



## DC 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
- DC input with transistor output
- Operating temperature range - 55 °C to 125 °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)

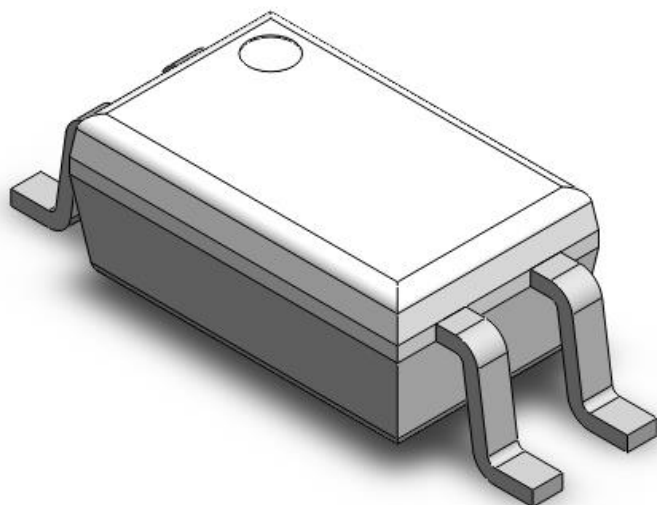
### Description

These series of general purpose optocoupler consists of a photo transistor optically coupled to an Infrared-emitting diode in a 4-lead half pitch Mini-Flat DMC-Isolator® package.

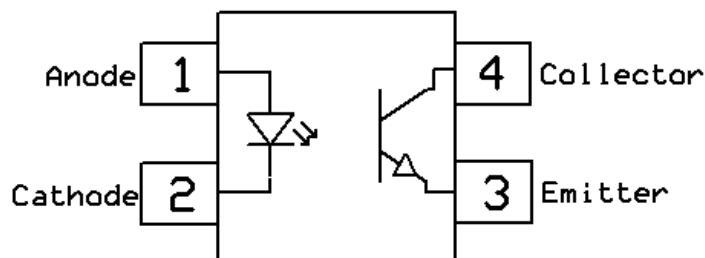
### Applications

- DC-DC Converters
- Programmable controllers
- Telecommunication equipment
- Hybrid substrates that require high density mounting

### Package Outline



### Schematic



**DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator®  
Phototransistor Optocoupler**[www.ct-micro.com](http://www.ct-micro.com)**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.

<b>Symbol</b>	<b>Parameters</b>	<b>Ratings</b>	<b>Units</b>	<b>Notes</b>
$V_{ISO}$	Isolation voltage (AC, 1 minute, 40 ~ 60% R.H.)	3750	$V_{RMS}$	
$P_{TOT}$	Total power dissipation	200	mW	
$T_{OPR}$	Operating temperature	-55 ~ +125	$^\circ\text{C}$	
$T_{STG}$	Storage temperature	-55 ~ +150	$^\circ\text{C}$	
$T_{SOL}$	Soldering temperature (For 10 seconds)	260	$^\circ\text{C}$	
<b>Emitter</b>				
$I_F$	Forward current	50	mA	
$I_{F(TRANS)}$	Peak transient current ( $\leq 1\mu\text{s P.W, 300pps}$ )	1	A	
$V_R$	Reverse voltage	6	V	
$P_D$	Power dissipation	70	mW	
<b>Detector</b>				
$P_C$	Power dissipation	150	mW	
$B_{V_{CEO}}$	Collector-Emitter Breakdown Voltage	80	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown Voltage	7	V	
$I_C$	Collector Current	50	mA	



# CTH217 Series DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator® 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	$I_F = 10\text{mA}$	-	1.24	1.4	V	
$I_R$	Reverse Current	$V_R = 6\text{V}$	-	-	5	$\mu\text{A}$	
$C_{IN}$	Input Capacitance	$f = 1\text{MHz}$	-	10	30	pF	

### Detector Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$B_{V_{CEO}}$	Collector-Emitter Breakdown	$I_C = 0.1\text{mA}$	80	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_E = 0.1\text{mA}$	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	$I_F = 5\text{mA}$ , $V_{CE} = 5\text{V}$	CTH217	50	-	600	%	
			CTH217A	80	-	160		
			CTH217B	130	-	260		
			CTH217C	200	-	400		
			CTH217D	300	-	600		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = 20\text{mA}$ , $I_C = 1\text{mA}$	-	0.1	0.2	V		
$R_{IO}$	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	$5 \times 10^{10}$	-	-	$\Omega$		
$C_{IO}$	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		



