



## Half Pitch Mini-Flat Phototransistor Optocoupler

### Features

- High isolation 3750  $V_{RMS}$
- Multiple CTR selection available
- DC input with transistor output
- Operating temperature range - 55 °C to 125 °C
- RoHS compliance
- REACH compliance
- Halogen compliance
- Regulatory Approvals
  - UL - UL1577 (Pending Approval)
  - VDE - EN60747-5-5 (Pending Approval)
  - CQC – GB4943.1, GB8898 (Pending Approval)
  - IEC60065, IEC60950 (Pending Approval)

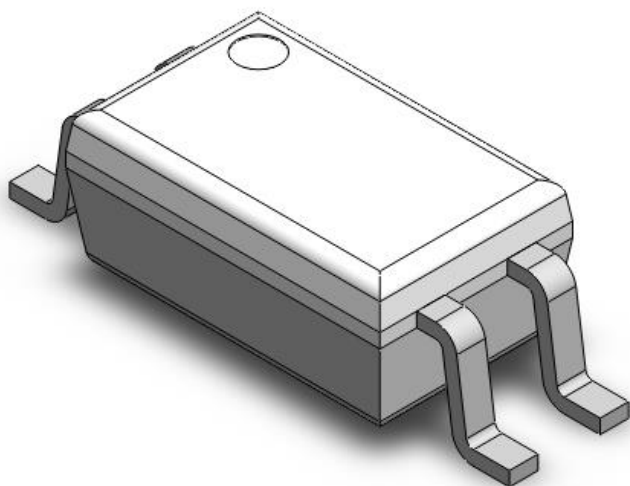
### Description

The CTH291GB series of general purpose optocoupler consists of a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead half pitch Mini-Flat package.

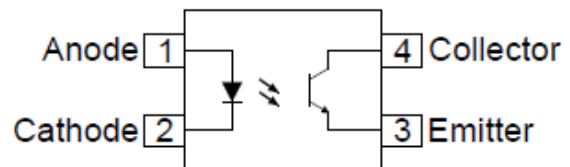
### Applications

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

### Package Outline



### Schematic



CTH291

**Half Pitch Mini-Flat Phototransistor Optocoupler****Absolute Maximum Rating at 25°C**

<b>Symbol</b>	<b>Parameters</b>	<b>Ratings</b>	<b>Units</b>	<b>Notes</b>
V <sub>ISO</sub>	Isolation voltage	3750	V <sub>RMS</sub>	
P <sub>TOT</sub>	Total power dissipation	200	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	60	mA	
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W,300pps)	1000	mA	
V <sub>R</sub>	Reverse voltage	6	V	
P <sub>D</sub>	Emitter power dissipation	70	mW	
<b>Detector</b>				
P <sub>C</sub>	Detector power dissipation	150	mW	
B <sub>VCEO</sub>	Collector-Emitter Breakdown Voltage	80	V	
B <sub>VECO</sub>	Emitter-Collector Breakdown Voltage	6	V	
I <sub>C</sub>	Collector Current	50	mA	

**Half Pitch Mini-Flat Phototransistor Optocoupler****Electrical Characteristics**  $T_A = 25^\circ\text{C}$  (unless otherwise specified)**Emitter 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>
$V_F$	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**

<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>
$B_{V_{CEO}}$	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	$V_{CE} = 48\text{V}, I_F = 0\text{mA}$	-	-	100	nA	
		$V_{CE} = 48\text{V}, T_a = 85^\circ\text{C}$	-	-	50	$\mu\text{A}$	

**Transfer 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>
CTR	Current Transfer Ratio	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$	100	-	400	%	
$V_{CE(SAT)}$	Collector -Emitter Saturation Voltage	$I_F = 1\text{mA}, I_C = 0.2\text{mA}$	-	-	0.4	V	
$R_{IO}$	Isolation Resistance	$V_{IO} = 500\text{V}_{DC}$	$5 \times 10^{10}$	-	-	$\Omega$	
$C_{IO}$	Isolation Capacitance	$f = 1\text{MHz}$	-	0.25	1	pF	

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**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>
$t_r$	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	$\mu\text{s}$	
$t_{off}$	Turn-off time				7		20



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## Typical Characteristic Curves

