

● Description

The KT1610 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.

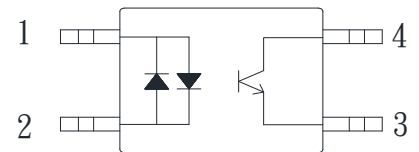
● Features

1. Pb free and RoHS compliant
2. Temperature range -55°C to 115°C
3. High isolation voltage 5000Vrms
4. Opaque type, SMD low profile 4 lead package
5. Current transfer ratio
(CTR : Min. 80% at $I_F = \pm 5\text{mA}$ $V_{CE} = 5\text{V}$)
6. 8mm outer creepage distance
7. AC input with transistor output
8. MSL class 1
9. 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

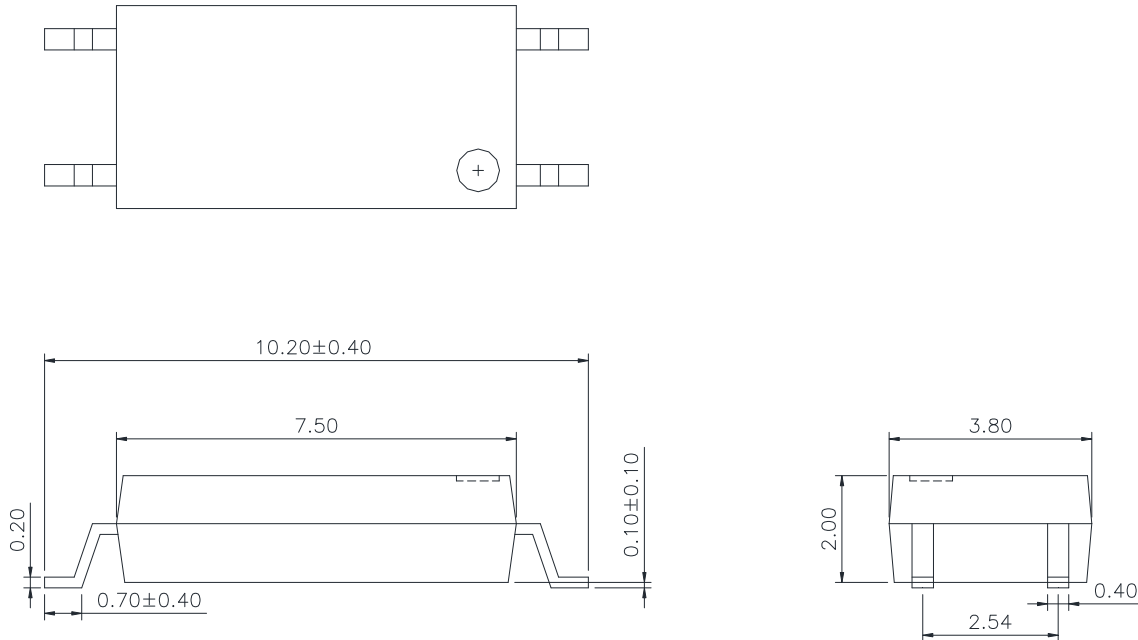
● Schematic



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

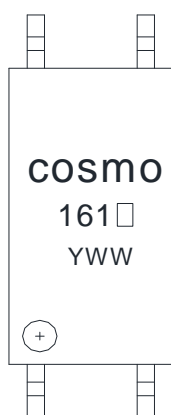
● **Outside Dimension**

Unit : mm



TOLERANCE : $\pm 0.2\text{mm}$

● **Device Marking**



Notes:

cosmo

161 □

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 +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	$I_F = \pm 20\text{mA}$	-	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	5×10^{10}	10^{11}	-	Ω
	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 (%)
KT1610	50 TO 300

