



| Parameter | Rating | Units |
|---------------------|--------|------------------|
| Blocking Voltage | 100 | V _P |
| Load Current | 300 | mA _{DC} |
| On-Resistance (max) | 4 | Ω |

Features

- Operating Temperature Range: -40°C to +110°C
- 1500V_{rms} Input/Output Isolation
- Small 4-Pin SOP Package
- Low Drive Power Requirements
- High Reliability
- No EMI/RFI Generation
- Tape & Reel Version Available
- Flammability Rating UL 94 V-0

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

Description

CPC1004N is a miniature, low-voltage, low on-resistance, normally-open (1-Form-A) DC solid state relay in a 4-pin SOP package. The relay uses optically coupled MOSFET technology to provide 1500V_{rms} of input to output isolation. The efficient MOSFET switch and photovoltaic die use IXYS Integrated Circuits' patented OptoMOS architecture while the optically coupled output is controlled by a highly efficient infrared LED.

The CPC1004N uses IXYS Integrated Circuits' state of the art double-molded vertical construction packaging to produce one of the world's smallest relays. The CPC1004N is ideal for replacing larger, less-reliable reed and electromechanical relays.

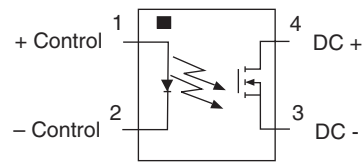
Approvals

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

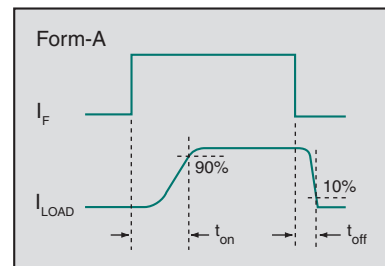
Ordering Information

| Part # | Description |
|------------|-----------------------|
| CPC1004N | 4-Pin SOP (100/tube) |
| CPC1004NTR | 4-Pin SOP (2000/reel) |

Pin Configuration



Switching Characteristics of Normally-Open Devices



Absolute Maximum Ratings @ 25°C

| Parameter | Ratings | Units |
|--------------------------------------|-------------|------------------|
| Blocking Voltage | 100 | V _P |
| Reverse Input Voltage | 5 | V |
| Input Control Current | 50 | mA |
| Peak (10ms) | 1 | A |
| Input Power Dissipation ¹ | 70 | mW |
| Total Power Dissipation ² | 400 | mW |
| Capacitance Input to Output | 1 | pF |
| Isolation Voltage, Input to Output | 1500 | V _{rms} |
| Operational Temperature, Ambient | -40 to +110 | °C |
| Storage Temperature | -40 to +125 | °C |

¹ Derate linearly 1.33 mW / °C

² 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 (Unless Otherwise Specified)

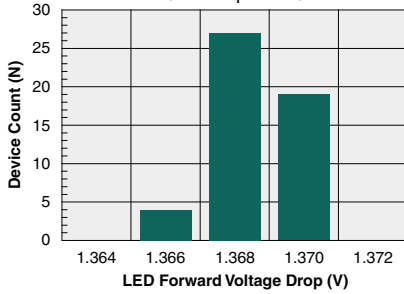
| Parameter | Conditions | Symbol | Min | Typ | Max | Units |
|-------------------------------------|--|-------------------|-----|------|-----|------------------|
| Output Characteristics | | | | | | |
| Blocking Voltage | I _L =1μA | V _{DRM} | 100 | - | - | V |
| Load Current | | | | | | |
| Continuous ¹ | - | I _L | - | - | 300 | mA _{DC} |
| Continuous | T=110°C, I _F =10mA | | - | - | 100 | |
| Peak | t=10ms | I _{LPK} | - | - | 500 | |
| On-Resistance ² | I _L =300mA | R _{ON} | - | - | 4 | Ω |
| Off-State Leakage Current | V _L =100V _P | I _{LEAK} | - | - | 1 | μA |
| Switching Speeds | | | | | | |
| Turn-On | I _F =5mA, V _L =10V | t _{on} | - | - | 3 | ms |
| Turn-Off | | t _{off} | - | - | 1 | |
| Output Capacitance | I _F =0mA, V _L =50V, f=1MHz | C _{OUT} | - | 25 | - | pF |
| Input Characteristics | | | | | | |
| Input Control Current to Activate | I _L =300mA | I _F | - | 0.9 | 2 | mA |
| Input Control Current to Deactivate | - | I _F | 0.3 | 0.8 | - | mA |
| Input Voltage Drop | I _F =5mA | V _F | 0.9 | 1.36 | 1.5 | V |
| Reverse Input Current | V _R =5V | I _R | - | - | 10 | μA |

¹ Load current derates linearly from 300mA @ 25°C to 100mA @ 110°C.