# CTH217 Series DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator<sup>®</sup> Phototransistor Optocoupler

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

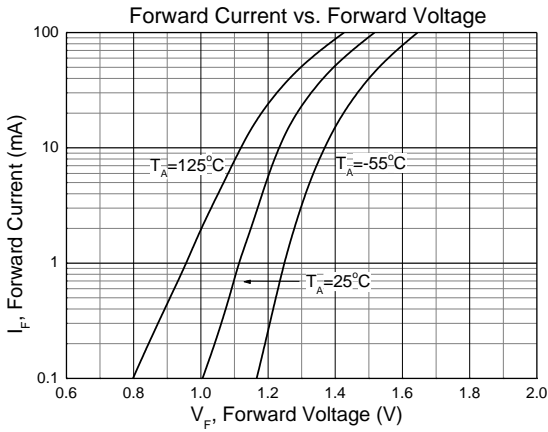


Figure 1

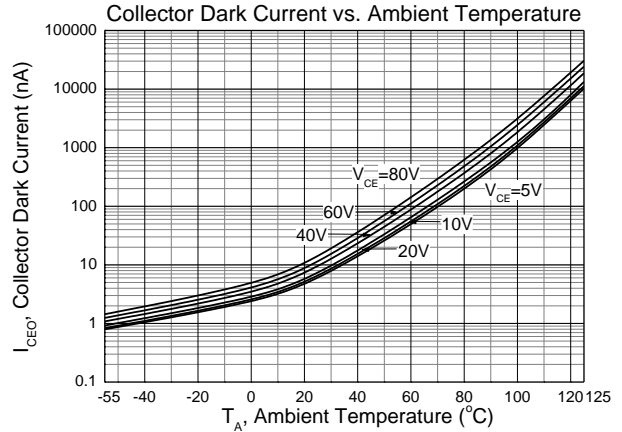


Figure 2

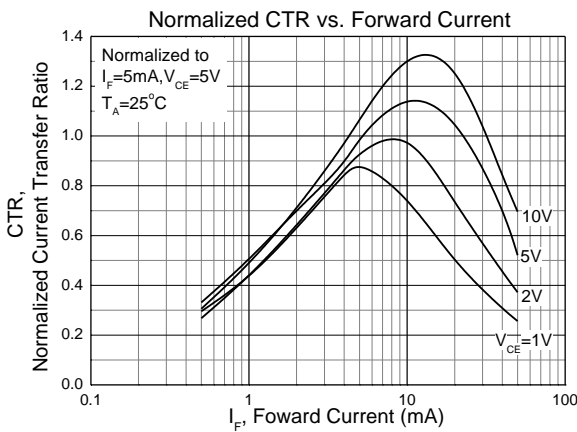


Figure 3

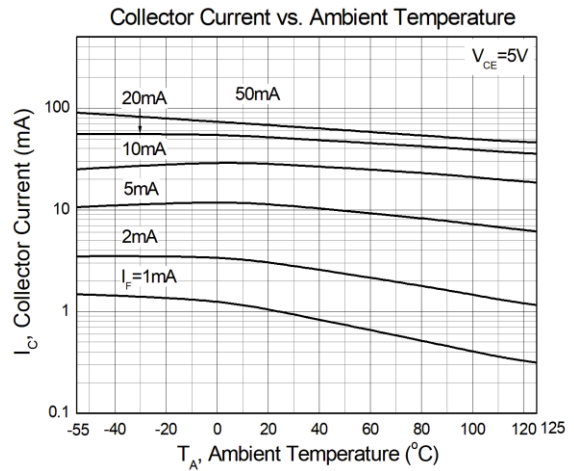


Figure 4

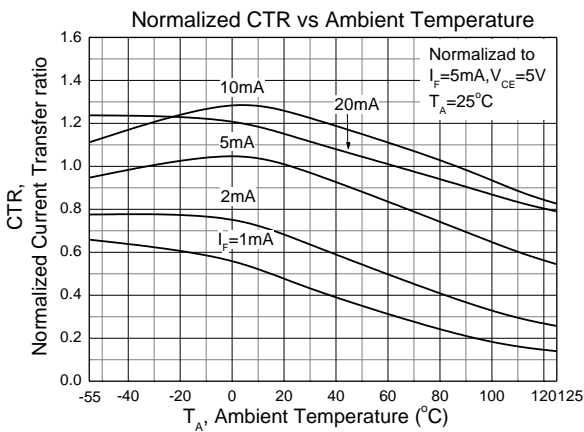


