



CTM3051, CTM3052, CTM3053
600V Random Phase MFP-4L DMC-Isolator®
Phototriac Optocoupler

Features

- High isolation 3750 VRMS
- Patented coplanar structure DMC-Isolator®
- Peak Breakdown Voltage 600V
- Operating temperature range - 55 °C to 100 °C
- External Creepage $\geq 5.0\text{mm}$
- Distance Through Isolation $\geq 0.4\text{mm}$
- Clearance Distance $\geq 5.0\text{mm}$
- RoHS and REACH Compliance
- Halogen Free Compliance
- MSL class 1
- Regulatory Approvals
 - ✓ UL - UL1577 (E364000)
 - ✓ VDE - EN60747-5-5(VDE0884-5)
 - ✓ CQC – GB4943.1, GB8898
 - ✓ IEC60065, IEC60950

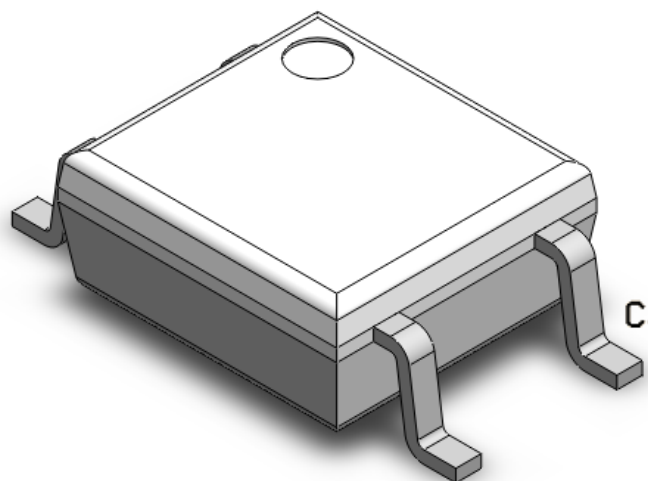
Description

The CTM3051, CTM3052, CTM3053 series consists of a Random Phase Photo Triac optically coupled to an Infrared-emitting diode in a 4-lead Mini-Flat DMC-Isolator® package.

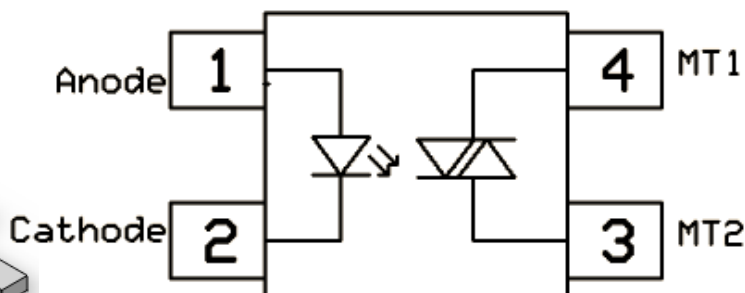
Applications

- Motor Controls
- Lamp ballasts
- Static AC Power Switch
- Solenoid/ Valve Control

Package Outline



Schematic





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Absolute Maximum Ratings $T_A = 25^{\circ}\text{C}$, unless otherwise specified

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

| Symbol | Parameters | Ratings | Units | Notes |
|-----------------------|---|------------|------------------|-------|
| V _{ISO} | Isolation voltage (AC, 1 minute, 40 ~ 60% R.H.) | 3750 | V _{RMS} | |
| T _{OPR} | Operating temperature | -55 ~ +100 | °C | |
| T _{STG} | Storage temperature | -55 ~ +150 | °C | |
| T _{SOL} | Soldering temperature (For 10 seconds) | 260 | °C | |
| P _{TOT} | Total power dissipation | 200 | mW | |
| Emitter | | | | |
| I _F | Forward current | 60 | mA | |
| I _{F(TRANS)} | Peak transient current (≤1μs P.W, 300pps) | 1 | A | |
| V _R | Reverse voltage | 6 | V | |
| P _D | Power dissipation | 100 | mW | |
| Detector | | | | |
| P _D | Power dissipation | 300 | mW | |
| V _{DRM} | Off-State Output Terminal Voltage | 600 | V | |
| I _{TSM} | Peak Repetitive Surge Current | 1 | A | |



