



# CT1010-W, CT1011-W, CT1012-W, CT1013-W, CT1014-W CT1015-W, CT1016-W, CT1017-W, CT1018-W, CT1019-W 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 125 °C
- External creepage distance > 8 mm
- Internal creepage distance > 4.6 mm
- Distances through insulation > 0.4 mm
- Green Package
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

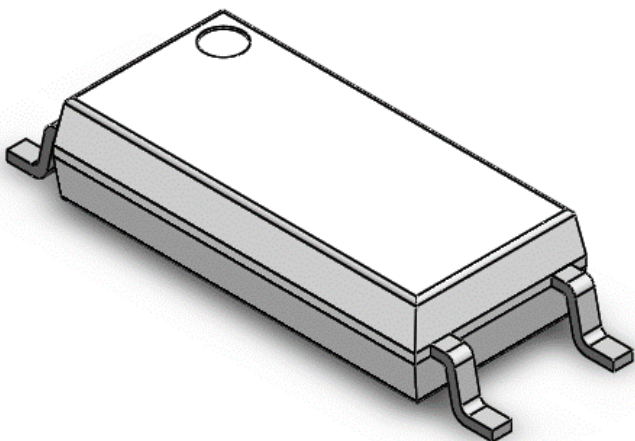
## Applications

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

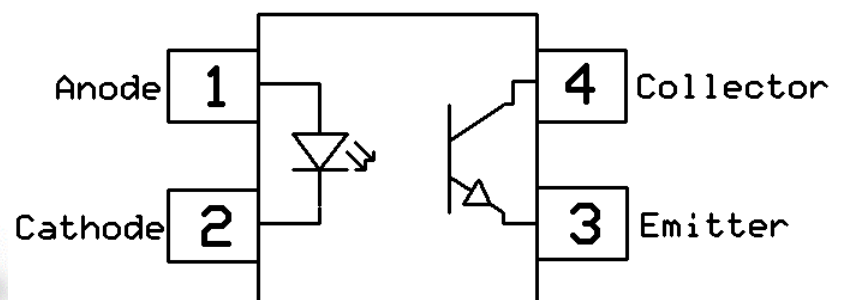
## Description

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

## Package Outline



## Schematic





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

### Absolute Maximum Rating at 25°C

<i>Symbol</i>	<i>Parameters</i>	<i>Ratings</i>	<i>Units</i>	<i>Notes</i>
V <sub>ISO</sub>	Isolation voltage	5000	V <sub>RMS</sub>	
T <sub>OPR</sub>	Operating temperature	-55 ~ +125	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +150	°C	
T <sub>SOL</sub>	Soldering temperature	260	°C	
<b>Emitter</b>				
I <sub>F</sub>	Forward current	50	mA	
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W,300pps)	1	A	
V <sub>R</sub>	Reverse voltage	6	V	
P <sub>D</sub>	Power dissipation	85	mW	
<b>Detector</b>				
P <sub>C</sub>	Power dissipation	150	mW	
B <sub>VCEO</sub>	Collector-Emitter Breakdown Voltage	80	V	
B <sub>VECO</sub>	Emitter-Collector Breakdown Voltage	7	V	
I <sub>C</sub>	Collector Current	50	mA	

### Thermal Characteristics

<i>Symbol</i>	<i>Parameters</i>	<i>Ratings</i>	<i>Units</i>	<i>Notes</i>
R <sub>θJA</sub>	Thermal Resistance Junction-Ambient	445	°C/W	
T <sub>J</sub>	Junction temperature	125	°C	



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DC Input 4-Pin Long Mini-Flat Phototransistor Optocoupler**

**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	$I_F = 10\text{mA}$		1.26	1.4	V	
		$I_F = 50\text{mA}$	-	1.42	1.5	V	
$I_R$	Reverse Current	$V_R = 6\text{V}$	-	-	5	$\mu\text{A}$	
$C_{IN}$	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-W	$I_F = 1\text{mA}, V_{CE} = 5\text{V}$	22	-	-	%		
		CT1013-W		34	-	-			
		CT1014-W		56	-	-			
		CT1011-W	$I_F = 10\text{mA}, V_{CE} = 5\text{V}$	60	-	300			
		CT1012-W		63	-	125			
		CT1013-W		100	-	200			
		CT1014-W		160	-	320			
		CT1010-W		$I_F = 5\text{mA}, V_{CE} = 5\text{V}$	50	-		600	
		CT1015-W			50	-		150	
		CT1016-W	100		-	300			
		CT1017-W	80		-	160			
		CT1018-W	130		-	260			
		CT1019-W	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	$V_{IO} = 500\text{V}_{DC}$	$5 \times 10^{10}$			$\Omega$			
$C_{IO}$	Isolation Capacitance	$f = 1\text{MHz}$			1	pF			



