



## 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)

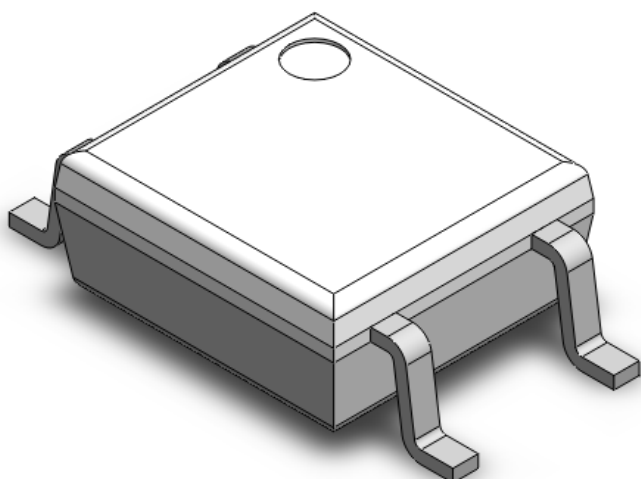
### Description

CT181 series of general purpose optocoupler consists of a photo transistor optically coupled to a gallium arsenide Infrared-emitting diode in a 4-lead Mini-Flat package.

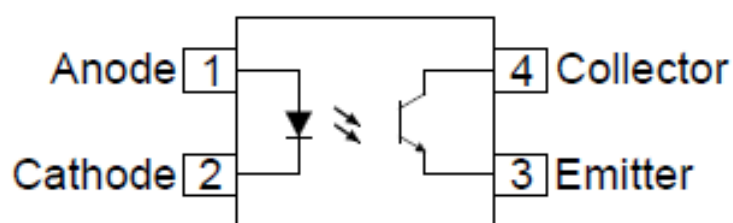
### Applications

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

### Package Outline



### Schematic



CT181

**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	

**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	$V_R = 5\text{V}$	-	-	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	$I_C = 500\mu\text{A}$	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	CT181GB	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$	100	-	600	%	
		CT181GR		100	-	300	%	
	Transfer Ratio	CT181GB	$I_F = 1\text{mA}, V_{CE} = 0.4\text{V}$	30	-	-	%	
		CT181GR		-	60	-	%	
$V_{CE}(\text{sat})$	Collector-emitter saturation voltage	$I_F = 8\text{mA}, I_C = 2.4\text{mA}$	-	-	0.3	V		
$I_{C(\text{off})}$	Off-state collector current	$V_{CE} = 48\text{V}, V_F = 0.7\text{V}$	-	1	10	$\mu\text{A}$		

**Isolation 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>
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	-	-	Vrms	
		AC, 1s in oil	-	10000	-		
		DC, 60s in oil	-	10000	-		

