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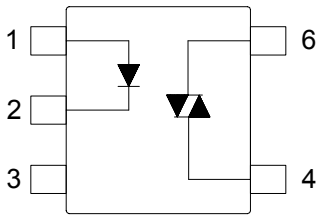
KMOC305X Series

5PIN RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

Description

The KMOC3051、KMOC3052、KMOC3053 series consist of a GaAs infrared emitting diode optically coupled to a non-zero-crossing silicon bilateral AC switch (TRIAC). These devices isolate low voltage logic from 115/240 VAC lines to provide random phase control of high current TRIACs or thyristors. These devices feature greatly enhanced static dv/dt capability to ensure stable switching performance of inductive loads.

Schematic



1. Anode
2. Cathode
3. NC
4. Main terminal
6. Main terminal

Features

1. Pb free and RoHS compliant
2. 600V peak blocking voltage
3. Simplifies logic control of 115/240 VAC power
4. Non zero voltage crossing
5. Isolation voltage between input and output (Viso：5300Vms)
6. Agency Approvals：
   - UL1577, File No. E169586
   - CUL C22.2 No.1 & NTC No.5, File No. E169586
   - VDE EN60747-5-2, File No. 40009235

Applications

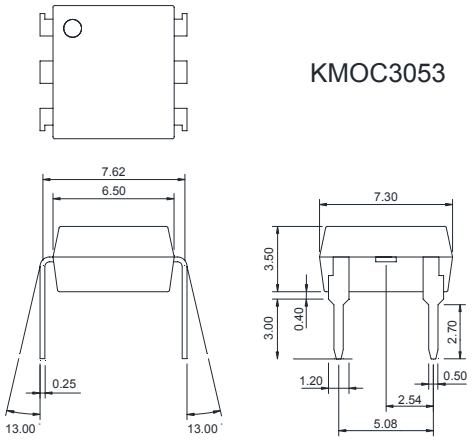
- Solenoid/Valve controls
- Lighting controls
- Static power switches
- AC motor drives
- Temperature controls
- E.M contactors
- AC motor contactors
- Solid state relay
- Programmable controllers

● Outside Dimension

Unit：mm

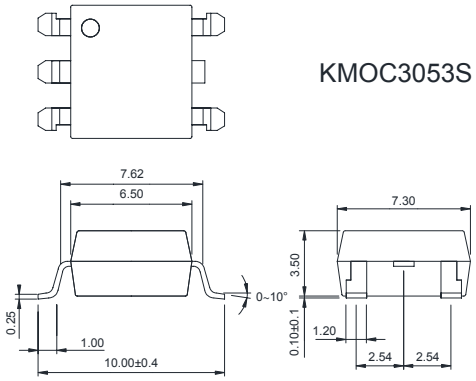
1. Dual-in-line type.

KMOC3053



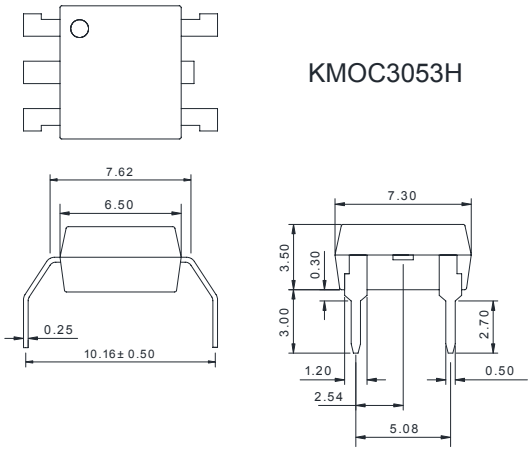
2. Surface mount type.

KMOC3053S



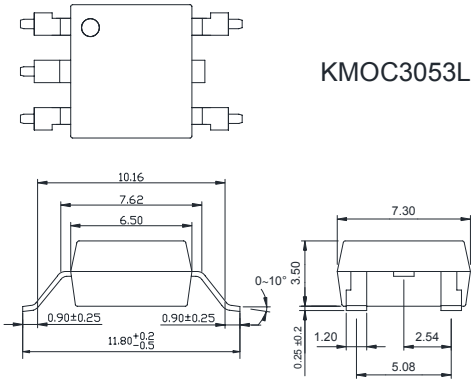
3. Long creepage distance type.

