

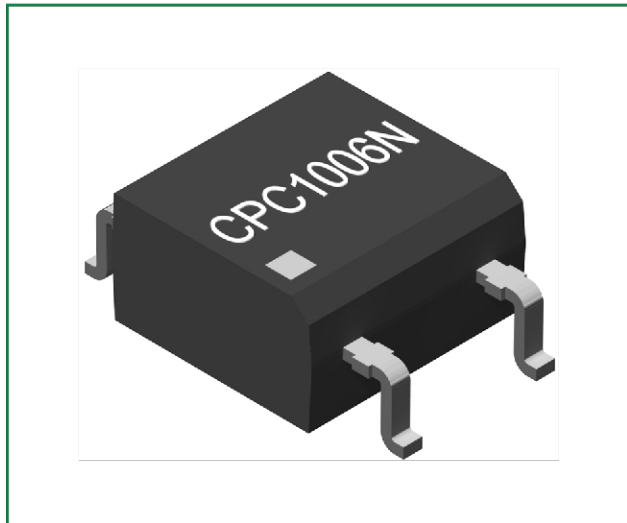
CPC1006N

60V, 75 mA_{RMS} / mA_{DC} 1-Form-A SSR



Key Attributes

| Characteristic | Rating | Unit |
|------------------------|--------|--------------------------------------|
| Blocking Voltage | 60 | V _P |
| Load Current | 75 | mA _{RMS} / mA _{DC} |
| On-resistance (max) | 10 | Ω |
| LED Current to Operate | 0.5 | mA |



Description

The CPC1006N is a miniature 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_{RMS} of input to output isolation.

The relay outputs are constructed with efficient MOSFET switches and photovoltaic die that use 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 to produce one of the world's smallest relays, the CPC1006N offers board space savings of at least 20 % over the competitor's larger 4-pin SOP relay.

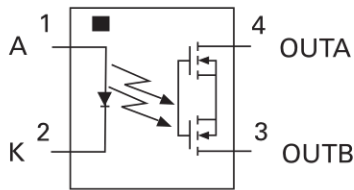
Features

- Designed for EN 50130-4 Compliant Security Systems
- 1500V_{RMS} 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
- Tape & Reel Version Available

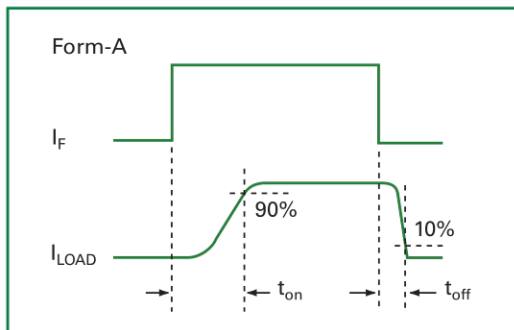
Applications

- 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

Pin Configuration



Switching Characteristics of Normally Open Devices



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 |
|-------------|-----------------------|
| CPC1006N | 4-Pin SOP (100/tube) |
| CPC1006NTR | 4-Pin SOP (2000/Reel) |

Specifications

Absolute Maximum Ratings

| Parameter | Ratings | Units |
|---|-------------|------------------|
| Blocking Voltage | 60 | V _P |
| Reverse Input Voltage | 5 | V |
| Input Control Current | 50 | mA |
| Peak (10 ms) | 1 | A |
| Input Power Dissipation | 70 | mW |
| Total Power Dissipation ¹ | 400 | |
| Isolation Voltage, Input to Output (60 s) | 1500 | V _{RMS} |
| ESD Rating, Human Body Model | ±4 | kV |
| Operating Temperature, Ambient | -40 to +85 | °C |
| Storage Temperature | -40 to +125 | |