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

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

**Switching Characteristics**

<b>Symbol</b>	<b>Parameters</b>	<b>Test Conditions</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Units</b>	<b>Notes</b>
$T_{ON}$	Turn On Time	$I_C = 5\text{mA}$ , $V_{CE} = 5\text{V}$ , $R_L = 100\Omega$	-	4.8	22	$\mu\text{s}$	
$T_{OFF}$	Turn Off Time		-	4.2	22		
$t_r$	Rise Time		-	2.7	18		
$t_f$	Fall Time		-	4	18		



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## Typical Characteristic Curves

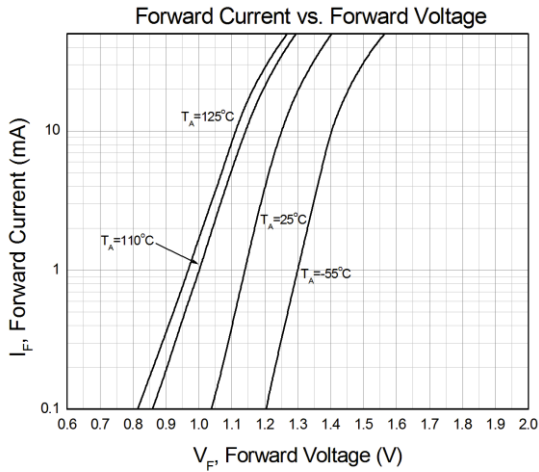


Figure 1

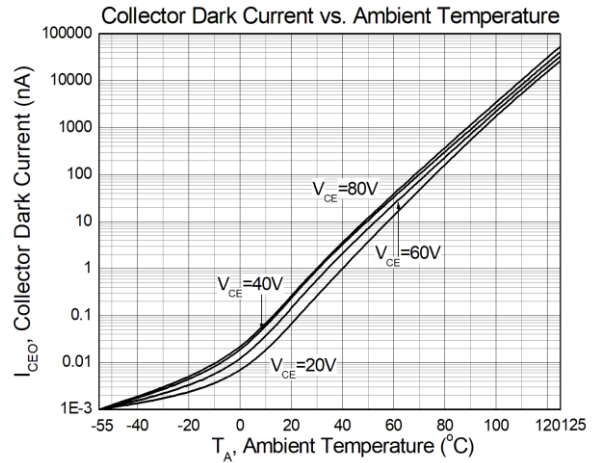


Figure 2

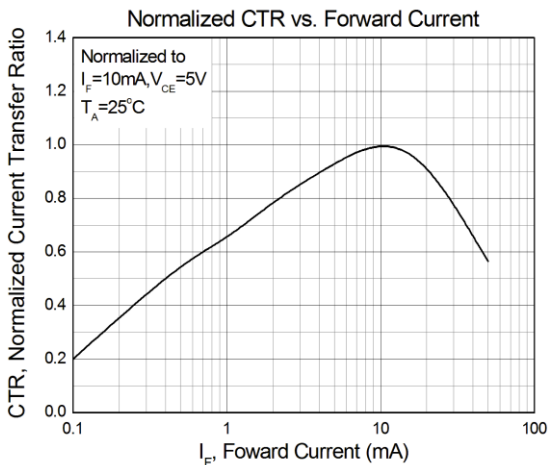


Figure 3

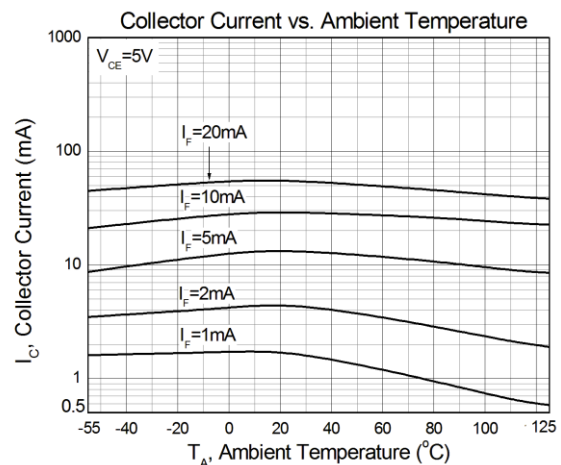


Figure 4

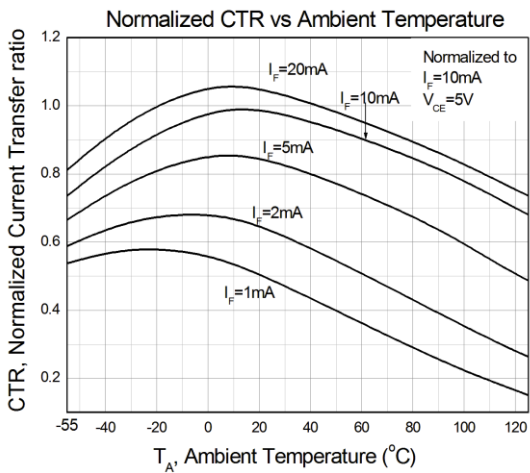


Figure 5

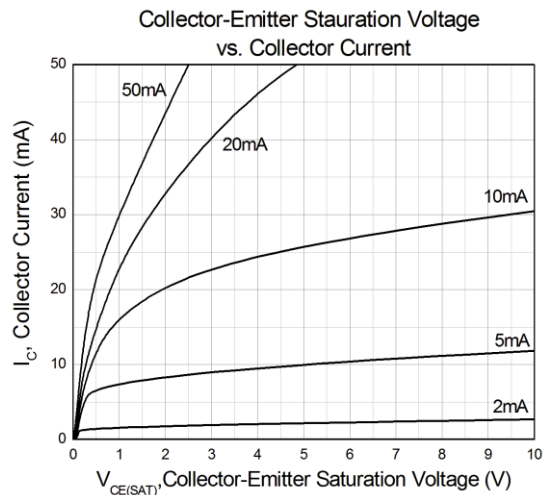
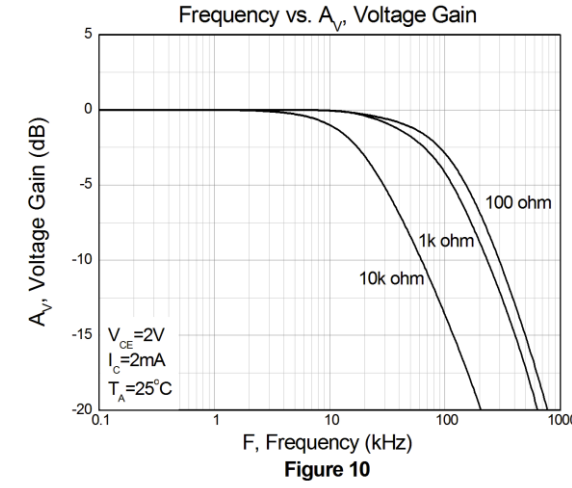
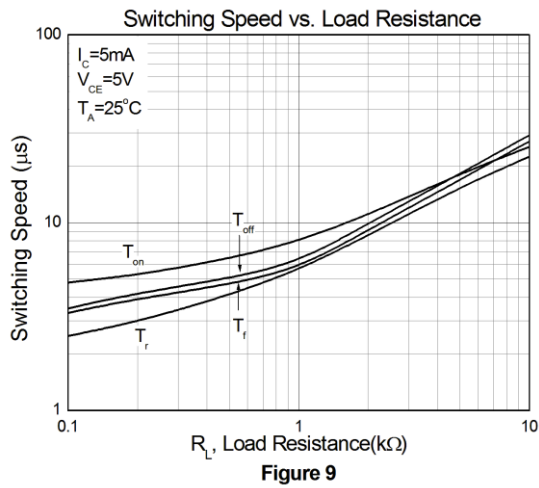
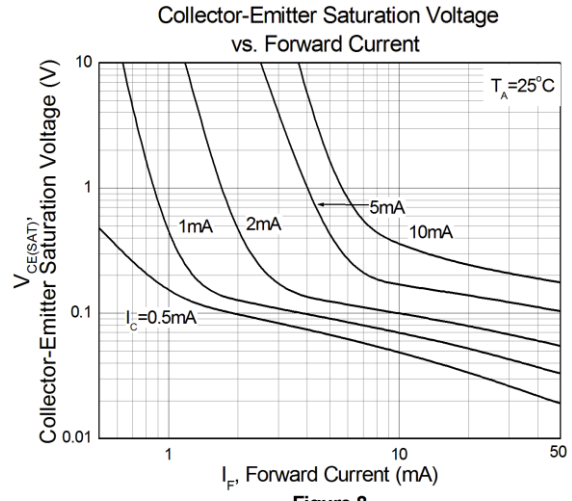
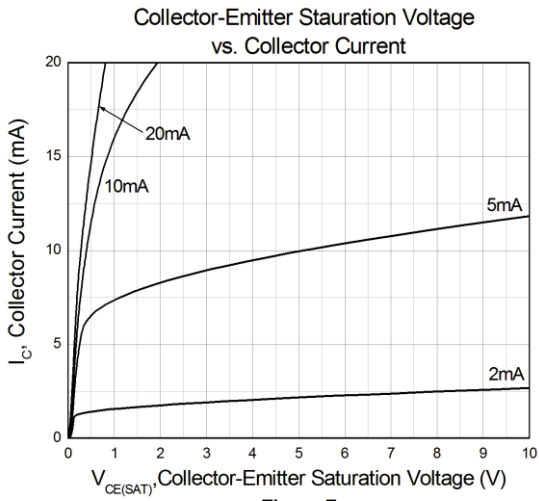


