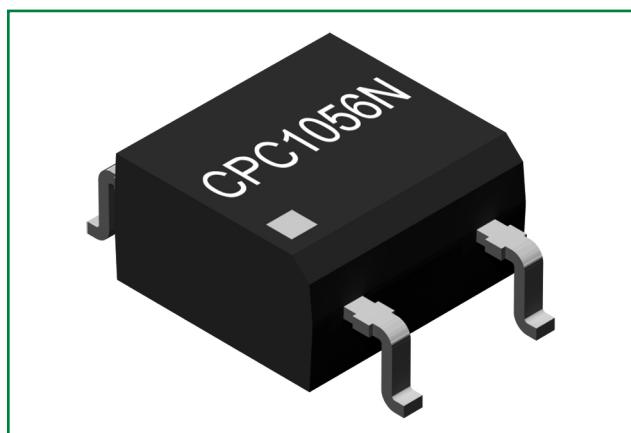


# CPC1056N

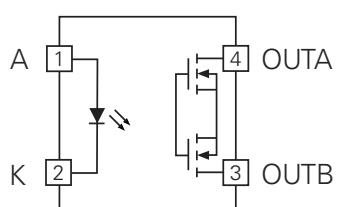
60 V, 75 mA<sub>RMS</sub>/mA<sub>DC</sub> Normally Open Relay

## Key Attributes

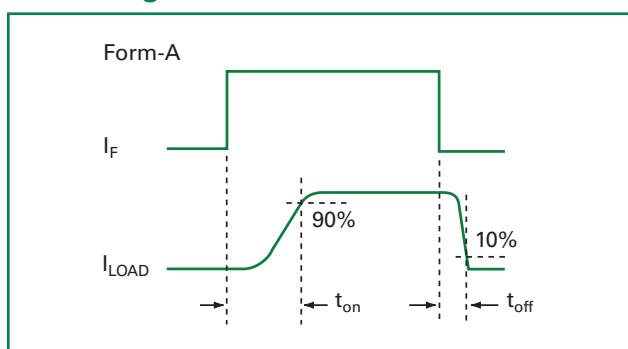
Characteristic	Rating	Unit
Blocking Voltage	60	V <sub>P</sub>
Load Current	75	mA <sub>RMS</sub> /mA <sub>DC</sub>
On-Resistance (max.)	10	Ω
LED Current to Operate	0.5	mA



## Pin Configuration



## Switching Characteristics



## Description



The CPC1056N is a bidirectional single-pole, normally open (1-Form-A) solid state relay in a 4-pin SOP package that employs optically coupled MOSFET technology to provide 1500V<sub>RMS</sub> of input to output isolation.

The relay outputs are constructed with efficient MOSFET switches and a photovoltaic generator/driver that uses Littelfuse's patented OptoMOS® architecture while the input, a highly efficient infrared LED, provides the optically coupled control.

Using Littelfuse's state of the art double-molded vertical construction packaging, the CPC1056N offers board space savings of at least 20 % over the competitor's larger 4-pin SOP relay.

## Features

- Designed for EN50130-4 Compliant Security Systems
- 1500V<sub>RMS</sub> Input/Output Isolation
- Only 0.5mA of LED Current Required to Operate
- Small 4-Pin SOP Package
- High Reliability
- No EMI/RFI Generation
- Immune to Radiated EM Fields

## Applications

- Security
- Passive Infrared Detectors (PIR)
- Data Signalling
- Sensor Circuitry
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Industrial Controls

## Approvals

- UL 1577 Recognized Component: File E76270
- EN 62368-1: TUV Certificate # B 082667 0008

## Ordering Information

Part Number	Description
CPC1056N	4-Pin SOP (100/Tube)
CPC1056NTR	4-Pin SOP (2000/Reel)

## Specifications

### Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage	60	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current Continuous	50	mA
	1	A
Power Dissipation Input	70	mW
	400	
	1500	V <sub>RMS</sub>
ESD Rating, Human Body Model (HBM)	4	kV
Operating Temperature, Ambient (T <sub>A</sub> )	-40 to +85	°C
Storage Temperature (T <sub>STG</sub> )	-40 to +125	