Figure 5

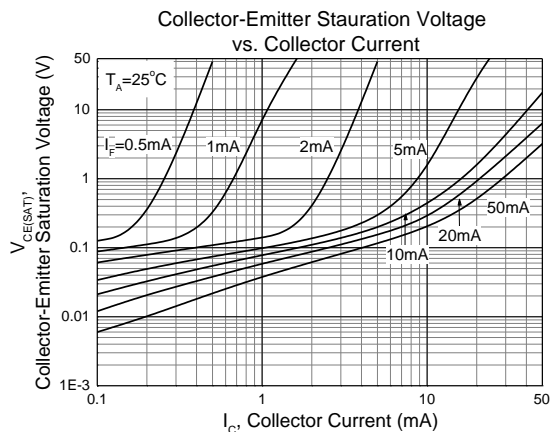


Figure 6



# CTH217 Series DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator<sup>®</sup> Phototransistor Optocoupler

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

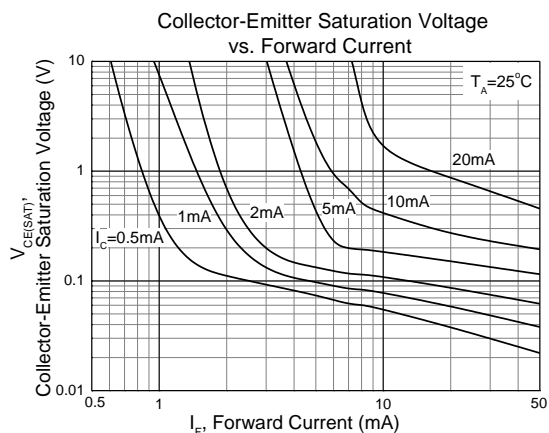


Figure 7

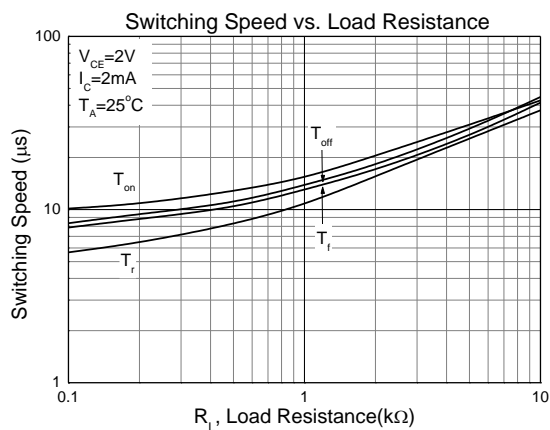


Figure 8

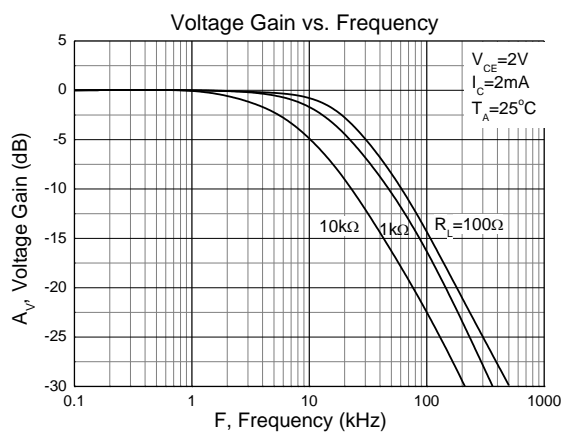


Figure 9