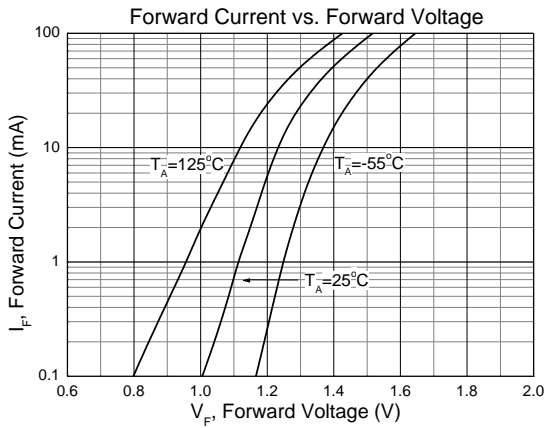


Figure 1

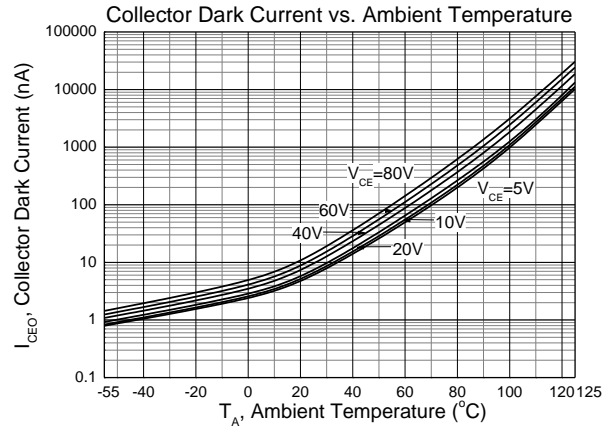


Figure 2

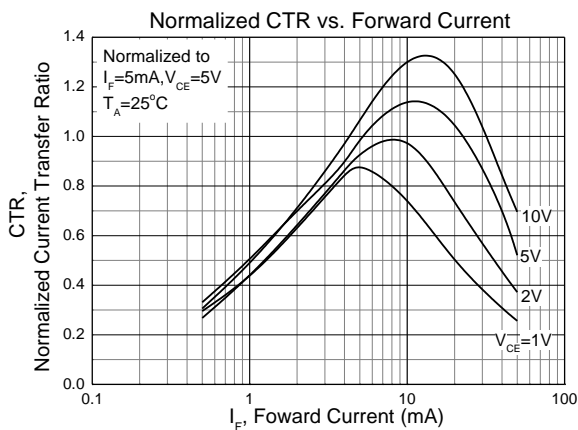


Figure 3

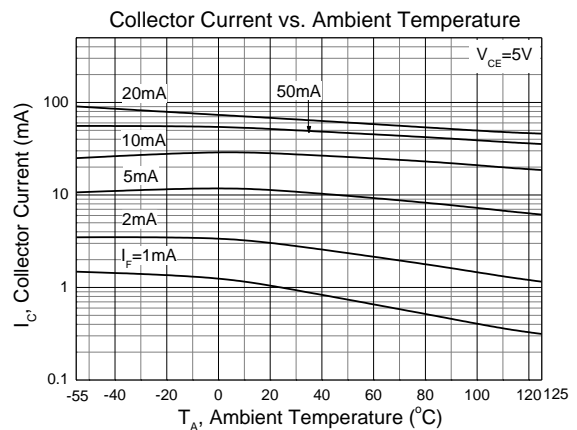


Figure 4

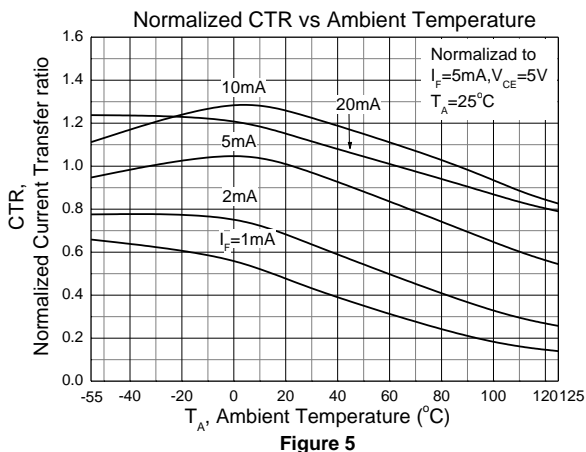


