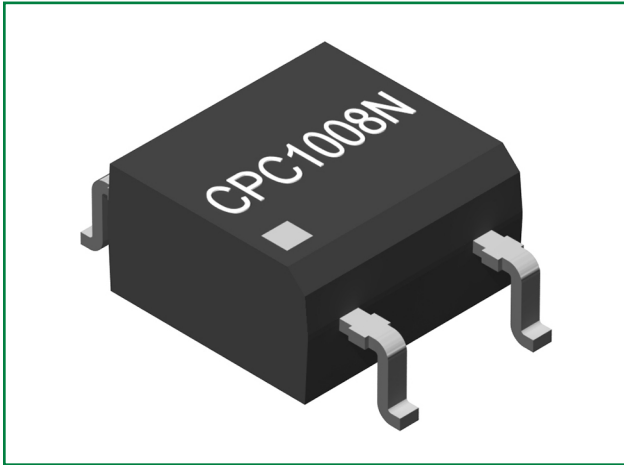


# CPC1008N

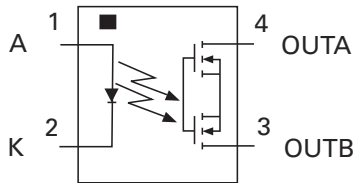
100V, 150 mA<sub>RMS</sub>/mA<sub>DC</sub> 1-Form-A SSR

## Key Attributes

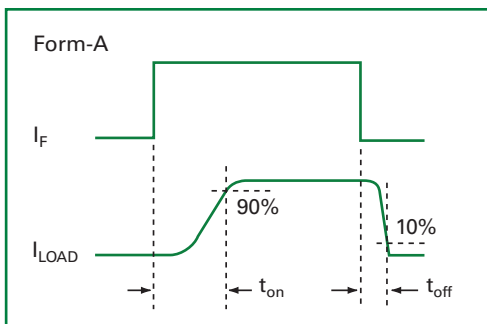
Characteristic	Rating	Unit
Blocking Voltage	100	V <sub>P</sub>
Load Current	150	mA <sub>RMS</sub> / mA <sub>DC</sub>
On-resistance (max)	8	Ω



## Pin Configuration



## Switching Characteristics of Normally Open Devices



## Description



The CPC1008N is a miniature, low-voltage, low on-resistance, single-pole, normally open (1-Form-A) solid state relay in a 4-Pin SOP package. It uses Littelfuse' patented OptoMOS architecture to optically control the isolated MOSFET switches while the optical coupling provides 1500V<sub>RMS</sub> of input/output isolation.

Using Littelfuse's state of the art double-molded vertical construction packaging, the CPC1008N is one of the world's smallest relays. It is ideal for replacing larger, less-reliable reed and electromechanical relays.

## Features

- 1500V<sub>RMS</sub> Input/Output Isolation
- Small 4-Pin SOP Package
- Low Drive Power Requirements
- No EMI/RFI Generation
- Halogen-Free
- Tape & Reel Version

## Applications

- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security Systems
- Industrial Controls
- Reed Relay Replacement

## Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- IEC EN 62368-1: TUV Certificate B 082667 0008

## Ordering Information

Part Number	Description
CPC1008N	4-Pin SOP (100/tube)
CPC1008NTR	4-Pin SOP (2000/Reel)

## Specifications

### Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage	100	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10 ms)	1	A
Input Power Dissipation	70	mW
Total Power Dissipation <sup>1</sup>	400	
Isolation Voltage, Input to Output (60 s)	1500	V <sub>RMS</sub>
Operating Temperature, Ambient	-40 to +85	°C
Storage Temperature	-40 to +125	