¹ 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

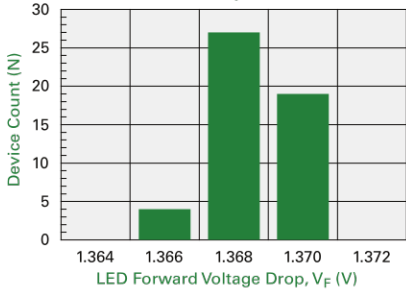
| Parameter | Conditions | Symbol | Value | | | Units |
|--|---|-------------------|---------|---------|---------|-------------------------------------|
| | | | Minimum | Typical | Maximum | |
| Output Characteristics | | | | | | |
| Blocking voltage | I _L = 1 μA | V _{DRM} | 60 | - | - | V |
| Load current: | | | | | | |
| Continuous | I _F = 0.5 mA | I _L | - | - | 75 | mA _{RMS} /mA _{DC} |
| Peak | t = 10 ms | I _{LPK} | - | - | ±350 | mA _P |
| On-resistance ¹ | I _F = 0.5 mA, I _L = 75 mA | R _{ON} | - | 7 | 10 | Ω |
| Off-state leakage current | I _F = 0 mA, I _L = 60 V | I _{LEAK} | - | - | 1 | μA |
| Switching speeds: | | | | | | |
| Turn-on | I _F = 2 mA, V _L = 10 V | t _{on} | - | - | 10 | ms |
| Turn-off | | t _{off} | - | - | 10 | |
| Output capacitance | I _F = 0 mA, V _L = 50 V, f = 1 MHz | C _{OUT} | - | 5 | - | pF |
| Input Characteristics | | | | | | |
| Input control current to activate ² | I _L = 75 mA | I _F | - | 0.1 | 0.5 | mA |
| Input control current to deactivate | - | I _F | 0.05 | - | - | |
| Input voltage drop | I _F = 5 mA | V _F | 0.9 | 1.36 | 1.5 | V |
| Reverse input current | V _R = 5 V | I _R | - | - | 10 | μA |
| Input/Output Characteristics | | | | | | |
| Capacitance, input to output | V _{IO} = 0 V, f = 1 MHz | C _{IO} | - | 1 | - | pF |

¹ Measurement taken within 1 second of on-time.

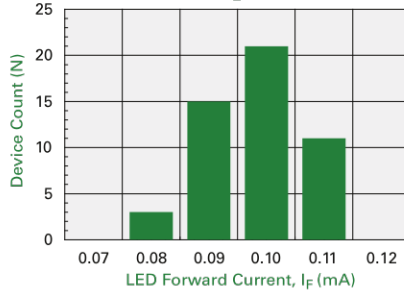
² For applications requiring operation greater than 60 °C, a minimum LED drive current of 2 mA is recommended.

Characteristic Curves

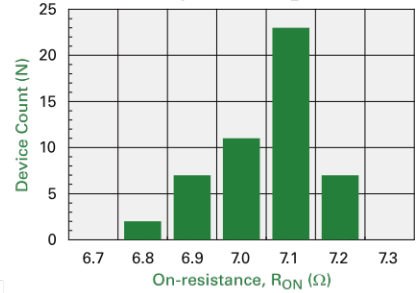
Typical LED Forward Voltage Drop
(N = 50, I_F = 5 mA)



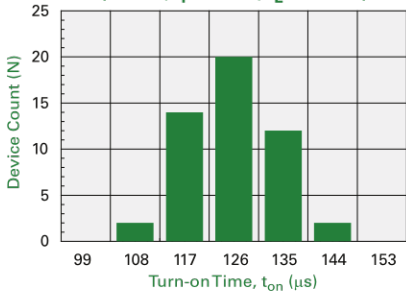
Typical I_F for Switch Operation
(N = 50, I_L = 75 mA)



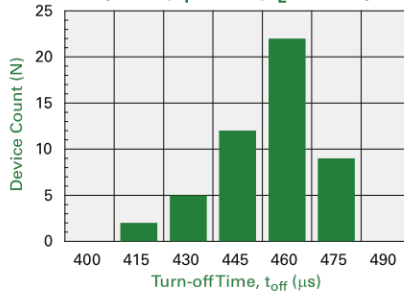
Typical On-resistance Distribution
(N = 50, I_F = 0.5 mA, I_L = 75 mA)



