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# CTH214 Series

## AC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator®

### Phototransistor Optocoupler

#### Features

- High isolation 3750 VRMS
- Patented coplanar structure DMC-Isolator®
- Various CTR selection available
- AC input with transistor output
- Operating Temperature range - 55 °C to 110 °C
- External Creepage  $\geq 5.0\text{mm}$
- Distance Through Isolation  $\geq 0.4\text{mm}$
- Clearance Distance  $\geq 5.0\text{mm}$
- RoHS and REACH compliance
- Halogen Free compliance
- MSL class 1
- Regulatory Approvals
  - ✓ UL - UL1577 (E364000)
  - ✓ VDE - EN60747-5-5 (VDE0884-5)
  - ✓ CQC – GB4943.1, GB8898 (15001123951)

✓ IEC62368 (FI/41119)

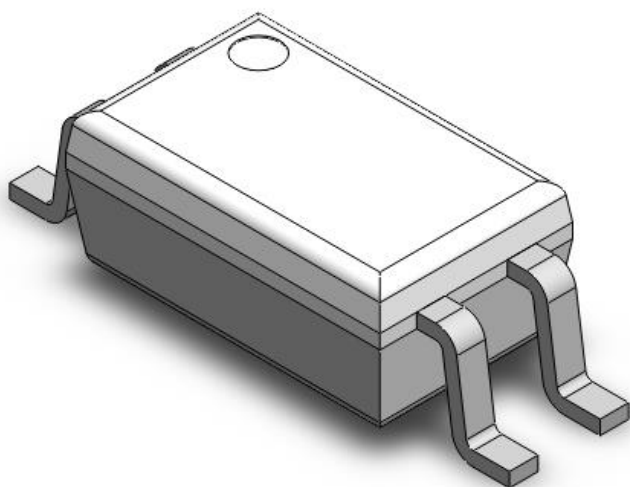
#### Description

The CTH214 series consists of a phototransistor optically coupled to two Infrared-emitting diodes, connected in inverse parallel in a 4-lead half pitch Mini-Flat DMC-Isolator® package.

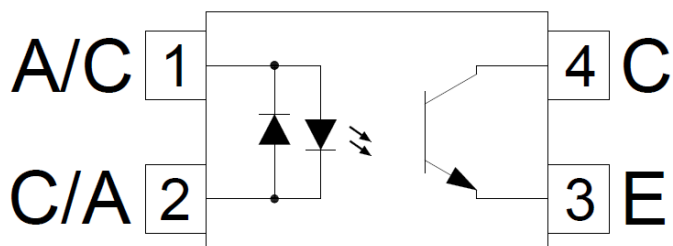
#### Applications

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

#### Package Outline



#### Schematic





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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 <sub>ISO</sub>	Isolation voltage (AC, 1 minute, 40 ~ 60% R.H.)	3750	V <sub>RMS</sub>	
P <sub>TOT</sub>	Total power dissipation	200	mW	
T <sub>OPR</sub>	Operating temperature	-55 ~ +110	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +150	°C	
T <sub>SOL</sub>	Soldering temperature (For 10 seconds)	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	
P <sub>D</sub>	Emitter power dissipation	70	mW	
<b>Detector</b>				
P <sub>D</sub>	Detector 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	



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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	$I_F = \pm 10\text{mA}$		1.24	1.4	V	
$C_{IN}$	Input Capacitance	$f = 1\text{MHz}$	-	30	-	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	CTH214	$I_F = \pm 1\text{mA}$ , $V_{CE} = 5\text{V}$	20	-	300	%	
		CTH214A		50	-	150		
		CTH214B		100		300		
CTR	Current Transfer Ratio	CTH214	$I_F = \pm 5\text{mA}$ , $V_{CE} = 5\text{V}$	30	-	600	%	
		CTH214A		80	-	300		
	CTR Symmetry		$I_F = \pm 1\text{mA}$ , $V_{CE} = 5\text{V}$	0.7	-	1.3		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage		$I_F = \pm 20\text{mA}$ , $I_C = 1\text{mA}$	-	0.04	0.2	V	
$R_{IO}$	Isolation Resistance		$V_{IO} = 500\text{V}_{DC}$ , 40 ~ 60% R.H.	$5 \times 10^{10}$	-	-	$\Omega$	
$C_{IO}$	Isolation Capacitance		$f = 1\text{MHz}$	-	0.5	1	pF	

##### Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$t_r$	Rise Time	$I_C = 2\text{mA}$ , $V_{CE} = 2\text{V}$ , $R_L = 100\Omega$	-	6	18	$\mu\text{s}$	
$t_f$	Fall Time		-	8	18		



