



CT1010, CT1011, CT1012, CT1013, CT1014 CT1015, CT1016, CT1017, CT1018, CT1019 DC Input 4-Pin Long Mini-Flat Phototransistor Optocoupler

Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- Extra low coupling capacitance
- DC input with transistor output
- Temperature range - 55 °C to 110 °C
- Regulatory Approvals
 - UL - UL1577 (E364000)
 - VDE - EN60747-5-5(VDE0884-5)
 - CQC – GB4943.1, GB8898
 - IEC60065, IEC60950
- Creepage distance > 8 mm
- Green Package

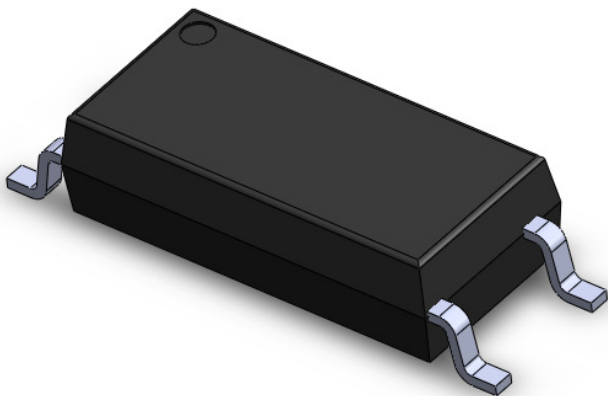
Applications

- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

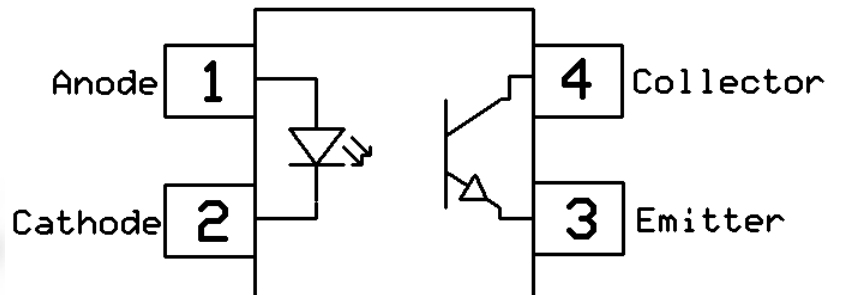
Description

The CT1010, CT1011, CT1012, CT1013, CT1014, CT1015, CT1016, CT1017, CT1018, CT1019 series consists of a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead SOP Package.

Package Outline



Schematic





CT1010, CT1011, CT1012, CT1013, CT1014

CT1015, CT1016, CT1017, CT1018, CT1019

DC Input 4-Pin Long Mini-Flat Phototransistor Optocoupler

Absolute Maximum Rating at 25°C

| Symbol | Parameters | Ratings | Units | Notes |
|-----------------------|--|----------------|------------------|--------------|
| V _{ISO} | Isolation voltage *1 | 5000 | V _{RMS} | |
| T _{OPR} | Operating temperature | -55 ~ +110 | °C | |
| T _{STG} | Storage temperature | -55 ~ +125 | °C | |
| T _{SOL} | Soldering temperature *2 | 260 | °C | |
| Emitter | | | | |
| I _F | Forward current | 50 | mA | |
| I _{F(TRANS)} | Peak transient current (≤1μs P.W,300pps) | 1 | A | |
| V _R | Reverse voltage | 6 | V | |
| P _D | Power dissipation | 85 | mW | |
| Detector | | | | |
| P _C | Power dissipation | 150 | mW | |
| B _{VCEO} | Collector-Emitter Breakdown Voltage | 80 | V | |
| B _{VECO} | Emitter-Collector Breakdown Voltage | 7 | V | |
| I _C | Collector Current | 50 | mA | |