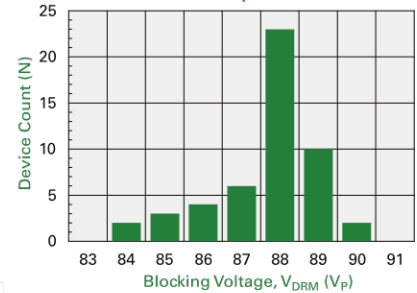
Typical Turn-on Time
(N = 50, I_F = 2 mA, I_L = 75 mA)



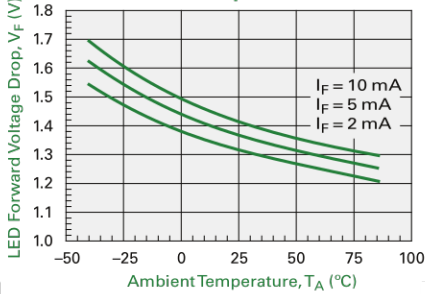
Typical Turn-off Time
(N = 50, I_F = 2 mA, I_L = 75 mA)



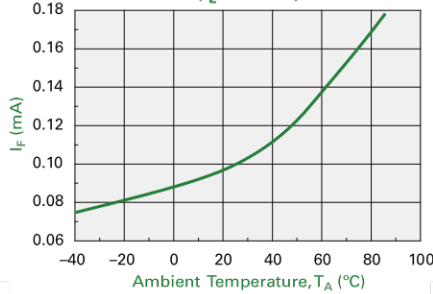
Typical Blocking Voltage Distribution
(N = 50, I_F = 0 mA)



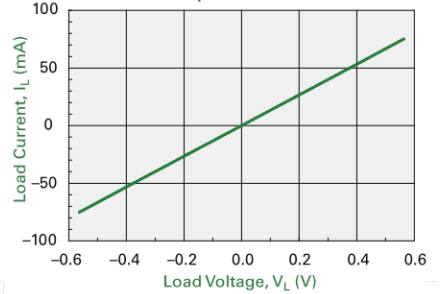
Typical LED Forward Voltage Drop vs. Temperature



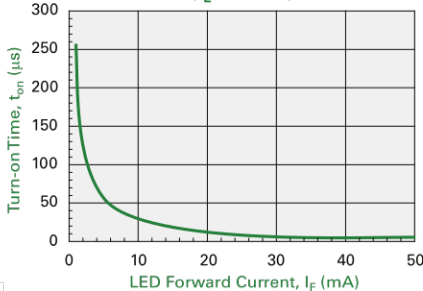
Typical I_F for Switch Operation vs. Temperature
(I_L = 50 mA)



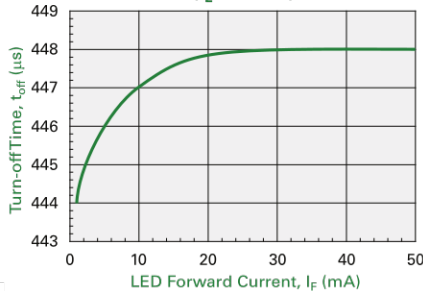
Typical Load Current vs. Load Voltage
(I_F = 0.5 mA)



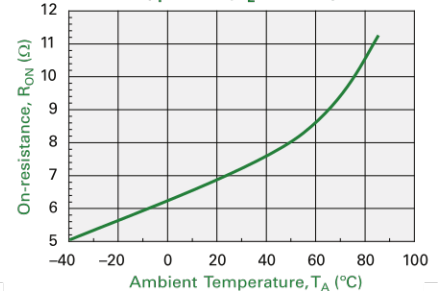
Typical Turn-on Time vs. LED Forward Current
(I_L = 50 mA)



Typical Turn-off Time vs. LED Forward Current
(I_L = 50 mA)

