



# CTT0213, CTT1213, CTT2213, CTT3213

## 600V Zero Cross High Power Photo TRIAC

### Features

- High isolation 5000 VRMS
- Supports 0.3 A, 0.6 A, 0.9 A and 1.2 A
- RoHS compliant
- REACH compliance
- External creepage > 7.5mm
- Internal creepage > 6.0mm
- Insulation distance > 0.4mm
- Regulatory Approvals
  - UL - UL1577 (pending approval)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

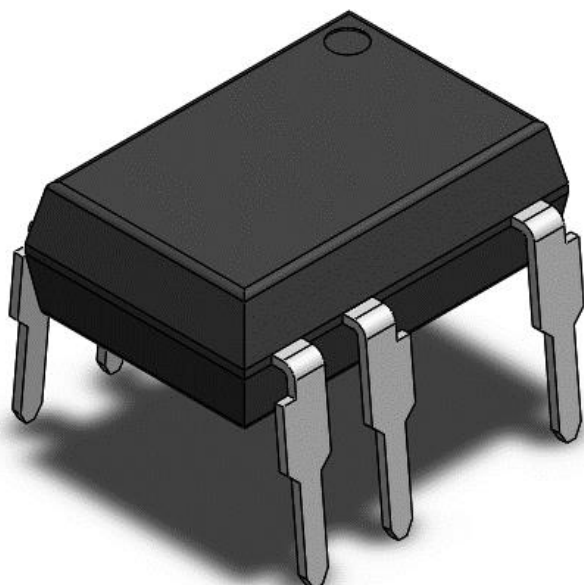
### Description

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

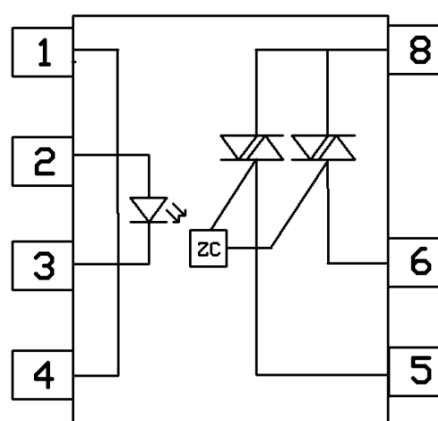
### Applications

- Home appliances
- Industrial equipment

### Package Outline



### Schematic



Note: Different bending options available. See package dimension.



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### Absolute Maximum Rating at 25°C

| <b>Symbol</b>       | <b>Parameters</b>                 | <b>Ratings</b> | <b>Units</b> | <b>Notes</b> |
|---------------------|-----------------------------------|----------------|--------------|--------------|
| V <sub>iso</sub>    | Isolation voltage                 | 5000           | Vrms         |              |
| T <sub>OPR</sub>    | Operating temperature             | -40 ~+85       | °C           |              |
| T <sub>STG</sub>    | Storage temperature               | -40 ~+125      | °C           |              |
| T <sub>SOL</sub>    | Soldering temperature             | 260            | °C           |              |
|                     | Wave soldering temperature        | 260            | °C           |              |
| <b>Emitter</b>      |                                   |                |              |              |
| I <sub>F</sub>      | LED forward current               | 50             | mA           |              |
| V <sub>R</sub>      | LED reverse voltage               | 6              | V            |              |
| I <sub>FP</sub>     | Peak forward current              | 1              | A            |              |
| P <sub>in</sub>     | Power dissipation                 | 75             | mW           |              |
| <b>Detector</b>     |                                   |                |              |              |
| V <sub>DRM</sub>    | Repetitive peak OFF-state voltage | 600            | V            |              |
| I <sub>T(RMS)</sub> | Continuous Current Load           | CTT02XX        | 0.3          | A            |
|                     |                                   | CTT12XX        | 0.6          |              |
|                     |                                   | CTT22XX        | 0.9          |              |
|                     |                                   | CTT32XX        | 1.2          |              |
| I <sub>TSM</sub>    | Peak Current Load                 | CTT02XX        | 3            | A            |
|                     |                                   | CTT12XX        | 6            |              |
|                     |                                   | CTT22XX        | 9            |              |
|                     |                                   | CTT32XX        | 12           |              |
| P <sub>out</sub>    | Power dissipation                 | 800            | mW           |              |
| P <sub>T</sub>      | Total power dissipation           | 850            | mW           |              |



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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   | $I_F = 10\text{mA}$ | -   | -   | 1.3 | V             |       |
| $I_R$    | Reverse Current   | $V_R = 6\text{V}$   | -   | -   | 5   | $\mu\text{A}$ |       |
| $C_{IN}$ | Input Capacitance | $f = 1\text{MHz}$   | -   | 45  | -   | pF            |       |

