

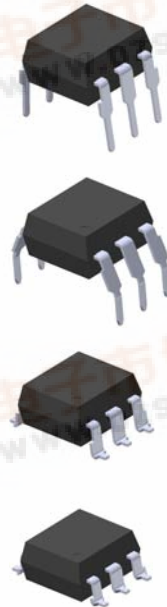


# 6 PIN DIP ZERO CROSS TRIAC DRIVER PHOTOCOUPLER

**EL303X Series**  
**EL304X Series**  
**EL306X Series**  
**EL308X Series**

## Features:

- Peak breakdown voltage
  - 250V: EL303X
  - 400V: EL304X
  - 600V: EL306X
  - 800V: EL308X
- High isolation voltage between input and output (Viso=5000 V rms )
- Zero voltage crossing
- Pb free and RoHS compliant.
- UL approved (No.E214129)
- VDE approval (pending)
- SEMKO approval (pending)
- NEMKO approval (pending)
- DEMKO approval (pending)
- FIMKO approval (pending)
- CSA approval (pending)



## Description

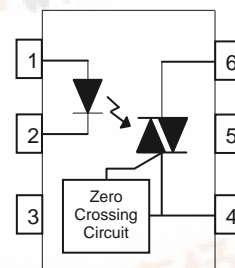
The EL303X, EL304X, EL306X and EL308X series of devices each consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon zero voltage crossing photo triac.

They are designed for use with a discrete power triac in the interface of logic systems to equipment powered from 110 to 380 VAC lines, such as solid-state relays, industrial controls, motors, solenoids and consumer appliances.

## Applications

- Solenoid/valve controls
- Light controls
- Static power switch
- AC motor drivers
- E.M. contactors
- Temperature controls
- AC Motor starters

## Schematic



## Pin Configuration

1. Anode
2. Cathode
3. No Connection
4. Terminal
5. Substrate (do not connect)
6. Terminal





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## Absolute Maximum Ratings ( $T_a=25^{\circ}\text{C}$ )

Parameter		Symbol	Rating	Unit
Input	Forward current	$I_F$	60	mA
	Reverse voltage	$V_R$	6	V
	Power dissipation	$P_D$	100	mW
	Derating factor (above $85^{\circ}\text{C}$ )		3.8	mW / $^{\circ}\text{C}$
Output	Off-state Output Terminal Voltage	$V_{DRM}$	EL303X 250	V
			EL304X 400	
			EL306X 600	
			EL308X 800	
	Peak Repetitive Surge Current	$I_{TSM}$	1	A
	Power dissipation	$P_D$	300	mW
Derating factor (above $85^{\circ}\text{C}$ )	7.6		mW / $^{\circ}\text{C}$	
Isolation voltage <sup>*1</sup>		$V_{iso}$	5000	V rms
Total power dissipation		$P_D$	330	mW
Operating temperature		$T_{opr}$	-55~+100	$^{\circ}\text{C}$
Storage temperature		$T_{stg}$	-55~+125	$^{\circ}\text{C}$
Soldering temperature <sup>*2</sup>		$T_{sol}$	260	$^{\circ}\text{C}$

### Notes

\*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 & 3 are shorted together, and pins 4, 5 & 6 are shorted together.

\*2 For 10 seconds.



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### Electrical Characteristics (T<sub>a</sub>=25°C unless specified otherwise)

#### Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V <sub>F</sub>	-	-	1.5	V	I <sub>F</sub> = 30mA
Reverse Leakage current	I <sub>R</sub>	-	-	10	μA	V <sub>R</sub> = 6V

#### Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Peak Blocking Current	EL303X/304X	-	-	100	nA	V <sub>DRM</sub> = Rated V <sub>DRM</sub> I <sub>F</sub> = 0mA
	EL306X/308X			500		
Peak On-state Voltage	V <sub>TM</sub>	-	-	3	V	I <sub>TM</sub> =100mA peak, I <sub>F</sub> =Rated I <sub>FT</sub>
Critical Rate of Rise of off-state Voltage	EL303X/304X	dv/dt	1000	-	V/μs	V <sub>PEAK</sub> = Rated V <sub>DRM</sub> , I <sub>F</sub> =0 (Fig. 10)
	EL306X/308X		600			
Inhibit Voltage (MT1-MT2 voltage above which device will not trigger)	V <sub>INH</sub>	-	-	20	V	I <sub>F</sub> = Rated I <sub>FT</sub>
Leakage in Inhibited State	I <sub>DRM2</sub>	-	-	500	μA	I <sub>F</sub> = Rated I <sub>FT</sub> , V <sub>DRM</sub> =Rated V <sub>DRM</sub> , off state