<sup>1</sup> Derate output power linearly 3.3mW/°C

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>	60	—	—	V
Load current Continuous <sup>1</sup>	I <sub>F</sub> = 0.5 mA	I <sub>L</sub>	—	—	75	mA <sub>RMS</sub> /mA <sub>DC</sub>
	t = 10 ms	I <sub>LPK</sub>	—	—	±350	
On-resistance <sup>2</sup>	I <sub>F</sub> = 0.5 mA, I <sub>L</sub> = 75 mA	R <sub>ON</sub>	—	7	10	Ω
Off-state leakage current	I <sub>F</sub> = 0 mA, V <sub>L</sub> = 60V	I <sub>LK</sub>	—	—	1	µA
Switching speeds	I <sub>F</sub> = 2 mA, V <sub>L</sub> = 10V	t <sub>on</sub>	—	—	3	ms
		t <sub>off</sub>	—	—	3	
	I <sub>F</sub> = 0 mA, V <sub>L</sub> = 50V, f = 1MHz	C <sub>OUT</sub>	—	5	—	pF
<b>Input Characteristics</b>						
Input control current to activate <sup>3</sup>	I <sub>L</sub> = 75 mA	I <sub>F</sub>	—	0.1	0.5	mA
Input control to deactivate <sup>4</sup>	—	—	0.05	—	—	mA
		—	0.8	—	—	V
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

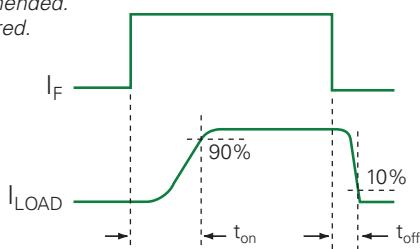
<sup>1</sup> Load current derates linearly from 75mA @ 55 °C to 50mA @ 85 °C.

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

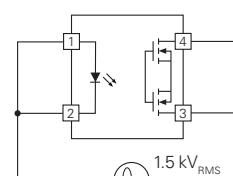
<sup>3</sup> For operation above 60 °C a minimum input current of 2mA is recommended.

<sup>4</sup> Either condition is sufficient to deactivate the relay, both are not required.