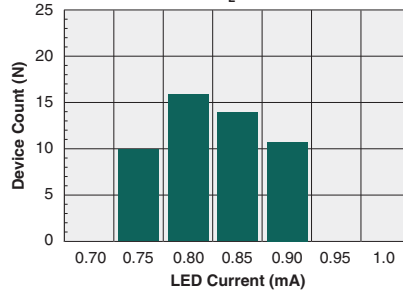
² Measurement taken within 1 second of on-time.

PERFORMANCE DATA*

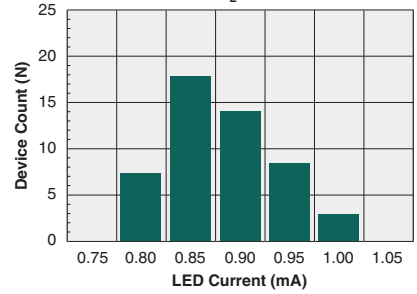
Typical LED Forward Voltage Drop
(N=50, $I_F=5mA$)



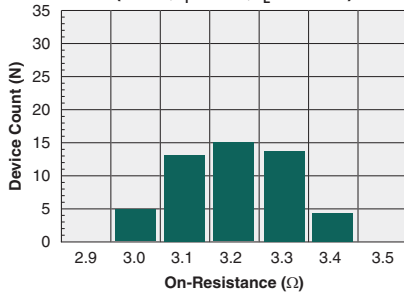
Typical I_F for Switch Operation
(N=50, $I_L=300mA$)



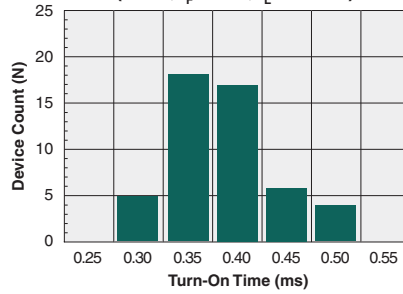
Typical I_F for Switch Dropout
(N=50, $I_L=300mA$)



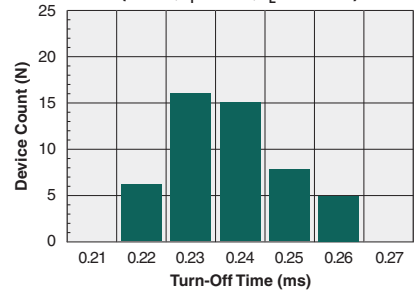
Typical On-Resistance Distribution
(N=50, $I_F=2mA$, $I_L=300mA$)



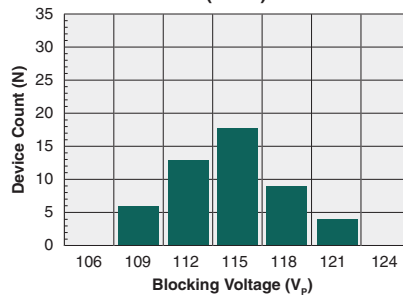
Typical Turn-On Time
(N=50, $I_F=5mA$, $I_L=300mA$)



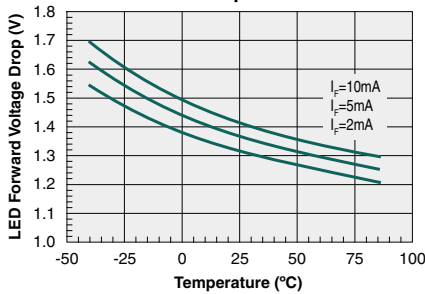
Typical Turn-Off Time
(N=50, $I_F=5mA$, $I_L=200mA$)



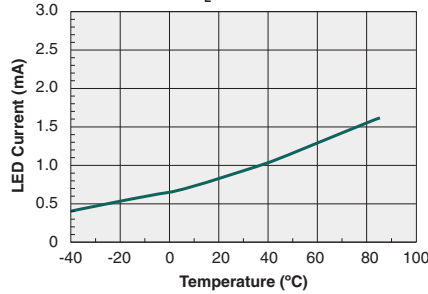
Typical Blocking Voltage Distribution
(N=50)