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#### Typical Characteristic Curves $T_A = 25^\circ\text{C}$ , unless otherwise specified

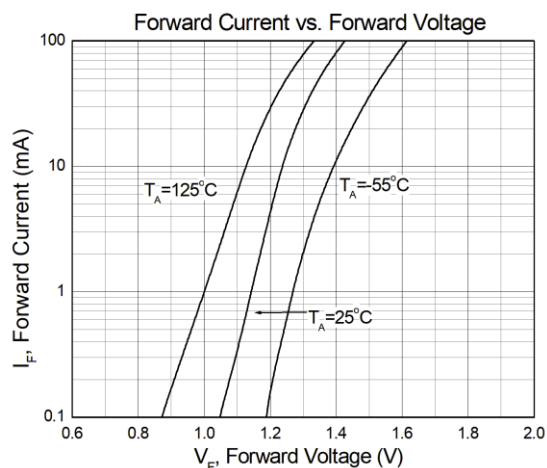


Figure 1

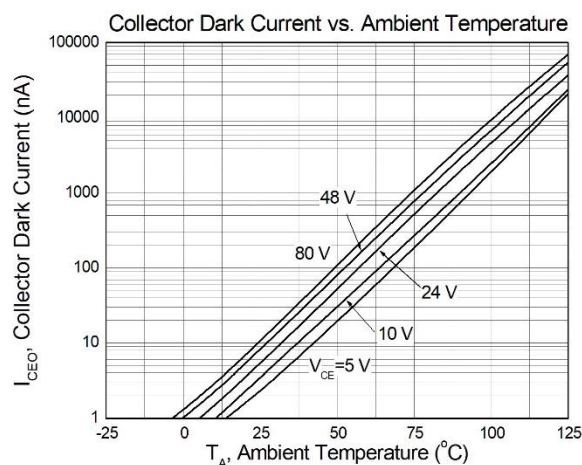


Figure 2

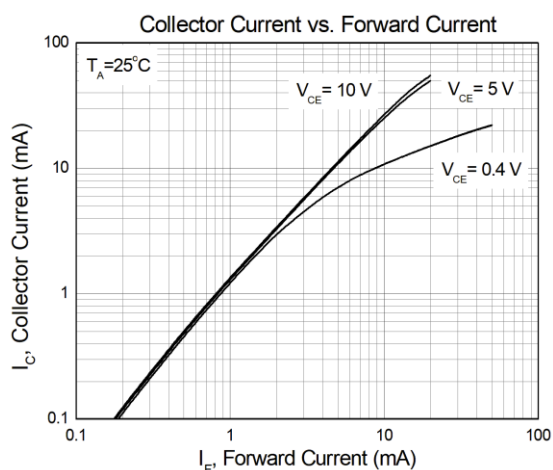


Figure 3

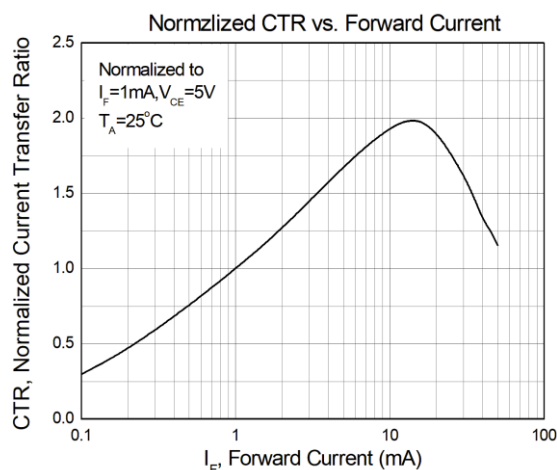


Figure 4

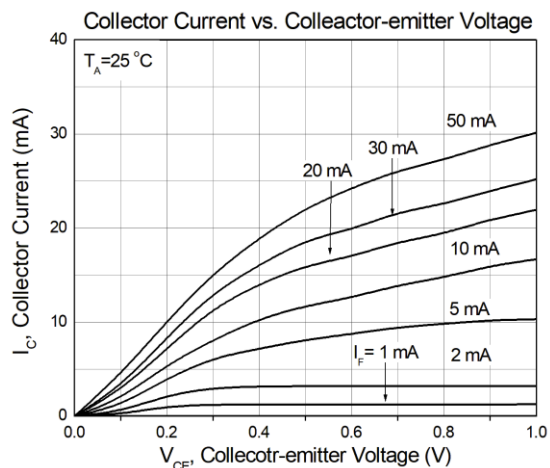


Figure 5

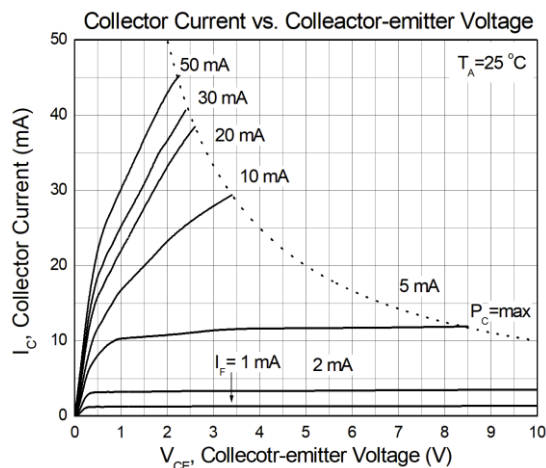


Figure 6



# CTH214 Series

## AC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator®

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#### Typical Characteristic Curves $T_A = 25^\circ\text{C}$ , unless otherwise specified (Continued)

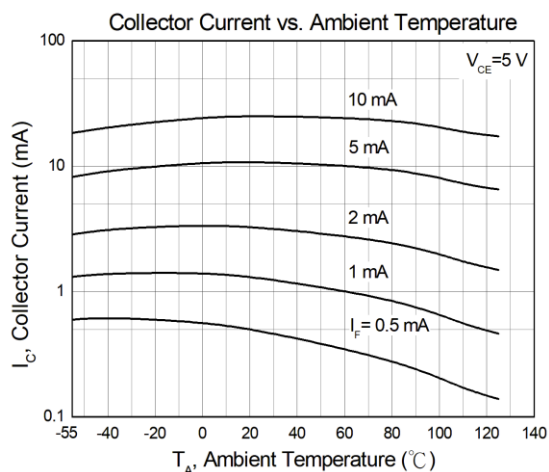


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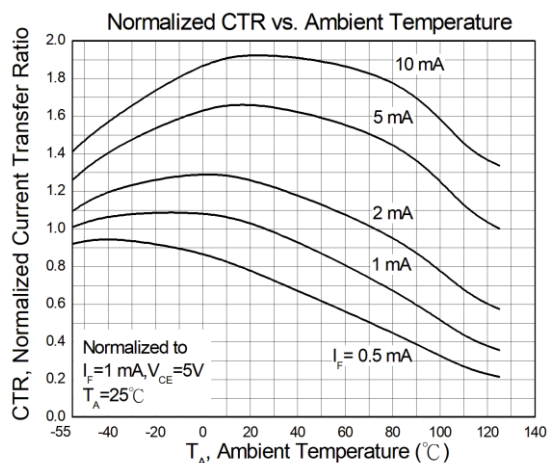