Figure 6



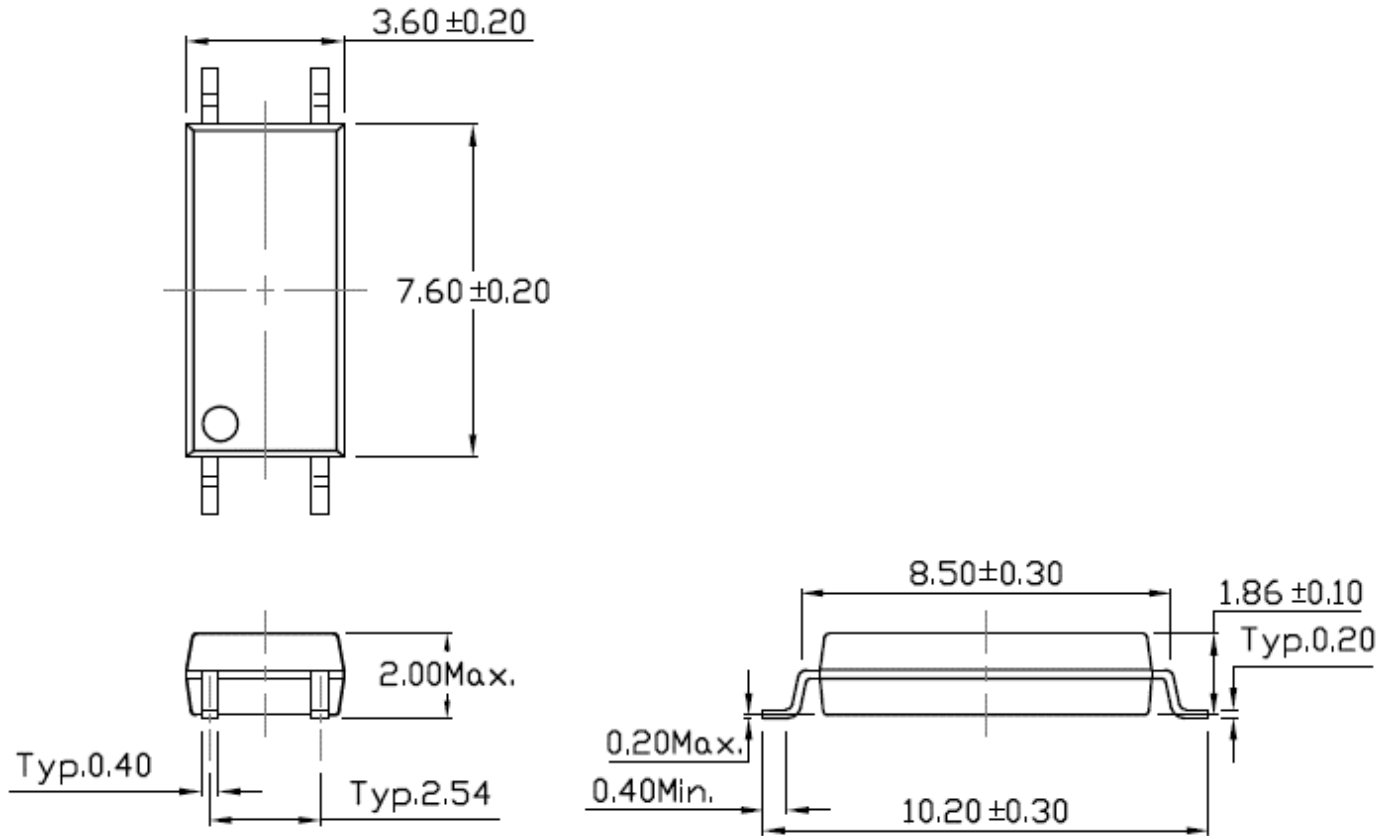
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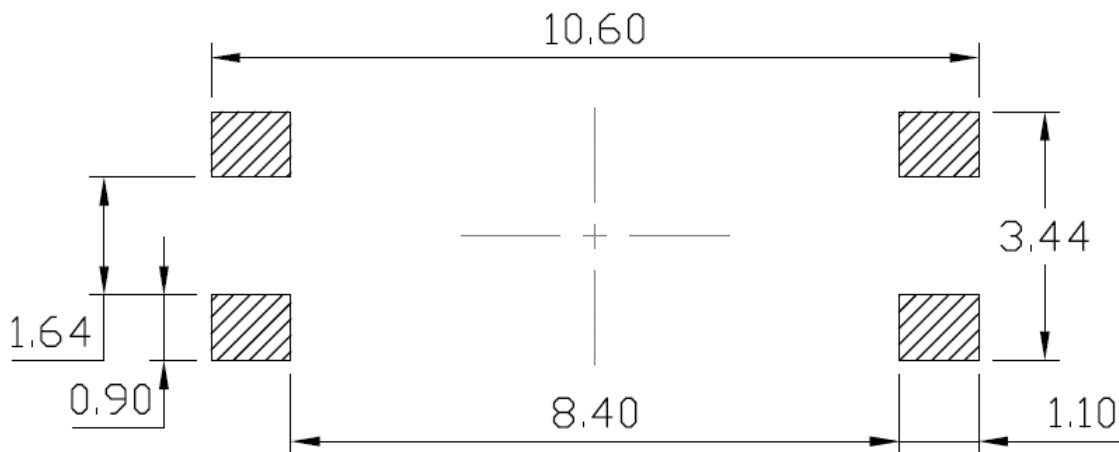


CT1010-W, CT1011-W, CT1012-W, CT1013-W, CT1014-W  
CT1015-W, CT1016-W, CT1017-W, CT1018-W, CT1019-W  
DC Input 4-Pin Long Mini-Flat Phototransistor Optocoupler

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



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





CT1010-W, CT1011-W, CT1012-W, CT1013-W, CT1014-W  
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## Marking Information



**Note:**

- CT : Denotes "CT Micro"
- 1019 : Part Number
- Y : Fiscal Year
- V : VDE safety mark (option)
- WW : Work Week
- K : Manufacturing Code

## Ordering Information

### CT101X(V)(Y) -W

- X = Part No. (0,1,2,3,4,5,6,7,8,9)
- V = VDE safety mark option (V or none)
- Y = Tape and reel option (T1 or T2)
- W = Outline Color (W, White)

<b>Option</b>	<b>Description</b>	<b>Quantity</b>
T1	Surface Mount Lead Forming – With Option 1 Taping	3000Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Taping	3000Units/Reel