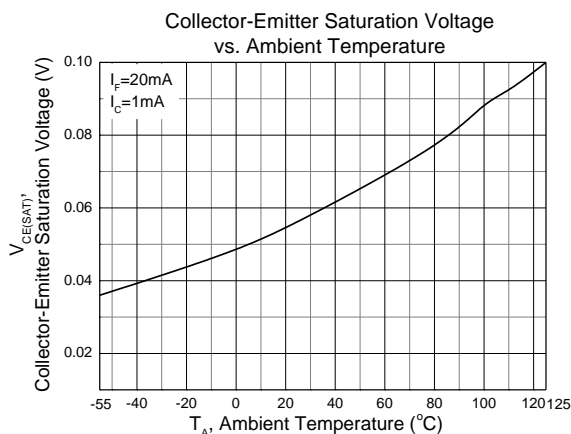


Figure 10



# CTH217 Series DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator<sup>®</sup> Phototransistor Optocoupler

## Test Circuit

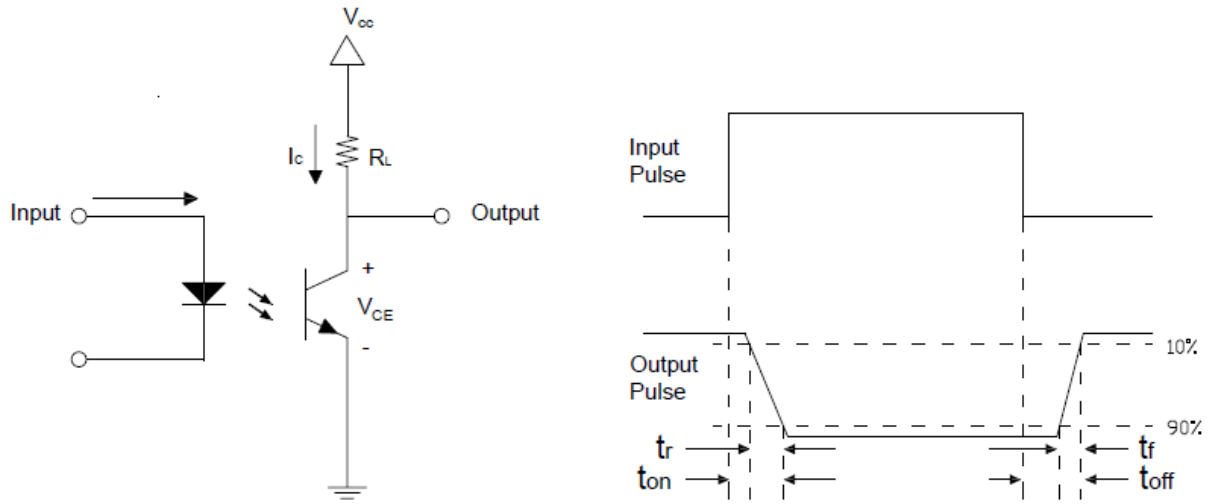


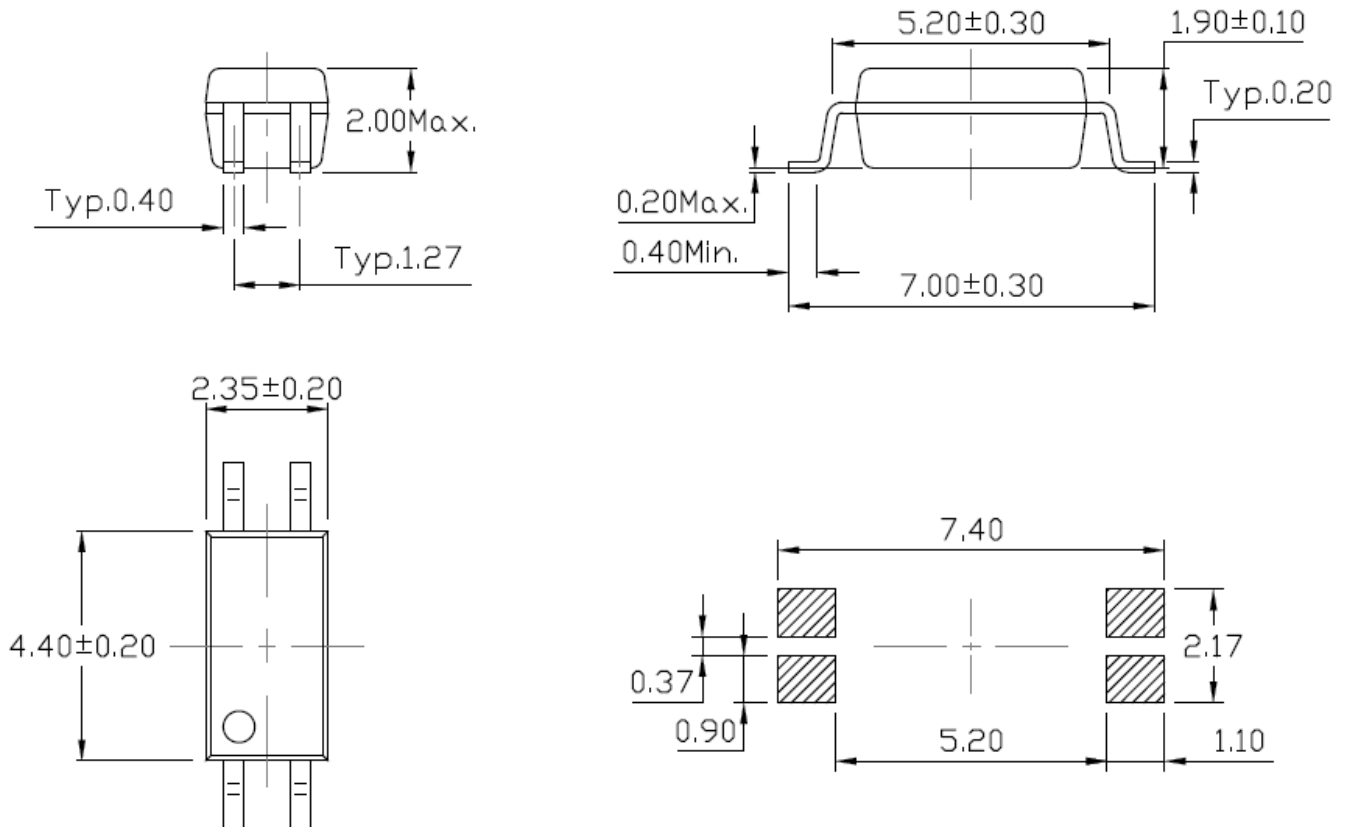
Figure 11: Switching Time Test Circuit



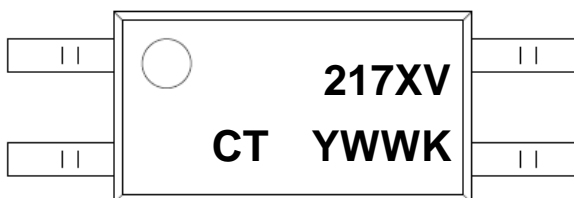
DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator®  
