

6 PIN DIP RANDOM-PHASE TRIAC DRIVER PHOTOCOUPLER

EL301X Series
EL302X Series
EL305X Series

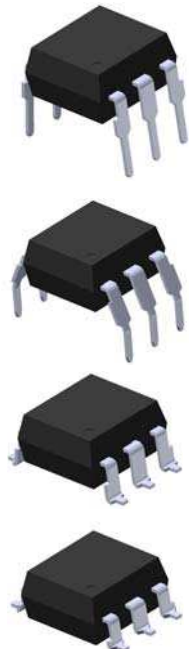
Features:

- Peak breakdown voltage
 - 250V: EL301X
 - 400V: EL302X
 - 600V: EL305X
- High isolation voltage between input and output (Viso=5000 V rms)
- Compact dual-in-line package
- 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 EL301X, EL302X and EL305X series of devices each consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon random phase photo Triac.

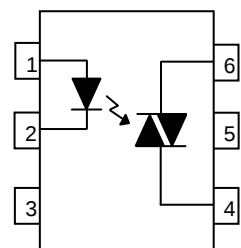
They are designed for interfacing between electronic controls and power triacs to control resistive and inductive loads for 115 to 240 VAC operations.



Applications

- Solenoid/valve controls
- Lamp ballasts
- Static AC power switch
- Interfacing microprocessors to 115 to 240Vac peripherals
- Incandescent lamp dimmers
- Temperature controls
- Motor controls

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℃)			3.8	mW /℃
Output	Off-state Output Terminal Voltage	EL301X	V _{DRM}	250	V
		EL302X		400	
		EL305X		600	
	Peak Repetitive Surge Current		I _{TSM}	1	A
	Power dissipation		P _D	300	mW
	Derating factor (above 85℃)			7.4	mW /℃
Isolation voltage ^{*1}			V _{iso}	5000	V rms
Total power dissipation			P _D	330	mW
Operating temperature			T _{opr}	-55~+100	℃
Storage temperature			T _{stg}	-55~+125	℃
Soldering temperature ^{*2}			T _{sol}	260	℃

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 ($T_a=25^\circ\text{C}$ unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V_F	-	1.18	1.5	V	$I_F = 10\text{mA}$
Reverse Leakage current	I_R	-	-	10	μA	$V_R = 6\text{V}$

Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Peak Blocking Current	I_{DRM}	-	-	100	nA	$V_{\text{DRM}} = \text{Rated } V_{\text{DRM}}$ $I_F = 0\text{mA}$
Peak On-state Voltage	V_{TM}	-	-	2.5	V	$I_{\text{TM}}=100\text{mA peak}$, $I_F=\text{Rated } I_{\text{FT}}$
Critical Rate of Rise off-state Voltage	EL301X EL302X	dv/dt	-	100	V/ μs	$V_{\text{PEAK}} = \text{Rated } V_{\text{DRM}}$, $I_F=0$ (Fig. 8)
	EL305X		1000	-		$V_{\text{PEAK}} = 400\text{V}$, $I_F=0$ (Fig. 8)

Transfer Characteristics

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
LED Trigger Current	EL3010 EL3021 EL3051	-	-	15	mA	Main terminal Voltage=3V
	EL3011 EL3022 EL3052	-	-	10		
	EL3012 EL3023 EL3053	-	-	5		
Holding Current	I_H	-	250	-	μA	

