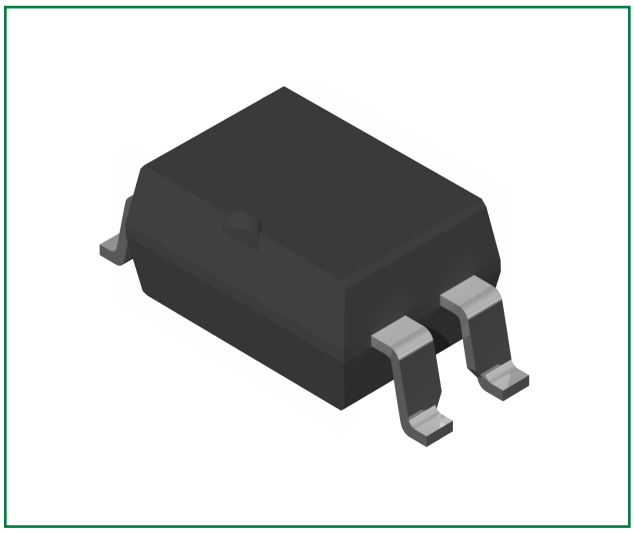
# CPC1343G

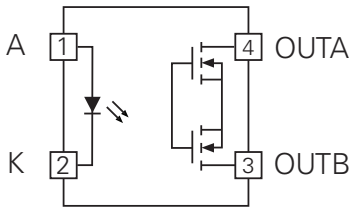
60 V, 900 $mA_{RMS}/mA_{DC}$, Normally Open Relay

## Key Attributes

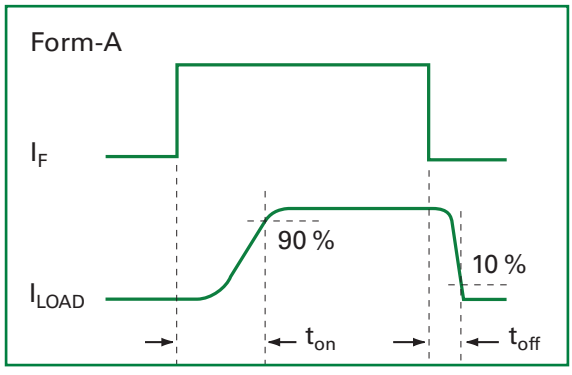
| Characteristic | Rating | Unit |
|---|---|---|
| Blocking Voltage | 60 | $V_P$ |
| Load Current | 900 | $mA_{RMS}/mA_{DC}$ |
| On-Resistance (max.) | 0.8 | Ω |
| Isolation Voltage, Input to Output | 5000 | $V_{RMS}$ |



## Pinout Diagram (DIP-4)




## Switching Characteristics




## Description

The CPC1343G is a bidirectional, normally open (1-Form-A) Solid State Relay with an enhanced input to output isolation barrier of 5000 $V_{RMS}$.

The relay output is constructed with efficient MOSFET switches that uses Littelfuse's patented OptoMOS® architecture. The input, a highly efficient infrared LED, controls the optically coupled output.

## Features

- 60 V, 900 mA continuous load current capability
- Operating ambient temperature –40 °C to + 105 °C
- Input/Output isolation 5000 $V_{RMS}$
- Fast switching $T_{on}/T_{off}$ = 4 ms /1 ms
- Low LED control current: $I_F$ max = 3 mA

## Applications

- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
- Meters (electric current, water, gas)
- Automatic test equipment
- Medical equipment—patient/equipment isolation
- Industrial controls

## Approvals

- UL Recognized Component: File E76270 (Pending)
- CSA Certified Component: 1172007
- TUV EN 62368-1: Certificate # B 082667 0008

## Ordering Information

| Part Number | Description |
|---|---|
| CPC1343G | 4-Pin DIP (100/Tube) |
| CPC1343GR | 4-Pin Surface Mount (100/Tube) |
| CPC1343GRTR | 4-Pin Surface Mount (1000/Reel) |

# Specifications

## Absolute Maximum Ratings

| Parameter | Ratings | Units |
|---|---|---|
| Blocking Voltage | 60 | V |
| Reverse Input Voltage | 5 | V |
| Input Control Current | 50 | mA |
| Peak (10 ms) | 1 | A |
| Input Power Dissipation [1] | 150 | mW |
| Total Power Dissipation [2] | 550 | |
| Isolation Voltage, Input to Output | 5000 | $V_{RMS}$ |
| ESD Rating (Human Body Model) | 2 | kV |
| Operational Temperature, Ambient | –40 to +105 | °C |
| Storage Temperature | –40 to +125 | |