<sup>1</sup> Derate output power linearly 3.33 mW/°C

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	
<b>Output Characteristics</b>						
Blocking voltage	I <sub>L</sub> = 1 μA	V <sub>DRM</sub>	100	-	-	V
Load current:						
Continuous <sup>1</sup>	-	I <sub>L</sub>	-	-	150	mA <sub>RMS</sub> /mA <sub>DC</sub>
Peak	t = 10 ms	I <sub>LPK</sub>	-	-	±350	mA <sub>P</sub>
On-resistance <sup>2</sup>	I <sub>F</sub> = 2 mA, I <sub>L</sub> = 150 mA	R <sub>ON</sub>	-	4.8	8	Ω
Off-state leakage current	V <sub>L</sub> = 100V	I <sub>LEAK</sub>	-	-	1	μA
Switching speeds:						
Turn-on	I <sub>F</sub> = 5 mA, V <sub>L</sub> = 10V	t <sub>on</sub>	-	1	2	ms
Turn-off		t <sub>off</sub>	-	0.17	1	
Output capacitance	I <sub>F</sub> = 0 mA, V <sub>L</sub> = 50V, f = 1 MHz	C <sub>OUT</sub>	-	6	-	pF
<b>Input Characteristics</b>						
Input control current to activate <sup>3</sup>	I <sub>L</sub> = 150 mA	I <sub>F</sub>	-	0.45	2	mA
Input control current to deactivate	-	I <sub>F</sub>	0.2	-	-	
Input voltage drop	I <sub>F</sub> = 5 mA	V <sub>F</sub>	0.9	1.36	1.5	V
Reverse input current	V <sub>R</sub> = 5V	I <sub>R</sub>	-	-	10	μA
<b>Input/Output Characteristics</b>						
Capacitance, input to output	V <sub>IO</sub> = 0V, f = 1 MHz	C <sub>IO</sub>	-	1	-	pF

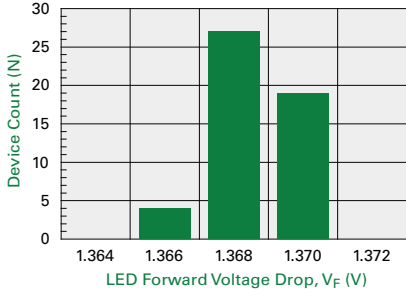
<sup>1</sup> Load current derates linearly from 150 mA @ 25°C to 120 mA @ 85°C.

<sup>2</sup> Measurement taken within 1 second of on-time.

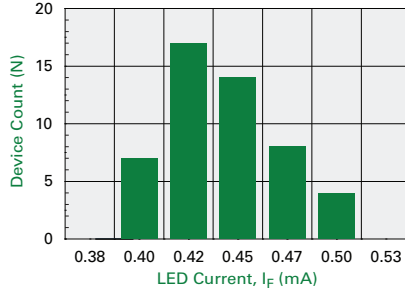
<sup>3</sup> For applications requiring operation greater than 60°C, a minimum LED drive current of 4 mA is recommended.

### Characteristic Curves

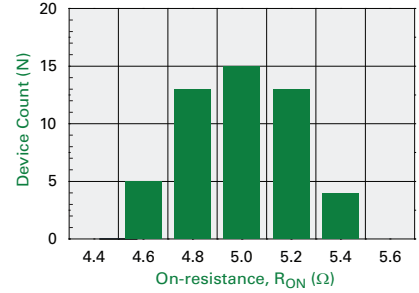
**Typical LED Forward Voltage Drop**  
(N = 50, I<sub>F</sub> = 5 mA)



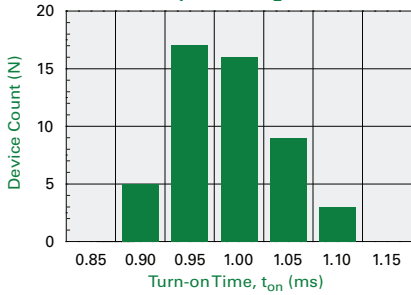
**Typical I<sub>F</sub> for Switch Operation**  
(N = 50, I<sub>L</sub> = 100 mA)



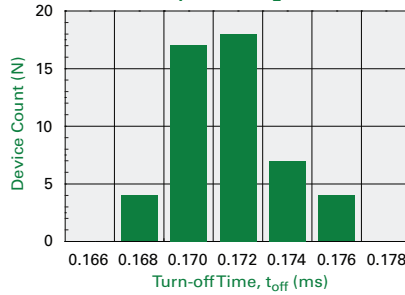
**Typical On-resistance Distribution**  
(N = 50, I<sub>F</sub> = 2 mA, I<sub>L</sub> = 150 mA)



