

4 PIN SOP RANDOM-PHASE TRIAC PHOTOCOUPLER

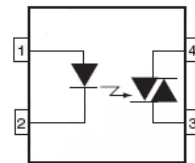
ELM302X Series
ELM305X Series

Features:

- ELM302X V_{DRM} of 400V, ELM305X V_{DRM} of 600V
- High isolation voltage between input and output ($V_{iso}=3750$ V rms)
- Compact dual-in-line package
- Pb free and RoHS compliant.
- cUL approved (No. E214129)
- VDE approved (No. 40028116))
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved



Schematic



Description

The ELM302X series and ELM305X series are optically isolated triac driver devices. These devices contain a GaAs infrared emitting diode and a light activated silicon bilateral switch, which functions like a triac.

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

Pin Configuration

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

Applications

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



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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
Output	Off-state Output Terminal Voltage	302X	V _{DRM}	400	V
		305X		600	
	On state RMS current		I _{T(RMS)}	70	mA(RMS)
	Peak Repetitive Surge Current		I _{TSM}	1	A
	Power dissipation		P _D	300	mW
	Total power dissipation			P _{TOT}	200
Isolation voltage ^{*1}			V _{iso}	3750	V rms
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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ELM302X Series
ELM305X Series**Electrical Characteristics ($T_a=25^{\circ}\text{C}$ unless specified otherwise)****Input**

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V_F	-	1.2	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	$I_{\text{TM}}=100\text{mA peak}$
Critical Rate of Rise off-state Voltage	ELM302X	dv/dt	-	10	$\text{V}/\mu\text{s}$	$I_F=0\text{mA}$, Figure 8
	ELM305X		1000	-		

Transfer Characteristics

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
LED Trigger Current	3022 3052	I_{FT}	-	-	mA	Main terminal Voltage=3V
	3023 3053		-	-		
	3024 3054		-	-		
Holding Current	I_H	-	3	5	mA	
Turn-on time	T_{on}	-	-	100	μs	$V_D=6\text{V}$, $R_L=100\text{ohm}$, $I_F=20\text{mA}$

