

4 PIN SOP ZERO CROSS TRIAC PHOTOCOUPLER

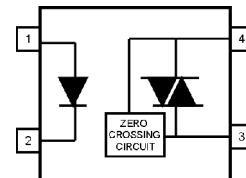
ELM304X Series
ELM306X Series
ELM308X Series

Features:

- ELM304X V_{DRM} of 400V, ELM306X V_{DRM} of 600V and ELM308X V_{DRM} of 800V
- High isolation voltage between input and output (Viso=3750 V rms)
- Zero voltage crossing
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No.40028116)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved



Schematic



Description

The ELM304X, ELM306X and ELM308X devices consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon detector performing the function of a zero voltage crossing bilateral triac driver.

They are designed for use with a discrete power triac in the interface of logic systems to equipment powered from 110 to 240 VAC lines, such as solid-state relays, industrial controls, motors, solenoids and consumer appliances, etc.

Pin Configuration

1. Anode
2. Cathode
3. Terminal
4. Terminal

Applications

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



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

Parameter			Symbol	Rating	Unit
Input	Forward current		I _F	60	mA
	Peak forward current (1us pulse, 300pps)		I _{F(PK)}	1	A
	Reverse voltage		V _R	6	V
	Power dissipation		P _D	100	mW
Output	Off-state Output Terminal Voltage	M304X	V _{DRM}	400	V
		M306X		600	
		M308X		800	
	On state RMS Current		I _{T(RMS)}	70	mA(RMS)
	Power dissipation		P _D	300	mW
	Isolation voltage ^{*1}			V _{iso}	3750
Operating temperature			T _{opr}	-40~+110	°C
Storage temperature			T _{stg}	-55~+150	°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 ($T_a=25^{\circ}\text{C}$ unless specified otherwise)

Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V_F	-	-	1.5	V	$I_F = 30\text{mA}$
Reverse Leakage current	I_R	-	-	10	μA	$V_R = 6\text{V}$

Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Peak Blocking Current	I_{DRM1}	-	-	100	nA	$V_{\text{DRM}} = \text{Rated } V_{\text{DRM}}$ $I_F = 0\text{mA}$
Peak On-state Voltage	V_{TM}	-	-	3	V	$I_{\text{TM}}=100\text{mA peak}$
Critical Rate of Rise off-state Voltage	dv/dt	1000	-	-	V/ μs	
Inhibit Voltage (MT1-MT2 voltage above which device will not trigger)	V_{INH}	-	-	20	V	$I_F = \text{Rated } I_{\text{FT}}$
Leakage in Inhibited State	I_{DRM2}	-	-	1000	μA	$I_F = \text{Rated } I_{\text{FT}}$, $V_{\text{DRM}} = \text{Rated } V_{\text{DRM}}$, off state

Transfer Characteristics

Parameter		Symbol	Min.	Typ.*	Max.	Unit	Condition
LED Trigger Current	3042	I _{FT}	-	-	10	mA	Main terminal Voltage=3V
	3062						
	3082						
	3043		-	-	5		
	3063						
	3083						
	3044		-	-	3		
	3064						
	3084						
Holding Current		I _H	-	280	-	μA	