Fig.1 Current Transfer Ratio vs. Forward Current

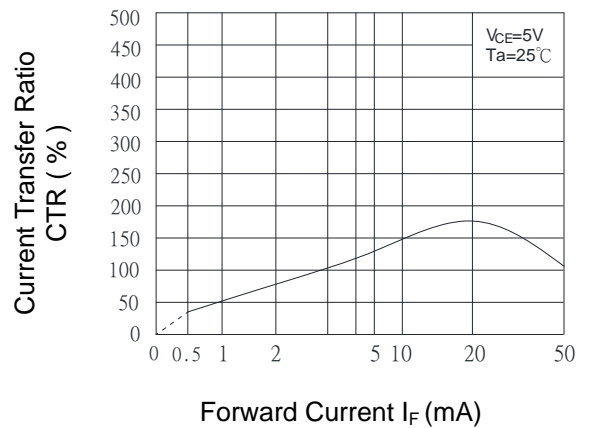


Fig.2 Collector Power Dissipation vs. Ambient Temperature

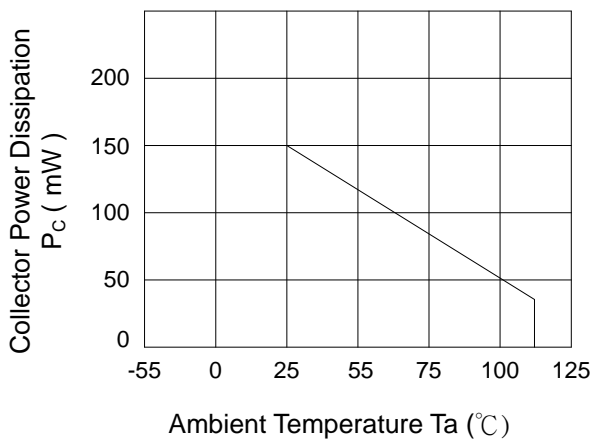


Fig.3 Collector Dark Current vs. Ambient Temperature

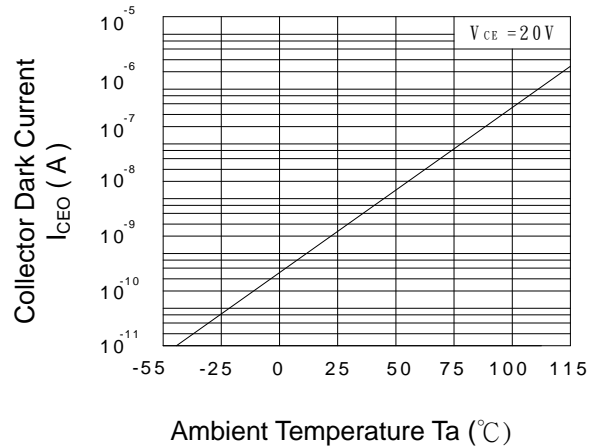


Fig.4 Forward Current vs. Ambient Temperature

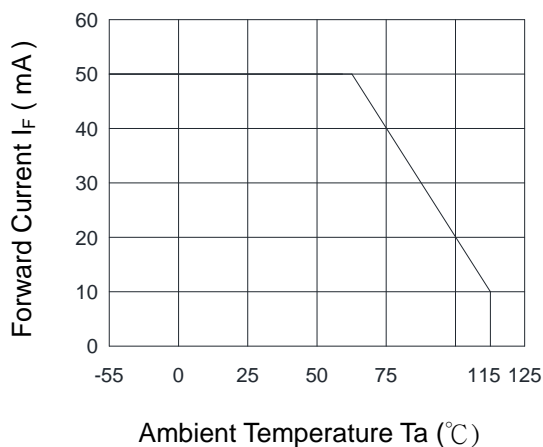