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

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Typical Performance Curves

Figure 1. Forward Current vs. Forward Voltage

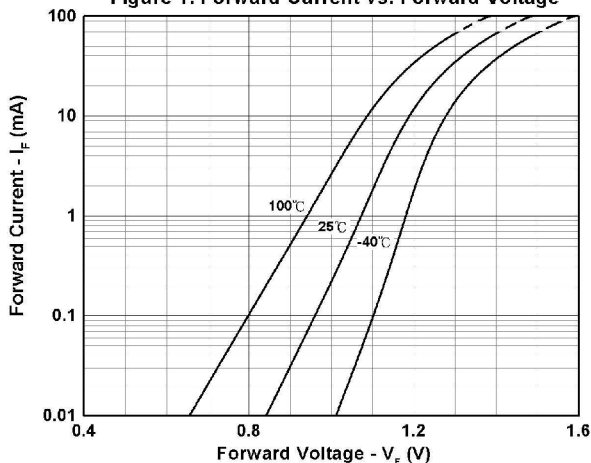


Figure 2. On-State Characteristics

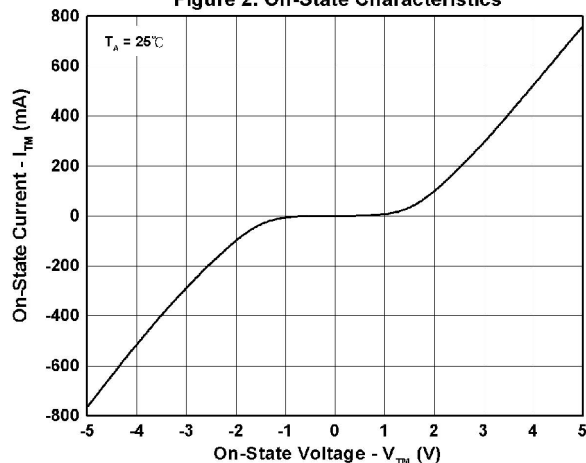


Figure 3. Normalized Holding Current vs. Ambient Temperature

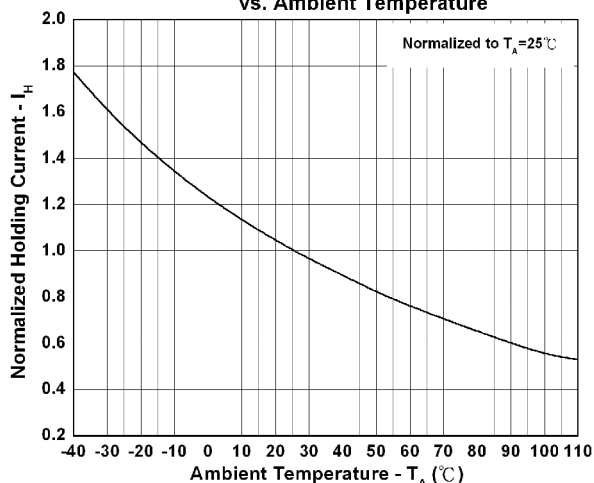


Figure 4. LED Current Required to Trigger vs. LED Pulse Width

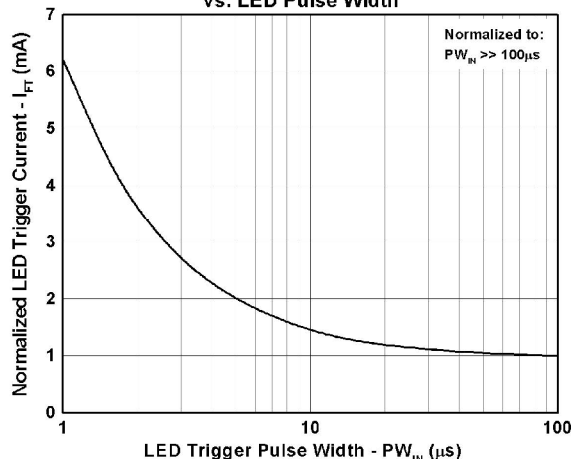


Figure 5. Leakage Current vs. Ambient Temperature

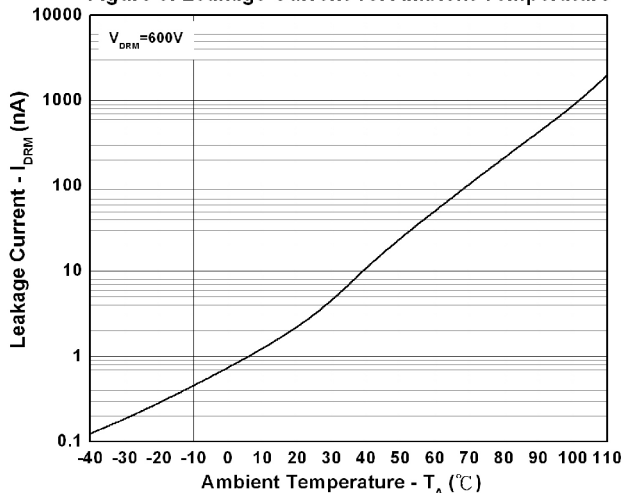
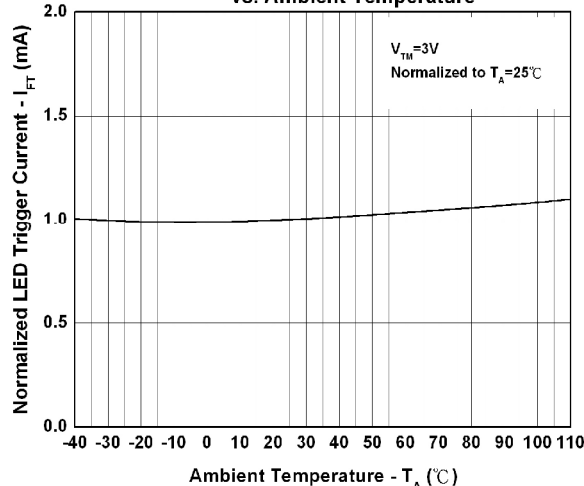


