



## Input 4-Pin Mini-Flat Phototransistor Optocoupler

### Features

- High isolation 3750  $V_{RMS}$
- Multiple CTR selection available
- Creepage distance  $\geq 5\text{mm}$
- Operating temperature range - 55 °C to 110 °C
- Green Package
- Regulatory Approvals
  - UL - UL1577 (Pending Approval)
  - VDE - EN60747-5-5 (Pending Approval)
  - CQC – GB4943.1, GB8898 (Pending Approval)
  - IEC60065, IEC60950 (Pending Approval)

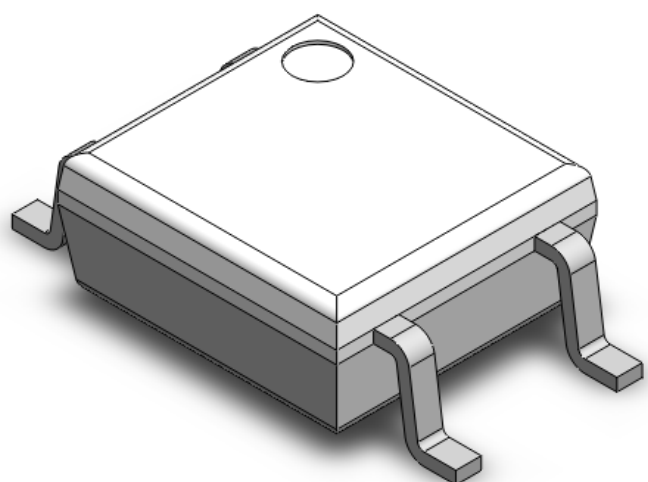
### Description

The CT184GB of AC input optocoupler consists of a photo transistor optically coupled to two gallium arsenide Infrared-emitting diodes in a 4-lead Mini-Flat package.

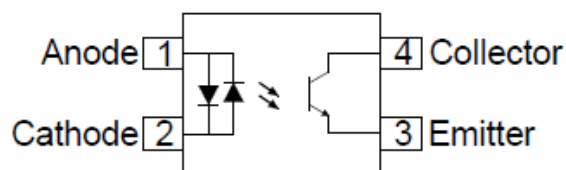
### Applications

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

### Package Outline



### Schematic



CT184

**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>	
T <sub>OPR</sub>	Operating temperature	-55 ~ +110	°C	
T <sub>STG</sub>	Storage temperature	-55 ~ +150	°C	
T <sub>SOL</sub>	Soldering temperature	260	°C	
P <sub>TOT</sub>	Total power dissipation	200	mW	
<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	
V <sub>R</sub>	Reverse voltage	6	V	
P <sub>D</sub>	Power dissipation	70	mW	
<b>Detector</b>				
P <sub>C</sub>	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	
$I_R$	Reverse Current	$V_R = 5\text{ V}$	-	-	5	$\mu\text{A}$	
$C_{IN}$	Input Capacitance	$f = 1\text{ MHz}$	-	10	250	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	$V_{CE} = 48\text{ V}$	-	0.01	0.08	$\mu\text{A}$	
		$V_{CE} = 48\text{ V}, T_A = 85^\circ\text{C}$	-	2	50	$\mu\text{A}$	
$C_{CE}$	Collector-Emitter Capacitance	$f = 1\text{ MHz}$	-	10	-	pF	

**Transfer Characteristics**

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	$I_F = \pm 5\text{ mA}, V_{CE} = 5\text{ V}$	100	-	400	%	
		$I_F = 1\text{ mA}, V_{CE} = 0.4\text{ V}$	30	-	-	%	
	CTR Symmetry	$I_F = \pm 5\text{ mA}, V_{CE} = 5\text{ V}$	0.5	-	2		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage	$I_F = \pm 8\text{ mA}, I_C = 2.4\text{ mA}$	-	-	0.4	V	
$I_{C(off)}$	Off-state collector current	$V_{CE} = 48\text{ V}, V_F = 0.7\text{ V}$	-	1	10	$\mu\text{A}$	



