

### ● Description

The KT1600 series consist of two infrared emitting diodes, connected in inverse parallel, optically coupled to a phototransistor detector. They are packaged in a 4 pin LSOP wide body package. It features a high current transfer ratio, low coupling capacitance and high isolation voltage.

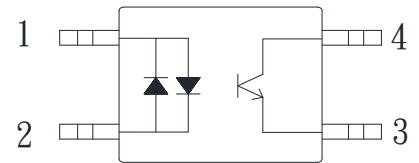
### ● Features

1. Pb free and RoHS compliant
2. High isolation voltage 5000Vrms
3. Opaque type, SMD low profile 4 lead package
4. Current transfer ratio  
(CTR : Min. 80% at  $I_F = \pm 5\text{mA}$   $V_{CE} = 5\text{V}$ )
5. 8mm outer creepage distance
6. AC input with transistor output
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

- Hybrid substrates that require high density mounting
- Programmable controllers
- Switch mode power supplies
- Microprocessor system interface

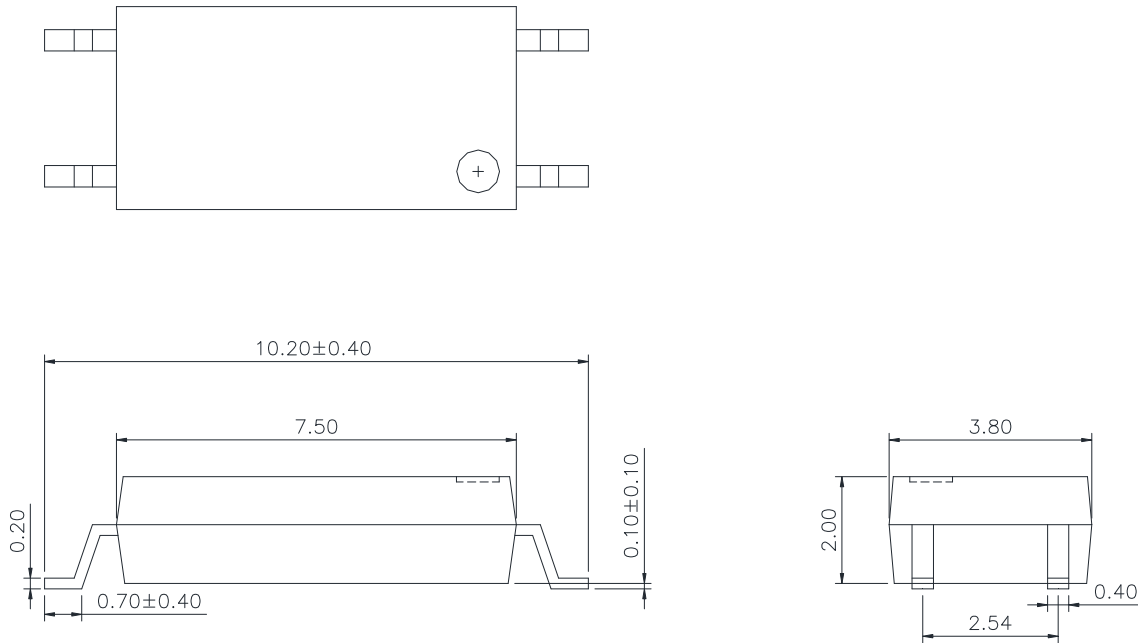
### ● Schematic



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

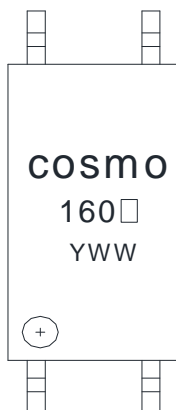
● **Outside Dimension**

Unit : mm



TOLERANCE :  $\pm 0.2$ mm

● **Device Marking**



**Notes:**

cosmo

160 □

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
	Power dissipation	$P_D$	100	mW
Output	Collector-Emitter voltage	$V_{CEO}$	80	V
	Emitter-Collector voltage	$V_{ECO}$	7	V
	Collector current	$I_C$	50	mA
	Collector power dissipation	$P_C$	150	mW
Total power dissipation		$P_{tot}$	250	mW
Isolation voltage 1 minute		$V_{iso}$	5000	Vrms
Operating temperature		$T_{opr}$	-55 to +100	°C
Storage temperature		$T_{stg}$	-55 to +125	°C
Soldering temperature 10 seconds		$T_{sol}$	260	°C

