

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 approved (No.132249)
- SEMKO approval (pending)
- NEMKO approval (pending)
- DEMKO approval (pending)
- FIMKO approval (pending)
- CSA approved (No. 2007798)

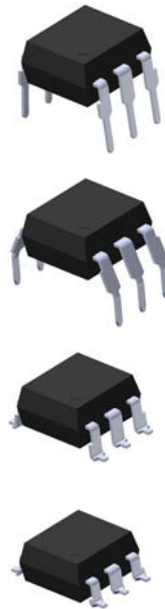
Description

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.

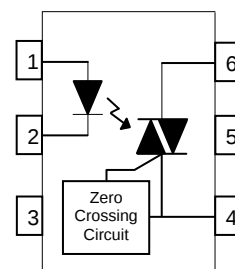
They are designed for use with a discrete power triac in the interface of logic systems to equipment powered from 110 to 380 VAC lines, such as solid-state relays, industrial controls, motors, solenoids and consumer appliances.

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°C)			3.8	mW /°C
Output	Off-state Output Terminal Voltage	EL303X	V _{DRM}	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°C)			7.6	mW /°C
Isolation voltage ^{*1}			V _{iso}	5000	V rms
Total power dissipation			P _D	330	mW
Operating temperature			T _{opr}	-55~+100	°C
Storage temperature			T _{stg}	-55~+125	°C
Soldering temperature ^{*2}			T _{sol}	260	°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_a=25°C unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V _F	-	-	1.5	V	I _F = 30mA
Reverse Leakage current	I _R	-	-	10	μA	V _R = 6V

Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Peak Blocking Current	I _{DRM1}	-	-	100	nA	V _{DRM} = Rated V _{DRM} I _F = 0mA
				500		
Peak On-state Voltage	V _{TM}	-	-	3	V	I _{TM} =100mA peak, I _F =Rated I _{FT}
Critical Rate of Rise of off-state Voltage	dv/dt	1000	-	-	V/μs	V _{PEAK} = Rated V _{DRM} , I _F =0 (Fig. 10)
		600	-	-		
Inhibit Voltage (MT1-MT2 voltage above which device will not trigger)	V _{INH}	-	-	20	V	I _F = Rated I _{FT}
Leakage in Inhibited State	I _{DRM2}	-	-	500	μA	I _F = Rated I _{FT} , V _{DRM} =Rated V _{DRM} , 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 _H	-	280	-	μA	