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## Isolation Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
R <sub>IO</sub>	Isolation Resistance	V <sub>IO</sub> = 500V <sub>DC</sub>	1x10 <sup>12</sup>	10 <sup>14</sup>	-	Ω	
C <sub>IO</sub>	Isolation Capacitance	f=1MHz	-	0.5	-	pF	
V <sub>ISO</sub>	Isolation voltage	AC, 60s	3750	-	-	V <sub>rms</sub>	
		AC, 1s in oil	-	10000	-		
		DC, 60s in oil	-	10000	-		

## Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
t <sub>r</sub>	Rise Time	V <sub>CC</sub> = 10V, I <sub>C</sub> = 2mA, R <sub>L</sub> = 100Ω	-	5	-	μs	
t <sub>f</sub>	Fall Time		-	9	-		
t <sub>on</sub>	Turn-on time		-	9	-		
t <sub>off</sub>	Turn-off time		-	9	-		
t <sub>on</sub>	Turn-on time	V <sub>CC</sub> = 5V, I <sub>F</sub> = 16mA, R <sub>L</sub> = 1.9kΩ	-	2	-		
t <sub>s</sub>	Storage time		-	30	-		
t <sub>off</sub>	Turn-off time		-	70	-		



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## Typical Characteristic Curves

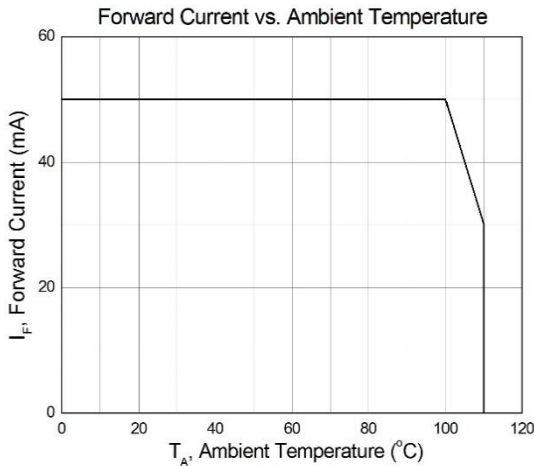


Figure 1

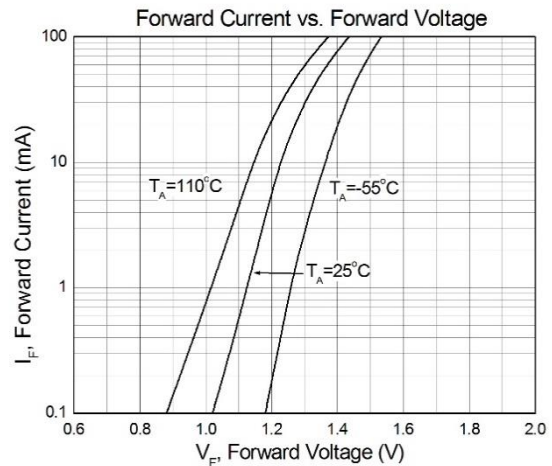


Figure 2

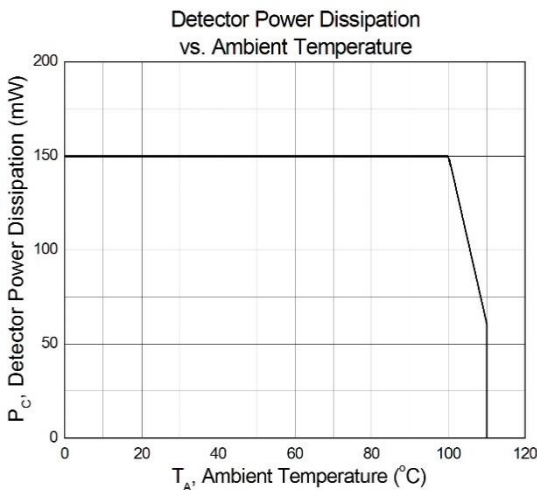


Figure 3