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Electrical Characteristics $T_A = 25^\circ\text{C}$ (unless otherwise specified)

Emitter Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|----------|-------------------|---------------------|-----|-----|-----|---------------|-------|
| V_F | Forward voltage | $I_F = 10\text{mA}$ | - | - | 1.5 | V | |
| I_R | Reverse Current | $V_R = 6\text{V}$ | - | - | 5 | μA | |
| C_{IN} | Input Capacitance | $f = 1\text{MHz}$ | - | 45 | - | pF | |

Detector Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|-----------|---|--|------|-----|-----|------------------|-------|
| I_{DRM} | Peak Blocking Current | $I_F = 0\text{mA}$, $V_{DRM} = \text{Rated } V_{DRM}$ | - | - | 100 | nA | |
| V_{TM} | Peak On-State Voltage | $I_F = \text{Rated } I_{FT}$, $I_{TM} = 100\text{mA}$ | - | - | 2.5 | V | |
| dv/dt | Critical Rate of Rise off-State Voltage | $V_{PEAK} = \text{Rated } V_{DRM}$ | 1000 | - | - | V/ μs | |

Transfer Characteristics

| Symbol | Parameters | | Test Conditions | Min | Typ | Max | Units | Notes |
|----------|-----------------------------|---------|--|--------------------|------|-----|---------------|-------|
| I_{FT} | Input Trigger Current | CTM3051 | Terminal Voltage = 3V $I_{TM} = 100\text{mA}$ | - | - | 15 | mA | |
| | | CTM3052 | | - | - | 10 | | |
| | | CTM3053 | | - | - | 5 | | |
| I_H | Holding Current | | Terminal Voltage from "ON" to "OFF" "ON" state $I_F = 0\text{mA}$ | - | 250 | - | μA | |
| R_{IO} | Isolation Resistance | | $V_{IO} = 500\text{V}_{DC}$, 40 ~ 60% R.H. | 1×10^{11} | - | - | Ω | |
| C_{IO} | Isolation Capacitance | | $f = 1\text{MHz}$ | - | 0.25 | - | pF | |



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Typical Characteristic Curves $T_A = 25^\circ\text{C}$, unless otherwise specified

