



# CTP17 Series DC 4-Pin DFN DMC-Isolator® Phototransistor Optocoupler

## Features

- High isolation 2500 VRMS
- Patented coplanar structure DMC-Isolator®
- Various CTR selection available
- DC input with Transistor output
- Operating Temperature range - 55 °C to 125 °C
- Leadless
- RoHS and REACH Compliance
- Halogen Free Compliance
- External creepage distance >2.8mm
- Distances through insulation >0.4mm
- Regulatory Approvals
  - ✓ UL - UL1577 (E364000)
  - ✓ VDE - EN60747-5-5

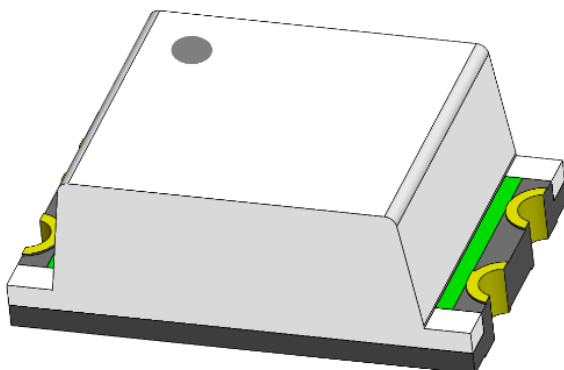
The CTP17 series consists of a photo transistor optically coupled to an Infrared-emitting diode in a DFN DMC-Isolator® package.

## Applications

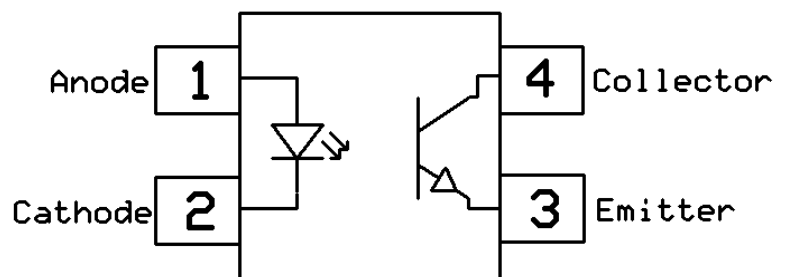
- Switch mode power supplies
- Computer peripheral interface
- Microprocessor system interface

## Description

### Package Outline



### Schematic





# CTP17 Series

## DC 4-Pin DFN DMC-Isolator®

### Phototransistor Optocoupler

#### 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.)	2500	V <sub>RMS</sub>	
P <sub>TOT</sub>	Total power dissipation	135	mW	
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	20	mA	
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W,300pps)	100	mA	
V <sub>R</sub>	Reverse voltage	6	V	
P <sub>D</sub>	Power dissipation	35	mW	
<b>Detector</b>				
P <sub>C</sub>	Power dissipation	100	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	$I_F = 10\text{mA}$	-	1.25	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	$I_C = 100\mu\text{A}$	80	-	-	V	
$B_{V_{ECO}}$	Emitter-Collector Breakdown	$I_{EC} = 100\mu\text{A}$	7	-	-	V	
$I_{CEO}$	Collector-Emitter Dark Current	$V_{CE} = 40\text{V}, I_F = 0\text{mA}$	-	-	100	nA	

### Transfer Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes	
CTR	Current Transfer Ratio	$I_F = 1\text{mA}, V_{CE} = 5\text{V}$	CTP17	100	-	600	%	1
			CTP17B	100	-	300		
			CTP17C	200	-	400		
			CTP17D	300	-	600		
CTR	Current Transfer Ratio	$I_F = 1\text{mA}, V_{CE} = 0.4\text{V}$	50	-	-	%		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = 1\text{mA}, I_C = 0.5\text{mA}$	-	0.2	0.4	V		
$R_{IO}$	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	$5 \times 10^{10}$	-	-	$\Omega$		
$C_{IO}$	Isolation Capacitance	$f = 1\text{MHz}$	-	0.25	1	pF		

### Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$t_r$	Rise Time	$I_C = 2\text{mA}, V_{CE} = 2\text{V}$ $R_L = 100\Omega$	-	5	16	$\mu\text{s}$	
$t_f$	Fall Time		-	6	16		
$t_{on}$	Turn-on time		-	8	20	$\mu\text{s}$	
$t_{off}$	Turn-off time		-	7	20		

Note1: CTP17 is random shipment



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

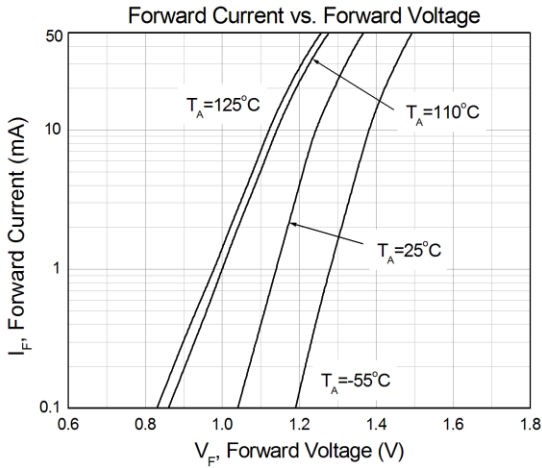


Figure 1

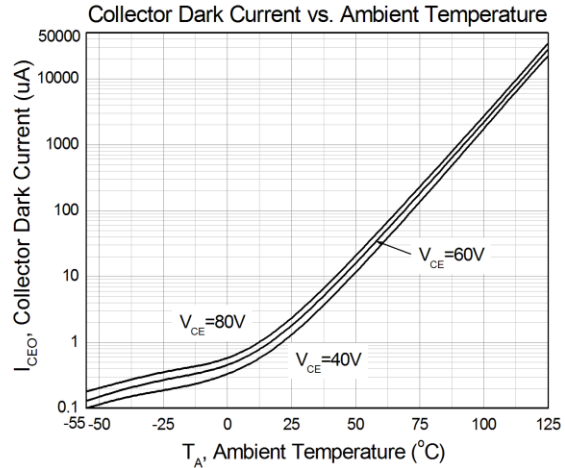