[1] *Derate linearly 1.33 mW/K*
[2] *Derate output power linearly 3 mW/K*

*Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.*

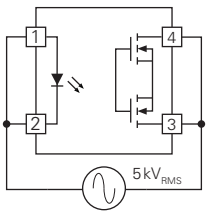
*Typical values are characteristic of the device at +25 °C, and are the result of engineering evaluations. They are provided for information purposes only, and are not part of the manufacturing testing requirements.*

## Electrical Characteristics @ 25 °C

| Parameter | Conditions | Symbol | Value | | | Units |
|---|---|---|---|---|---|---|
| | | | Minimum | Typical | Maximum | |
| **Output Characteristics** | | | | | | |
| Blocking voltage | $I_L$ = 1 µA | $V_{DRM}$ | 60 | — | — | V |
| Load current: | | | | | | |
| Continuous [1] | — | $I_L$ | — | — | 900 | $mA_{RMS}/mA_{DC}$ |
| Peak | t = 100 ms | $I_{LPK}$ | — | — | ±1500 | $mA_P$ |
| On-resistance [2] | $I_L$ = 100 mA | $R_{ON}$ | — | 0.37 | 0.8 | Ω |
| Off-state leakage current | $V_L$ = 60 $V_P$ | $I_{LEAK}$ | — | — | 1 | µA |
| Switching speeds: | | | | | | |
| Turn-on | $I_F$ = 5 mA, $V_L$ = 10 V | $t_{on}$ | — | 0.36 | 4 | ms |
| Turn-off | | $t_{off}$ | — | 0.16 | 1 | |
| Output capacitance | $I_F$ = 0 mA, $V_L$ = 20 V, f = 1 MHz | $C_{OUT}$ | — | 20 | — | pF |
| **Input Characteristics** | | | | | | |
| Input control current to activate | $I_L$ = 100 mA | $I_F$ | — | 0.46 | 3 | mA |
| Input control current to deactivate | — | $I_F$ | 0.1 | — | — | |
| Input voltage to deactivate | — | $V_F$ | 0.8 | — | — | V |
| Input voltage drop | $I_F$ = 5 mA | $V_F$ | 0.9 | 1.36 | 1.5 | |
| Reverse input current | $V_R$ = 5 V | $I_R$ | — | — | 10 | µA |
| **Common Characteristics** | | | | | | |
| Capacitance, input to output | $V_{IO}$ = 0 V, f = 1 MHz | $C_{IO}$ | — | 0.8 | 1.5 | pF |
| Isolation Resistance I/O | — | $R_{I/O}$ | 1000 | — | — | MΩ |

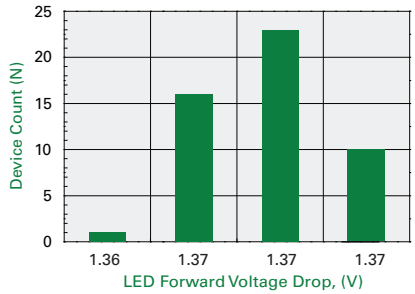
[1] *Load current derates linearly from 900 mA @ 25 °C to 400 mA @ 105 °C.*
[2] *Measurement taken within 1 second of on-time.*

**Isoltation Test Circuit**

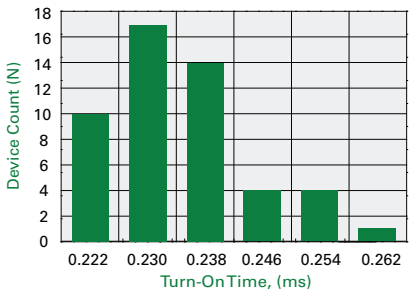


## Characteristic Curves

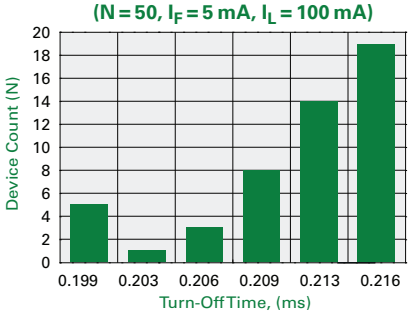
**Typical LED Forward Voltage Drop ($N = 50$, $I_F = 5$ mA)**



