



**THE DATASHEET OF
ELM3082(TA)-V**



4 PIN SOP ZERO-CROSS TRIAC PHOTOCOUPLER ELM304X, ELM306X, ELM308X Series



Features:

- Peak breakdown voltage
 - 400V: ELM304X
 - 600V: ELM306X
 - 800V: ELM308X
- 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.132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved

Description

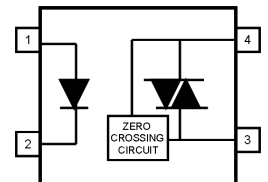
The ELM304X, ELM306X and ELM308X devices consist of a GaAs infrared emitting diode optically coupled to a monolithic silicon detector performing the function of a zero voltage crossing bilateral triac driver.

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.

Applications

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

Schematic



Pin Configuration

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

Absolute Maximum Ratings (Ta=25°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 | | | ELM304X | 400 |
| | Off-state Output Terminal Voltage | | ELM306X | 600 |
| | | | ELM308X | 800 |
| | | | V_{DRM} | |
| | On state RMS current | $I_{T(RMS)}$ | 70 | mA(RMS) |
| Power dissipation | P_C | 300 | mW | |
| Isolation voltage ^{*1} | | V_{ISO} | 3750 | Vrms |
| 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 are shorted together, and pins 3, 4 are shorted together.

*2 For 10 seconds

Electro-Optical Characteristics (Ta=25°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 | - | - | 10 | mA | Main terminal Voltage=3V |
| | 3062 | | | | | |
| | 3082 | | | | | |
| | 3043 | - | - | 5 | | |
| | 3063 | | | | | |
| | 3083 | | | | | |
| 3044 | | | | | | |
| 3064 | - | - | 3 | | | |
| 3084 | | | | | | |
| Holding Current | I_H | - | 280 | - | μA | |

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

Typical Electro-Optical Characteristics Curves

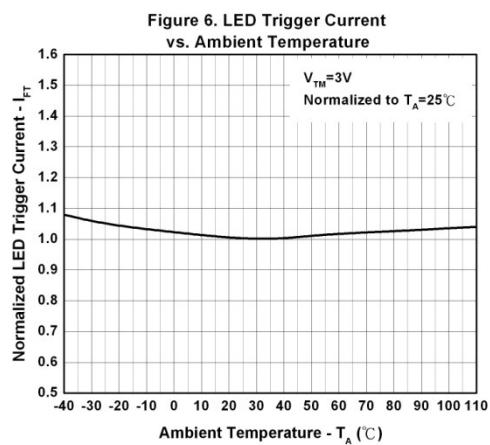
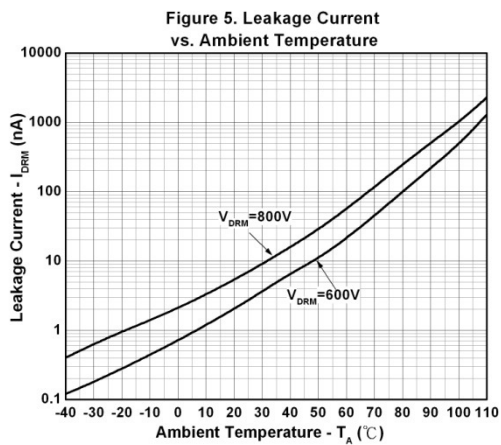
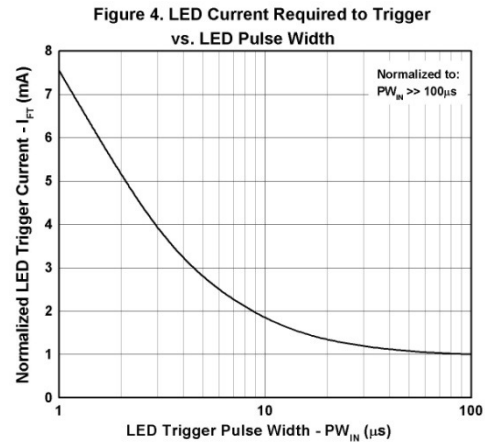
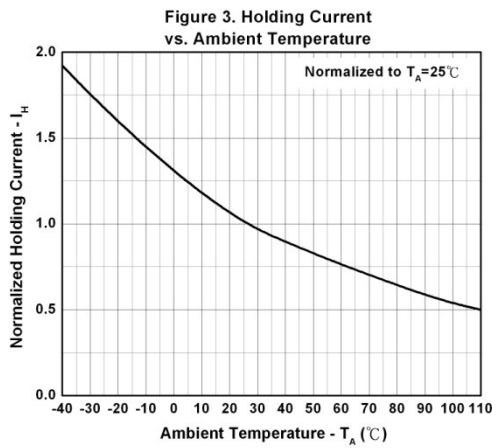
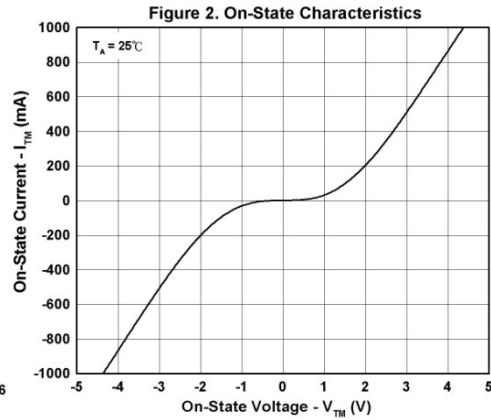
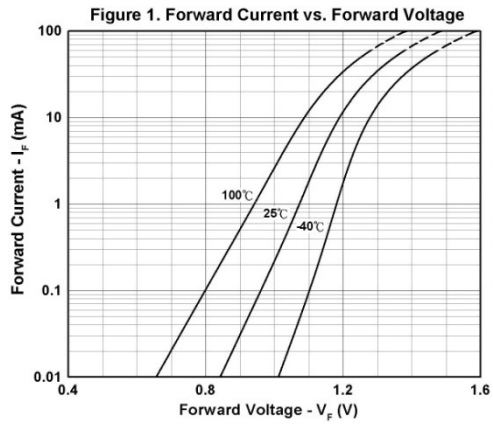


