

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 approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved



Description

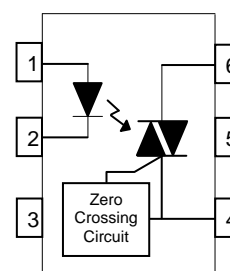
The EL303X, EL304X, EL306X and EL308X series of devices each consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon zero voltage crossing photo triac.

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°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	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°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	EL303X/304X	-	-	100	nA	V _{DRM} = Rated V _{DRM} I _F = 0mA
	EL306X/308X			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	EL303X /304X /306X	1000	-	-	V/μs	V _{PEAK} =Rated V _{DRM} , I _F =0 (Fig. 10)
	EL308X	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	I _{FT}	-	-	15	mA	Main terminal Voltage=3V
				10		
				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

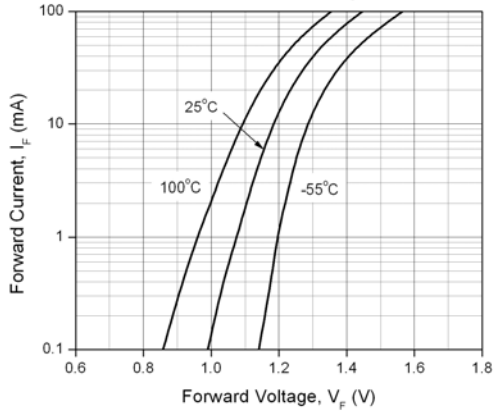


Figure 2. On-State Characteristics



Figure 3. Holding Current vs. Ambient Temperature

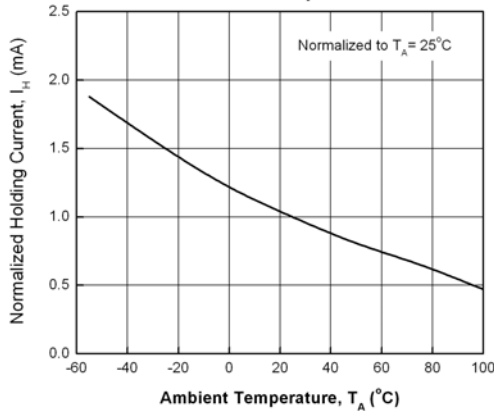


Figure 4. LED Current Required to Trigger vs. LED Pulse Width

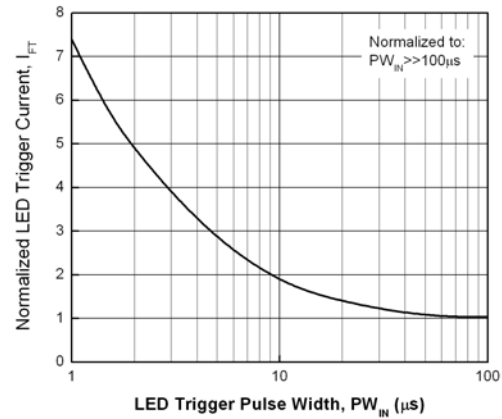


Figure 5. Leakage Current vs. Ambient Temperature

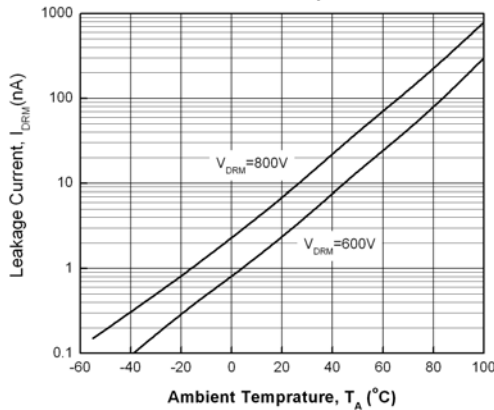
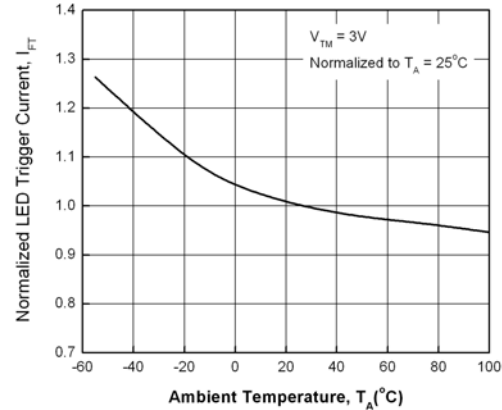