Fig.5 Forward Current vs. Forward Voltage

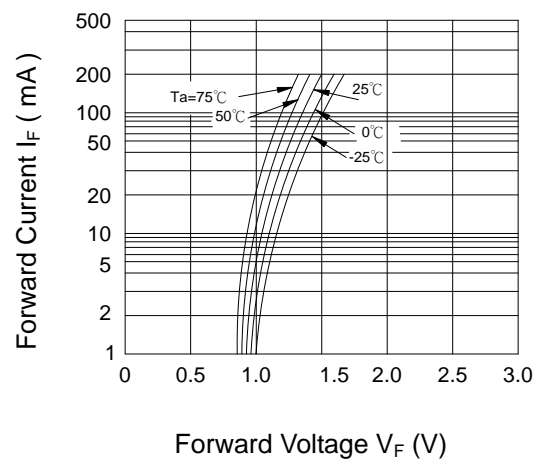


Fig.6 Collector Current vs. Collector-Emitter Voltage

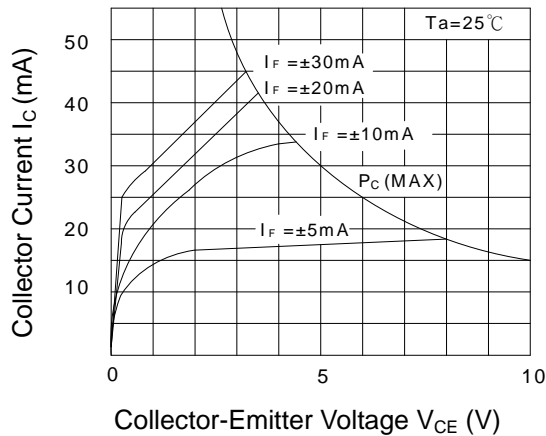


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

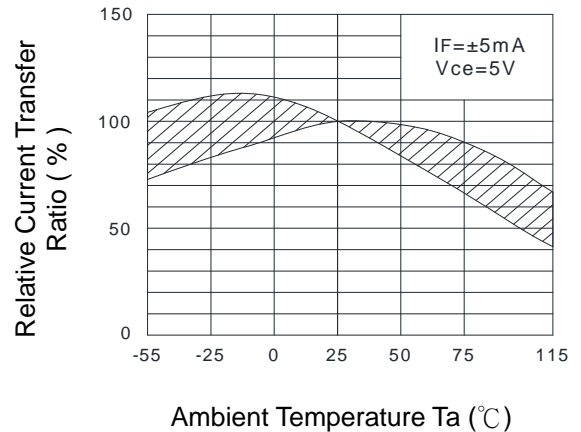


Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature

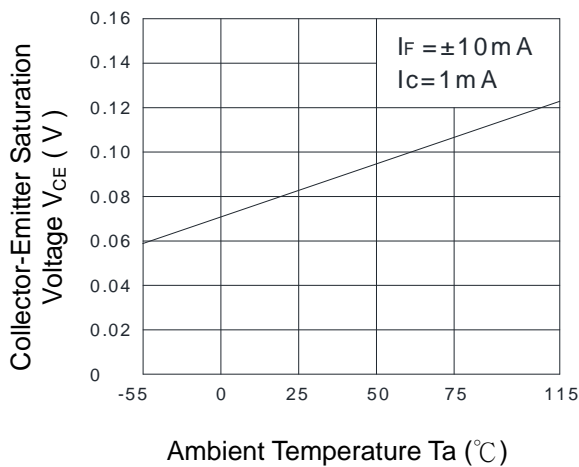


Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current

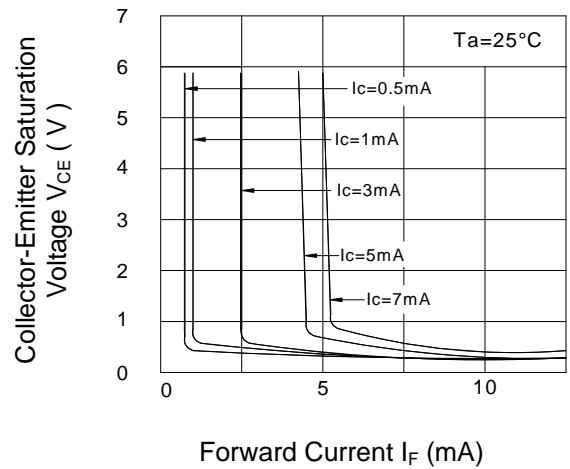


Fig.10 Response Time (Rise) vs. Load Resistance

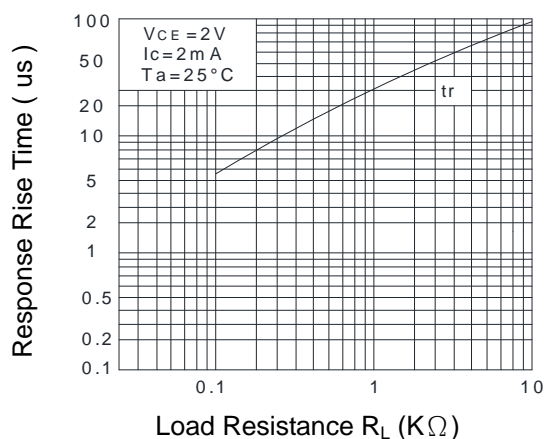
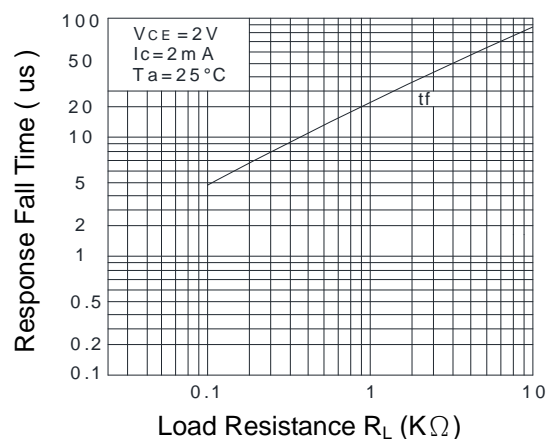
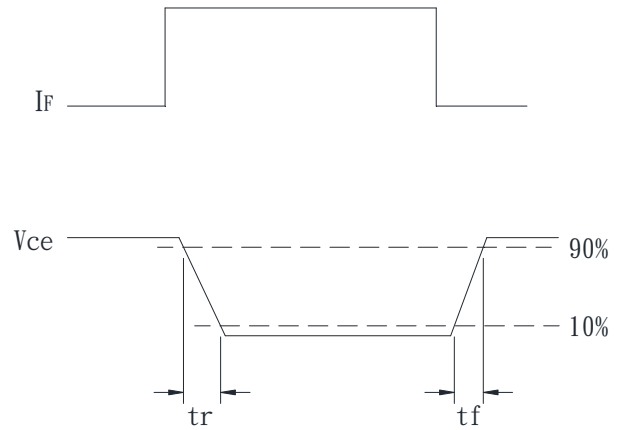
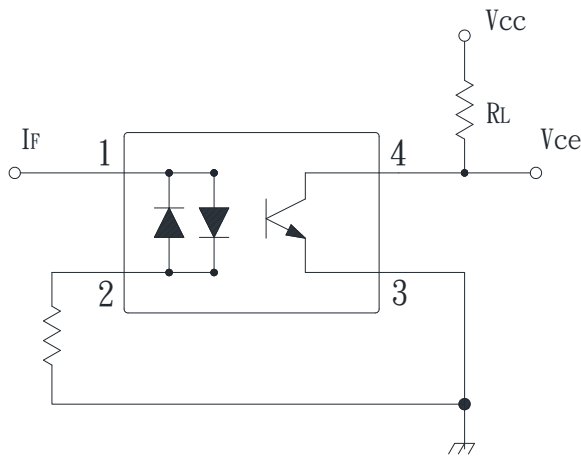