**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 <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	-		



Typical Characteristic Curves

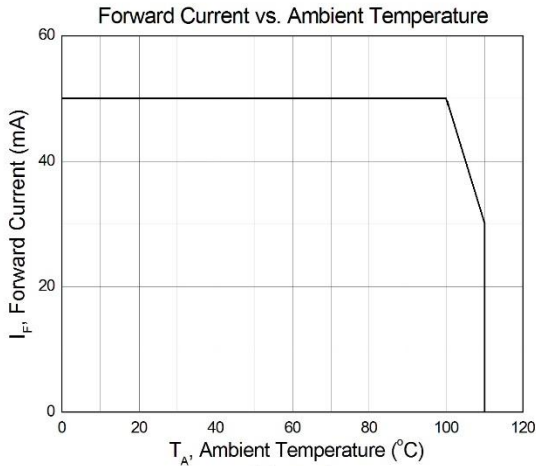


Figure 1

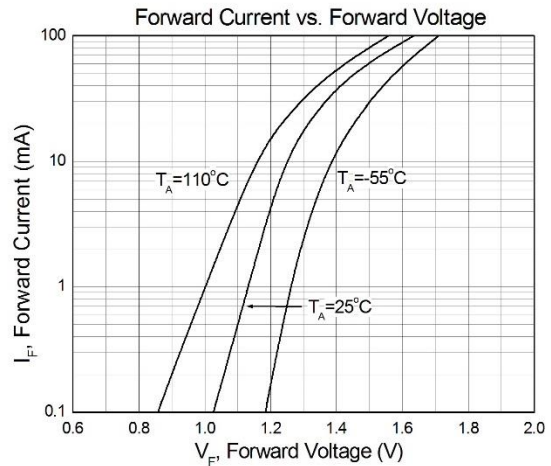


Figure 2

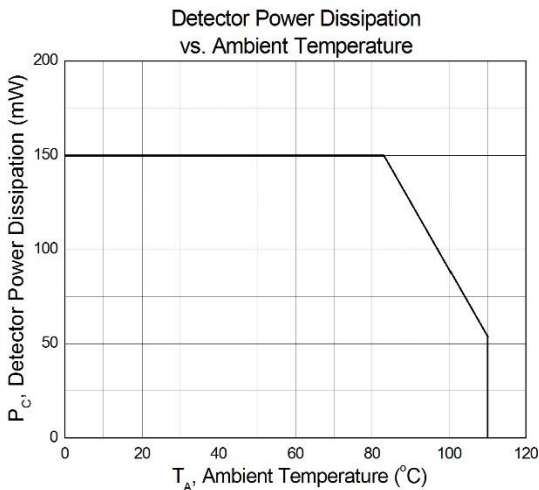


Figure 3

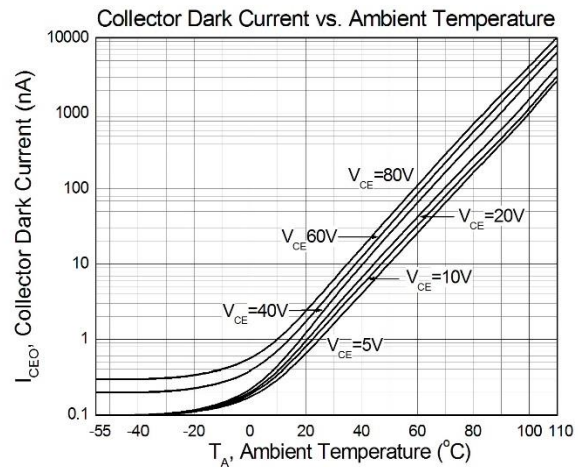


Figure 4

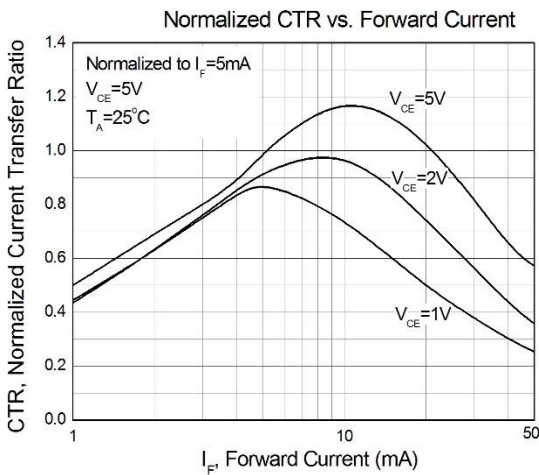


Figure 5

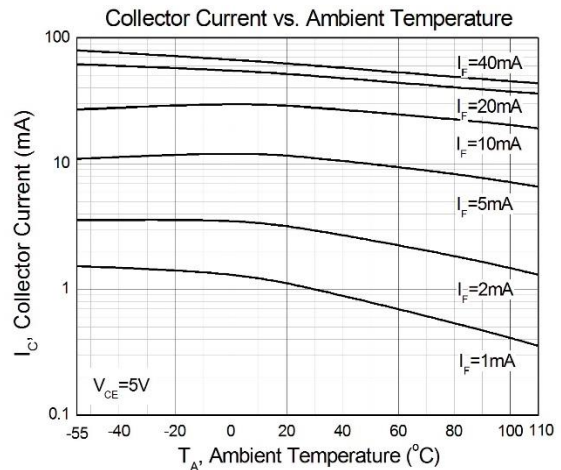


Figure 6



