KPC357NT Series

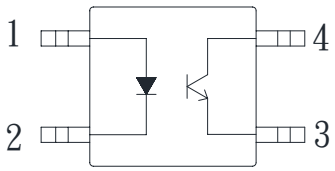
4PIN MINI-FLAT PHOTOTRANSISTOR PHOTOCOUPLER

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

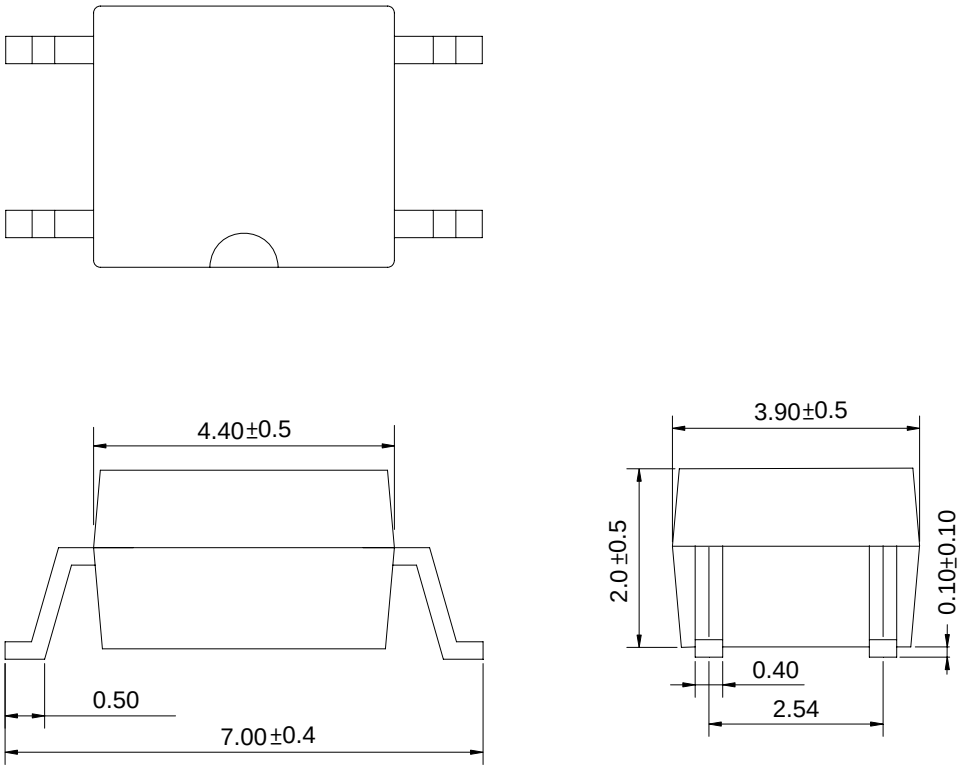
1. Halogen free
2. Pb free and RoHS compliant
3. Mini-flat package: compact 4 pin SOP with a 2.0mm profile
4. Current transfer ratio
   (CTR : Min.50% at I_F=5mA Vce=5V)
5. Isolation voltage between input and output
   (Viso : 3750vrms).
6. Agency Approvals:
   - UL1577, File No. E169586
   - VDE EN 60747-5-2, File No.40014684
   - FIMKO EN 60065, File No.FI 23147 A2
   - FIMKO EN 60950-1, File No.FI 24583 A2
   - CQC GB4943 / GB8898-2011, File No. CQC10001049555 / CQC08001023986

Applications

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

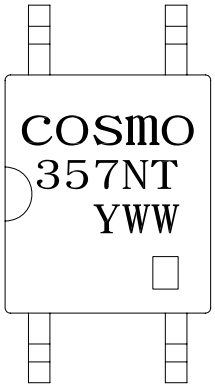
Outside Dimension

Unit : mm



TOLERANCE : ±0.2mm

Device Marking



Notes:

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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 (%)
KPC357NT0A	80 TO 160
KPC357NT0B	130 TO 260
KPC357NT0C	200 TO 400
KPC357NT0D	300 TO 600
KPC357NT0E	50 TO 600

