



| Parameter                      | Rating    | Units |
|--------------------------------|-----------|-------|
| Breakdown Voltage - $BV_{CEO}$ | 350       | $V_P$ |
| Current Transfer Ratio - CTR   | 1000-8000 | %     |

## Features

- 5000V<sub>rms</sub> Input/Output Isolation
- Small 4-Pin Package
- 350V<sub>P</sub> Breakdown Voltage
- Machine Insertable, Wave Solderable
- Surface Mount Tape & Reel Version Available

## Applications

- Telecom Switching
- Tip/Ring Circuits
- Hook Switch
- Modem Switching (Laptop, Notebook, Pocket Size)
- Loop Detect
- Ringing Detect
- Current Sensing

## Description

The CPC1301 is a unidirectional input optocoupler with a high-voltage Darlington output. Light output from the highly efficient GaAlAs infrared LED activates the optically coupled silicon NPN photo-Darlington output transistor. The input LED and the output transistor are separated by a 5000V<sub>rms</sub> isolation barrier.

With an LED current of only 1mA, a current transfer ratio of 1000% to 8000% is guaranteed at the collector of the 350V Darlington output transistor.

The CPC1301's low input current, high current transfer ratio, high output voltage capability, and large isolation barrier rating make it ideal for many applications such as telecom, industrial, and power control.

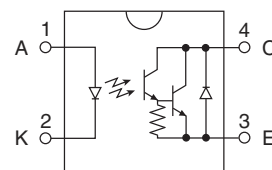
## Approvals

- UL Recognized Component: File # E76270
- UL 1577 Double Protection
- CSA Certified Component:  
Certificate # 156092 (LR 43639)
- EN/IEC 60950-1 compliant

## Ordering Information

| Part Number | Description                     |
|-------------|---------------------------------|
| CPC1301G    | 4-Pin DIP (100/Tube)            |
| CPC1301GR   | 4-Pin Surface Mount (100/Tube)  |
| CPC1301GRTR | 4-Pin Surface Mount (1000/Reel) |

## Pin Configuration



## Absolute Maximum Ratings

| Parameter                                      | Ratings     | Units       |
|------------------------------------------------|-------------|-------------|
| Breakdown Voltage, $BV_{CEO}$                  | 350         | $V_P$       |
| Reverse Input Voltage                          | 5           | V           |
| Input Control Current                          | 50          | mA          |
| Peak (10ms)                                    | 1           | A           |
| Input Power Dissipation <sup>1</sup>           | 150         | mW          |
| Phototransistor Power Dissipation <sup>2</sup> | 150         | mW          |
| Isolation Voltage Input to Output              | 5000        | $V_{rms}$   |
| Operational Temperature                        | -40 to +85  | $^{\circ}C$ |
| Storage Temperature                            | -40 to +125 | $^{\circ}C$ |

<sup>1</sup> Derate Linearly 1.33 mW/ $^{\circ}C$

<sup>2</sup> Derate Linearly 1.5 mW/ $^{\circ}C$

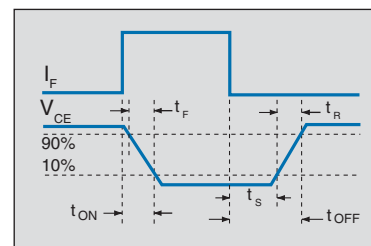
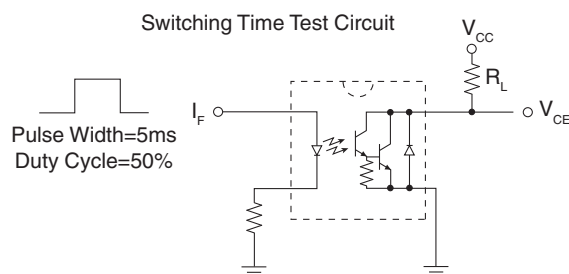
Electrical absolute maximum ratings are at 25 $^{\circ}C$