#### Detector Characteristics

| Symbol     | Parameters                              | Test Conditions  | Min | Typ | Max | Units                  | Notes |
|------------|---|--|-----|-----|-----|------------------------|-------|
| $I_{DRM1}$ | Peak Blocking Current                   | $I_F = 0\text{mA}$ , $V_{DRM} = 600\text{V}$           | -   | -   | 100 | $\mu\text{A}$          |       |
| $I_{DRM2}$ | Inhibit Leakage Current                 | $I_F = \text{Rated } I_{FT}$ , $V_{DRM} = 600\text{V}$ |     |     | 500 | $\mu\text{A}$          |       |
| $V_{INH}$  | Inhibit Voltage                         | $I_F = \text{Rated } I_{FT}$                           | -   | -   | 50  | V                      |       |
| $V_{TM}$   | 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 | $V_{PEAK} = \text{Rated } V_{DRM}$                     | 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       |                             | -                  | -    | 25  | mA       |       |
| $R_{IO}$ | Isolation Resistance  | $V_{IO} = 500\text{V}_{DC}$ | $1 \times 10^{11}$ | -    | -   | $\Omega$ |       |
| $C_{IO}$ | Isolation Capacitance | $f = 1\text{MHz}$           | -                  | 0.25 | -   | pF       |       |



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### Typical Characteristic Curves

