



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)

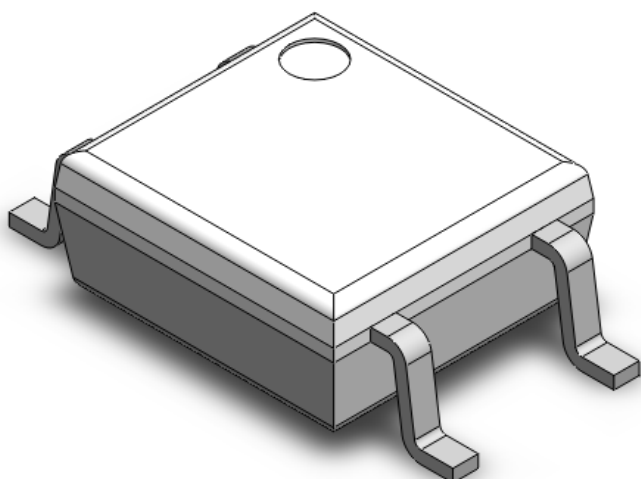
Description

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.

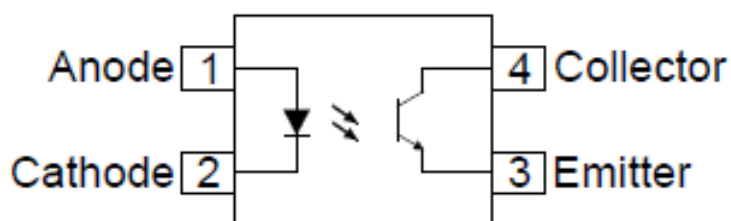
Applications

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

Package Outline



Schematic



CT181

**Absolute Maximum Rating at 25°C**

Symbol	Parameters	Ratings	Units	Notes
V _{ISO}	Isolation voltage	3750	V _{RMS}	
T _{OPR}	Operating temperature	-55 ~ +110	°C	
T _{STG}	Storage temperature	-55 ~ +150	°C	
T _{SOL}	Soldering temperature	260	°C	
P _{TOT}	Total power dissipation	200	mW	
Emitter				
I _F	Forward current	50	mA	
I _{F(TRANS)}	Peak transient current (≤1μs P.W,300pps)	1	A	
V _R	Reverse voltage	6	V	
P _D	Power dissipation	70	mW	
Detector				
P _C	Power dissipation	150	mW	
B _{VCEO}	Collector-Emitter Breakdown Voltage	80	V	
B _{VECO}	Emitter-Collector Breakdown Voltage	7	V	
I _C	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	μA	
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	μA	
		$V_{CE} = 48\text{V}, T_A = 85^\circ\text{C}$	-	2	50	μA	
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	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	μA		

**Isolation Characteristics**

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

Switching Characteristics

<i>Symbol</i>	<i>Parameters</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Units</i>	<i>Notes</i>
t _r	Rise Time	V _{CC} = 10V, I _C = 2mA, R _L = 100Ω	-	5	-	μs	
t _f	Fall Time		-	9	-		
t _{on}	Turn-on time		-	9	-		
t _{off}	Turn-off time		-	9	-		
t _{on}	Turn-on time	V _{CC} = 5V, I _F = 16mA, R _L = 1.9kΩ	-	2	-		
t _s	Storage time		-	30	-		
t _{off}	Turn-off time		-	70	-		