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

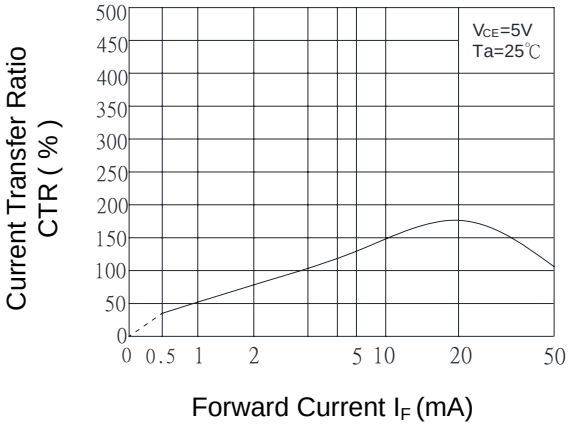


Fig.2 Collector Power Dissipation vs. Ambient Temperature

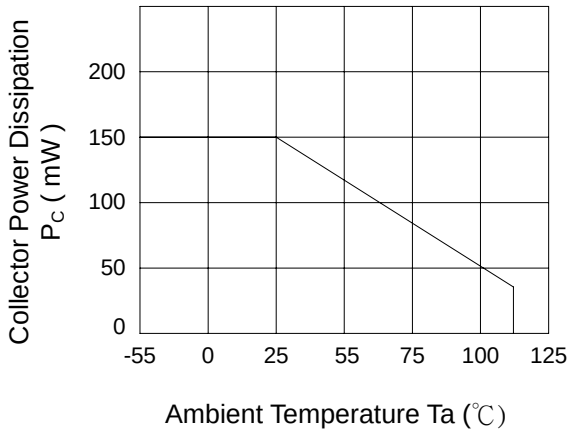


Fig.3 Collector Dark Current vs. Ambient Temperature

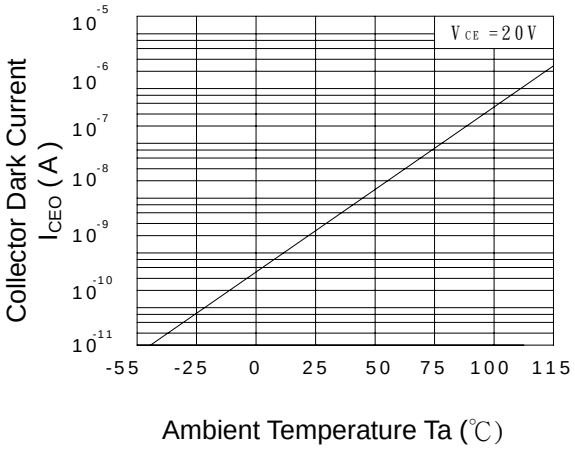


Fig.4 Forward Current vs. Ambient Temperature

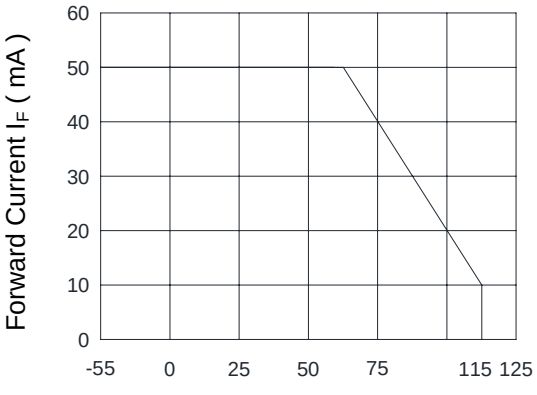


Fig.5 Forward Current vs. Forward Voltage

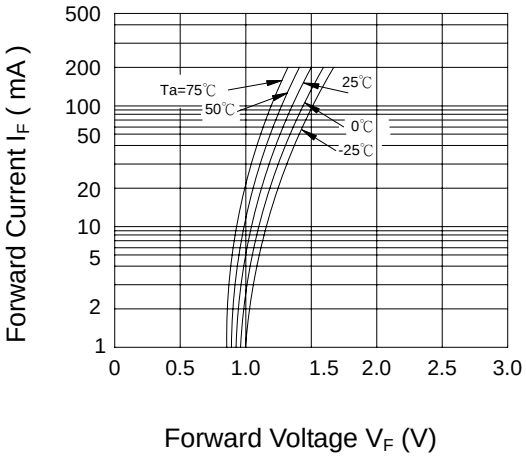


Fig.6 Collector Current vs. Collector-Emitter Voltage