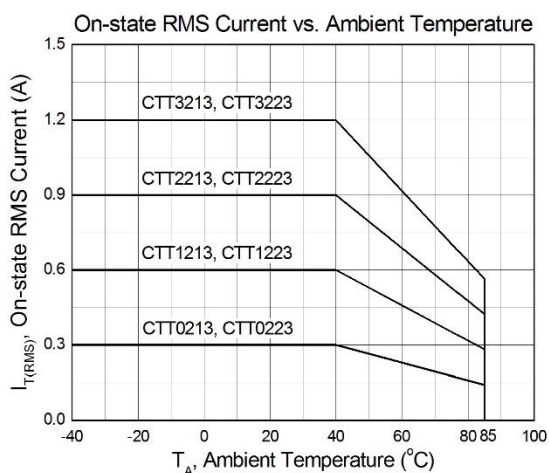


Figure 1

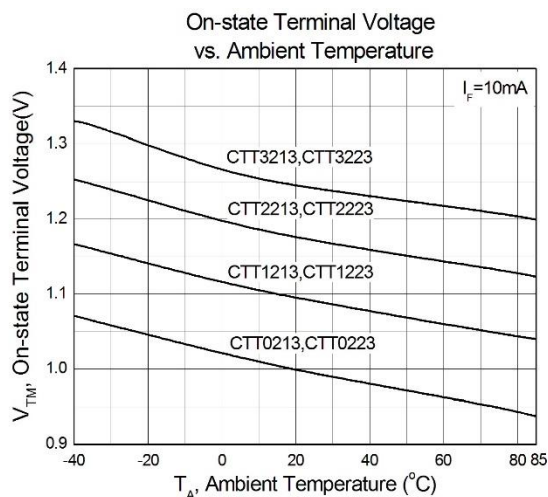


Figure 2

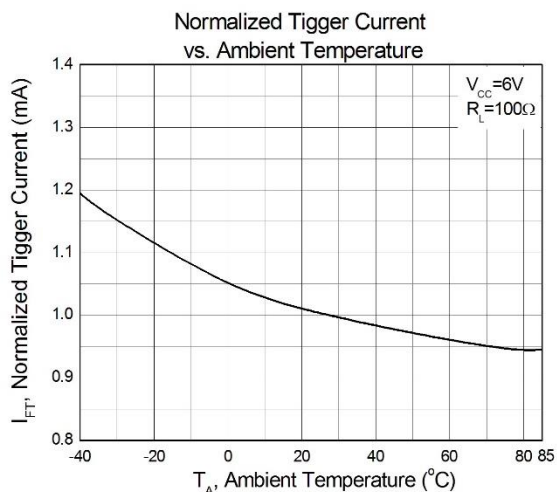


Figure 3

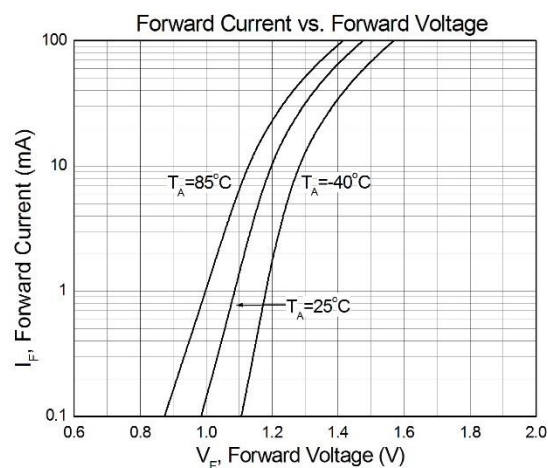


Figure 4

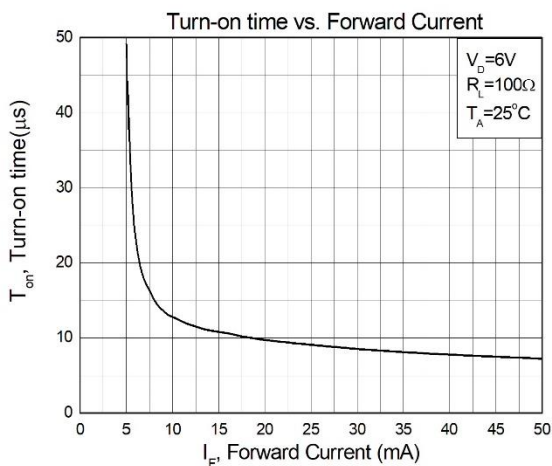


Figure 5

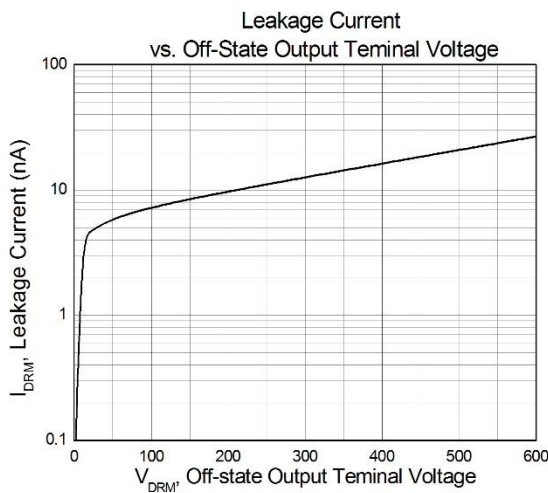


Figure 6



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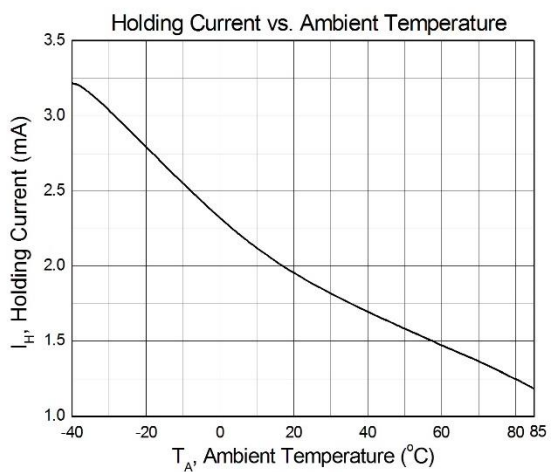