KMOC3053H



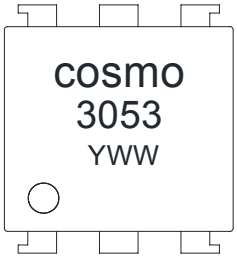
4. Long creepage distance for surface mount type.

KMOC3053L



TOLERANCE：±0.2mm

● Device Marking



Notes：

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3051、3052、3053

YWW　Y：Year code / W：Week code

● Absolute Maximum Ratings

(Ta=25℃)

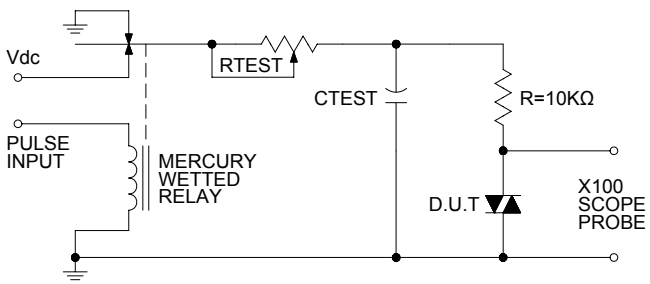
Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Peak forward current	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P_D	70	mW
Output	Off-state output terminal voltage	V_{DRM}	600	V_{PEAK}
	On-state R.M.S. current	$I_{T(RMS)}$	100	mA
	Peak repetitive surge current (PW=10ms.DC 10%)	I_{TSM}	1	A
	Power dissipation	P_D	300	mW
Total power dissipation		P_{tot}	330	mW
Isolation voltage 1 minute		V_{iso}	5300	Vrms
Operating temperature		T_{opr}	-40 to +115	℃
Storage temperature		T_{stg}	-50 to +125	℃
Soldering temperature 10 seconds		T_{sol}	260	℃

● Electro-optical Characteristics

(Ta=25℃)

Parameter		Symbol	Conditions		Min.	Typ.	Max.	Unit
Input	Forward voltage	V_F	I_F=10mA		-	1.2	1.4	V
	Reverse current	I_R	V_R=4V		-	-	10	μA
Output	Peak blocking current	I_{DRM}	V_{DRM} Rated		-	-	500	nA
	On-state voltage	V_{TM}	I_{TM}=100mA		-	1.6	3	V
Transfer characteristics	Holding current	I_H			-	0.1	-	mA
	Critical rate of rise of off-state voltage	dv/dt	V_{DRM}=(1/$\sqrt{2}$)*Rated		1000	-	-	V/μs
	Isolation resistance	R_{iso}	DC500V		$5x10^{10}$	10^{11}	-	Ω
	Minimum trigger current	I_{FT}	Main terminal voltage=3V	KMOC3051	-	-	15	mA
				KMOC3052	-	-	10	mA
				KMOC3053	-	-	5	mA
	Turn-on time	T_{ON}	V_D=6V,R_L=100Ω,I_F=20mA		-	-	100	μs