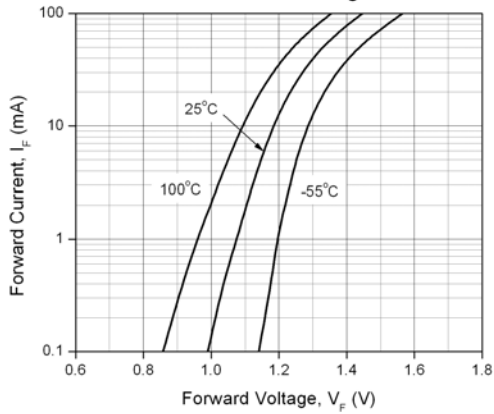
#### Transfer Characteristics

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
LED Trigger Current	EL3031 EL3041 EL3061 EL3081	-	-	15	mA	Main terminal Voltage=3V
	EL3032 EL3042 EL3062 EL3082			10		
	EL3033 EL3043 EL3063 EL3083			5		
Holding Current	I <sub>H</sub>	-	280	-	μA	

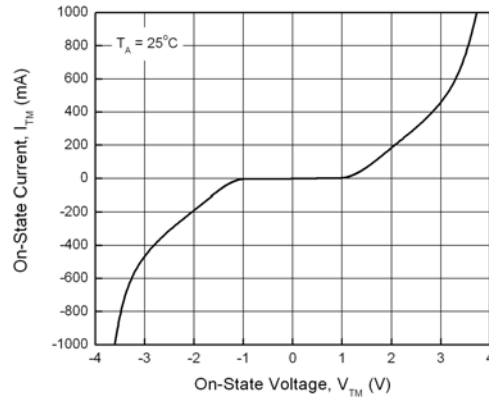
\* Typical values at T<sub>a</sub> = 25°C

**Typical Performance Curves**

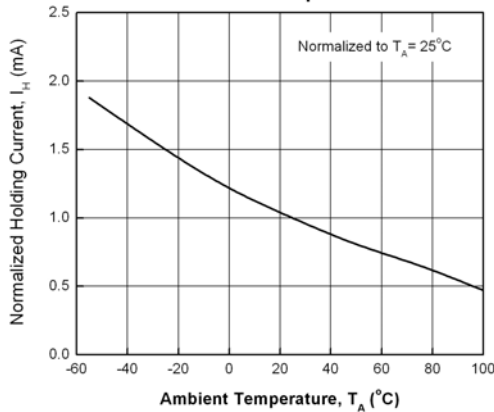
**Figure 1. Forward Current vs Forward Voltage**



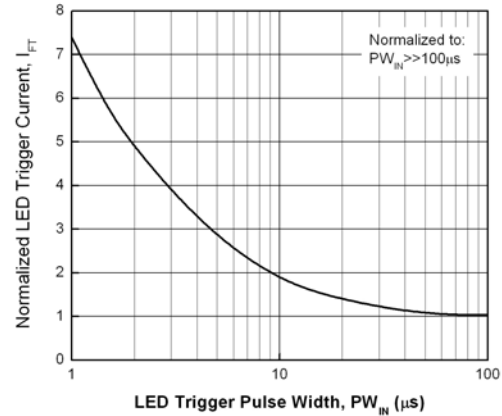
**Figure 2. On-State Characteristics**



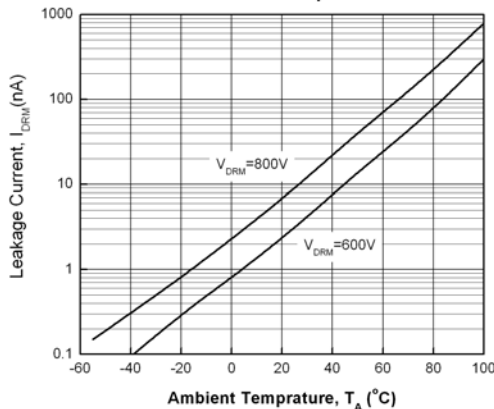
**Figure 3. Holding Current vs. Ambient Temperature**