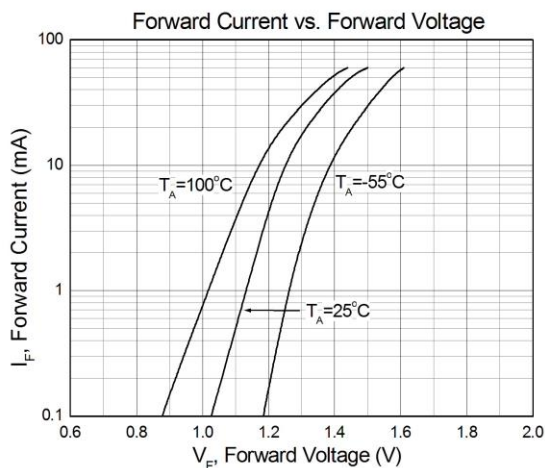


Figure 1

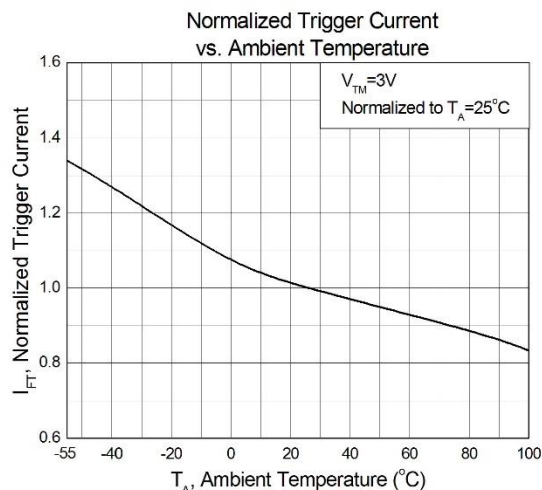


Figure 2

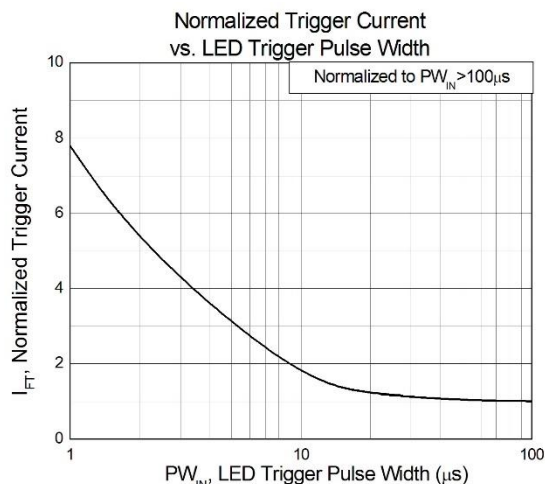


Figure 3

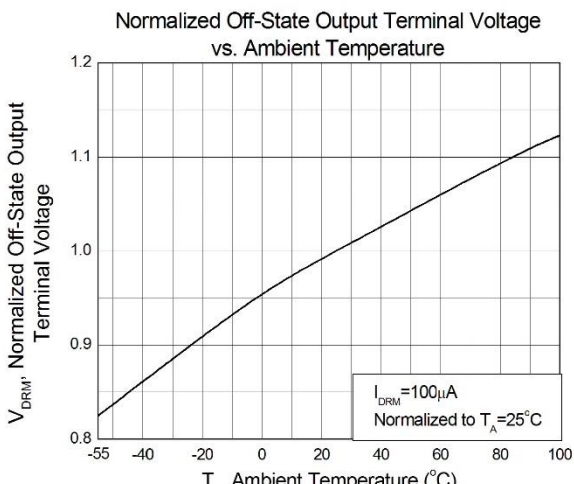


Figure 4

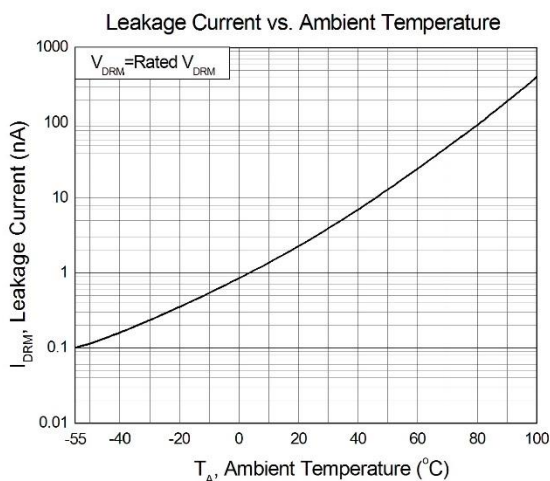


Figure 5

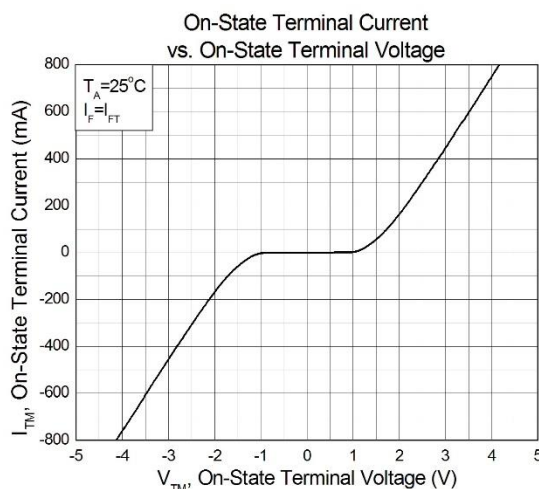
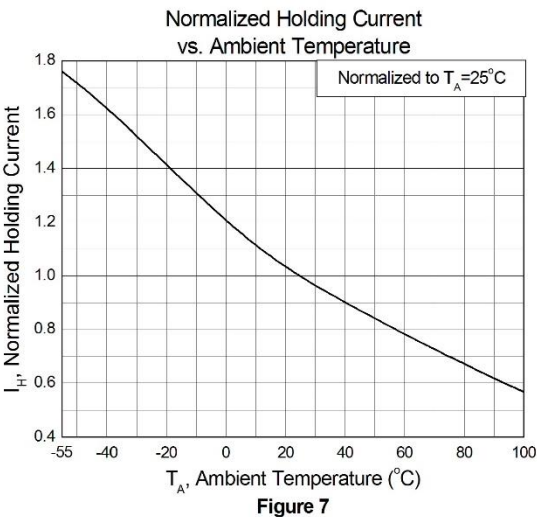


