



## 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)

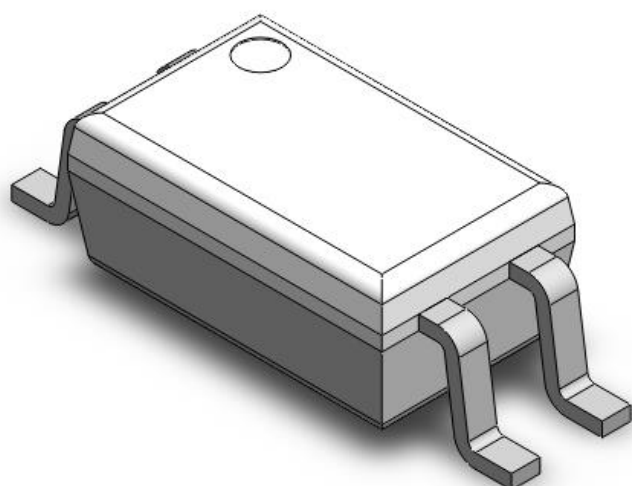
### Description

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.

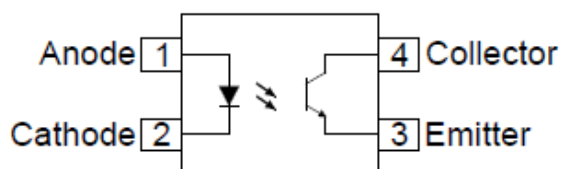
### Applications

- 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