## Electrical Characteristics

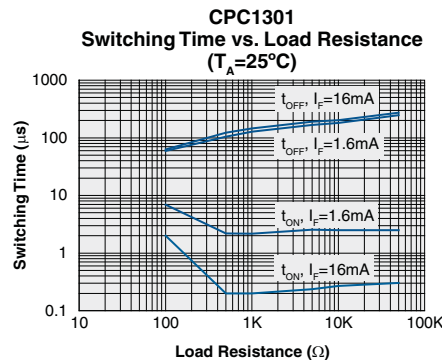
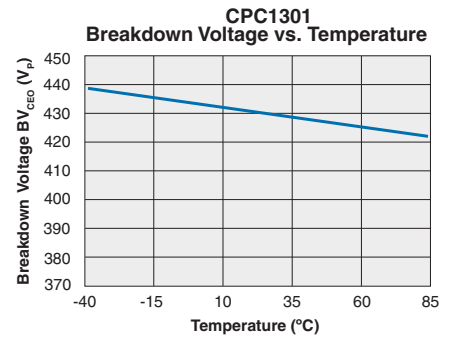
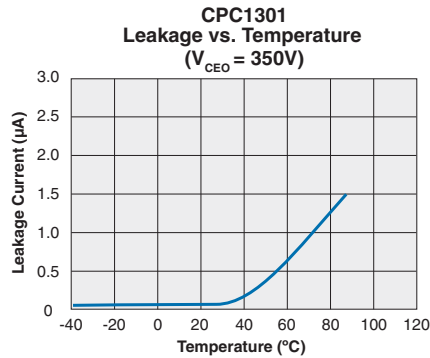
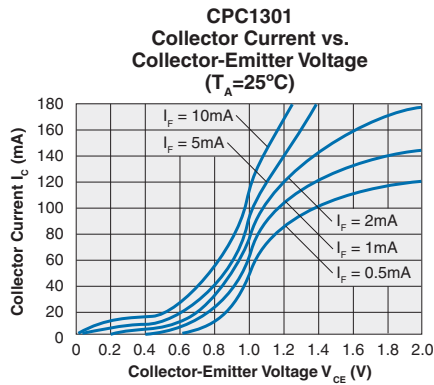
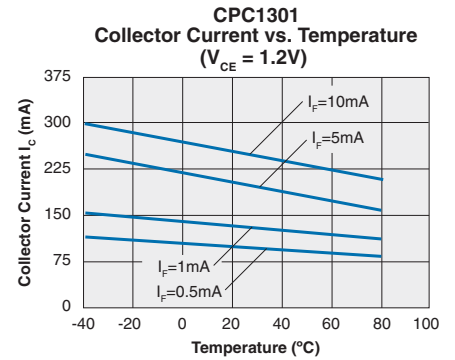
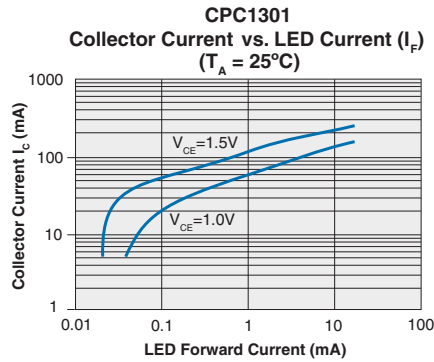
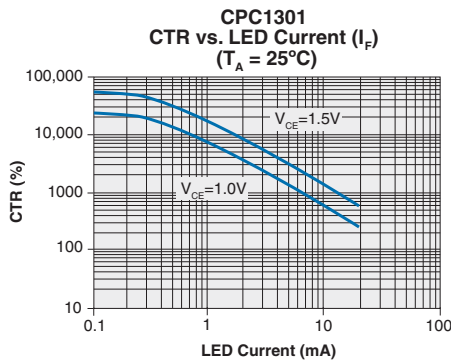
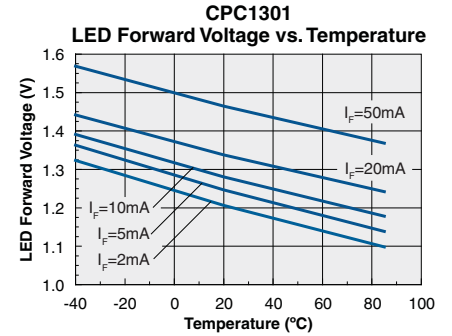
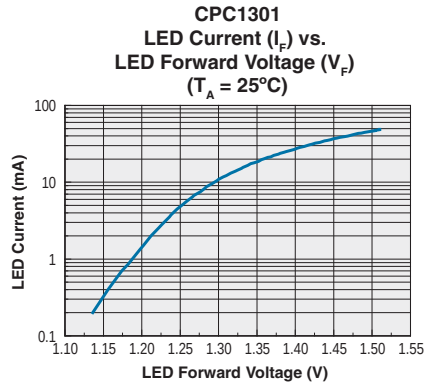
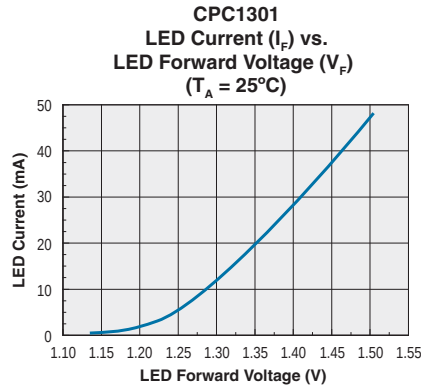
| Parameters                                               | Conditions              | Symbol        | Min  | Typ  | Max  | Units   |
|----------------------------------------------------------|-------------------------|---------------|------|------|------|---------|
| <b>Output Characteristics @ 25<math>^{\circ}C</math></b> |                         |               |      |      |      |         |
| Phototransistor Breakdown Voltage                        | $I_{CEO}=100\mu A$      | $BV_{CEO}$    | 350  | -    | -    | $V_P$   |
| Emitter-Collector Breakdown Voltage                      | $I_E=0.1mA$             | $BV_{ECO}$    | 0.3  | -    | -    | V       |
| Phototransistor Output (Dark) Current                    | $V_{CEO}=200V, I_F=0mA$ | $I_{CEO}$     | -    | -    | 100  | nA      |
| Saturation Voltage                                       | $I_C=10mA, I_F=1mA$     | $V_{CE(Sat)}$ | -    | -    | 1    | V       |
|                                                          | $I_C=100mA, I_F=10mA$   |               | -    | -    | 1.2  | V       |
| Current Transfer Ratio                                   | $I_F=1mA, V_{CE}=1V$    | CTR           | 1000 | 5500 | 8000 | %       |
| Output Capacitance                                       | $V_{CEO}=50V, f=1MHz$   | $C_{OUT}$     | -    | 13   | -    | pF      |
| <b>Input Characteristics @ 25<math>^{\circ}C</math></b>  |                         |               |      |      |      |         |
| Input Control Current                                    | $I_C=10mA, V_{CE}=1V$   | $I_F$         | -    | 0.07 | 1    | mA      |
| Input Voltage Drop                                       | $I_F=5mA$               | $V_F$         | 0.9  | 1.2  | 1.4  | V       |
| Input Reverse Current                                    | $V_R=5V$                | $I_R$         | -    | -    | 10   | $\mu A$ |
| <b>Common Characteristics @ 25<math>^{\circ}C</math></b> |                         |               |      |      |      |         |
| Input to Output Capacitance                              | -                       | $C_{IO}$      | -    | 3    | -    | pF      |