# Input 4-Pin Mini-Flat Phototransistor Optocoupler

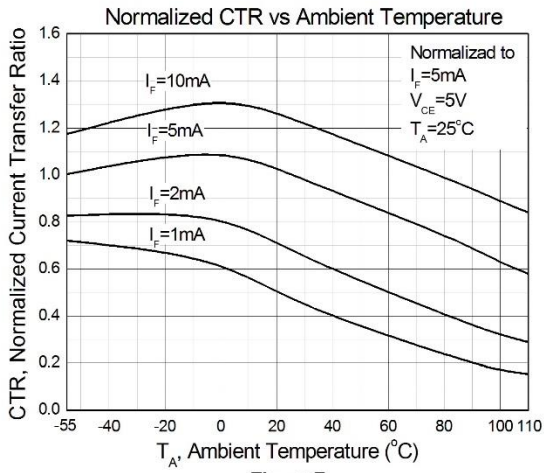


Figure 7

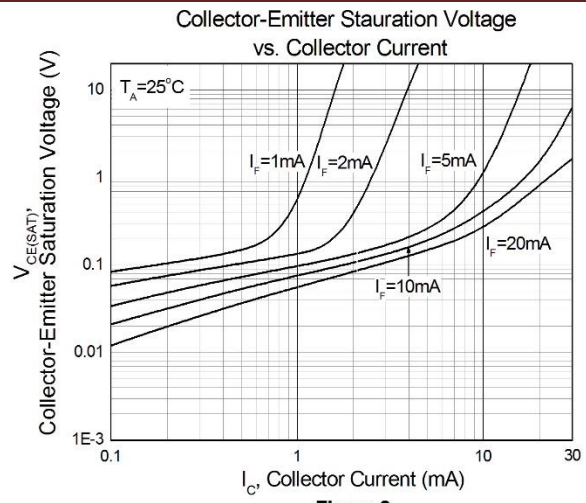


Figure 8

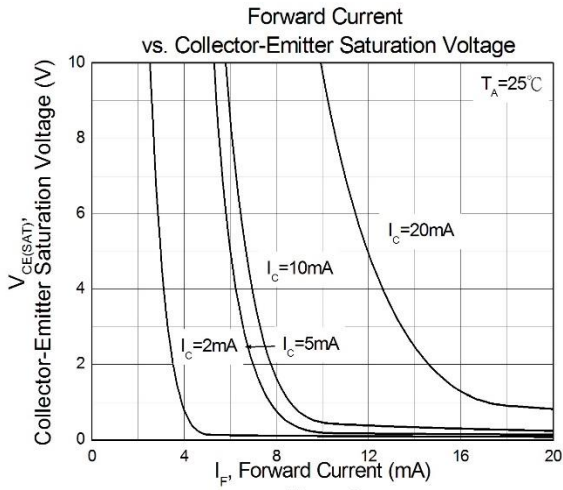


Figure 9

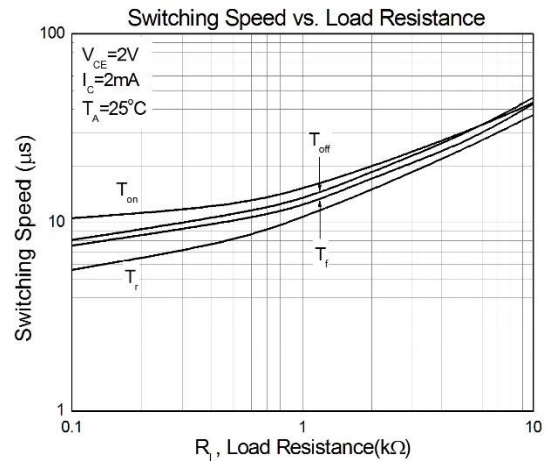


Figure 10

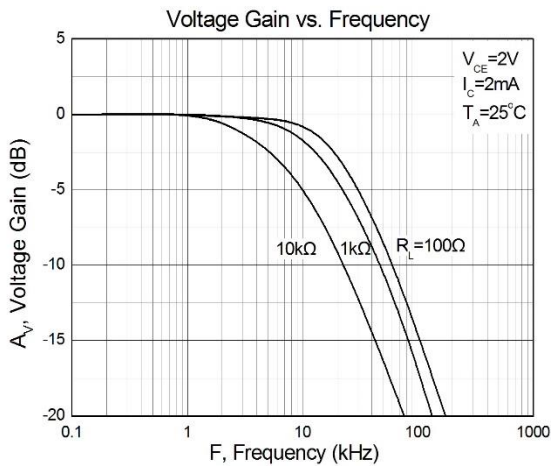
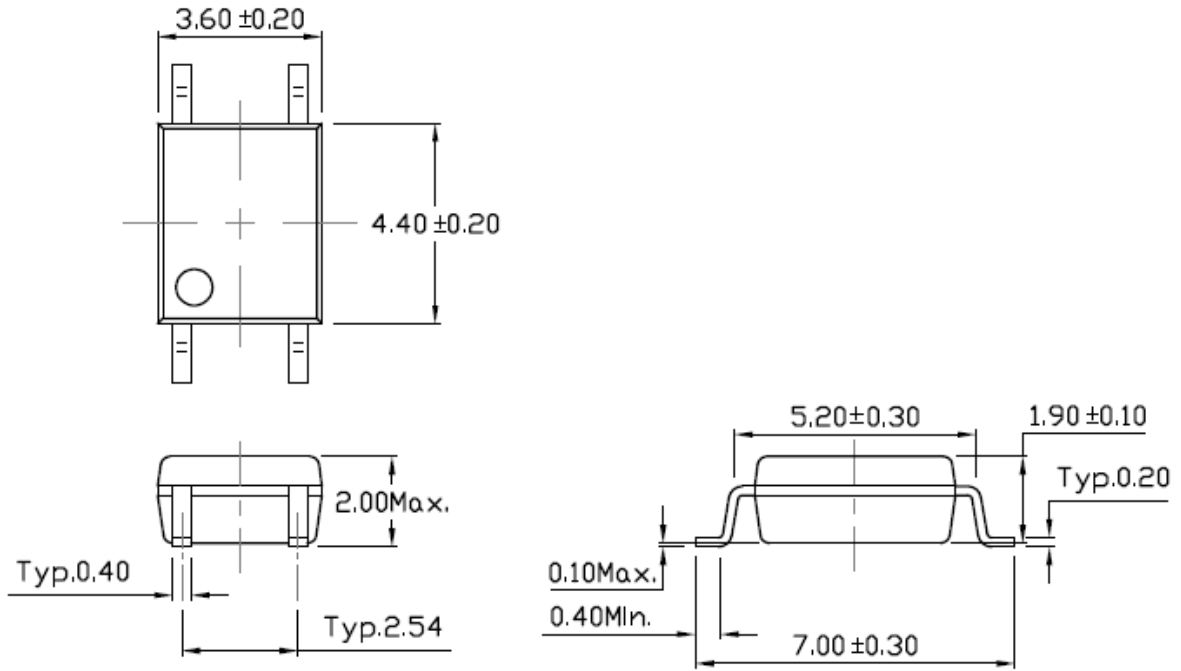


Figure 11

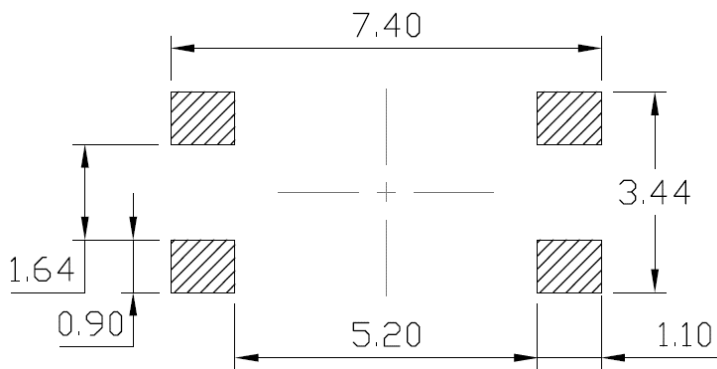


Input 4-Pin Mini-Flat Phototransistor Optocoupler

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

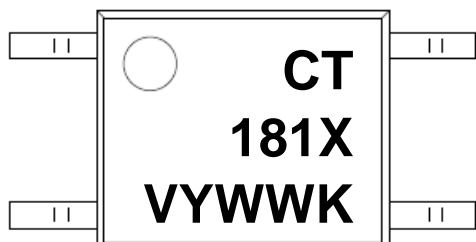


**Recommended Solder Mask** *Dimensions in mm unless otherwise stated*





### Marking Information



#### Note:

- CT : Denotes "CT Micro"
- 181 : Part Number
- X : "X" is CTR Rank (X= GB or GR)
- V : VDE Safety Option (V or none)
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code

### Ordering Information

#### CT181X(V)(Y)

- CT : Denotes "CT Micro"
- 181 : Part Number
- X : "X" is CTR Rank (X= GB or GR)
- 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