Figure 5

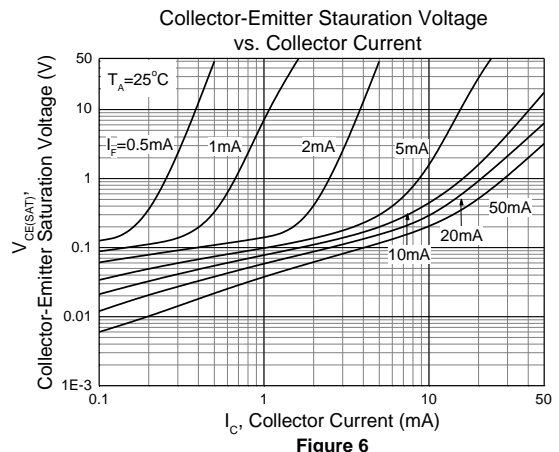
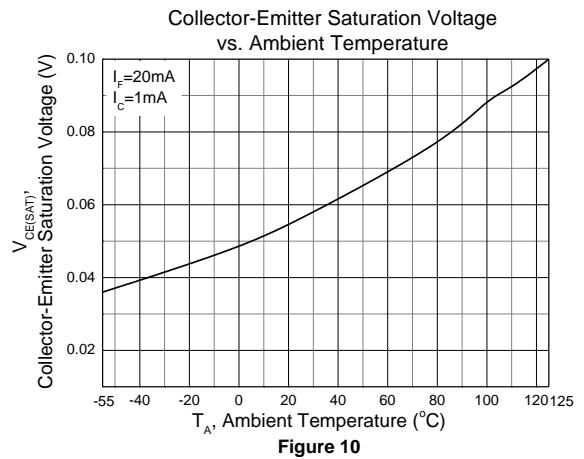
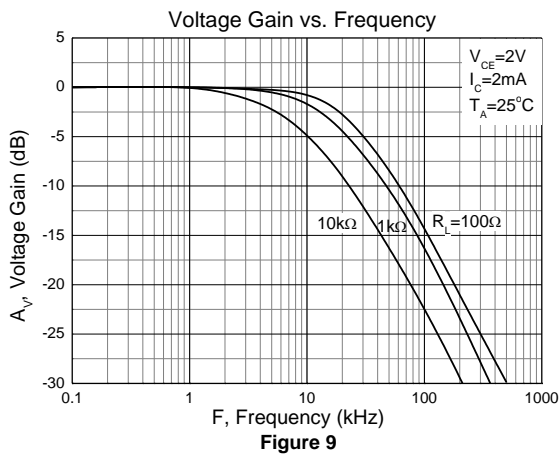
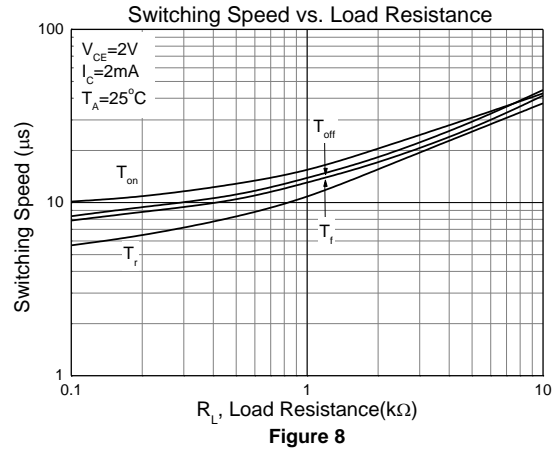
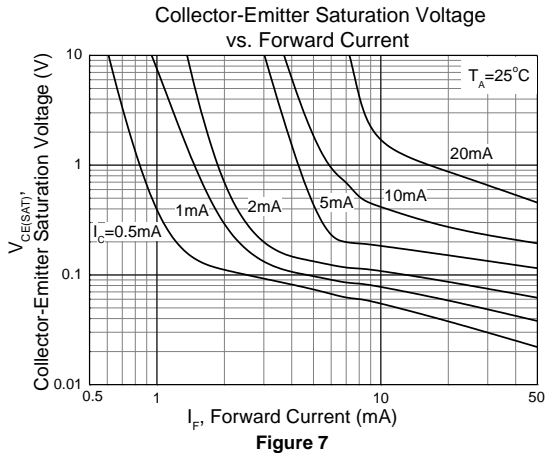


