



| 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 (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Tape & Reel Version Available

Applications

- Instrumentation
 - Multiplexers
 - Data Acquisition
 - Electronic Switching
 - I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security Systems
- Aerospace
- 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 Division's patented OptoMOS architecture while the optically coupled output is controlled by a highly efficient GaAlAs infrared LED.

The CPC1004N uses IXYS Integrated Circuits Division's 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.

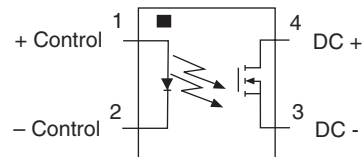
Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component: TUV Certificate B 09 07 49410 004

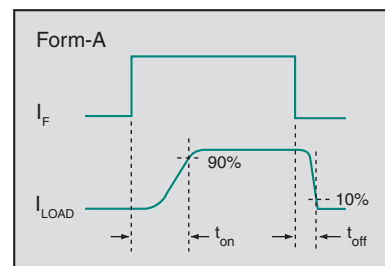
Ordering Information

| 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 | 70 | mW |
| Total Power Dissipation ¹ | 400 | mW |
| Capacitance Input to Output | 1 | pF |
| Isolation Voltage, Input to Output | 1500 | V _{rms} |
| Operational Temperature | -40 to +110 | °C |
| Storage Temperature | -40 to +125 | °C |

¹ Derate 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.