Figure 7. Off-State Output Terminal Voltage vs. Ambient Temperature

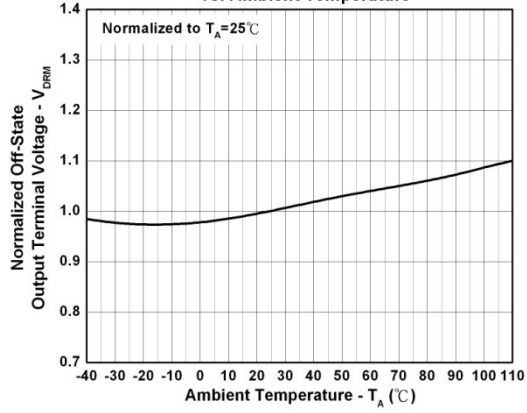


Figure 8. Leakage in Inhibit State vs. Ambient Temperature

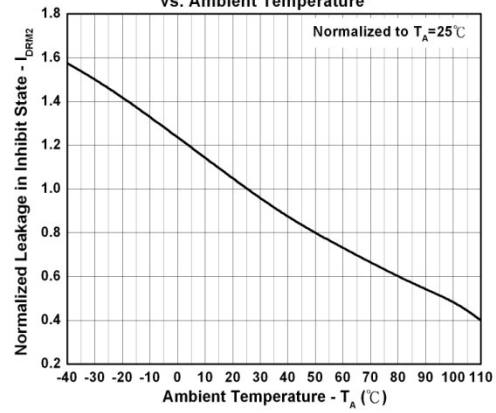


Figure 9. Inhibit Voltage vs. Ambient Temperature

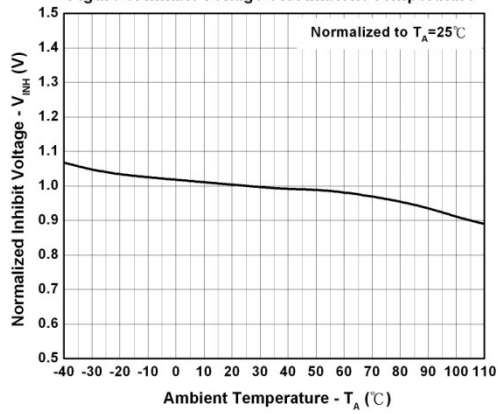
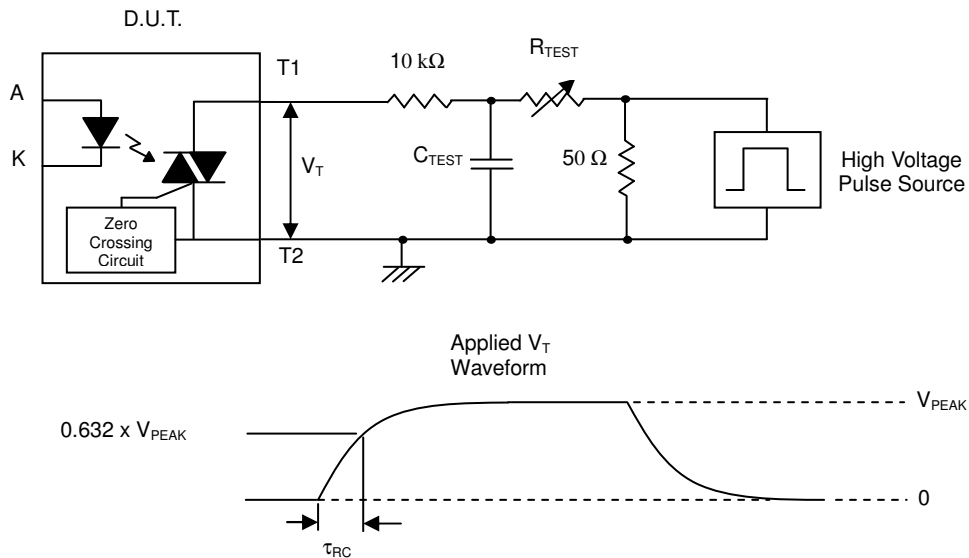


Figure 10. Static dv/dt Test Circuit & Waveform