● **Electro-optical Characteristics**

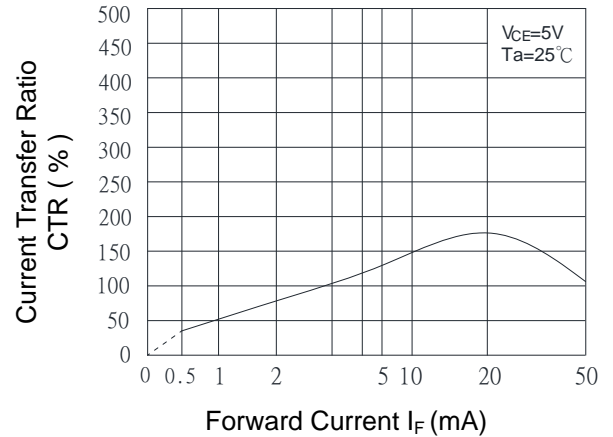
(Ta=25°C)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	$V_F$	$I_F = \pm 20\text{mA}$	-	1.2	1.4	V
	Terminal capacitance	$C_t$	$V = 0, f = 1\text{kHz}$	-	30	250	pF
Output	Collector dark current	$I_{CEO}$	$V_{CE} = 20\text{V}, I_F = 0$	-	-	0.1	uA
	Collector-Emitter breakdown voltage	$BV_{CEO}$	$I_C = 0.1\text{mA}, I_F = 0$	80	-	-	V
	Emitter-Collector breakdown voltage	$BV_{ECO}$	$I_E = 100\text{uA}, I_F = 0$	7	-	-	V
Transfer characteristics	Current transfer ratio	CTR	$I_F = \pm 5\text{mA}, V_{CE} = 5\text{V}$	50	-	300	%
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	$I_F = \pm 10\text{mA}, I_C = 1\text{mA}$	-	0.1	0.3	V
	Isolation resistance	Riso	DC500V, 40 to 60%RH	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$
	Floating capacitance	$C_f$	$V = 0, f = 1\text{MHz}$	-	0.6	1.0	pF
	Response time (Rise)	$t_r$	$V_{CC} = 2\text{V}, I_C = 2\text{mA}, R_L = 100\Omega$	-	5	20	us
	Response time (Fall)	$t_f$		-	4	20	us

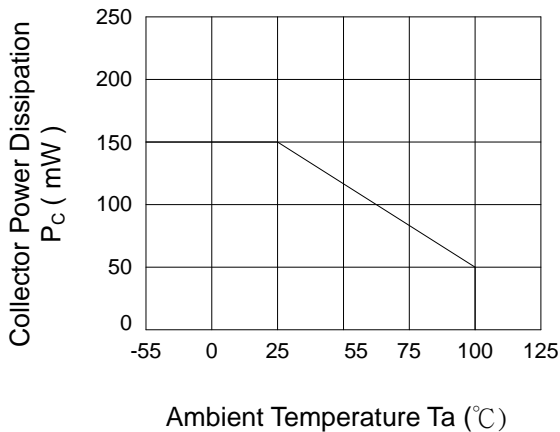
Classification table of current transfer ratio is shown below.

CTR Rank	CTR (%)
KT1600	50 TO 300

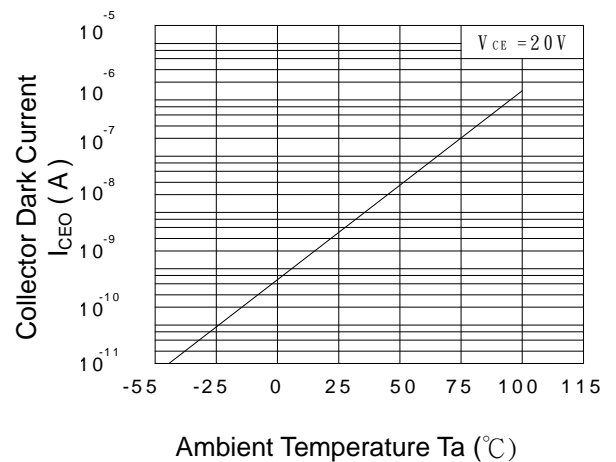
**Fig.1 Current Transfer Ratio vs. Forward Current**



