



CTT0223, CTT1223, CTT2223, CTT3223

600V Random Phase High Power Photo TRIAC

Features

- High isolation 5000 VRMS
- Supports 0.3 A, 0.6 A, 0.9 A and 1.2 A
- RoHS and REACH Compliance
- External creepage distance $\geq 7.0\text{mm}$
- Distance Through Isolation $\geq 0.4\text{mm}$
- External Creepage $\geq 8\text{mm}$ (S/SL Type)
- RoHS and REACH compliance
- Halogen Free compliance
- MSL class 1
- Regulatory Approvals
 - ✓ UL - UL1577 (E364000)
 - ✓ VDE - EN60747-5-5(40039590)
 - ✓ CQC – GB4943.1, GB8898 (14001104779)
 - ✓ IEC62368 (FI/41119)

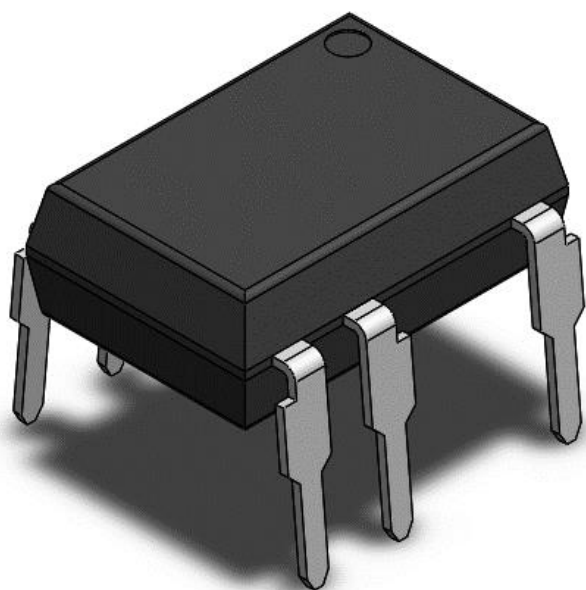
Description

The random phase power Triac consists of a Triac and a photo-Triac, which is optically coupled to an Infrared emitting diode, and house in a 7-lead DIP package. It also comes with different lead forming options.

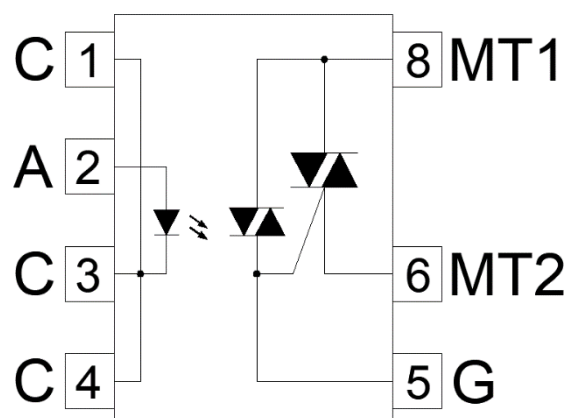
Applications

- Home appliances
- Industrial equipment
- Switching motors, fans, heaters, solenoids and valves.
- Power control such as lighting and temperature control

Package Outline



Schematic



Note: Different bending options available. See package dimension.



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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, R.H.=40~60%) | 5000 | Vrms | |
| T_{OPR} | Operating temperature | -40 ~+85 | °C | |
| T_{STG} | Storage temperature | -40 ~+125 | °C | |
| T_{SOL} | Soldering temperature (For 10 Seconds) | 260 | °C | |
| | Wave soldering temperature | 260 | °C | |
| Emitter | | | | |
| I_F | LED forward current | 50 | mA | |
| I_{FP} | Peak transient current ($\leq 1\mu\text{s P.W, 300pps}$) | 1 | A | |
| V_R | LED reverse voltage | 6 | V | |
| P_{in} | Power dissipation | 75 | mW | |
| Detector | | | | |
| V_{DRM} | Repetitive peak OFF-state voltage | 600 | V | |
| $I_{T(RMS)}$ | Continuous Current Load | CTT0223 | 0.3 | A |
| | | CTT1223 | 0.6 | |
| | | CTT2223 | 0.9 | |
| | | CTT3223 | 1.2 | |
| I_{TSM} | Peak Current Load (60Hz, 1 cycle) | CTT0223 | 3 | A |
| | | CTT1223 | 6 | |
| | | CTT2223 | 9 | |
| | | CTT3223 | 12 | |
| P_{out} | Power dissipation | 800 | mW | |
| P_T | Total power dissipation | 850 | mW | |
| R_{thJ-A} | Thermal Resistance Junction-Ambient | 120 | °C/W | |