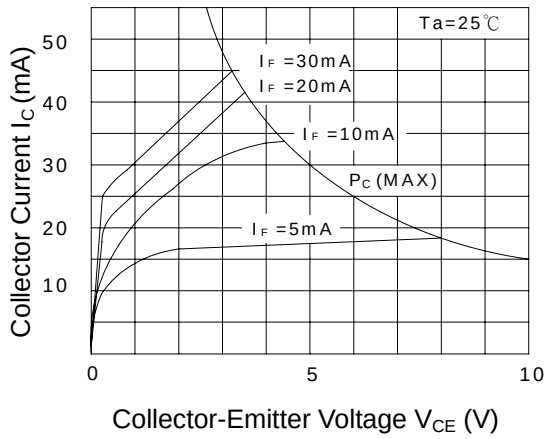


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

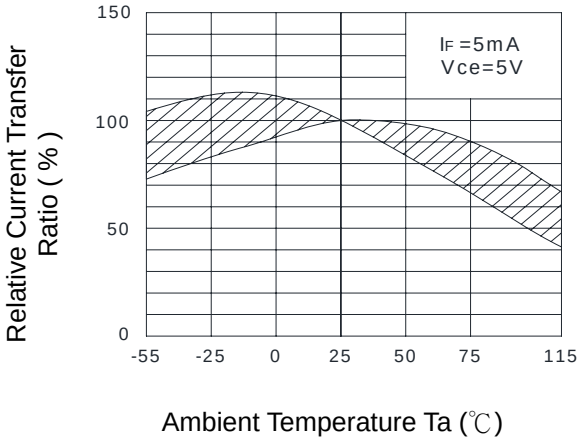


Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature

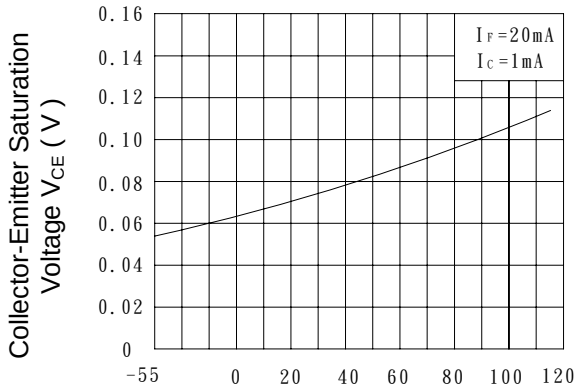


Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current

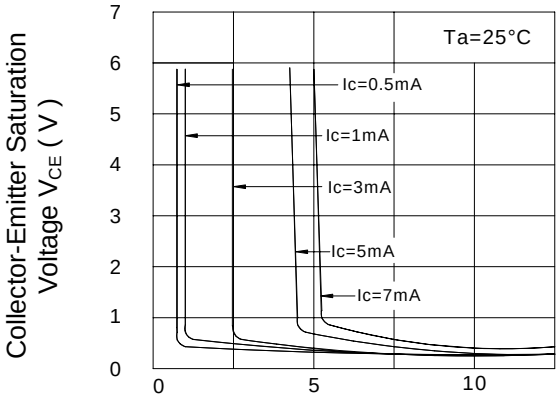


Fig.10 Response Time (Rise) vs. Load Resistance

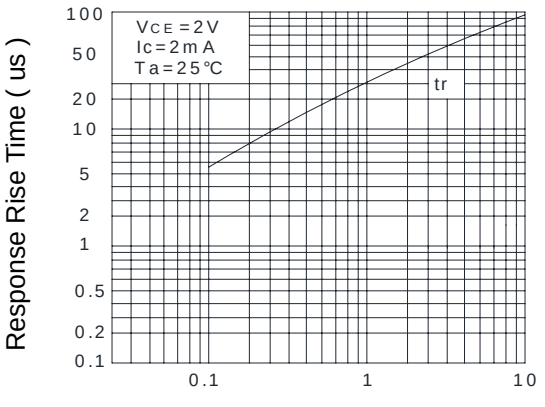
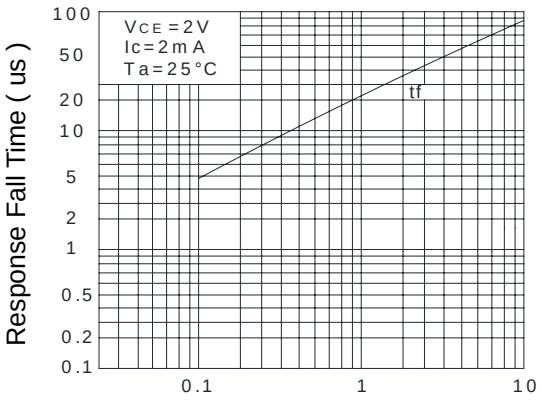
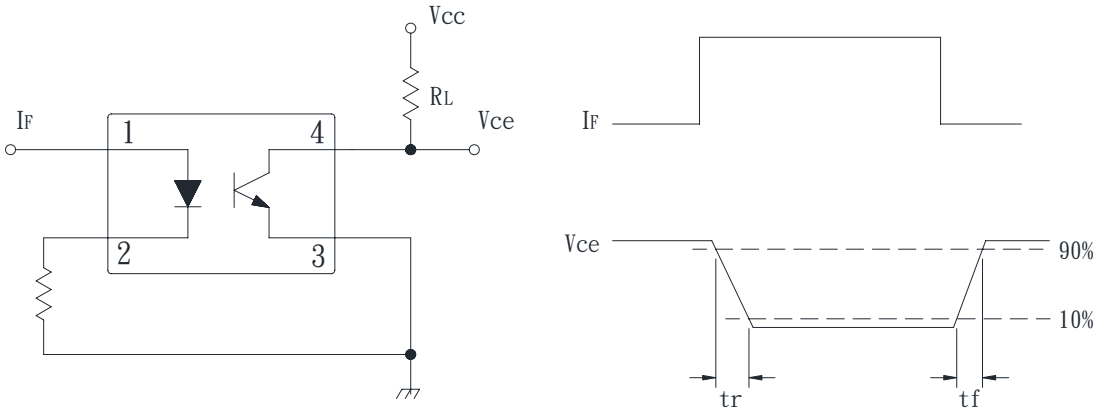