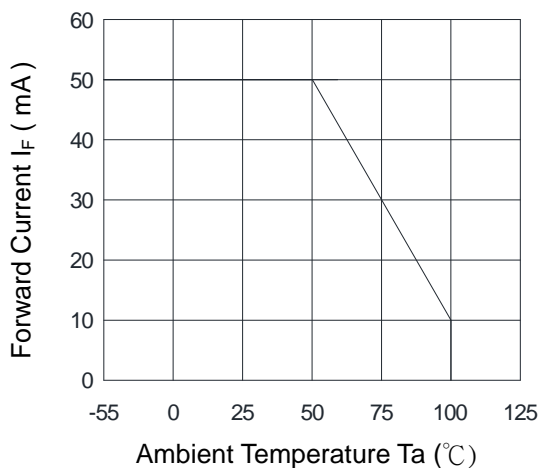
**Fig.2 Collector Power Dissipation vs. Ambient Temperature**



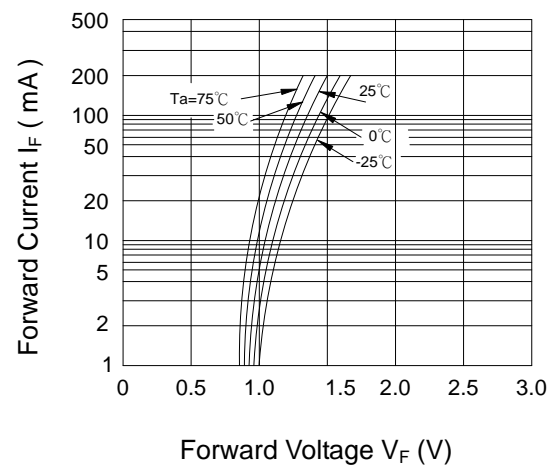
**Fig.3 Collector Dark Current vs. Ambient Temperature**



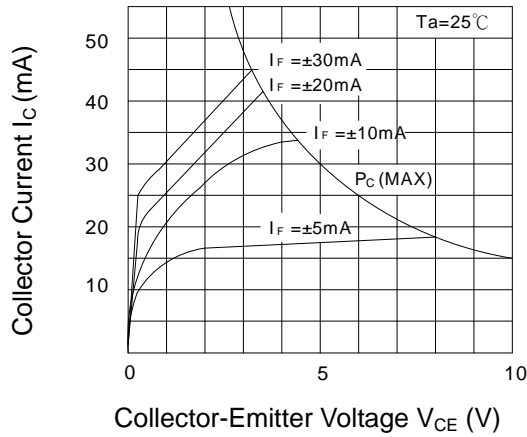
**Fig.4 Forward Current vs. Ambient Temperature**



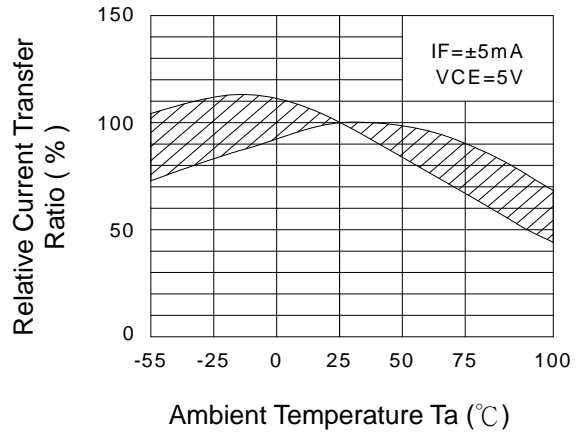
**Fig.5 Forward Current vs. Forward Voltage**



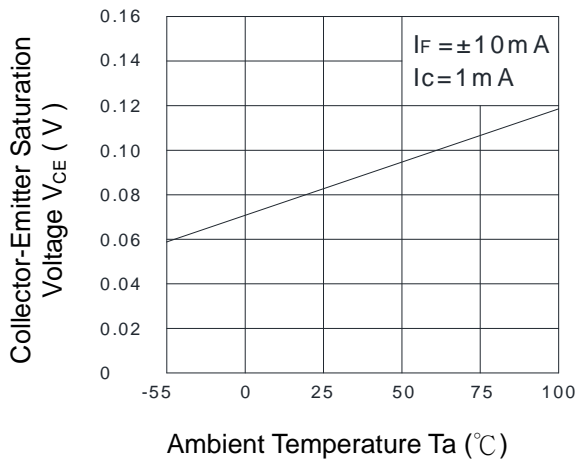
**Fig.6 Collector Current vs. Collector-Emitter Voltage**