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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 | $I_F = 10\text{mA}$ | - | - | 1.4 | 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 | μA | |
| V_{TM} | Peak On-State Voltage | $I_F = \text{Rated } I_{FT}$, $I_{TM} = \text{Max.}$ | - | - | 2.5 | V | |
| dv/dt | Critical Rate of Rise off-State Voltage | $V_{PEAK} = \text{Rated } V_{DRM}$ | 200 | - | - | $\text{V}/\mu\text{s}$ | |

Transfer Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|----------|-----------------------|--|--------------------|------|-----|---------------|-------|
| I_{FT} | Input Trigger Current | Terminal Voltage = 3V | - | - | 10 | mA | |
| I_H | Holding Current | Terminal Voltage from "ON" to "OFF" "ON" state $I_F = 0\text{mA}$ | - | - | 25 | mA | |
| T_{on} | Turn On Time | $I_F = 20\text{mA}$, $V_D = 6\text{V}$, $R_L = 100\ \Omega$ | - | 10 | 100 | μs | |
| R_{IO} | Isolation Resistance | $V_{IO} = 500\text{V}_{DC}$, R.H.=40~60% | 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

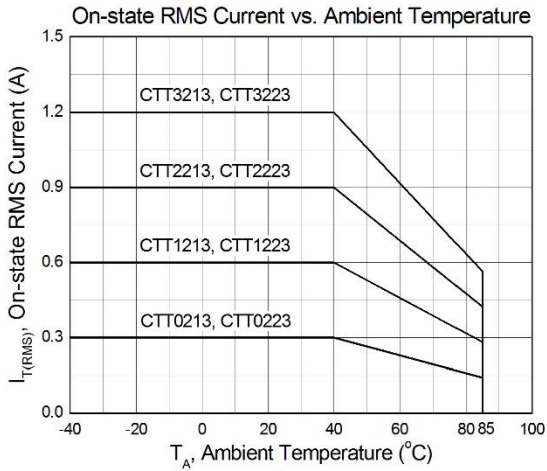


Figure 1

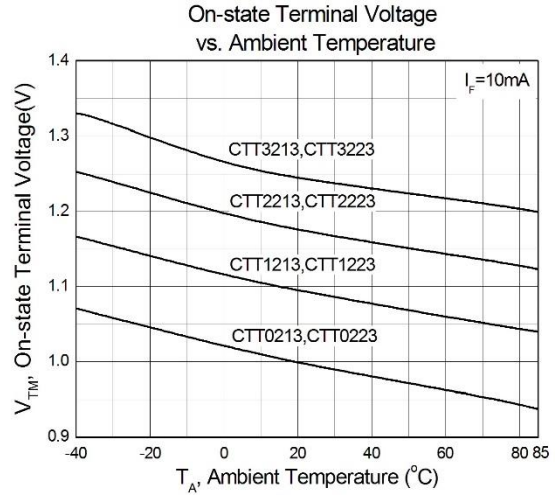


Figure 2

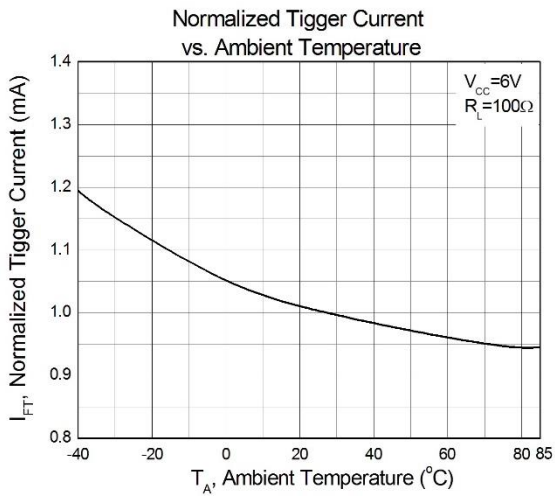


Figure 3

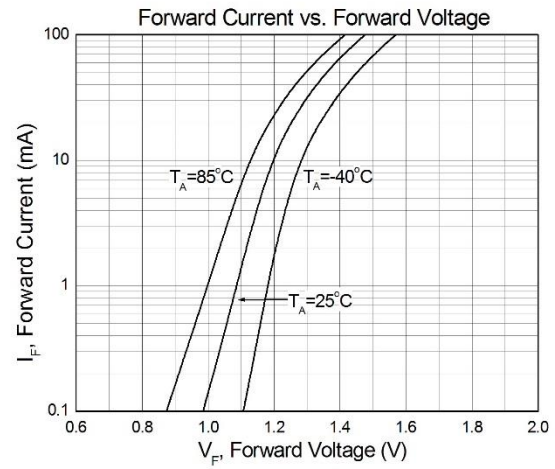


Figure 4

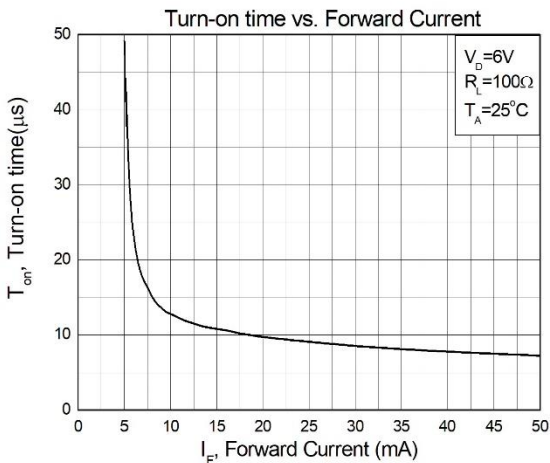


Figure 5

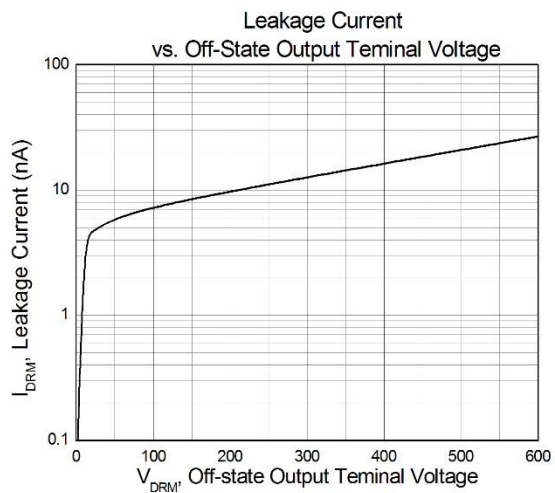


Figure 6



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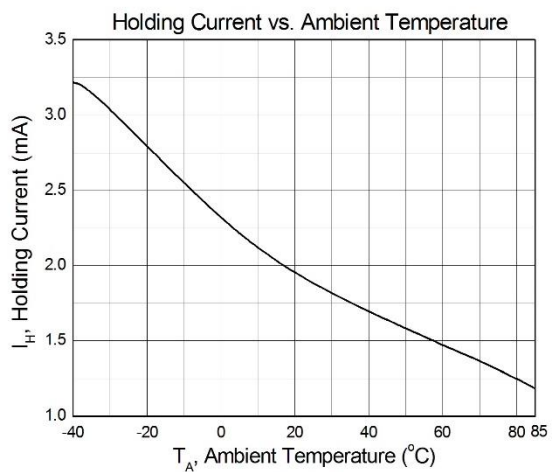