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

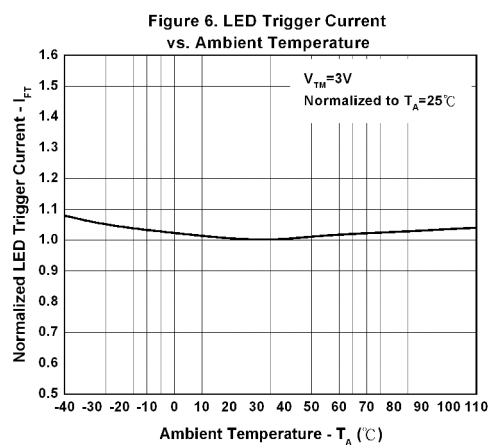
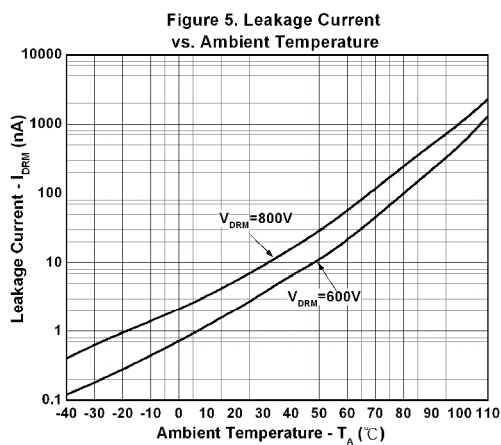
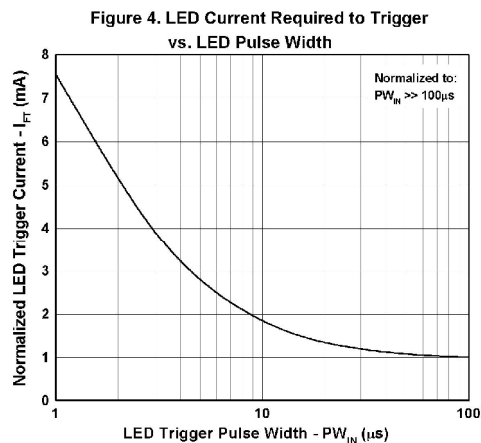
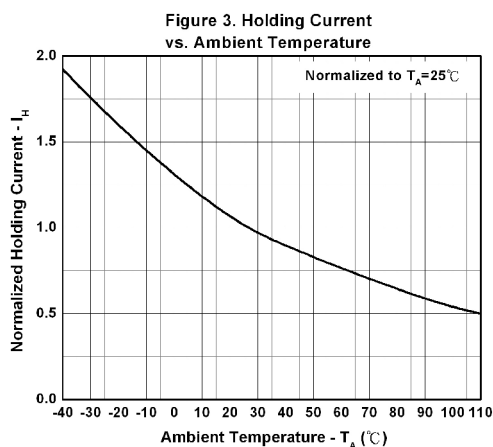
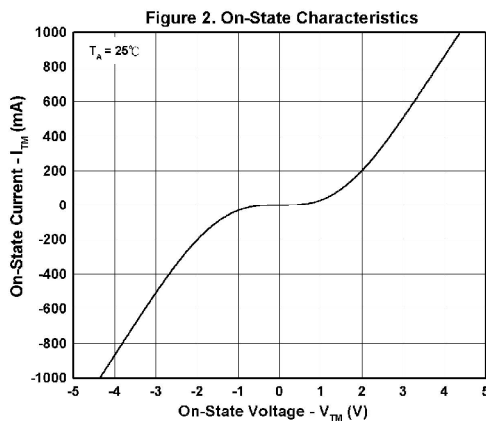
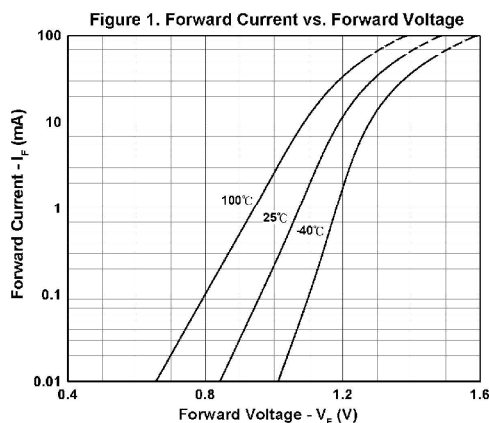