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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 | $I_F = 10\text{mA}$ | | 1.24 | 1.4 | V | |
| | | $I_F = 50\text{mA}$ | - | 1.45 | 1.5 | V | |
| I_R | Reverse Current | $V_R = 6\text{V}$ | - | - | 5 | μA | |
| C_{IN} | Input Capacitance | $f = 1\text{kHz}$ | - | 45 | - | pF | |

Detector Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|---------------|--------------------------------|---|-----|-----|-----|-------|-------|
| $B_{V_{CEO}}$ | Collector-Emitter Breakdown | $I_C = 100\mu\text{A}$ | 80 | - | - | V | |
| $B_{V_{ECO}}$ | Emitter-Collector Breakdown | $I_E = 100\mu\text{A}$ | 7 | - | - | V | |
| I_{CEO} | Collector-Emitter Dark Current | $V_{CE} = 20\text{V}, I_F = 0\text{mA}$ | - | - | 100 | nA | |

Transfer Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes | |
|---------------|--------------------------------------|---------------------------------------|---|-----|-----|----------|-------|--|
| CTR | Current Transfer Ratio | CT1012 | $I_F = 1\text{mA}, V_{CE} = 5\text{V}$ | 22 | - | - | % | |
| | | CT1013 | | 34 | - | - | | |
| | | CT1014 | | 56 | - | - | | |
| | | CT1011 | $I_F = 10\text{mA}, V_{CE} = 5\text{V}$ | 60 | - | 300 | | |
| | | CT1012 | | 63 | - | 125 | | |
| | | CT1013 | | 100 | - | 200 | | |
| | | CT1014 | | 160 | - | 320 | | |
| | | CT1010 | $I_F = 5\text{mA}, V_{CE} = 5\text{V}$ | 50 | - | 600 | | |
| | | CT1015 | | 50 | - | 150 | | |
| | | CT1016 | | 100 | - | 300 | | |
| | | CT1017 | | 80 | - | 160 | | |
| | | CT1018 | | 130 | - | 260 | | |
| | | CT1019 | | 200 | - | 400 | | |
| $V_{CE(SAT)}$ | Collector-Emitter Saturation Voltage | $I_F = 10\text{mA}, I_C = 1\text{mA}$ | - | - | 0.4 | V | | |
| R_{IO} | Isolation Resistance | $V_{IO} = 500\text{V}_{DC}$ | 5×10^{10} | | | Ω | | |
| C_{IO} | Isolation Capacitance | $f = 1\text{MHz}$ | | | 1 | pF | | |



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Electrical Characteristics $T_A = 25^\circ\text{C}$, $V_{CC} = 5\text{V}$ (unless otherwise specified)

Switching Characteristics

| Symbol | Parameters | Test Conditions | Min | Typ | Max | Units | Notes |
|-----------|---------------|---|-----|-----|-----|---------------|-------|
| T_{ON} | Turn On Time | $I_C = 5\text{mA}$, $V_{CE} = 5\text{V}$, $R_L = 100$ | - | 5 | - | μs | |
| T_{OFF} | Turn Off Time | | - | 4.2 | - | | |
| t_r | Rise Time | | - | 2.8 | - | | |
| t_f | Fall Time | | - | 4.1 | - | | |



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Typical Characteristic Curves

