



# AC Input 4-Pin Phototransistor Optocoupler

### Features

- High isolation 5000 VRMS
- CTR flexibility available see order information
- DC input with transistor output
- External Creepage  $\geq 7.5\text{mm}$  (S/SL Type)
- External Creepage  $\geq 8.0\text{mm}$  (SLM Type)
- Operating Temperature range - 55 °C to 110 °C
- Regulatory Approvals
  - UL - UL1577 (E364000)
  - VDE - EN60747-5-5(VDE0884-5)
  - CQC – GB4943.1, GB8898
  - IEC60065, IEC60950

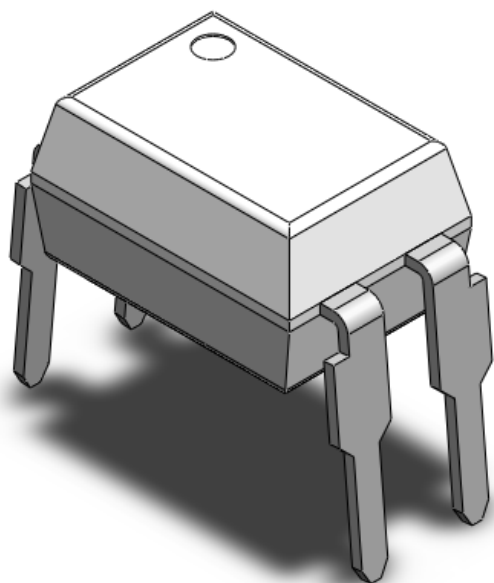
### Description

The CT814 series consists of a phototransistor optically coupled to two gallium arsenide Infrared-emitting diode, connected in inverse parallel, in a 4-lead DIP package with bending options.

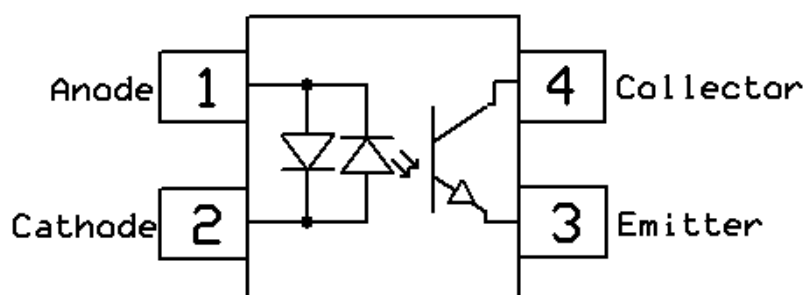
### Applications

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

### Package Outline



### Schematic



**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	5000	V <sub>RMS</sub>	
P <sub>TOT</sub>	Total power dissipation	200	mW	
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	
<b>Emitter</b>				
I <sub>F</sub>	Forward current	±60	mA	
I <sub>F(TRANS)</sub>	Peak transient current (≤1μs P.W,300pps)	1	A	
P <sub>D</sub>	Emitter power dissipation	100	mW	
<b>Detector</b>				
P <sub>D</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	



## 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	
$C_{IN}$	Input Capacitance	$f = 1\text{MHz}$	-	30	-	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	$I_E = 100\mu\text{A}$	6	-	-	V	
$I_{CEO}$	Collector-Emitter Dark Current	$V_{CE} = 20\text{V}$ , $I_F = 0\text{mA}$	-	-	100	nA	

### Transfer Characteristics

Symbol	Parameters		Test Conditions	Min	Typ	Max	Units	Notes
CTR	Current Transfer Ratio	CT814	$I_F = \pm 1\text{mA}$ , $V_{CE} = 5\text{V}$	20	-	300	%	
		CT814A		50	-	150		
		CT814B		100	-	300		
	CTR Symmetry		$I_F = \pm 1\text{mA}$ , $V_{CE} = 5\text{V}$	0.7	-	1.3		
$V_{CE(SAT)}$	Collector-Emitter Saturation Voltage		$I_F = \pm 20\text{mA}$ , $I_C = 1\text{mA}$	-	0.04	0.2	V	
$R_{IO}$	Isolation Resistance		$V_{IO} = 500\text{V}_{DC}$	$5 \times 10^{10}$	-	-	$\Omega$	
$C_{IO}$	Isolation Capacitance		$f = 1\text{MHz}$	-	0.5	1	pF	

### Switching Characteristics

Symbol	Parameters	Test Conditions	Min	Typ	Max	Units	Notes
$t_r$	Rise Time	$I_C = 2\text{mA}$ , $V_{CE} = 2\text{V}$ , $R_L = 100$	-	6	-	$\mu\text{s}$	
$t_f$	Fall Time		-	8	-		