Typical Characteristic Curves

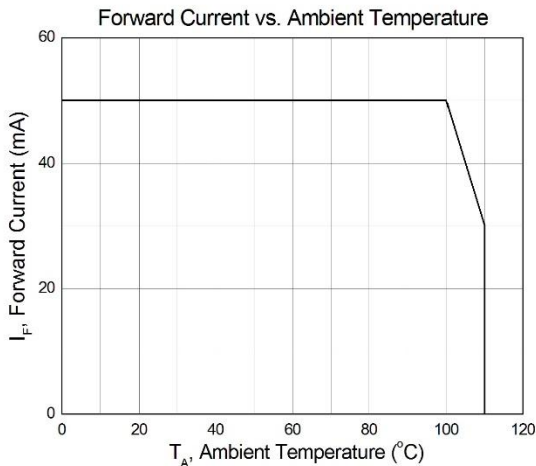


Figure 1

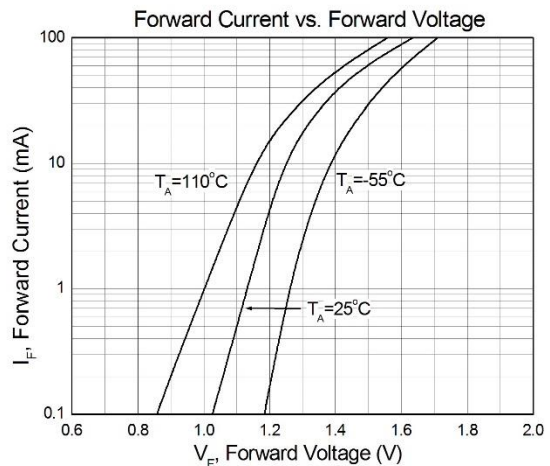


Figure 2

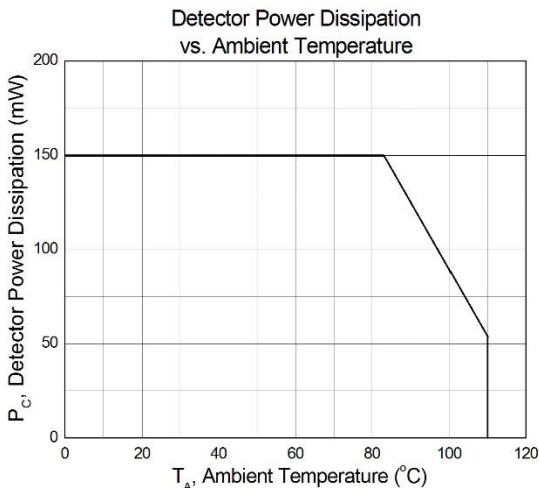


Figure 3

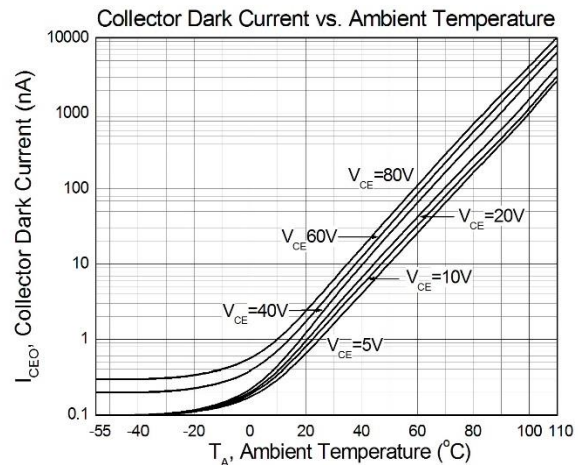