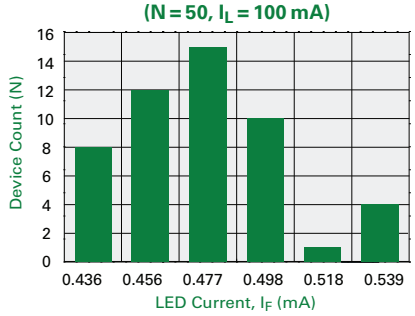

**Typical Turn-On Time ($N = 50$, $I_F = 5$ mA, $I_L = 100$ mA)**



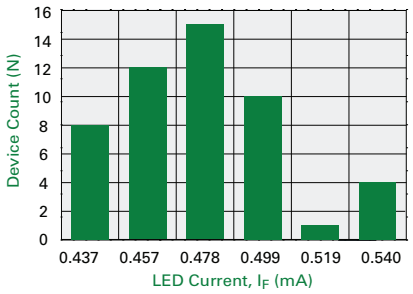

**Typical Turn-Off Time ($N = 50$, $I_F = 5$ mA, $I_L = 100$ mA)**



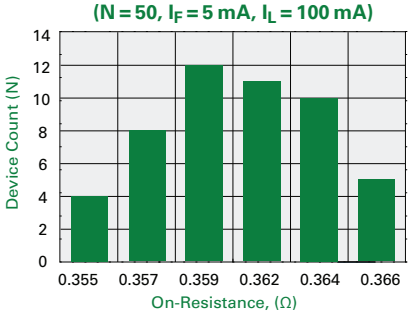

**Typical $I_F$ for Switch Dropout ($N = 50$, $I_L = 100$ mA)**



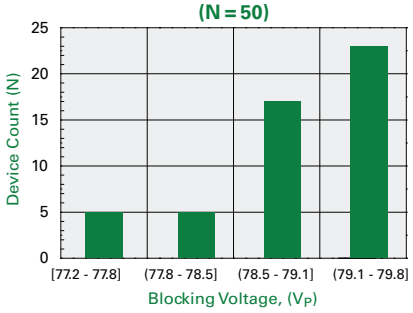

**Typical $I_F$ for Switch Operation ($N = 50$, $I_L = 100$ mA)**



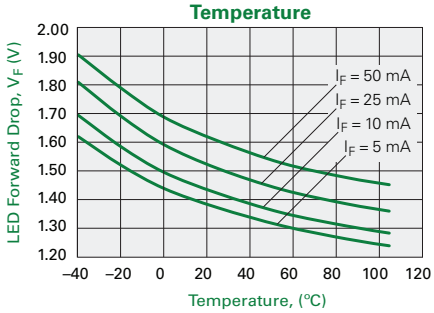

**Typical On-Resistance ($N = 50$, $I_F = 5$ mA, $I_L = 100$ mA)**



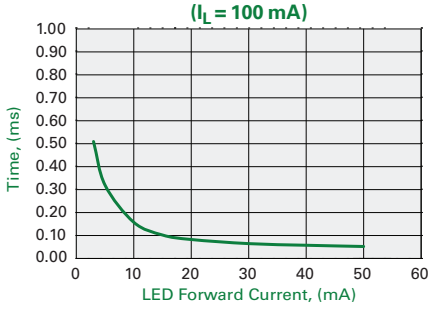

**Typical Blocking Voltage Distribution ($N = 50$)**



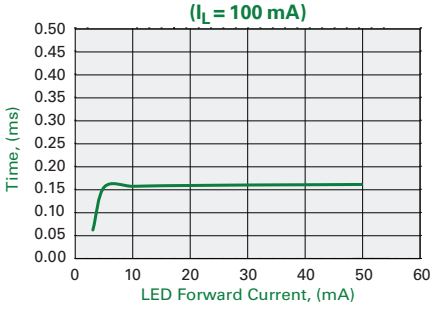

**Typical LED Forward Voltage Drop vs. Temperature**




**Typical Turn-On Time vs. LED Forward Current ($I_L = 100$ mA)**



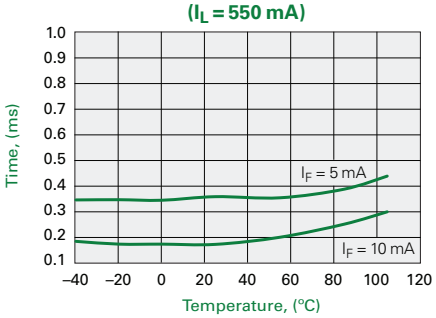

**Typical Turn-Off Time vs. LED Forward Current ($I_L = 100$ mA)**



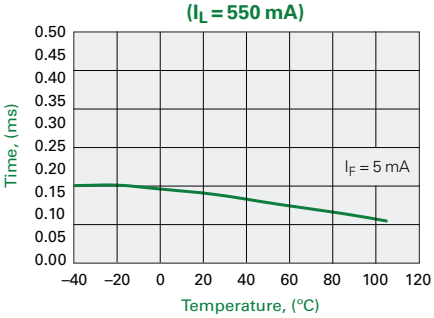

*Unless otherwise noted, data presented in these graphs is typical for device operation at $T_A$ = 25°C.