● Static dv/dt Test Circuit



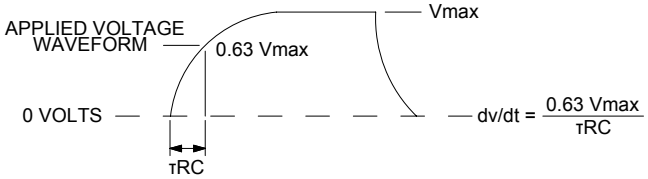


Fig.1 Forward Current vs. Ambient Temperature

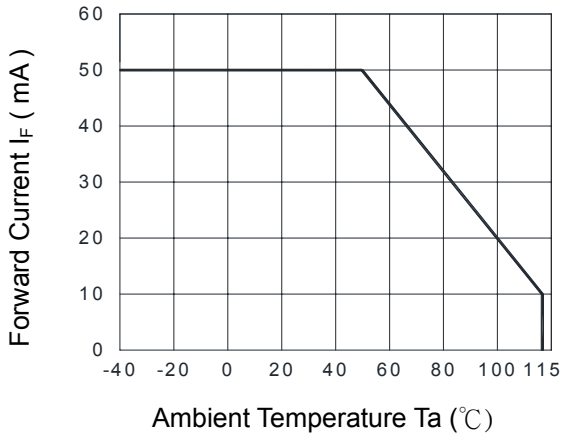


Fig.2 Diode Power Dissipation vs. Ambient Temperature

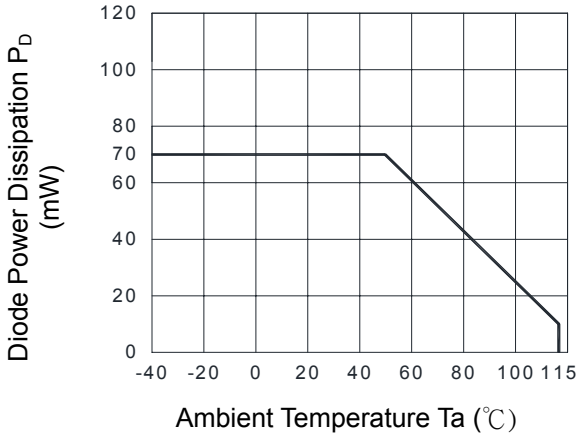


Fig.3 On-state R.M.S. Current vs. Ambient Temperature

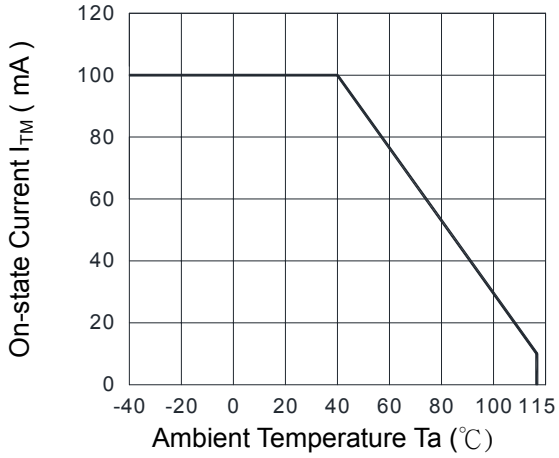


Fig.4 Total Power Dissipation vs. Ambient Temperature