Fig.11 Response Time (Fall) vs. Load Resistance



- **Test Circuit For Response Time**

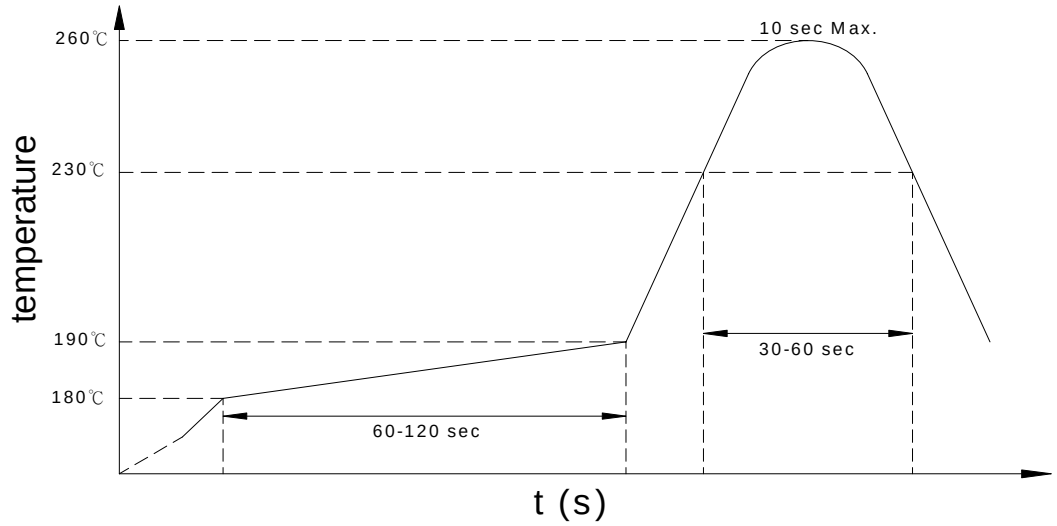


Recommended Soldering Conditions

(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:

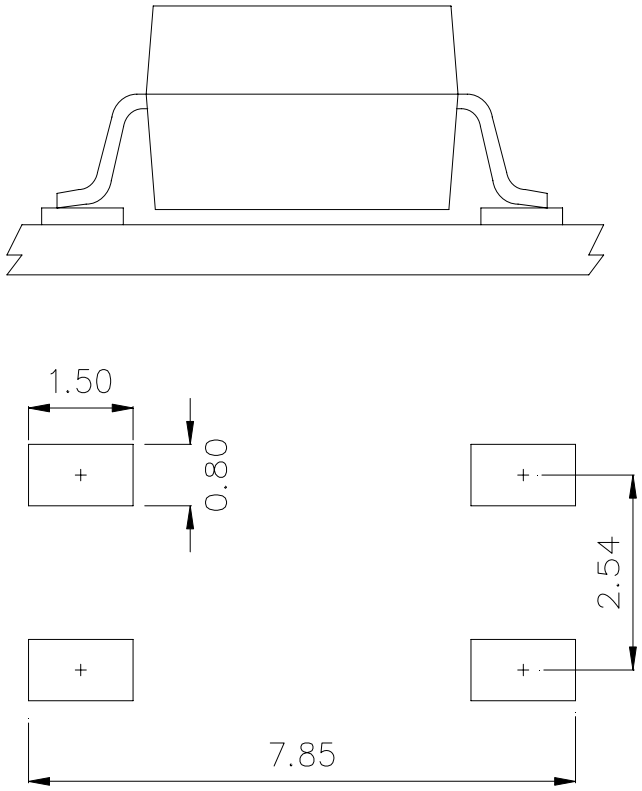
KPC357NT = Part No.