* Typical values at $T_a = 25^\circ\text{C}$



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Typical Performance Curves

Figure 1. Forward Current vs Forward Voltage

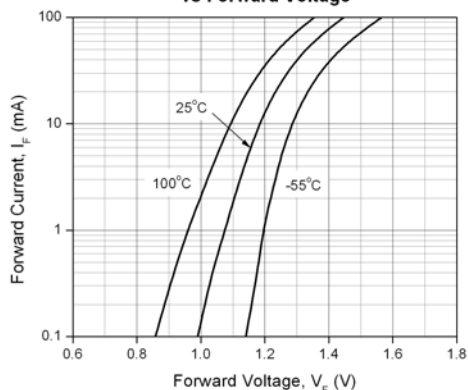


Figure 2. On-State Characteristics

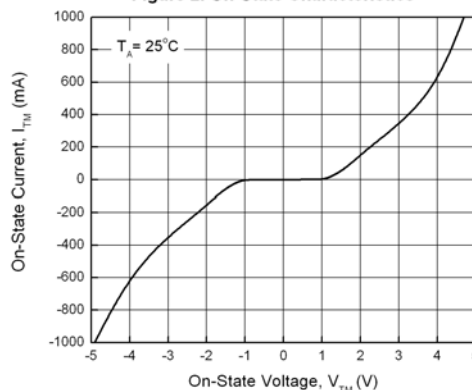


Figure 3. Holding Current vs. Ambient Temperature

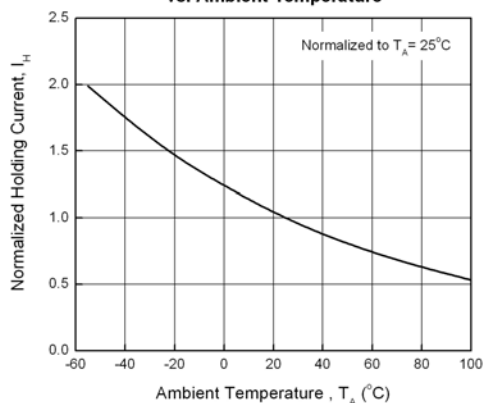


Figure 4. LED Current Required to Trigger vs. LED Pulse Width

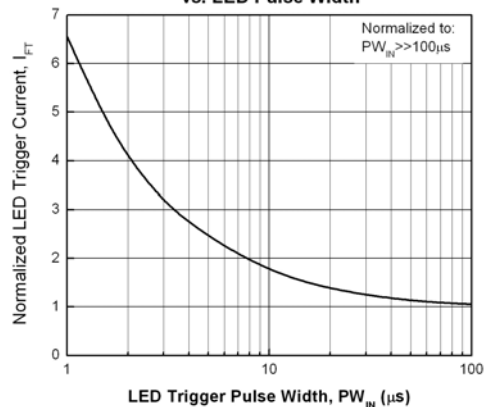


Figure 5. Leakage Current vs. Ambient Temperature

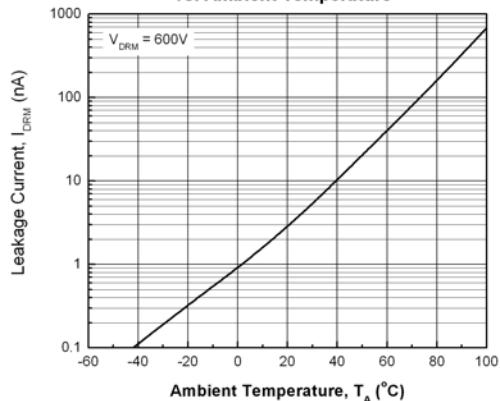
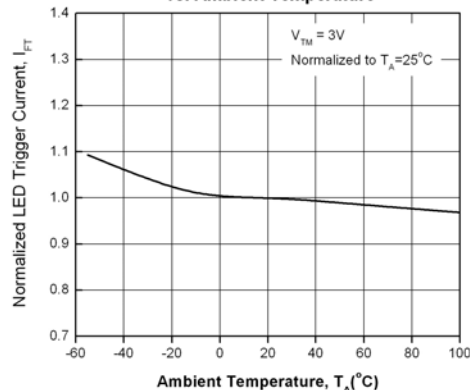


