# CT303X, CT304X, CT306X, CT308X

# 6Pin Zero Cross TRIAC Driver Coupler

**CT Micro**

## Features

- High isolation 5000 VRMS
- Peak Breakdown Voltage
  - 250V – CT303X
  - 400V – CT304X
  - 600V – CT306X
  - 800V – CT308X
- Temperature range - 55 °C to 100 °C

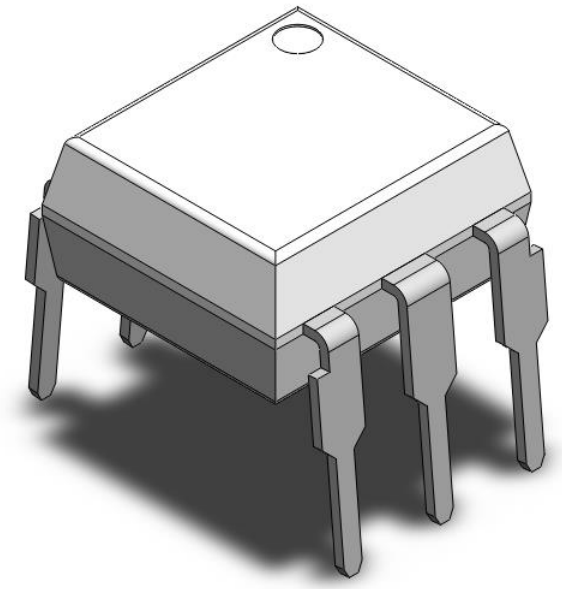
## Description

The CT303X, CT304X, CT306X and CT308X series consists of a Zero Cross Photo Triac optically coupled to a gallium arsenide Infrared-emitting diode in a 6-lead DIP package with bending options.

## Applications

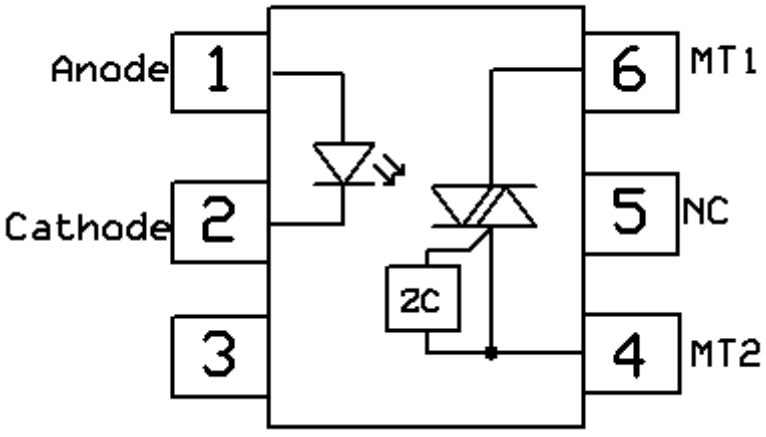
- Motor Controls
- Lamp ballasts
- Static AC Power Switch
- Solenoid/ Valve Control

## Package Outline



*Note: Different bending options available. See package dimension.*

## Schematic



## Absolute Maximum Rating at 25°C

| *Symbol* | *Parameters* | | *Ratings* | *Units* | *Notes* |
|---|---|---|---|---|---|
| $V_{ISO}$ | Isolation voltage | | 5000 | $V_{RMS}$ | |
| $T_{OPR}$ | Operating temperature | | -55 ~ +100 | °C | |
| $T_{STG}$ | Storage temperature | | -55 ~ +125 | °C | |
| $T_{SOL}$ | Soldering temperature | | 260 | °C | |
| **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 | CT303X | 250 | V | |
| | | CT304X | 400 | V | |
| | | CT306X | 600 | V | |
| | | CT308X | 800 | V | |
| $I_{TSM}$ | Peak Repetitive Surge Current | | 1 | A | |

## Electrical Characteristics $T_A$ = 25°C (unless otherwise specified)

### Emitter Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|---|---|---|---|---|---|---|---|
| $V_F$ | Forward voltage | $I_F$=10mA | | 1.2 | 1.4 | V | |
| $I_R$ | Reverse Current | $V_R$ = 6V | - | - | 5 | μA | |
| $C_{IN}$ | Input Capacitance | f= 1MHz | - | 45 | - | pF | |