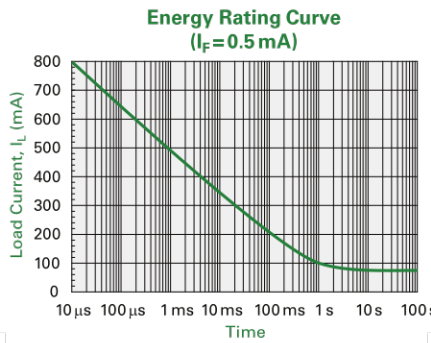
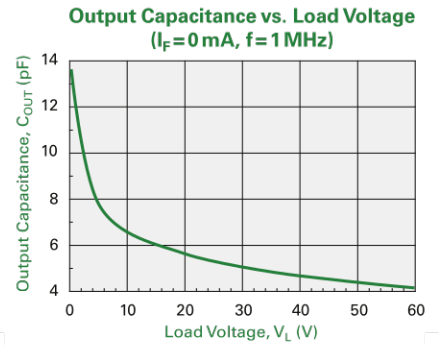
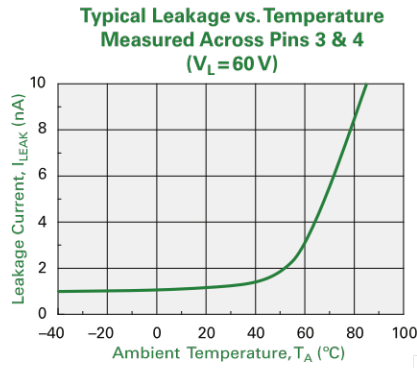
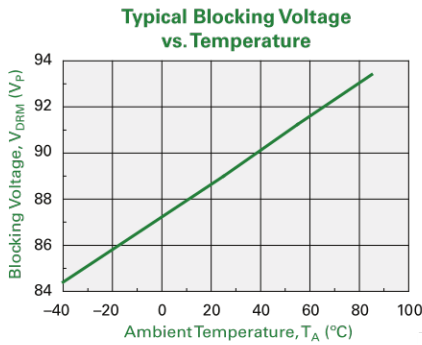
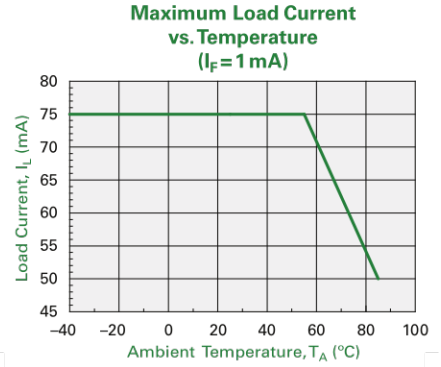
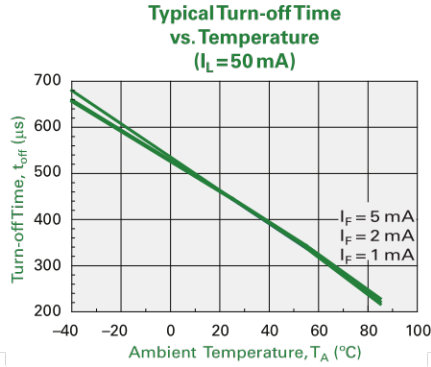
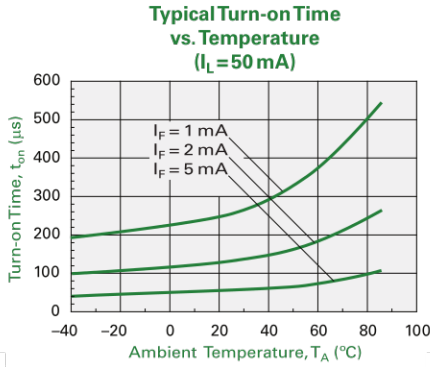


Typical On-resistance vs. Temperature
(I_F = 1 mA, I_L = 50 mA)