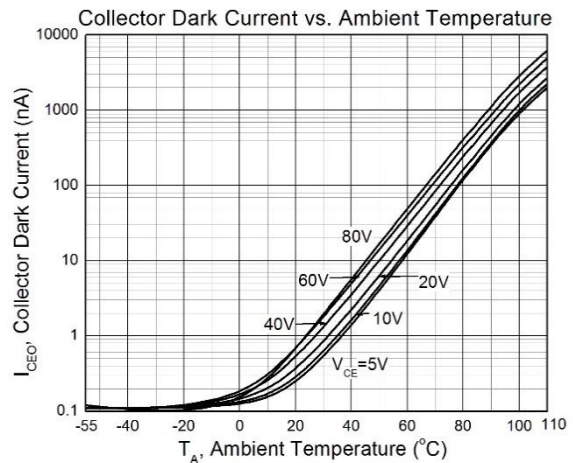


Figure 4

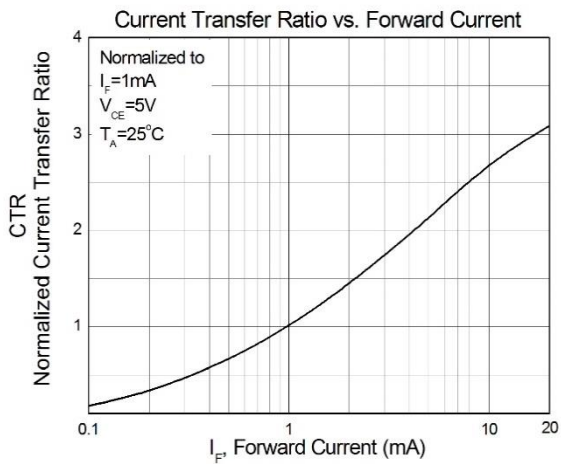


Figure 5

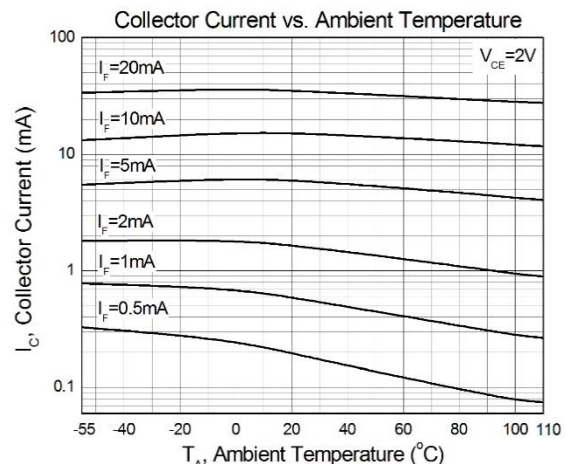


Figure 6



Input 4-Pin Mini-Flat Phototransistor Optocoupler

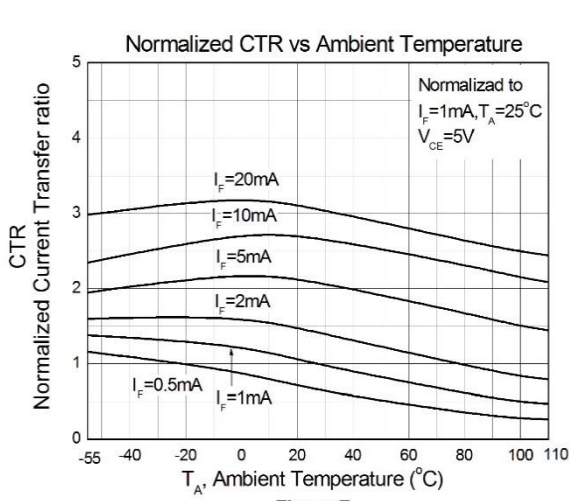


Figure 7

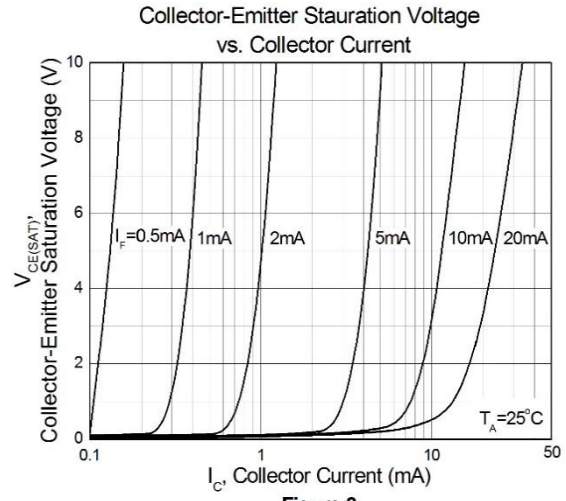


Figure 8

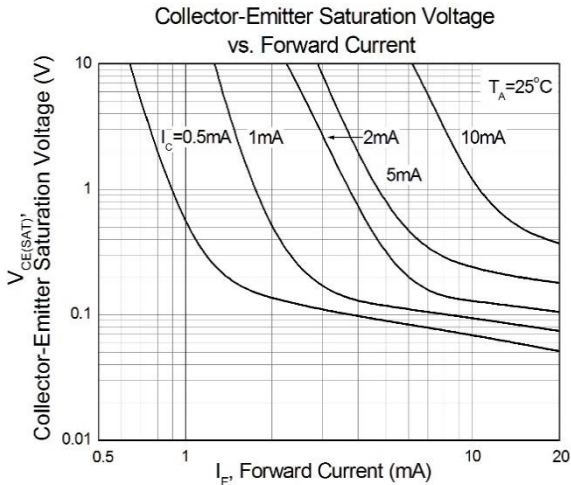


Figure 9

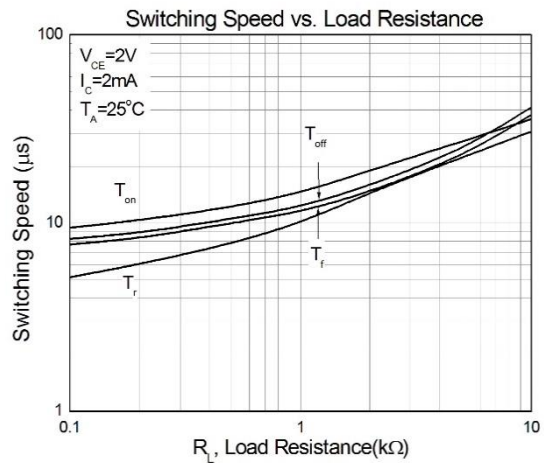


Figure 10

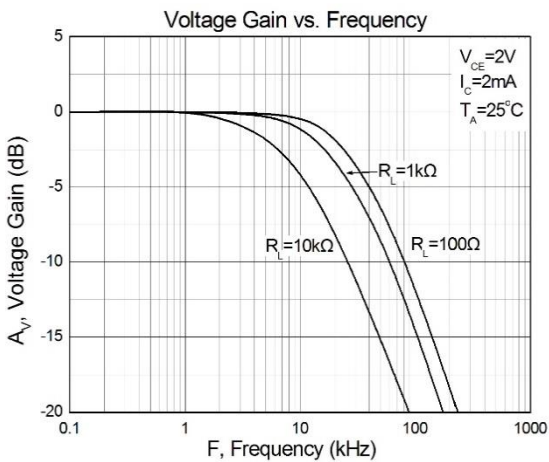


Figure 11

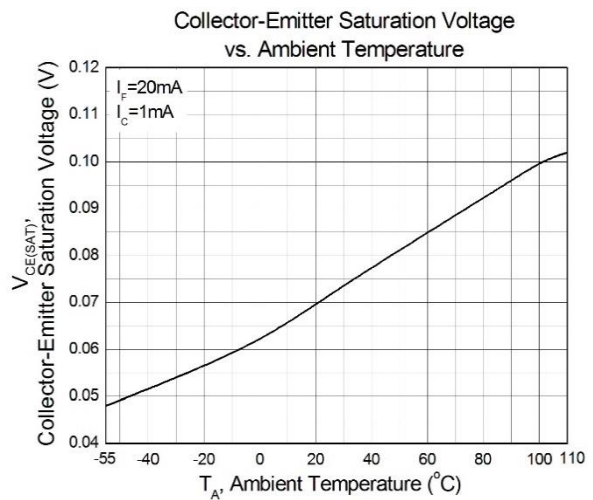
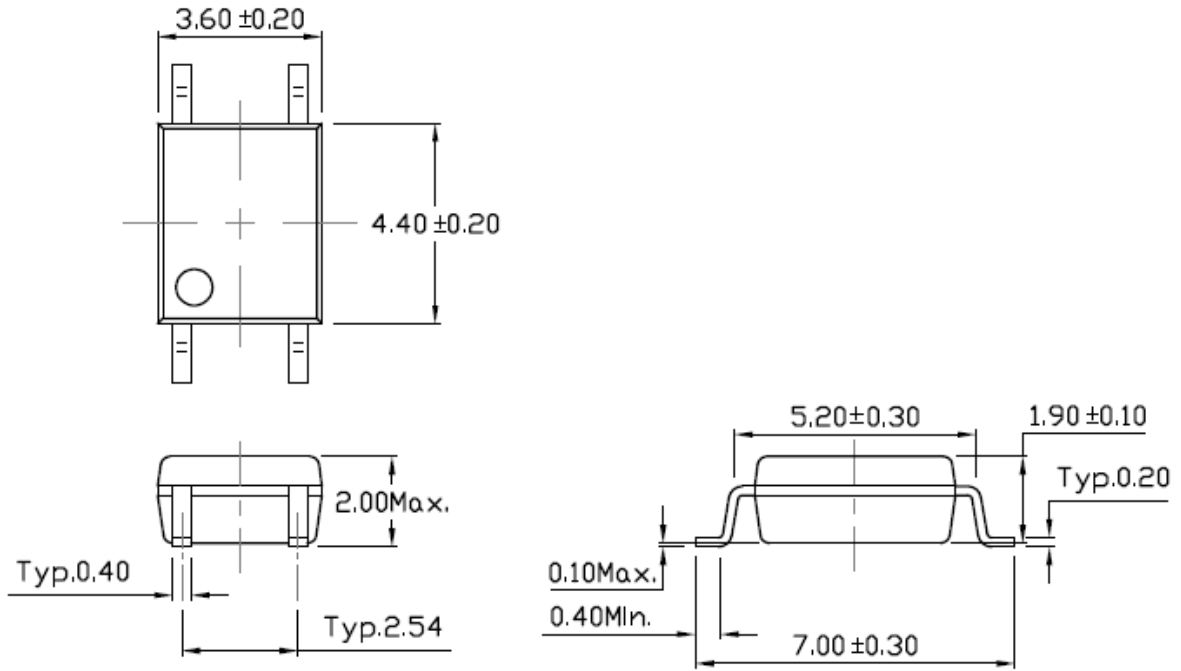


Figure 12

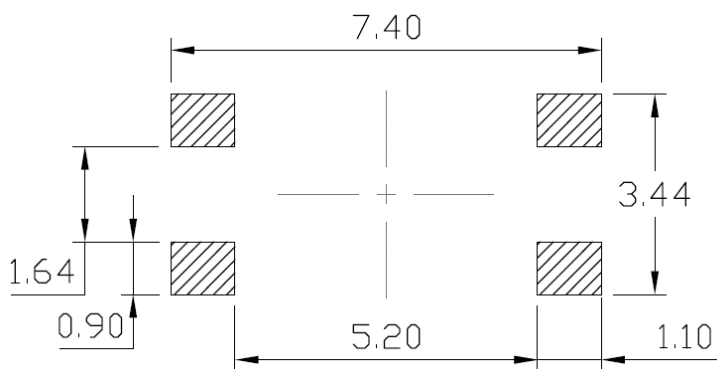


# Input 4-Pin Mini-Flat Phototransistor Optocoupler

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



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





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### Marking Information



**Note:**

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

### Ordering Information

#### CT184GB(V)(Y)

- CT : Denotes “CT Micro”
- 184 : 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 Tapping	3000 Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Tapping	3000 Units/Reel