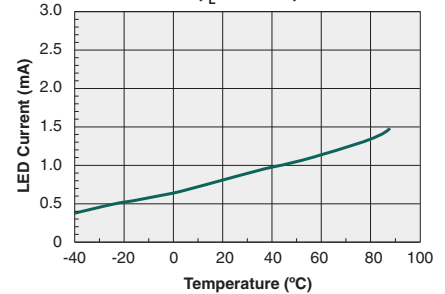
Typical LED Forward Voltage Drop vs. Temperature



Typical I_F for Switch Operation vs. Temperature
($I_L=100mA$)

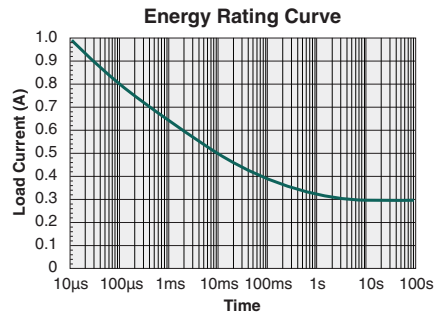
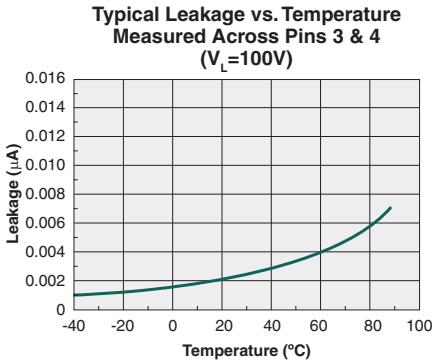
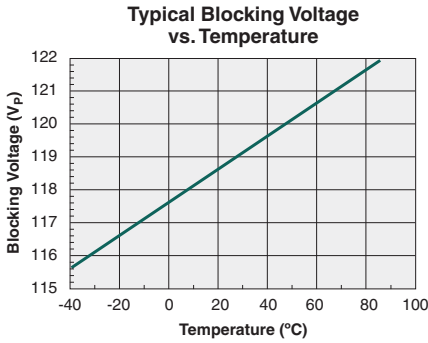
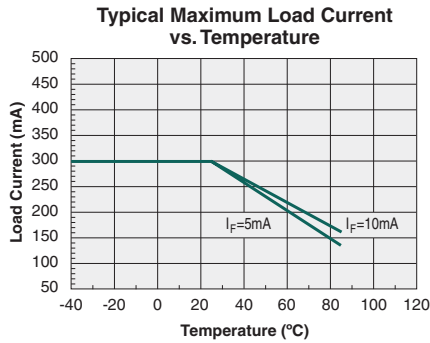
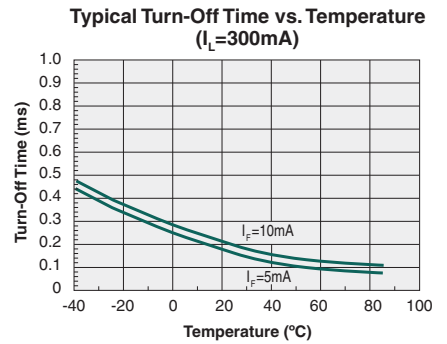
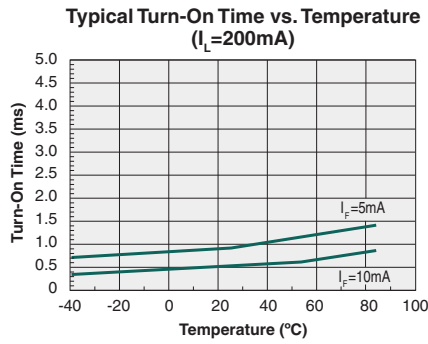
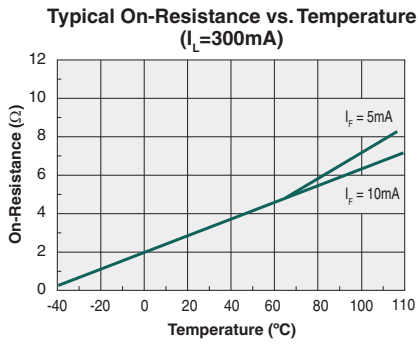
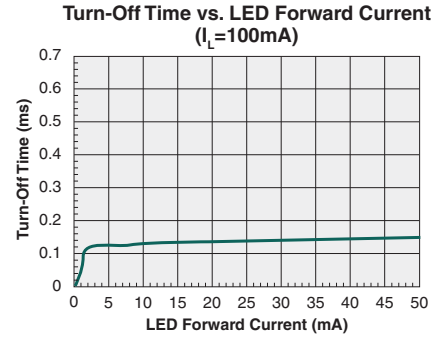
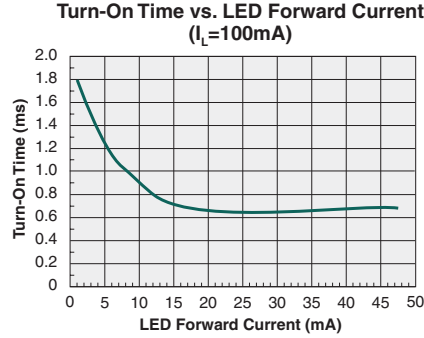
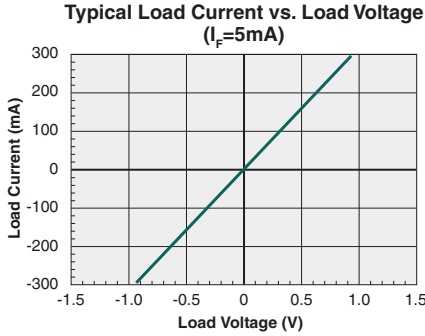