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Typical Performance Curves





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

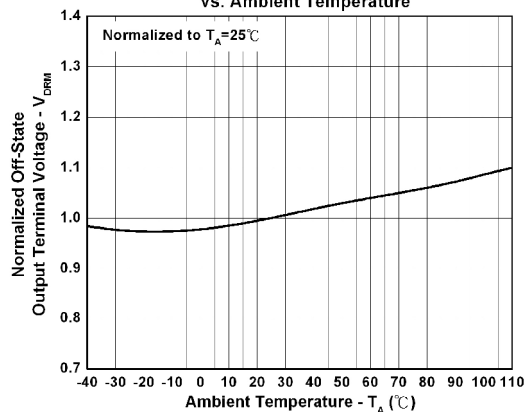


Figure 8. Leakage in Inhibit State
vs. Ambient Temperature

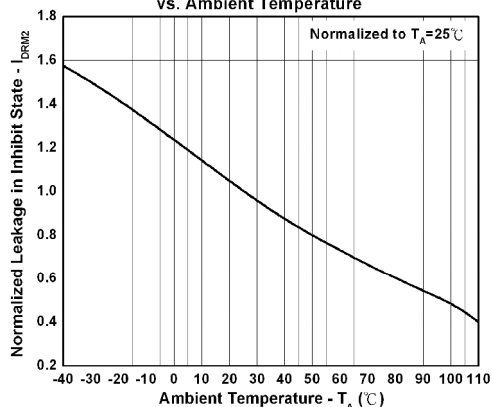
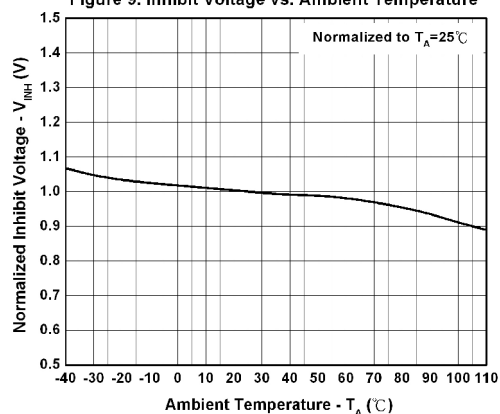


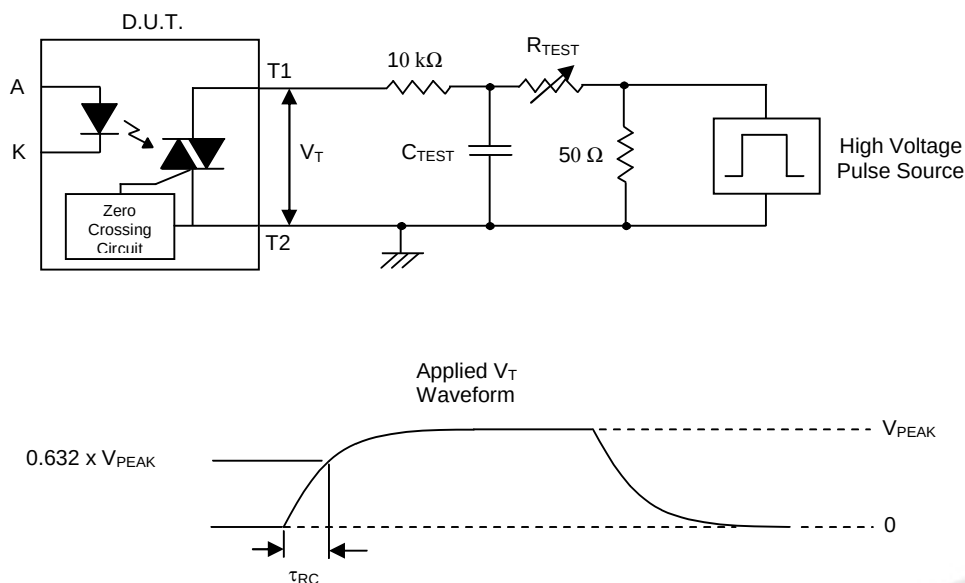
Figure 9. Inhibit Voltage vs. Ambient Temperature



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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

ELM304X(Z)-V
or **ELM306X(Z)-V**
or **ELM308X(Z)-V**

Note

X = Part No. (2 for $I_{FT}=10mA$, 3 for $I_{FT}=5mA$, 4 for $I_{FT}=3mA$)