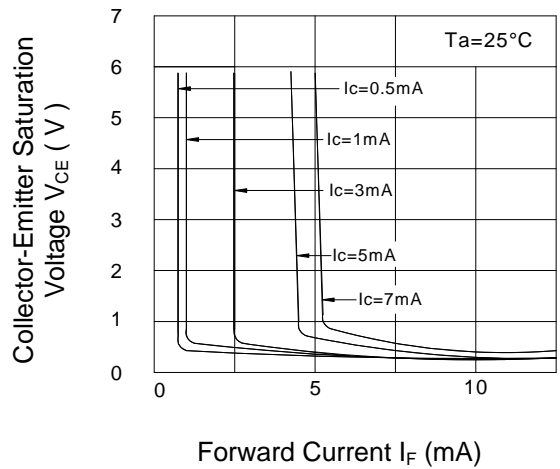
**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**



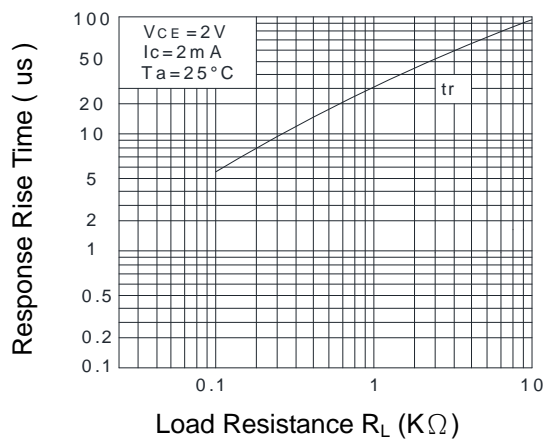
**Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature**



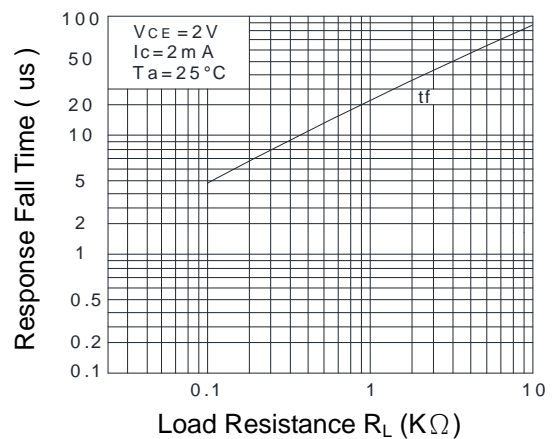
**Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current**



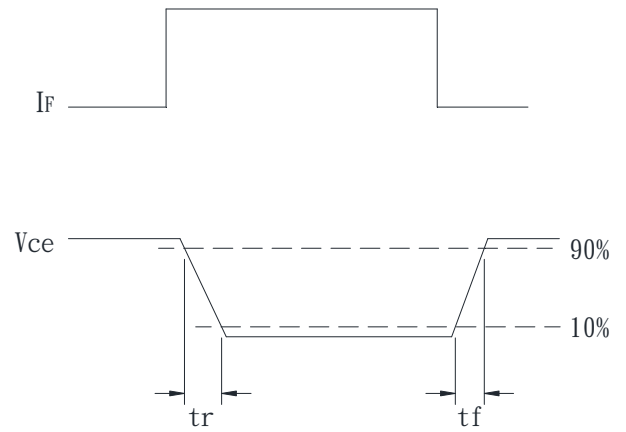
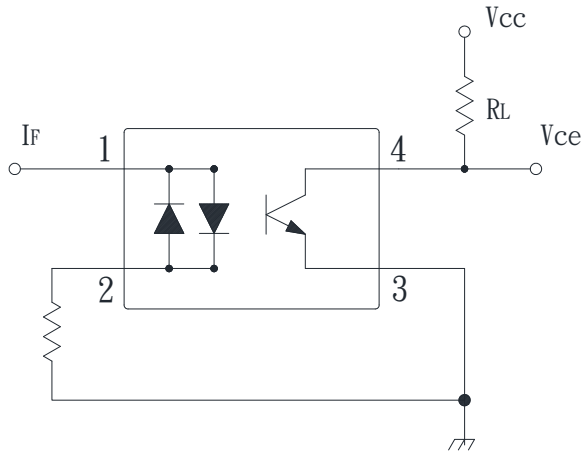
**Fig.10 Response Time (Rise) vs. Load Resistance**