Figure 6



Typical Characteristic Curves $T_A = 25^{\circ}\text{C}$, unless otherwise specified

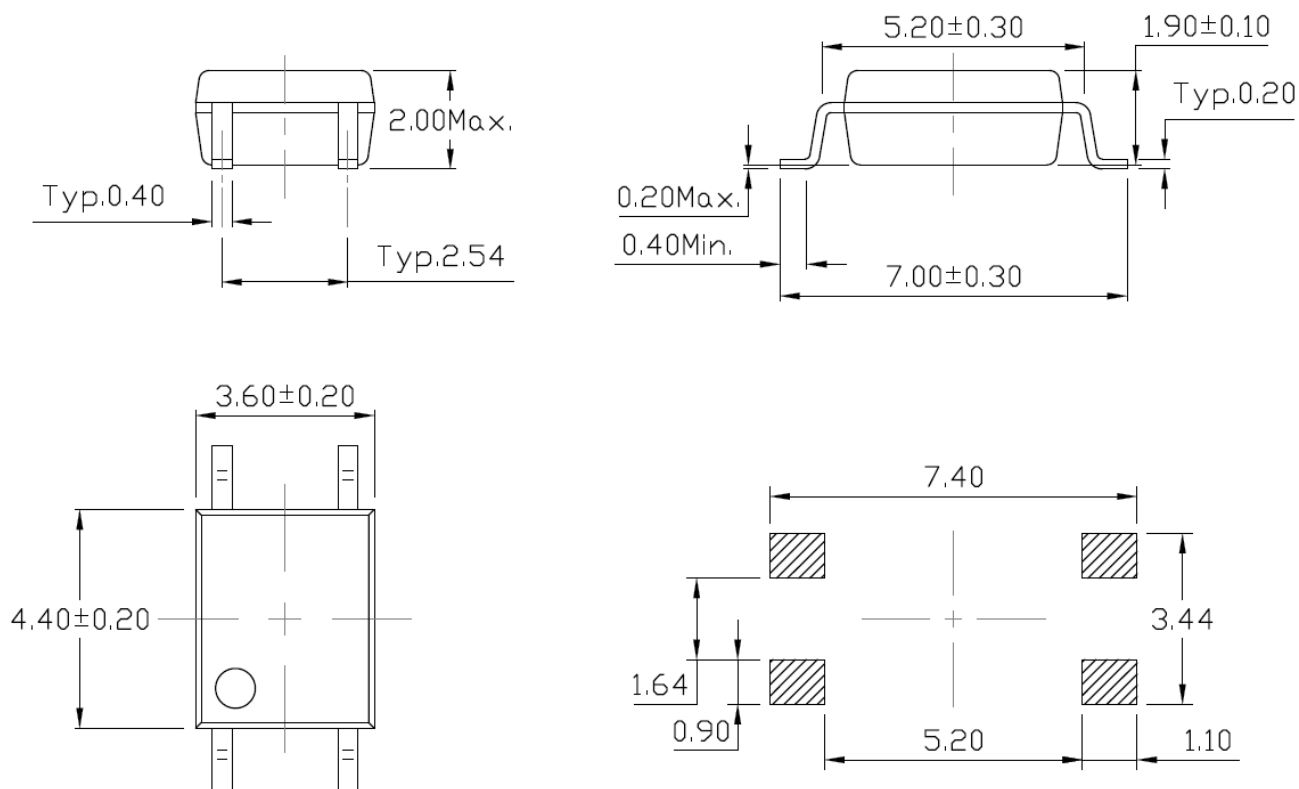




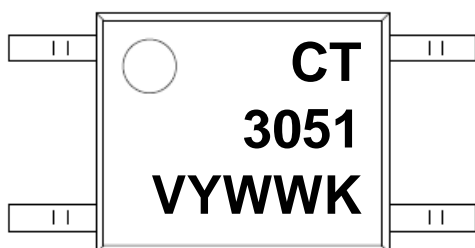
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Package Dimension *Dimensions in mm unless otherwise stated*