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

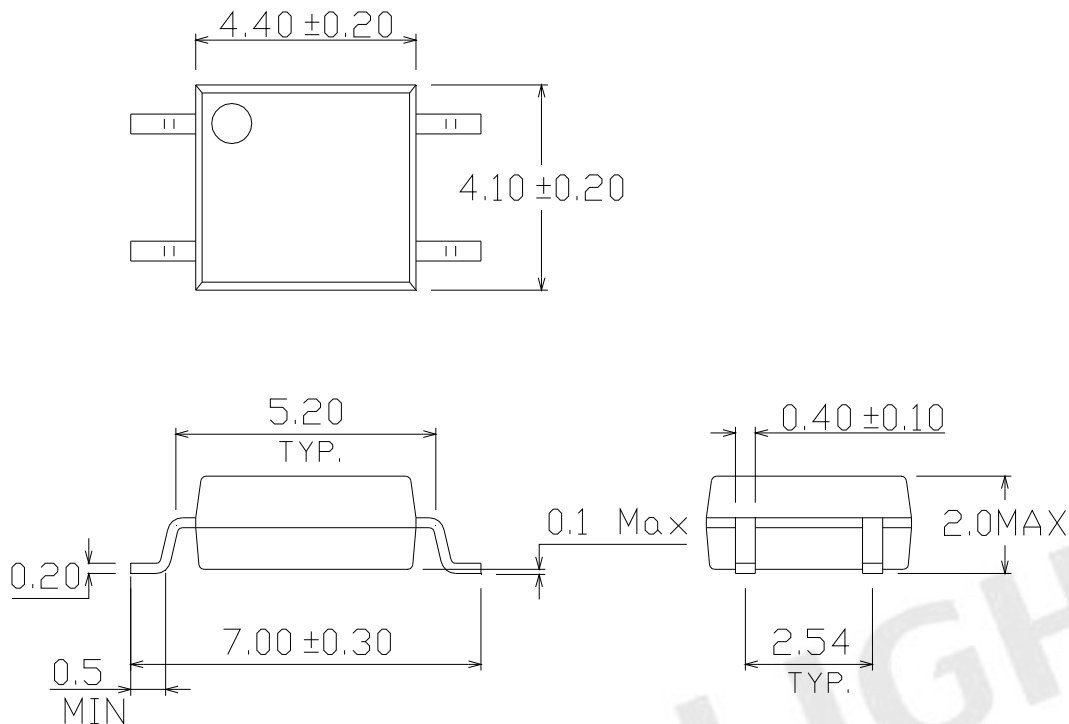
V = VDE safety approved optional

Option	Description	Packing quantity
None	Standard	100 units per tube
None	Standard + VDE safety optional	100 units per tube
(TA)	TA tape & reel option	3000 units per reel
(TB)	TB tape & reel option	3000 units per reel
(TA)-V	TA tape & reel option + VDE safety optional	3000 units per reel
(TB)-V	TB tape & reel option + VDE safety optional	3000 units per reel

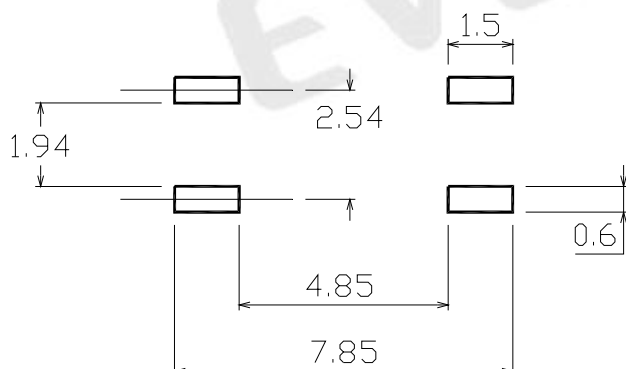
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Package Drawings (Dimensions in mm)