* Typical values at T_a = 25°C

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Typical Performance Curves

Figure 1. Forward Current vs Forward Voltage

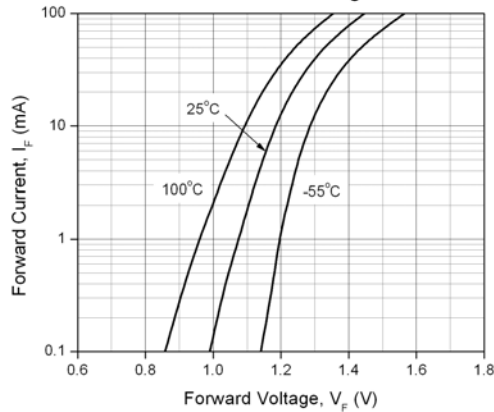


Figure 2. On-State Characteristics

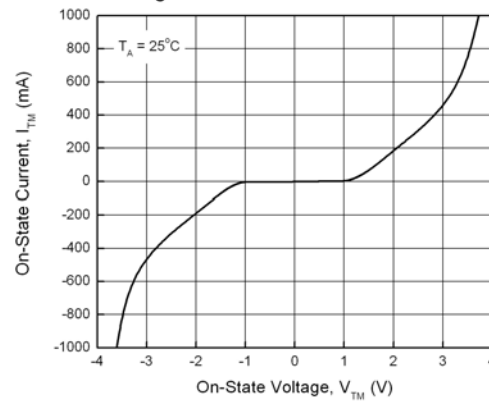


Figure 3. Holding Current vs. Ambient Temperature

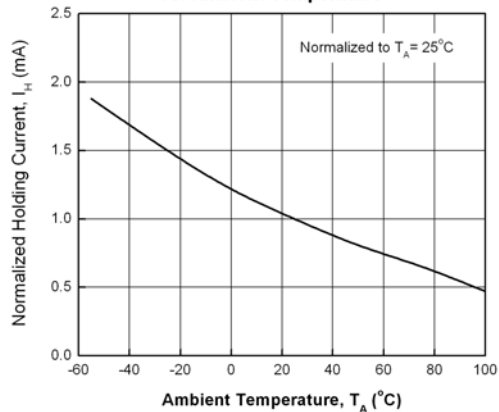


Figure 4. LED Current Required to Trigger vs. LED Pulse Width

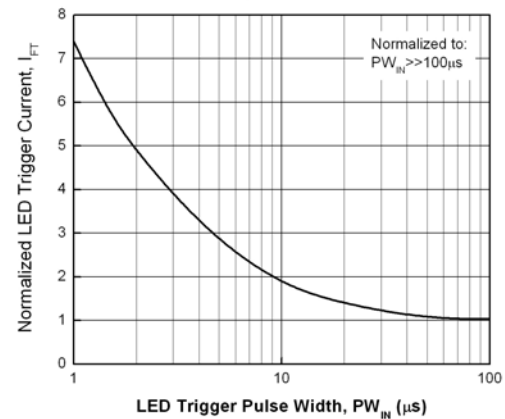


Figure 5. Leakage Current vs. Ambient Temperature

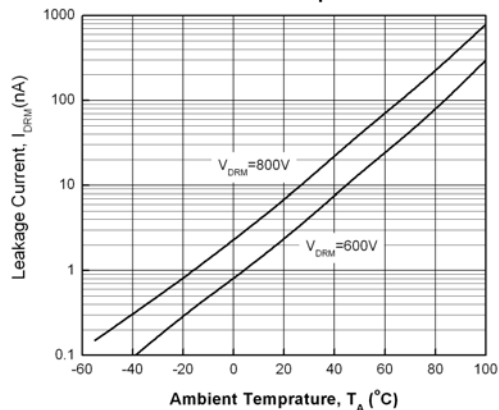
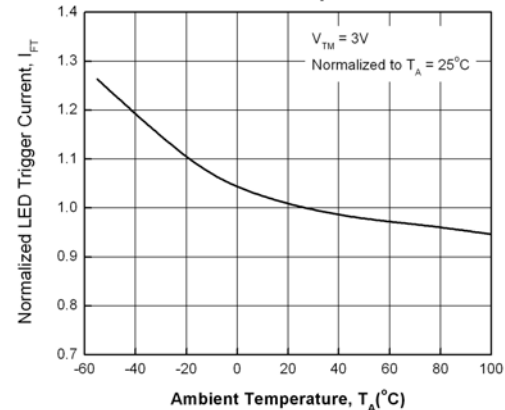