Phototransistor Optocoupler

www.ct-micro.com

Package Dimension *Dimensions in mm unless otherwise stated*



Marking Information



Note:

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



www.ct-micro.com

# CTH217 Series

## DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator® Phototransistor Optocoupler

### Ordering Information

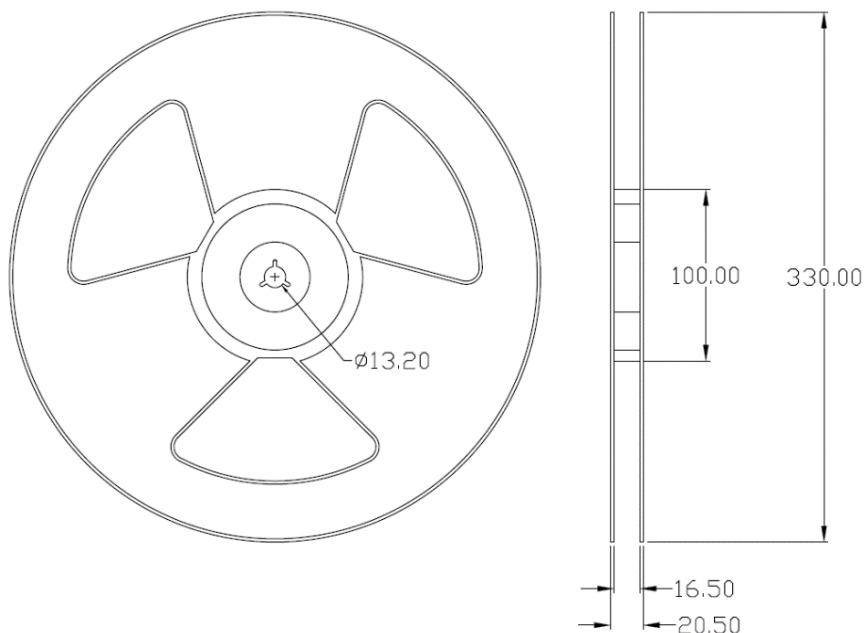
#### CTH217X(V)(Z)