Figure 2

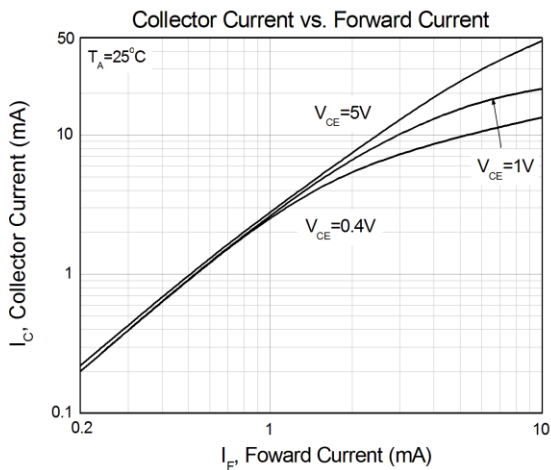


Figure 3

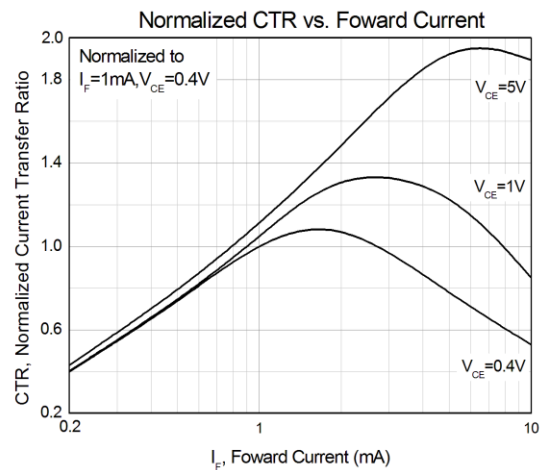


Figure 4

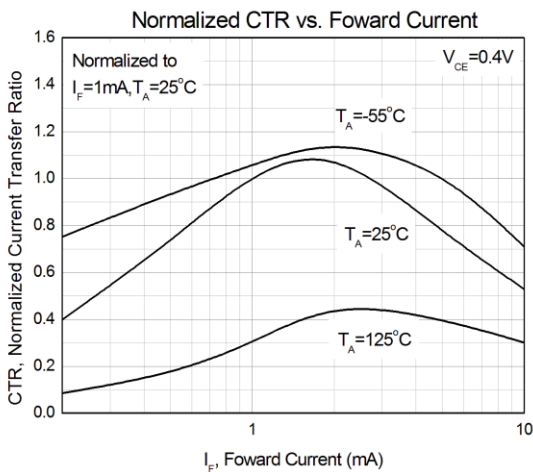


Figure 5

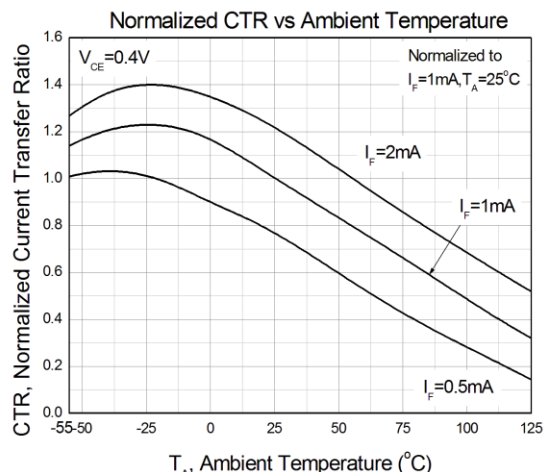


Figure 6



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

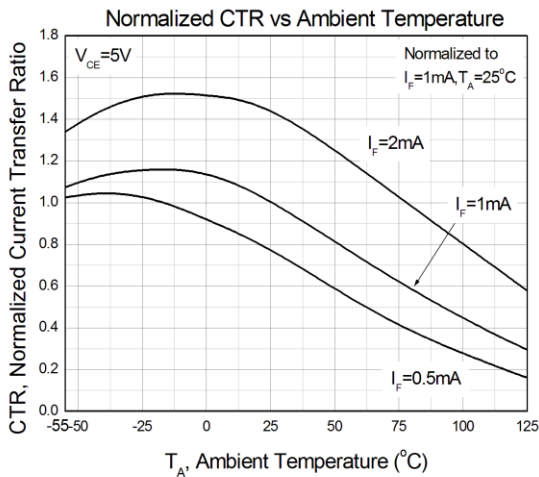


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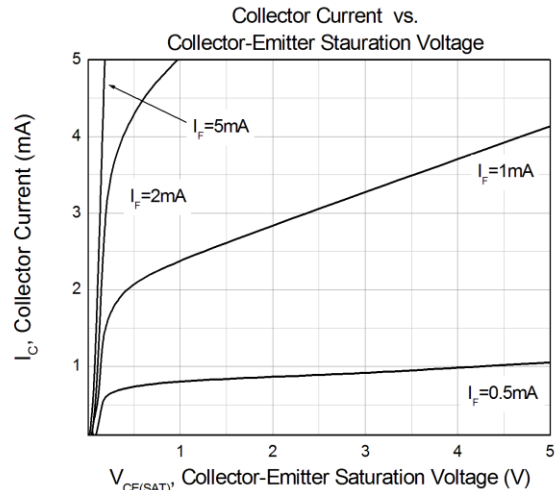