Figure 4

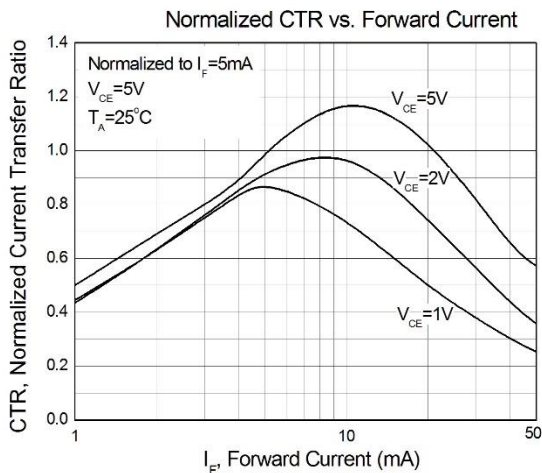


Figure 5

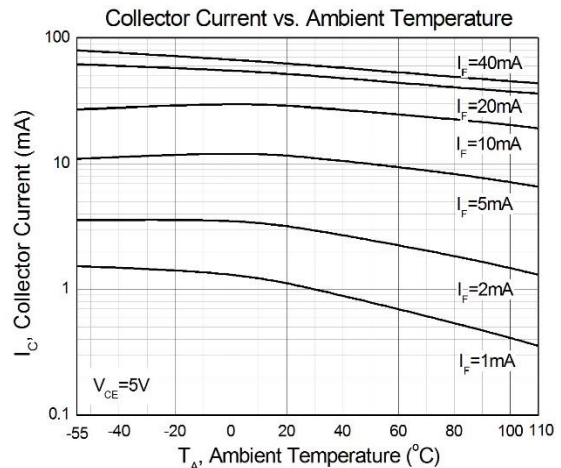


Figure 6



Input 4-Pin Mini-Flat Phototransistor Optocoupler

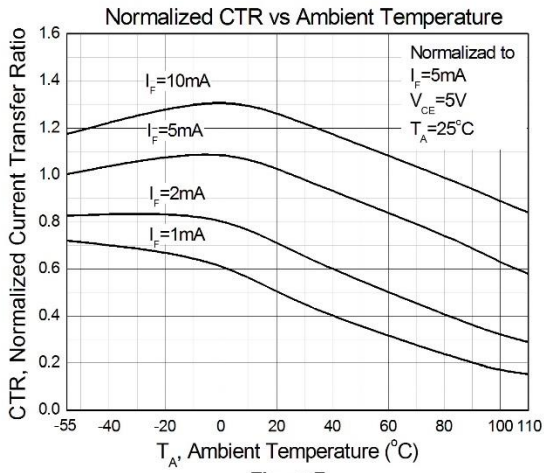


Figure 7