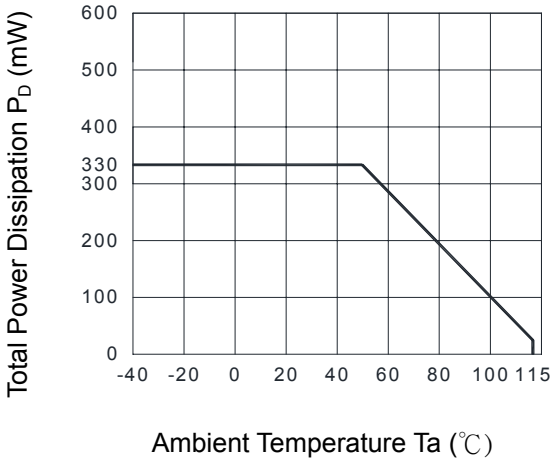


Fig.5 Peak Forward Current vs. Duty Ratio

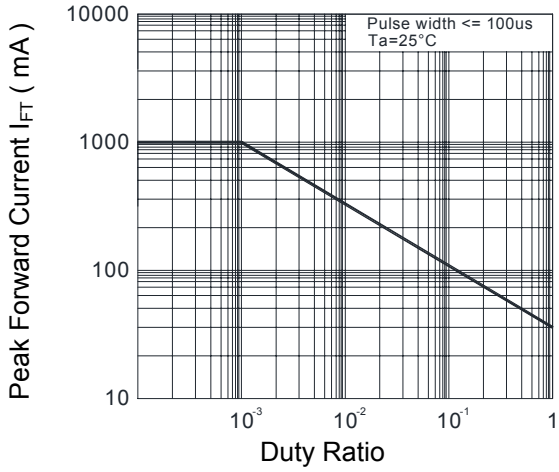


Fig.6 Forward Current vs. Forward Voltage

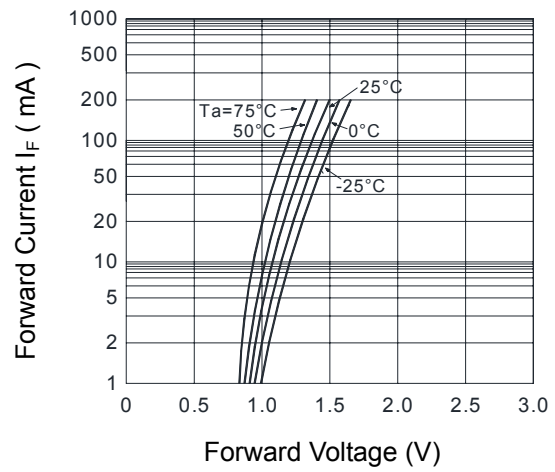


Fig.7 On-state Characteristics

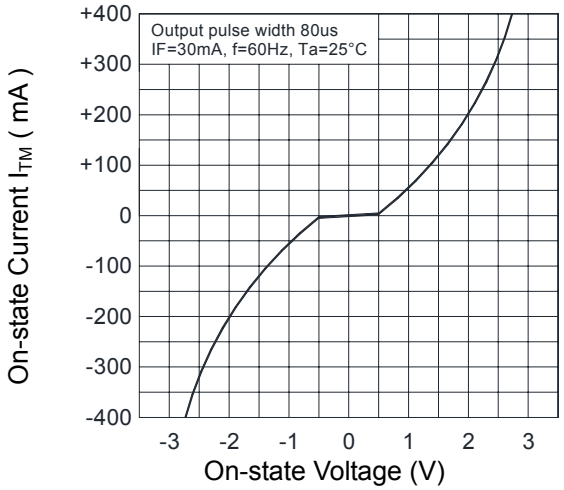


Fig.8 Leakage with LED off vs. Ambient Temperature

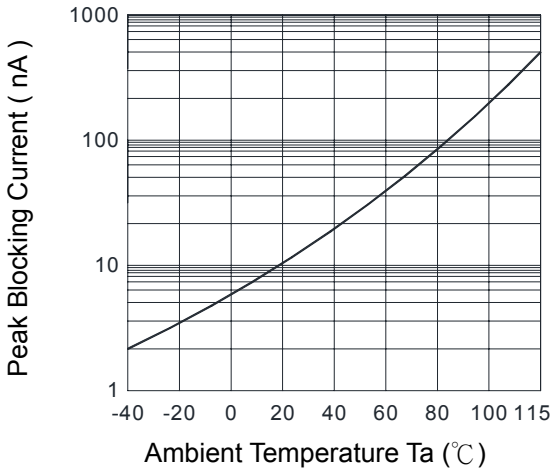
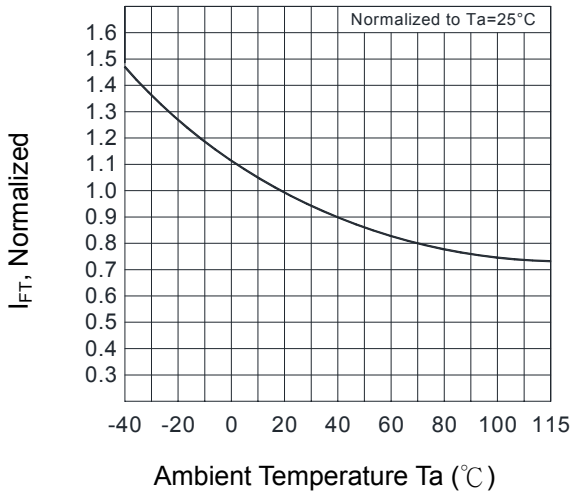