## Switching Characteristics @ 25 $^{\circ}C$

| Characteristic | Symbol    | Test Condition                                | Typ  | Units   |
|----------------|-----------|-----------------------------------------------|------|---------|
| Rise Time      | $t_R$     | $V_{CC}=10V$<br>$I_F=10mA$<br>$R_L=100\Omega$ | 40   | $\mu s$ |
| Fall Time      | $t_F$     |                                               | 2.6  |         |
| Turn-On Time   | $t_{ON}$  |                                               | 2.75 |         |
| Storage Time   | $t_S$     |                                               | 20   |         |
| Turn-Off Time  | $t_{OFF}$ |                                               | 60   |         |
| Turn-On Time   | $t_{ON}$  | $V_{CC}=10V$<br>$I_F=16mA$<br>$R_L=180\Omega$ | 1    |         |
| Storage Time   | $t_S$     |                                               | 40   |         |
| Turn-Off Time  | $t_{OFF}$ |                                               | 80   |         |



**PERFORMANCE DATA\***



\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

## Manufacturing Information

### Soldering

For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

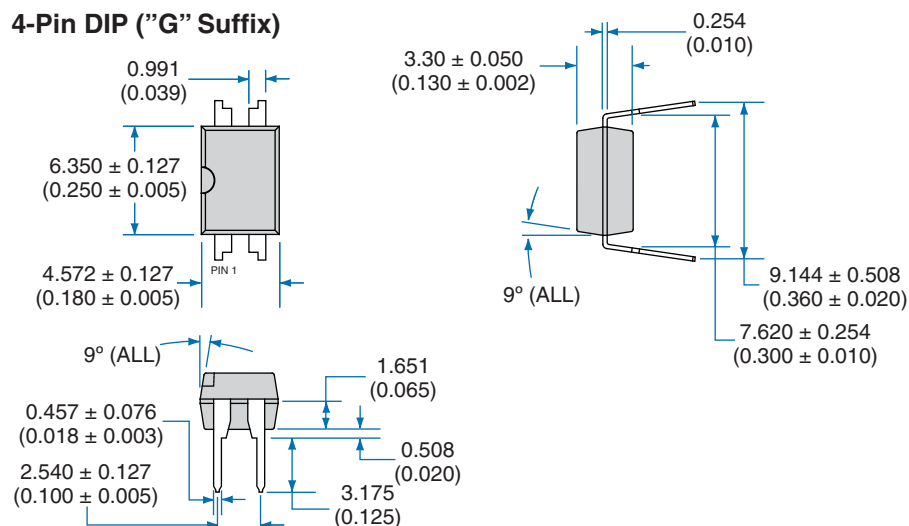
### Washing

Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

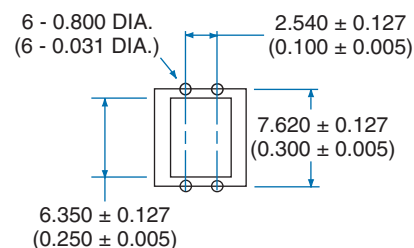


## MECHANICAL DIMENSIONS

### 4-Pin DIP ("G" Suffix)

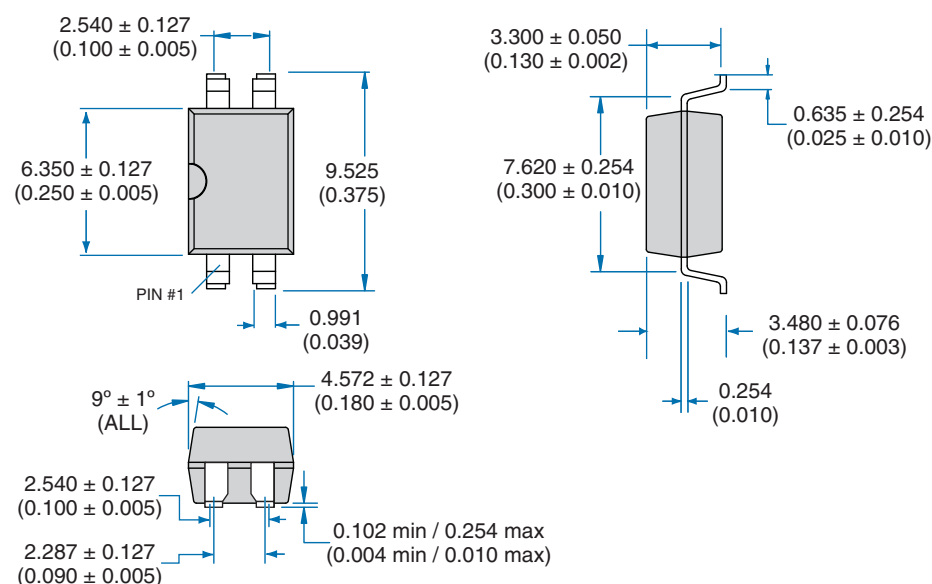


### PC Board Pattern (Top View)

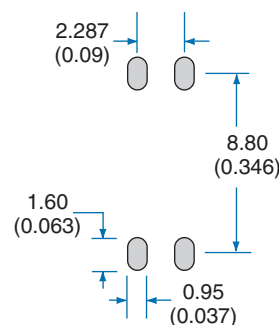


Dimensions  
mm  
(inches)

### 4-Pin Surface Mount ("GR" Suffix)

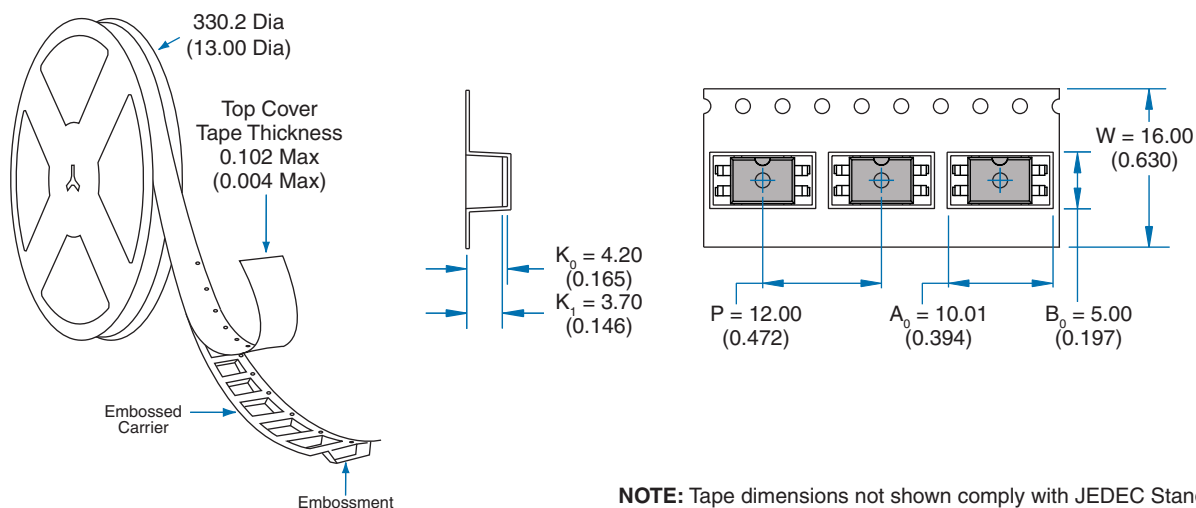


### Recommended PCB Land Pattern



Dimensions  
mm  
(inches)

## Tape and Reel Packaging for 4-Pin Surface Mount Package



**NOTE:** Tape dimensions not shown comply with JEDEC Standard EIA-481-2

**For additional information please visit our website at: [www.clare.com](http://www.clare.com)**

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