- CT = Denotes "CT Micro"
- H217 = Part Number
- X = CTR Rank Option (Blank, A, B, C or D)
- 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





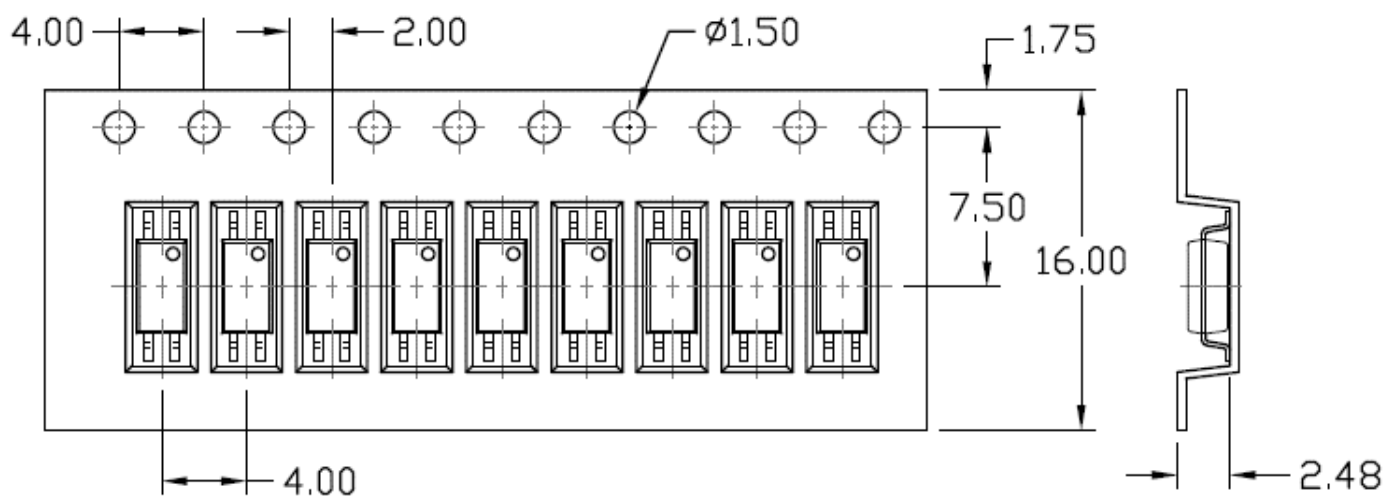


# CTH217 Series DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator® Phototransistor Optocoupler

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

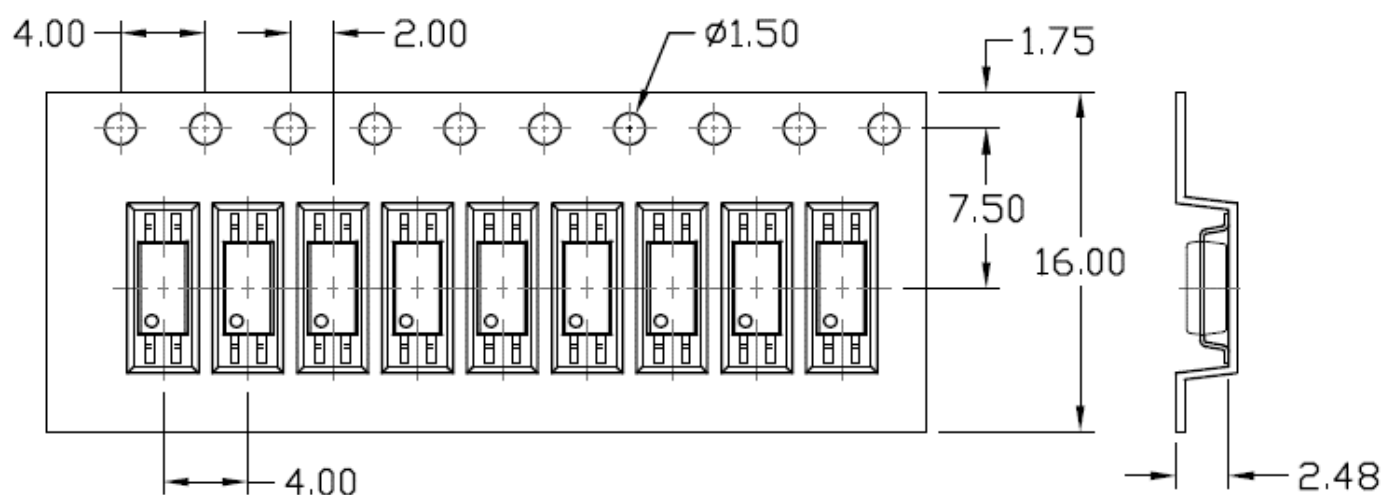