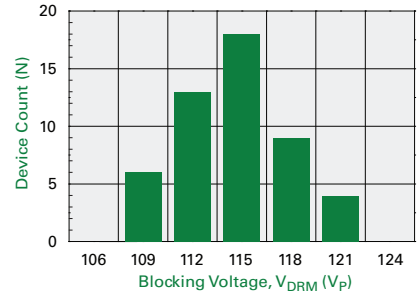
**Typical Turn-on Time**  
(N = 50, I<sub>F</sub> = 5 mA, I<sub>L</sub> = 100 mA)



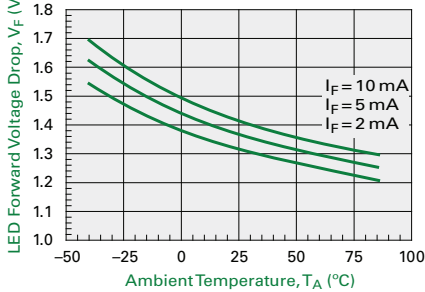
**Typical Turn-off Time**  
(N = 50, I<sub>F</sub> = 5 mA, I<sub>L</sub> = 100 mA)



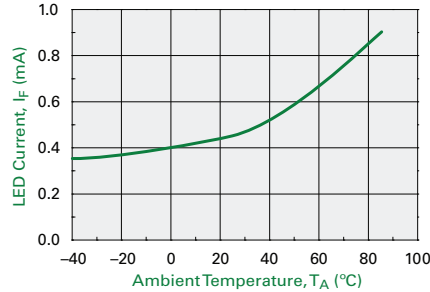
**Typical Blocking Voltage Distribution**  
(N = 50)



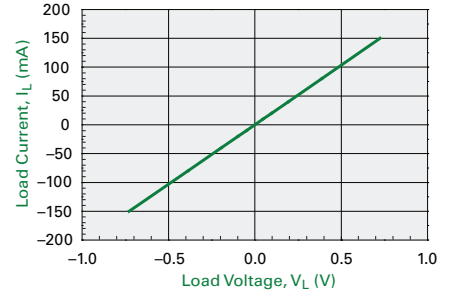
**Typical LED Forward Voltage Drop vs. Temperature**



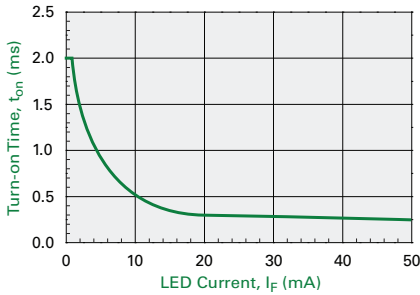
**Typical I<sub>F</sub> for Switch Operation vs. Temperature**  
(I<sub>L</sub> = 120 mA)



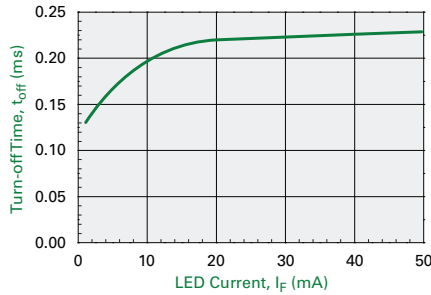
**Typical Load Current vs. Load Voltage**  
(I<sub>F</sub> = 2 mA)



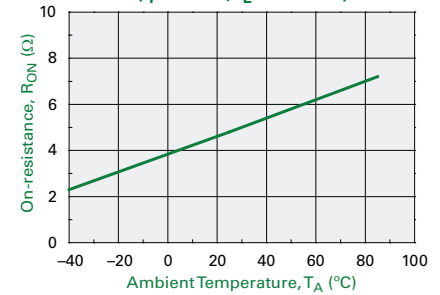
**Typical Turn-on Time vs. LED Forward Current**