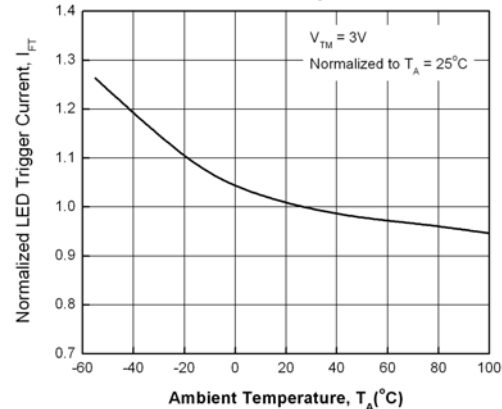
**Figure 4. LED Current Required to Trigger vs. LED Pulse Width**



**Figure 5. Leakage Current vs. Ambient Temperature**



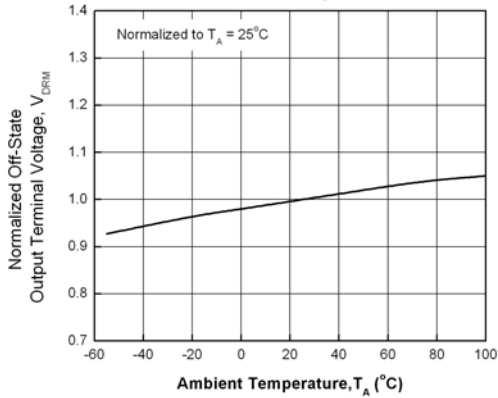
**Figure 6. LED Trigger Current vs. Ambient Temperature**



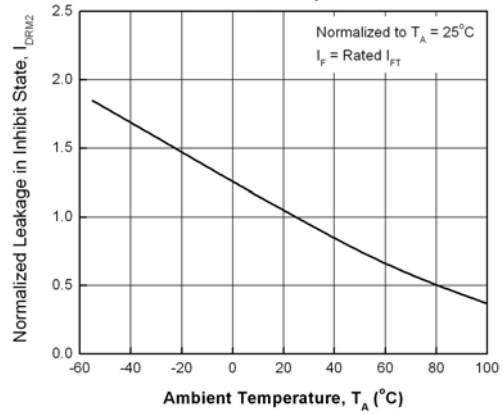
**6 PIN DIP ZERO CROSS TRIAC DRIVER  
PHOTOCOUPLER**

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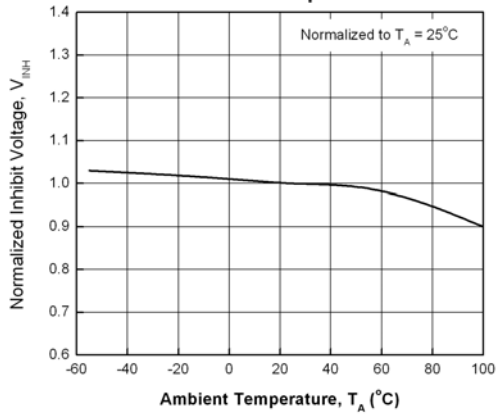
**Figure 7. Off-State Output Terminal Voltage vs. Ambient Temperature**