Figure 6



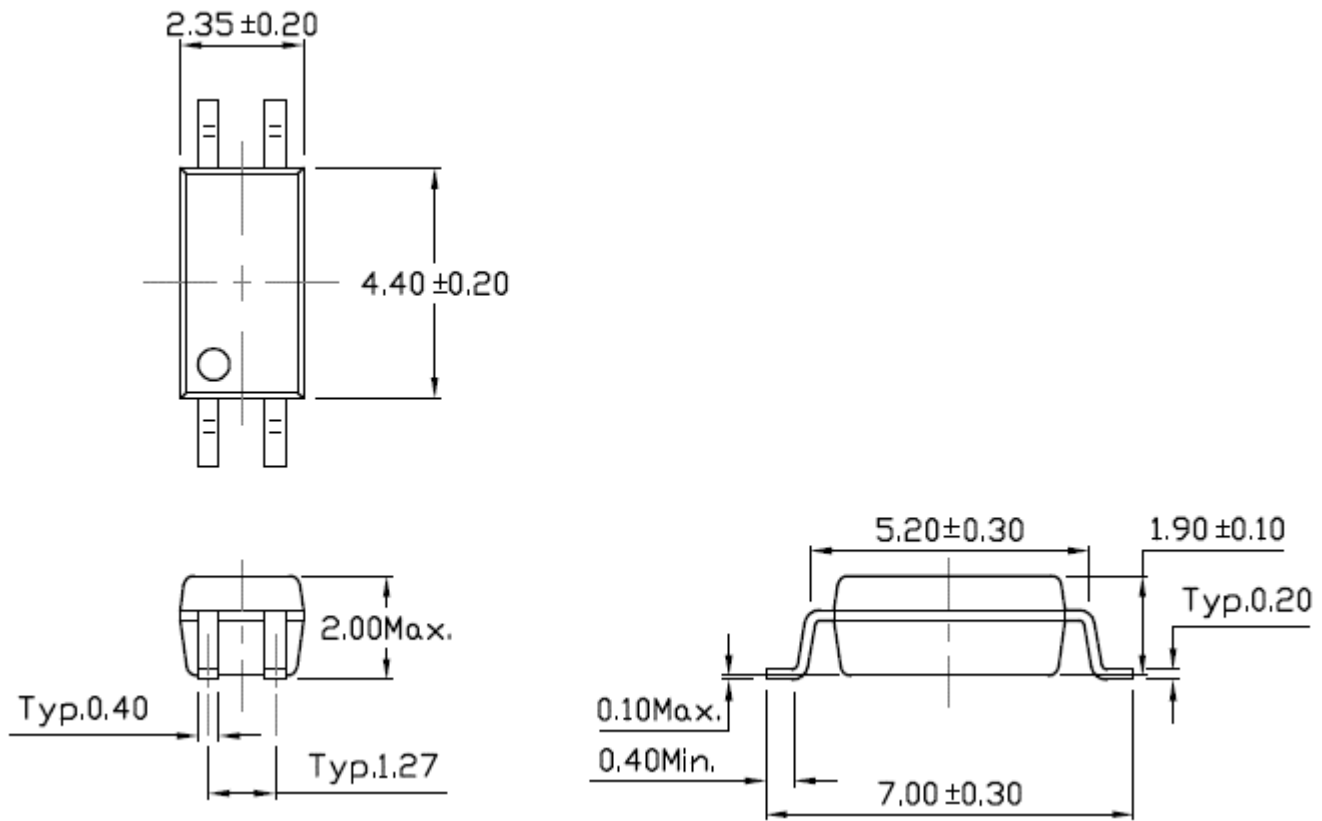
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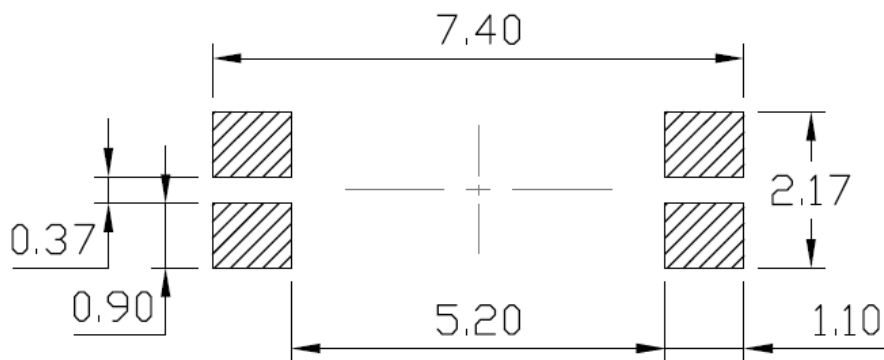