Figure 8

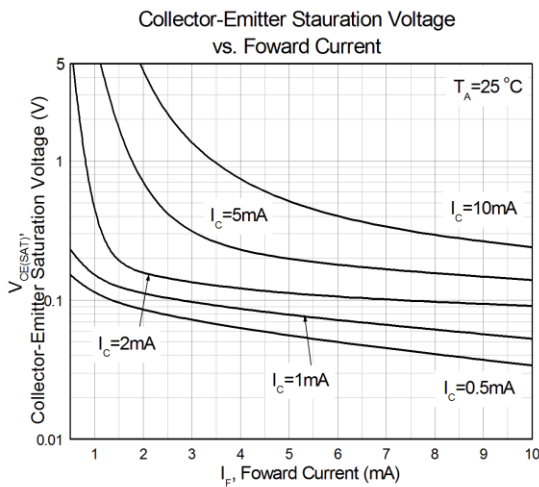


Figure 9

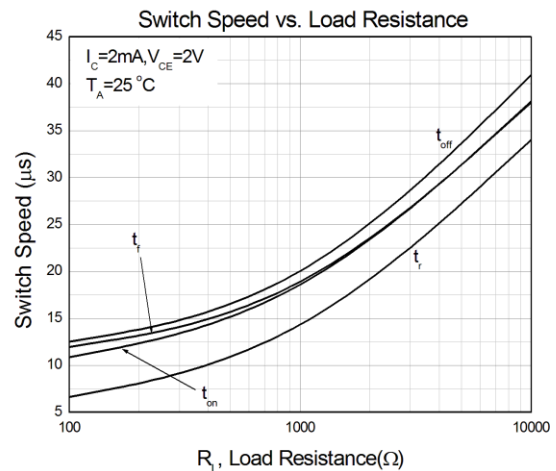


Figure 10

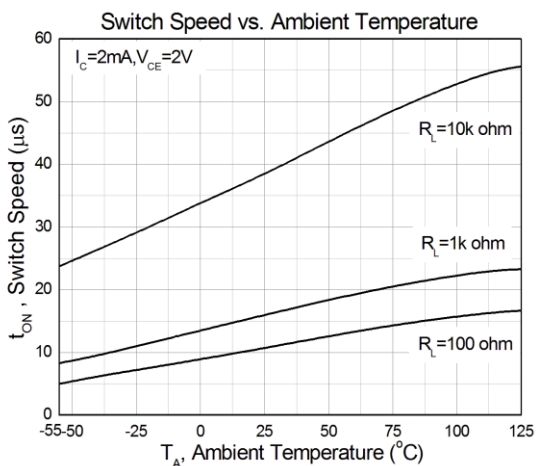


Figure 11

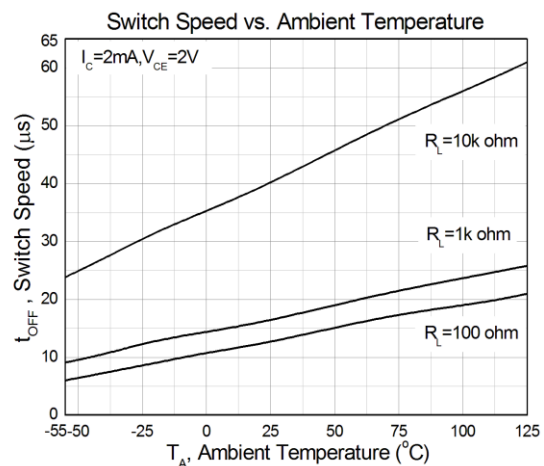
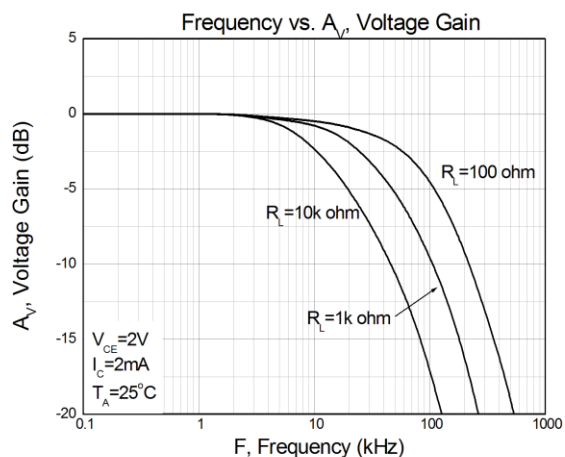