Marking Information



Note:

- CT : Denotes "CT Micro"
- 3051 : Part Number
- V : VDE Safety Mark Option (Blank or V)
- Y : One Digit Year Code
- WW : Two Digit Work Week
- K : Manufacturing Code



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Ordering Information

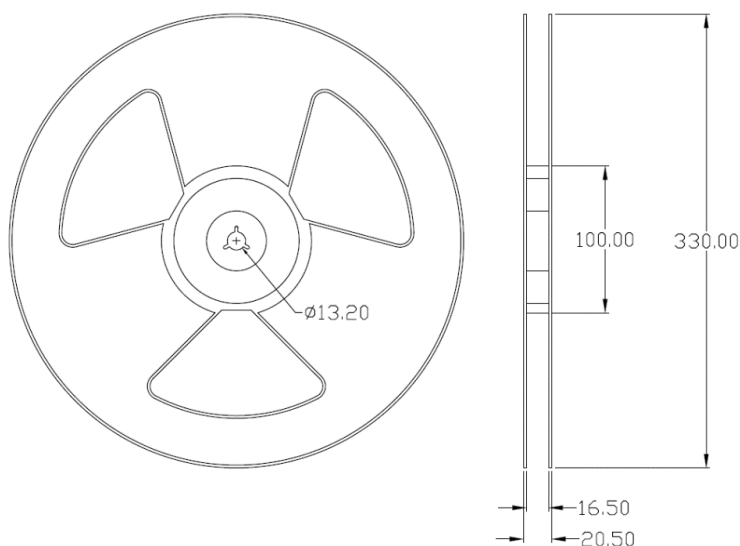
CTM305X(V)(Z)

| | |
|------|--|
| CT | = Denotes "CT Micro" |
| 305X | = Part No. (CT305X:0,1,2) |
| V | = VDE Safety Mark Option (Blank or V) |
| Y | = Lead Form Option (Blank or MFP) |
| Z | = Tape and Reel Option (Blank, T1 or T2) |
| G | = Material Option (G: Halogen Free, Blank: Non-Halogen Free) |

| Option | Description | Quantity |
|--------|---|-----------------|
| T1 | Surface Mount Lead Forming – With Option 1 Taping | 3000 Units/Reel |
| T2 | Surface Mount Lead Forming – With Option 2 Taping | 3000 Units/Reel |