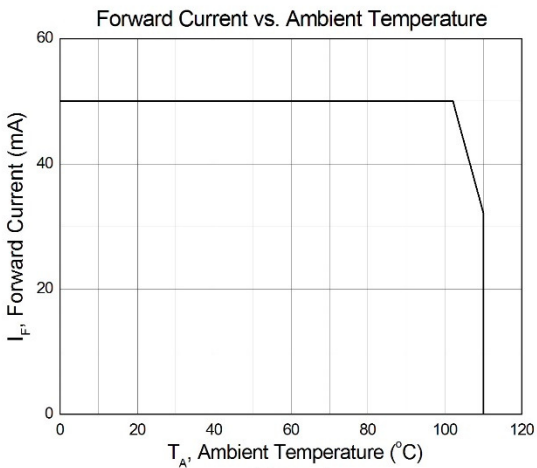


Figure 1

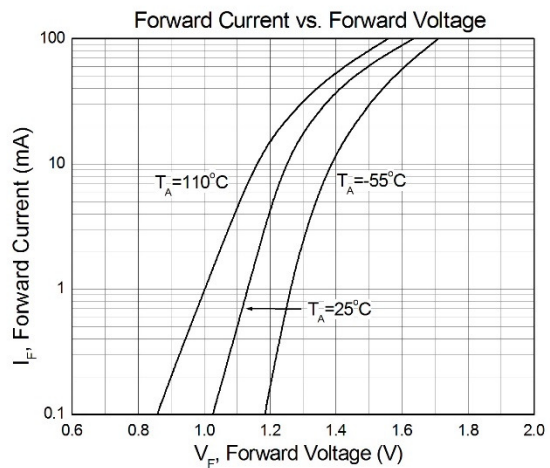


Figure 2

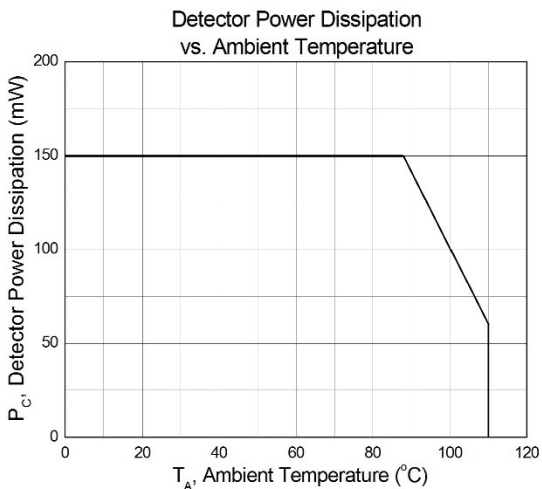


Figure 3

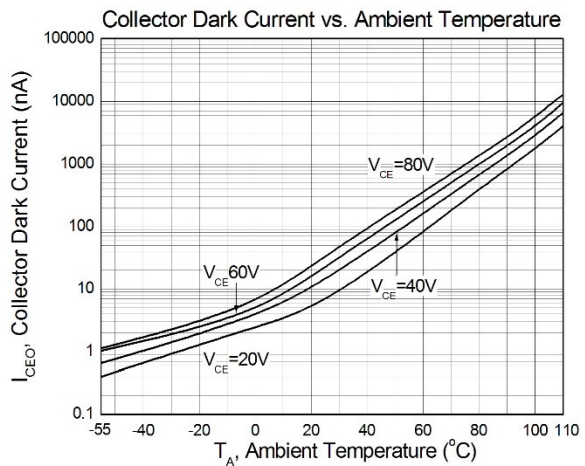


Figure 4

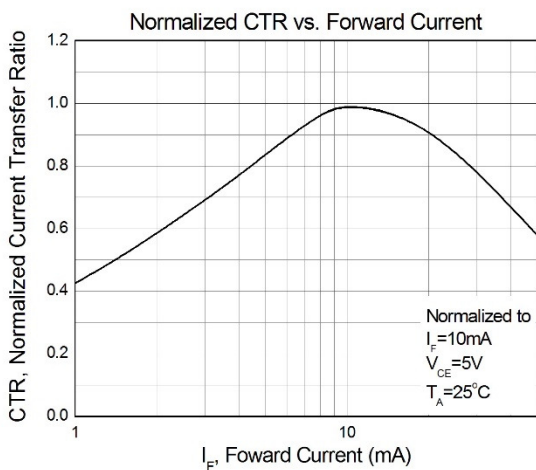


Figure 5

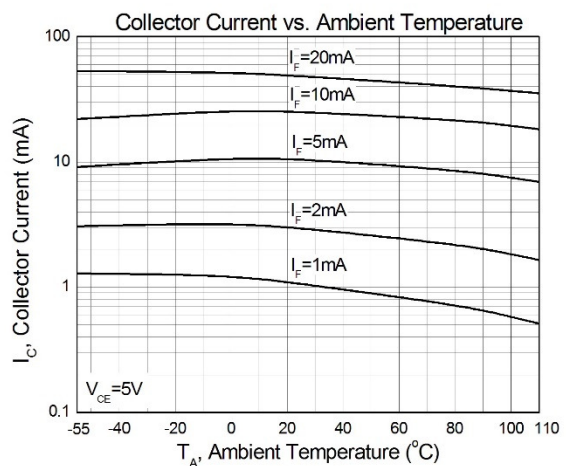


Figure 6



CT1010, CT1011, CT1012, CT1013, CT1014 CT1015, CT1016, CT1017, CT1018, CT1019

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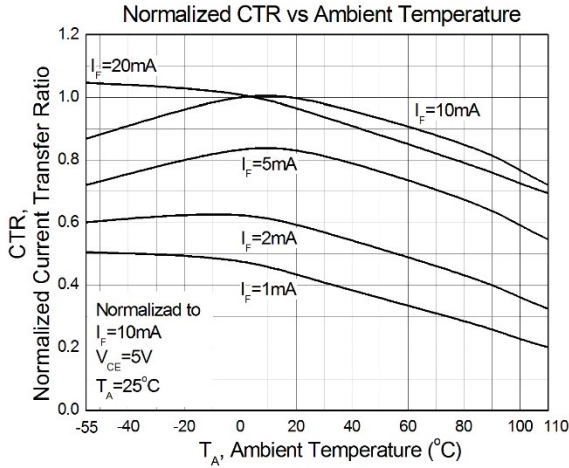