### Detector Characteristics

| Symbol | Parameters | | Test Conditions | Min | Typ | Max | Units | Notes |
|---|---|---|---|---|---|---|---|---|
| $I_{DRM1}$ | Peak Blocking Current | CT303X, CT304X | $I_F$= 0mA, $V_{DRM}$= Rated $V_{DRM}$ | - | - | 100 | nA | |
| | | CT306X, CT308X | | - | - | 500 | | |
| $I_{DRM2}$ | Inhibit Leakage Current | | $I_F$= Rated $I_{FT}$, $V_{DRM}$= Rated $V_{DRM}$ | | | 500 | μA | |
| $V_{TM}$ | Peak On-State Voltage | | $I_F$= Rated $I_{FT}$, $I_{TM}$= 100mA | - | - | 3 | V | |
| dv/dt | Critical Rate of Rise off-State Voltage | CT303X, CT304X, CT306X | $V_{PEAK}$= Rated $V_{DRM}$ | 1000 | - | - | V/μs | |
| | | CT308X | $V_{PEAK}$ = 400V | 600 | - | - | | |

### Transfer Characteristics

| Symbol | Parameters | | Test Conditions | Min | Typ | Max | Units | Notes |
|---|---|---|---|---|---|---|---|---|
| $I_{FT}$ | Input Trigger Current | CT3031, CT3041, Ct3061, CT3081 | Terminal Voltage = 3V | - | - | 15 | V | |
| | | CT3032, CT3042, CT3062, CT3082 | | - | - | 10 | | |
| | | CT3033, CT3043, CT3063, CT3083 | | - | - | 5 | | |
| $I_H$ | Holding Current | | | - | 270 | - | μA | |
| $R_{IO}$ | Isolation Resistance | | $V_{IO}$= 500$V_{DC}$ | $1x10^{11}$ | | | Ω | |
| $C_{IO}$ | Isolation Capacitance | | f= 1Mhz | | 0.25 | | pF | |