Reel Dimension *All dimensions are in mm, unless otherwise stated*

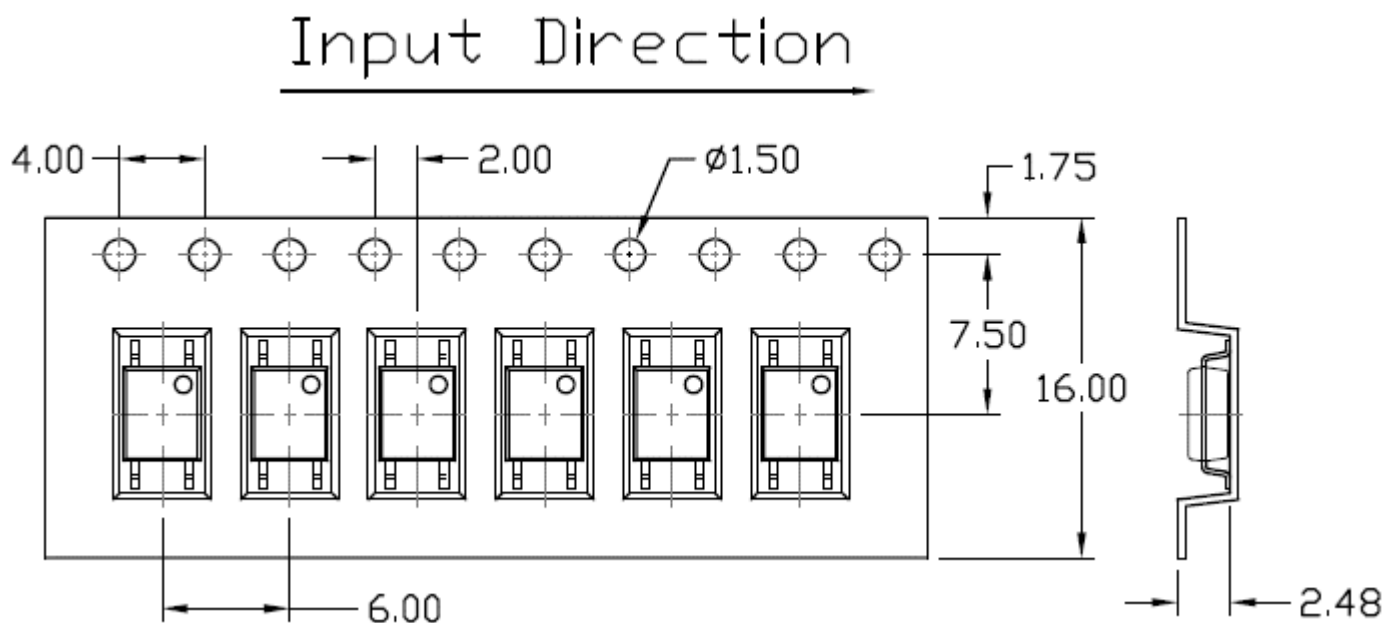
Option T1/T2



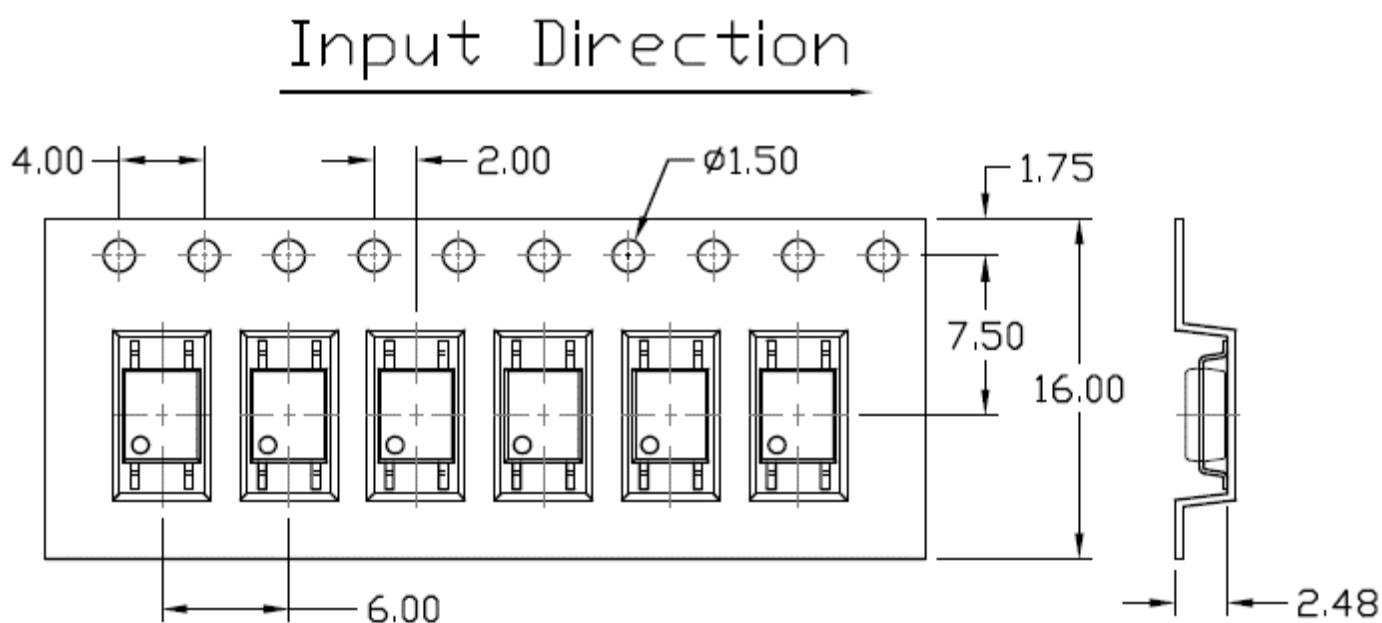


Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option T1



Option T2





Solderability spec (Follow the JEDEC standard JESD22-B102)

Reflow Soldering: Immersed surface, other than the end of pin as cut-surface, must be covered by solder.