Figure 7

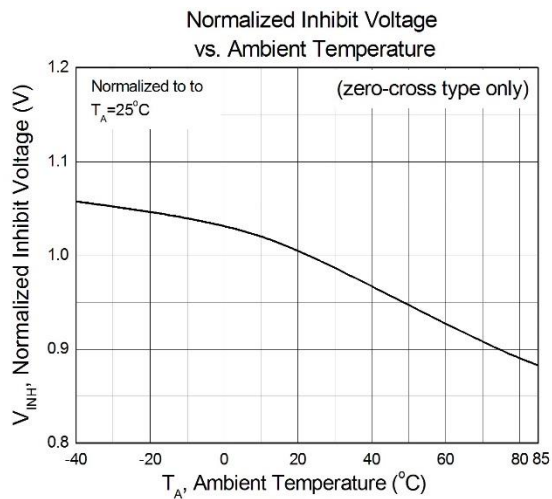


Figure 8

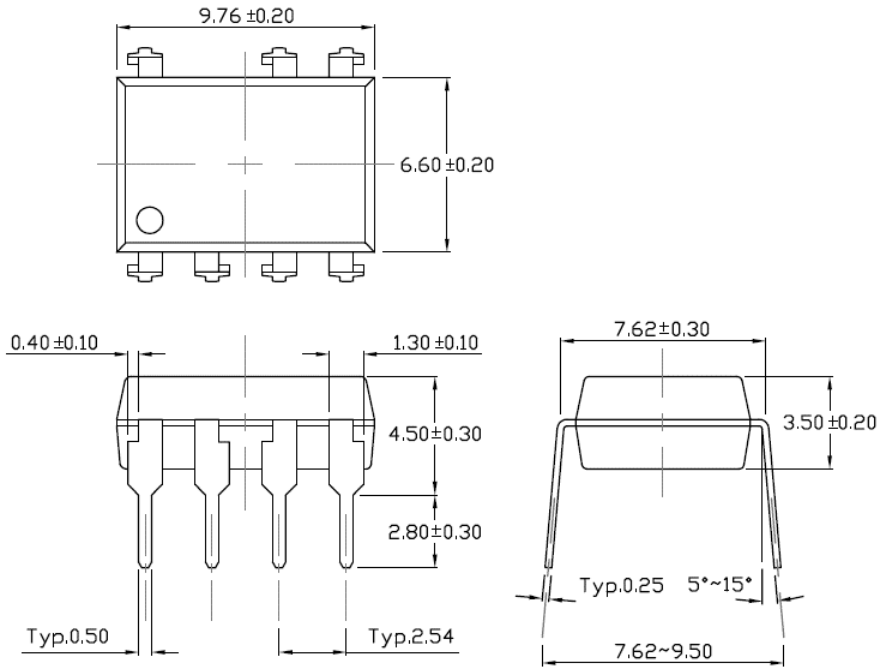


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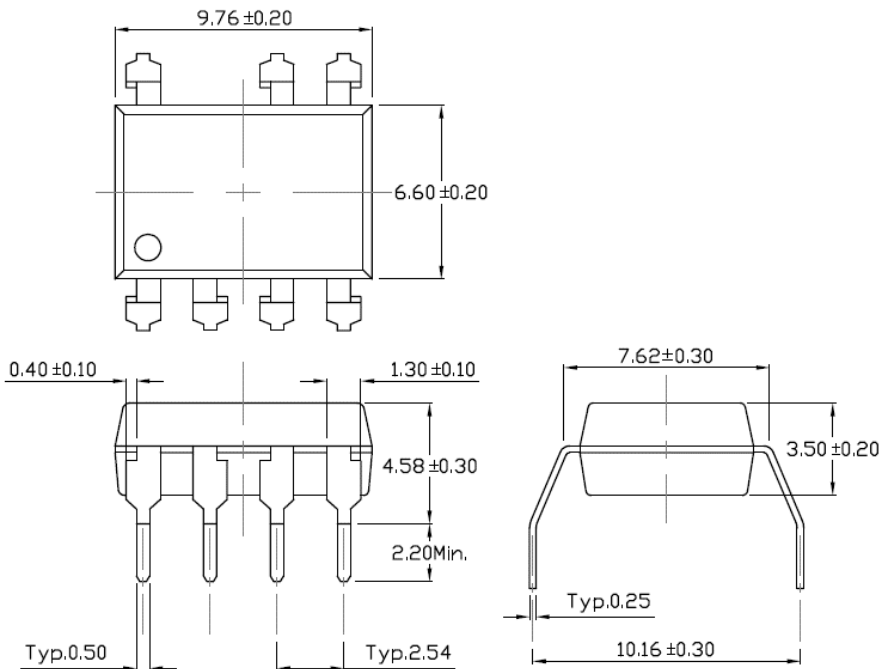
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### Package Dimension *Dimensions in mm unless otherwise stated*