### Option (T1)

Input Direction  
→



### Option (T2)

Input Direction  
→





# CTH217 Series DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator® Phototransistor Optocoupler

## 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)

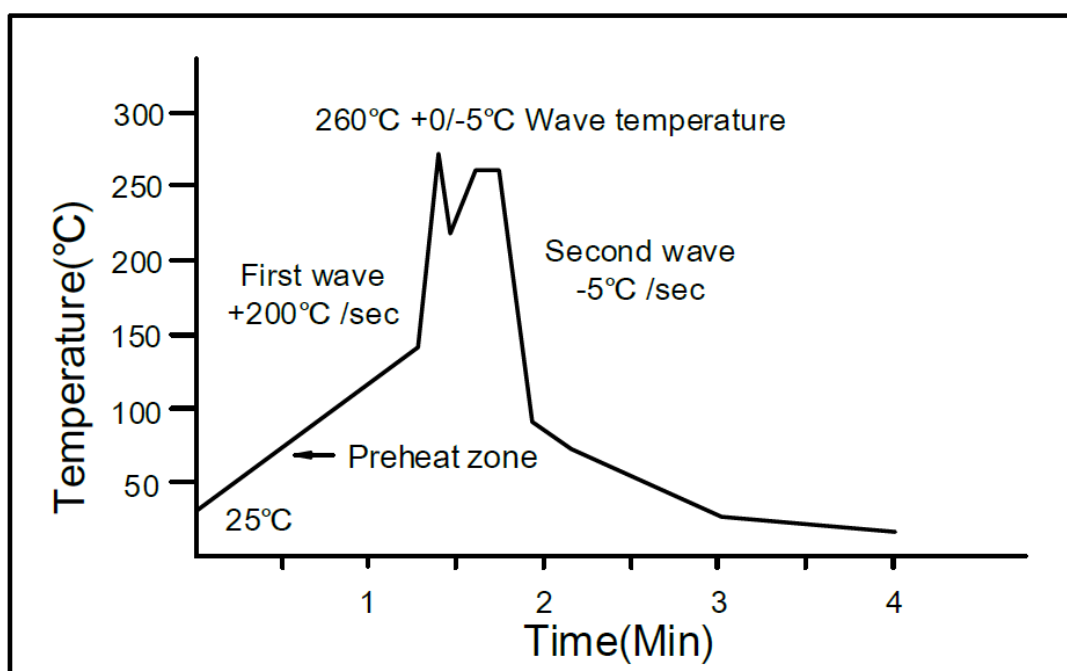
One time soldering is recommended within the condition of temperature.

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.