Figure 6. LED Trigger Current vs. Ambient Temperature



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

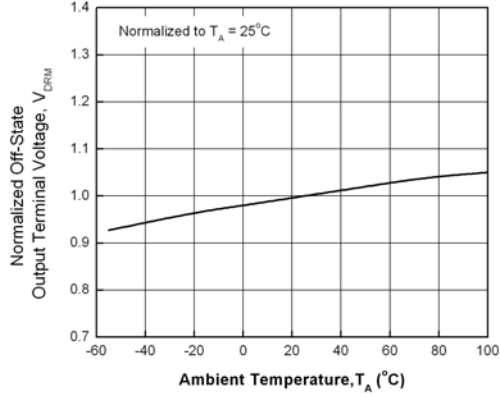


Figure 8. Leakage in Inhibit State vs. Ambient Temperature

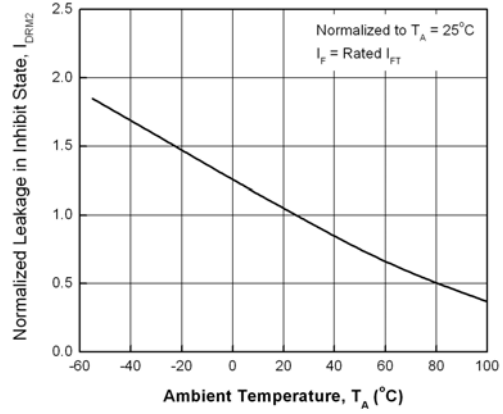


Figure 9. Inhibit Voltage vs. Ambient Temperature

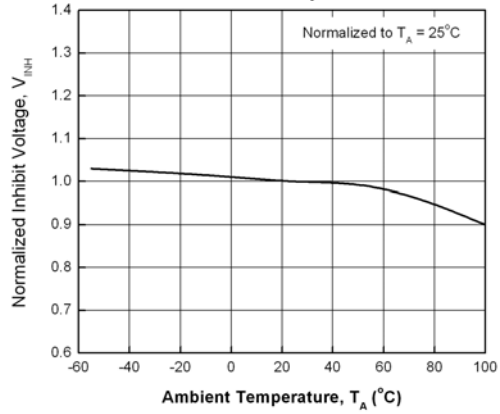
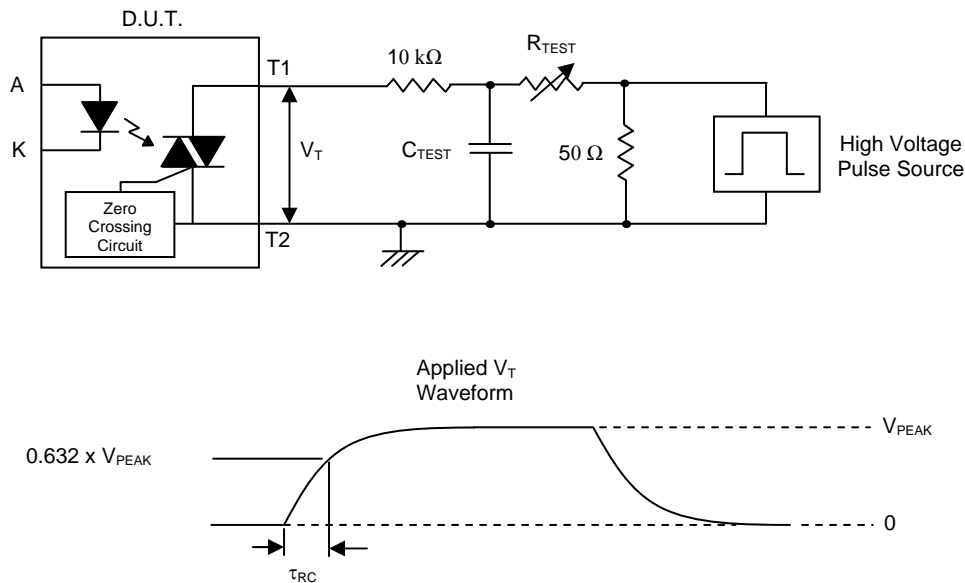