# CT814 Series

## AC Input 4-Pin Phototransistor Optocoupler

### Typical Characteristic Curves

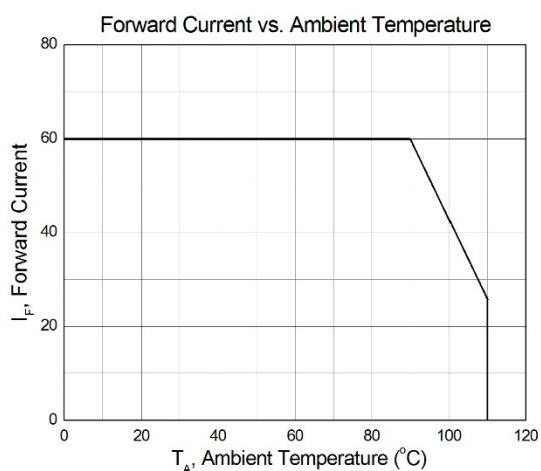


Figure 1

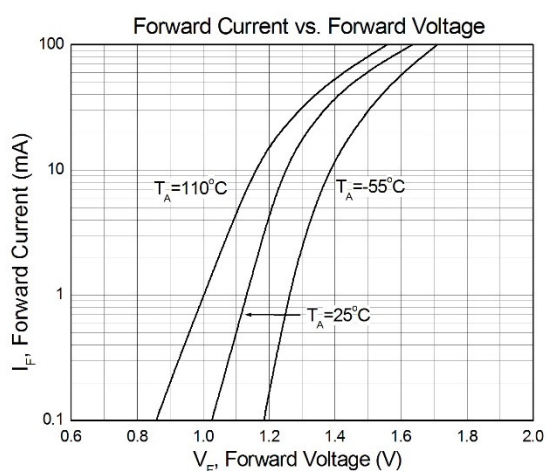


Figure 2

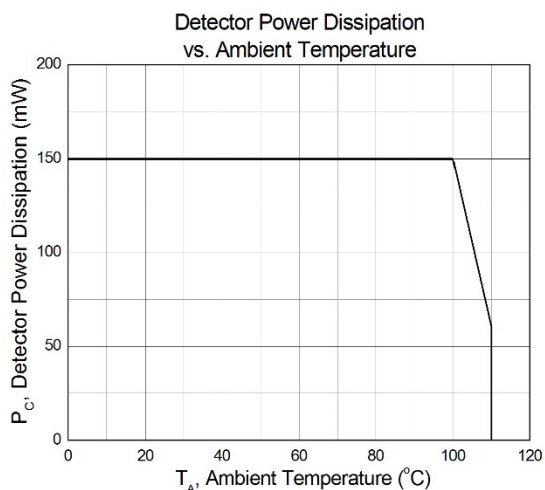


Figure 3

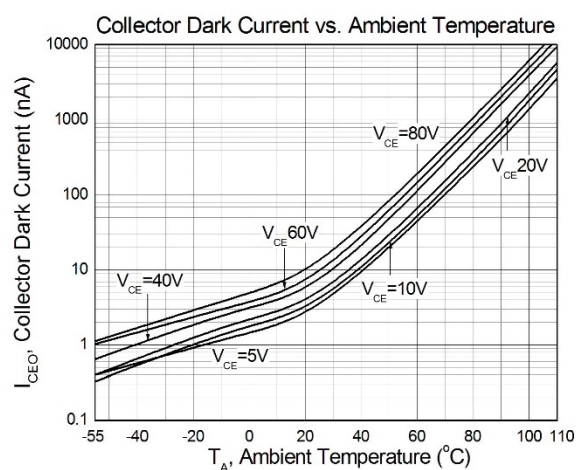


Figure 4

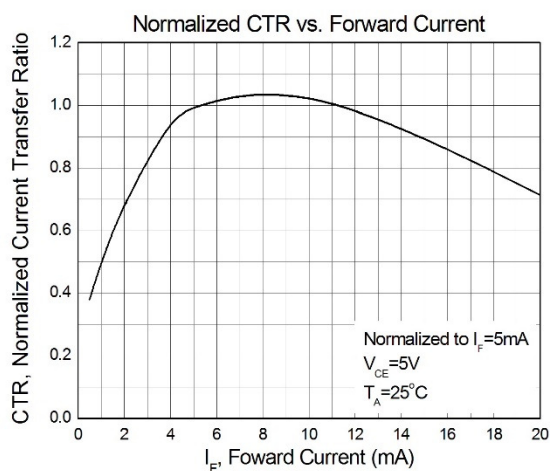


Figure 5