Figure 8

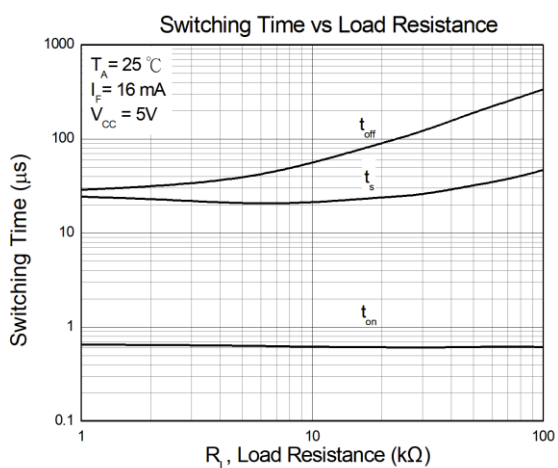


Figure 9

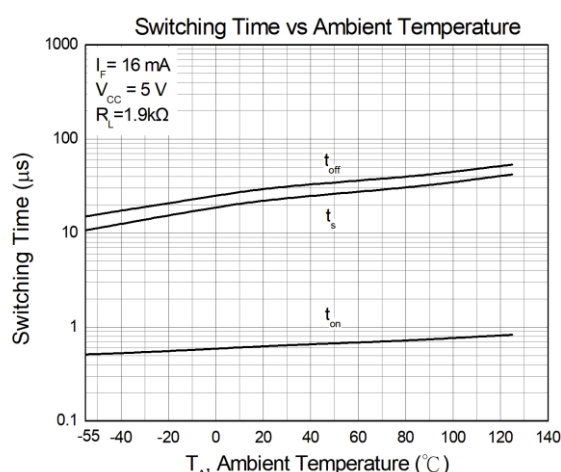


Figure 10

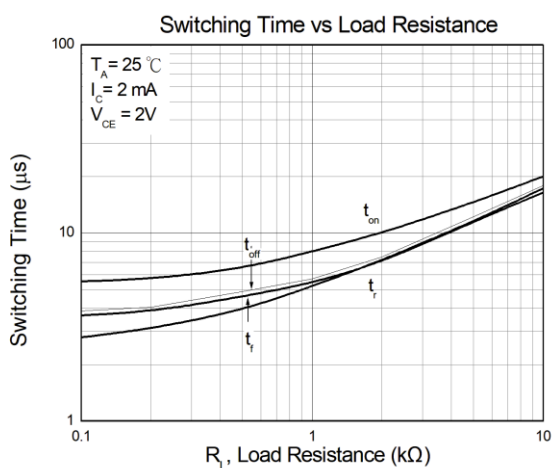


Figure 11

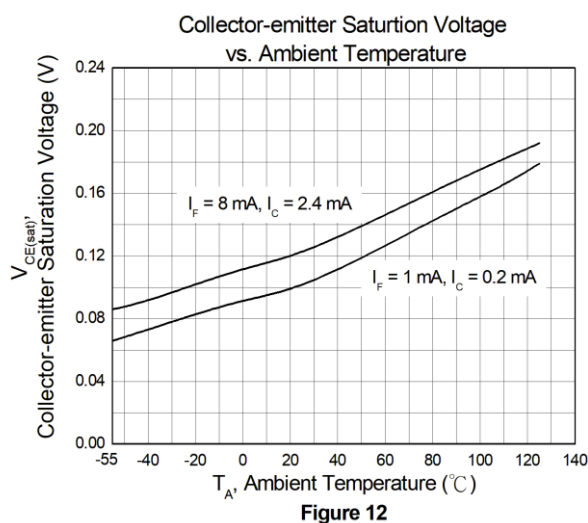


Figure 12



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## AC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator®