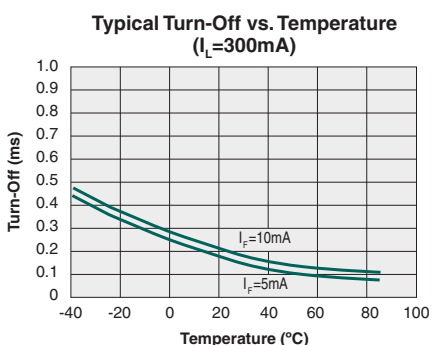
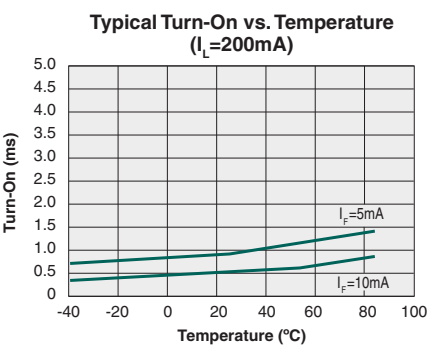
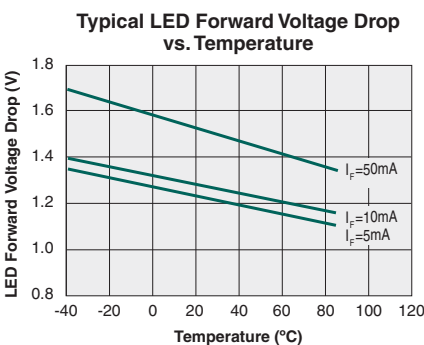
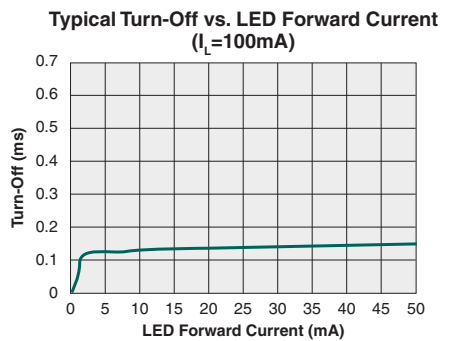
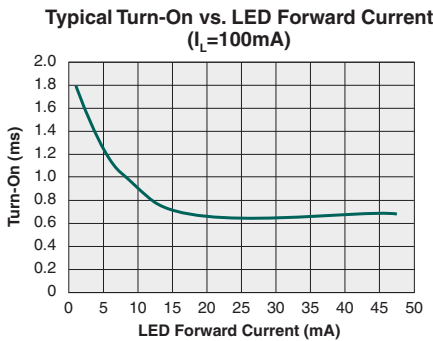
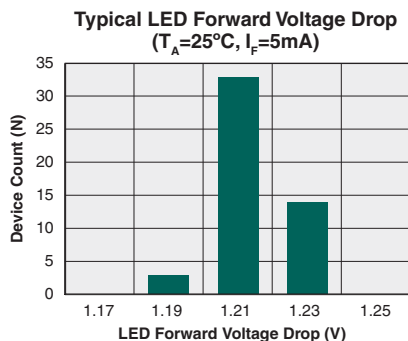
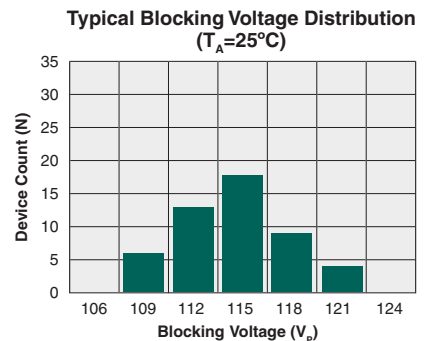
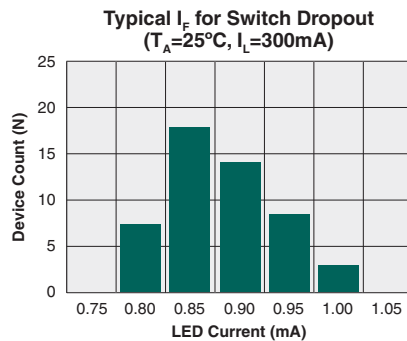
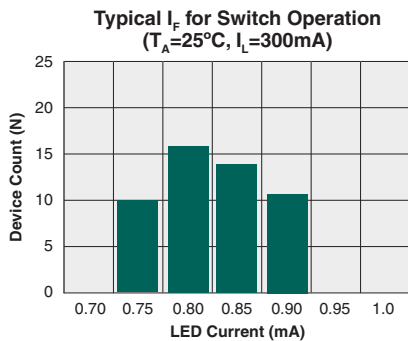
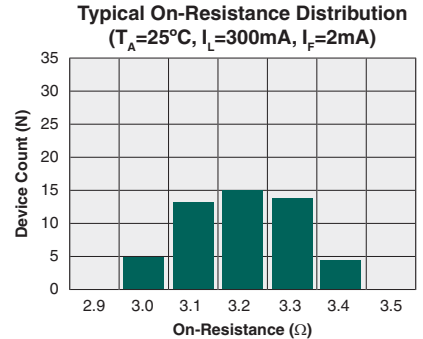
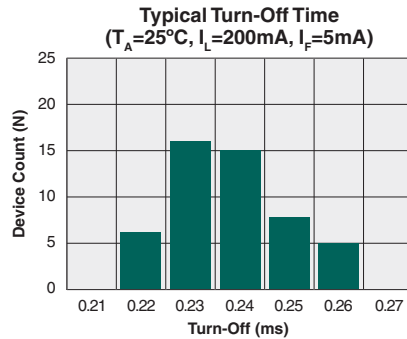
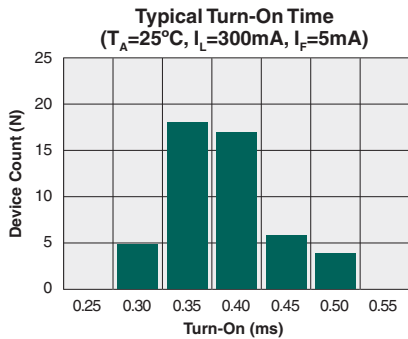
Electrical Characteristics @ 25°C (Unless Otherwise Specified)

| Parameter | Conditions | Symbol | Min | Typ | Max | Units |
|-------------------------------------|--|-------------------|-----|-----|-----|------------------|
| Output Characteristics | | | | | | |
| Load Current | | | | | | |
| Continuous ¹ | - | I _L | - | - | 300 | mA _{DC} |
| Continuous | T=110°C, I _F =10mA | I _L | - | - | 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 | 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 | 1.2 | 1.4 | 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.