Figure 6. LED Trigger Current vs. Ambient Temperature



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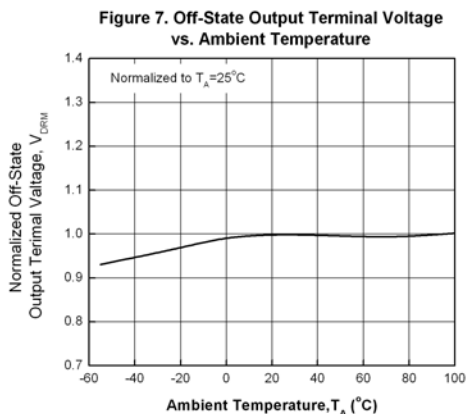
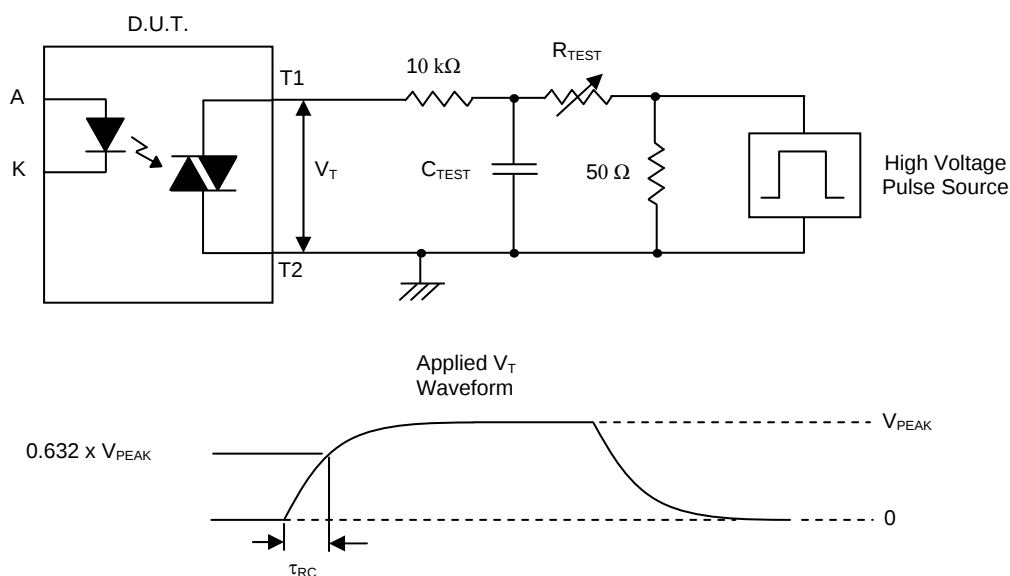


Figure 8. Static dv/dt Test Circuit & Waveform



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.

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



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For example, $V_{PEAK} = 400V$ for EL302X series. The dv/dt value is calculated as follows:

$$dv/dt = \frac{0.63 \times 400}{\tau_{RC}} = \frac{252}{\tau_{RC}}$$

Order Information

Part Number

EL301XY(Z)-V
or **EL302XY(Z)-V**
or **EL305XY(Z)-V**

Note

X = Part No. for EL301x (0, 1 or 2)

X = Part No. for EL302x, EL305x (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

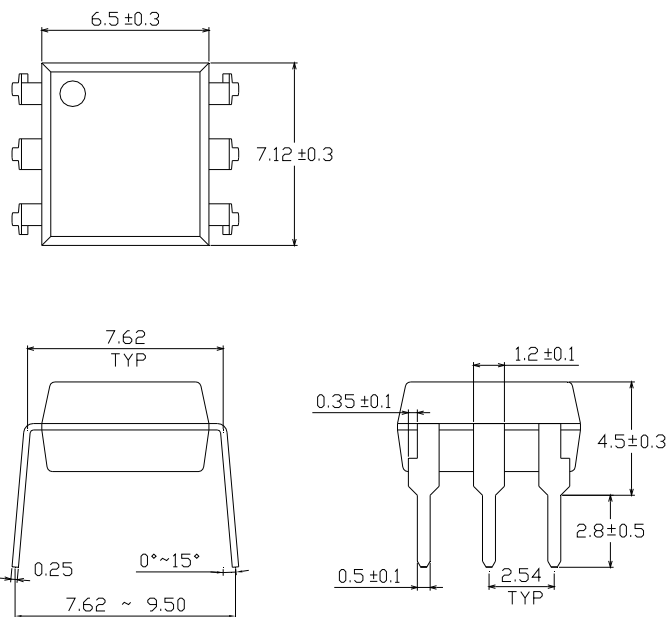
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead 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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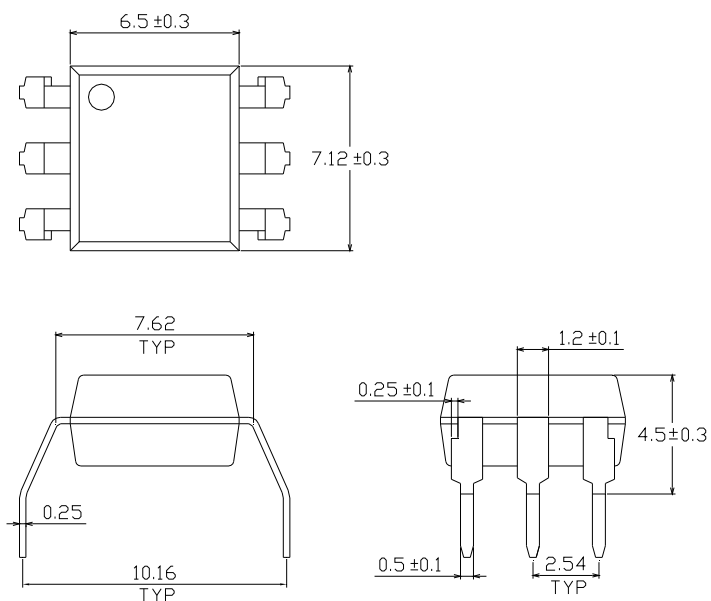
**EL301X Series
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EL305X Series**