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#### Test Circuit

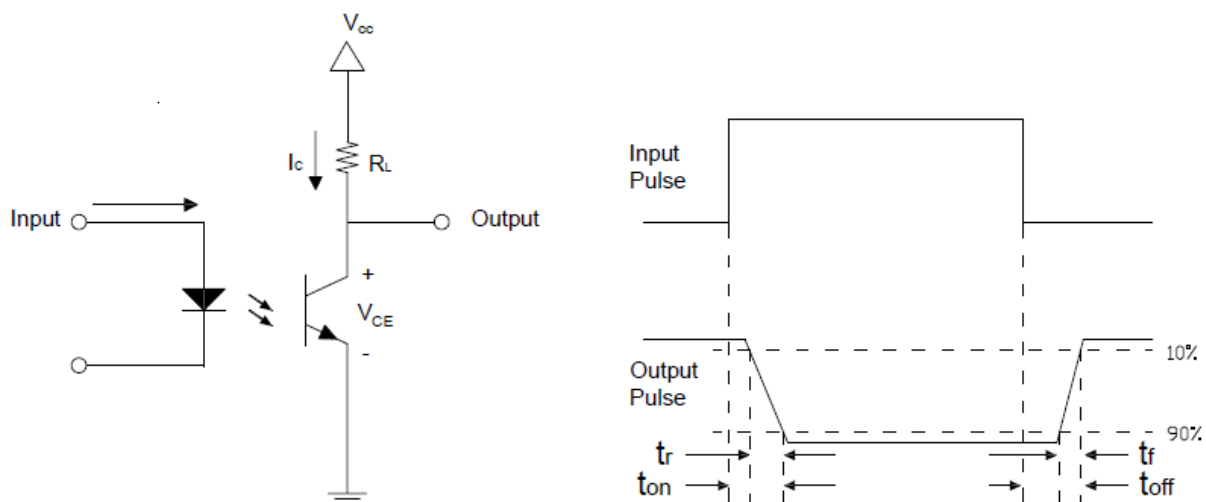


Figure 13: Switching Time Test Circuits



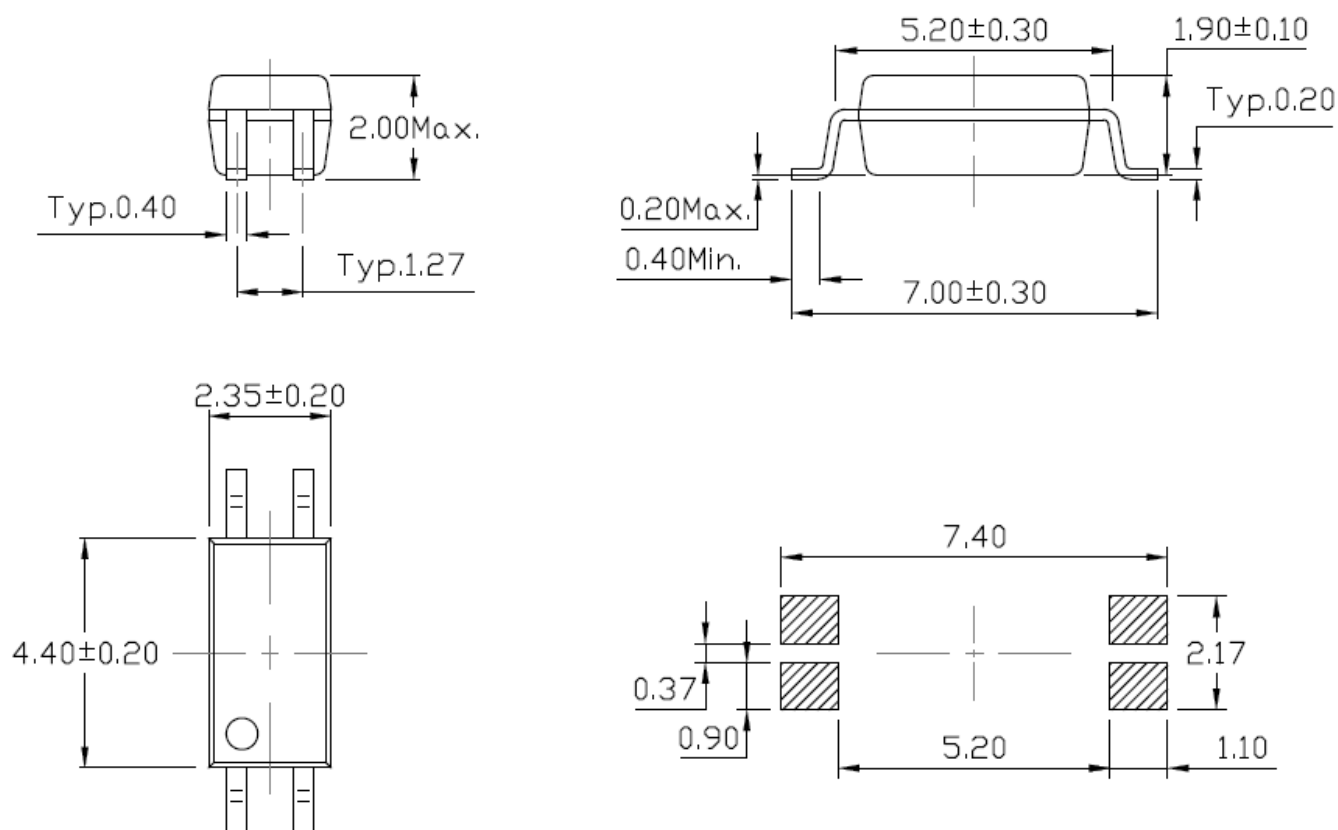
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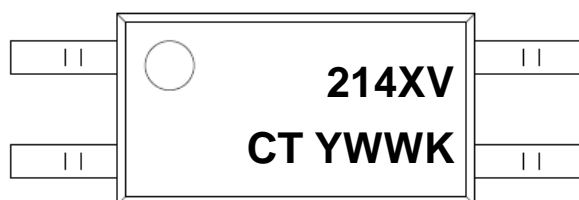
## AC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator®

### Phototransistor Optocoupler

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



#### Marking Information



#### Note:

- CT : Denotes "CT Micro"
- 214 : Part Number
- X : CTR Rank Option (Blank, A or B)
- V : VDE Safety Mark Option(Blank or V)
- Y : One Digit Year Code
- WW : Two Digit Work Week
- K : Manufacturing Code