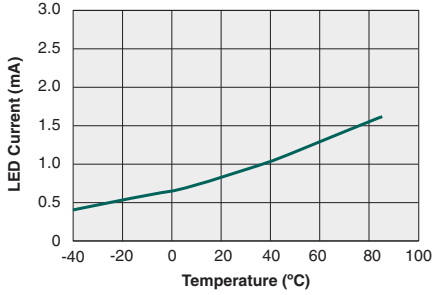
PERFORMANCE DATA*



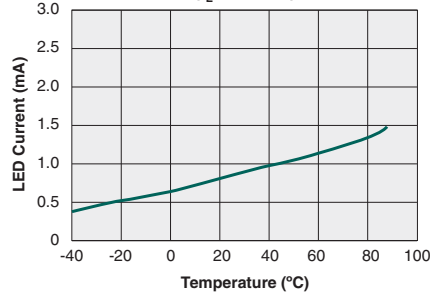
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

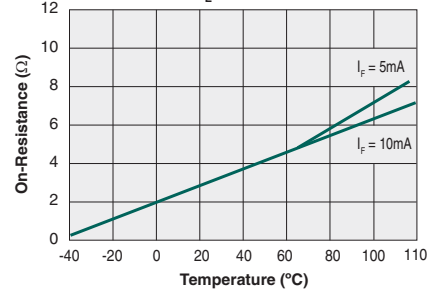
Typical I_F for Switch Operation vs. Temperature ($I_L=100mA$)



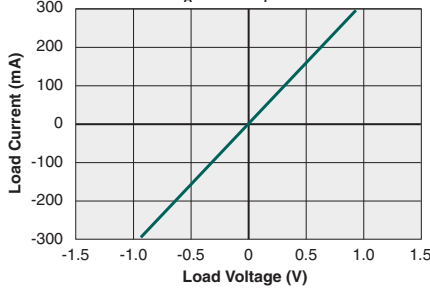
Typical I_F for Switch Dropout vs. Temperature ($I_L=100mA$)



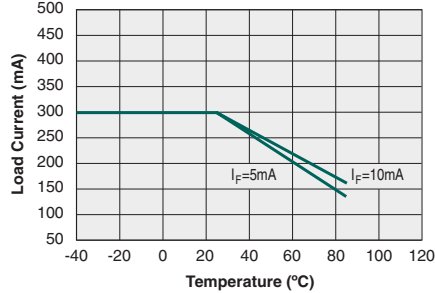
Typical On-Resistance vs. Temperature ($I_L=300mA$)



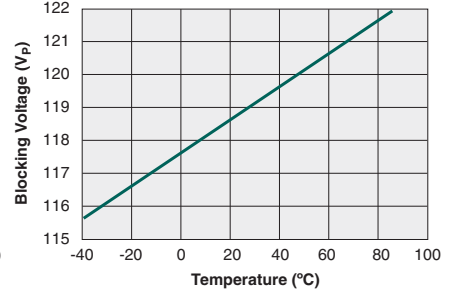
Typical Load Current vs. Load Voltage ($T_A=25°C, I_F=5mA$)



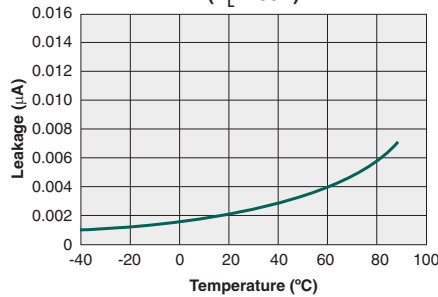
Typical Maximum Load Current vs. Temperature