Figure 7

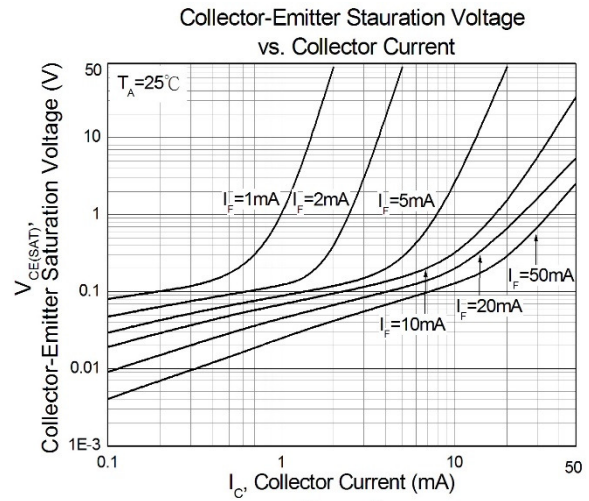


Figure 8

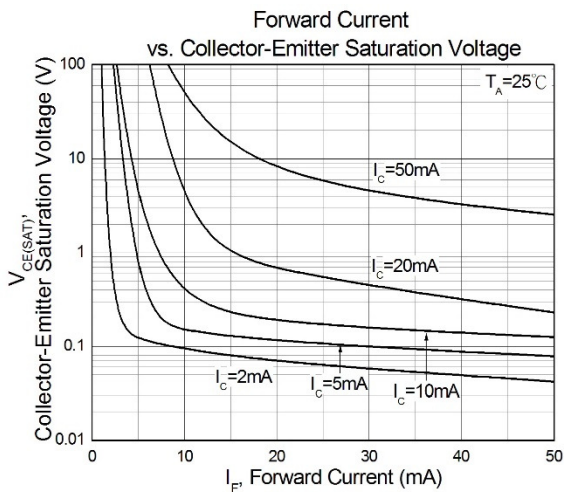