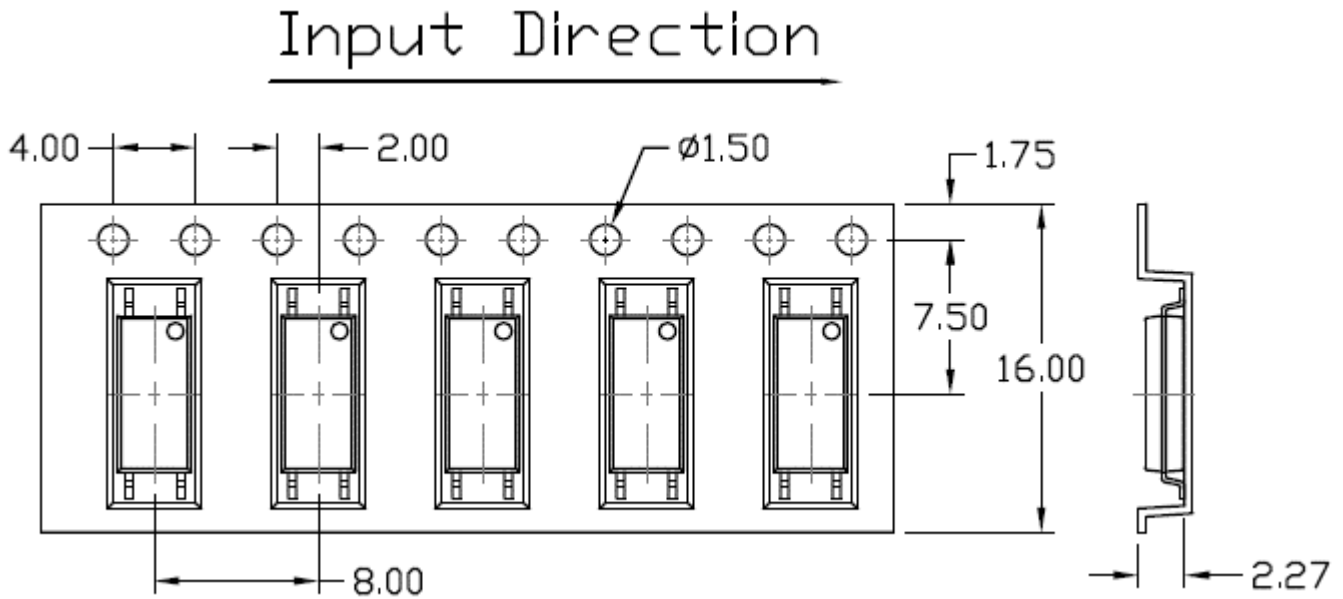




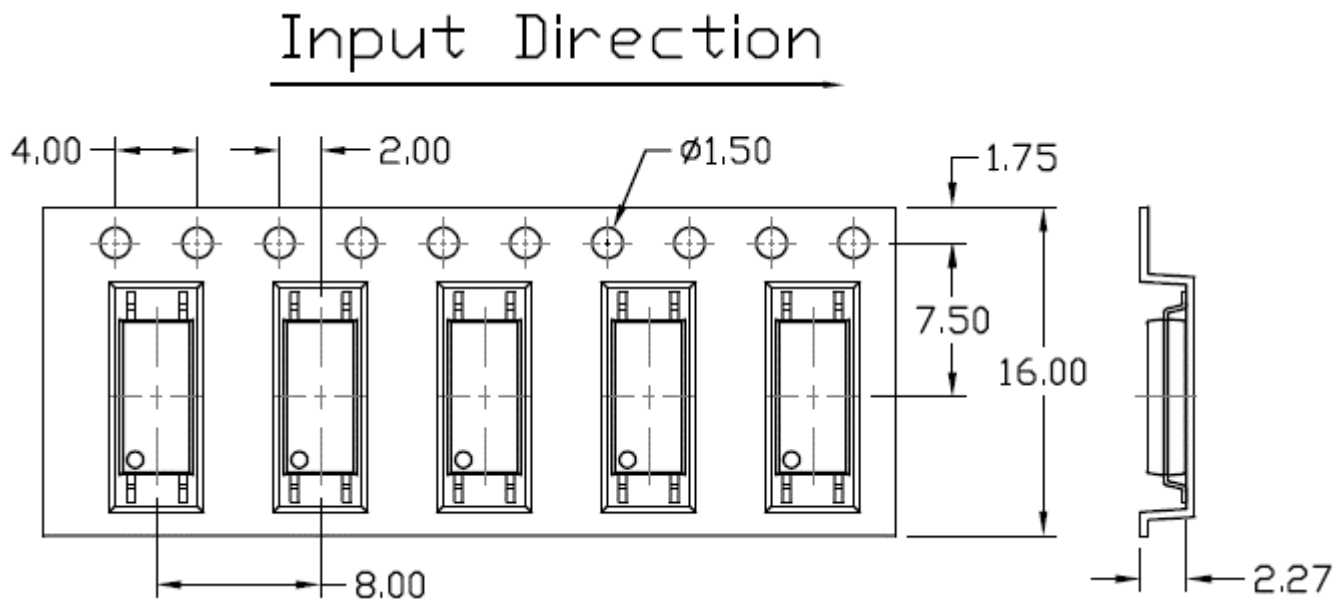
CT1010-W, CT1011-W, CT1012-W, CT1013-W, CT1014-W  
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DC Input 4-Pin Long Mini-Flat Phototransistor Optocoupler