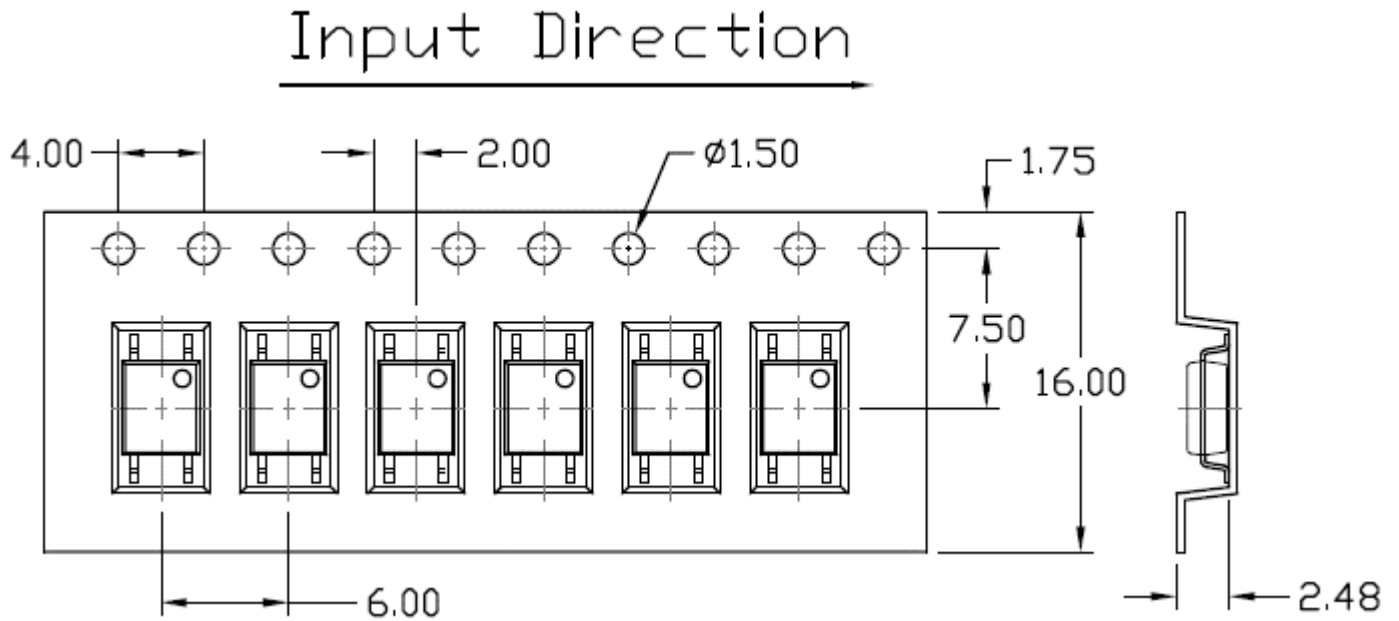




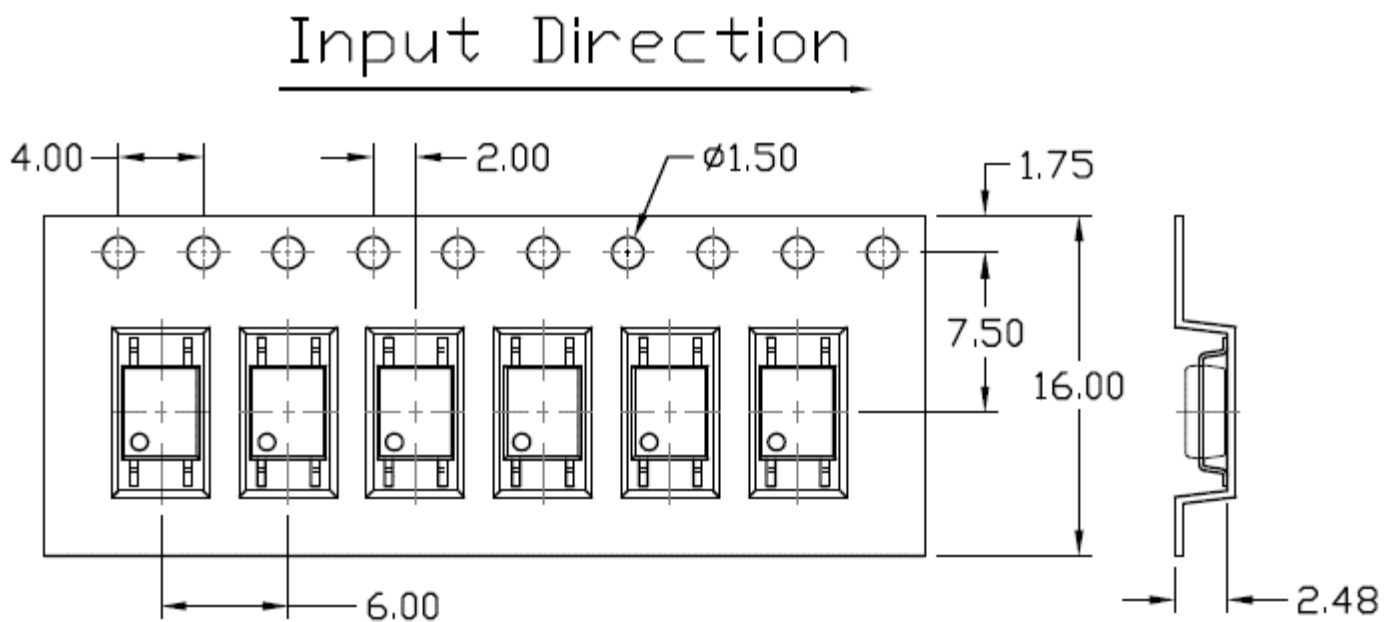
Input 4-Pin Mini-Flat Phototransistor Optocoupler