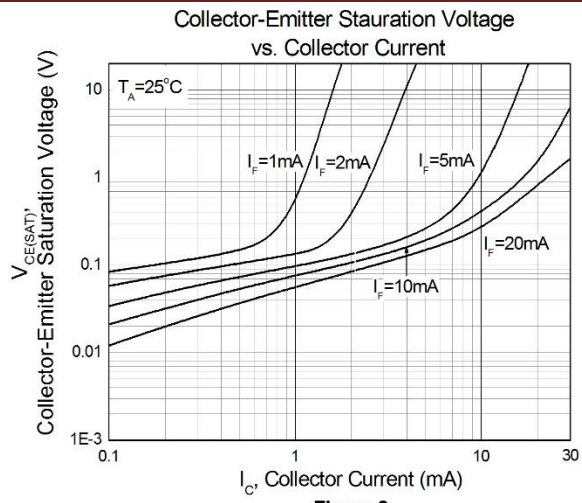


Figure 8

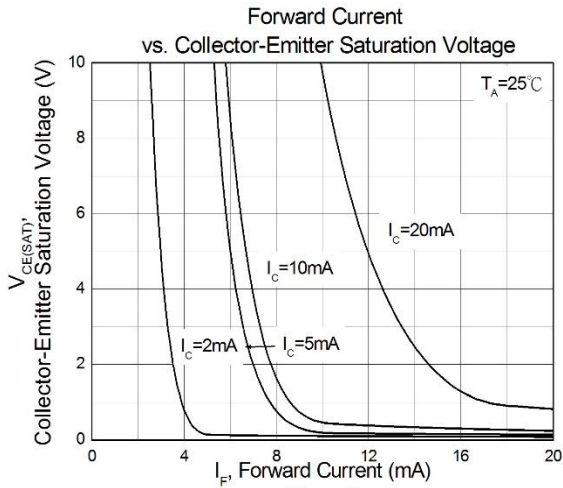


Figure 9

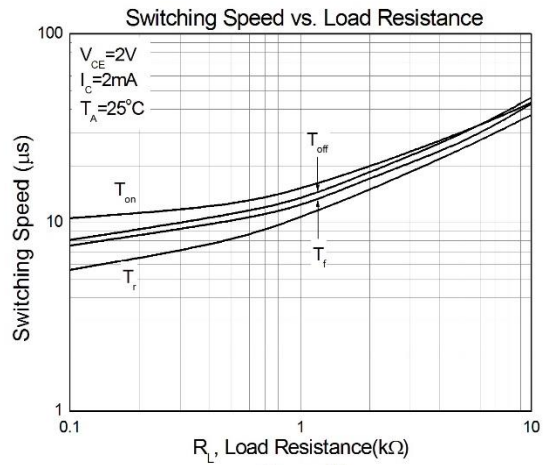


Figure 10

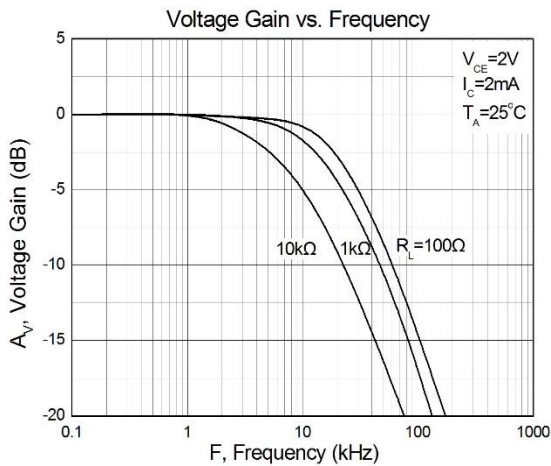
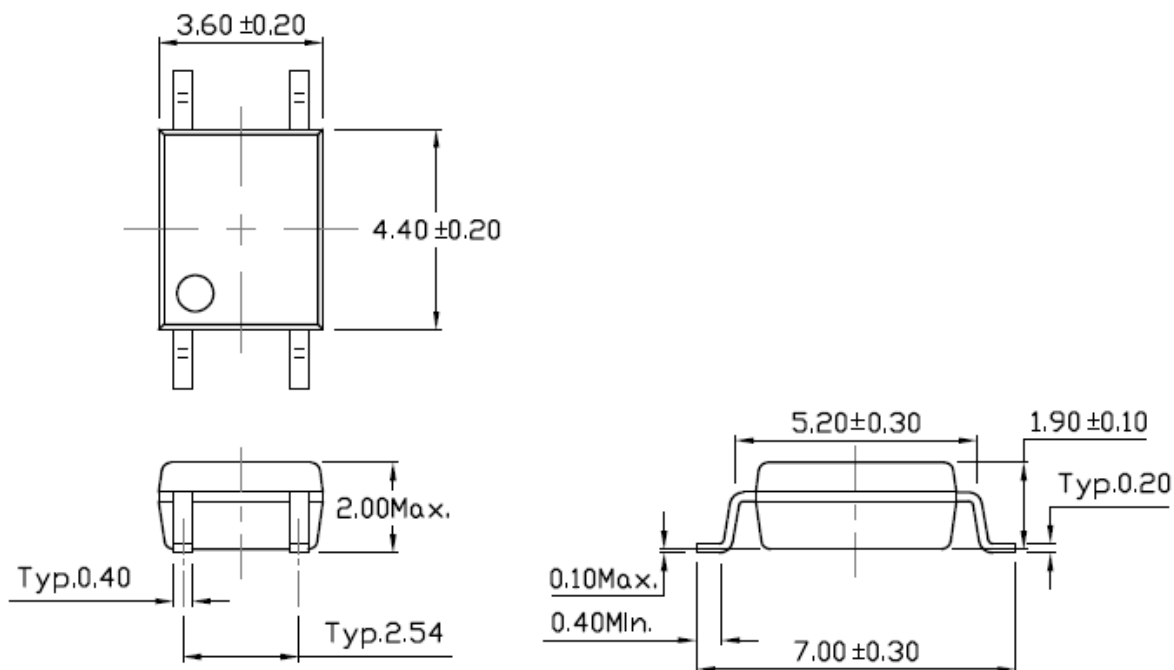