Solder-Bath: More than 95% of the electrode must be covered with solder.

Wave soldering (Follow the JEDEC standard JESD22-A111)

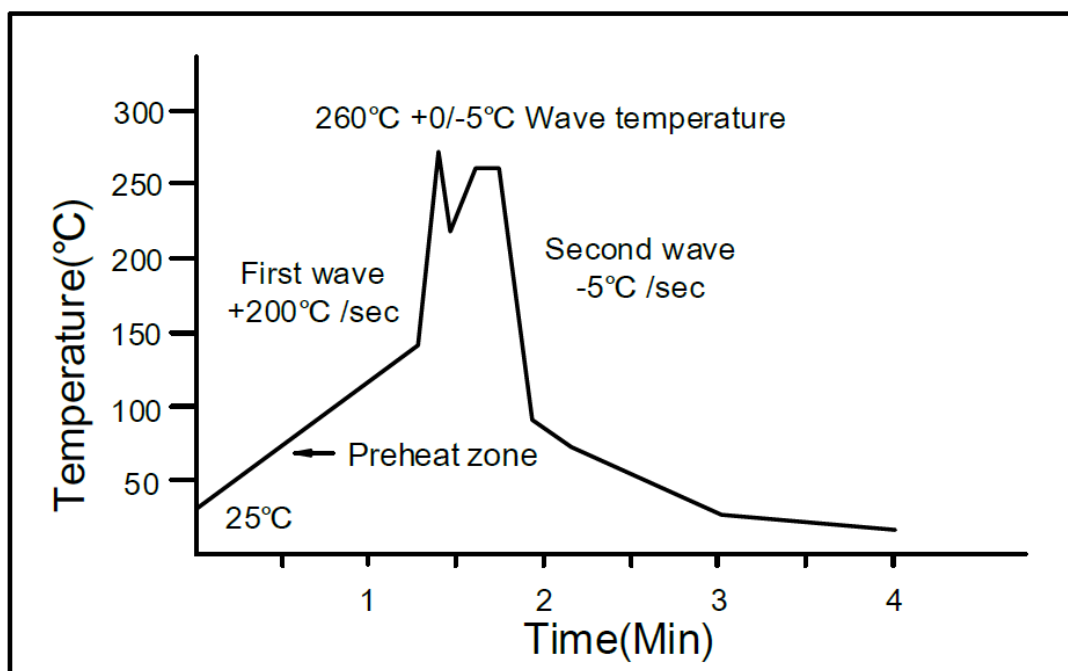
One time soldering is recommended within the condition of temperature.

Temperature: $260 \pm 0/-5^{\circ}\text{C}$.

Time: 10 sec.

Preheat temperature: 25 to 140°C .

Preheat time: 30 to 80 sec.