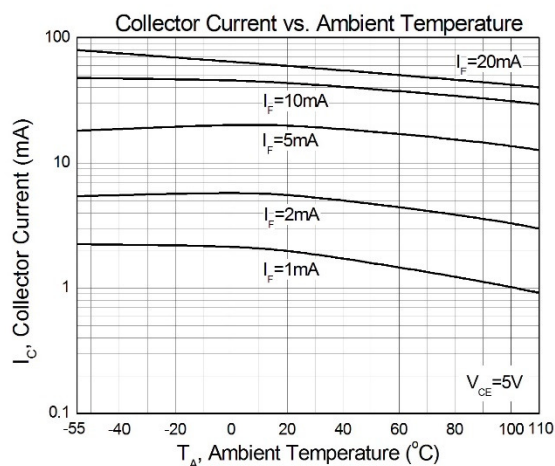


Figure 6



## AC Input 4-Pin Phototransistor Optocoupler

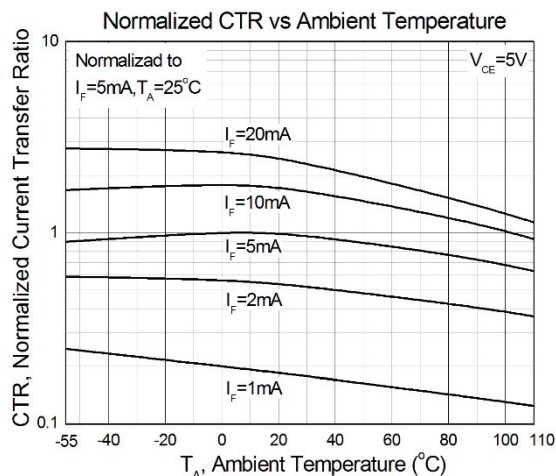


Figure 7

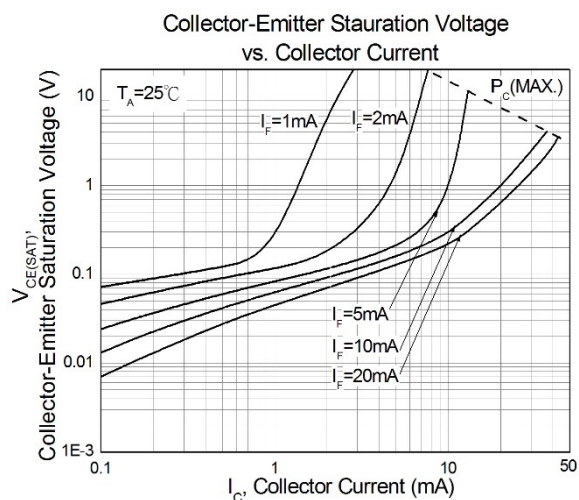


Figure 8

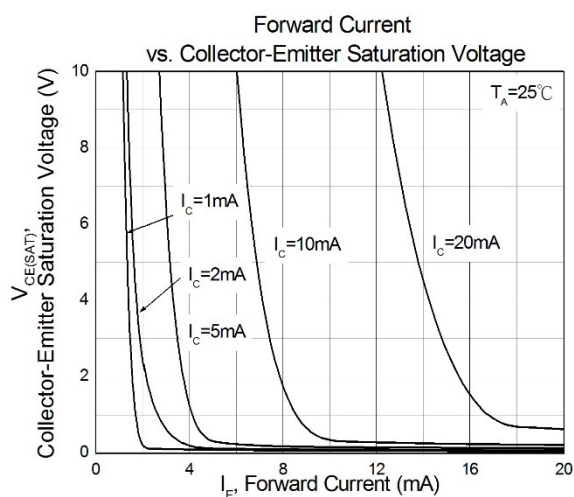


Figure 9

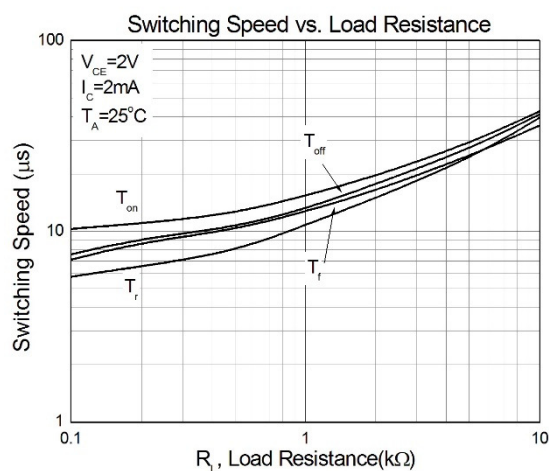


Figure 10

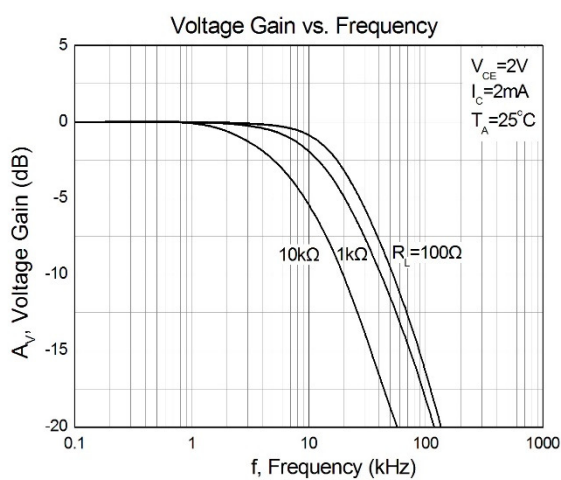
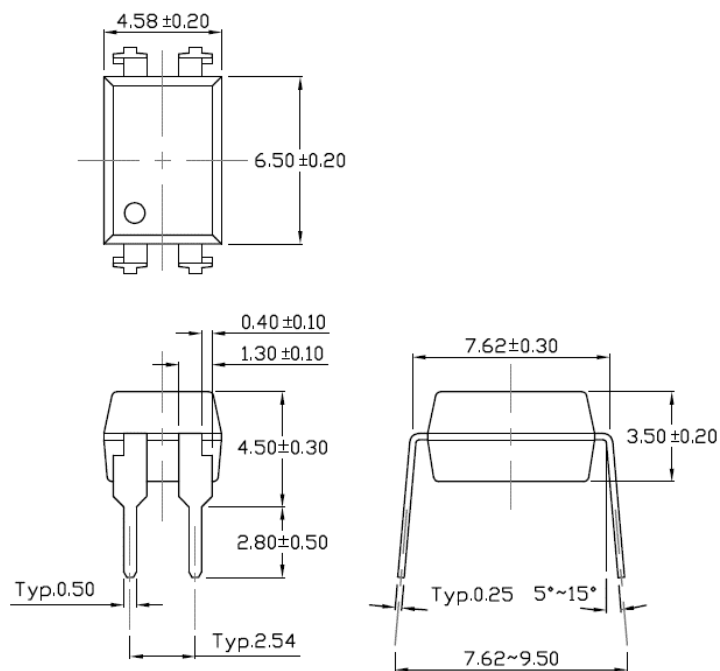


