KPC357NT Series

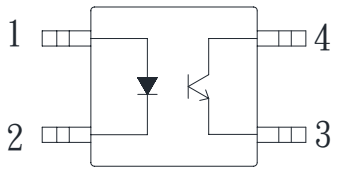
4PIN MINI-FLAT PHOTOTRANSISTOR PHOTOCOUPLER

cosmo

Description

The KPC357 is DC-input single channel which contains a light emitting diode optically coupled to a phototransistor. It is packaged in a 4-pin Mini-Flat package. The input-output isolation voltage is rated at 3750 Vrms.

Schematic



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

Features

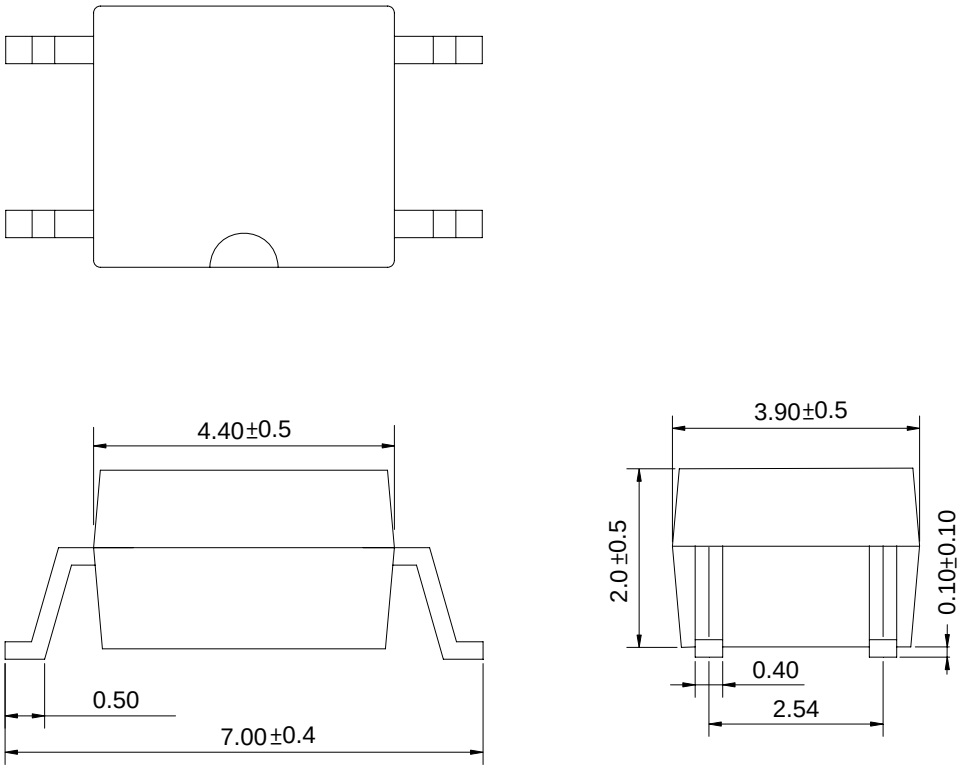
1. Pb free and RoHS compliant
2. Mini-flat package: compact 4 pin SOP with a 2.0mm profile
3. Current transfer ratio
   (CTR : Min.50% at I_F=5mA Vce=5V)
4. Isolation voltage between input and output
   (Viso : 3750vrms).
5. MSL class 1
6. Agency Approvals:
   - UL Approved (No. E169586): UL1577
   - c-UL Approved (No. E169586)
   - VDE Approved (No. 40014684): DIN EN 60747-5-5
   - FIMKO Approved: EN60065, EN60950
   - CQC Approved: GB8898-2011, GB4943.1-2011

Applications

- Hybrid substrates that require high density mounting
- Programmable controllers
- DC-DC converters
- Telecommunication equipments

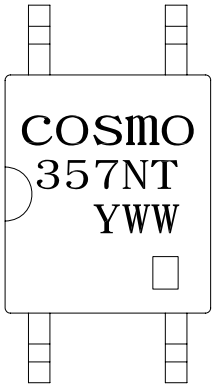
Outside Dimension

Unit : mm



TOLERANCE : ±0.2mm

Device Marking



Notes:

Cosmo
357NT
YWW Y: Year code / WW: Week code
□ □: CTR rank

Absolute Maximum Ratings

(Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P_D	70	mW
Output	Collector-Emitter voltage	V_{CEO}	80	V
	Emitter-Collector voltage	V_{ECO}	5	V
	Collector current	I_C	50	mA
	Collector power dissipation	P_C	150	mW
Total power dissipation		Ptot	170	mW
Isolation voltage 1 minute		Viso	3750	Vrms
Operating temperature		Topr	-55 to +115	℃
Storage temperature		Tstg	-55 to +125	℃
Soldering temperature 10 seconds		Tsol	260	℃

Electro-optical Characteristics

(Ta=25℃)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	V_F	I_F=20mA	-	1.2	1.4	V
	Reverse current	I_R	V_R=4V	-	-	10	uA
	Terminal capacitance	Ct	V=0, f=1KHz	-	30	250	pF
Output	Collector dark current	I_{CEO}	V_{CE}=20V, I_F=0	-	-	0.1	uA
	Collector-Emitter breakdown voltage	BV_{CEO}	Ic=100uA , I_F=0	80	-	-	V
	Emitter-Collector breakdown voltage	BV_{ECO}	I_E=100uA, I_F=0	5	-	-	V
Transfer charac-teristics	Current transfer ratio	CTR	I_F=5mA, V_{CE}=5V	50	-	600	%
			I_F=1mA, V_{CE}=5V	15	-	-	%
	Collector-Emitter saturation voltage	V_{CE}(sat)	I_F=20mA, Ic=1mA	-	0.1	0.3	V
	Isolation resistance	Riso	DC500V, 40 to 60%RH	$5x10^{10}$	10^{11}	-	Ω
	Floating capacitance	Cf	V=0, f=1MHz	-	0.6	1.0	pF
	Response time (Rise)	tr	Vce=2V,Ic=2mA,R_L=100Ω	-	5	20	us
	Response time (Fall)	tf		-	4	20	us

Classification table of current transfer ratio is shown below.

CTR Rank.	CTR (%)	Marking of Classification
KPC357NT0A	80 TO 160	A
KPC357NT0B	130 TO 260	B
KPC357NT0C	200 TO 400	C
KPC357NT0D	300 TO 600	D
KPC357NT0E	50 TO 600	Blank,A,B,C,D,E