**Typical Turn-off Time vs. LED Forward Current**

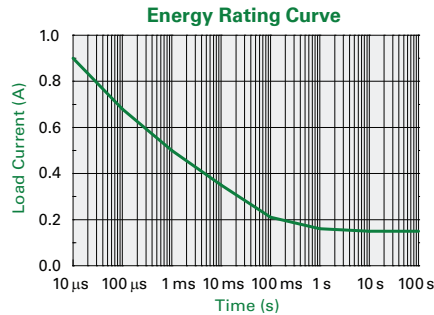
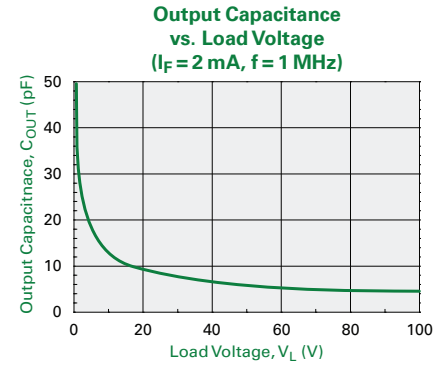
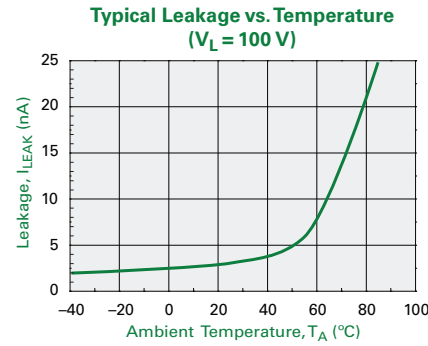
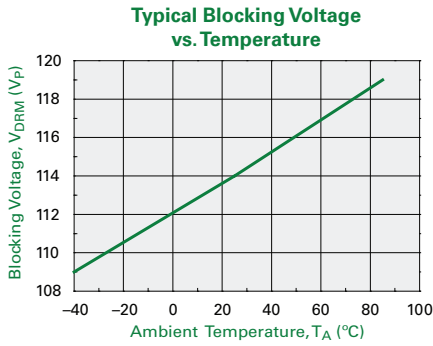
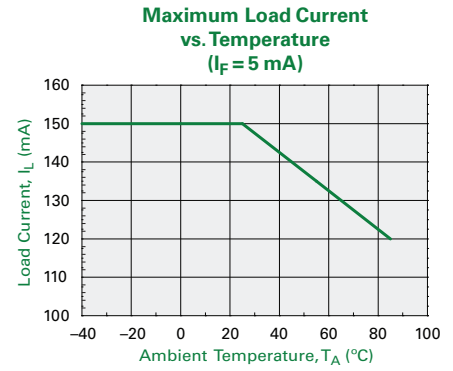
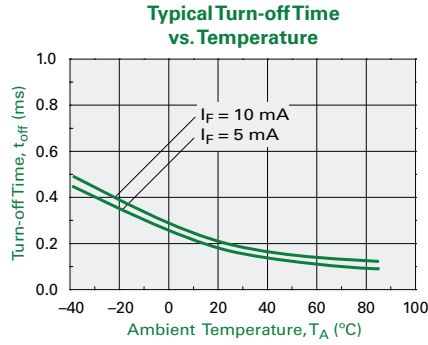
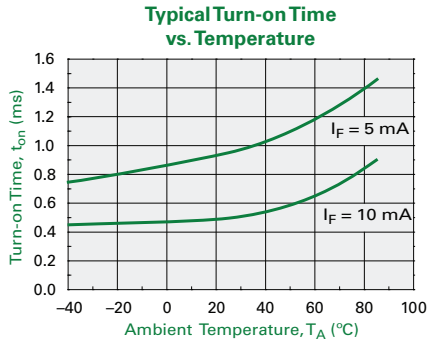


**Typical On-resistance vs. Temperature**  
(I<sub>F</sub> = 2 mA, I<sub>L</sub> = 120 mA)



\*Unless otherwise noted, data presented in these graphs is typical of device operation at T<sub>A</sub> = 25°C.

### Characteristic Curves



\*Unless otherwise noted, data presented in these graphs is typical of device operation at  $T_A = 25^\circ\text{C}$ .