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.

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

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For example, $V_{PEAK} = 600V$ for EL306X series. The dv/dt value is calculated as follows:

$$dv/dt = \frac{0.63 \times 600}{\tau_{RC}} = \frac{378}{\tau_{RC}}$$

Order Information

Part Number

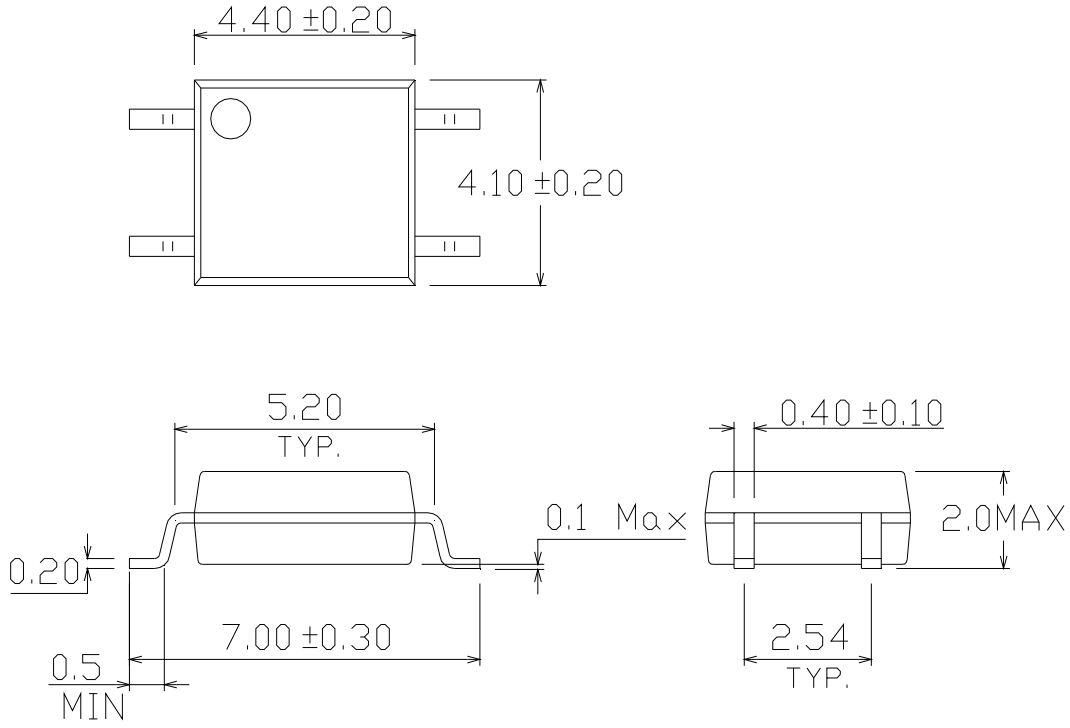
ELM304X(Z)-V
or **ELM306X(Z)-V**
or **ELM308X(Z)-V**