Figure 9

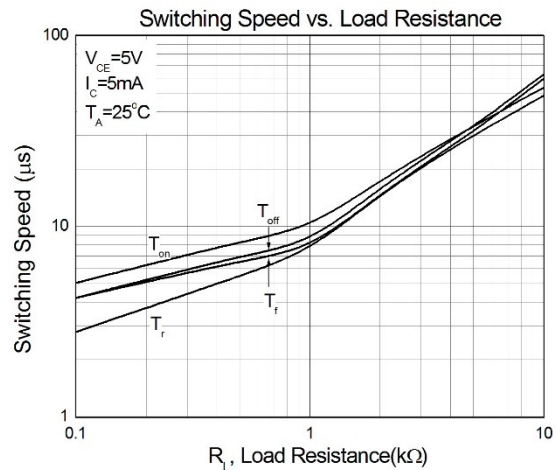
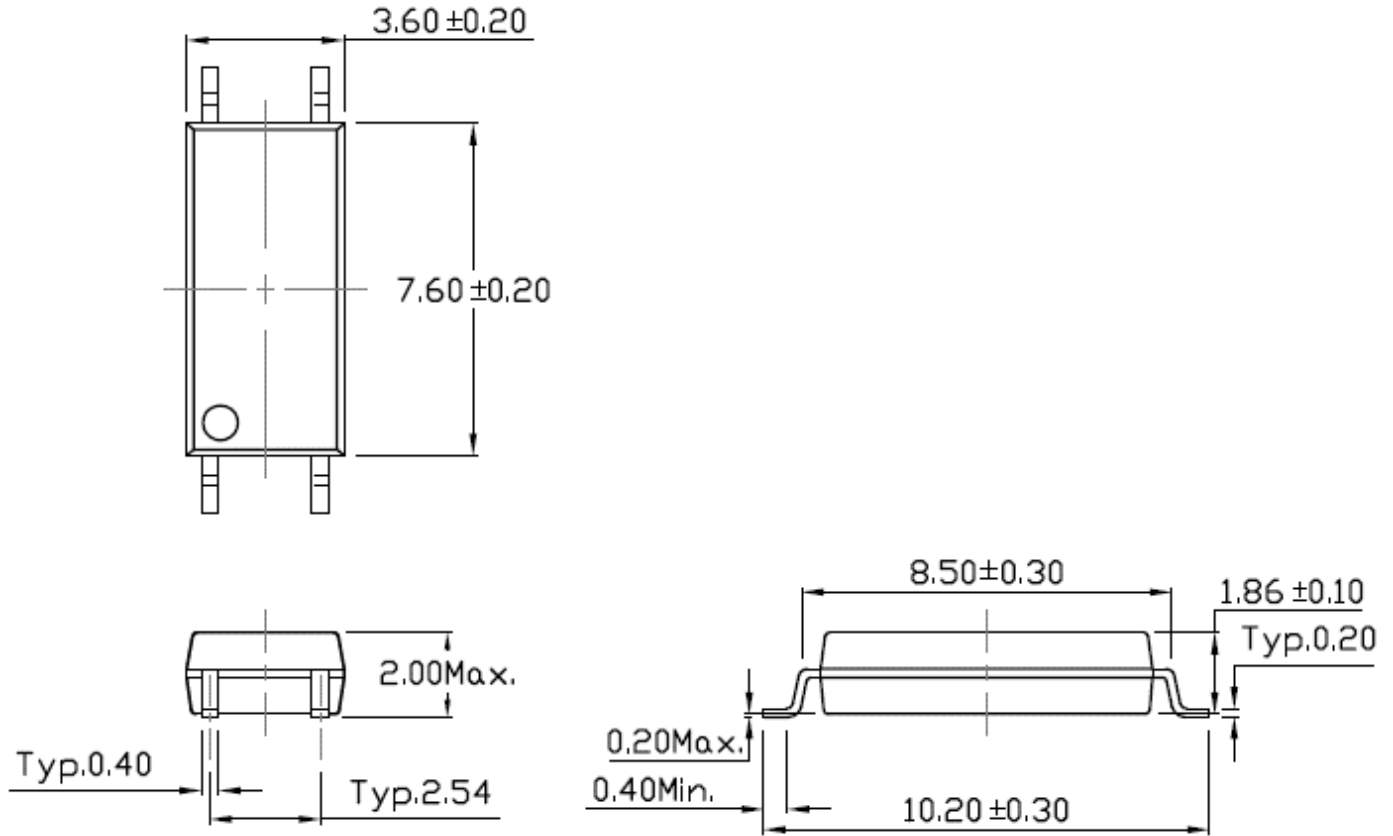


