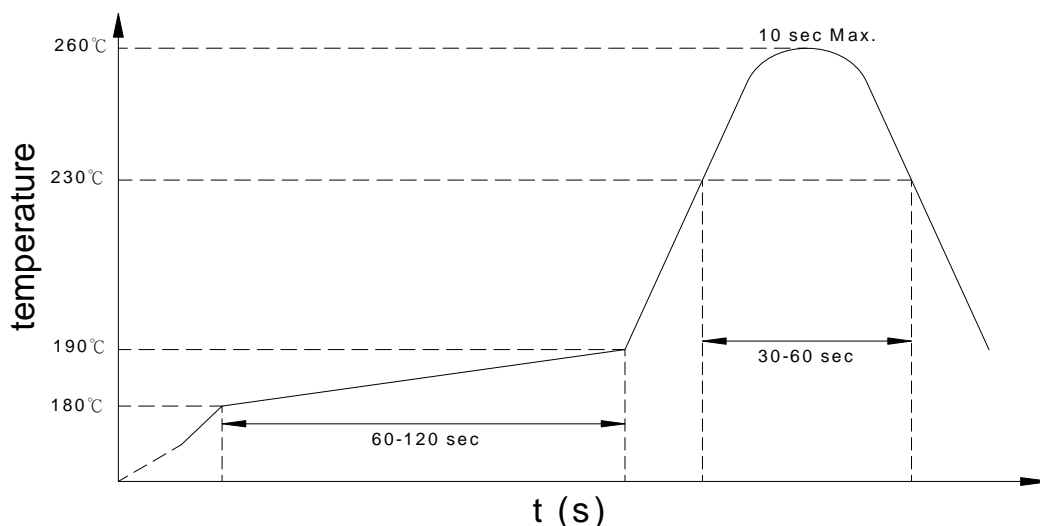


● **Recommended Soldering Conditions**

**(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**

### KT1210 (Z)

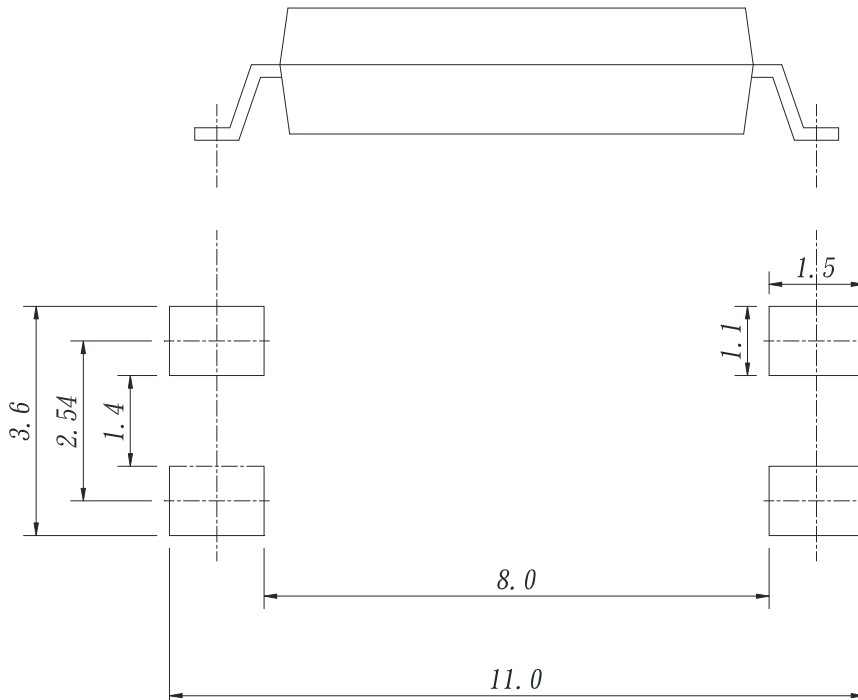
**Notes:**

KT1210 = Part No.