Figure 11

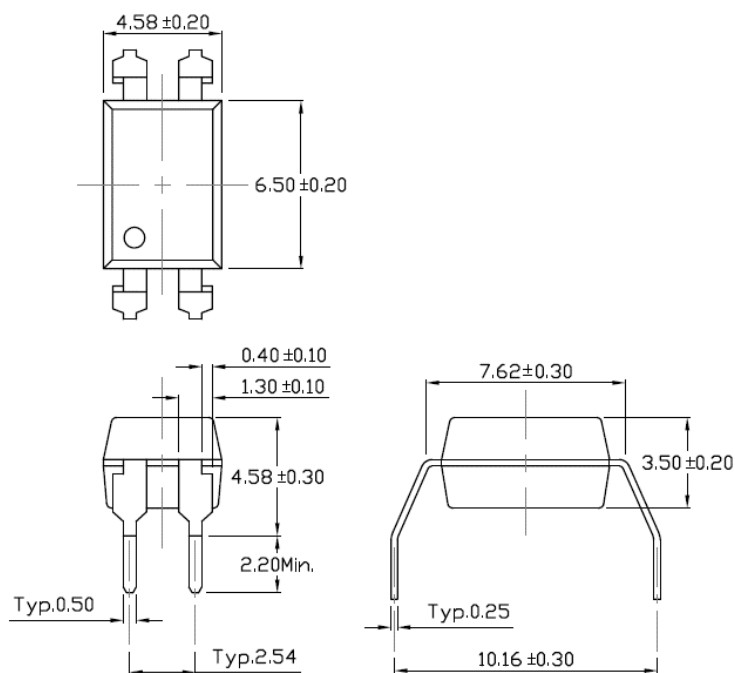


**Package Dimension** *Dimensions in mm unless otherwise stated*

**Standard DIP – Through Hole**



**Gullwing (400mil) Lead Forming – Through Hole (M Type)**

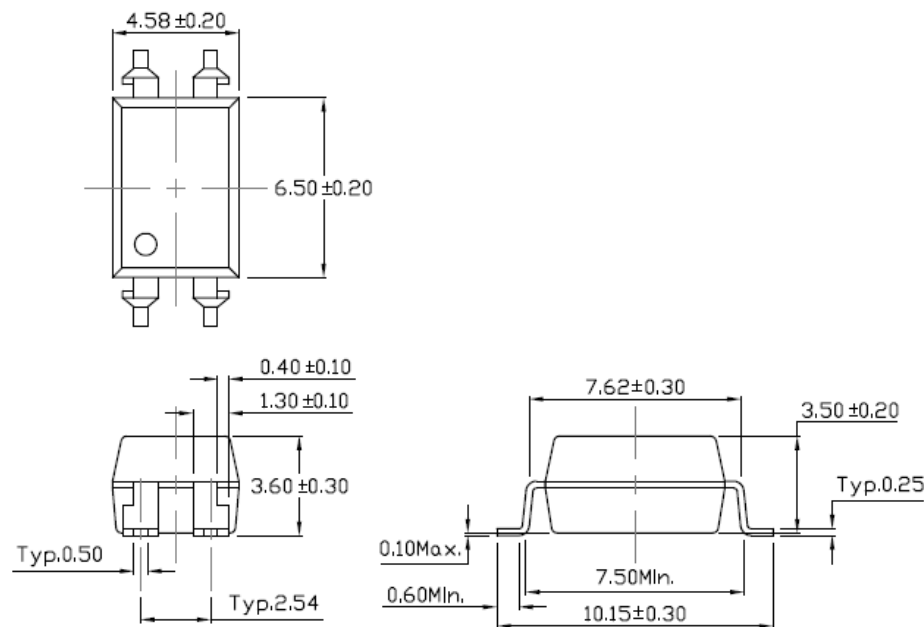




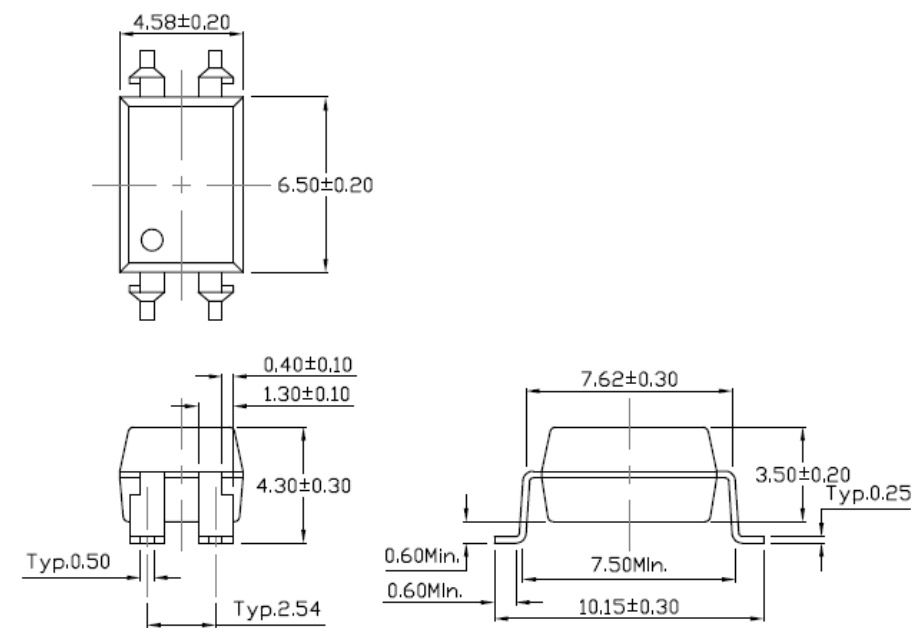
# CT814 Series

## AC Input 4-Pin Phototransistor Optocoupler

### Surface Mount Lead Forming (S Type)



### Surface Mount (Low Profile) Lead Forming (SL Type)

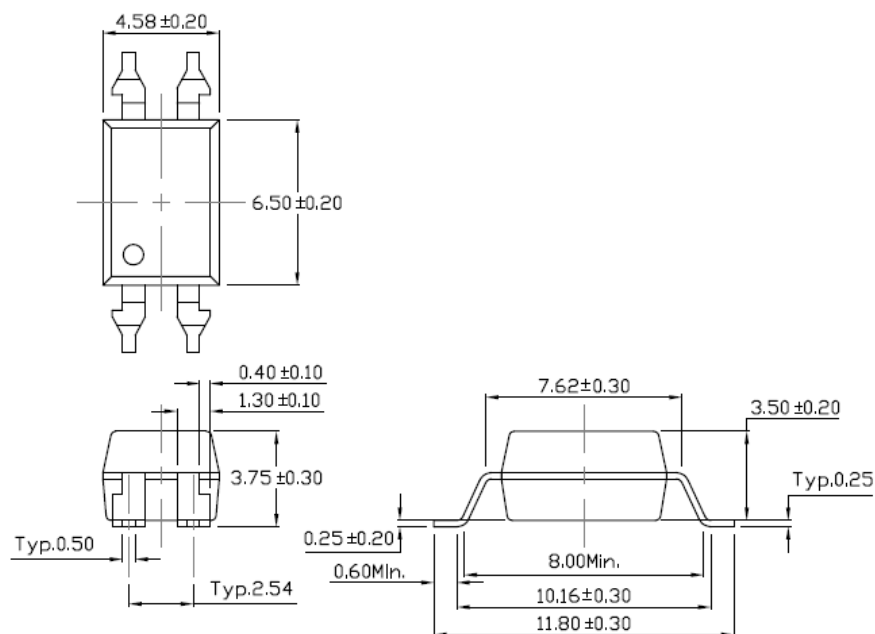




## CT814 Series

### AC Input 4-Pin Phototransistor Optocoupler

#### Surface Mount (Gullwing) Lead Forming (SLM Type)

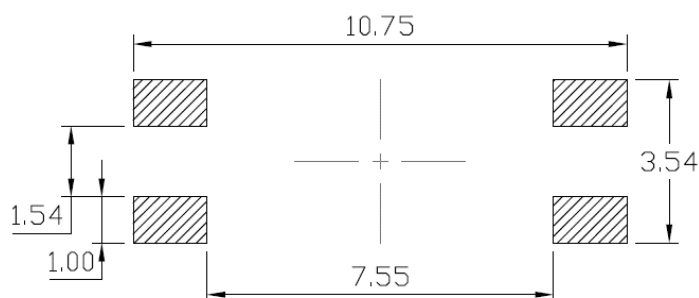




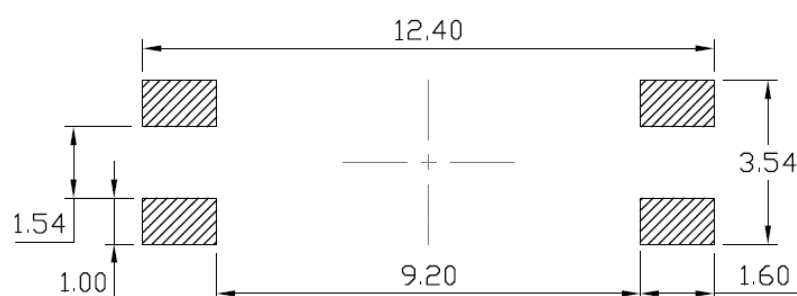