Note

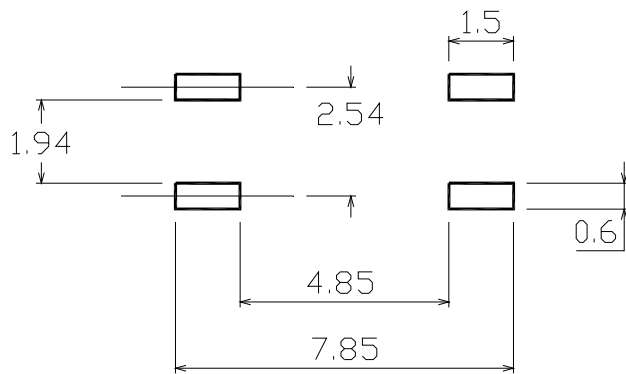
X = Part No. (2 for $I_{FT}=10mA$, 3 for $I_{FT}=5mA$, 4 for $I_{FT}=3mA$)
Z = Tape and reel option (TA, TB or none).
V = VDE safety approved optional

| 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 |

Package Dimension (Dimensions in mm)



Recommended pad layout for surface mount leadform



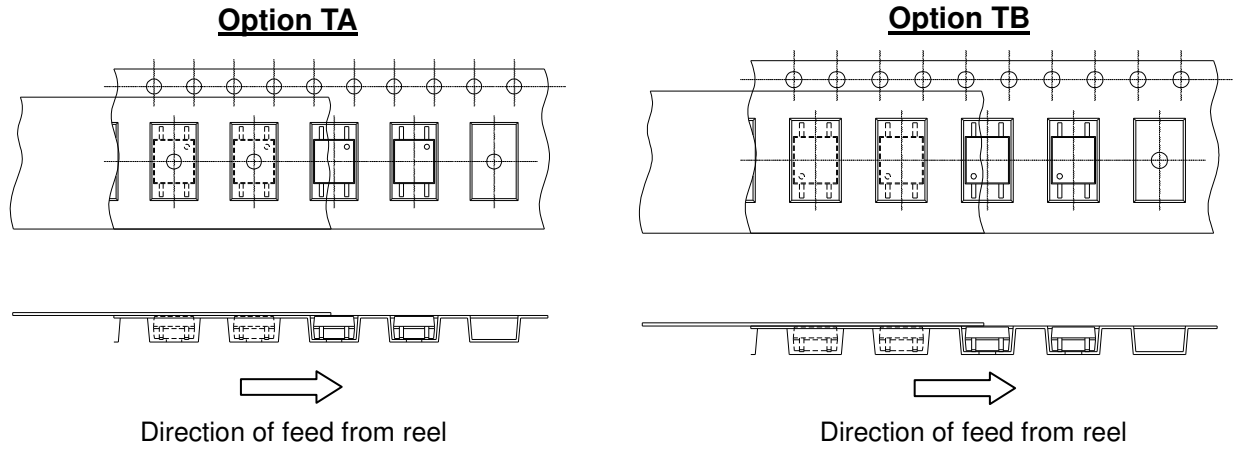
Device Marking



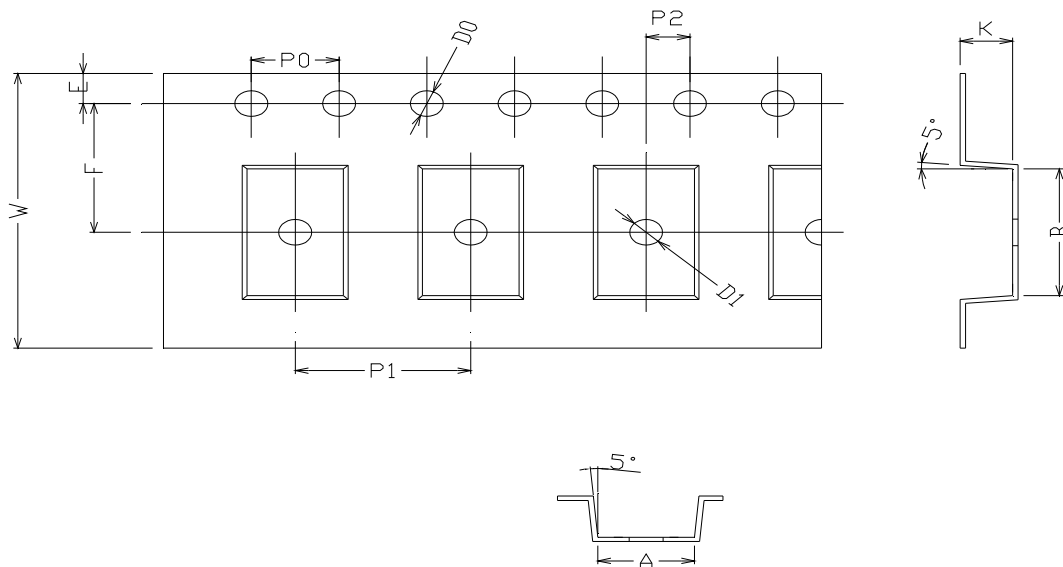
Notes

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

Tape & Reel Packing Specifications



Tape dimensions



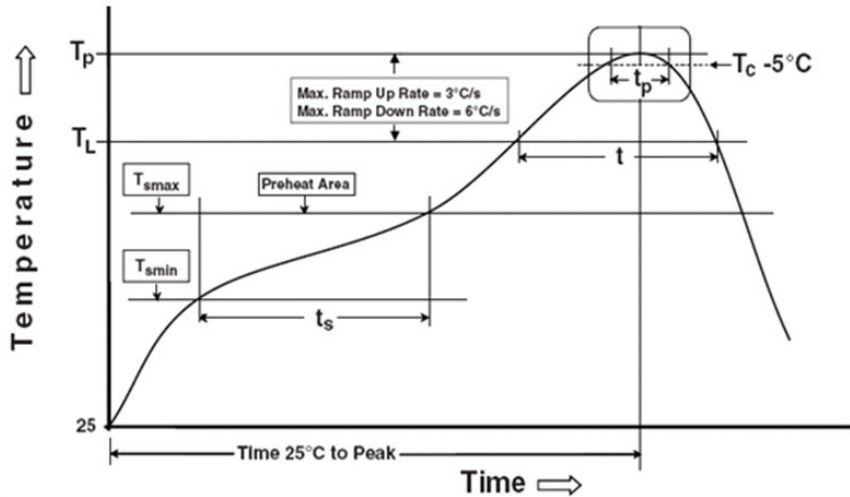
| Dimension No. | A | B | Do | D1 | E | F |
|----------------|-----------|-----------|--------------|-----------|------------|-----------|
| Dimension (mm) | 4.4 ± 0.1 | 7.4 ± 0.1 | 1.5 + 0.1/-0 | 1.5 ± 0.1 | 1.75 ± 0.1 | 7.5 ± 0.1 |

| 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 |

Precautions for Use

1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note:

Reference: IPC/JEDEC J-STD-020D

Preheat

| | |
|--|-----------------|
| Temperature min (T_{smin}) | 150 °C |
| Temperature max (T_{smax}) | 200 °C |
| Time (T_{smin} to T_{smax}) (t_s) | 60-120 seconds |
| Average ramp-up rate (T_{smax} to T_p) | 3 °C/second max |

Other



| | |
|--|-------------------|
| Liquidus Temperature (T_L) | 217 °C |
| Time above Liquidus Temperature (t_L) | 60-100 sec |
| Peak Temperature (T_p) | 260 °C |
| Time within 5 °C of Actual Peak Temperature: $T_p - 5^\circ\text{C}$ | 30 s |
| Ramp- Down Rate from Peak Temperature | 6 °C /second max. |
| Time 25 °C to peak temperature | 8 minutes max. |
| Reflow times | 3 times |

DISCLAIMER

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