## Typical Characteristic Curves

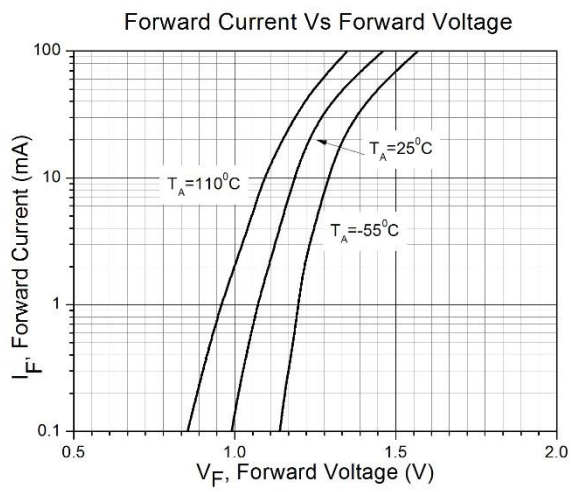



Figure 1

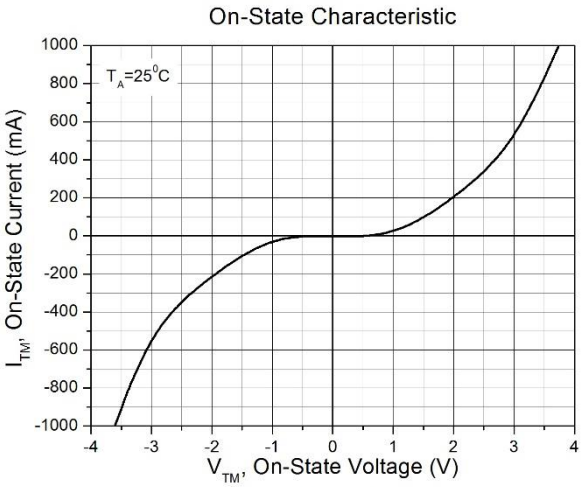



Figure 2

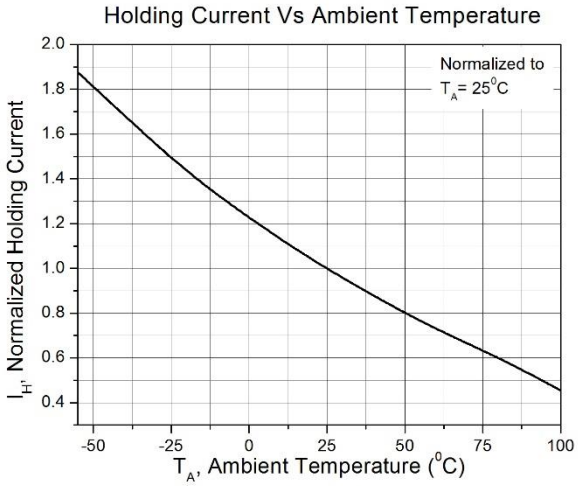



Figure 3

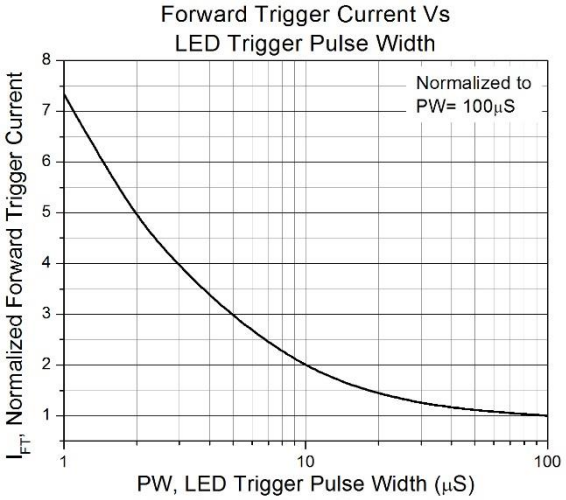



Figure 4

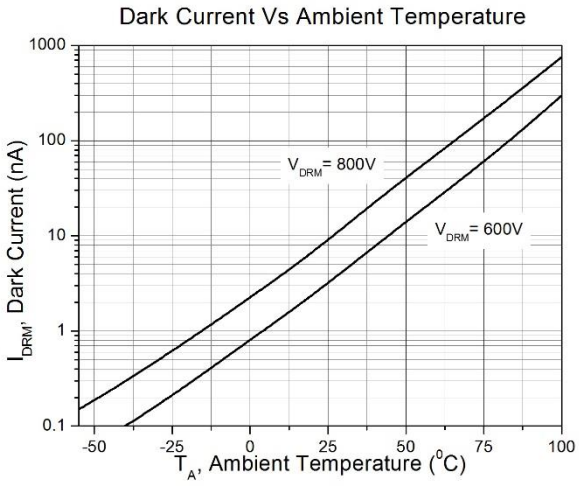