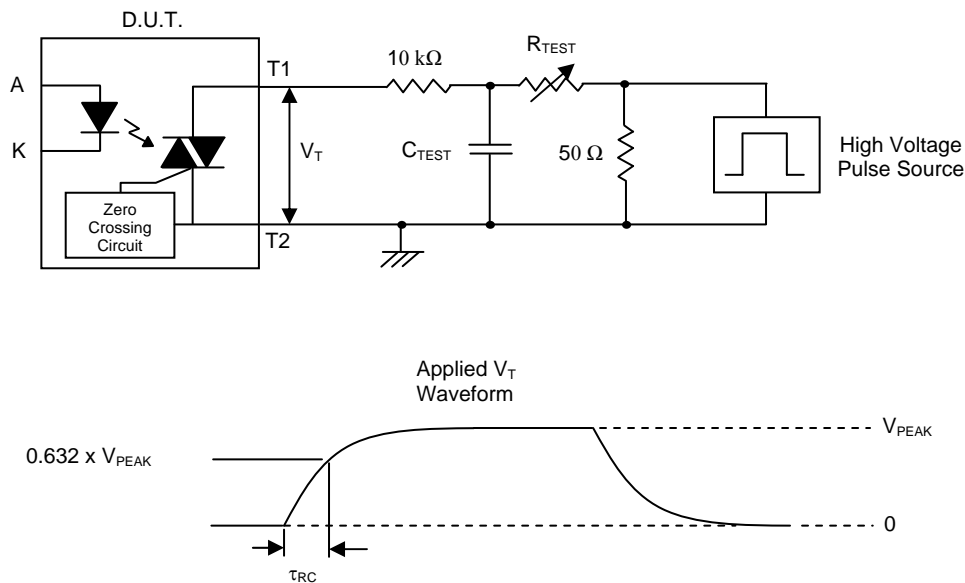
**Figure 8. Leakage in Inhibit State vs. Ambient Temperature**



**Figure 9. Inhibit Voltage vs. Ambient Temperature**



**Figure 10. Static dv/dt Test Circuit & Waveform**



**Measurement Method**

The high voltage pulse is set to the required  $V_{PEAK}$  value and applied to the D.U.T. output side through the RC circuit above. LED current is not applied. The waveform  $V_T$  is monitored using a x100 scope probe. By varying  $R_{TEST}$ , the  $dv/dt$  (slope) is increased, until the D.U.T. is observed to trigger (waveform collapses). The  $dv/dt$  is then decreased until the D.U.T. stops triggering. At this point,  $\tau_{RC}$  is recorded and the  $dv/dt$  calculated.

$$dv/dt = \frac{0.632 \times V_{PEAK}}{\tau_{RC}}$$

For example,  $V_{PEAK} = 600V$  for EL306X series. The  $dv/dt$  value is calculated as follows:

$$dv/dt = \frac{0.63 \times 600}{\tau_{RC}} = \frac{378}{\tau_{RC}}$$



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### Order Information

#### Part Number

**EL303XY(Z)-V**  
or **EL304XY(Z)-V**  
or **EL306XY(Z)-V**  
or **EL308XY(Z)-V**

#### Note

X = Part No. (1, 2 or 3)

Y = Lead form option (S, S1, M or none)

Z = Tape and reel option (TA, TB or none).

V = VDE safety approved option

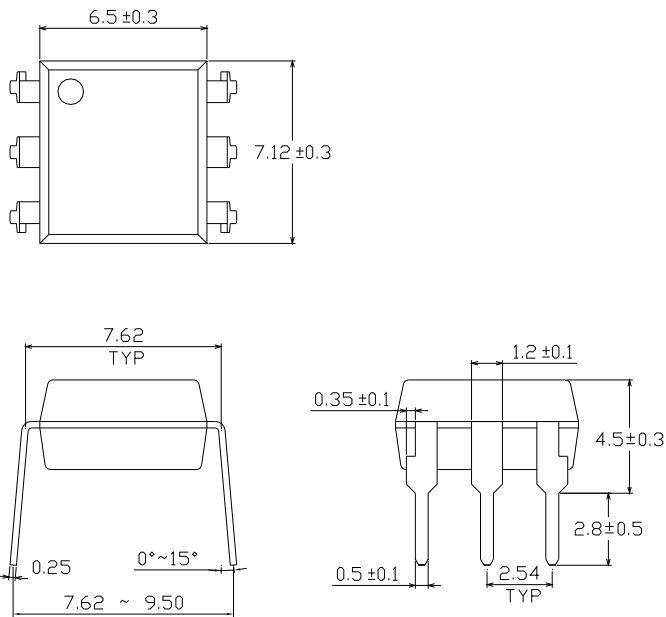
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 (TB)	Surface mount lead form (low profile) + TB tape & reel option	1000 units per reel