#### Standard DIP – Through Hole



#### Gullwing (400mil) Lead Forming – Through Hole (M Type)

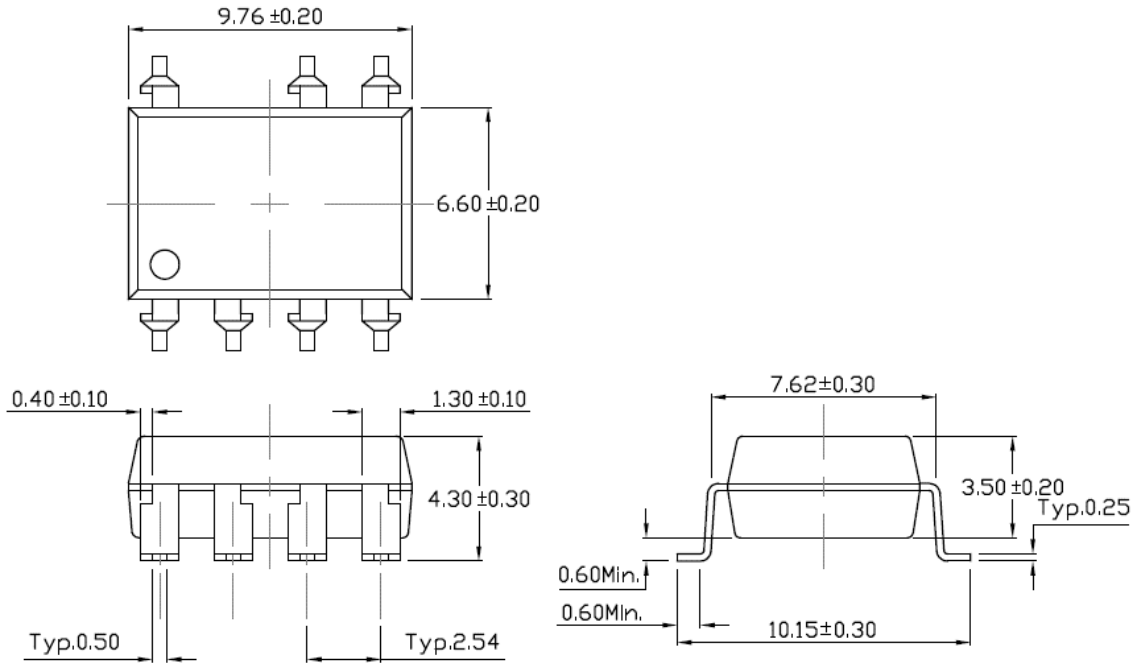




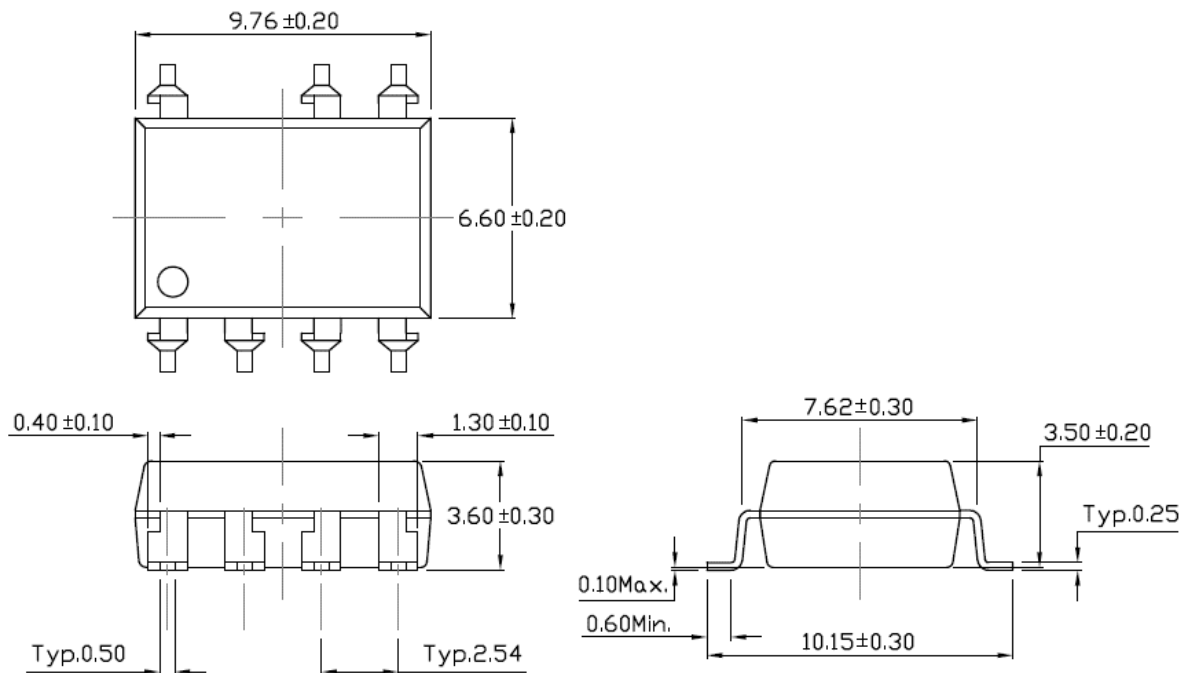
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### Surface Mount Lead Forming (S Type)



### Surface Mount (Low Profile) Lead Forming (SL Type)

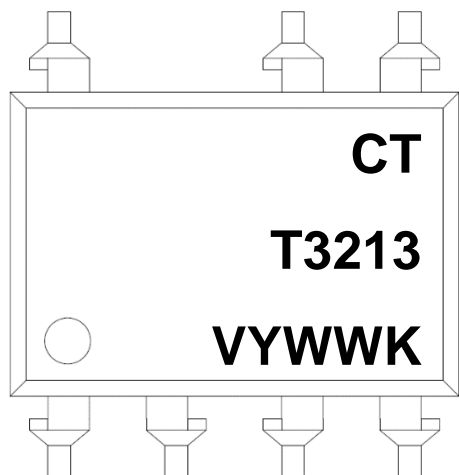




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## 600V Zero Cross High Power Photo TRIAC