Figure 5

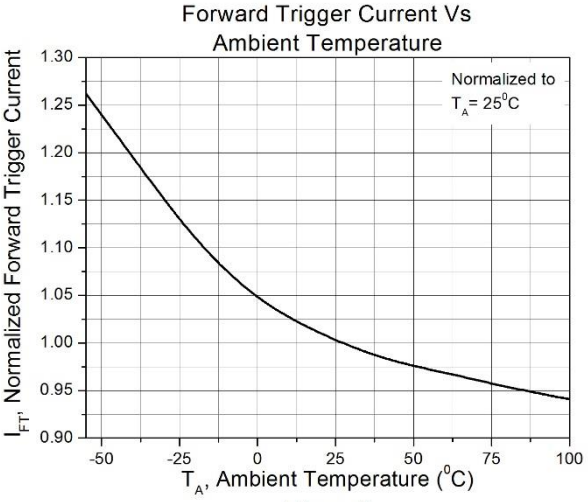



Figure 6

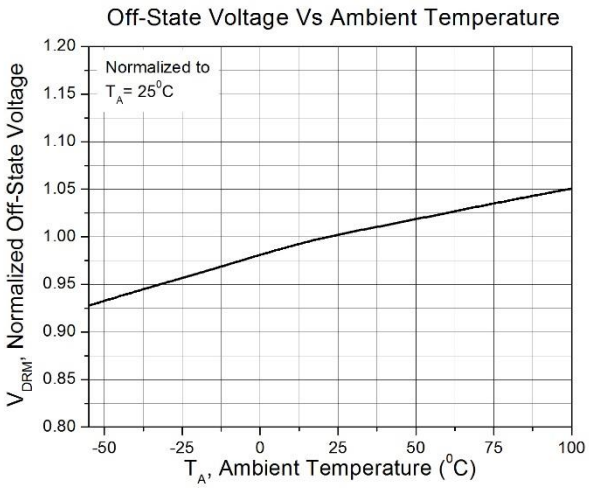



**Figure 7**

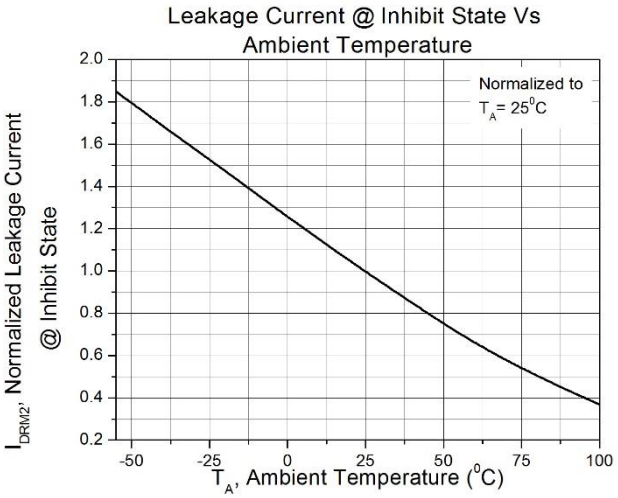



**Figure 8**

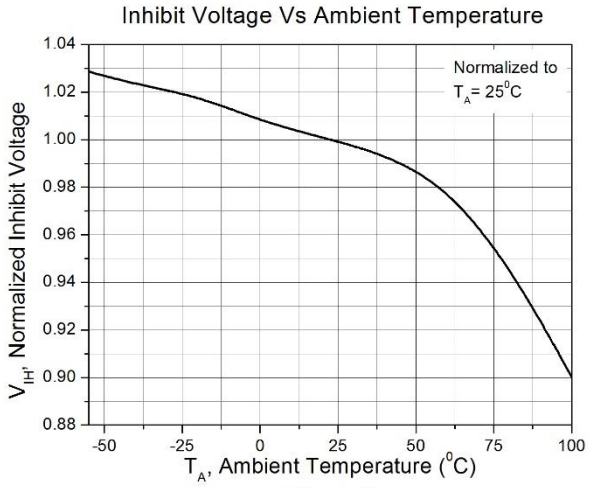
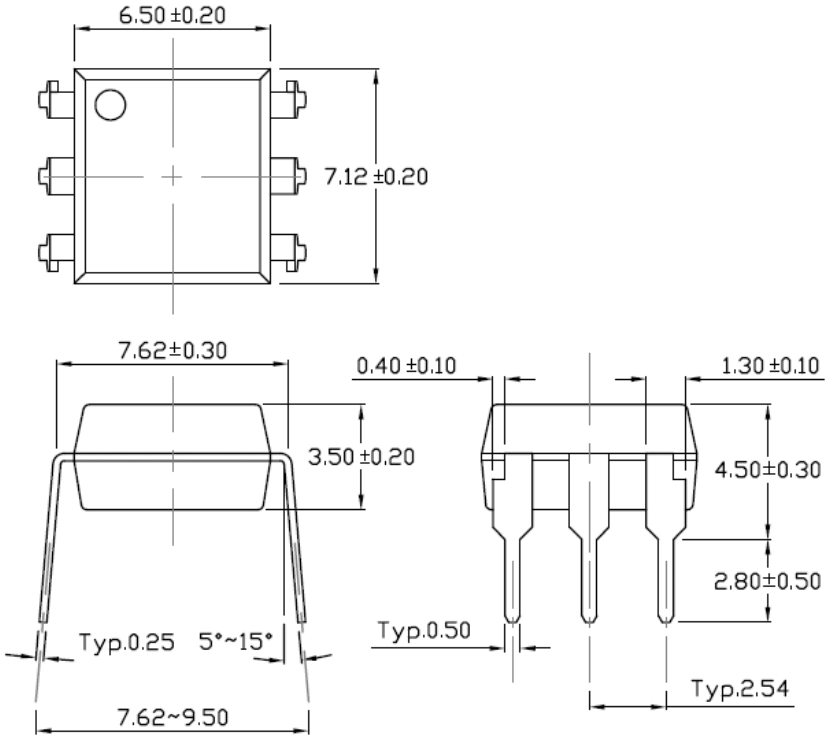