Figure 7



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Test Circuit

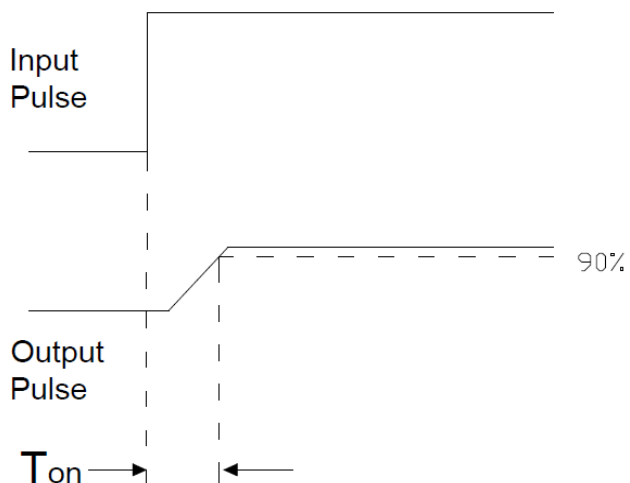


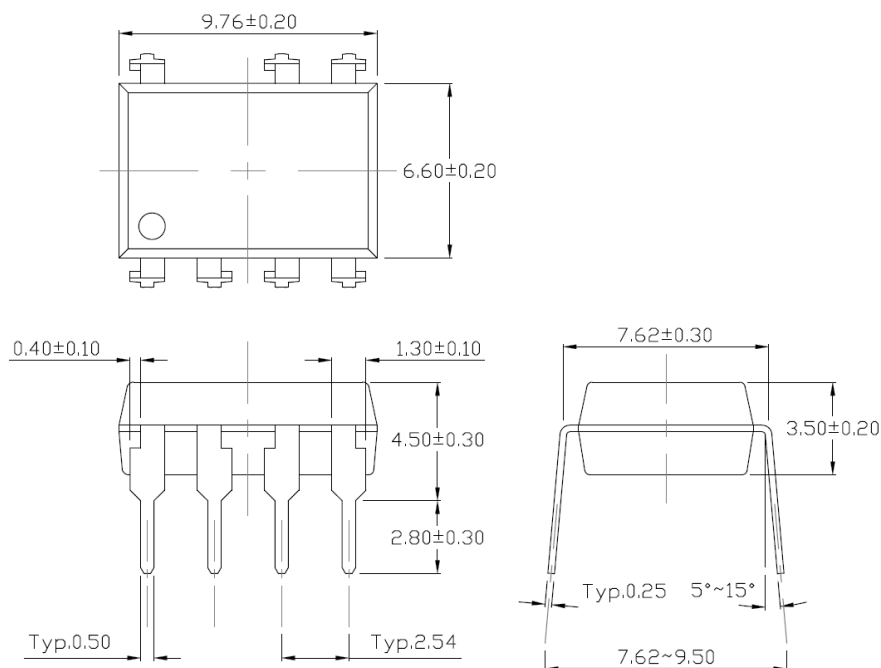
Figure 8: Turn On Time



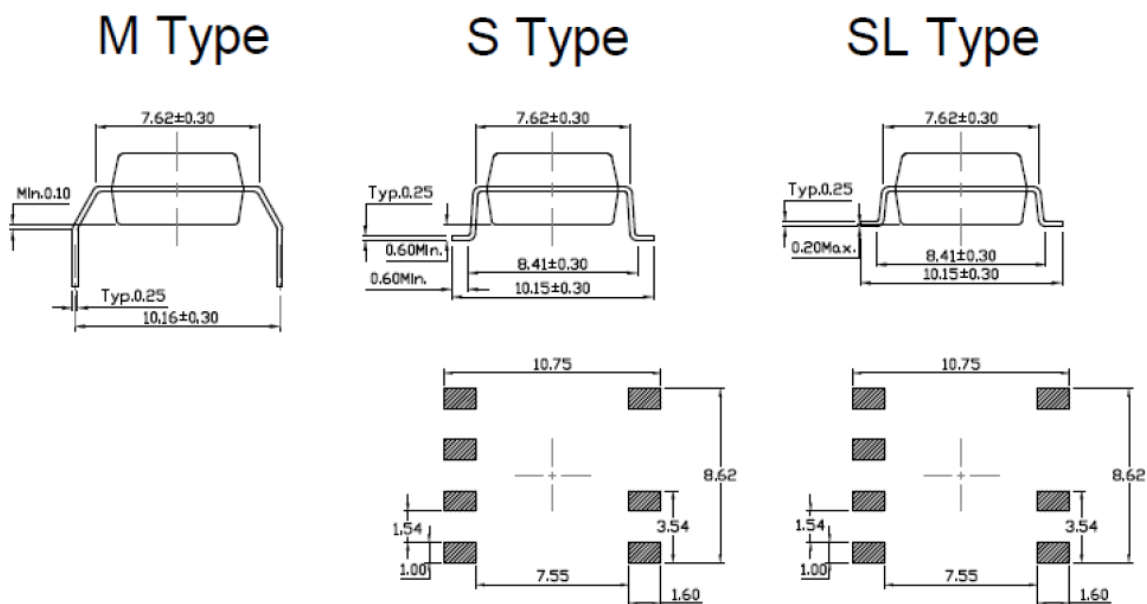
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Package Dimension *Dimensions in mm unless otherwise stated*