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

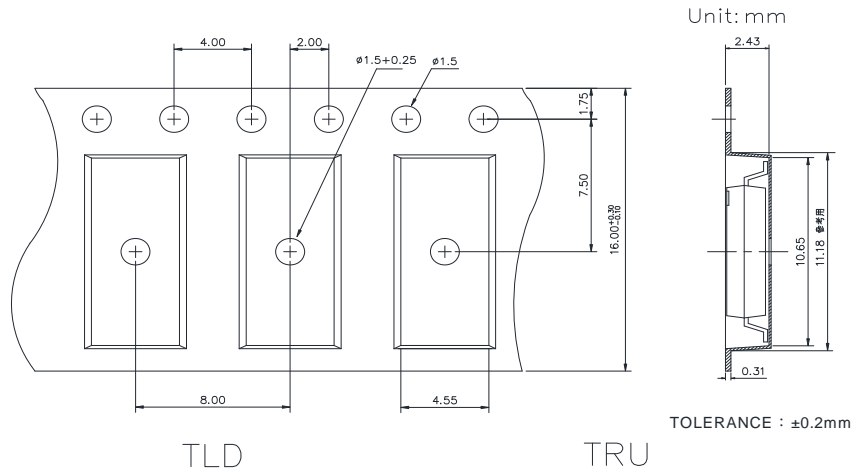
- **Recommended Pad Layout for Surface Mount Lead Form**



Unit : mm

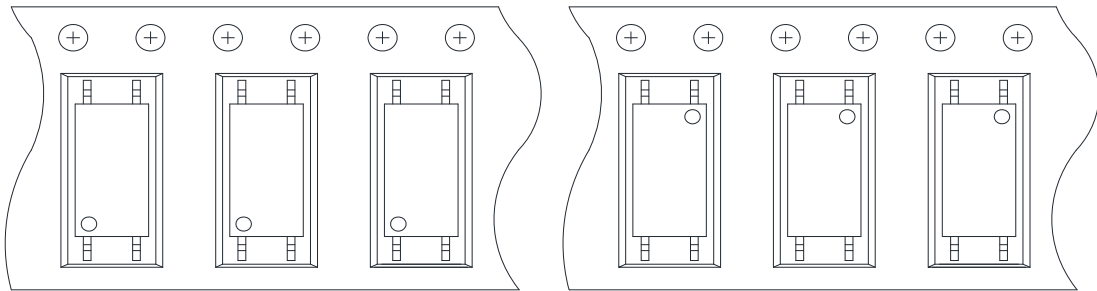


● 4-pin LSOP Carrier Tape & Reel



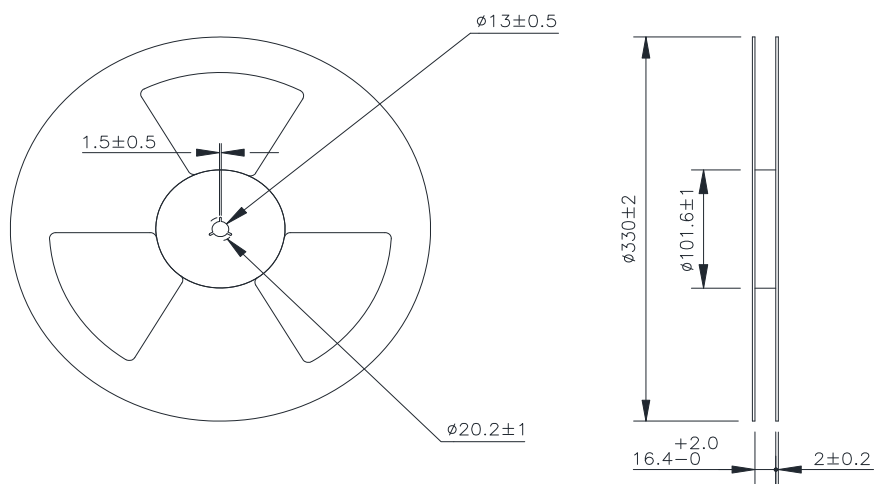
TLD

TRU



Direction of feed from reel

Direction of feed from reel





● **Application Notice**

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