Package Drawings (Dimensions in mm)

Standard DIP Type



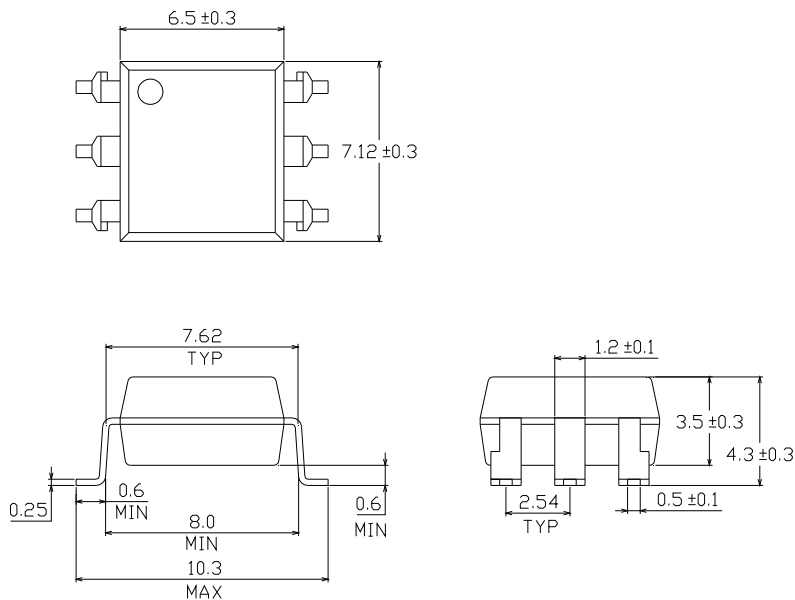
Option M Type



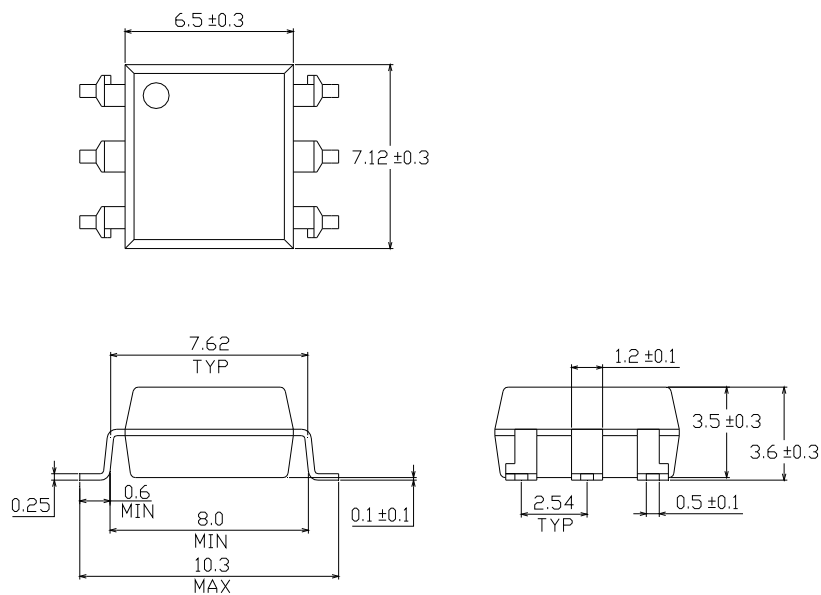
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Option S Type