Iron soldering (Follow the standard MIL-STD 202G, Method 210F)

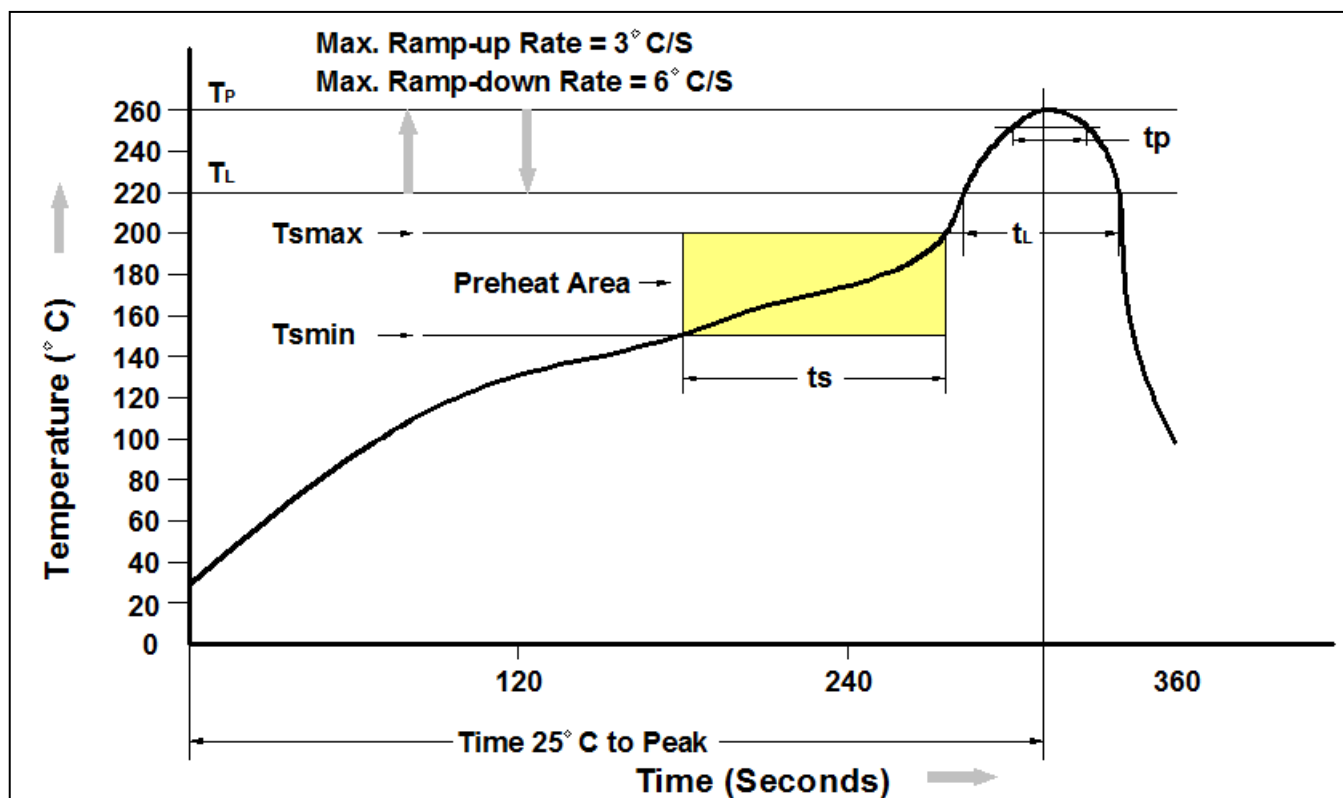
Allow single lead soldering in every single process.

One time soldering is recommended. Temperature: $350 \pm 10^{\circ}\text{C}$

Time: 5 sec max.



Reflow Profile (Follow the JEDEC standard J-STD-020)



| Profile Feature | Pb-Free Assembly Profile |
|---------------------------------|--------------------------|
| Temperature Min. (Tsmin) | 150°C |
| Temperature Max. (Tsmax) | 200°C |
| Time (ts) from (Tsmin to Tsmax) | 60-120 seconds |
| Ramp-up Rate (tL to tP) | 3°C/second max. |
| Liquidous Temperature (TL) | 217°C |
| Time (tL) Maintained Above (TL) | 60 – 150 seconds |
| Peak Body Package Temperature | 260°C +0°C / -5°C |
| Time (tP) within 5°C of 260°C | 30 seconds |
| Ramp-down Rate (TP to TL) | 6°C/second max |
| Time 25°C to Peak Temperature | 8 minutes max. |



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