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

**Option T1**



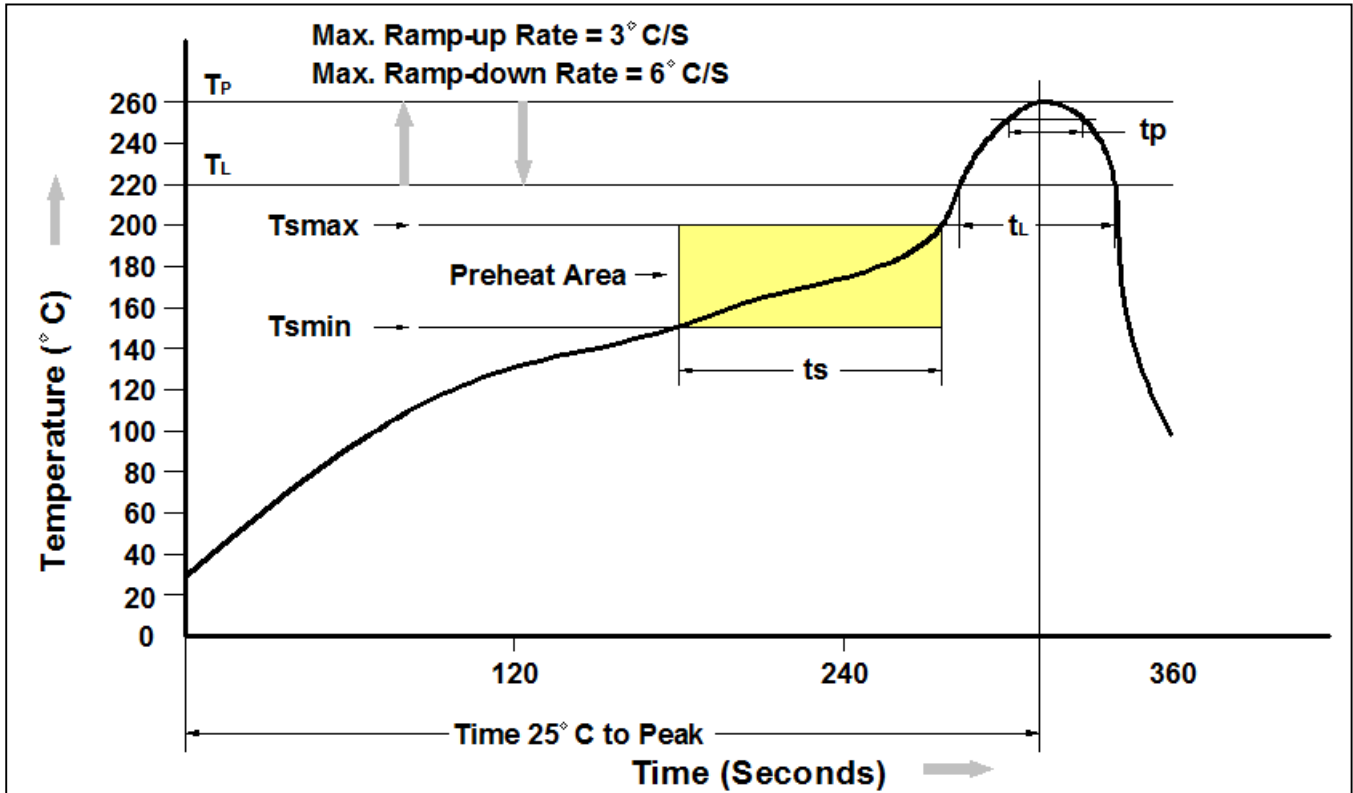
**Option T2**





Input 4-Pin Mini-Flat Phototransistor Optocoupler

Reflow Profile



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



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