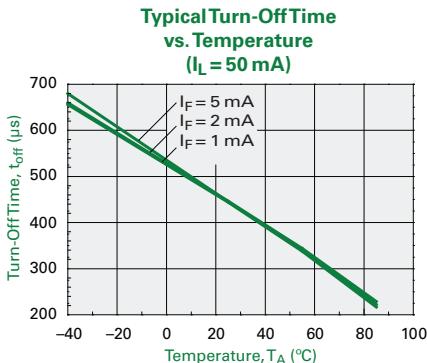
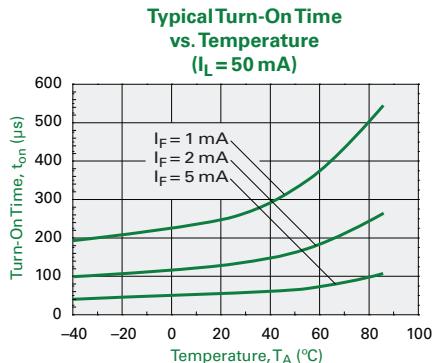
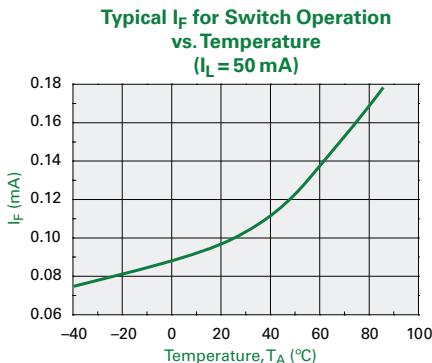
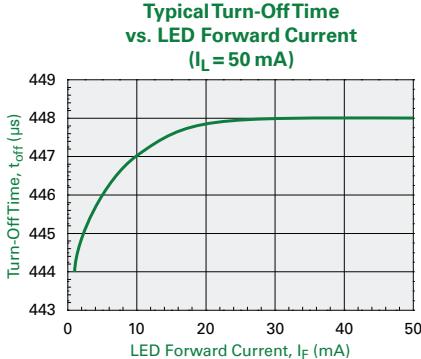
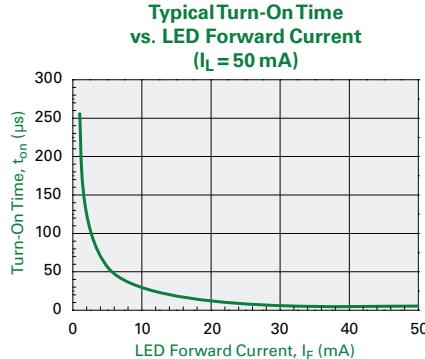
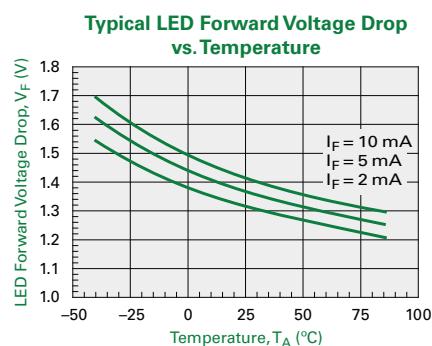
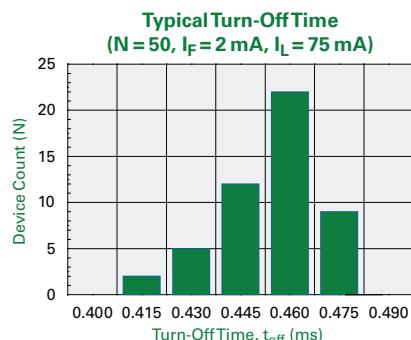
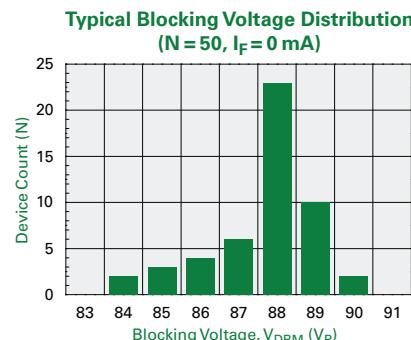
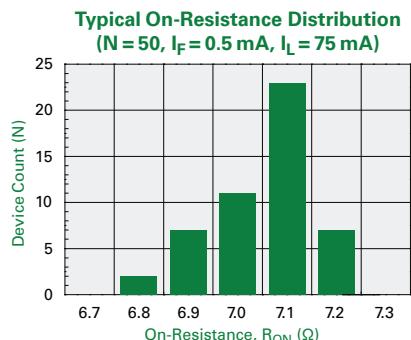
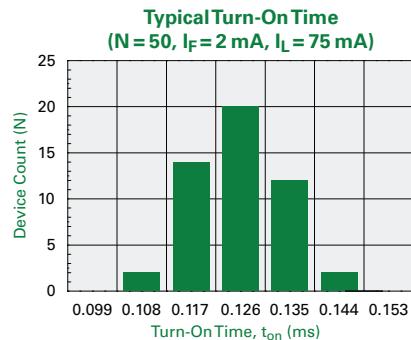
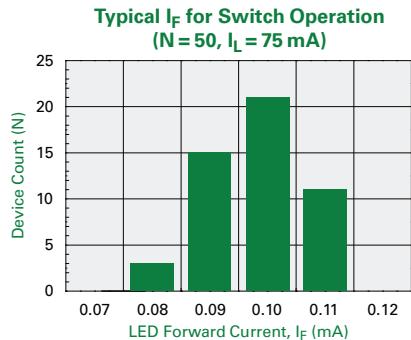
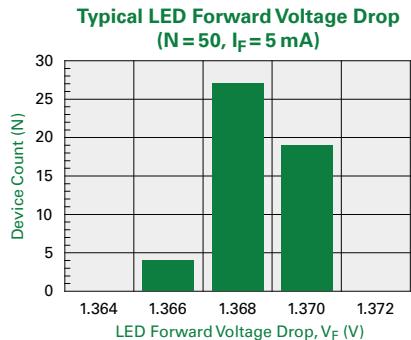
### Timing Diagram