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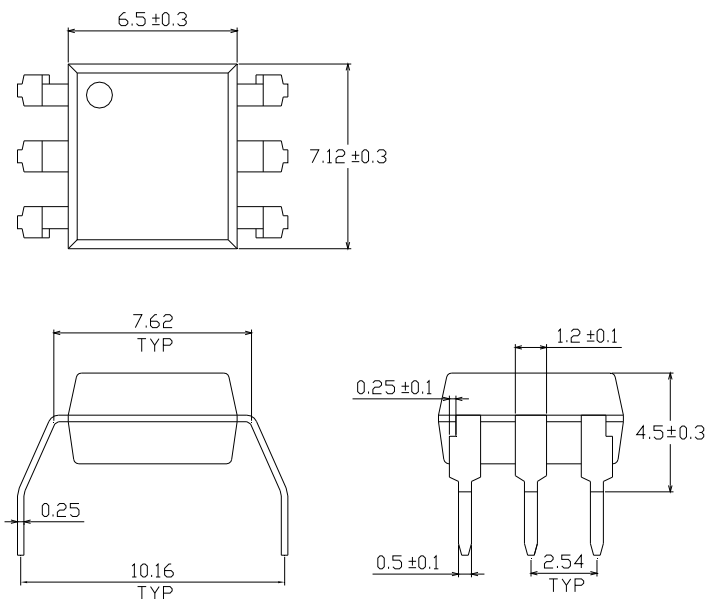
**EL303X Series  
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**Package Drawings  
(Dimensions in mm)**

**Standard DIP Type**



**Option M Type**

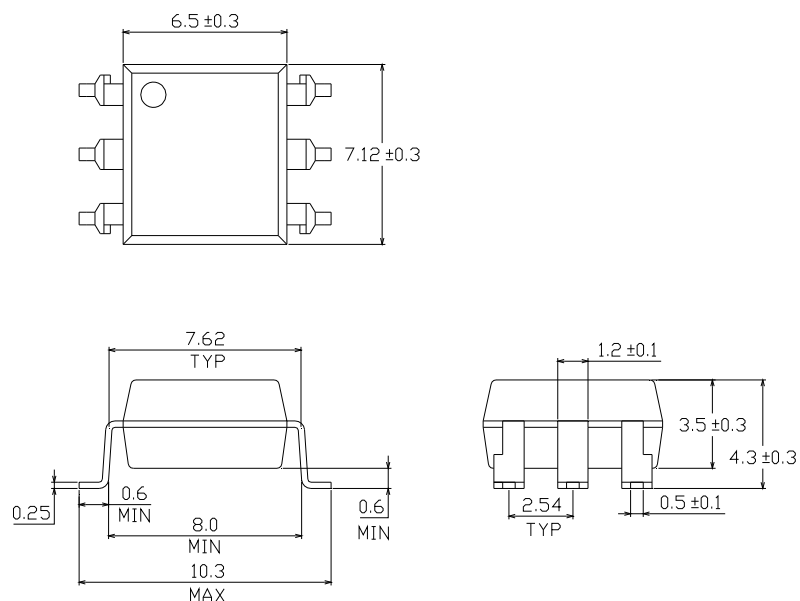




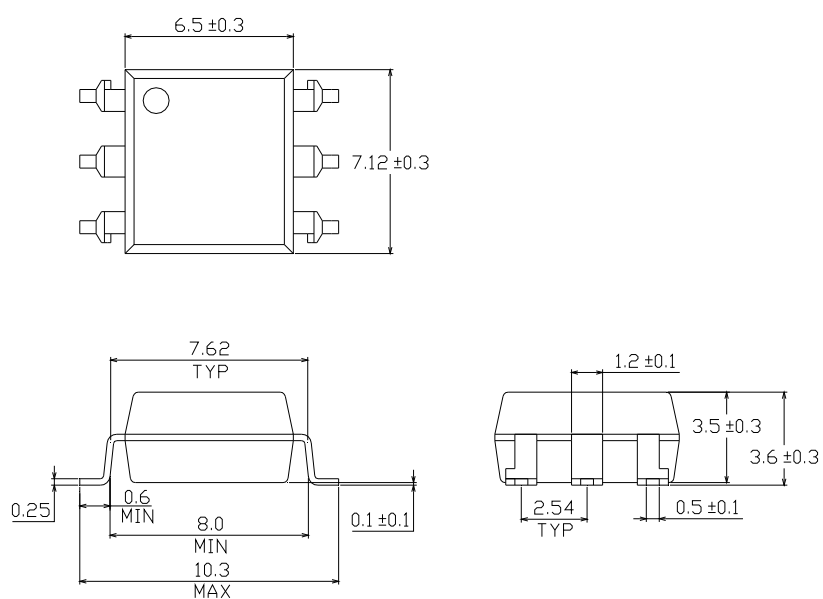
# 6 PIN DIP ZERO CROSS TRIAC DRIVER PHOTOCOUPLER