Figure 10. Static dv/dt Test Circuit & Waveform



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

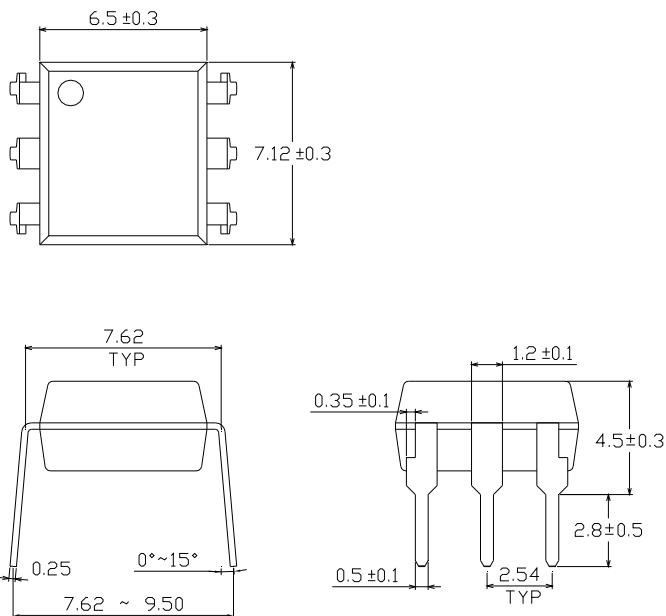
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead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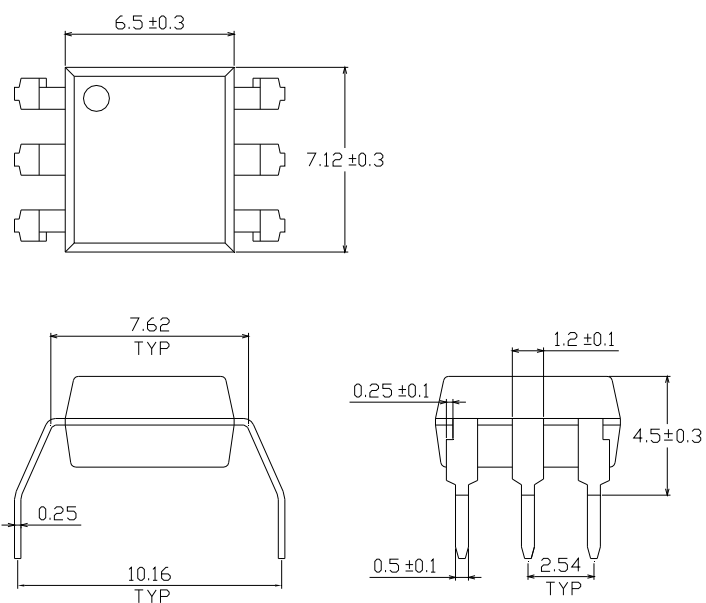
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**Package Drawings
(Dimensions in mm)**