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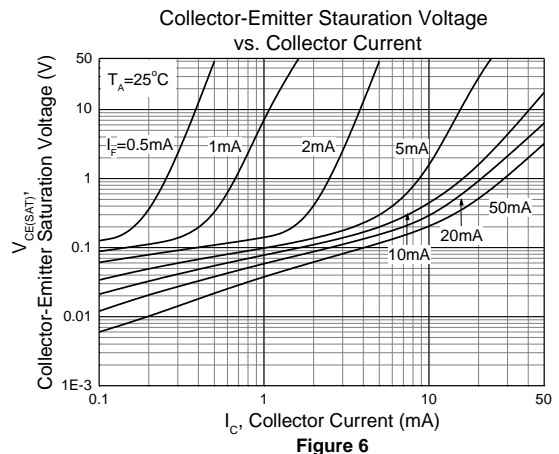
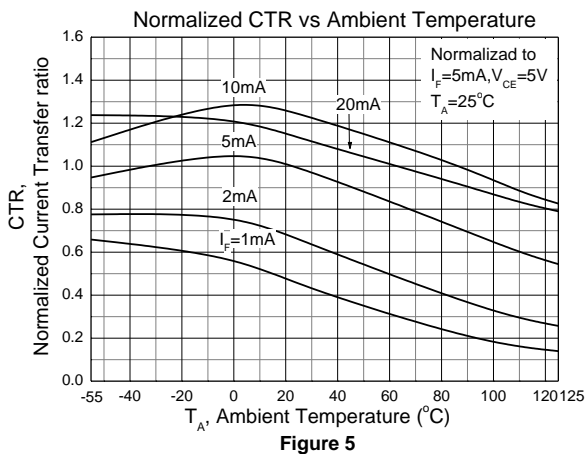
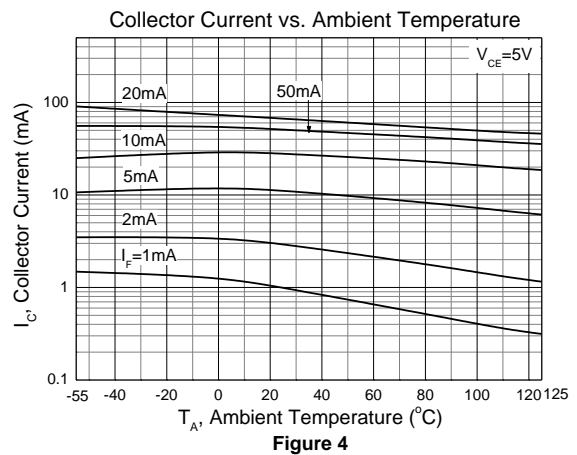
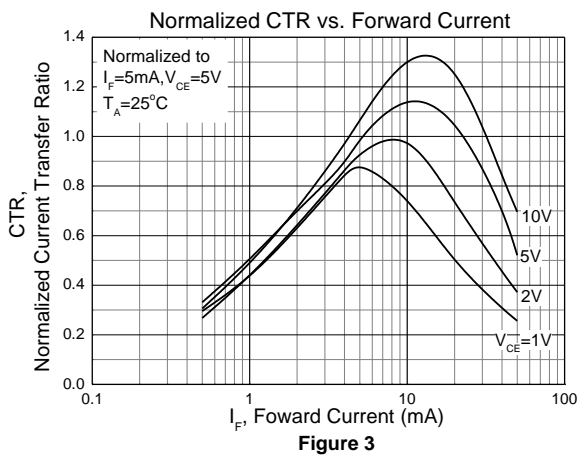
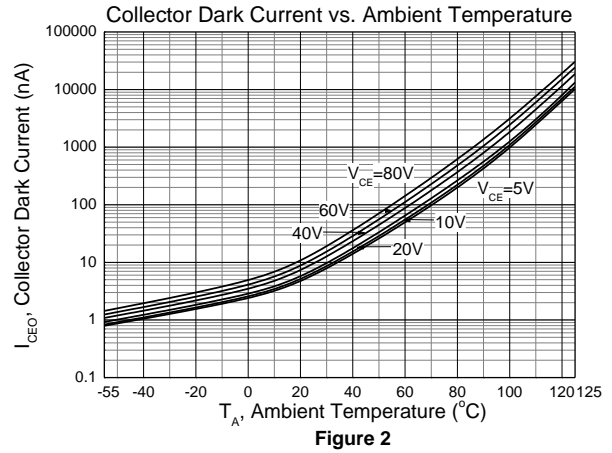
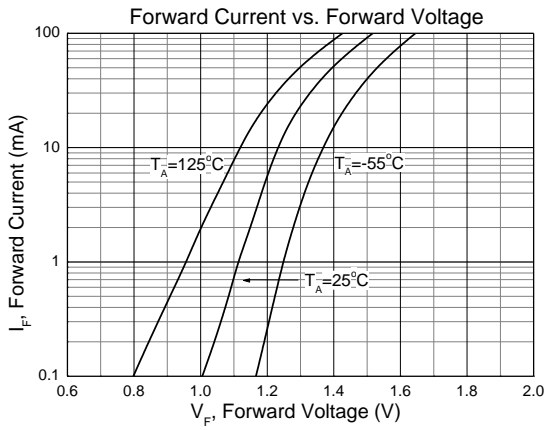
**Switching Characteristics**