Figure 6. Normalized LED Trigger Current vs. Ambient Temperature



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

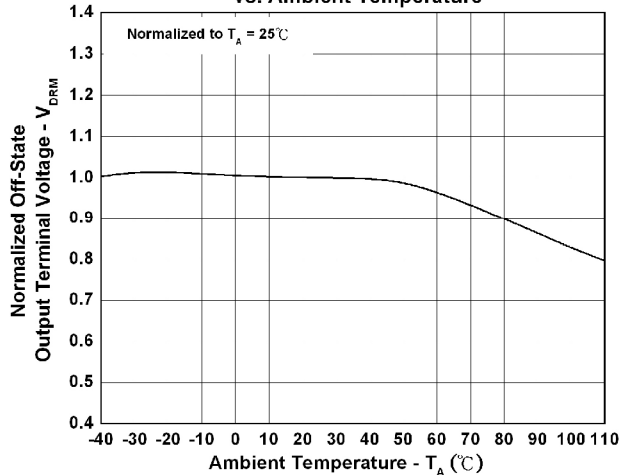
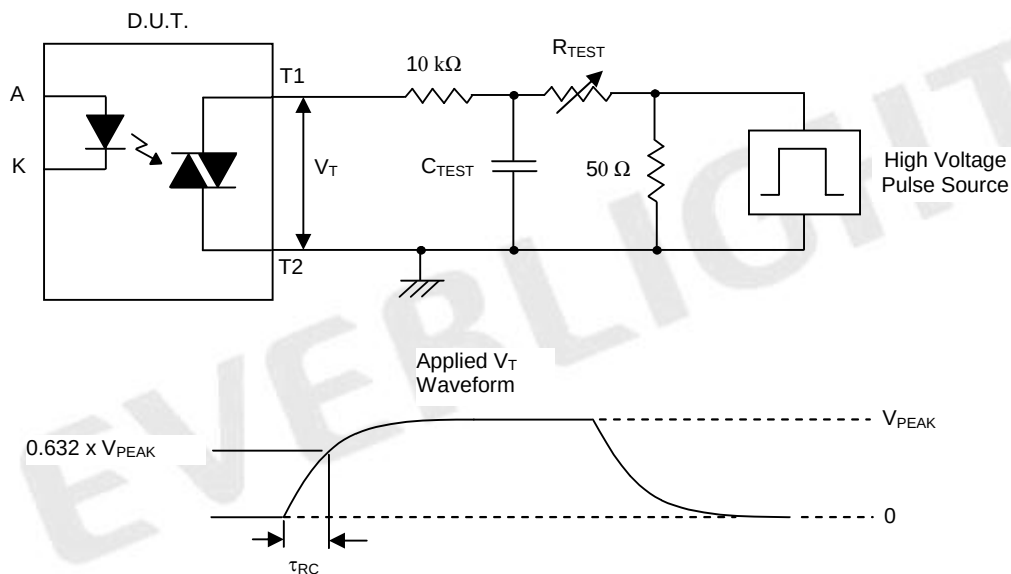


Figure 8. Static dv/dt Test Circuit & Waveform



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

ELM302X(Z)-V
or **ELM305X(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 (optional)

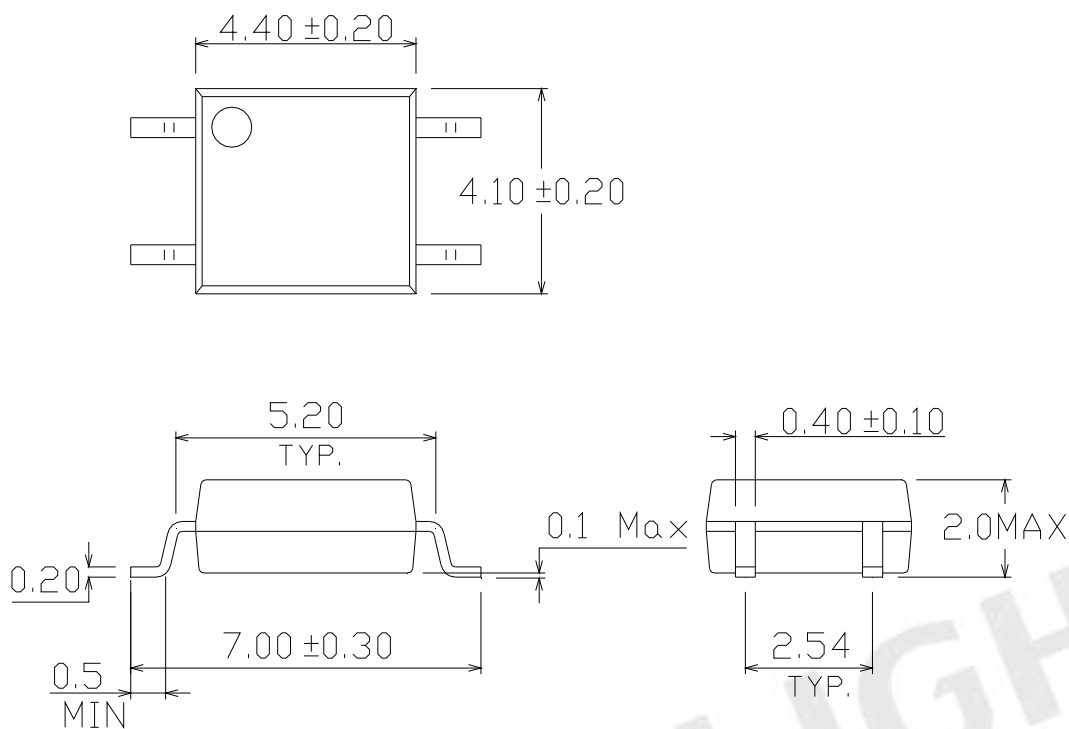
Option	Description	Packing quantity
None	Standard	100 units per tube
None	Standard + VDE safety optional	100 units per tube
(TA)	TA tape & reel option	3000 units per reel
(TB)	TB tape & reel option	3000 units per reel
(TA)-V	TA tape & reel option + VDE safety optional	3000 units per reel
(TB)-V	TB tape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