## Recommended Solder Mask Dimensions in mm unless otherwise stated

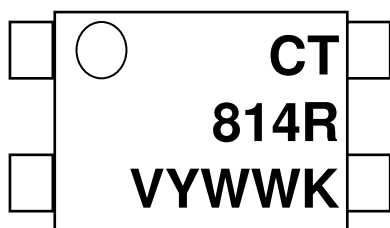
### Surface Mount Lead Forming & Surface Mount (Low Profile) Lead Forming



### Surface Mount (Gullwing) Lead Forming



## Marking Information



### Note:

- CT : Denotes "CT Micro"
- 814 : Part Number
- R : CTR Rank
- V : VDE Option
- Y : Fiscal Year
- WW : Work Week
- K : Manufacturing Code



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**Ordering Information****CT814X(V)(Y)(Z)-G**

X = Part No. (X=A, B or None)

V = VDE Option ( V or None)

Y = Lead form option (S, SL, M, SLM or none)

Z = Tape and reel option (T1, T2, T3, T4 or none)

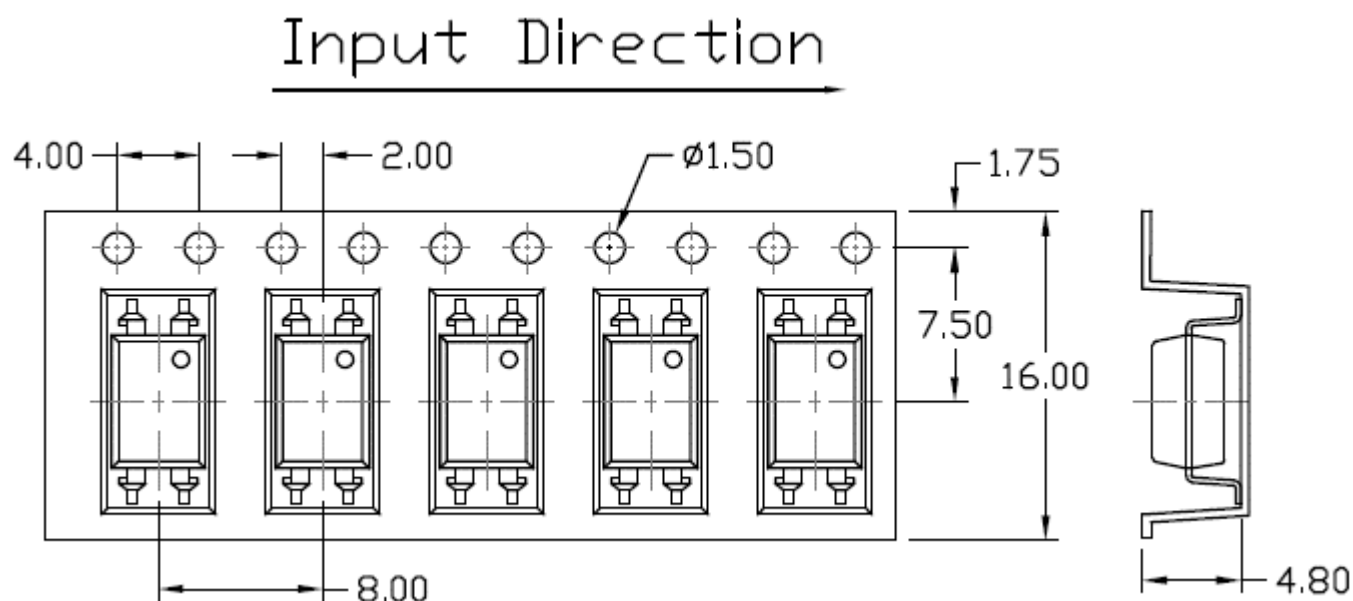
G= Material option (G: Green, None: Non-green)