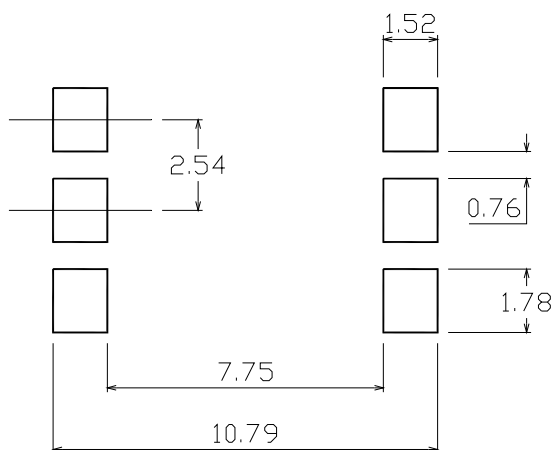
Option S1 Type



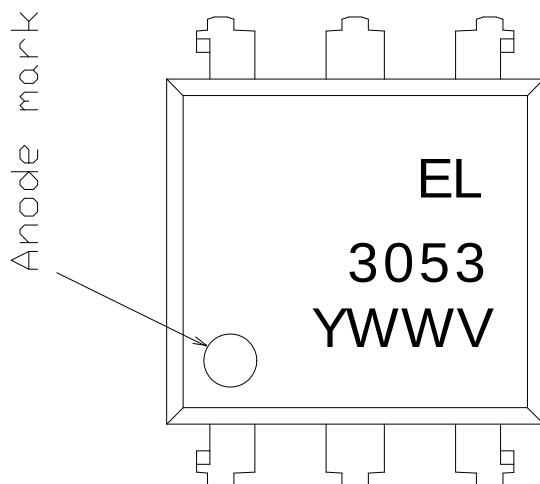
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Recommended pad layout for surface mount leadform



Device Marking



Notes

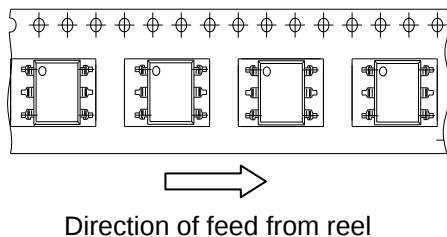
EL denotes Everlight
3053 denotes Device Number
Y denotes 1 digit Year code
WW denotes 2 digit Week code
V denotes VDE option

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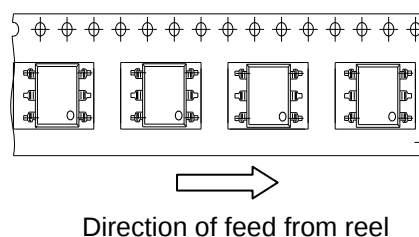
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Tape & Reel Packing Specifications