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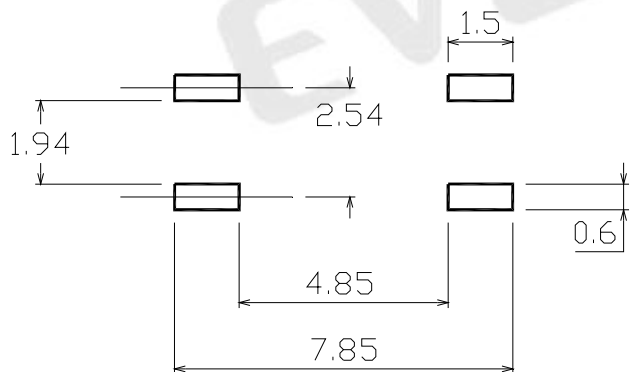
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Package Drawings

(Dimensions in mm)



Recommended pad layout for surface mount leadform



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Device Marking



Notes

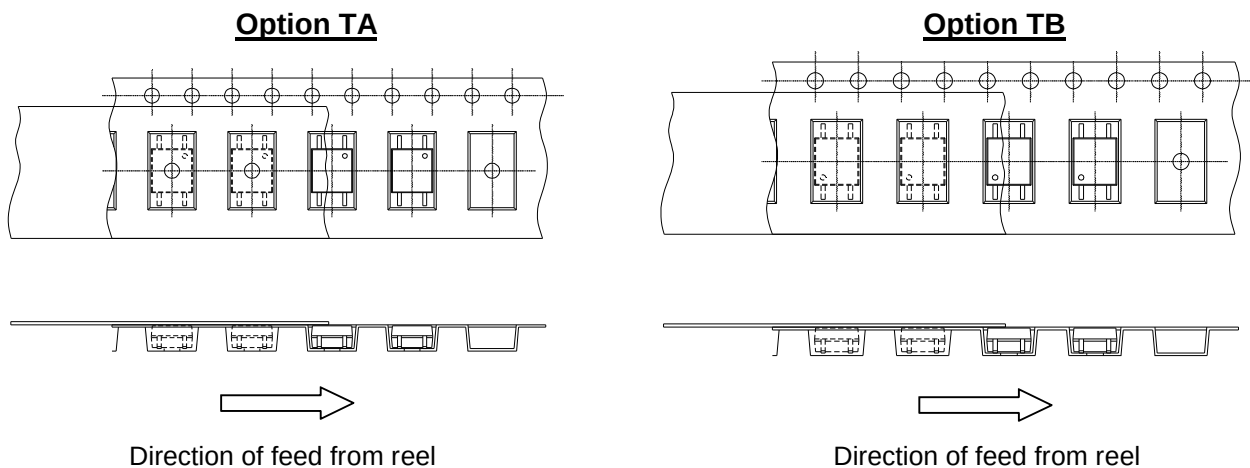
EL	denotes Everlight
M3054	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE safety option (optional)