Recommended pad layout for surface mount leadform





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Device Marking



Notes

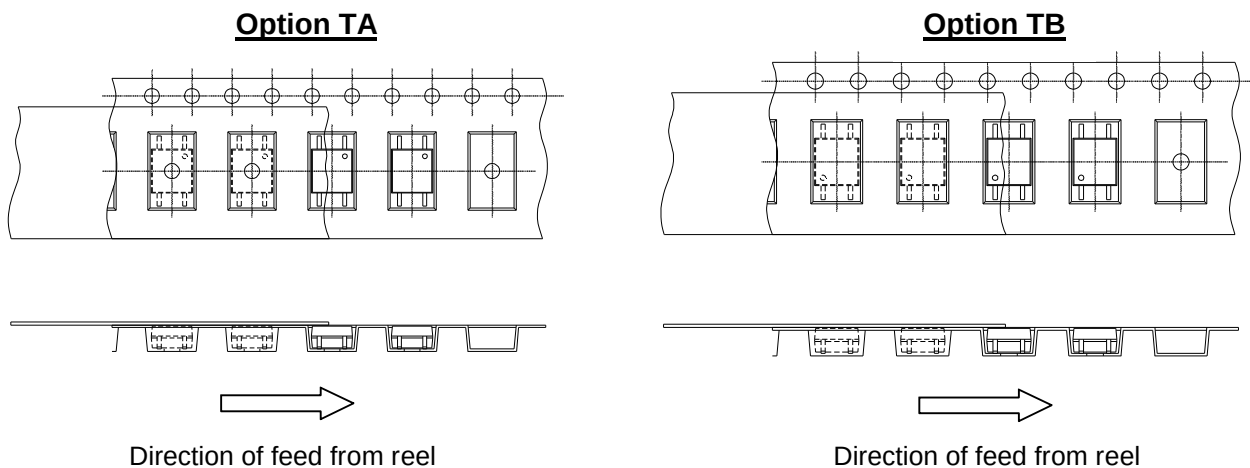
EL	denotes Everlight
M3063	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE safety (optional)

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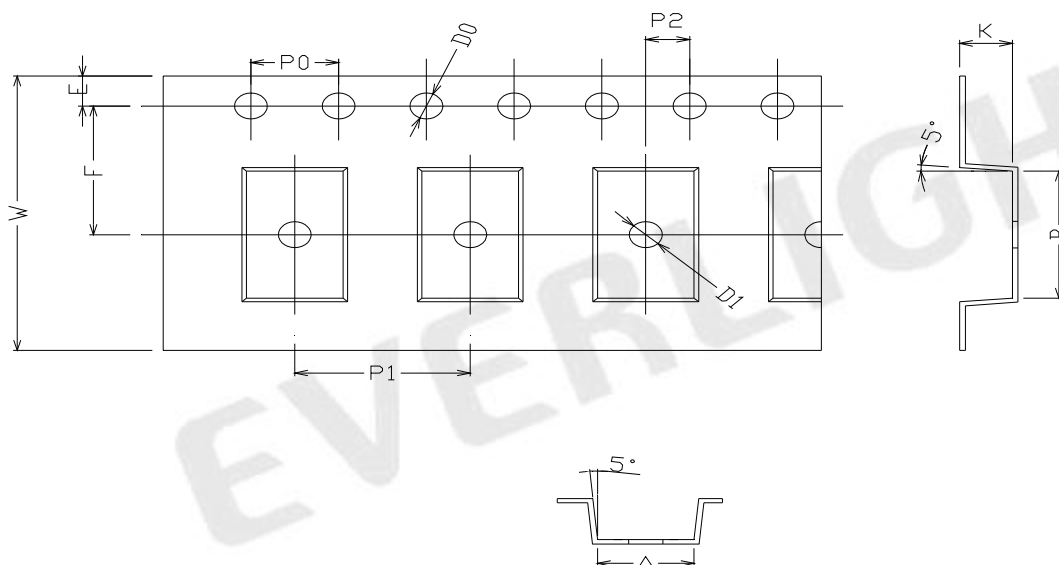
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Tape & Reel Packing Specifications