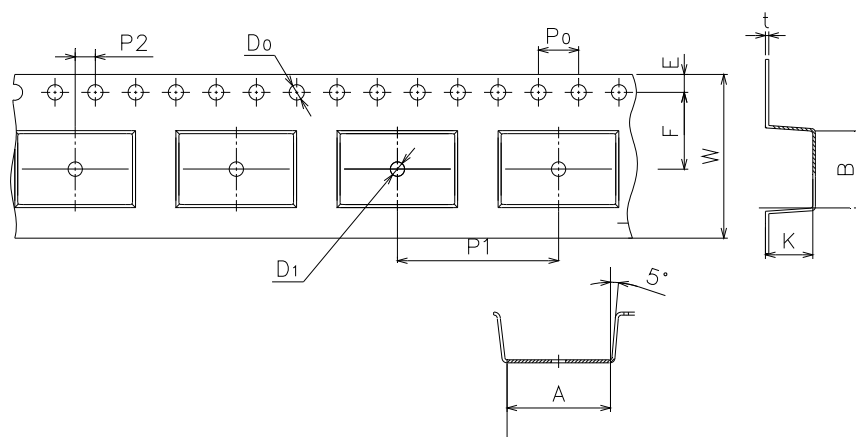
Option TA



Option TB



Tape dimensions



Dimension No.	A	B	D ₀	D ₁	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.	P ₀	P ₁	P ₂	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

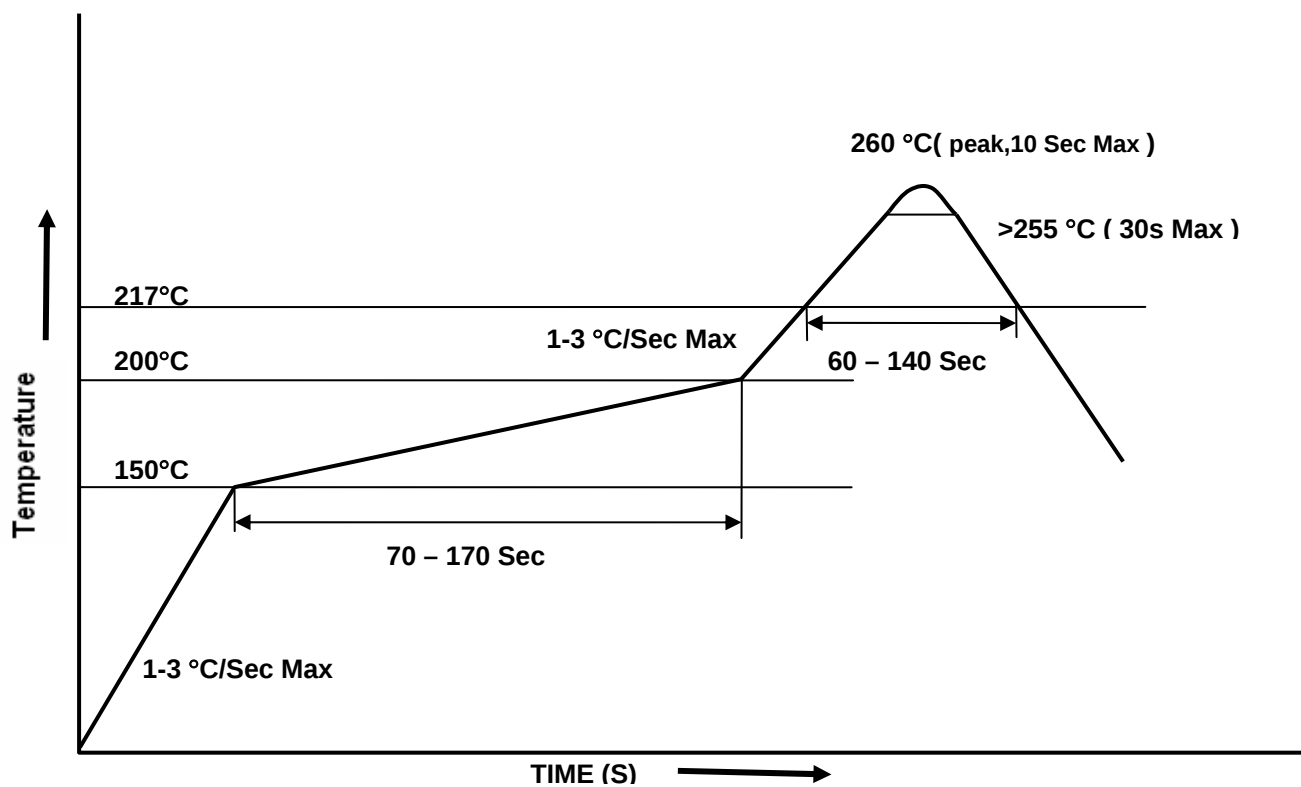


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Solder Reflow Temperature Profile



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