Forming Option



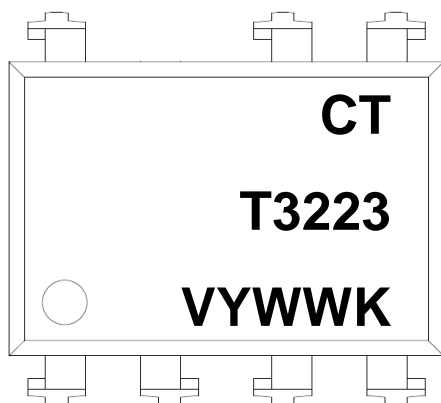


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Marking Information



Note:

- CT : Denotes "CT Micro"
- T3223: Part Number
- V : VDE Safety Mark Option (Blank or V)
- Y : One Digit Year Code
- WW : Two Digit Work Week
- K : Manufacturing Code

Ordering Information

CTTX223(V)(Y)(Z)

- CT = Denotes "CT Micro"
- TX223 = Product Number (Current Rating Option X=0, 1, 2, or 3)
- V = VDE Safety Mark Option (Blank or V)
- Y = Lead Form Option (Blank, S, SL or M)
- Z = Tape and Reel Option (Blank, T1 or T2)

| Option | Description | Quantity |
|---------------|--|-----------------|
| None | Standard 8 Pin Dip | 40 Units/Tube |
| M | Gullwing (400mil) Lead Forming | 40 Units/Tube |
| S(T1) | Surface Mount Lead Forming – With Option 1 Taping | 1000 Units/Reel |
| S(T2) | Surface Mount Lead Forming – With Option 2 Taping | 1000 Units/Reel |
| SL(T1) | Surface Mount (Low Profile) Lead Forming– With Option 1 Taping | 1000 Units/Reel |
| SL(T2) | Surface Mount (Low Profile) Lead Forming– With Option 2 Taping | 1000 Units/Reel |

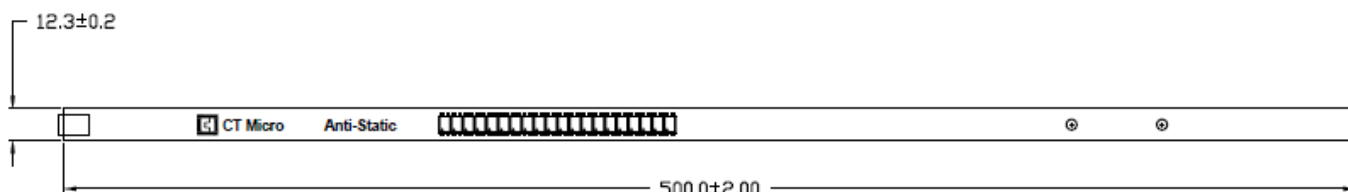


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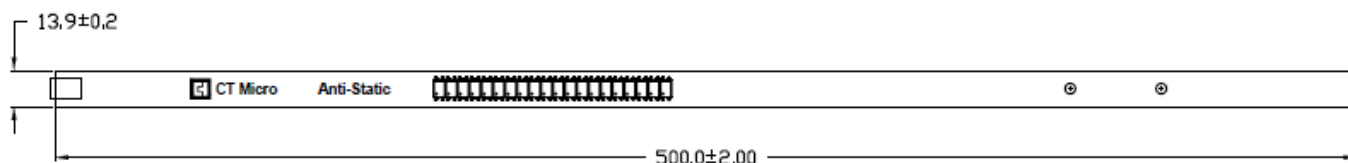
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Carrier Specifications *Dimensions in mm unless otherwise stated*

