



| Parameter           | Rating | Units           |
|---------------------|--------|-----------------|
| Blocking Voltage    | 30     | V <sub>P</sub>  |
| Load Current        | 1.2    | A <sub>DC</sub> |
| On-Resistance (max) | 0.25   | Ω               |

### Features

- 1500V<sub>rms</sub> Input/Output Isolation
- Small 4-Pin SOP Package
- Low Drive Power Requirements
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Wave Solderable
- Tape & Reel Version Available

### Applications

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

### Description

The CPC1020N is a 30V, single-pole, normally-open (1-Form-A) Solid State Relay. The ultra-low on-resistance, 0.25Ω, of this relay allows for high-current operation.

IXYS Integrated Circuits Division's patented OptoMOS architecture makes available the optically coupled technology necessary to activate the output's efficient MOSFET switches while providing 1500V<sub>rms</sub> input to output isolation. Control of the isolated output is accomplished by means of the highly efficient infrared LED at the input.

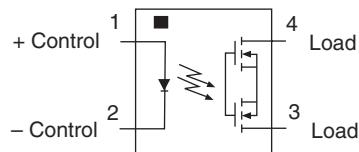
### Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- EN/IEC 60950-1 Certified Component: Certificate B 13 12 82667 003

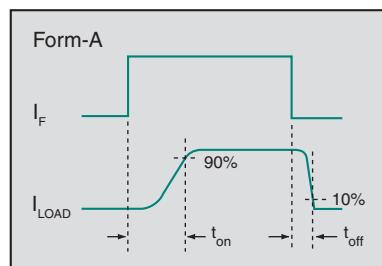
### Ordering Information

| Part #     | Description           |
|------------|-----------------------|
| CPC1020N   | 4-Pin SOP (100/tube)  |
| CPC1020NTR | 4-Pin SOP (2000/reel) |

### Pin Configuration



### Switching Characteristics of Normally-Open Devices



**Absolute Maximum Ratings @ 25°C**

| Parameter                            | Ratings     | Units            |
|--------------------------------------|-------------|------------------|
| Blocking Voltage                     | 30          | V <sub>P</sub>   |
| Input Power Dissipation <sup>1</sup> | 75          | mW               |
| Input Control Current<br>Peak (10ms) | 50          | mA               |
|                                      | 1           | A                |
| Reverse Input Voltage                | 5           | V                |
| Total Power Dissipation <sup>2</sup> | 400         | mW               |
| Isolation voltage, Input to Output   | 1500        | V <sub>rms</sub> |
| Operational Temperature              | -40 to +85  | °C               |
| Storage Temperature                  | -40 to +125 | °C               |