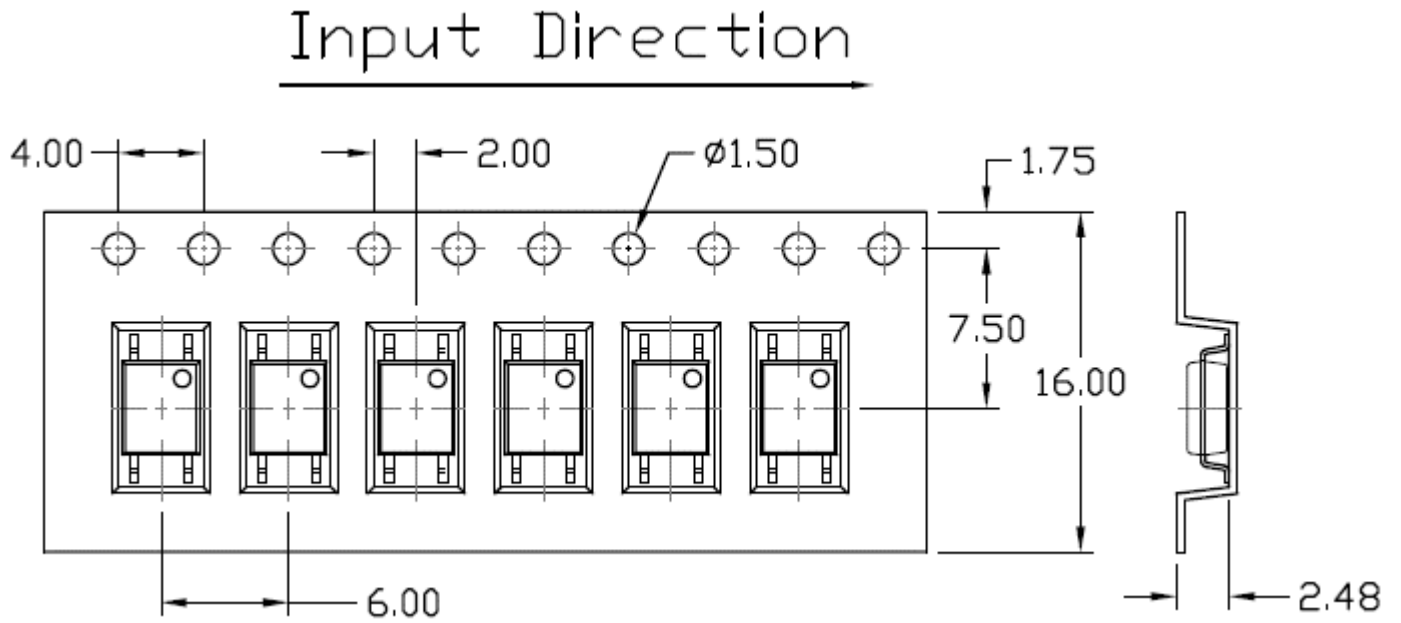




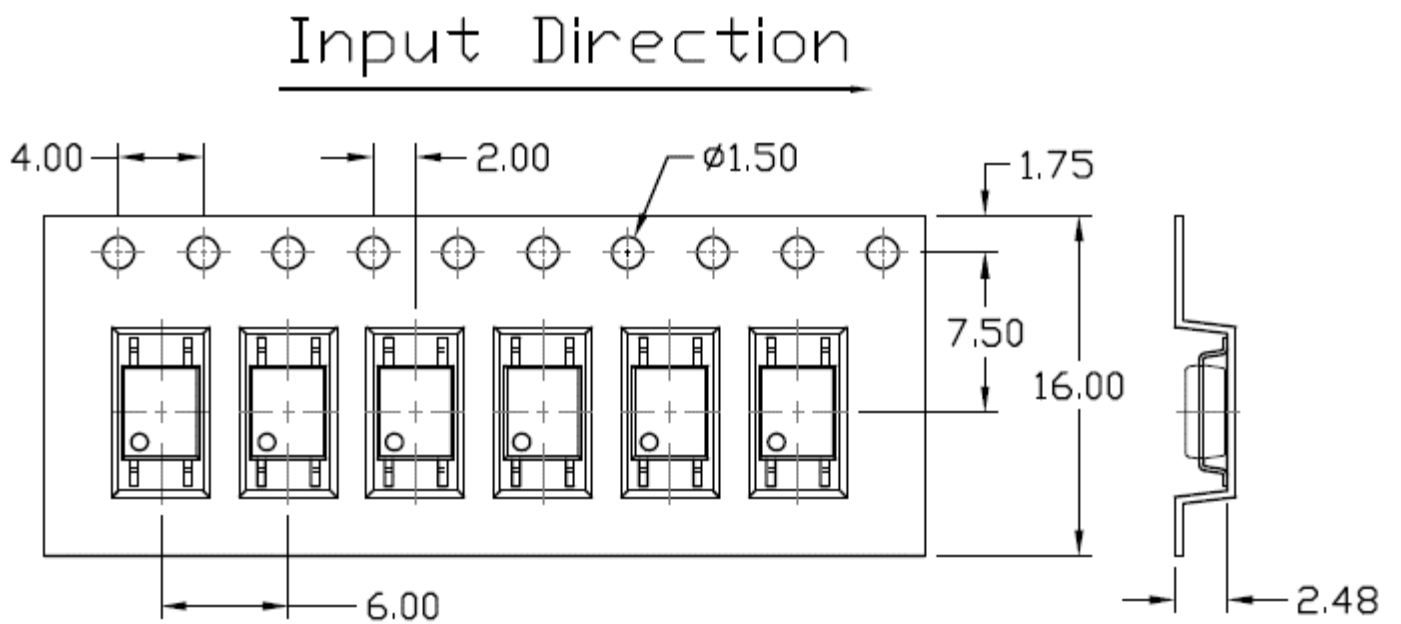
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## Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