Figure 10

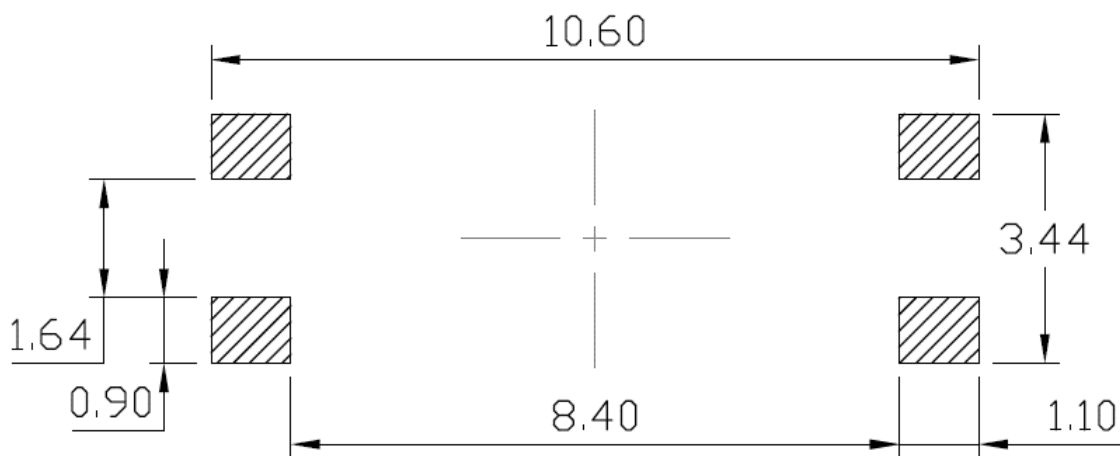


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Package Dimension *Dimensions in mm unless otherwise stated*



Recommended Solder Mask *Dimensions in mm unless otherwise stated*





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Marking Information



Note:

CT : Denotes “CT Micro”

1019 : Part Number

V : VDE Option

Y : Fiscal Year

WW : Work Week

K : Manufacturing Code

Ordering Information

CT101X(V)(Y)

X = Part No. (0,1,2,3,4,5,6,7,8,9)

V = VDE Option (V or None)

Y = Tape and reel option (T1 or T2)