### Device Marking



**Note:**

- CT : Denotes “CT Micro”
- T3213 : Product Number
- V : VDE Safety Mark (option)
- Y : Fiscal Year
- WW : Work Week
- K : Production Code

### Ordering Information

#### CTTX213(V)(Y)(Z)

- CT = Denotes “CT Micro”
- TX213 = Product Number (Current Rating Option X=0, 1, 2, or 3)
- V = VDE safety mark option (V, or none)
- Y = Lead form option (S, SL, M or none)
- Z = Tape and reel option (T1, T2 or none)

| <b>Option</b> | <b>Description</b>   | <b>Quantity</b> |
|---------------|--|-----------------|
| 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 |

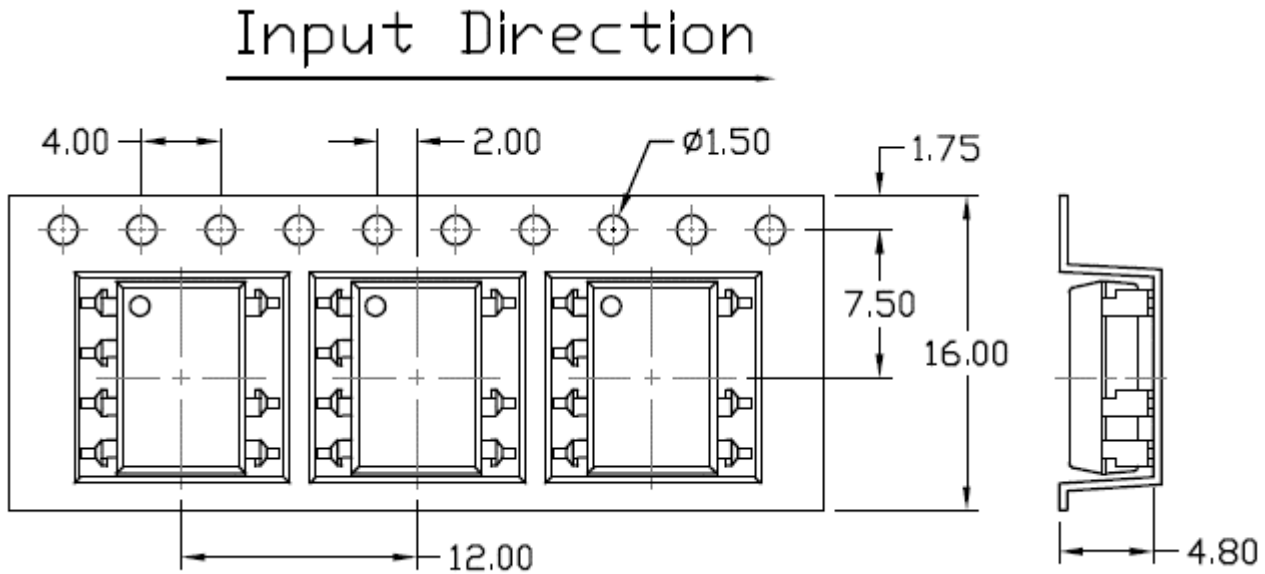




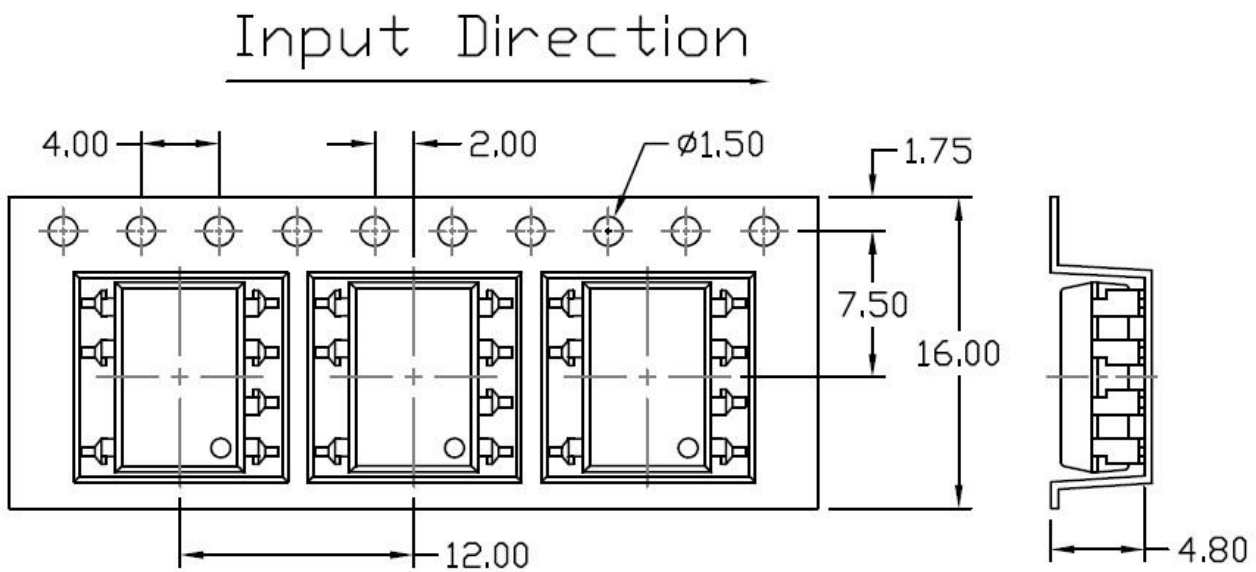
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## Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