# Half Pitch Mini-Flat Phototransistor Optocoupler

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



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





**Half Pitch Mini-Flat Phototransistor Optocoupler**

**Marking Information**



**Note:**

- CT : Denotes “CT Micro”
- 291 : Part Number
- GB : CTR Rank
- V : VDE Safety Option (V or none)
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code

**Ordering Information**

**CTH291GB(V)(Y)**

- CT : Denotes “CT Micro”
- 291 : Part Number
- GB : CTR Rank
- V : VDE Safety Option (V or none)
- Y : Tape and reel option (T1 or T2)

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



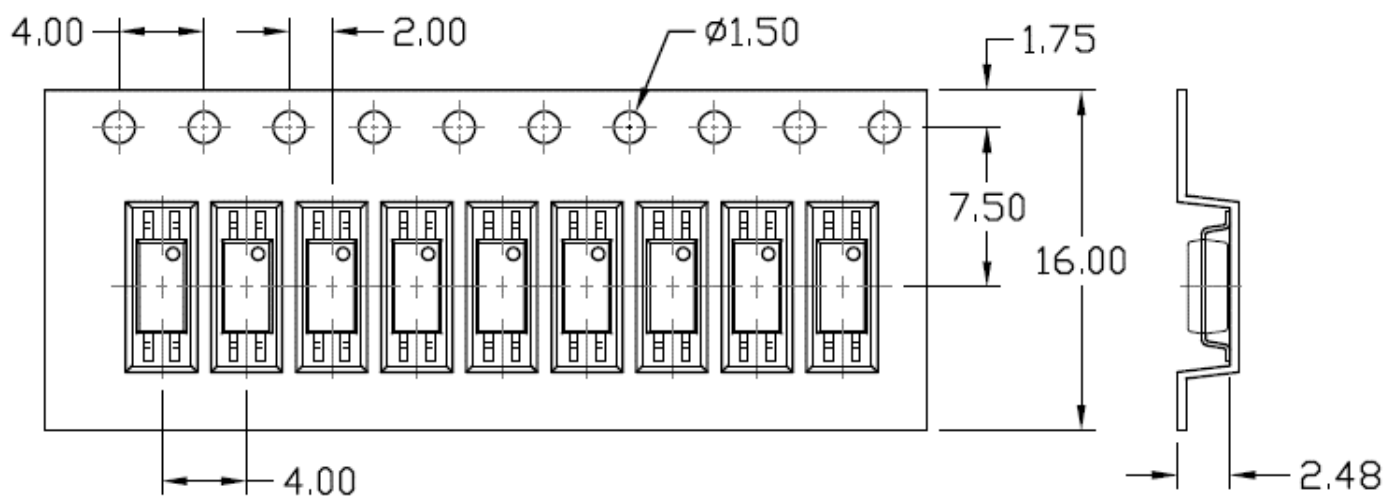


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## Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

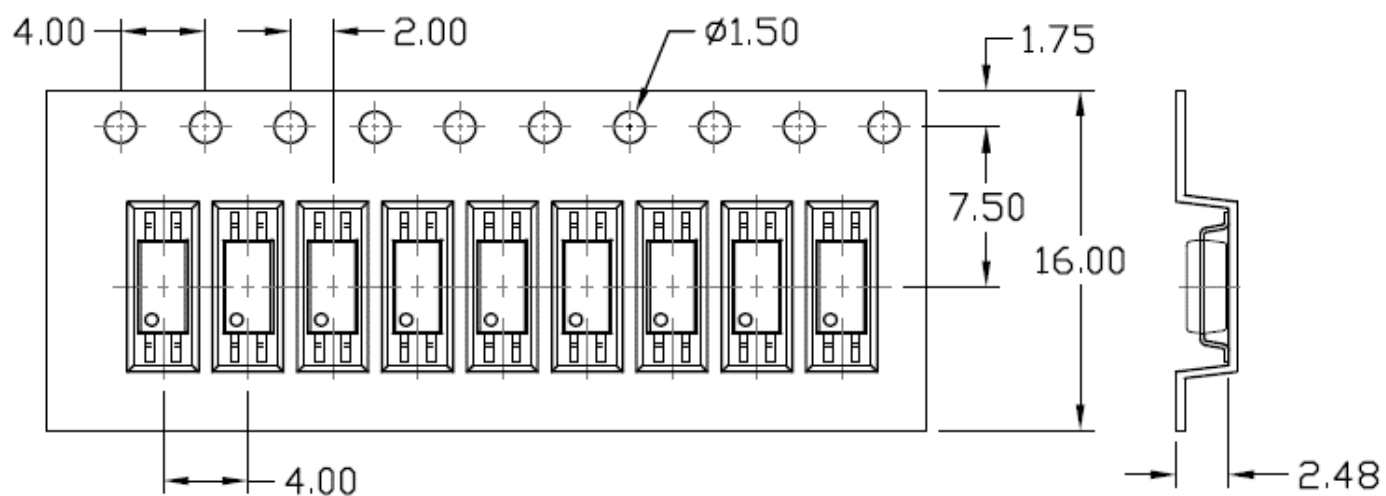
### Option T1

Input Direction  
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### Option T2