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

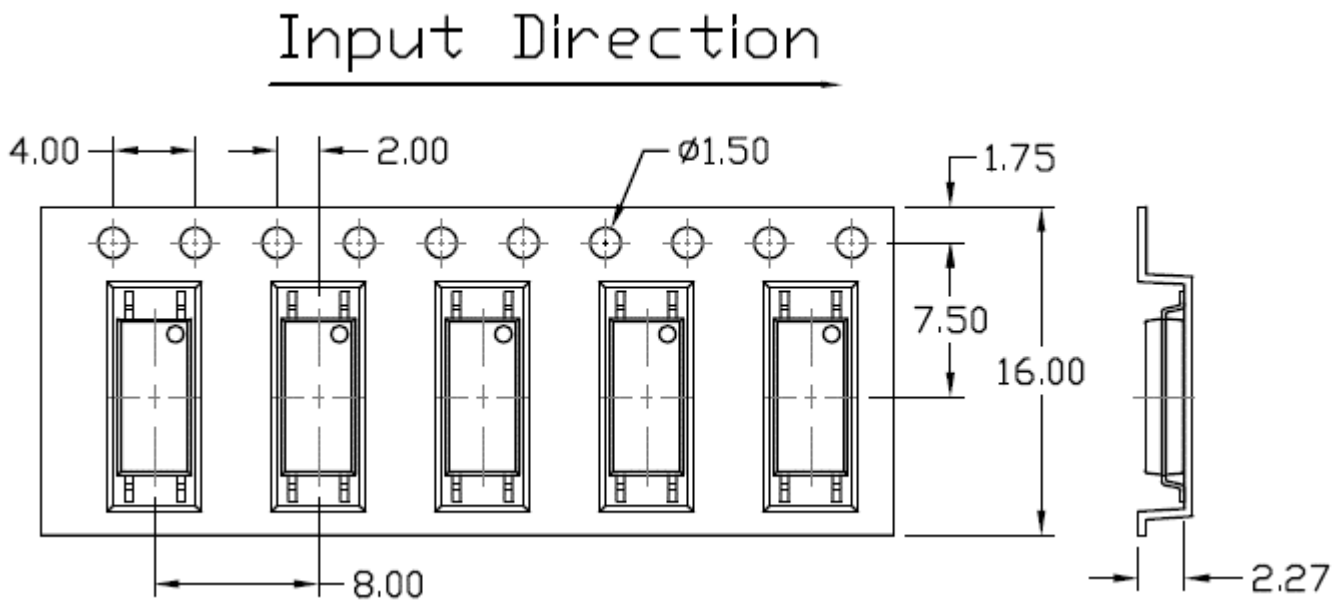


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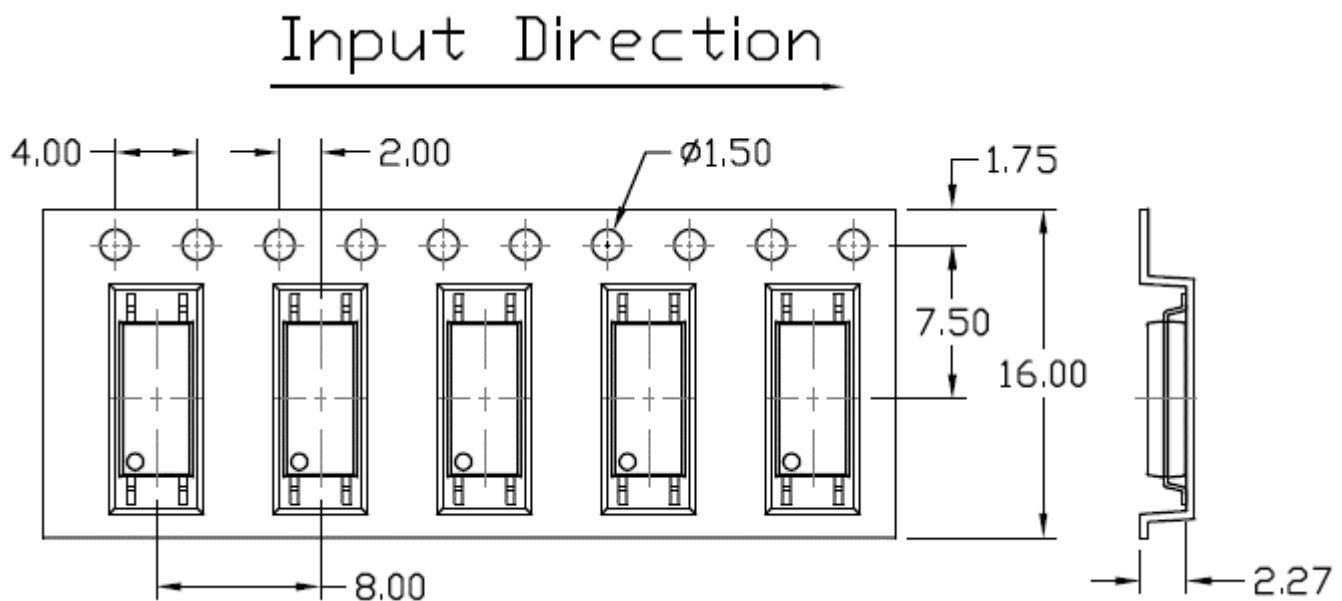
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Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option T1