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



● **Test Circuit for Response Time**

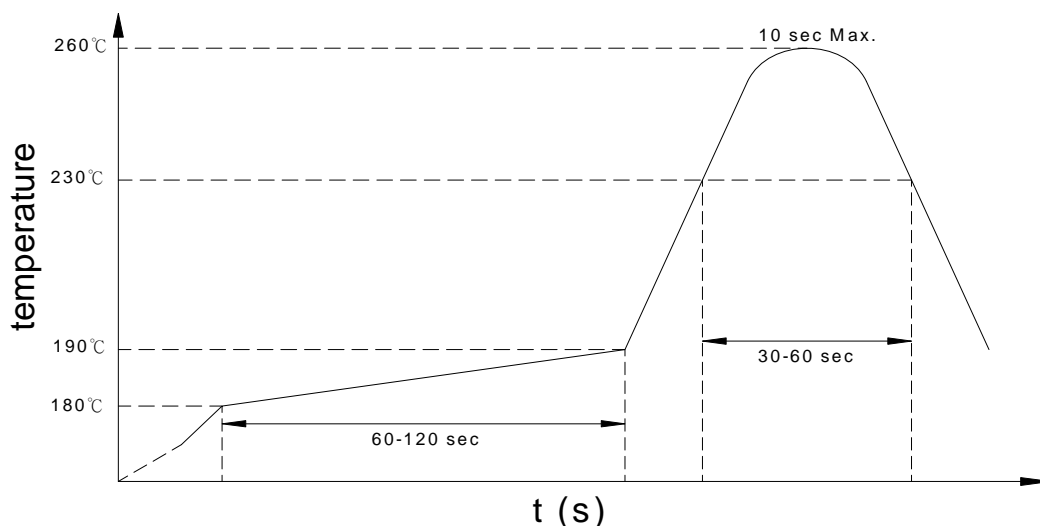


### ● Recommended Soldering Conditions

#### (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**

### KT1600 (Z)

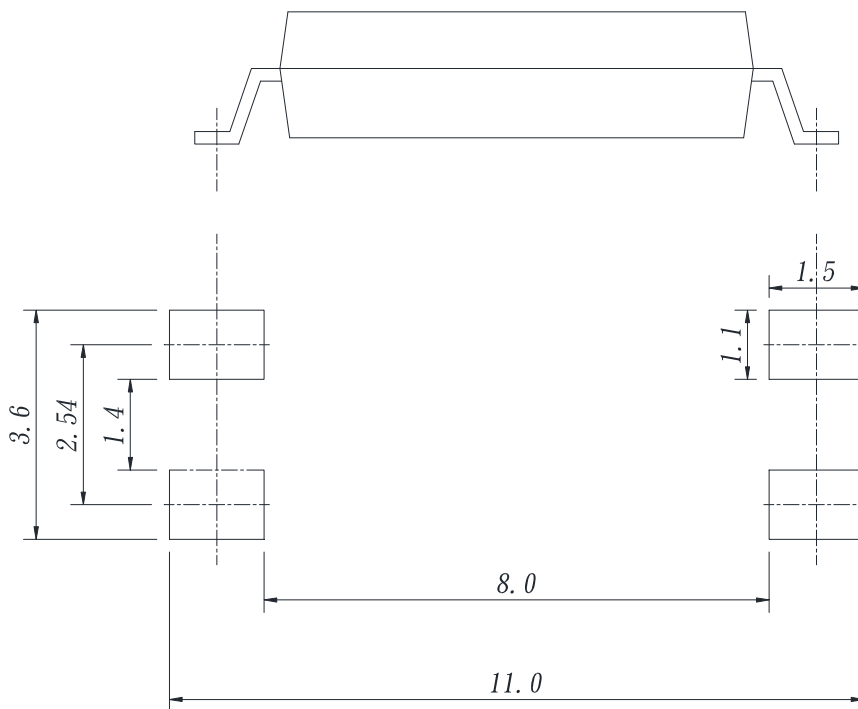
**Notes:**

KT1600 = 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