<b>Option</b>	<b>Description</b>	<b>Quantity</b>
None	Standard 4 Pin DIP	100 Units/Tube
M	Gullwing (400mil) Lead Forming	100 Units/Tube
S(T1)	Surface Mount Lead Forming – With Option 1 Taping	1500 Units/Reel
S(T2)	Surface Mount Lead Forming – With Option 2 Taping	1500 Units/Reel
S(T3)	Surface Mount Lead Forming – With Option 3 Taping	1000 Units/Reel
S(T4)	Surface Mount Lead Forming – With Option 4 Taping	1000 Units/Reel
SL(T1)	Surface Mount (Low Profile) Lead Forming– With Option 1 Taping	1500 Units/Reel
SL(T2)	Surface Mount (Low Profile) Lead Forming – With Option 2 Taping	1500 Units/Reel
SL(T3)	Surface Mount (Low Profile) Lead Forming– With Option 3 Taping	1000 Units/Reel
SL(T4)	Surface Mount (Low Profile) Lead Forming – With Option 4 Taping	1000 Units/Reel
SLM(T1)	Surface Mount (Gullwing) Lead Forming– With Option 1 Taping	1500 Units/Reel
SLM(T2)	Surface Mount (Gullwing) Lead Forming – With Option 2 Taping	1500 Units/Reel