Figure 6. LED Trigger Current vs. Ambient Temperature



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

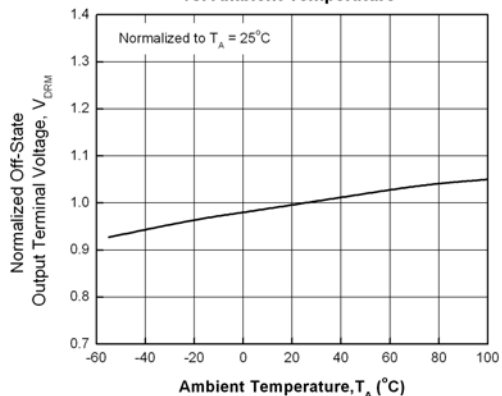


Figure 8. Leakage in Inhibit State vs. Ambient Temperature

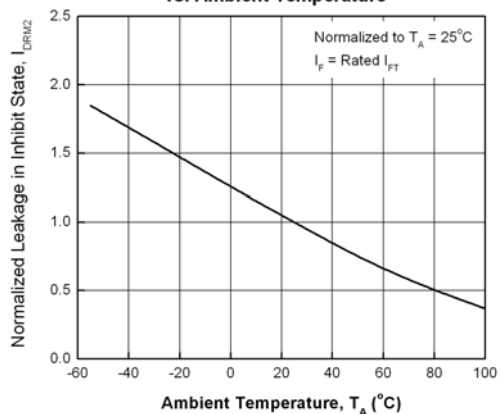
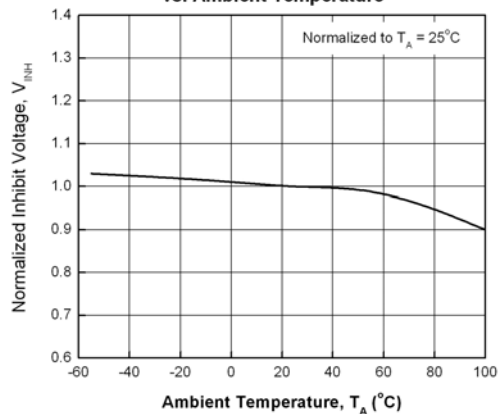


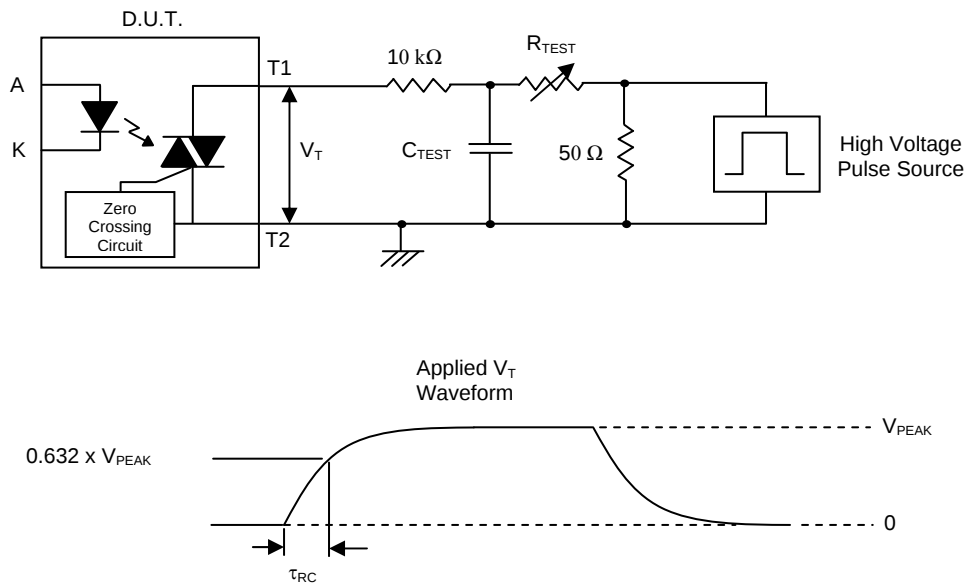
Figure 9. Inhibit Voltage vs. Ambient Temperature



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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, τ_{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