Figure 12



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



## Test Circuit

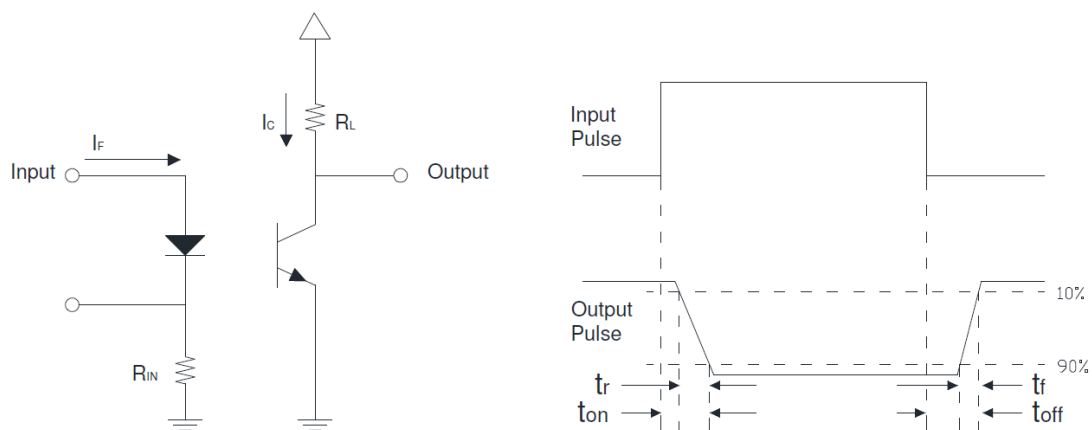
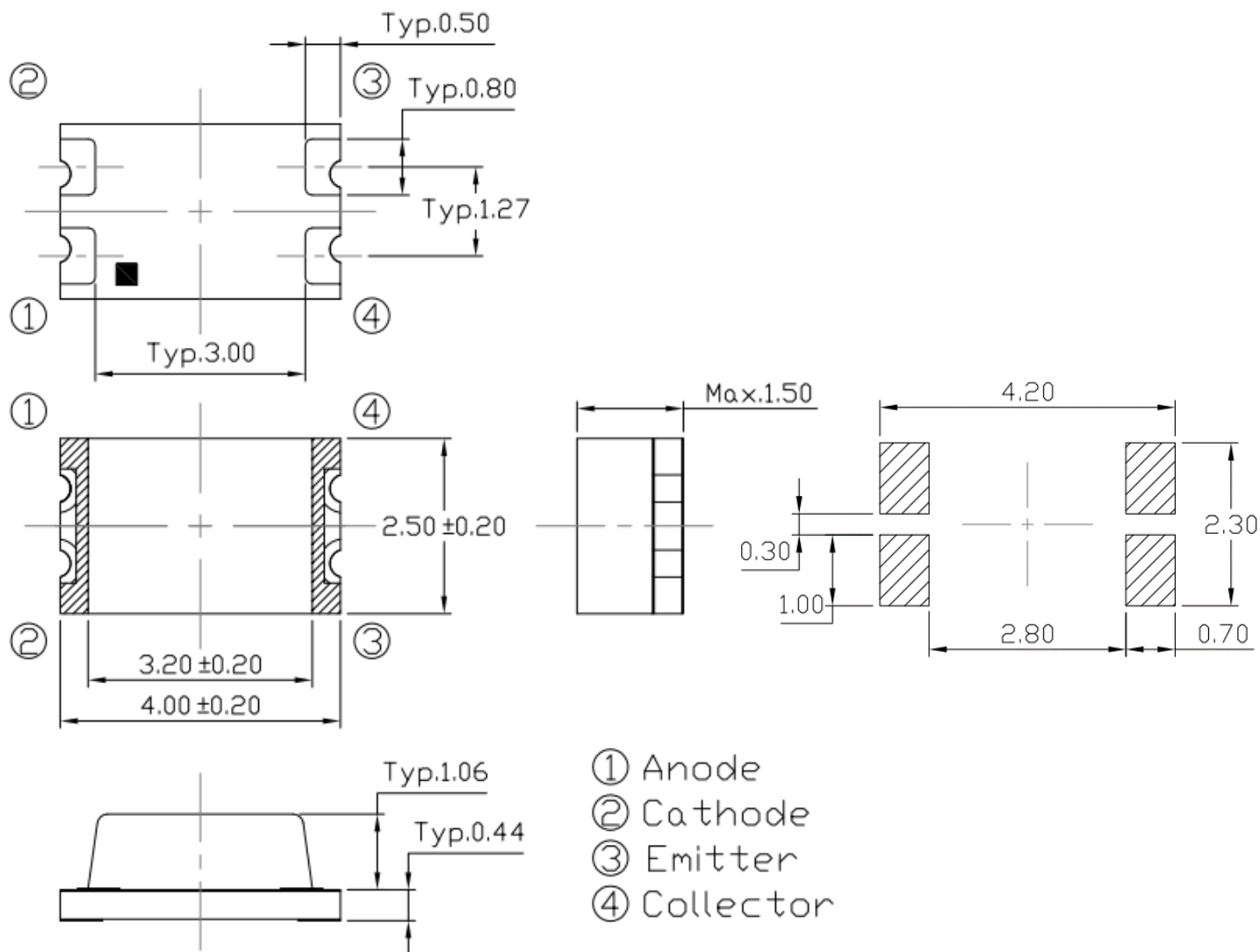