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

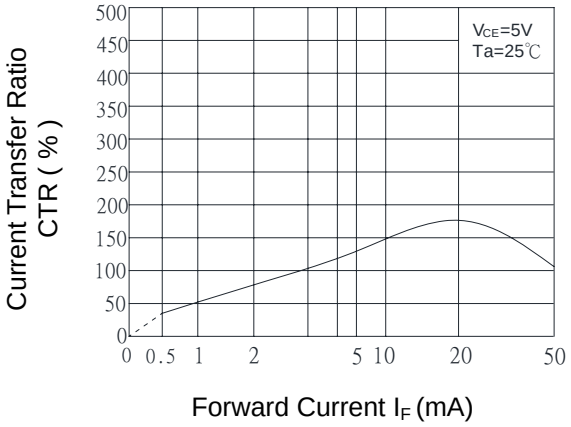


Fig.2 Collector Power Dissipation vs. Ambient Temperature

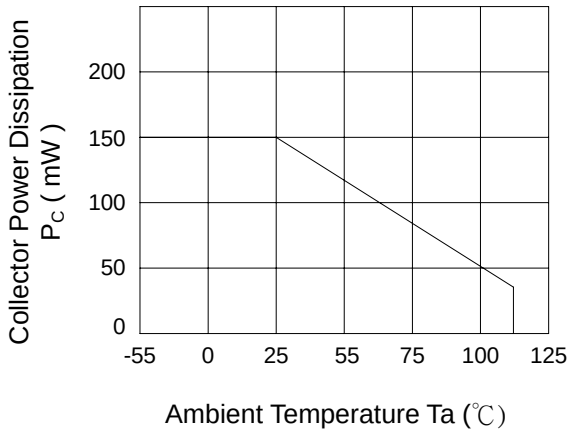


Fig.3 Collector Dark Current vs. Ambient Temperature

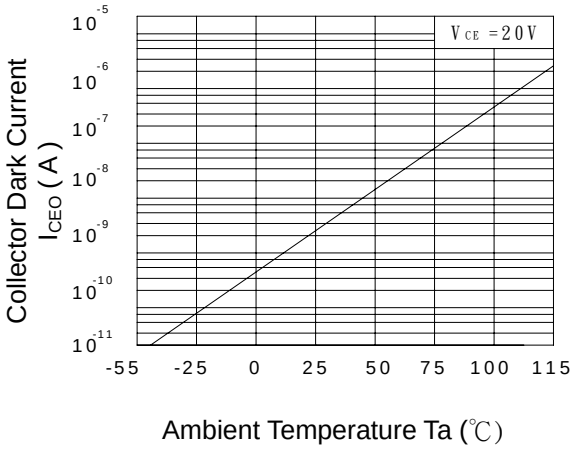


Fig.4 Forward Current vs. Ambient Temperature

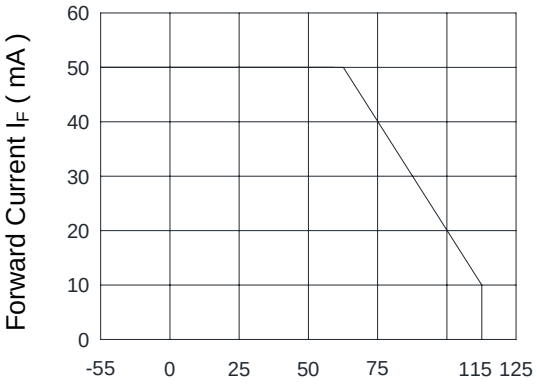


Fig.5 Forward Current vs. Forward Voltage

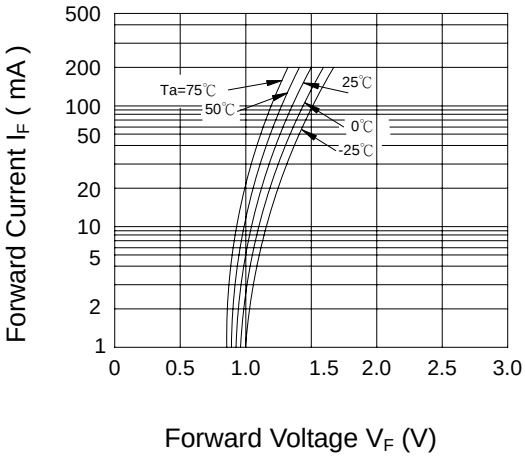


Fig.6 Collector Current vs. Collector-Emitter Voltage