## Manufacturing Information

### Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. 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
CPC1008N	MSL 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 the body temperature of these surface mount devices may be ( $T_c - 5$ )°C or greater. 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
CPC1008N	260°C	30 seconds	3

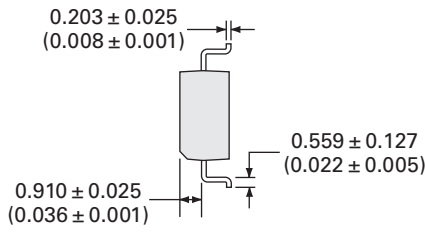
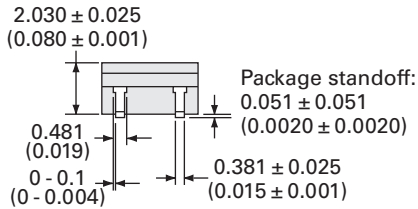
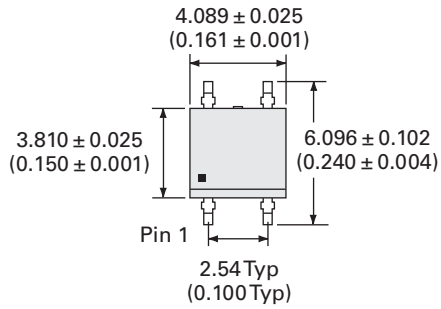
### Board Wash

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.

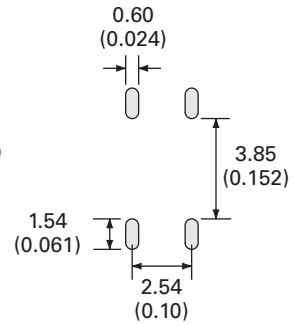


### Mechanical Dimensions

CPC1008N 4-Pin SOP



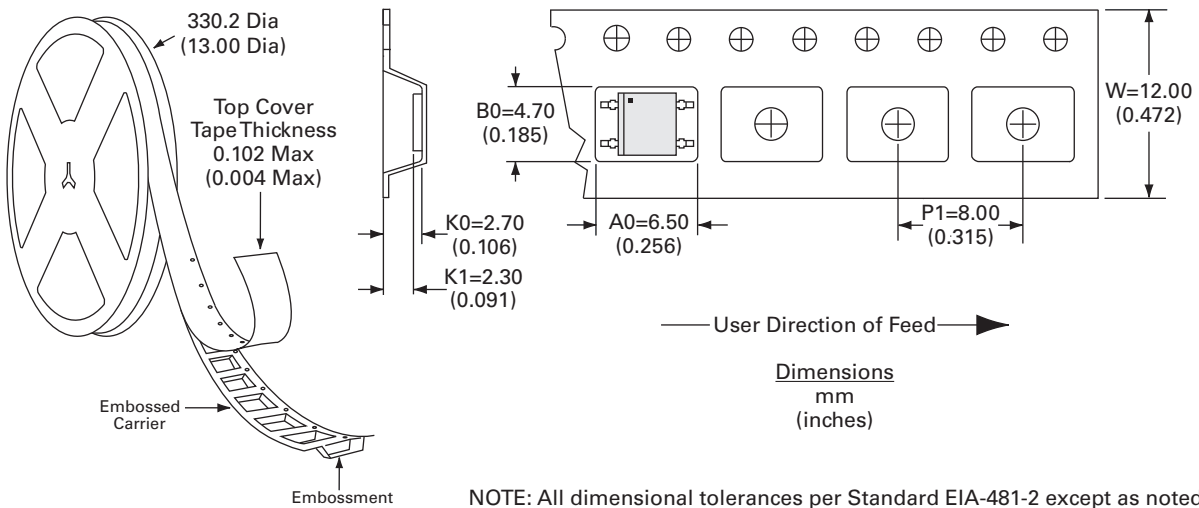
#### Recommended PCB Land Pattern



**Dimensions**  
mm  
(inches)

- Note:**
1. Controlling dimension: mm
  2. Lead dimensions do not include plating: 1000 microinches max.

#### CPC1008NTR Tape & Reel Packaging



**Dimensions**  
mm  
(inches)

**NOTE:** All dimensional tolerances per Standard EIA-481-2 except as noted.

**Disclaimer Notice** - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <https://www.littelfuse.com/disclaimer-electronics>