Figure 14: Switching Time Test Circuits

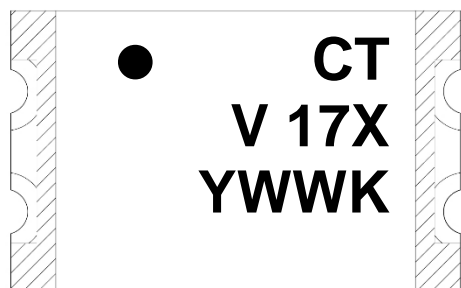


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## Package Dimension *Dimensions in mm unless otherwise stated*



## Marking Information



### Note:

- : Pin 1
- CT : Denotes "CT Micro"
- V : VDE Safety Mark Option (Blank or V)
- 17 : Part Number
- Y : One Digit Year Code
- X : CTR Rank
- WW : Two Digit Work Week
- K : Manufacturing Code



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## Ordering Information

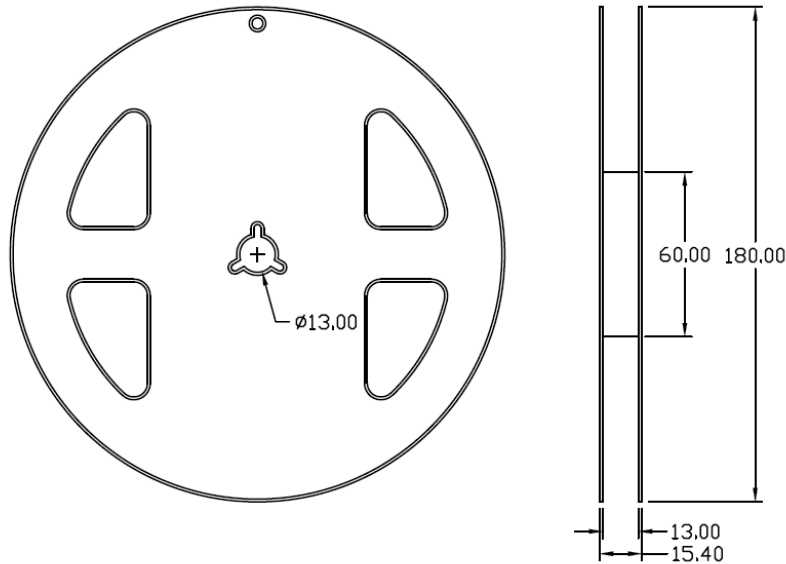
### CTP17X (V)(Z)

- CT = Denotes "CT Micro"
- P17 = Part Numbers (X= 0,1,2,3,4,5,6,7,8,9)
- X = CTR Rank Option (Blank or B, C, D)
- V = VDE Safety Mark Option (Blank or V)
- Z = Tape and Reel Option (T1 only)