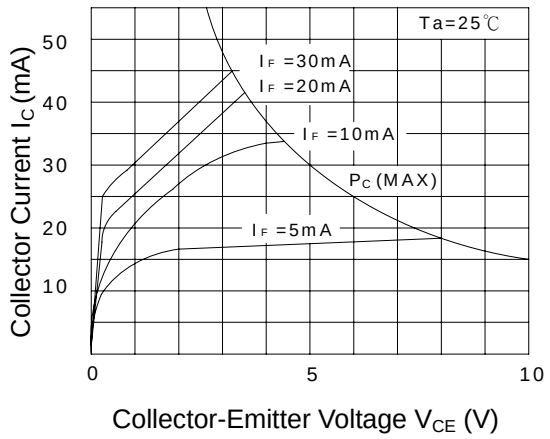


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

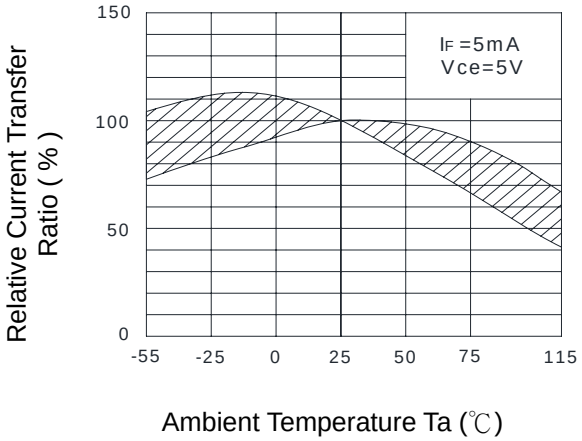


Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature

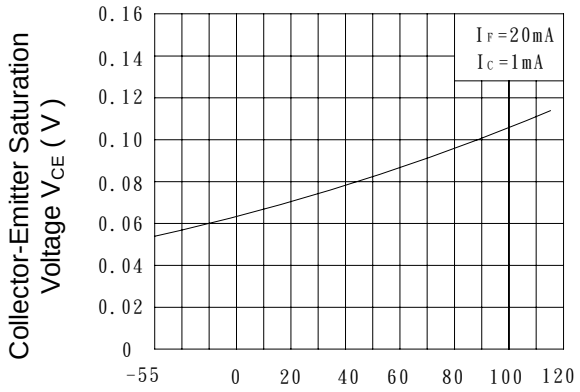


Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current

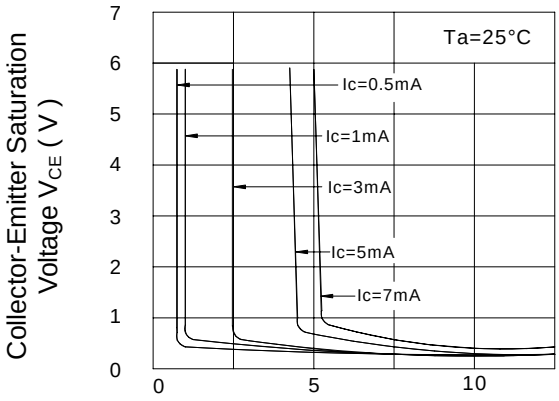


Fig.10 Response Time (Rise) vs. Load Resistance

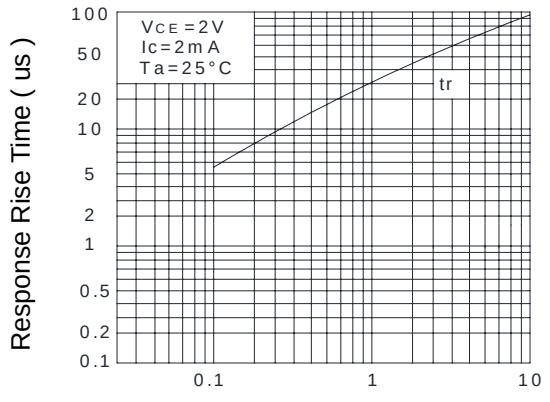
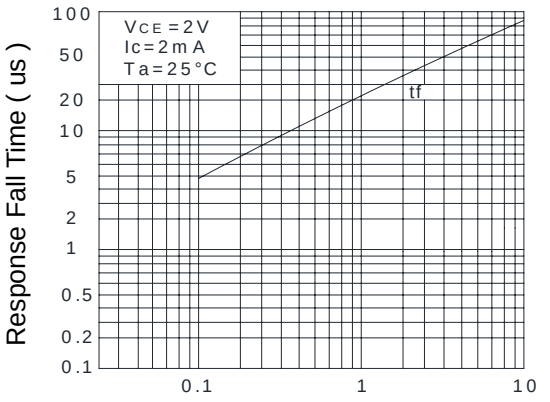
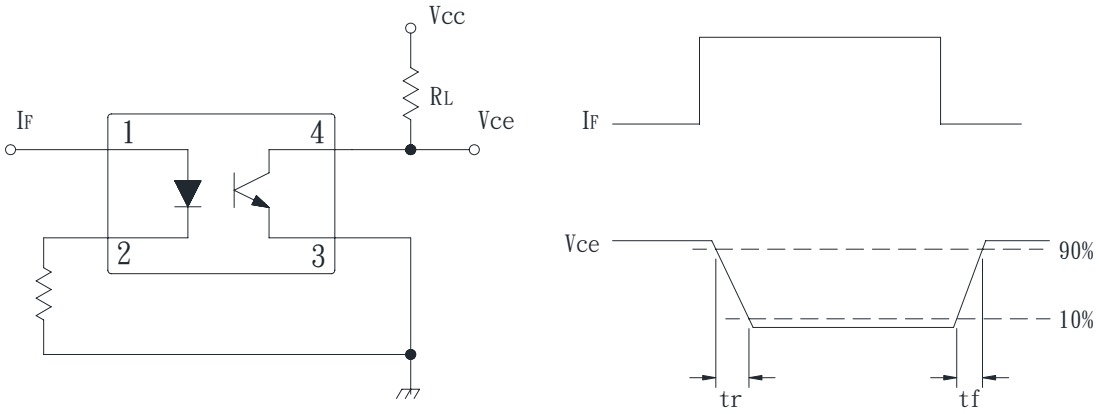