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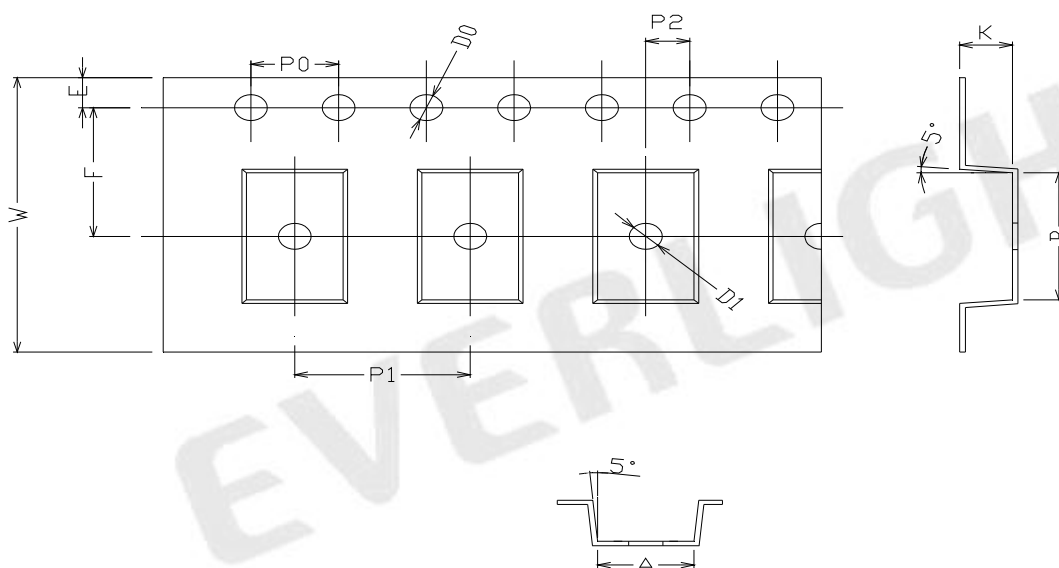
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Tape & Reel Packing Specifications



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

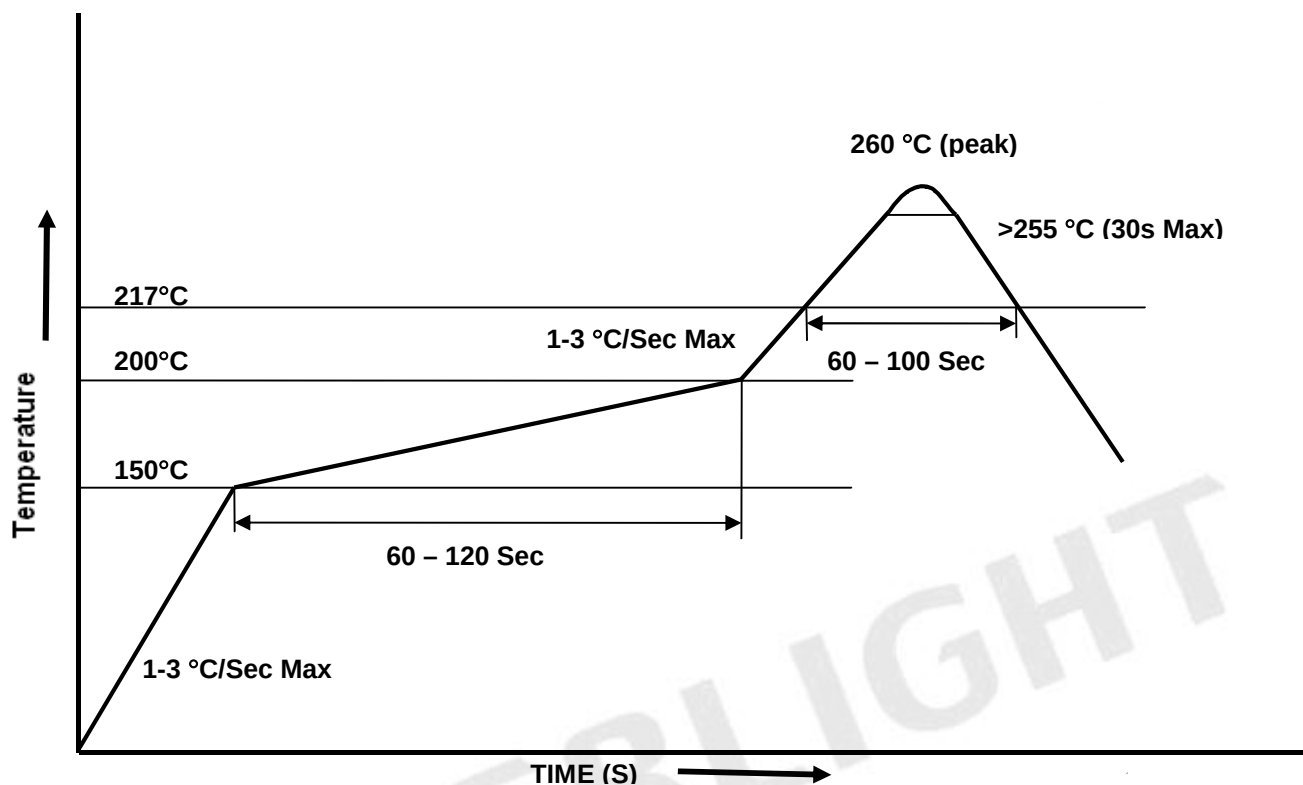


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Solder Reflow Temperature Profile



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