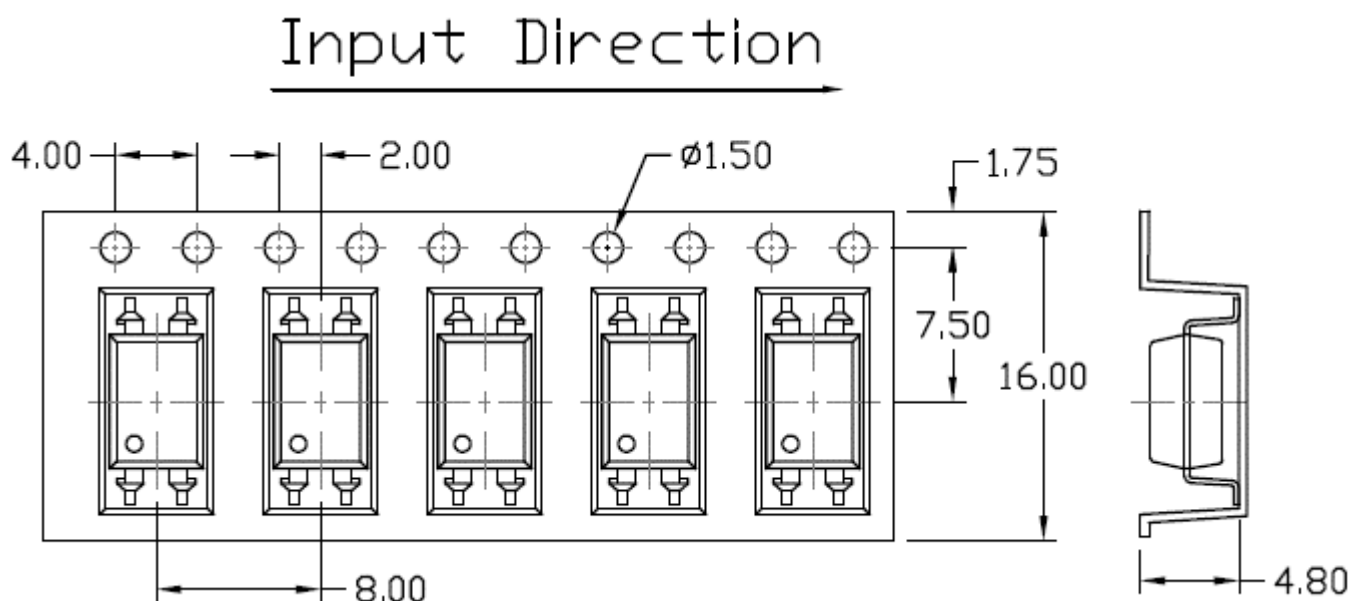


**Carrier Tape Specifications** *Dimensions in mm unless otherwise stated*

**Option S(T1) & SL(T1)**



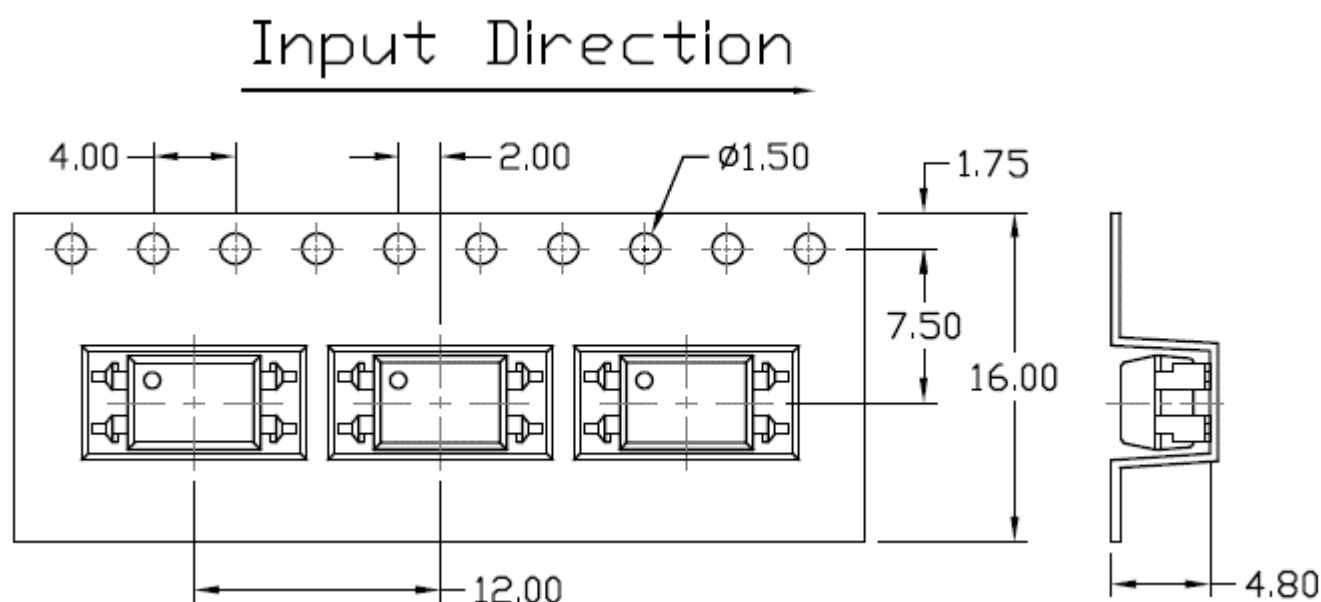
**Option S(T2) & SL(T2)**



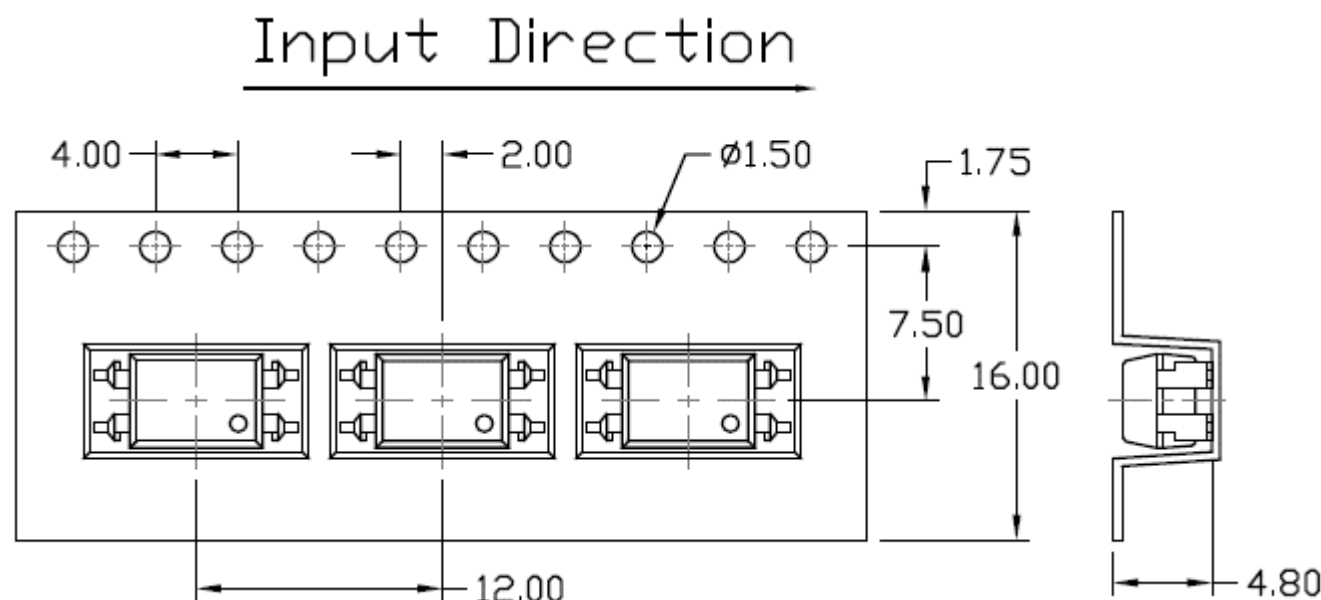


## AC Input 4-Pin Phototransistor Optocoupler

### Option S(T3) & SL(T3)

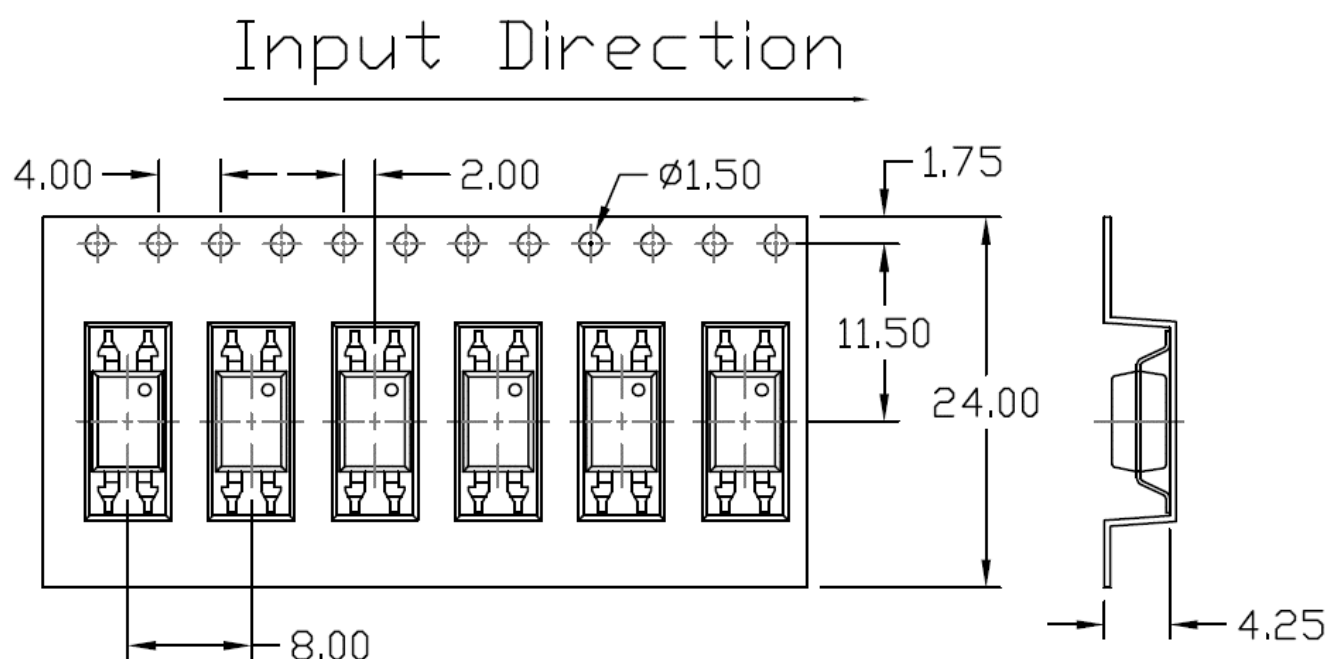