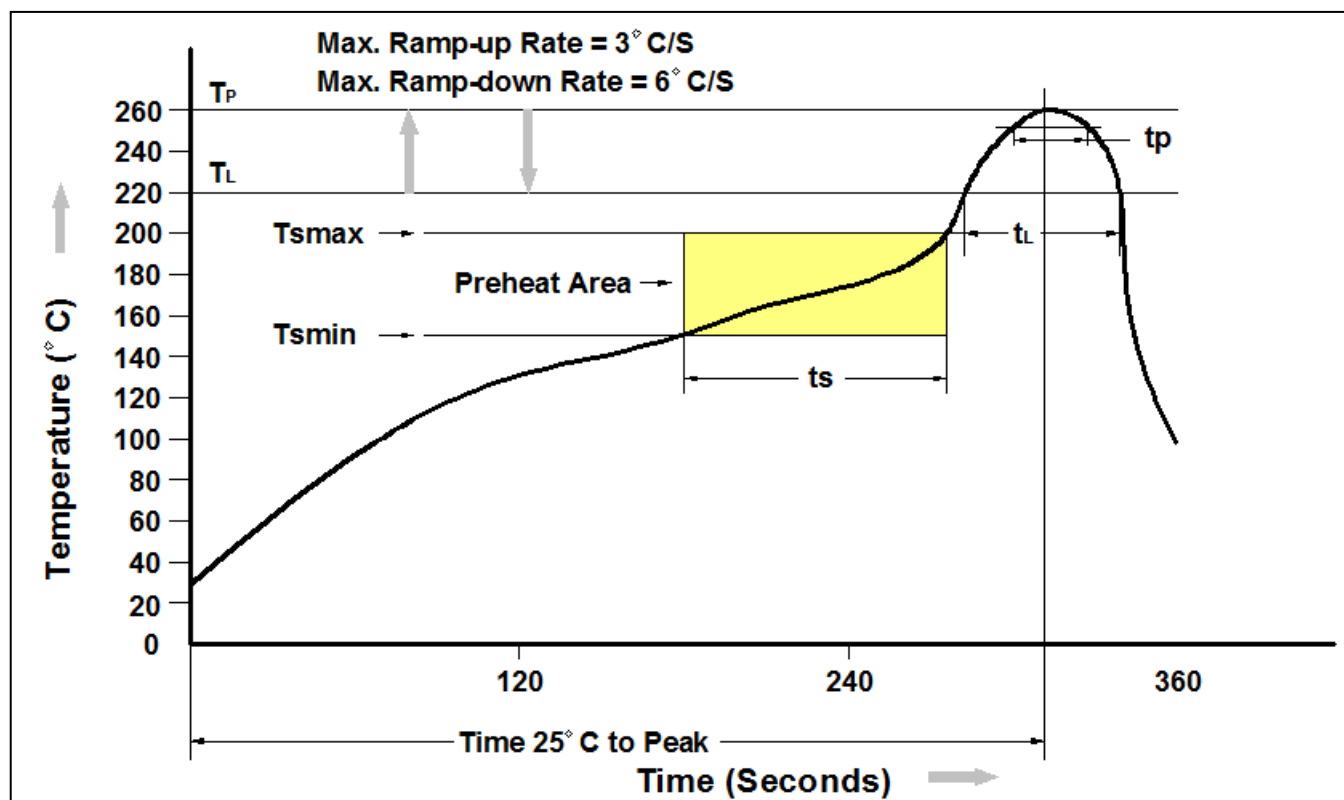


# CTH217 Series

## DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator<sup>®</sup>

### Phototransistor Optocoupler

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



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.



# CTH217 Series DC Input 4-Pin Half Pitch Mini-Flat DMC-Isolator® Phototransistor Optocoupler

---

## DISCLAIMER

**DMC-Isolator® IS A TRADEMARK OF CT MICRO INTERNATIONAL CORPORATION AND/OR ITS SUBSIDIARIES. CT MICRO OWNS THE RIGHTS TO A NUMBER OF PATENTS, TRADEMARKS, COPYRIGHTS AND OTHER INTELLECTUAL PROPERTY.**

---

**CT MICRO RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. CT MICRO DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.**

---

**DISCOLORATION MIGHT OCCUR ON THE PACKAGE SURFACE AFTER SOLDERING, REFLOW OR LONG TERM USE. THIS DOES NOT IMPACT THE PRODUCT PERFORMANCE NOR THE PRODUCT RELIABILITY.**

---

**CT MICRO ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT EXPRESS WRITTEN APPROVAL OF CT MICRO INTERNATIONAL CORPORATION.**

- 1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instruction for use provided in the labelling, can be reasonably expected to result in significant injury to the user.*
- 2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.*