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

**Option T1**



**Option T2**





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

**Wave soldering** (JEDEC22A111 compliant)

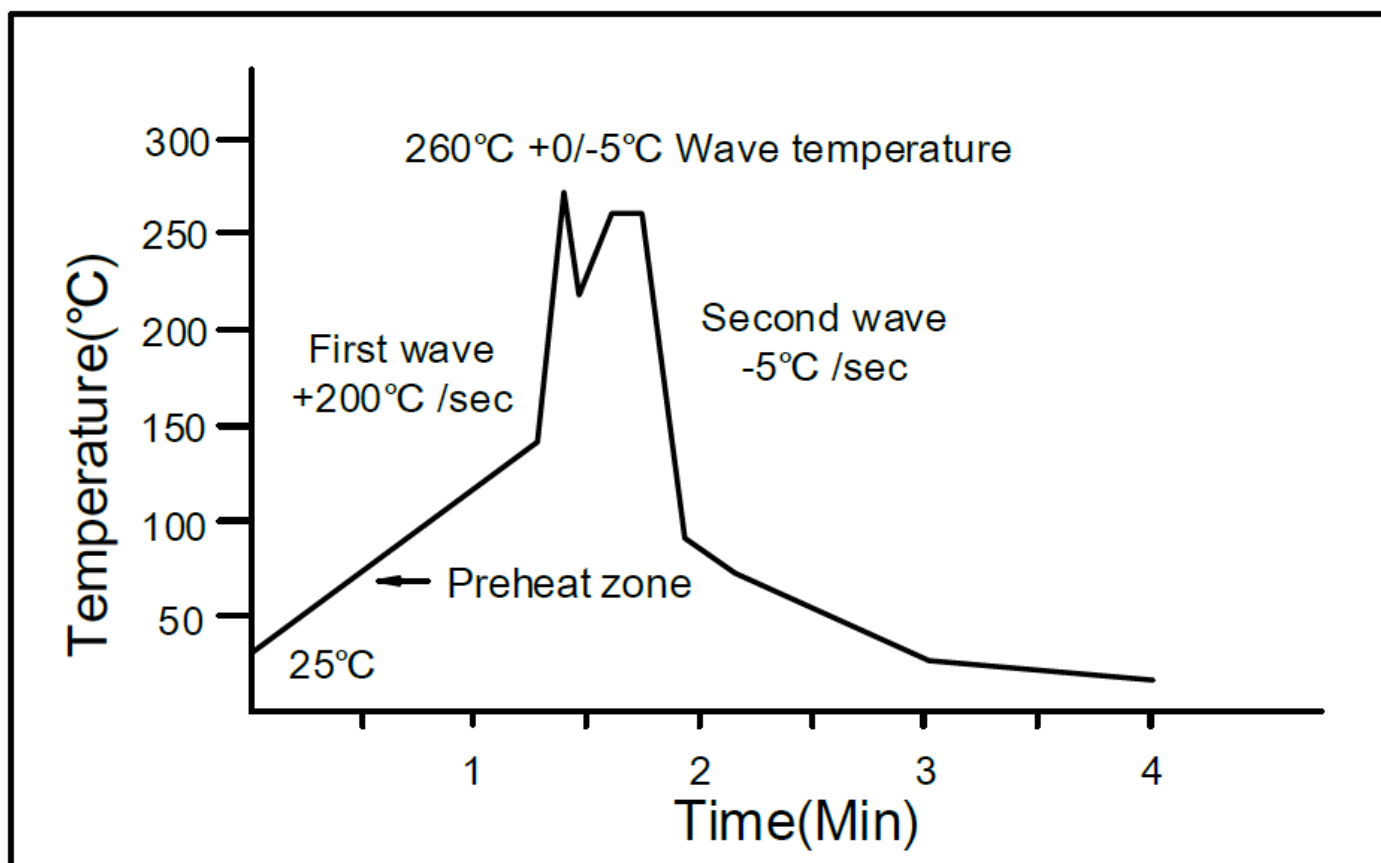
One time soldering is recommended within the condition of temperature.