Option	Description	Quantity
T1	Option 1 Taping	2500 Units/Reel

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

### Option T1





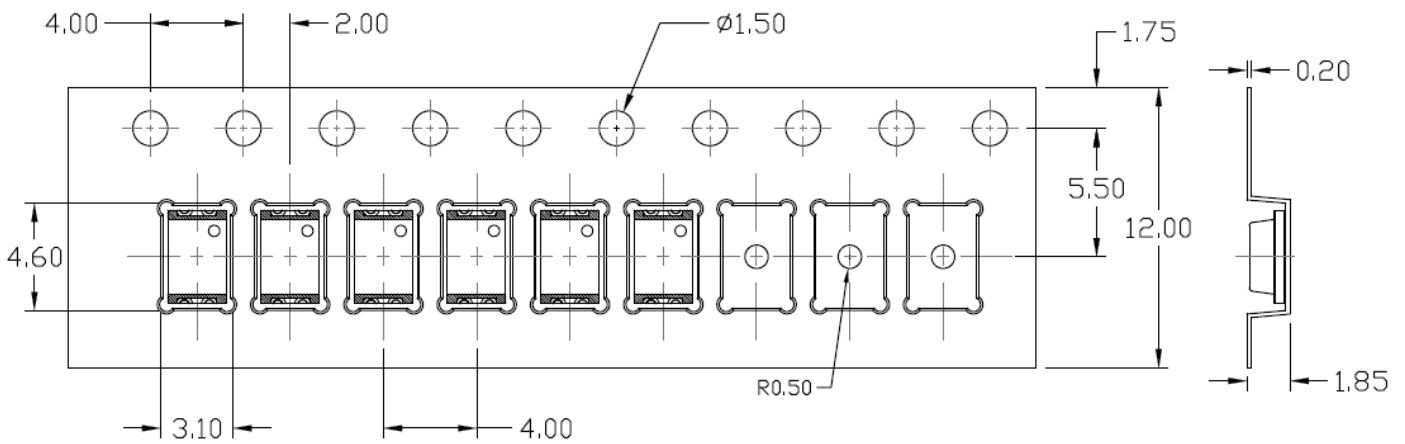


# CTP17 Series DC 4-Pin DFN DMC-Isolator® Phototransistor Optocoupler

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

### Option T1

Input Direction  
→





**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)**

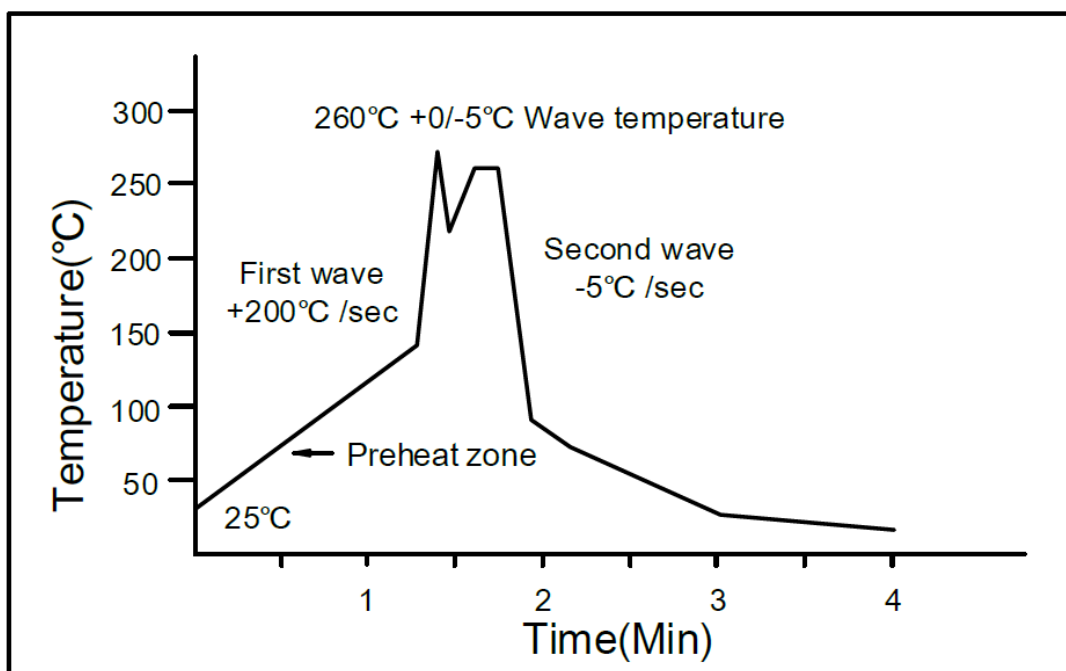
One time soldering is recommended within the condition of temperature.