Figure 11

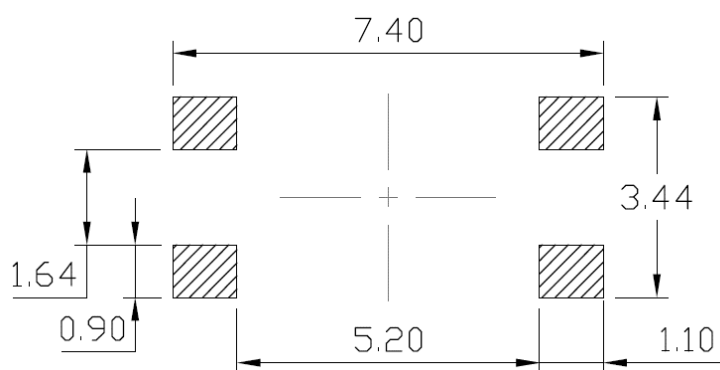


Input 4-Pin Mini-Flat Phototransistor Optocoupler

Package Dimension *Dimensions in mm unless otherwise stated*

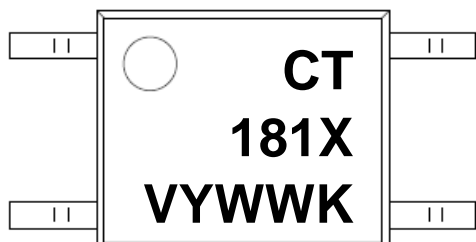


Recommended Solder Mask *Dimensions in mm unless otherwise stated*





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)

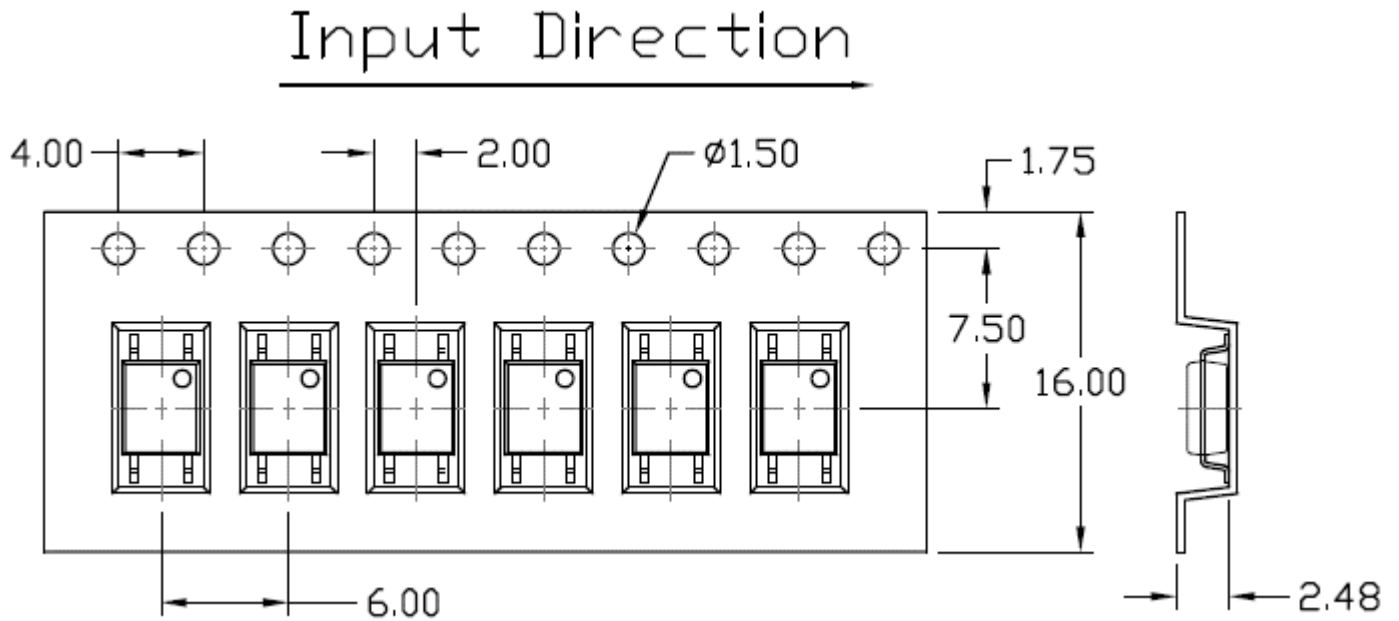
Option	Description	Quantity
T1	Surface Mount Lead Forming – With Option 1 Tapping	3000 Units/Reel
T2	Surface Mount Lead Forming – With Option 2 Tapping	3000 Units/Reel