Tube Option Standard DIP

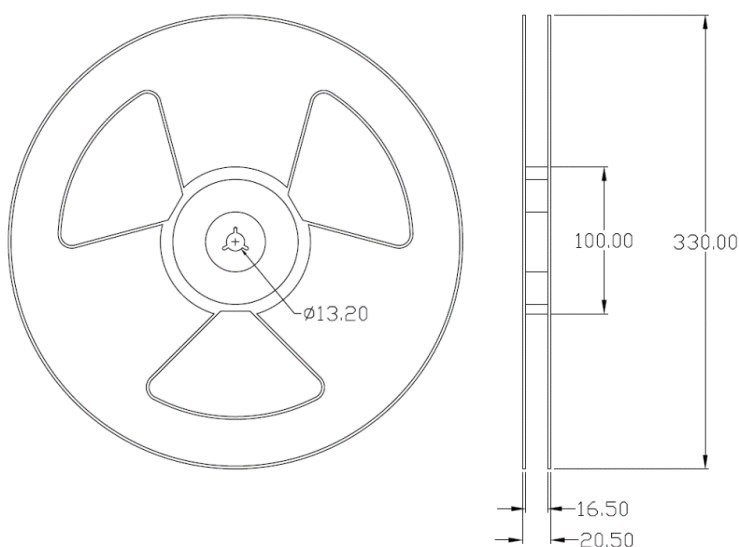


Tube Option M Type



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

Option S(T1/T2) & SL(T1/T2)





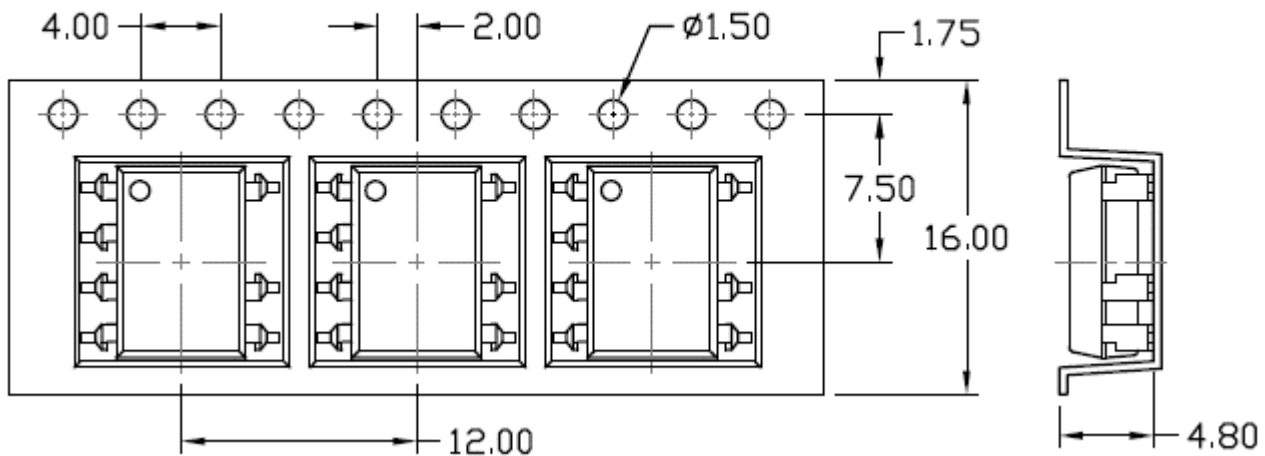
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Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