<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



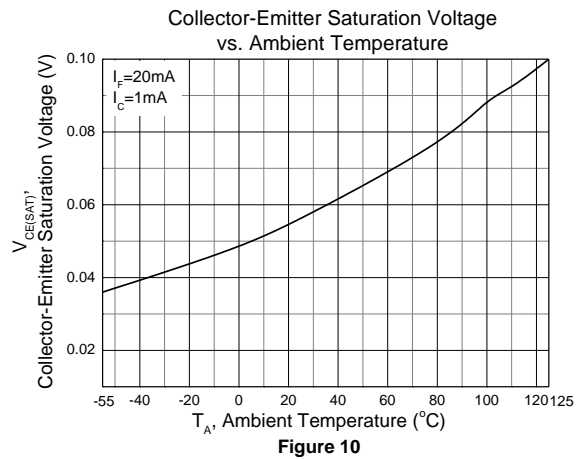
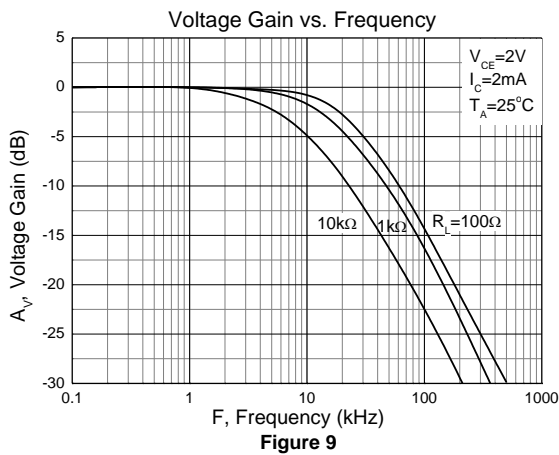
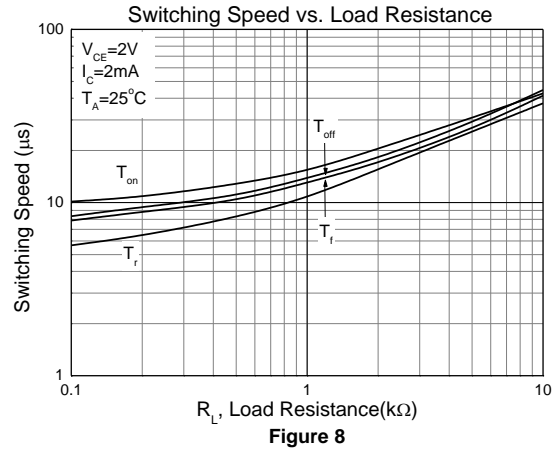
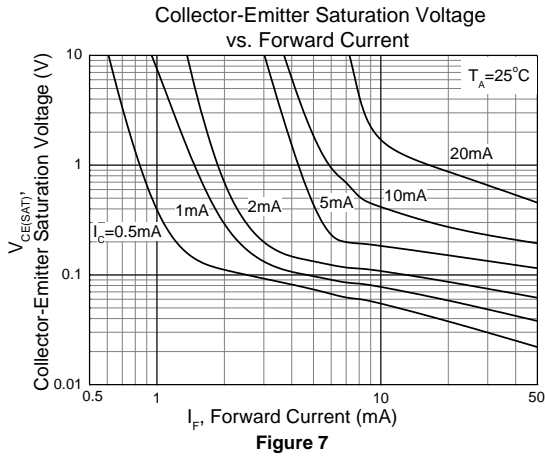
# Half Pitch Mini-Flat Phototransistor Optocoupler