Fig.11 Response Time (Fall) vs. Load Resistance



● **Test Circuit for Response Time**

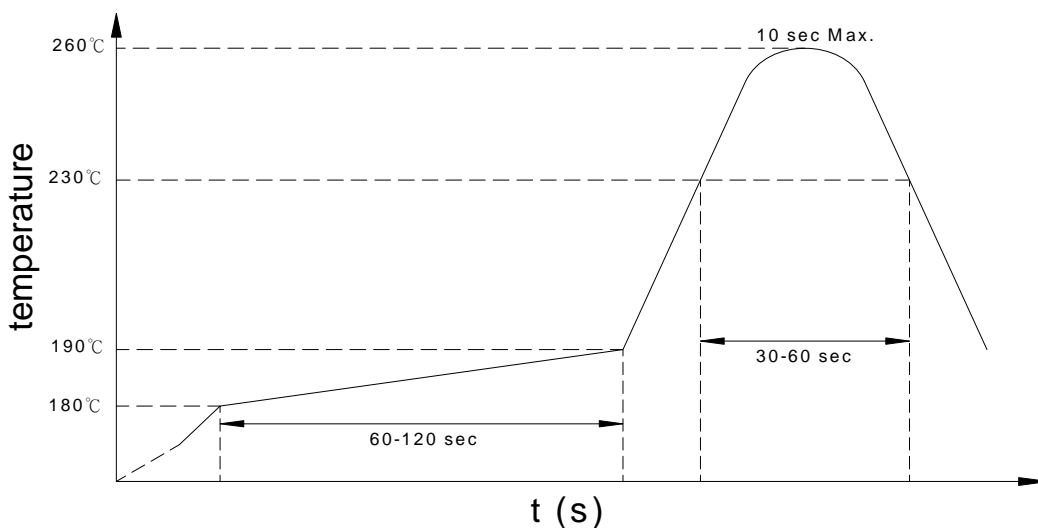


● **Recommended Soldering Conditions**

(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**

KT1610 (Z)

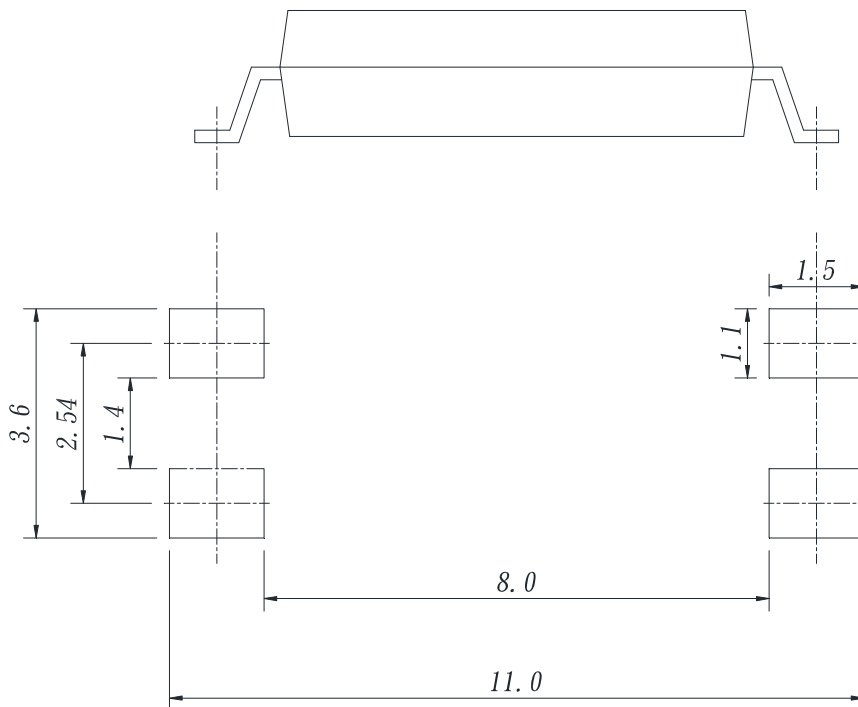
Notes:

KT1610 = Part No.