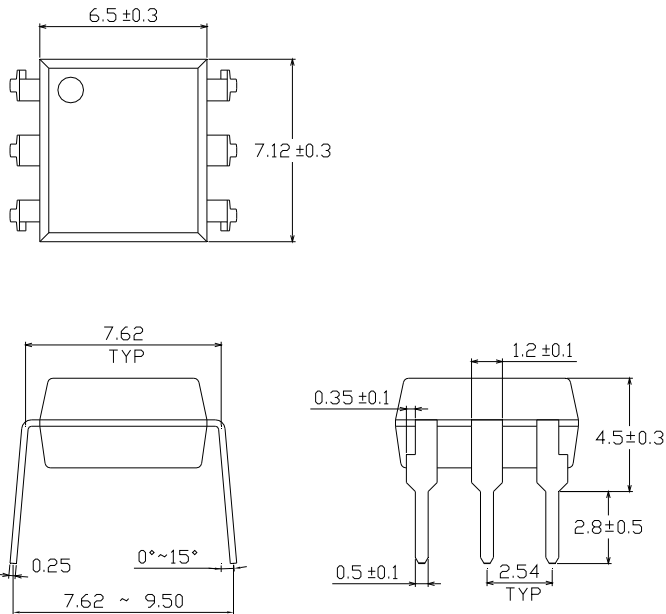
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead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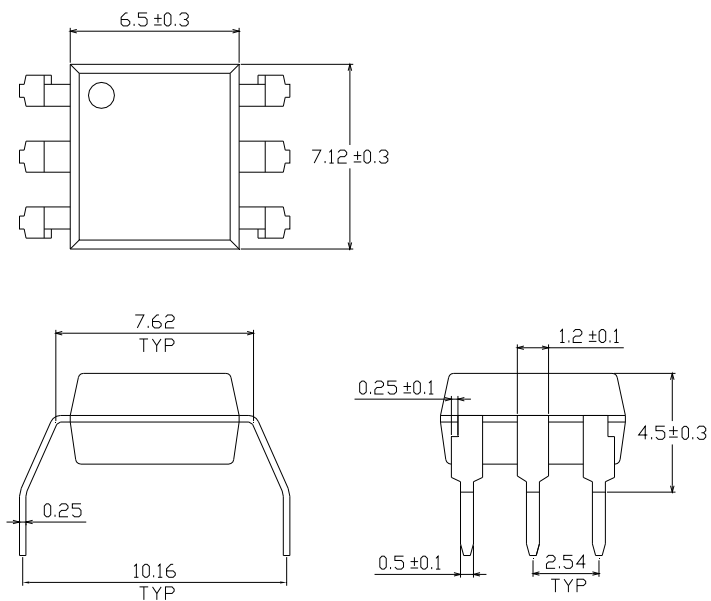
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Package Drawings (Dimensions in mm)

Standard DIP Type



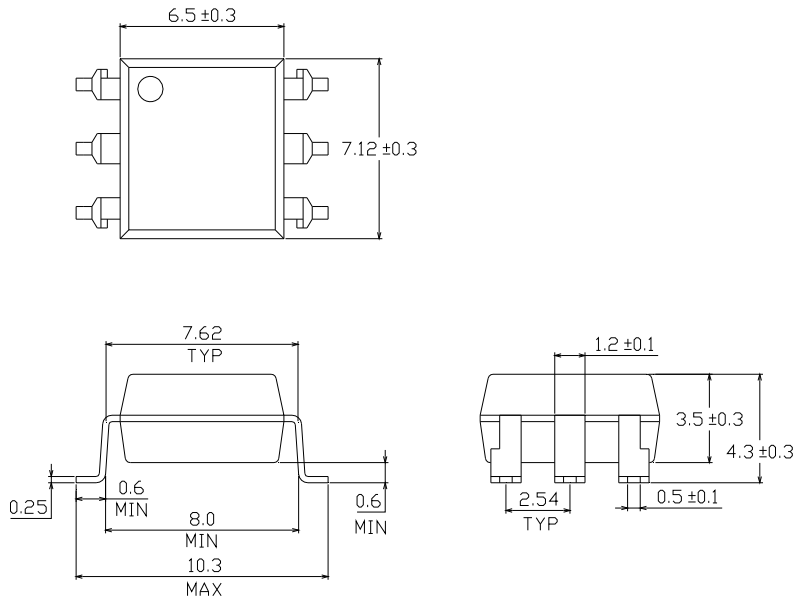
Option M Type



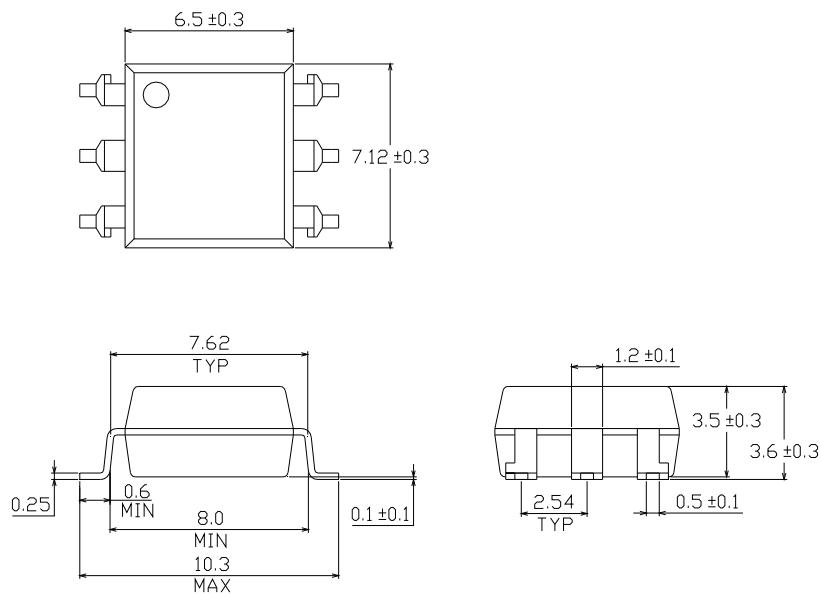
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Option S Type