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## Ordering Information

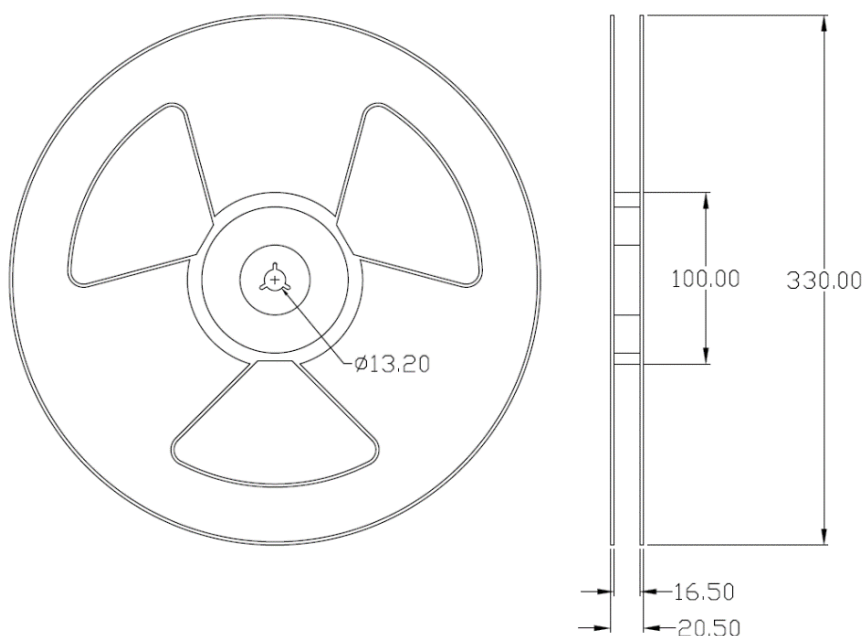
### CTH214X(V)(Z)

- CT = Denotes "CT Micro"  
H214 = Part Number  
X = CTR Rank Option (Blank, A or B)  
V = VDE Safety Mark Option (Blank or V)  
Z = Tape and Reel Option (Blank, T1 or T2)

Option	Description	Quantity
T1	Surface Mount Lead Forming – With Option 1 Taping	5000 Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Taping	5000 Units/Reel