Z = Tape and reel option (TLD · TRU)

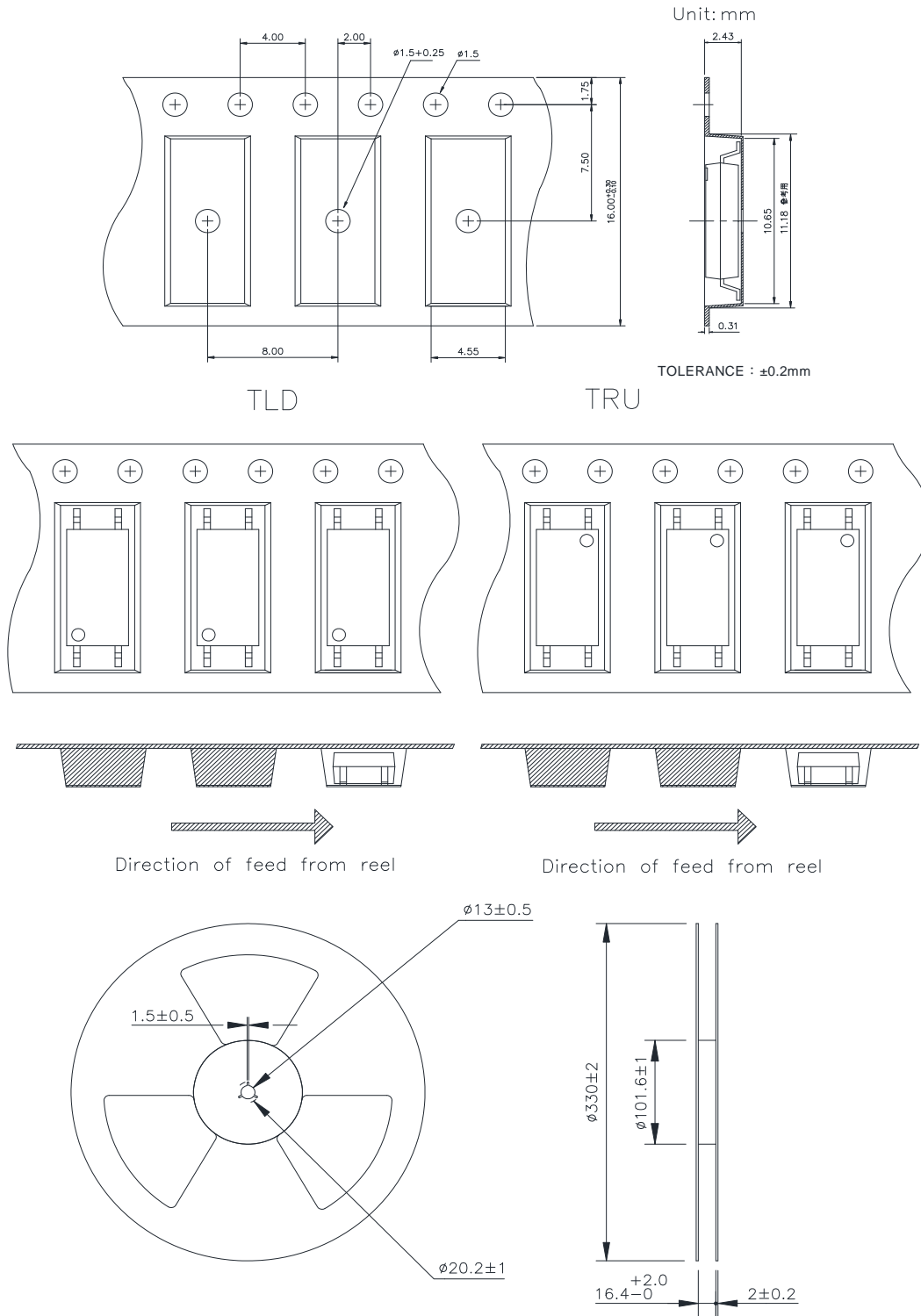
Option	Description	Packing quantity
(TLD)	TLD tape & reel option	3000 units per reel
(TRU)	TRU tape & reel option	3000 units per reel

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



Unit : mm

● 4-pin LSOP Carrier Tape & Reel



- **Application Notice**

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