## Characteristic Curves

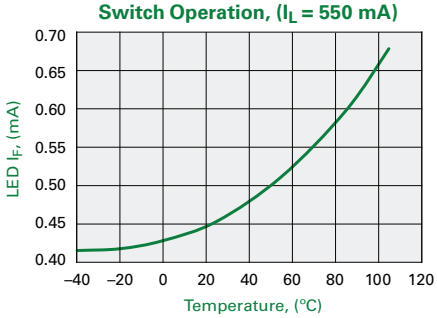
**Typical Turn-On Time vs. Temperature ($I_L$ = 550 mA)**



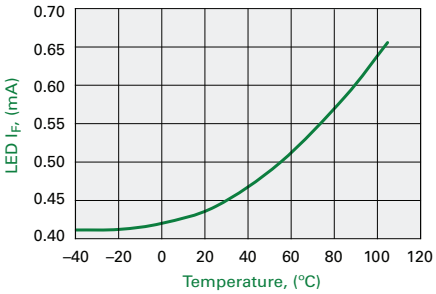

**Typical Turn-Off Time vs. Temperature ($I_L$ = 550 mA)**



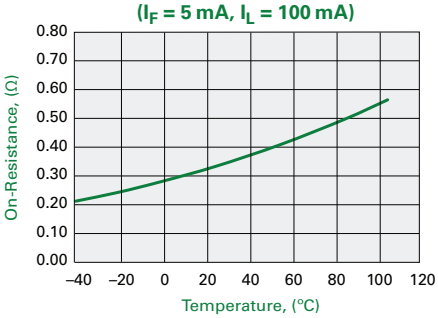

**Typical forward current for Switch Operation, ($I_L$ = 550 mA)**



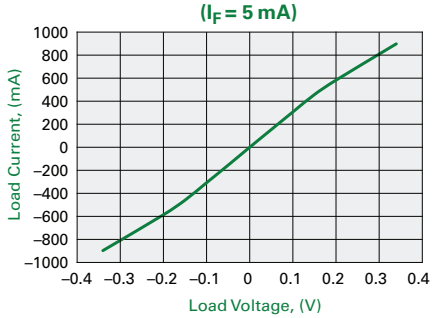

**Typical forward current for Switch Dropout, ($I_L$ = 550 mA)**



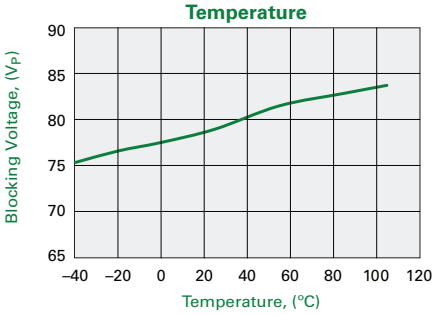

**On-Resistance vs. Temperature ($I_F$ = 5 mA, $I_L$ = 100 mA)**



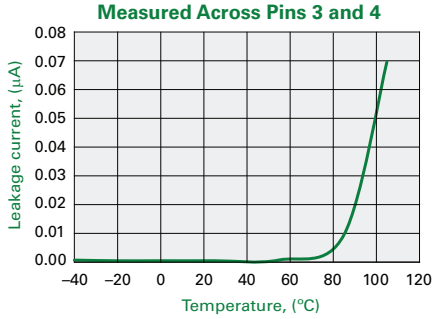

**Typical Load Current vs. Load Voltage ($I_F$ = 5 mA)**



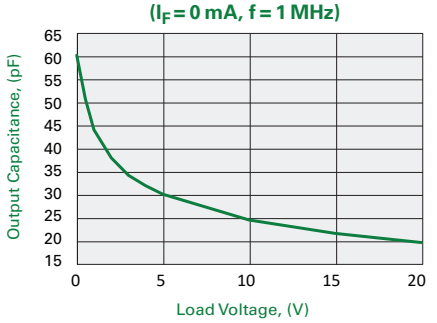

**Typical Blocking Voltage vs. Temperature**



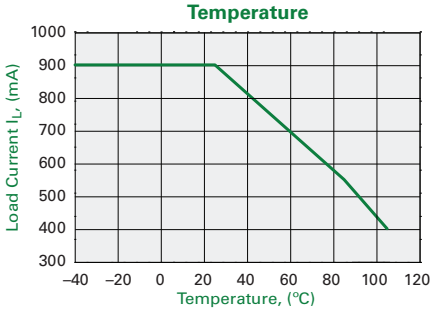

**Typical Leakage vs. Temperature Measured Across Pins 3 and 4**




**Output Capacitance vs. Load Voltage ($I_F$ = 0 mA, f = 1 MHz)**




**Maximum Load Current vs. Temperature**




*Unless otherwise noted, data presented in these graphs is typical for device operation at $T_A$ = 25°C.

# Manufacturing Information

## Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. Littelfuse classifies its plastic encapsulated devices for moisture sensitivity according to the latest revision of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a **Moisture Sensitivity Level (MSL)** classification as shown below, and should be handled according to the requirements of the latest revision of the joint industry standard **IPC/JEDEC J-STD-033**.