Option T2



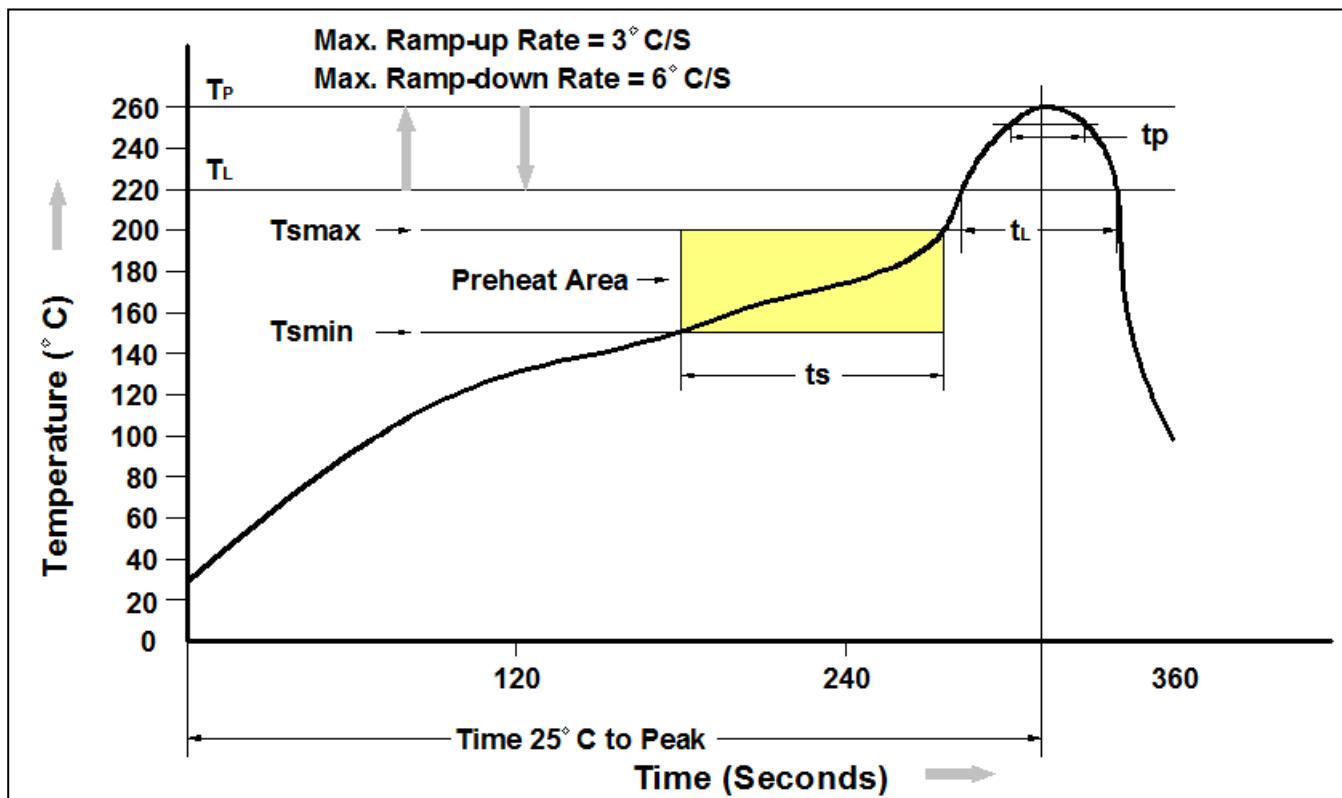


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Reflow Profile



| 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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