### Option T1



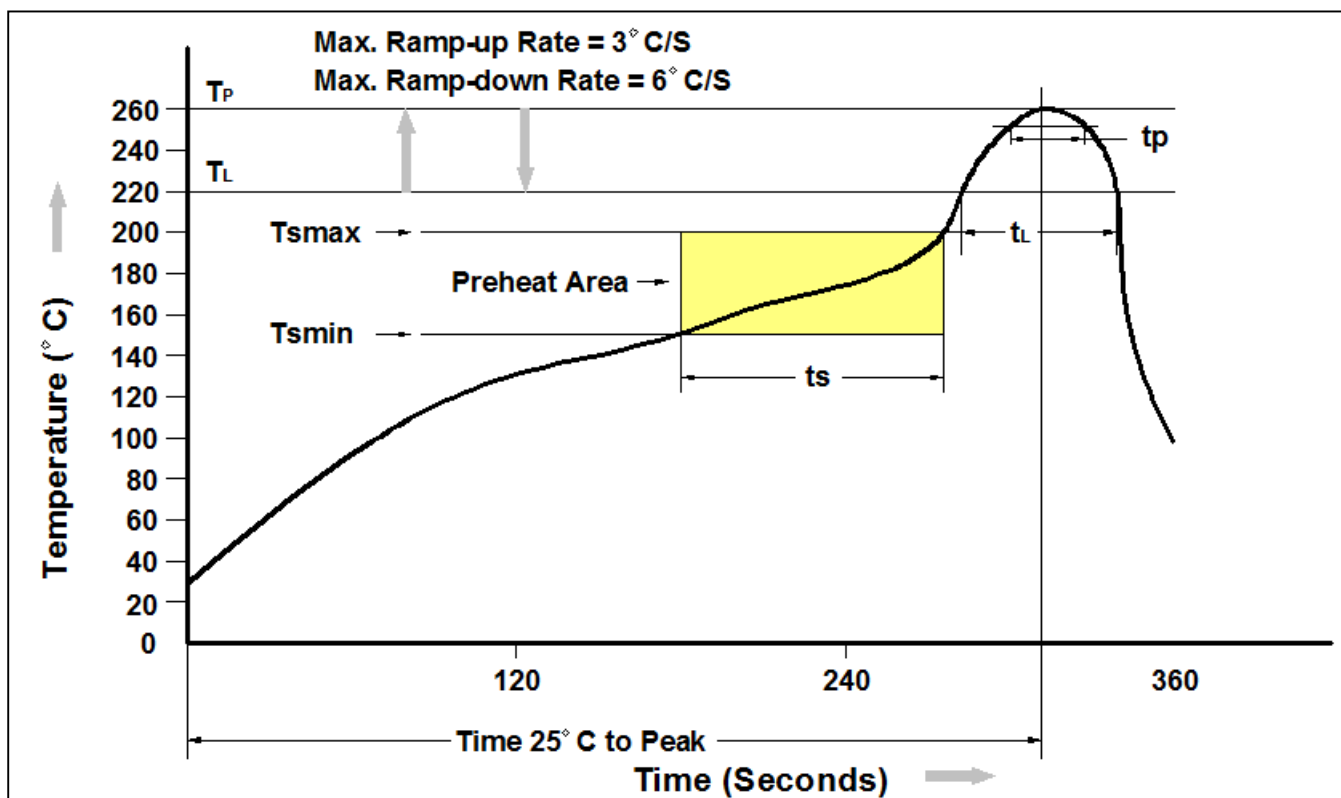
### Option T2





# Input 4-Pin Mini-Flat Phototransistor Optocoupler

## Reflow Profile



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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