## Typical Characteristic Curves





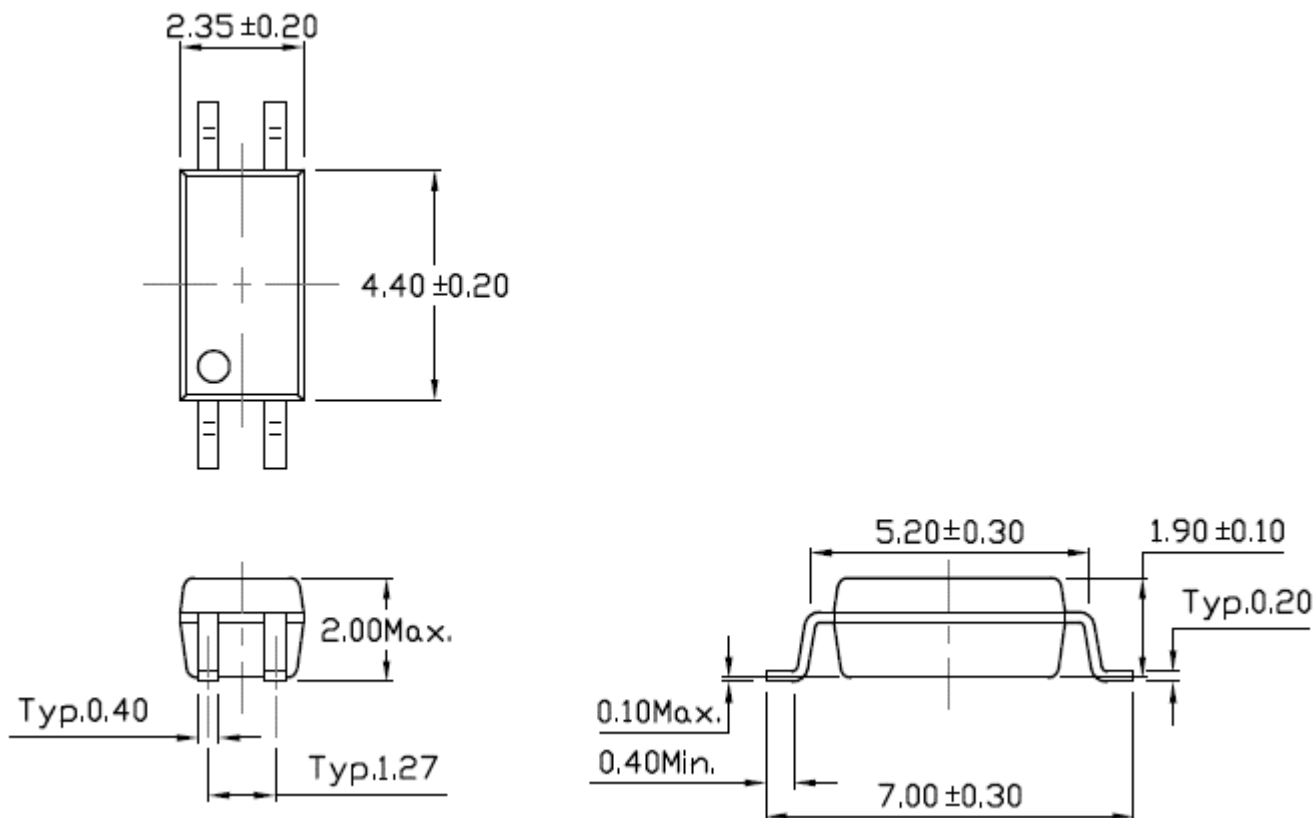
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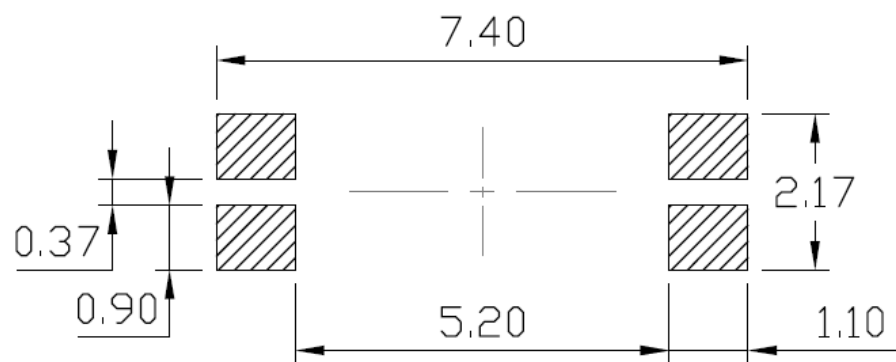