Typical I_F for Switch Dropout vs. Temperature
($I_L=100mA$)



*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.

PERFORMANCE DATA*



*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.

Manufacturing Information

Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. IXYS Integrated Circuits 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 |
|----------|---|
| CPC1004N | 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 |
|----------|--------------------------------------|----------------------|-------------------|
| CPC1004N | 260°C | 30 seconds | 3 |

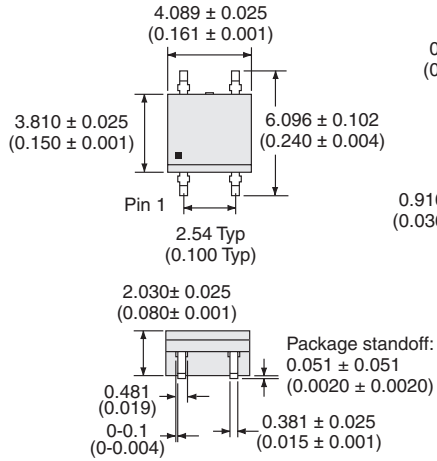
Board Wash

IXYS Integrated Circuits 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.

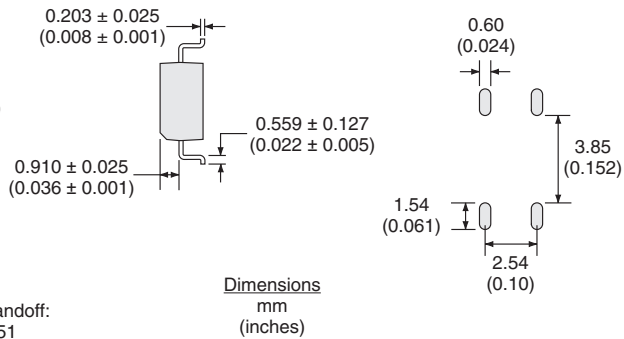


MECHANICAL DIMENSIONS

CPC1004N

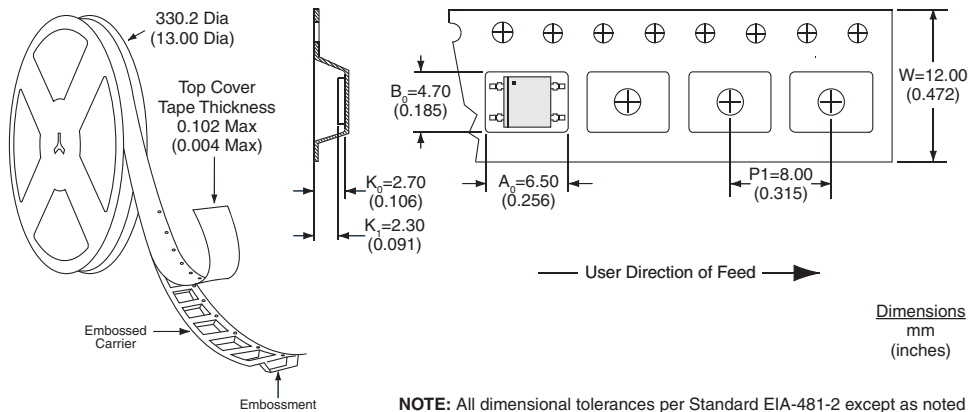


Recommended PCB Land Pattern



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

CPC1004NTR Tape & Reel



For additional information please visit our website at: <https://www.ixysic.com>