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## Option S Type



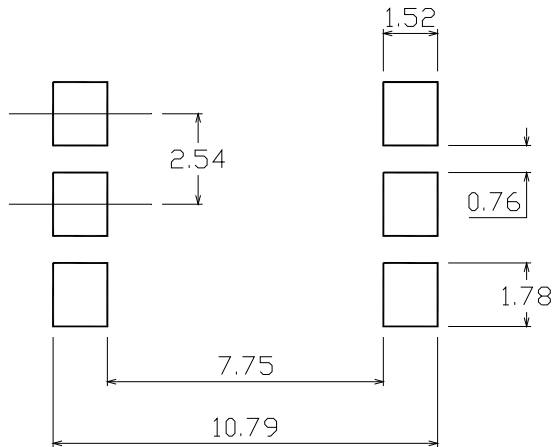
## Option S1 Type



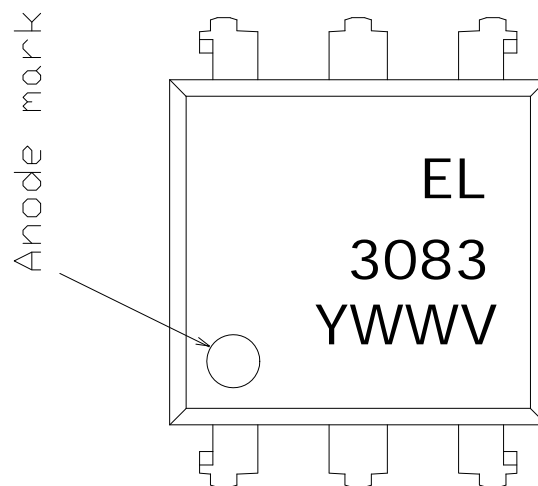
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Recommended pad layout for surface mount leadform



### Device Marking



### Notes

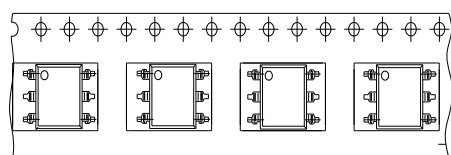
EL denotes Everlight  
3083 denotes Device Number  
Y denotes 1 digit Year code  
WW denotes 2 digit Week code  
V denotes VDE option

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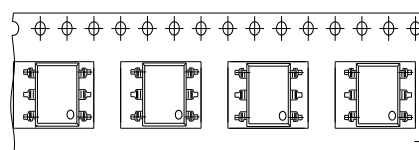
## Tape & Reel Packing Specifications