Y = CTR rank option (A ~ E)

Z = Tape and reel option (TLD、TRU)

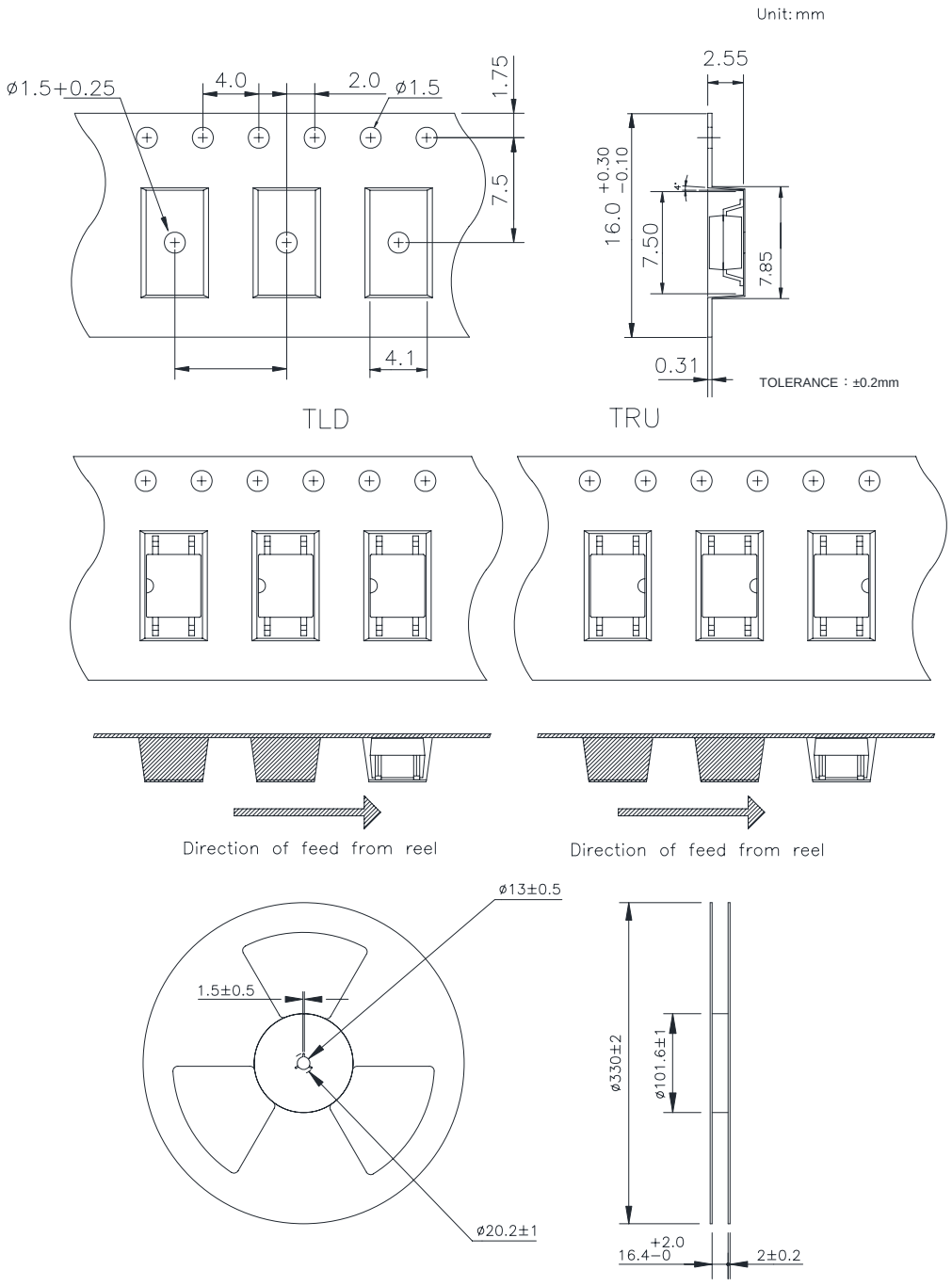
Option	Description	Packing quantity
TLD	TLD tape & reel option	3000 units per reel
TRU	TRU tape & reel option	3000 units per reel

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



Unit : mm

● 4-pin Mini-Flat Carrier Tape & Reel



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f. Measurement equipment
g. Consumer electronics
h. Telecommunication

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c. Telecommunication equipment (trunk lines)
d. Nuclear power control
e. Equipment used for automotive vehicles, trains, ships...etc.