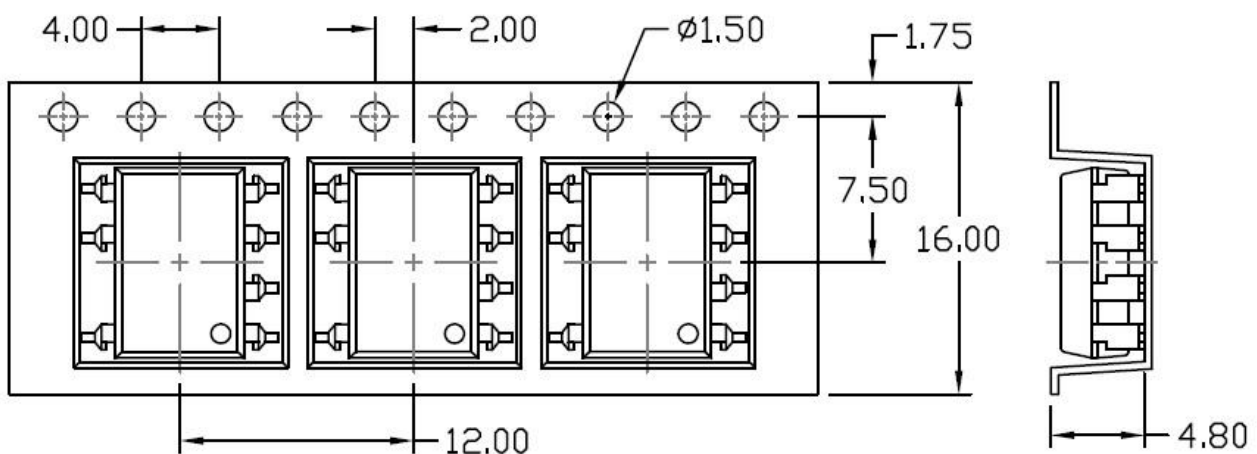
Option S(T1) & SL(T1)

Input Direction
→



Option S(T2) & SL(T2)

Input Direction
→





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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)

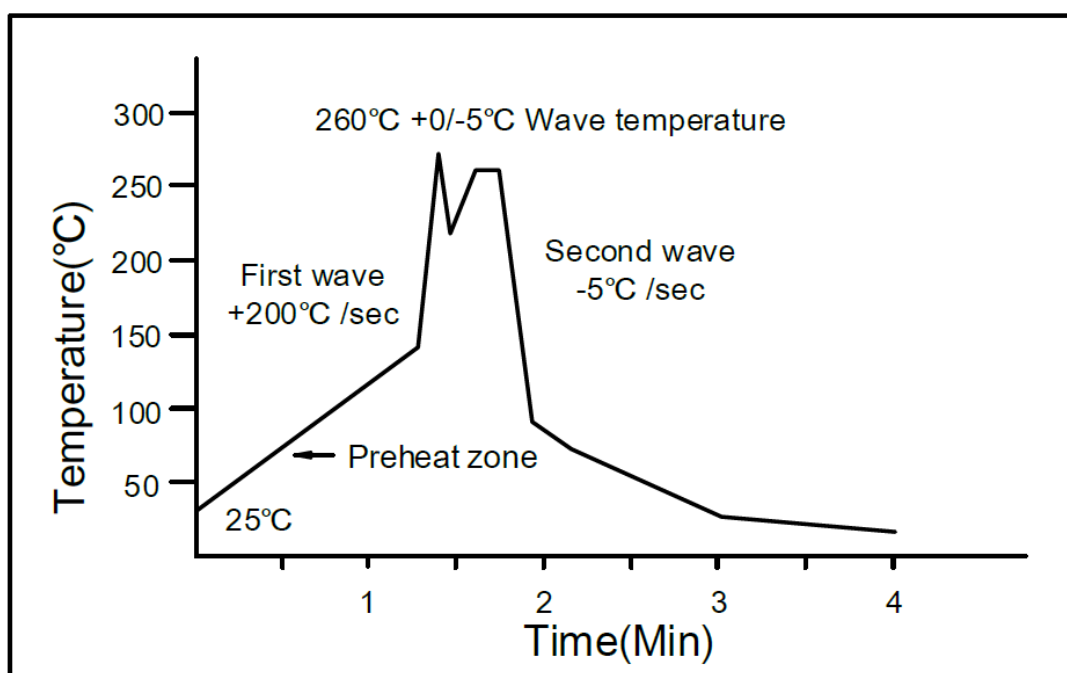
One time soldering is recommended within the condition of temperature.