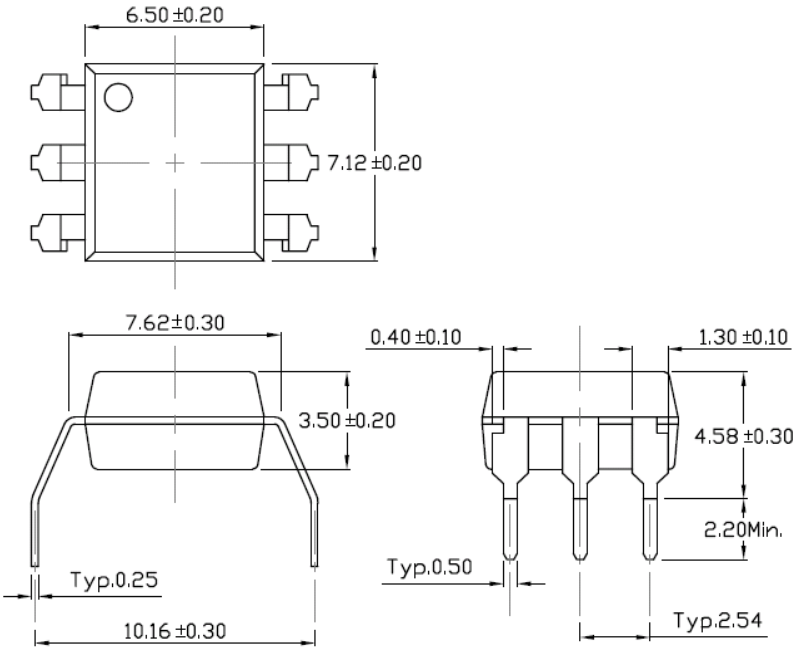

**Figure 9**

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

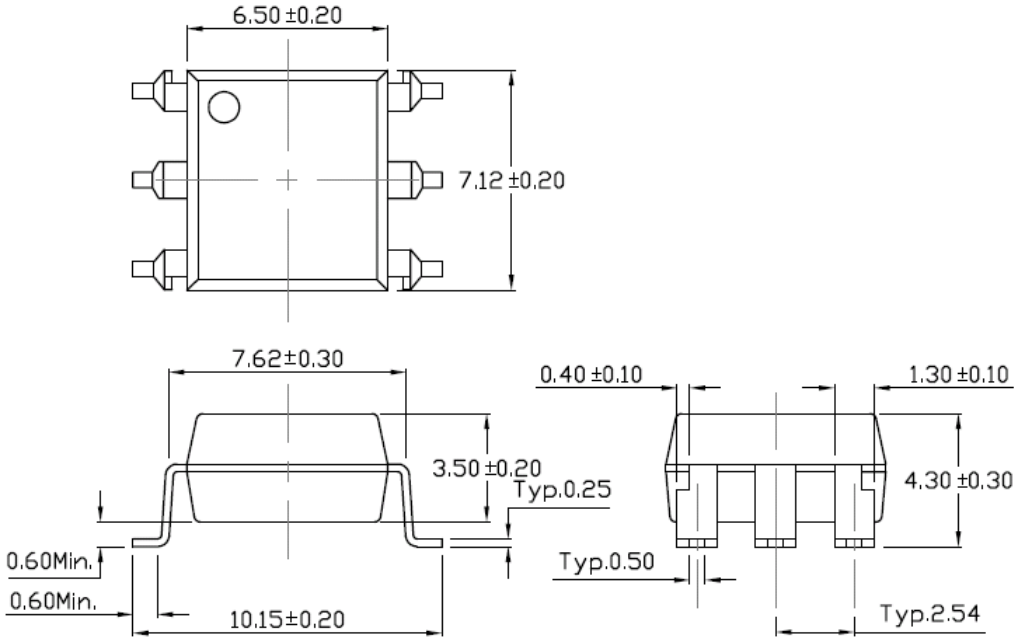
### Standard DIP – Through Hole



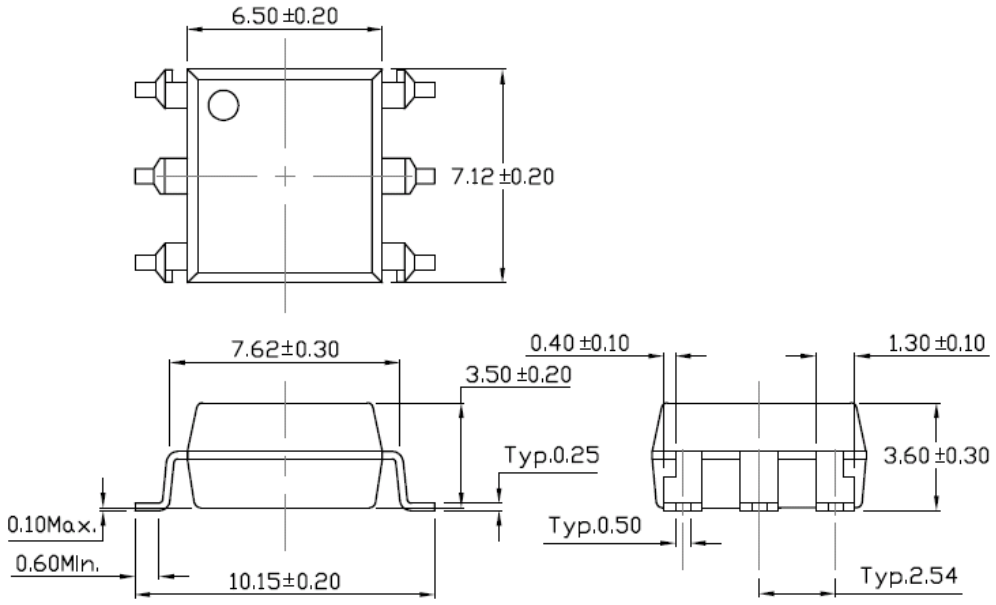

### Wide Lead Forming – Through Hole



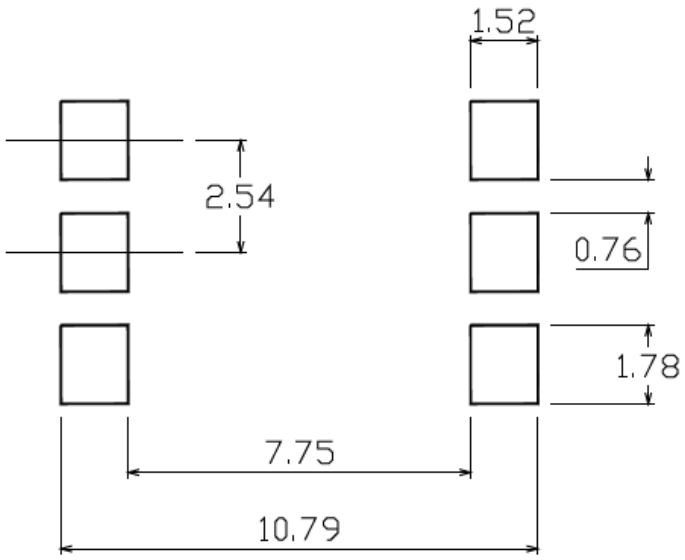
## Surface Mount Forming



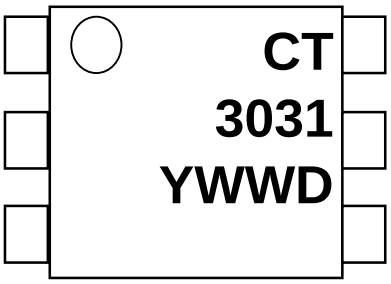

## Surface Mount Forming (Low Profile)



## Recommended Solder Mask *Dimensions in mm unless otherwise stated*




## Marking Information




**Note:**

CT : Logo

3031 : Part Number

Y : Fiscal Year

WW : Work Week

D : Manufacturing Code

## Ordering Information

CT303X(Y)(Z)-G, CT304X(Y)(Z)-G, CT306X(Y)(Z)-G, CT308X(Y)(Z)-G

X = (1,2,3)