### Option S(T4) & SL(T4)

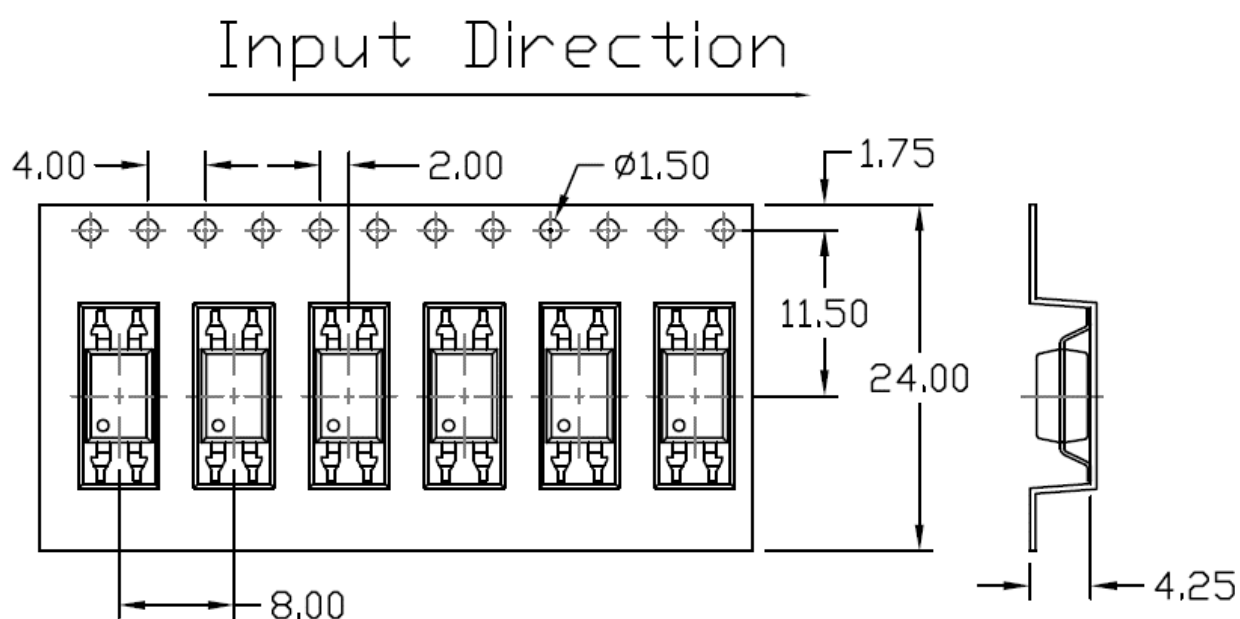




Option SLM(T1)

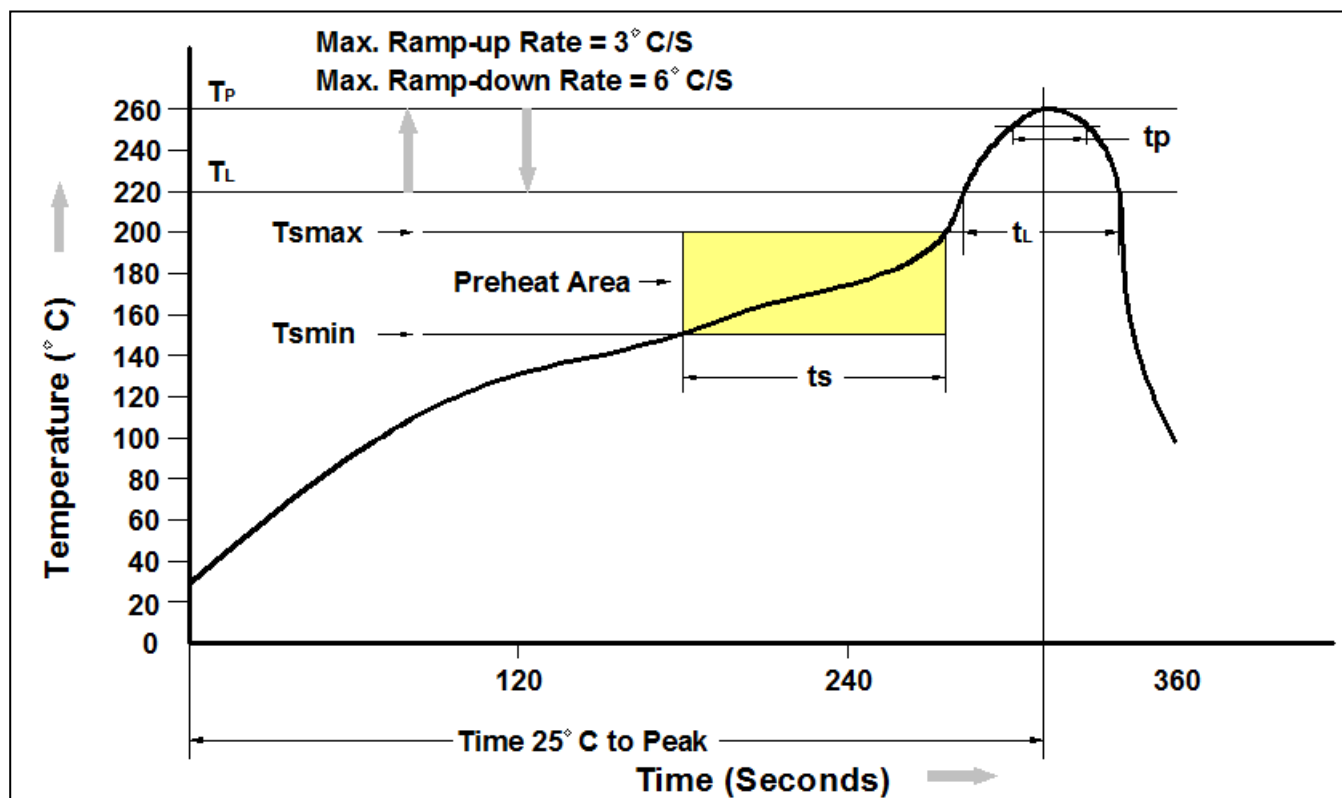


Option SLM(T2)





## 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.



## AC Input 4-Pin Phototransistor Optocoupler

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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.*