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: $350 \pm 10^\circ\text{C}$

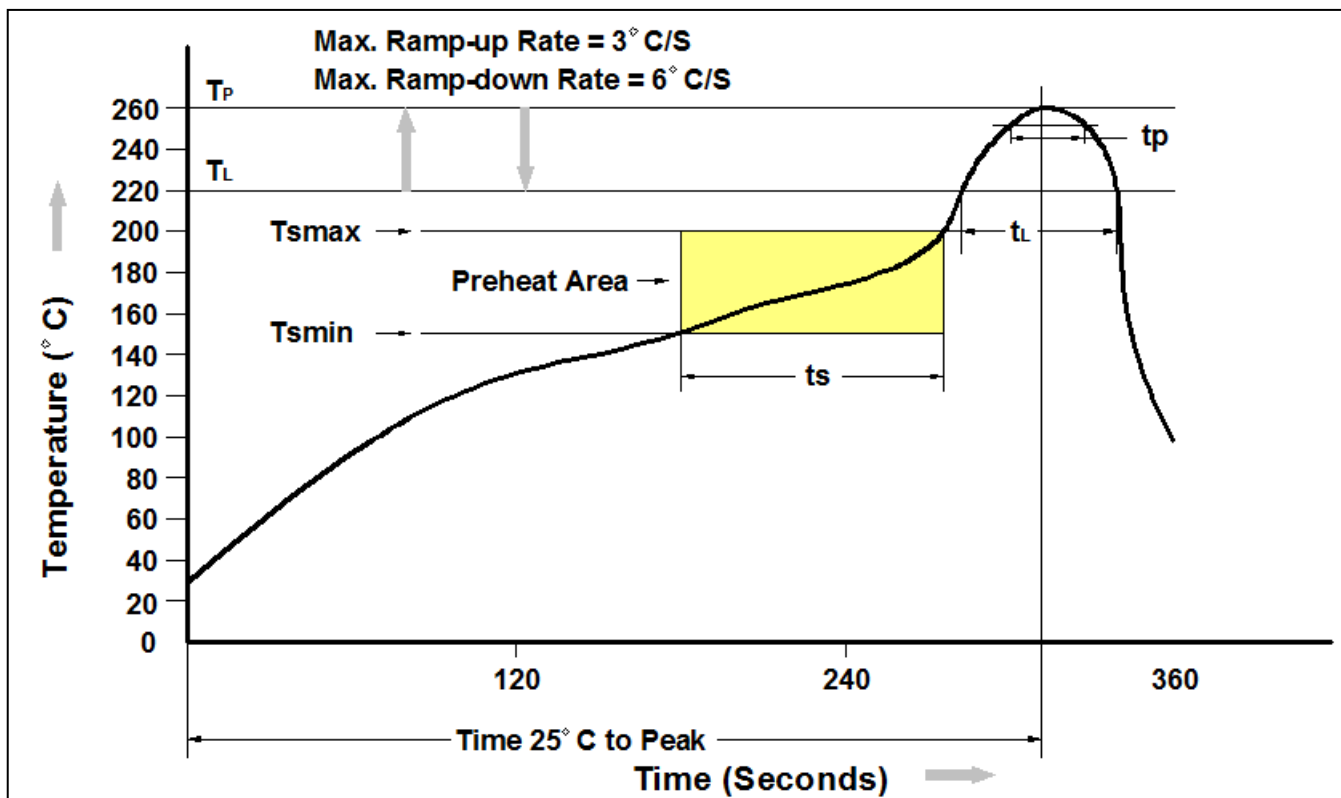
Time: 5 sec max.



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



| Profile Feature | Pb-Free Assembly Profile |
|---|--------------------------|
| Temperature Min. (T _{smin}) | 150°C |
| Temperature Max. (T _{smax}) | 200°C |
| Time (t _s) from (T _{smin} to T _{smax}) | 60-120 seconds |
| Ramp-up Rate (t _L to t _P) | 3°C/second max. |
| Liquidous Temperature (T _L) | 217°C |
| Time (t _L) Maintained Above (T _L) | 60 – 150 seconds |
| Peak Body Package Temperature | 260°C +0°C / -5°C |
| Time (t _P) within 5°C of 260°C | 30 seconds |
| Ramp-down Rate (T _P to T _L) | 6°C/second max |
| Time 25°C to Peak Temperature | 8 minutes max. |



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