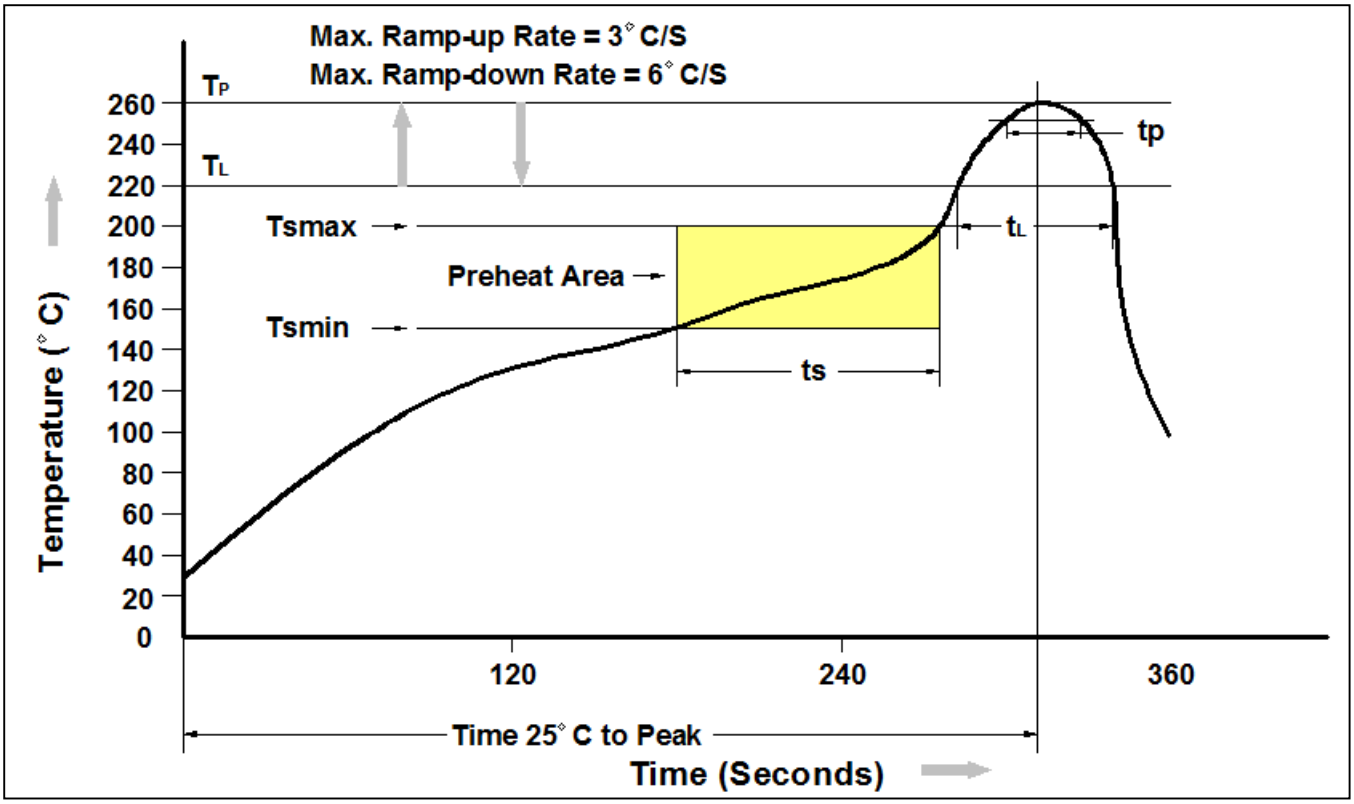
Y = Lead form option (S, SL, M or none)

Z = Tape and reel option (TA, TB or none)

G= Material option (G: Green, None: Non-green)

| ***Option*** | ***Description*** | ***Quantity*** |
|---|---|---|
| None | Standard 6 Pin Dip | 50Units/Tube |
| M | Wide Lead Forming | 50Units/Tube |
| S(TA) | Surface Mount Lead Forming – With Option A Taping | 1000 Units/Reel |
| S(TB) | Surface Mount Lead Forming – With Option B Taping | 1000 Units/Reel |
| SL(TA) | Surface Mount Lead Forming(Low Profile) – With Option A Taping | 1000 Units/Reel |
| SL(TB) | Surface Mount Lead Forming(Low Profile) – With Option B Taping | 1000 Units/Reel |

## Reflow Profile




| 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 ($t_L$ 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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