### Option S(T1) & SL(T1)



### Option S(T2) & SL(T2)





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### Wave soldering (JEDEC22A111 compliant)

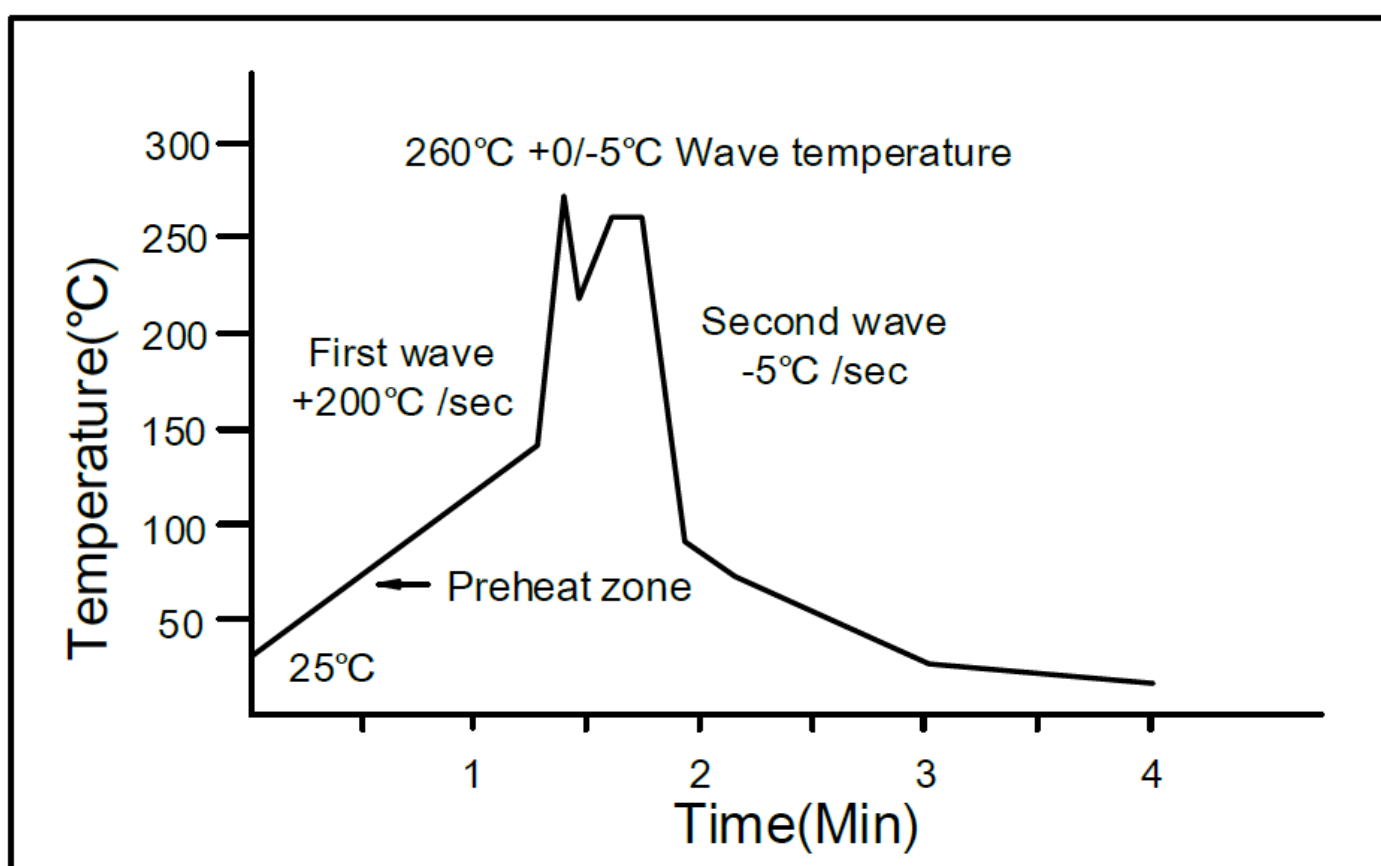
One time soldering is recommended within the condition of temperature.