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

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)**

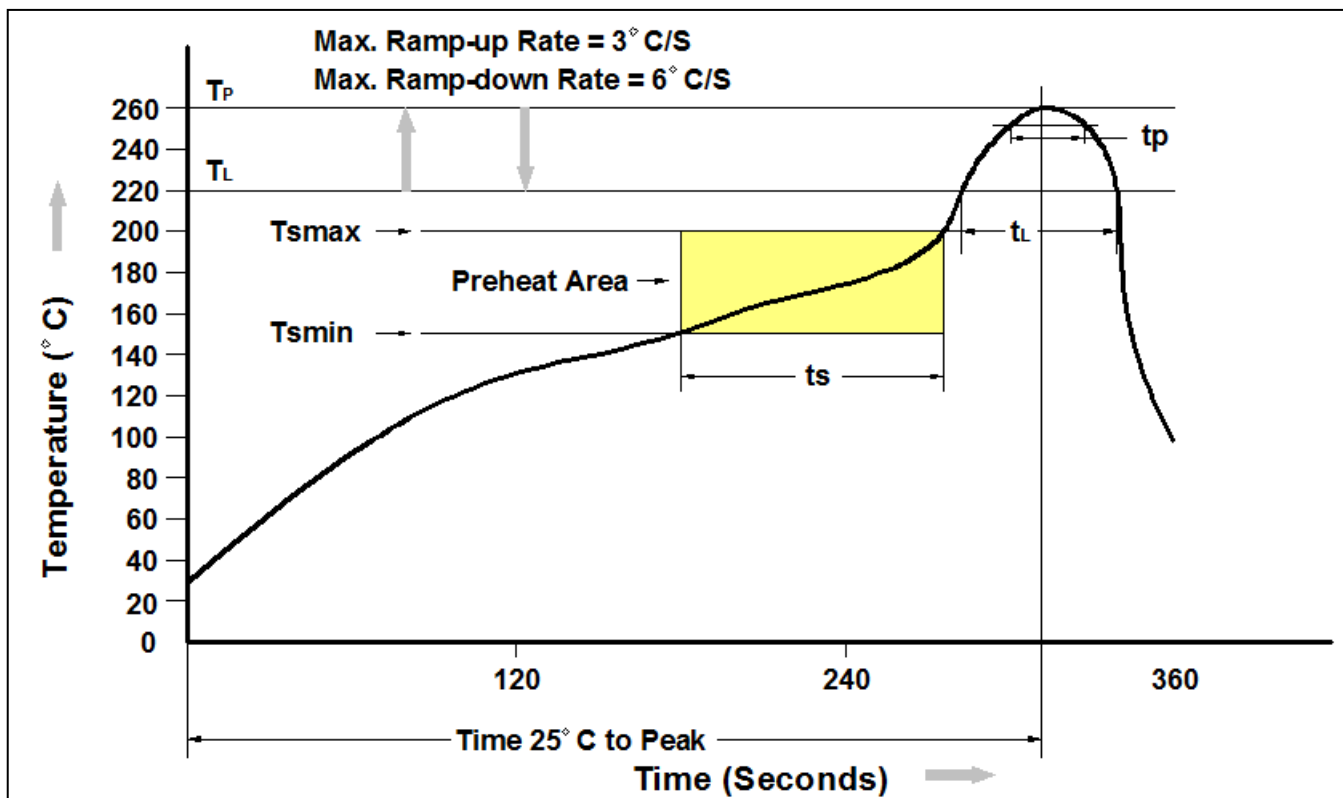
Allow single lead soldering in every single process.

One time soldering is recommended. Temperature:  $350 \pm 10^\circ\text{C}$

Time: 5 sec max.



**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.



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- 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.*