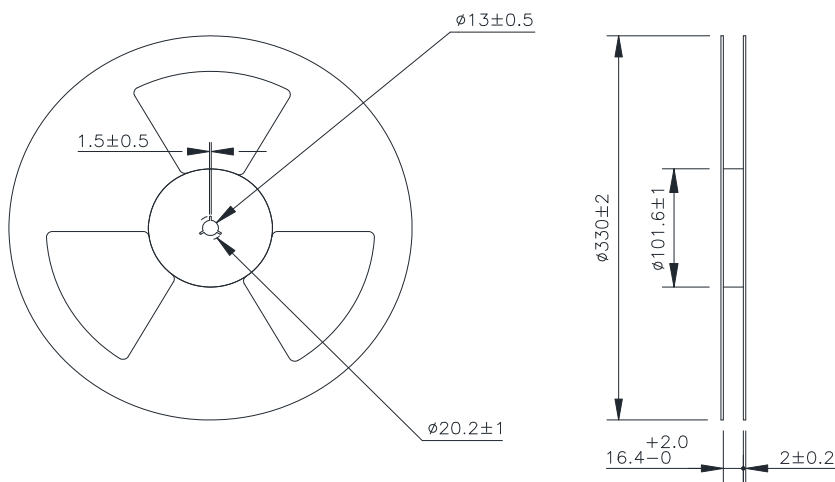
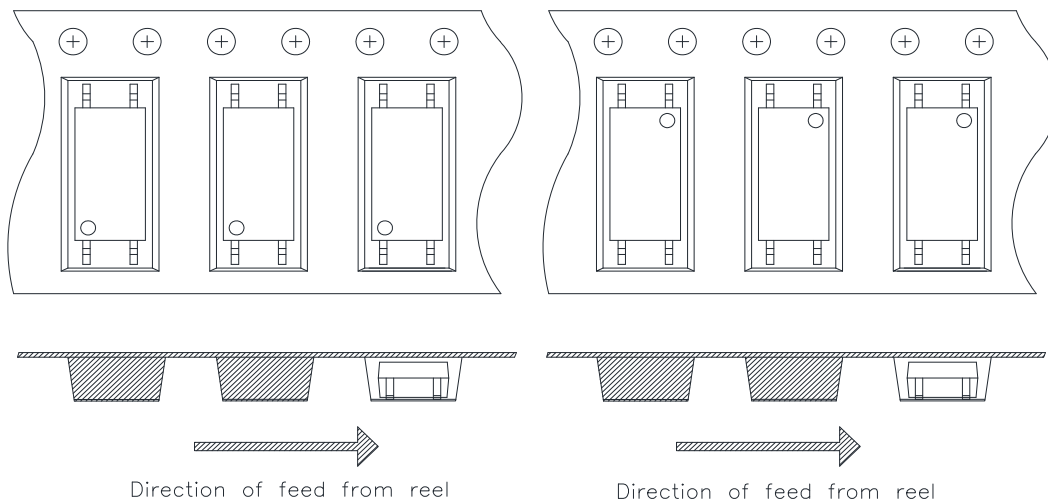
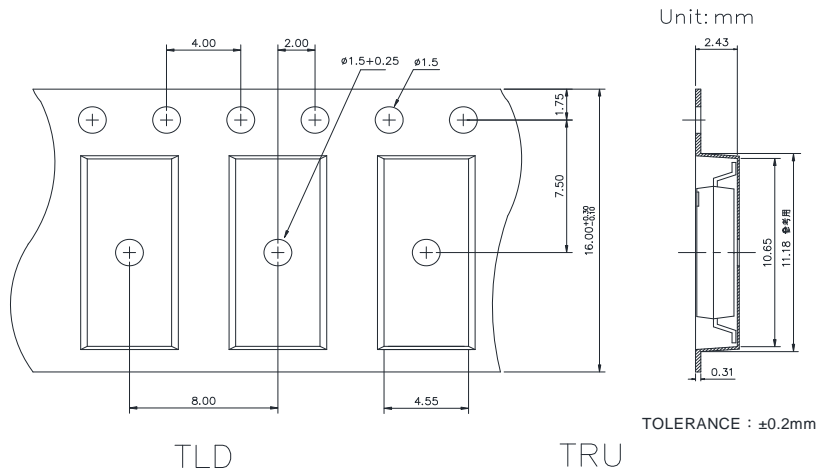
- **Recommended Pad Layout for Surface Mount Lead Form**



Unit : mm



● 4-pin LSOP Carrier Tape & Reel



- **Application Notice**

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