Standard DIP Type



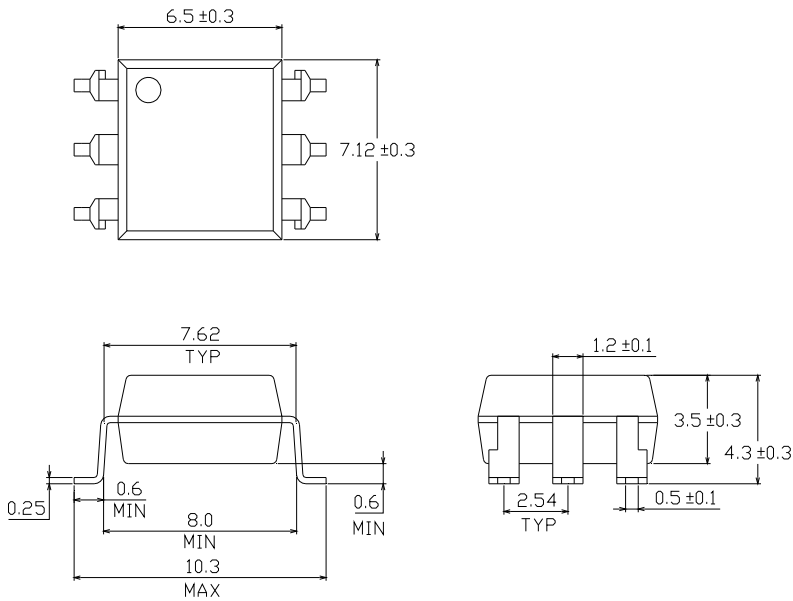
Option M Type



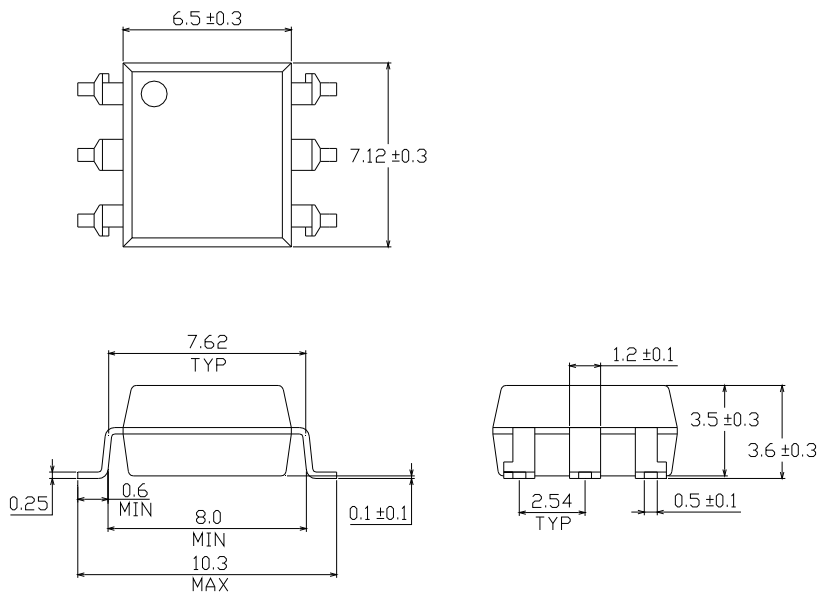
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PHOTOCOUPLER**

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

Option S Type



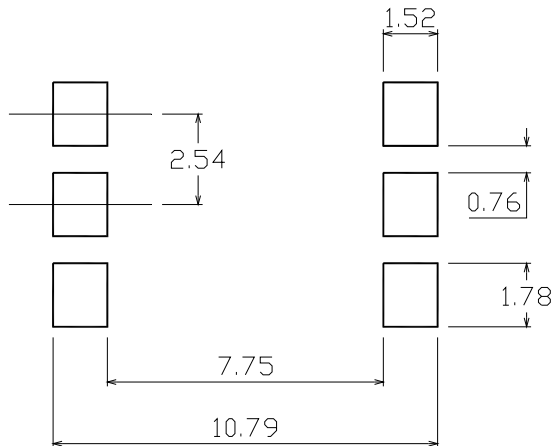
Option S1 Type



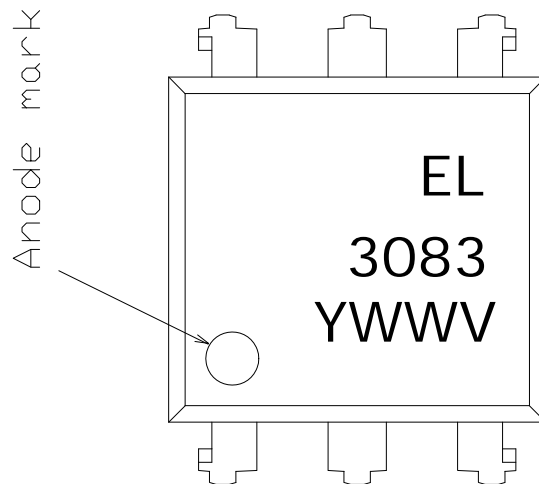
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Recommended pad layout for surface mount leadform



Device Marking



Notes

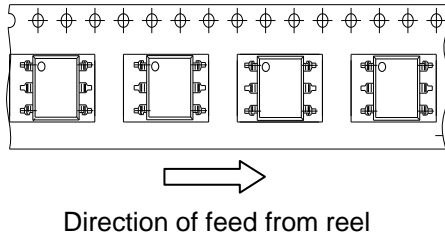
- EL denotes Everlight
- 3083 denotes Device Number
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE option

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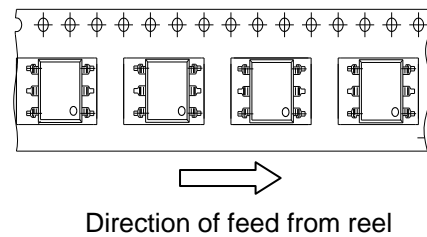
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Tape & Reel Packing Specifications