Fig.9 Trigger Current vs. Ambient Temperature

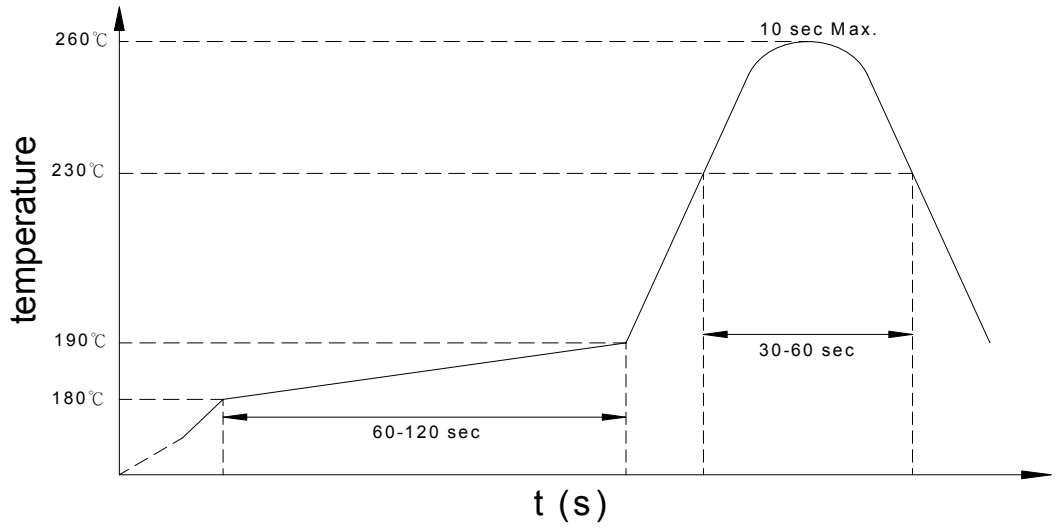


Recommended Soldering Conditions

(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**

KMOC3051 X (Y)

KMOC3052 X (Y)

KMOC3053 X (Y)

Notes：

KMOC3051 / KMOC3052 / KMOC3053 = Part No.

X = Lead form option (blank、S、H、L)

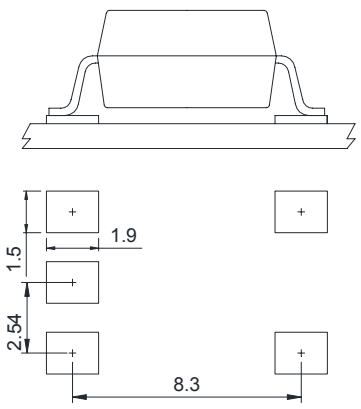
Y = Tape and reel option (TL、TR、TLD、TRU)

Option	Description	Packing quantity
S (TL)	surface mount type package + TL tape & reel option	1000 units per reel
S (TR)	surface mount type package + TR tape & reel option	1000 units per reel
L (TLD)	long creepage distance for surface mount type package + TLD tape & reel option	1000 units per reel
L (TRU)	long creepage distance for surface mount type package + TRU tape & reel option	1000 units per reel

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

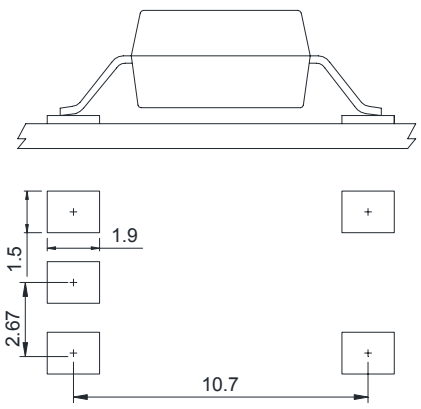
1. Surface mount type.