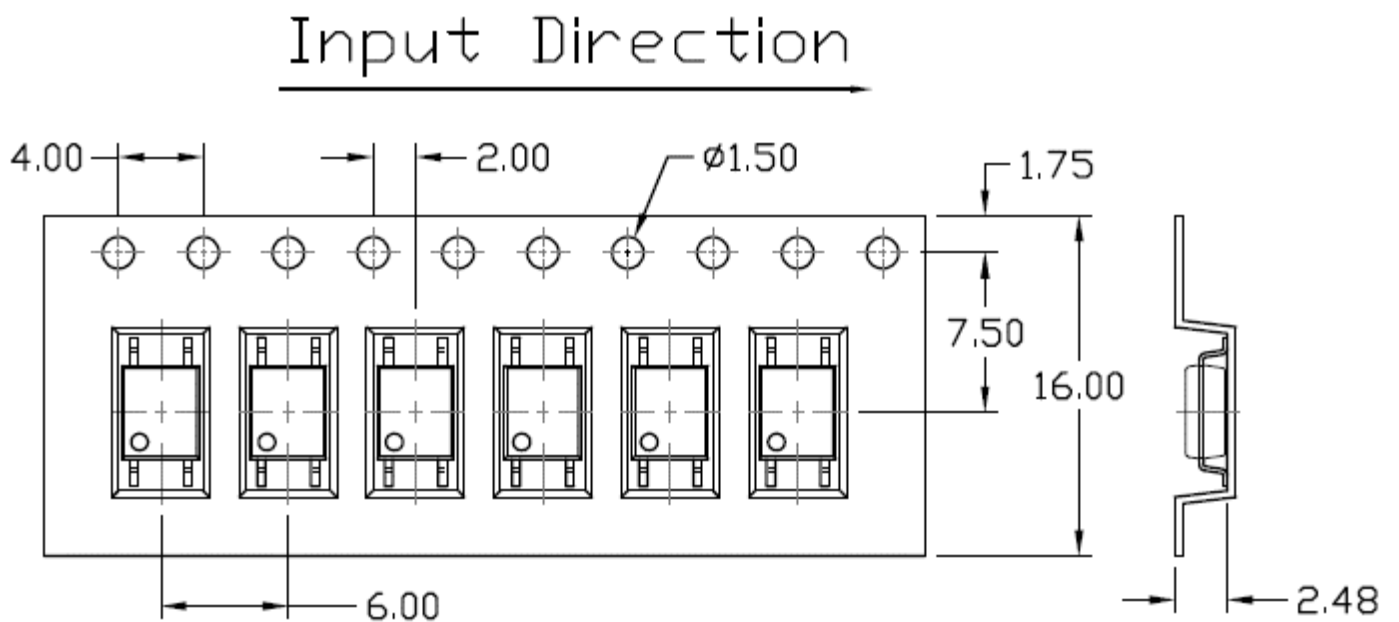
Input 4-Pin Mini-Flat Phototransistor Optocoupler