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

### Option T1/T2





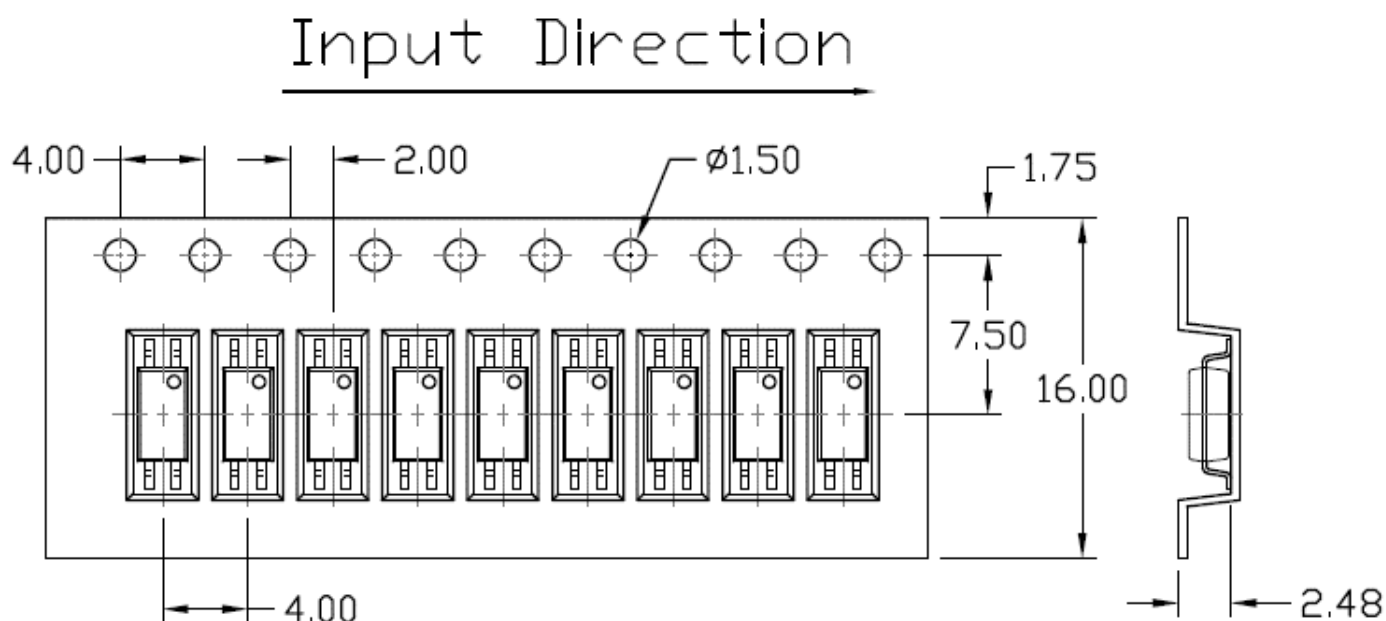
# CTH214 Series

## AC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator®

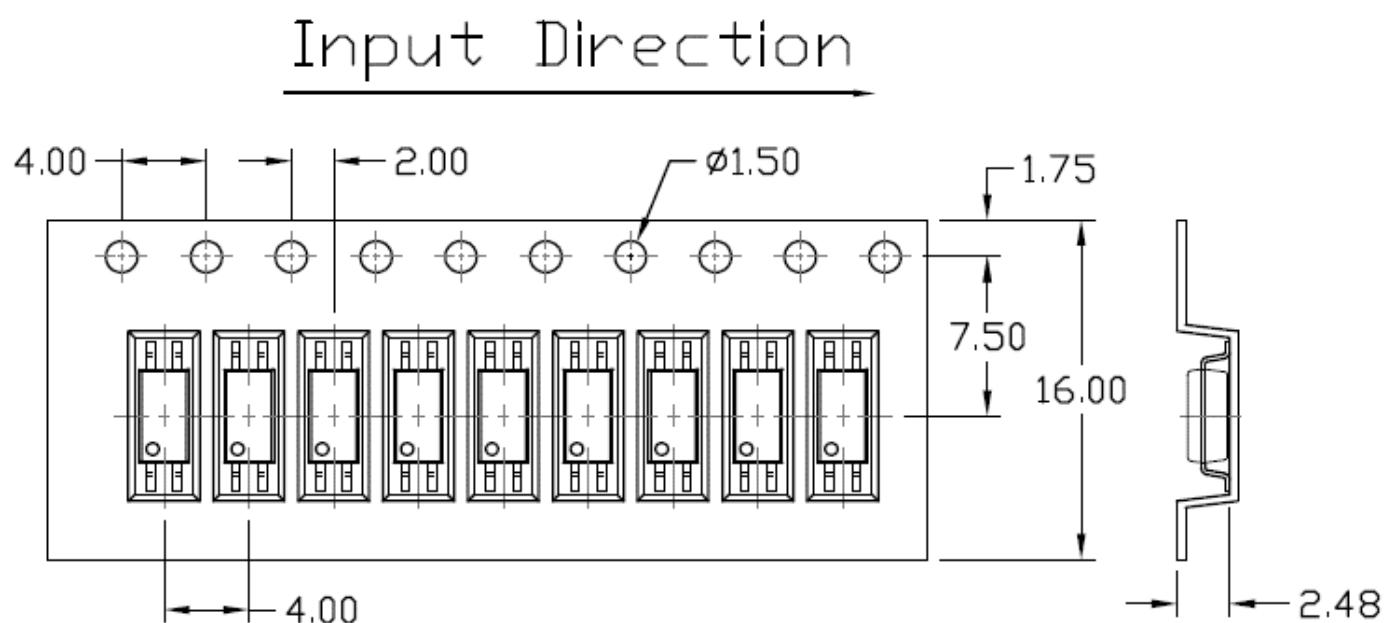
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#### Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