# Half Pitch Mini-Flat Phototransistor Optocoupler

## 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

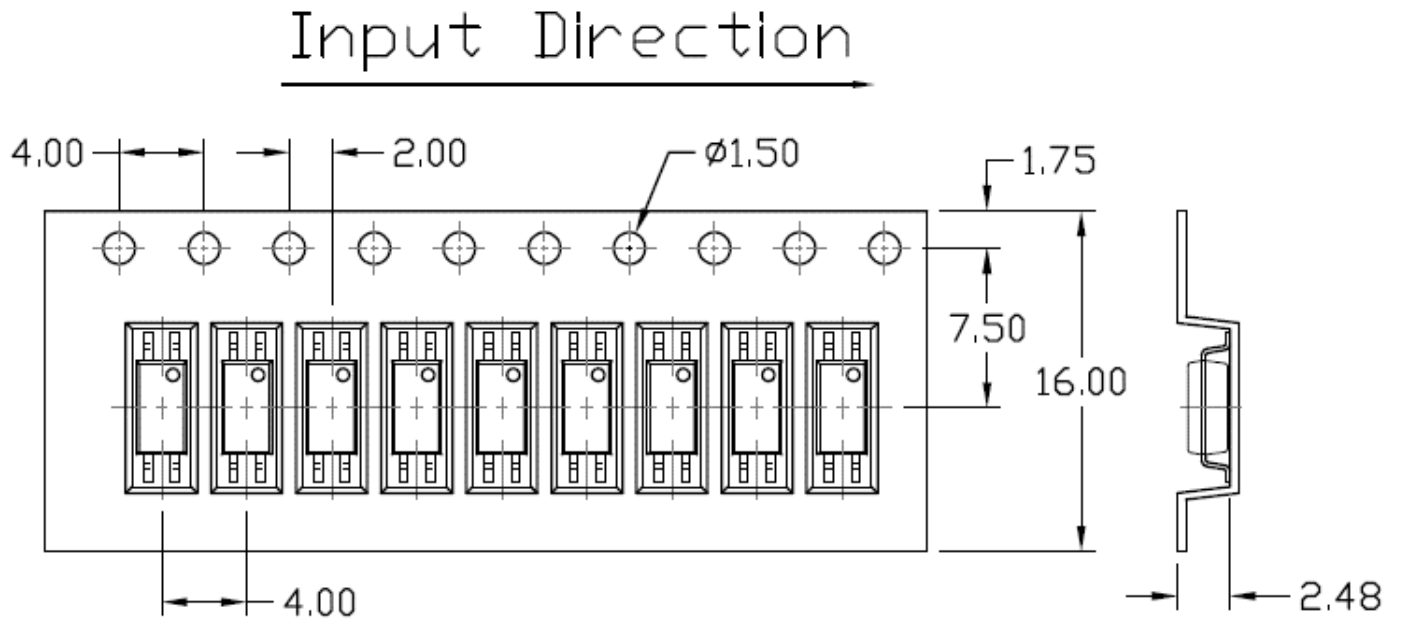




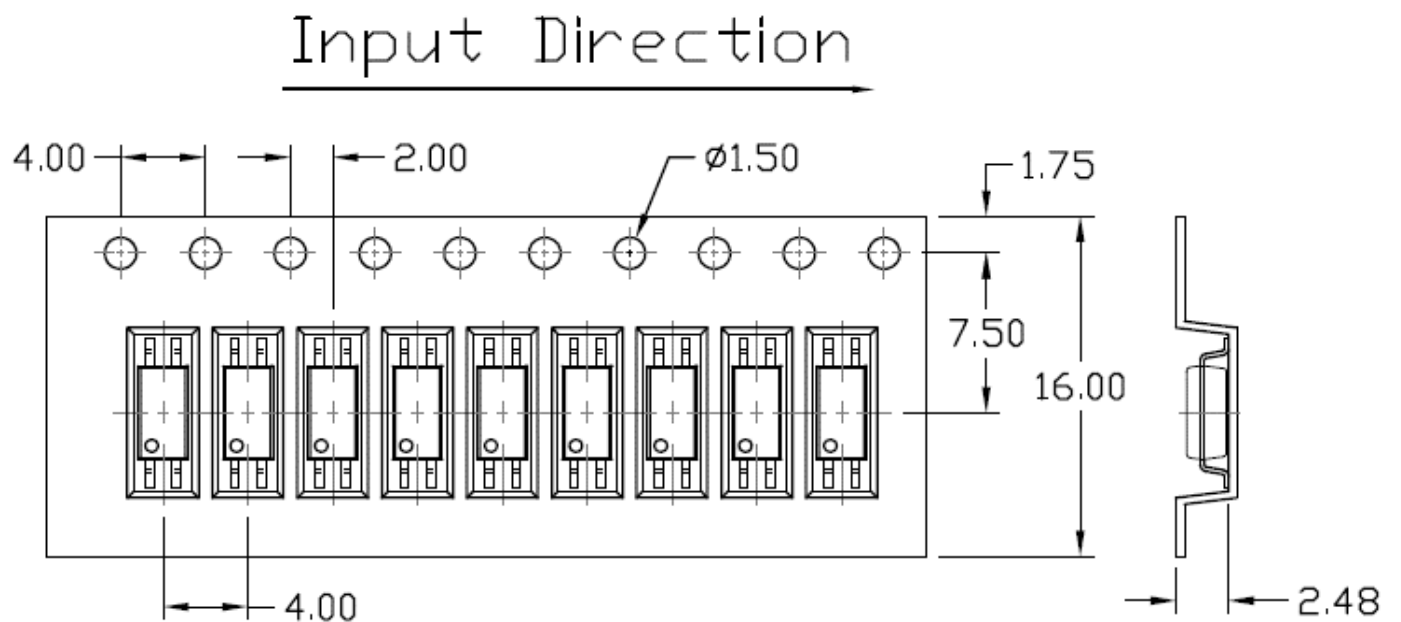
# Half Pitch Mini-Flat Phototransistor Optocoupler