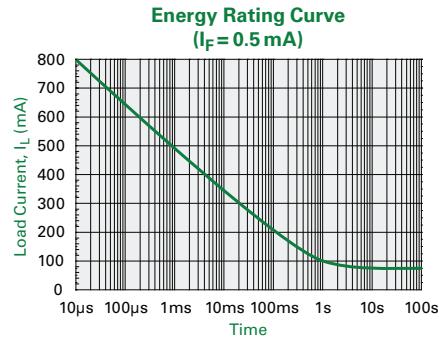
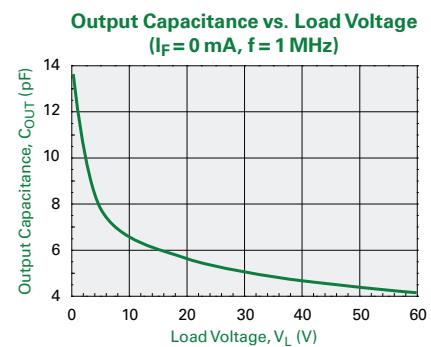
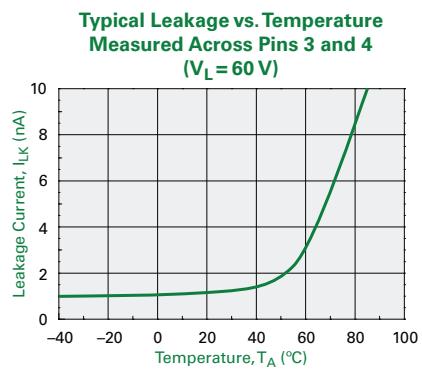
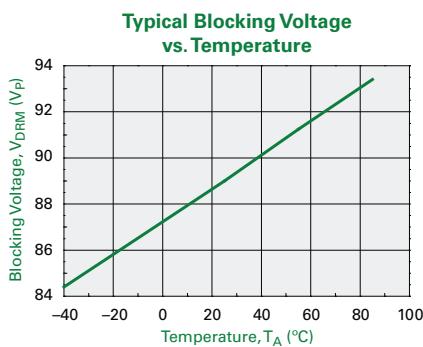
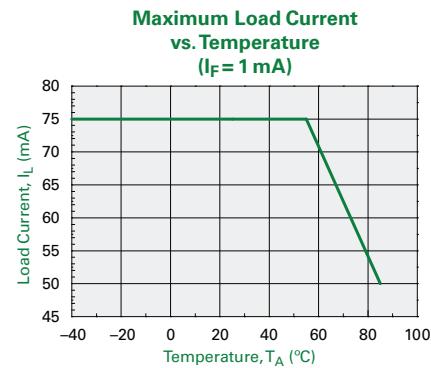
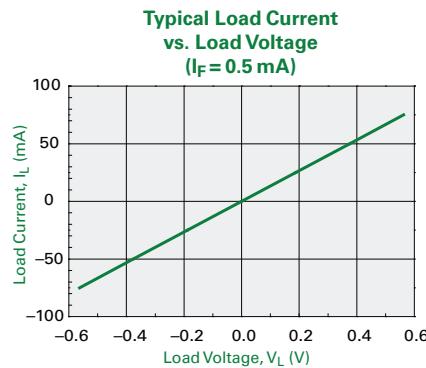
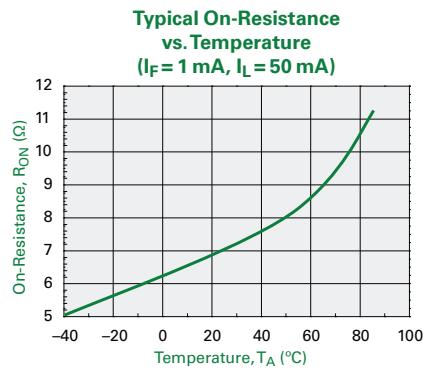
### Isolation Test Circuit



## Characteristic Curves



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



Unless otherwise noted, data presented in these graphs is typical of device operation at T<sub>A</sub> = 25°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 version 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 version of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Classification
CPC1056N	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 ( $T_C - 5^\circ\text{C}$ ). 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
CPC1056N	260°C	30 seconds	3