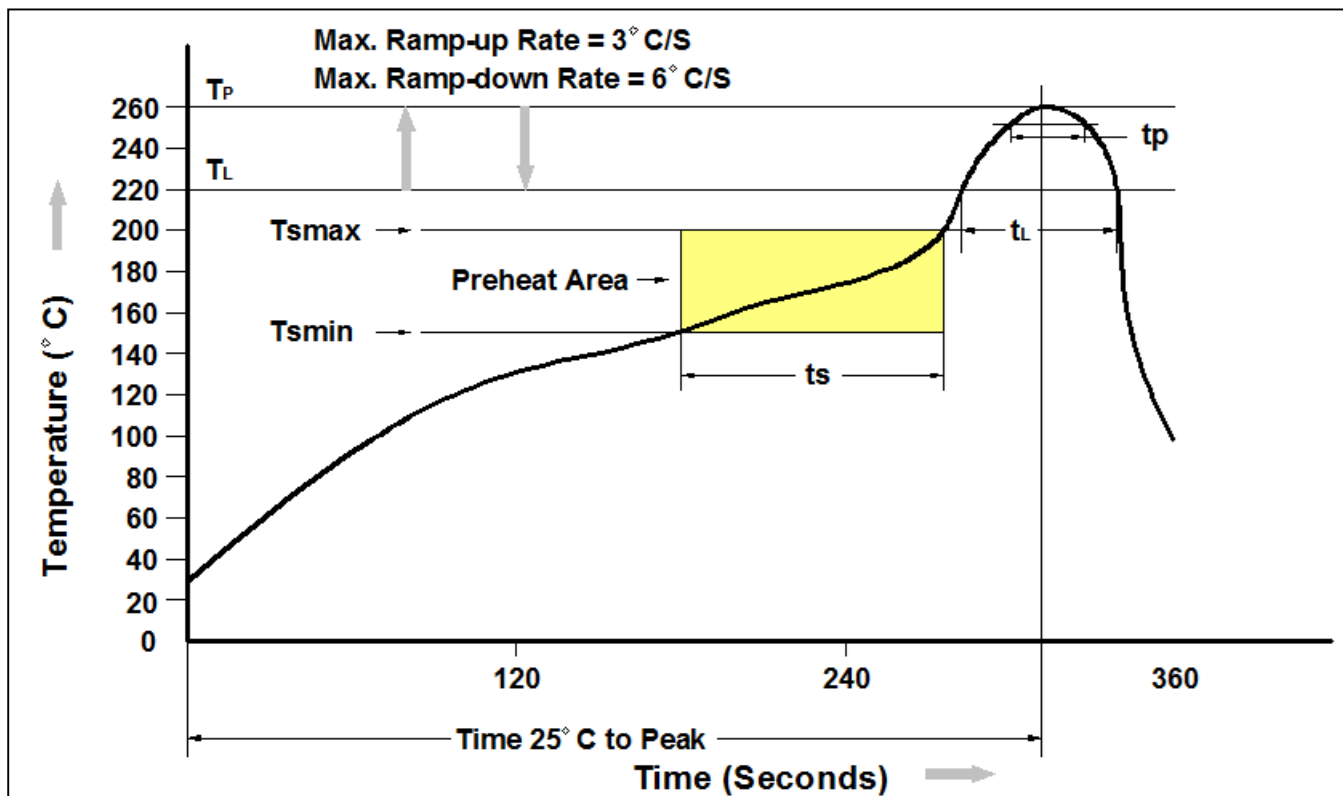
Input Direction  
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## Half Pitch Mini-Flat Phototransistor Optocoupler

### Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T <sub>sm</sub> )	150°C
Temperature Max. (T <sub>sl</sub> )	200°C
Time (t <sub>s</sub> ) from (T <sub>sm</sub> to T <sub>sl</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.



**CTH291GB**

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