| Device | Moisture Sensitivity Level (MSL) Classification |
|---|---|
| CPC1343G | 1 |
| CPC1343GR | 3 |

## ESD Sensitivity

This product is ESD Sensitive, and should be handled according to the industry standard **JESD-625**.

## Soldering Profile

Provided in the table below is the **IPC/JEDEC J-STD-020** Classification Temperature ($T_C$) and the maximum dwell time ($T_C$ – 5 °C). The Classification Temperature sets the Maximum Body Temperature allowed for these devices, during reflow soldering processes.

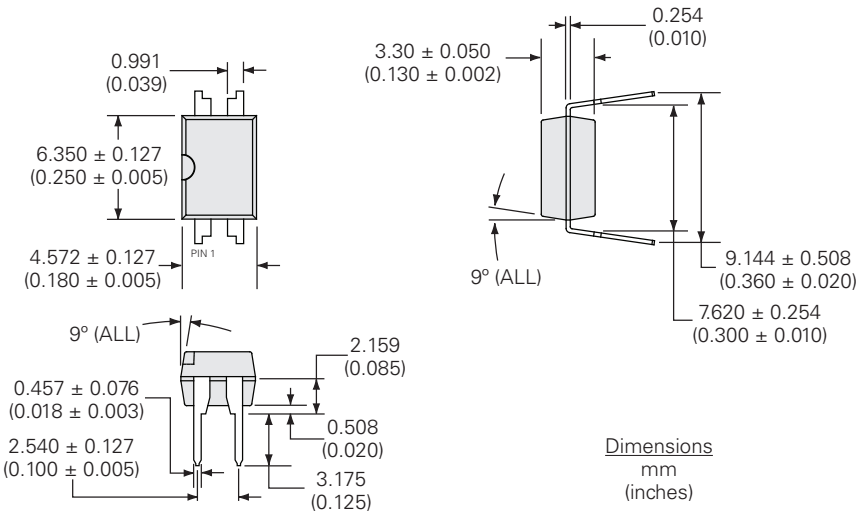
| Device | Classification Temperature ($T_C$) | Dwell Time ($T_P$) | Max Reflow Cycles |
|---|---|---|---|
| CPC1343G | 250 °C | 30 seconds | 3 |

## Board Wash

Littelfuse recommends the use of no-clean flux formulations. Board washing to reduce or remove flux residue following the solder reflow process is acceptable provided proper precautions are taken to prevent damage to the device. These precautions include but are not limited to: Using a low pressure wash and providing a follow up bake cycle sufficient to remove any moisture trapped within the device due to the washing process. Due to the variability of the wash parameters used to clean the board, determination of the bake temperature and duration necessary to remove the moisture trapped within the package is the responsibility of the user (assembler). Cleaning or drying methods that employ ultrasonic energy may damage the device and should not be used. Additionally, the device must not be exposed to halide flux or solvents.