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

Time: 10 sec.

Preheat temperature: 25 to  $140^\circ\text{C}$ .

Preheat time: 30 to 80 sec.



### Hand soldering by soldering iron

Allow single lead soldering in every single process.

One time soldering is recommended. Temperature:  $350 \pm 5^\circ\text{C}$

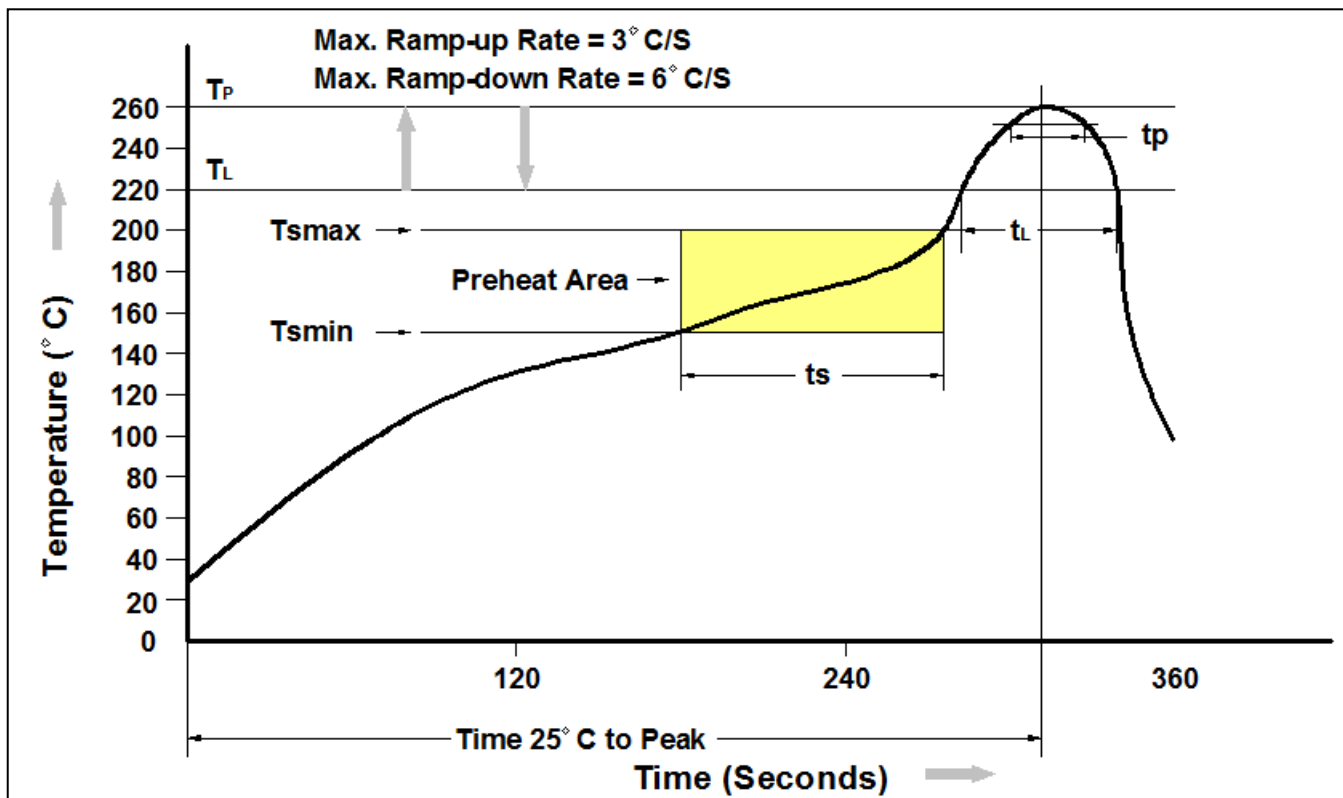
Time: 3 sec max.



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### Reflow Profile



| Profile Feature                   | Pb-Free Assembly Profile |
|-----------------------------------|--------------------------|
| Temperature Min. (Tsmmin)         | 150°C                    |
| Temperature Max. (Tsmmax)         | 200°C                    |
| Time (ts) from (Tsmmin to Tsmmax) | 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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