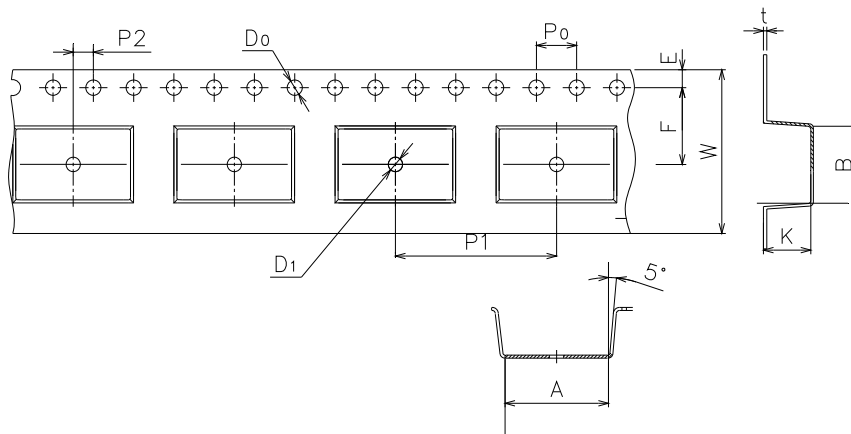
Option TA



Option TB



Tape dimensions



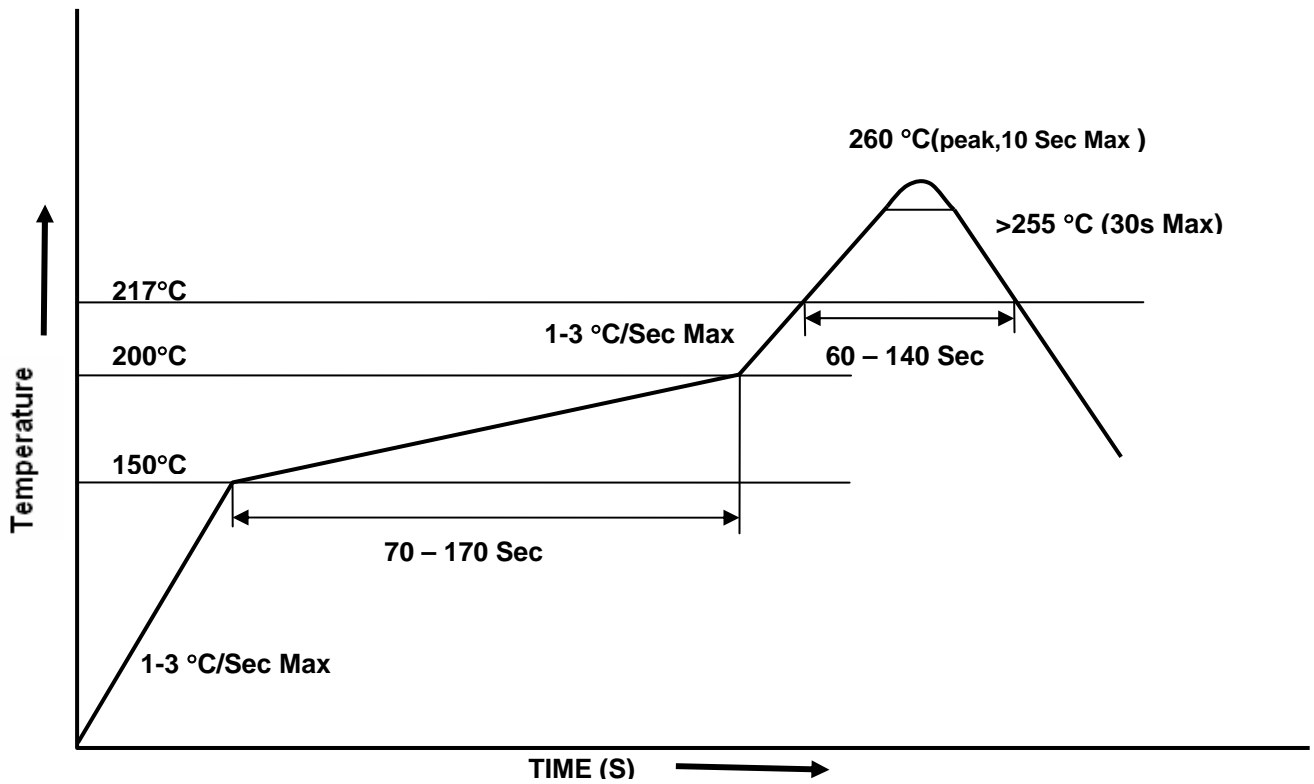
Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	10.4±0.1	7.52±0.1	1.5+0.1/-0	1.5+0.1/-0	1.75±0.1	7.5±0.1

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

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Solder Reflow Temperature Profile





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