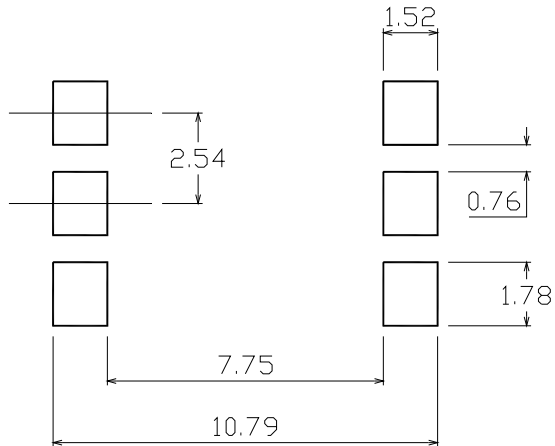
Option S1 Type



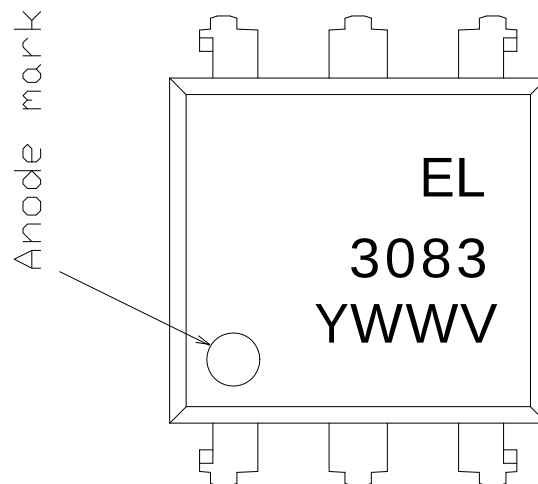
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Recommended pad layout for surface mount leadform



Device Marking



Notes

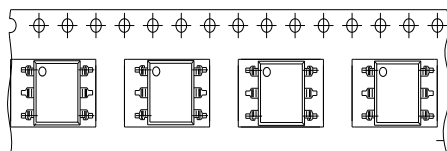
EL	denotes Everlight
3083	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE option

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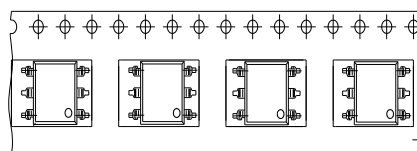
Tape & Reel Packing Specifications

Option TA



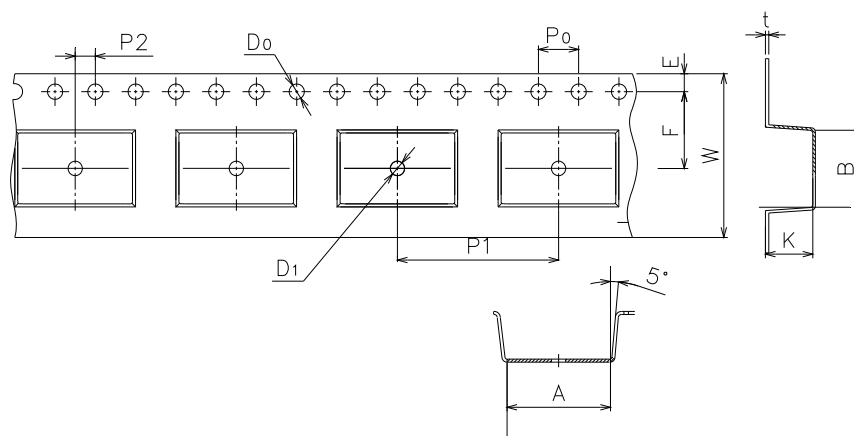
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions