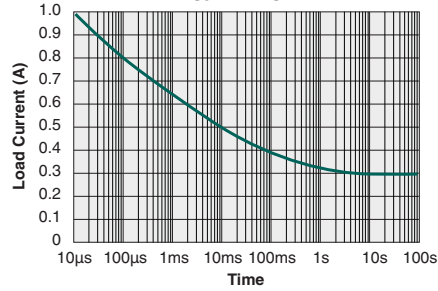
Typical Blocking Voltage vs. Temperature



Typical Leakage vs. Temperature Measured Across Pins 3 & 4 ($V_L=100V$)



Energy Rating Curve



*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

Manufacturing Information

Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. IXYS Integrated Circuits Division classified all of 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) rating** 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) Rating |
|----------|---|
| CPC1004N | MSL 3 |

ESD Sensitivity



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

Reflow Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

| Device | Maximum Temperature x Time |
|----------|----------------------------|
| CPC1004N | 260°C for 30 seconds |

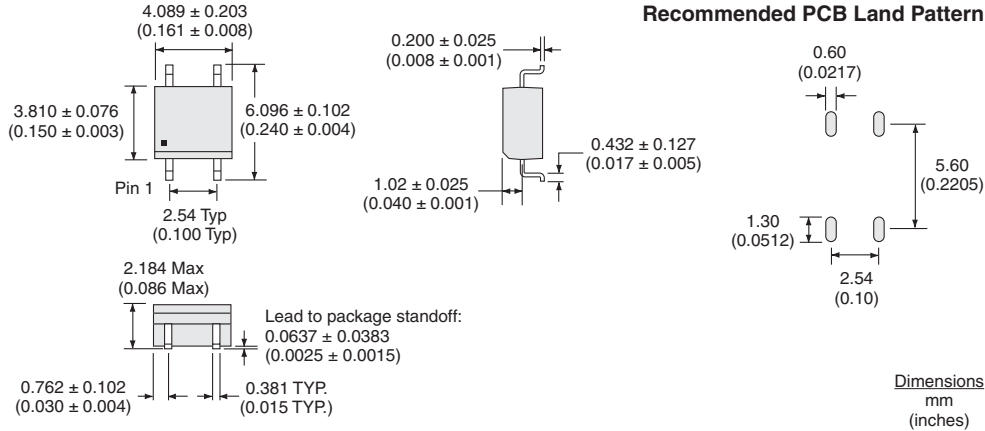
Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used after solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

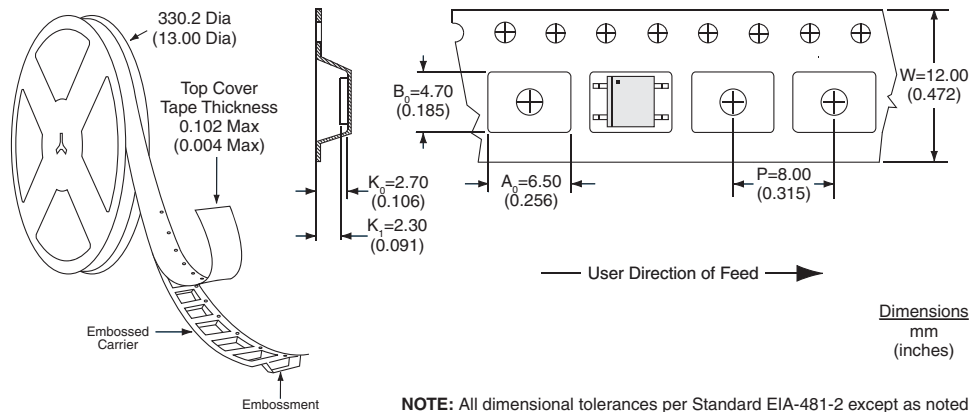


MECHANICAL DIMENSIONS

CPC1004N



CPC1004NTR Tape & Reel



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