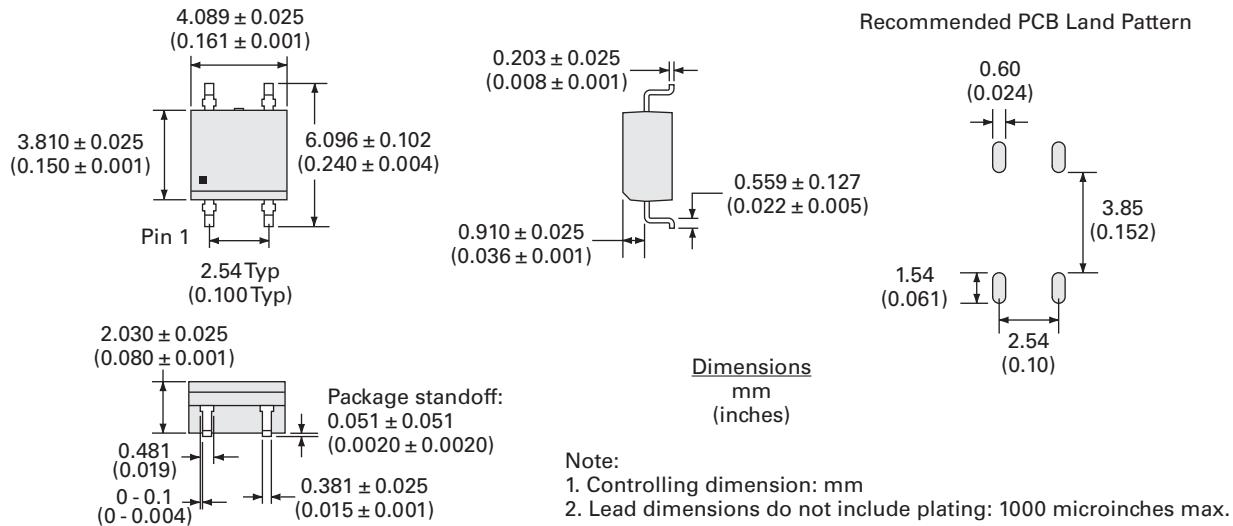
### Board Wash

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.

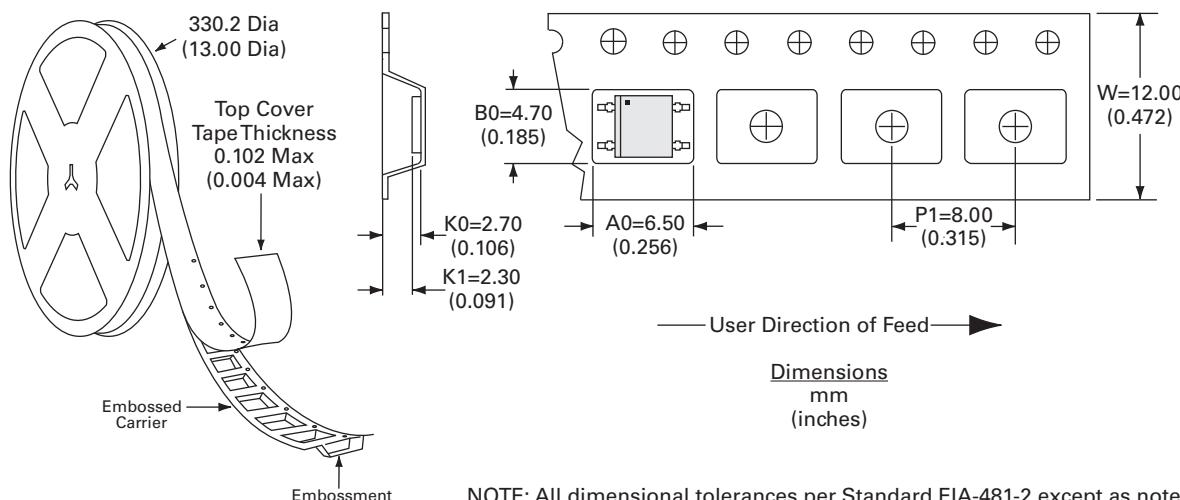


## Mechanical Dimensions

CPC1056N



CPC1056NTR Tape and Reel Packaging



**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>