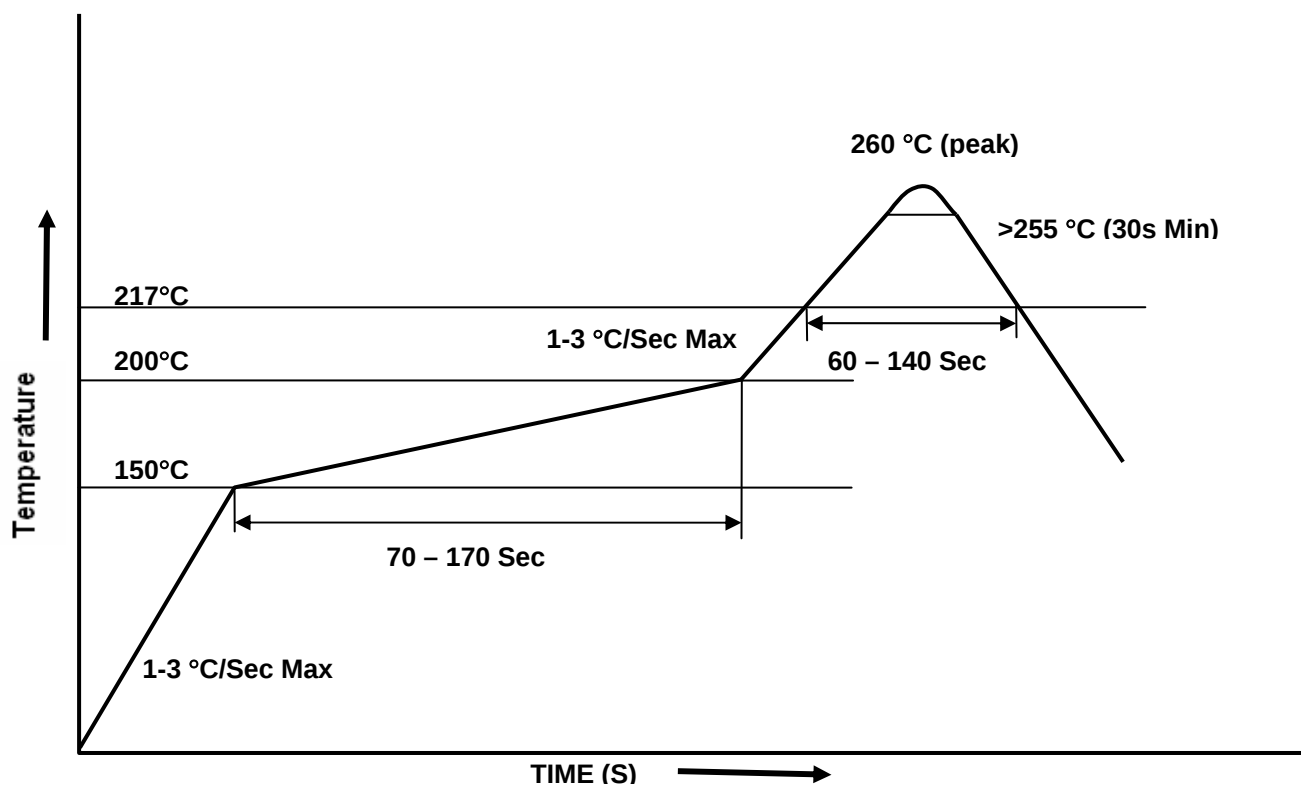
Dimension No.	A	B	D0	D1	E	F
Dimension (mm)	10.4±0.1	7.52±0.1	1.5+0.1/-0	1.5+0.1/-0	1.75±0.1	7.5±0.1

Dimension No.	P0	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

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Solder Reflow Temperature Profile



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