**Option TA**



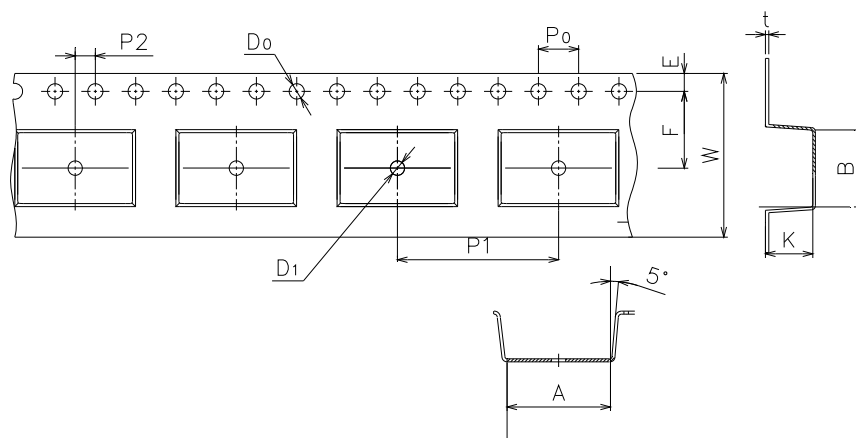
Direction of feed from reel

**Option TB**



Direction of feed from reel

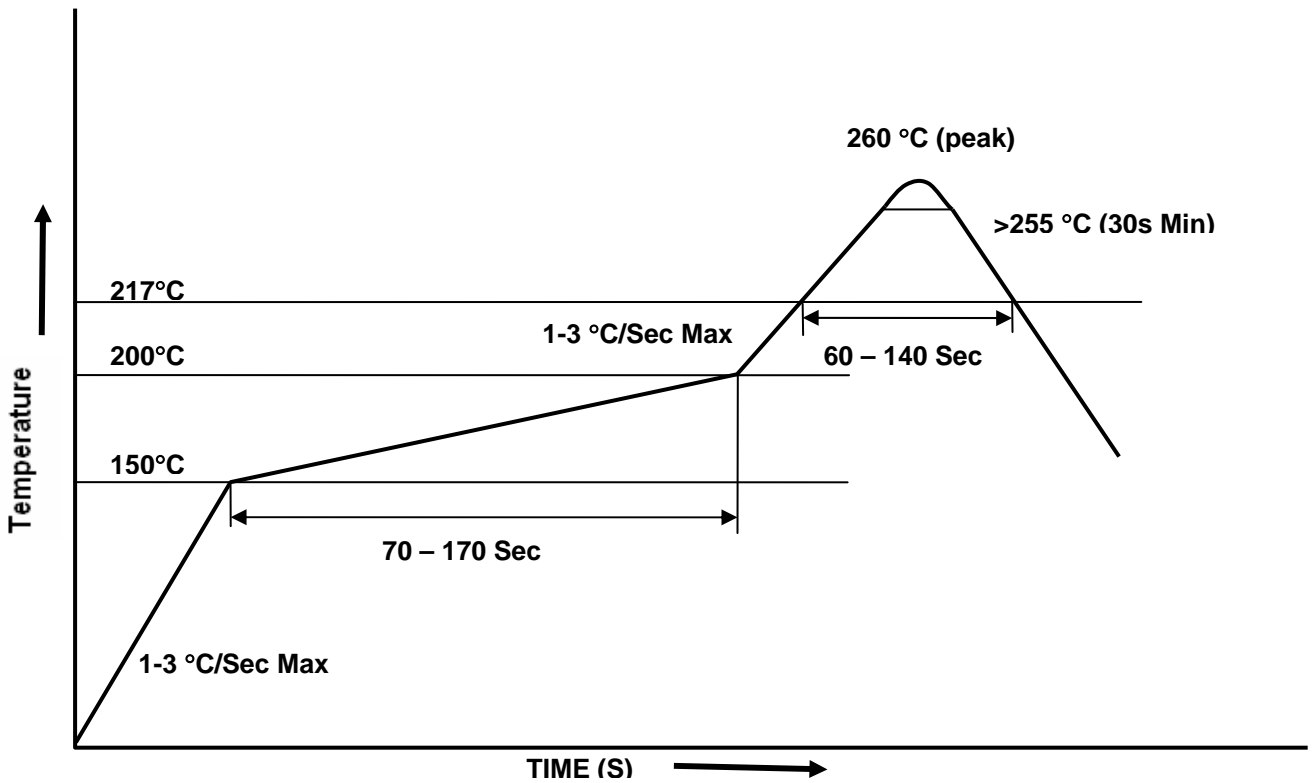
## Tape dimensions



Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	10.4±0.1	7.52±0.1	1.5+0.1/-0	1.5+0.1/-0	1.75±0.1	7.5±0.1

Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0±0.15	1.6±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

**Solder Reflow Temperature Profile**





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