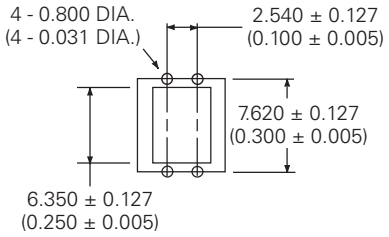
## Mechanical Dimensions

CPC1343G

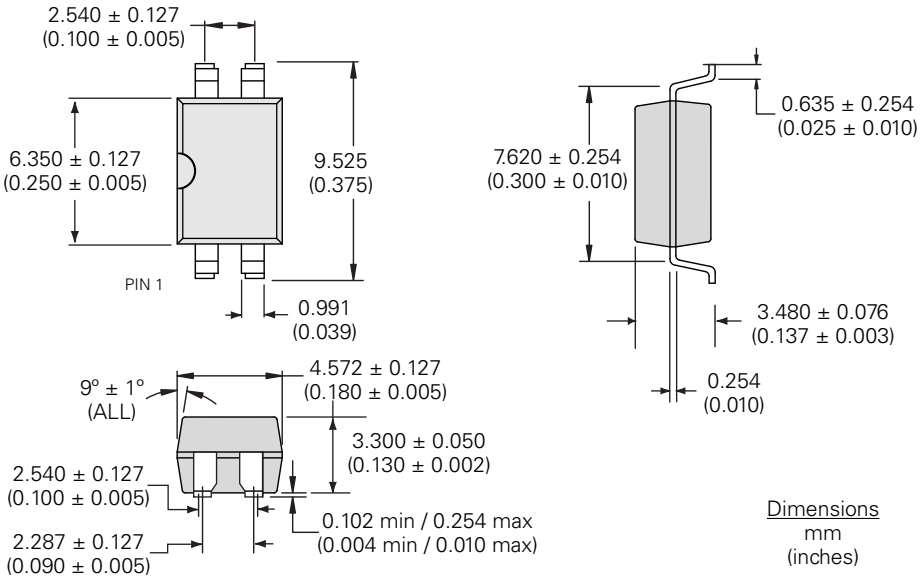



Dimensions
mm
(inches)

**PC Board Pattern (Top View)**

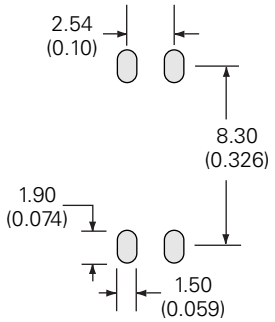



CPC1343GR

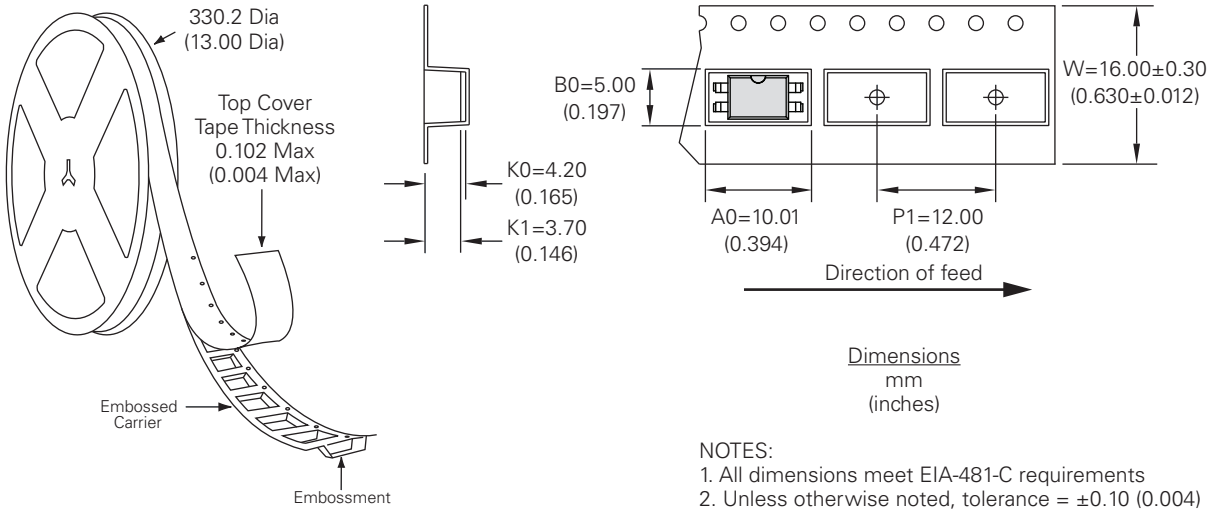



Dimensions
mm
(inches)

**PCB Land Pattern**



CPC1343GTR Tape and Reel Packaging




Dimensions
mm
(inches)

NOTES:
1. All dimensions meet EIA-481-C requirements
2. Unless otherwise noted, tolerance = ±0.10 (0.004)