5-pin SMD



2. Long creepage distance for surface mount type.

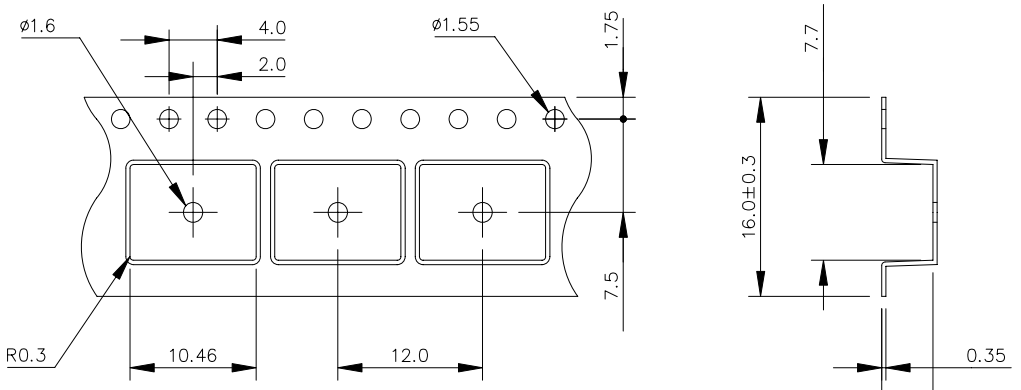
5-pin L



Unit：mm

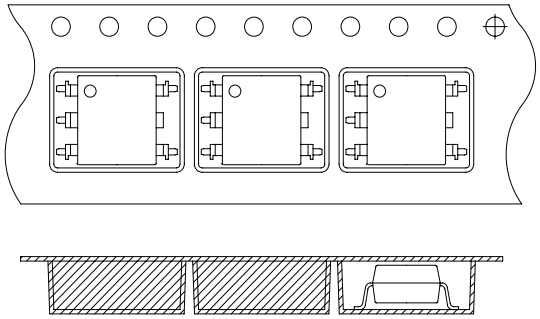
● SMD Carrier Tape & Reel

unit：mm



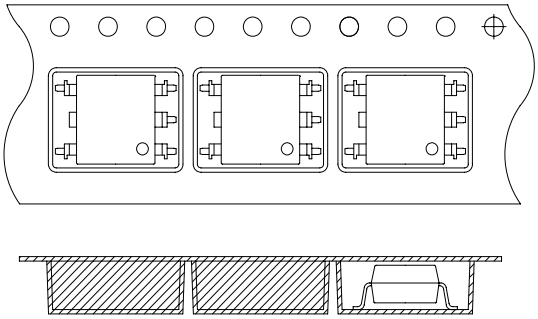
TOLERANCE：±0.2mm

TL

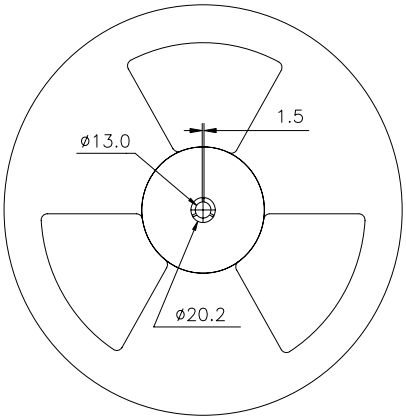


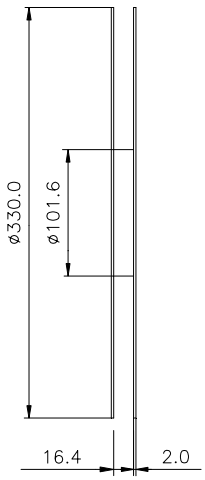
Direction of feed from reel

TR

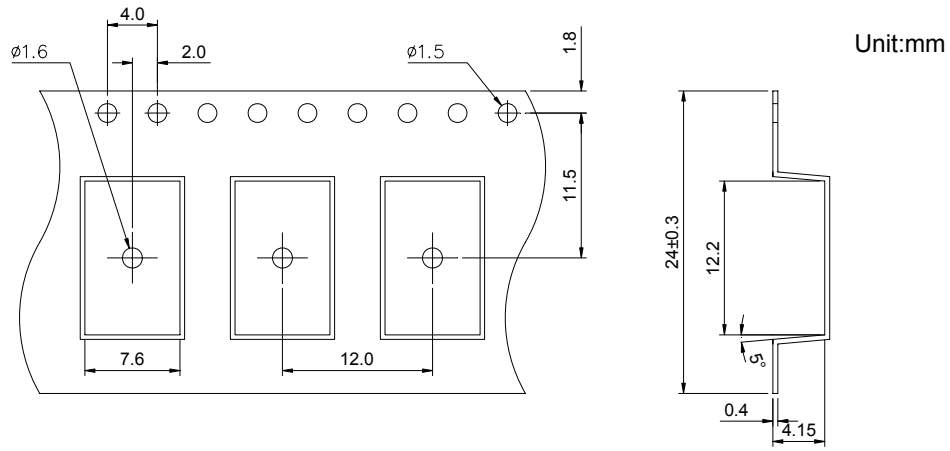


Direction of feed from reel



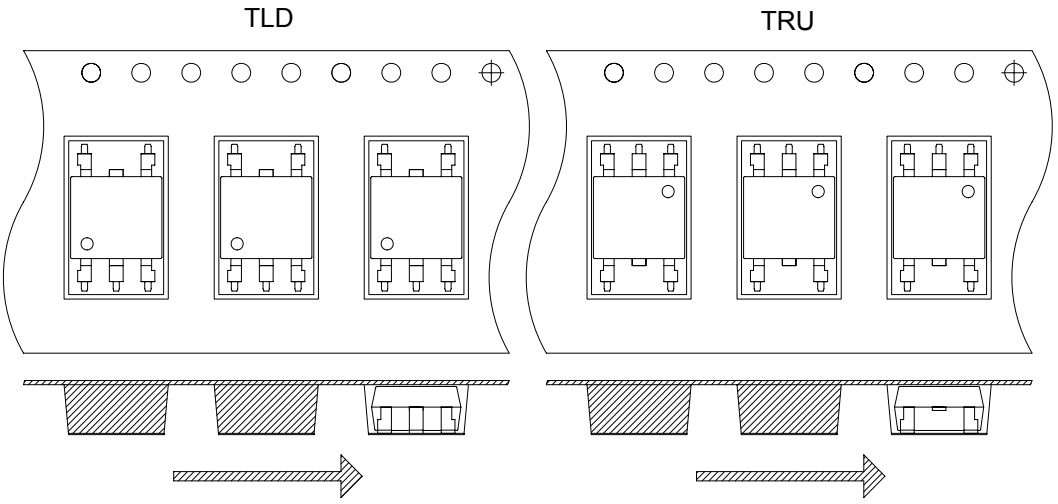


L Carrier Tape & Reel



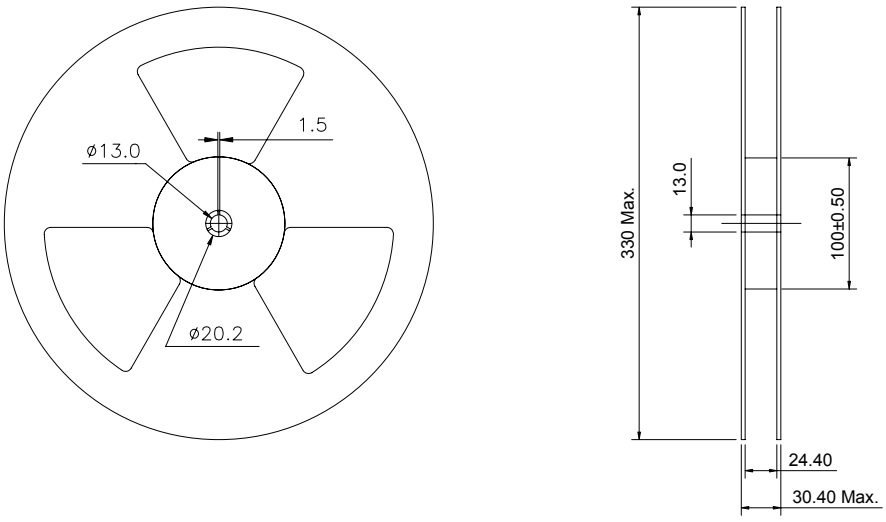
Unit:mm

TOLERANCE：±0.2mm



Direction of feed from reel

Direction of feed from reel



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a. Personal computer
b. OA machine
c. Audio / Video
d. Instrumentation
e. Electrical application
f. Measurement equipment
g. Consumer electronics
h. Telecommunication

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a. Medical and other life supporting equipments
b. Space application
c. Telecommunication equipment (trunk lines)
d. Nuclear power control
e. Equipment used for automotive vehicles, trains, ships...etc.