*Unless otherwise noted, data presented in these graphs is typical of device operation at T_A = 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 |
|----------|---|
| CPC1006N | 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 |
|----------|--------------------------------------|----------------------|-------------------|
| CPC1006N | 260°C | 30 seconds | 3 |

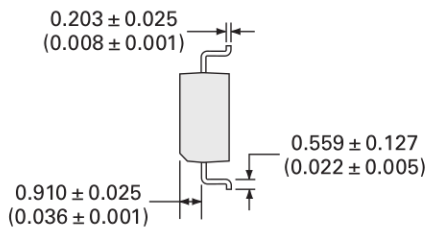
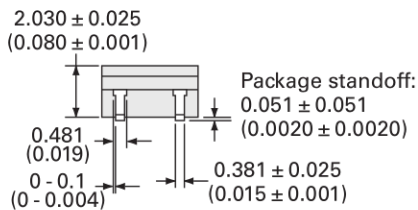
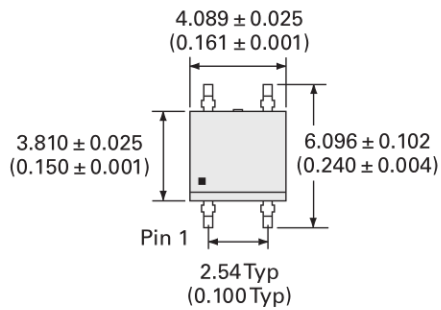
Board Wash

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.

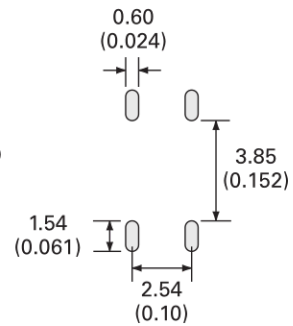


Mechanical Dimensions

CPC1006N



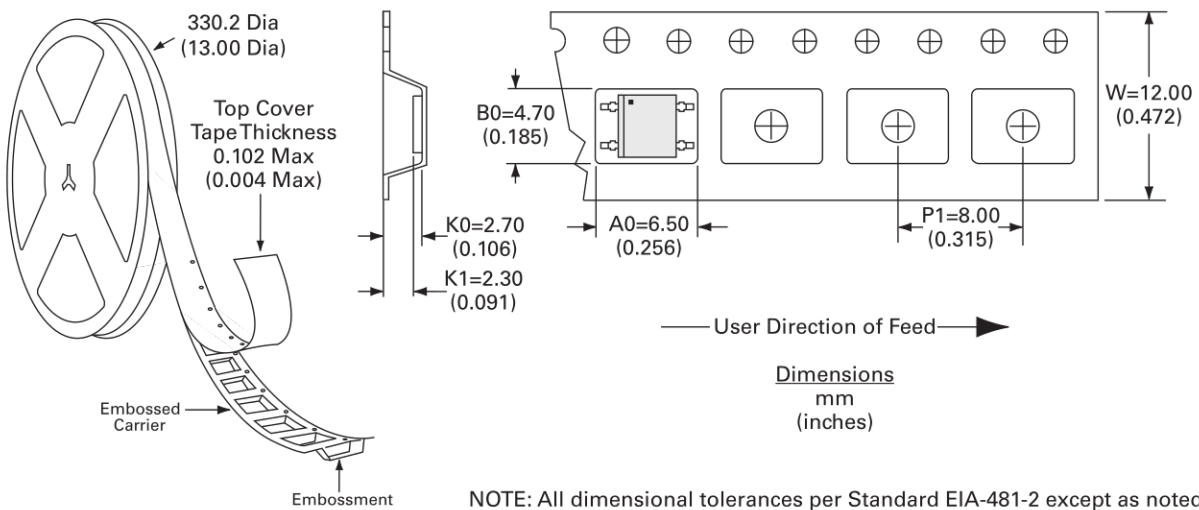
Recommended PCB Land Pattern



Dimensions
mm
(inches)

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

CPC1010NTR 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>