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

### Option T1



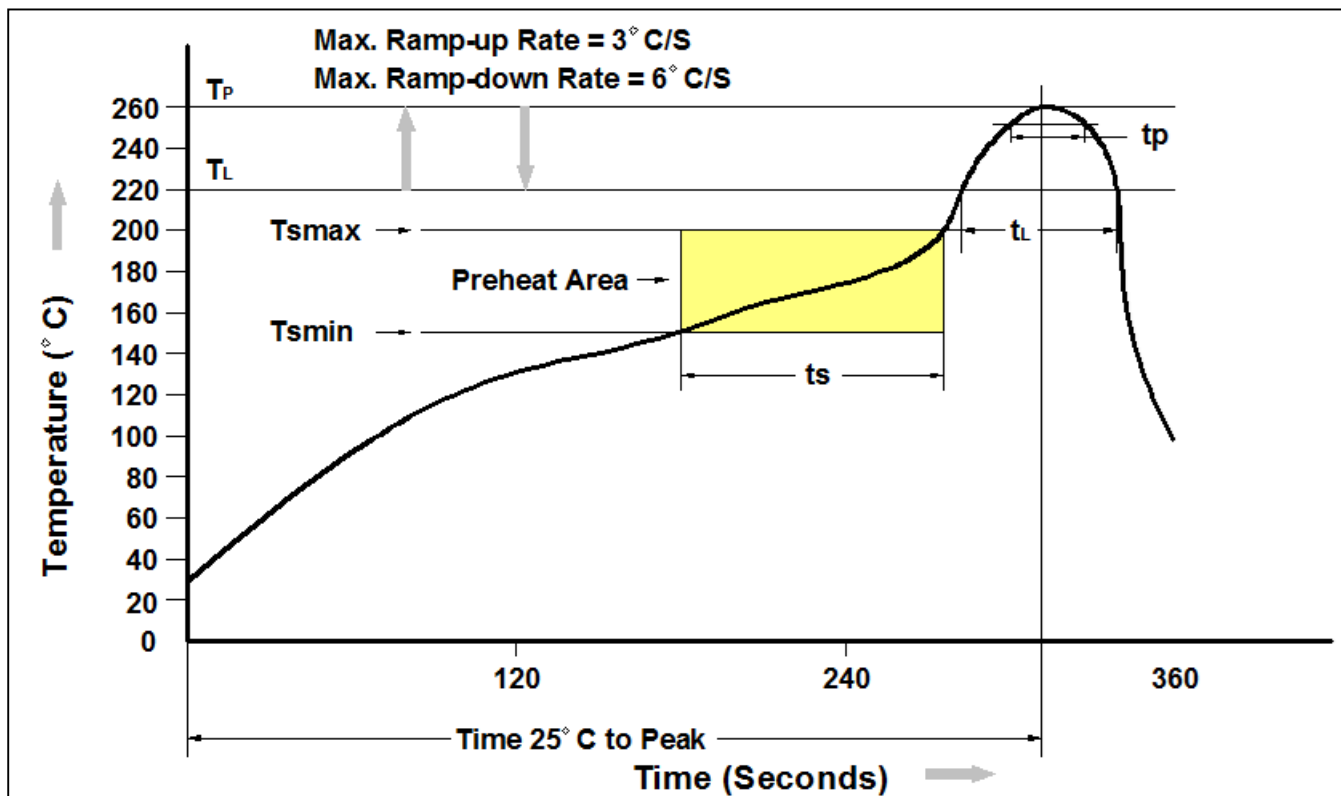
### Option T2





# Half Pitch Mini-Flat Phototransistor Optocoupler

## Reflow Profile



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



**CTH291GB**

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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.*

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