Fig.11 Response Time (Fall) vs. Load Resistance



Test Circuit For Response Time

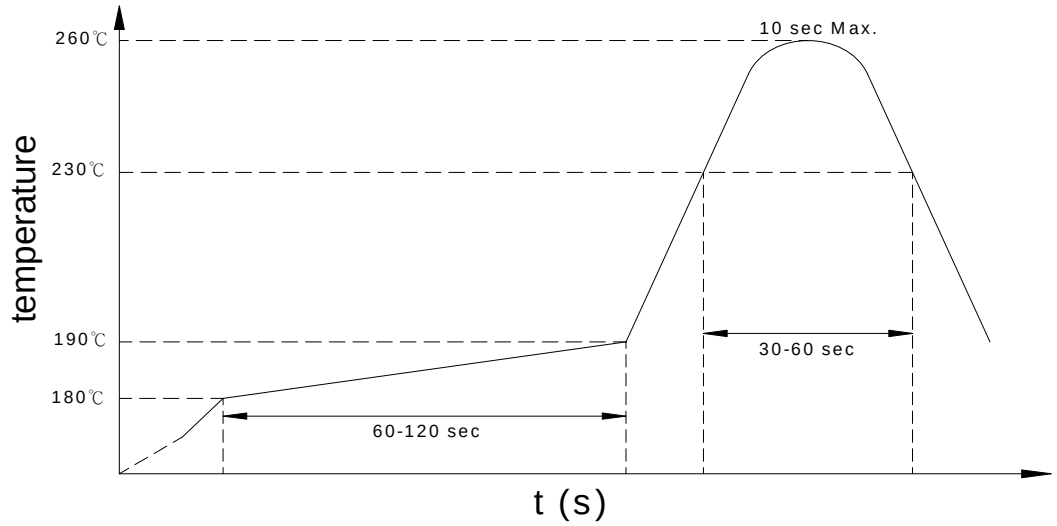


Recommended Soldering Conditions

(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**

KPC357NT Y (Z)

Notes:

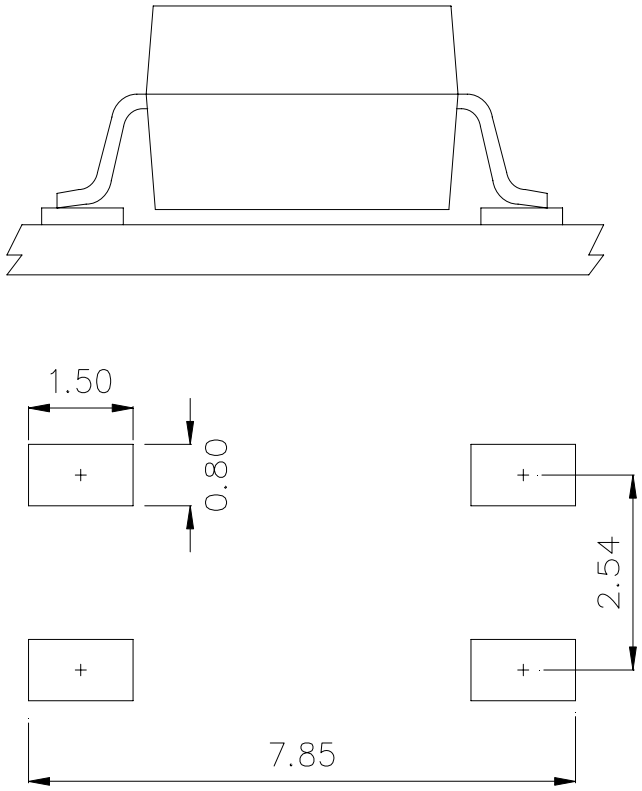
KPC357NT = Part No.

Y = CTR rank option (A ~ E)

Z = Tape and reel option (TLD、TRU)