##### Option (T1)



##### Option (T2)





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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)

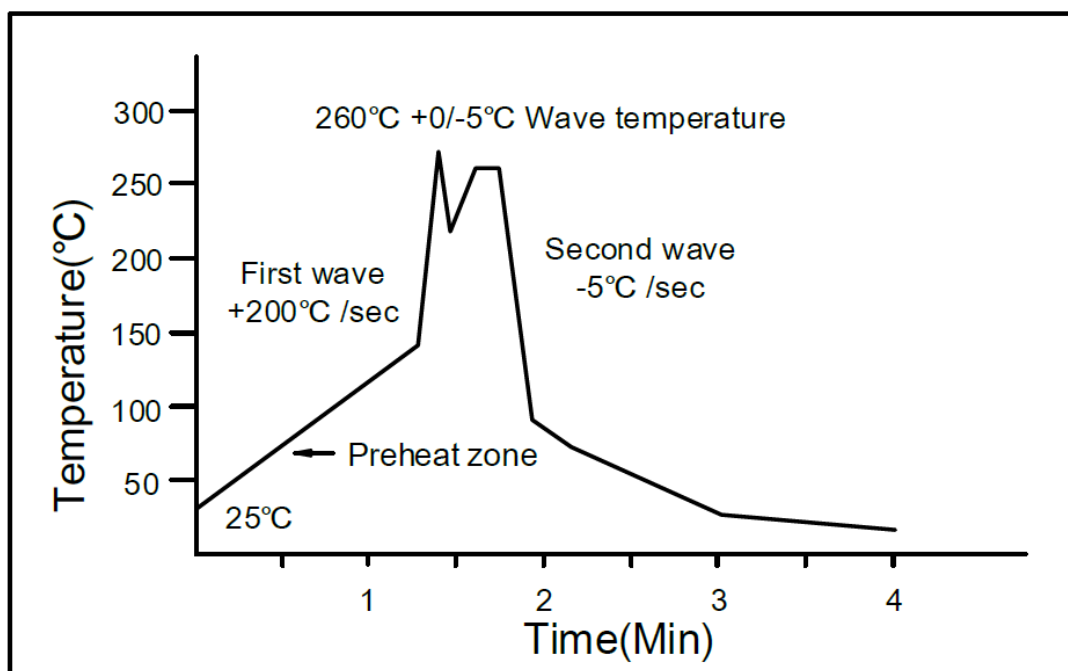
One time soldering is recommended within the condition of temperature.