Tape dimensions



Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	4.4 ± 0.1	7.4 ± 0.1	$1.5 + 0.1/-0$	1.5 ± 0.1	1.75 ± 0.1	7.5 ± 0.1

Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0 ± 0.15	8.0 ± 0.1	2.0 ± 0.1	0.25 ± 0.03	16.0 ± 0.2	2.4 ± 0.1

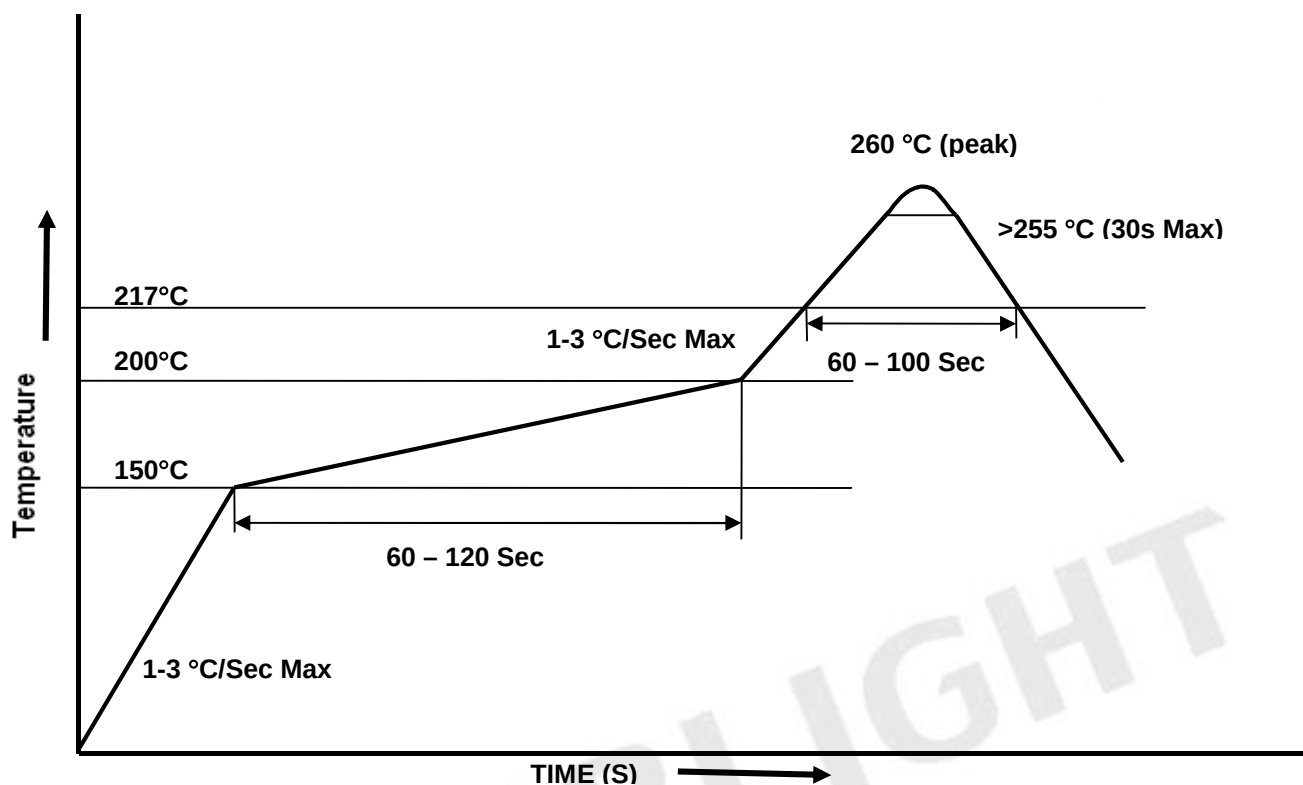


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Solder Reflow Temperature Profile



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