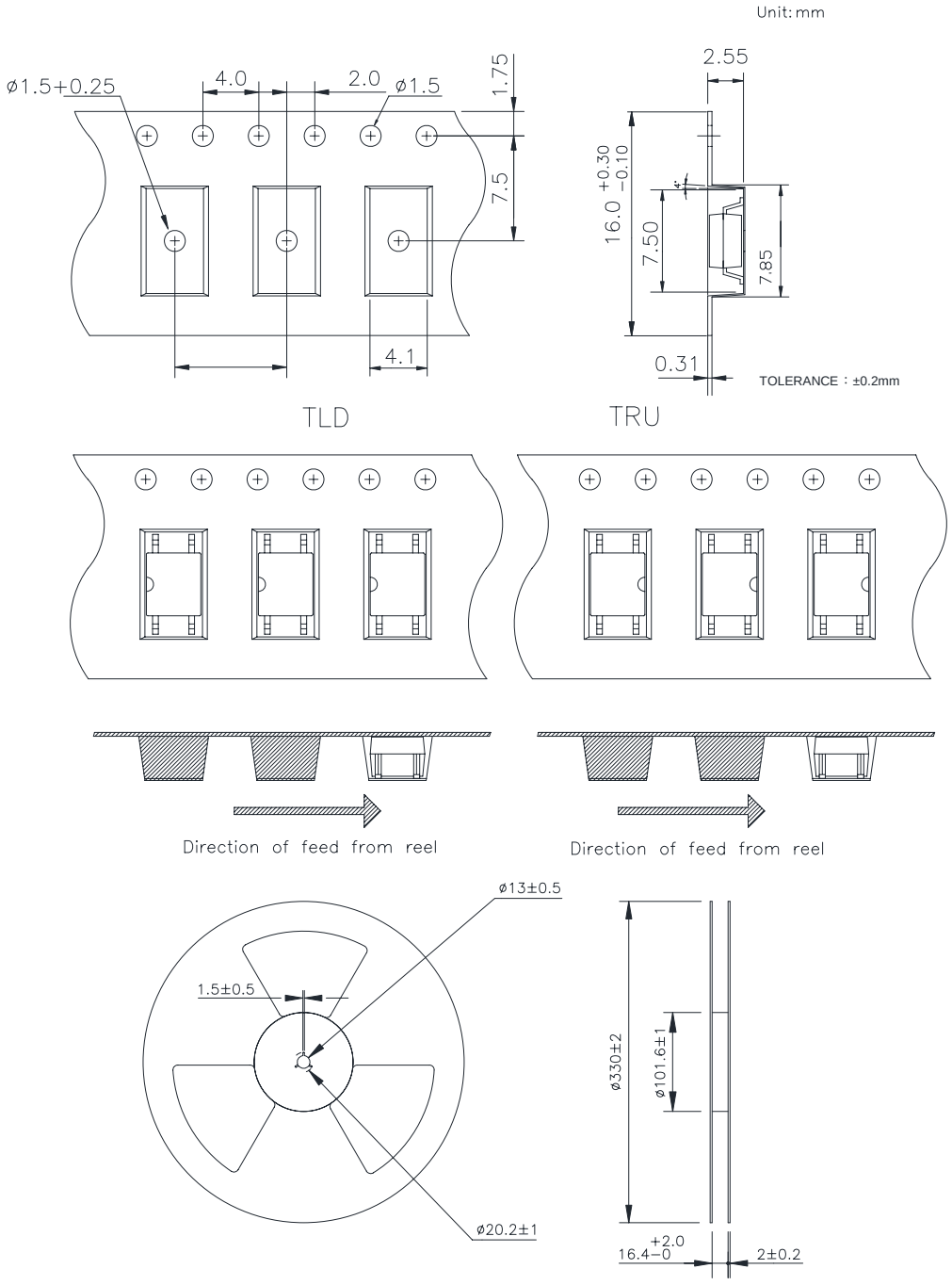
Option	Description	Packing quantity
TLD	TLD tape & reel option	3000 units per reel
TRU	TRU tape & reel option	3000 units per reel

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



Unit : mm

● 4-pin Mini-Flat Carrier Tape & Reel



Application Notice

The statements regarding the suitability of products for certain types of applications are based on cosmo's knowledge of general applications of cosmo products. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to verify the specifications are suitable for use in a particular application. Customers are solely responsible for all aspects of their own product design or applications. The parameters provided in the datasheet may vary in different applications and performance may vary over time. All operating parameters (including typical parameters) must be validated by customer's technical experts for different applications. cosmo assumes no liability for customer' product design or applications. Product specifications do not expand or otherwise change cosmo's terms and conditions of purchase, including but not limited to the warranty expressed therein.

When using cosmo products, please comply with safety standards and instructions. cosmo has no liability and responsibility to the damage caused by improper use of the instructions specified in the specifications.

cosmo products are designed for use in general electronic equipment such as telecommunications, office automation equipments, personal computers, test and measurement equipments, consumer electronics, industrial control, instrumentation, audio, video.

cosmo devices shall not be used in equipment that requires higher level of reliability and safety, such as nuclear power control equipment, telecommunication equipment(trunk lines), space application, medical and other life supporting equipments, and equipment for aircraft, military, automotive or any other application that can cause human injury or death.

cosmo reserves the right to change the specifications, data, characteristics, structure, materials and other contents at any time without notice. Please contact cosmo to obtain the latest specification.

cosmo disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.