Carrier Tape Specifications *Dimensions in mm unless otherwise stated*

Option T1

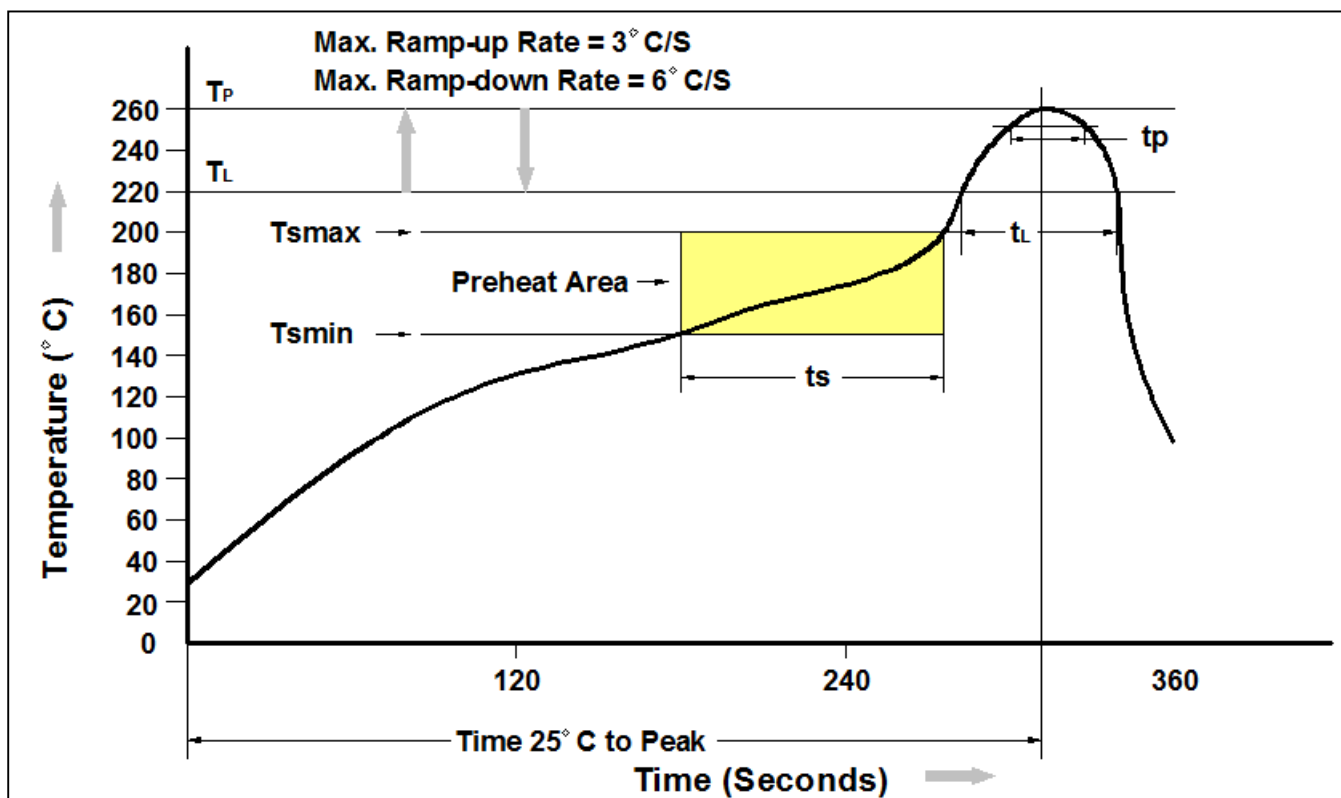


Option T2





Reflow Profile



Profile Feature	Pb-Free Assembly Profile
Temperature Min. (T _{sm})	150°C
Temperature Max. (T _{smax})	200°C
Time (t _s) from (T _{sm} to T _{smax})	60-120 seconds
Ramp-up Rate (t _L to t _p)	3°C/second max.
Liquidous Temperature (T _L)	217°C
Time (t _L) Maintained Above (T _L)	60 – 150 seconds
Peak Body Package Temperature	260°C +0°C / -5°C
Time (t _p) within 5°C of 260°C	30 seconds
Ramp-down Rate (T _p to T _L)	6°C/second max
Time 25°C to Peak Temperature	8 minutes max.



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