Temperature:  $260 \pm 0/-5^{\circ}\text{C}$ .

Time: 10 sec.

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

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.

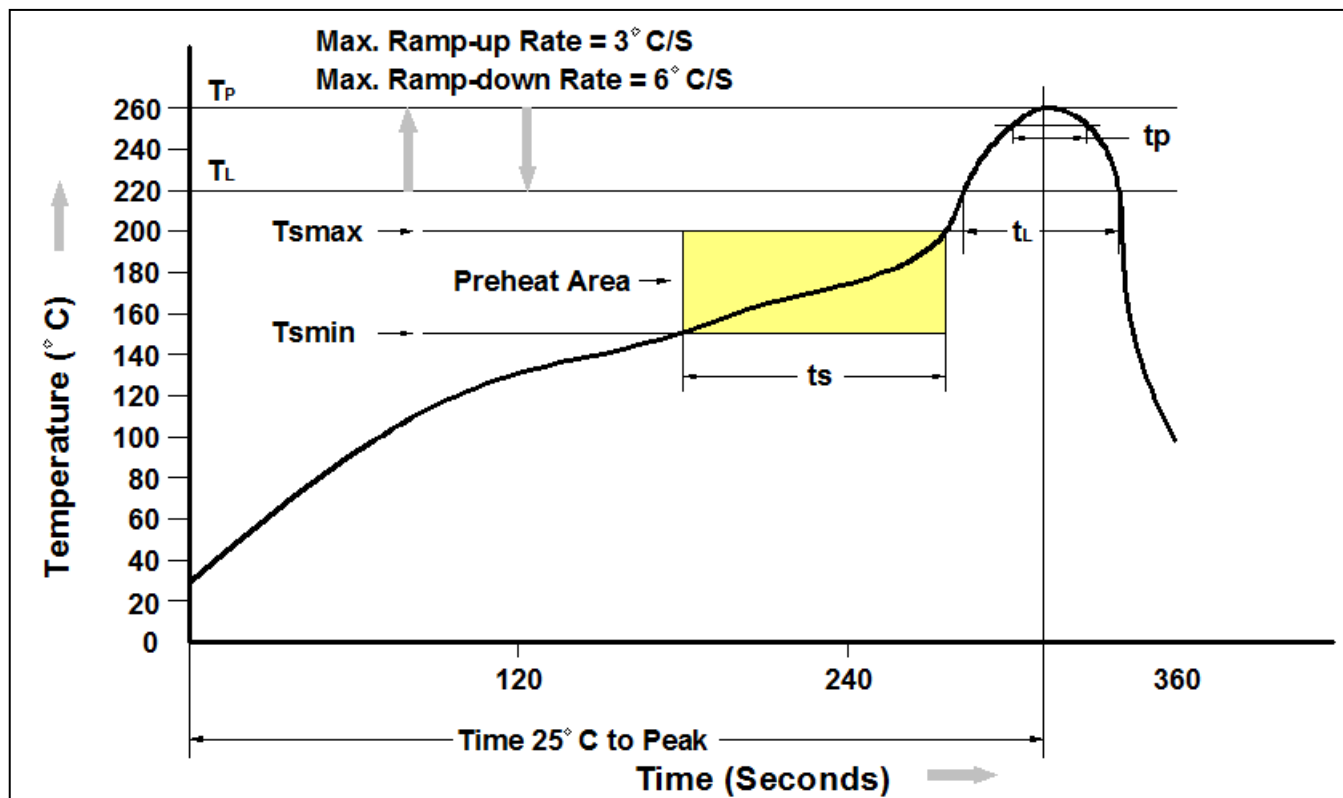


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#### Reflow Profile (Follow the JEDEC standard J-STD-020)



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