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.

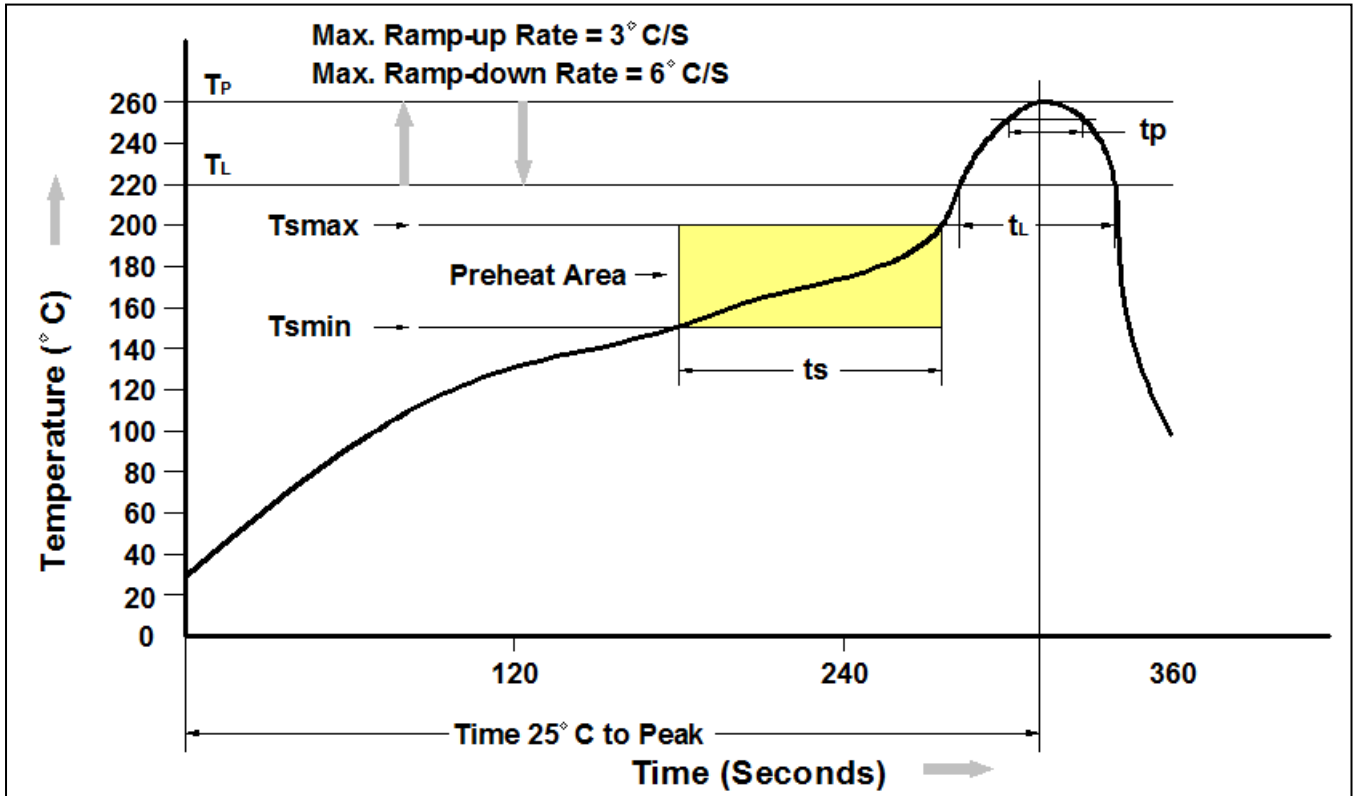
One time soldering is recommended. Temperature:  $350 \pm 5^\circ\text{C}$

Time: 3 sec max.



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**Reflow Profile**



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



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

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