<sup>1</sup> Derate linearly 1.33 mW / °C

<sup>2</sup> 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.*

*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**

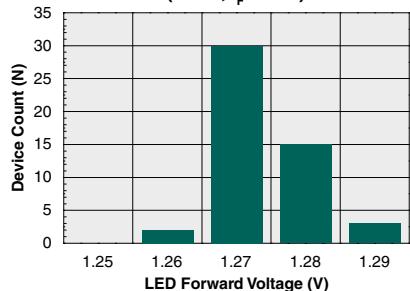
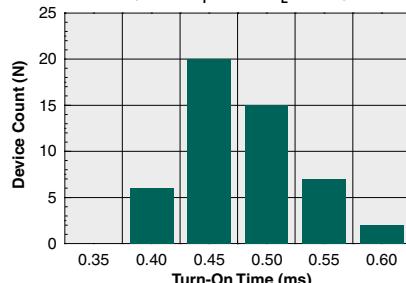
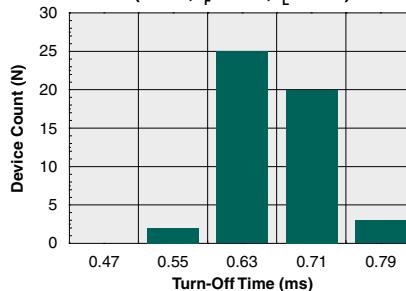
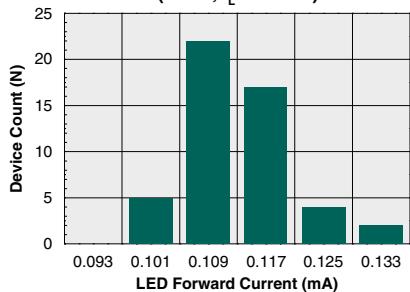
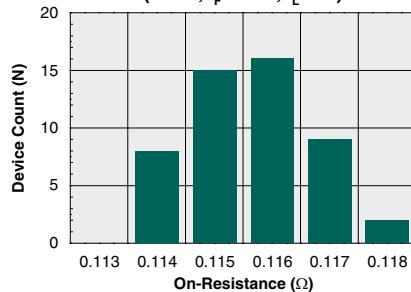
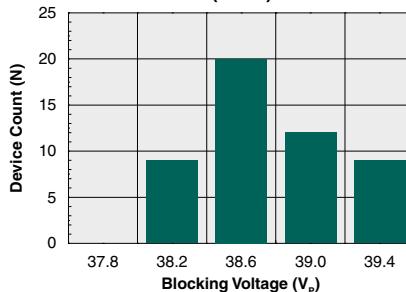
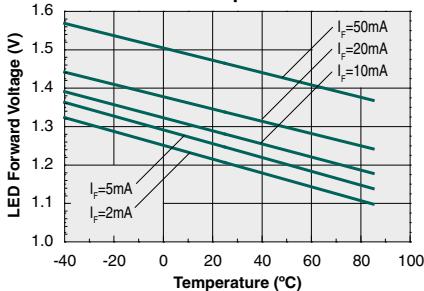
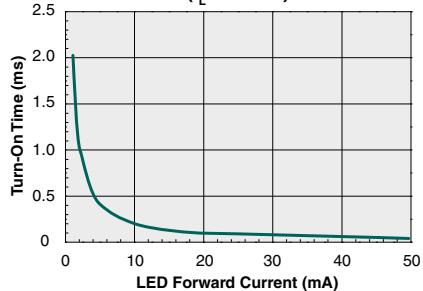
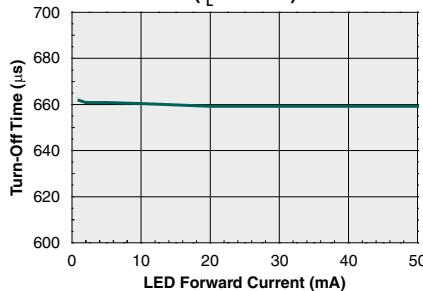
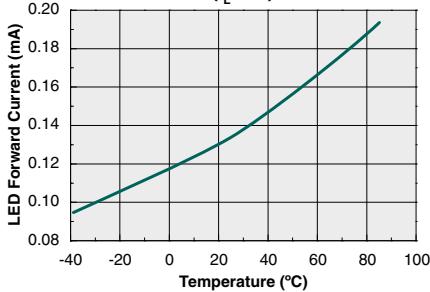
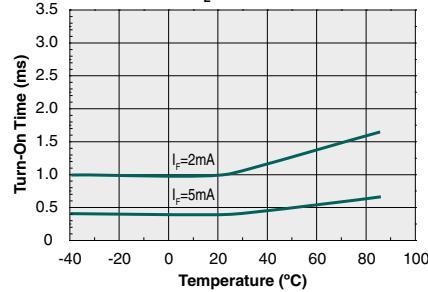
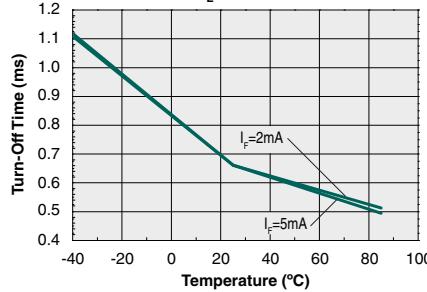
| Parameter                           | Conditions                                       | Symbol            | Min | Typ   | Max  | Units           |
|-------------------------------------|--|-------------------|-----|-------|------|-----------------|
| <b>Output Characteristics</b>       |  |                   |     |       |      |                 |
| Load Current                        |  |                   |     |       |      |                 |
| Continuous <sup>1</sup>             | I <sub>F</sub> =2mA                              | I <sub>L</sub>    | -   | -     | 1.2  | A <sub>DC</sub> |
| Peak                                | t ≤ 10ms   | I <sub>LPK</sub>  | -   | -     | 3    | A               |
| On-Resistance <sup>2</sup>          | I <sub>L</sub> =1A                               | R <sub>ON</sub>   | -   | 0.116 | 0.25 | Ω               |
| Off-State Leakage Current           | V <sub>L</sub> =30V <sub>P</sub>                 | I <sub>LEAK</sub> | -   | -     | 1    | μA              |
| Switching Speeds                    |  |                   |     |       |      |                 |
| Turn-On                             | I <sub>F</sub> =5mA, V <sub>L</sub> =10V         | t <sub>on</sub>   | -   | 0.48  | 3    | ms              |
| Turn-Off                            |  | t <sub>off</sub>  | -   | 0.65  | 3    |                 |
| Output Capacitance                  | I <sub>F</sub> =0mA, V <sub>L</sub> =25V, f=1MHz | C <sub>OUT</sub>  | -   | 33    | -    | pF              |
| <b>Input Characteristics</b>        |  |                   |     |       |      |                 |
| Input Control Current to Activate   | I <sub>L</sub> =1A                               | I <sub>F</sub>    | -   | 0.13  | 2    | mA              |
| Input Control Current to Deactivate | -  | I <sub>F</sub>    | 0.1 | -     | -    | mA              |
| Input Voltage Drop                  | I <sub>F</sub> =5mA                              | V <sub>F</sub>    | 0.9 | 1.2   | 1.4  | 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=1MHz                      | C <sub>IO</sub>   | -   | 3     | -    | pF              |

<sup>1</sup> Load current derates linearly from 1.2A @ 25°C to 0.58A @ 85°C.

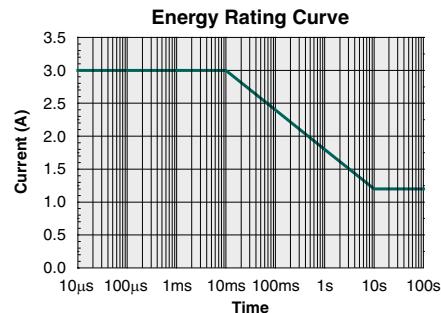
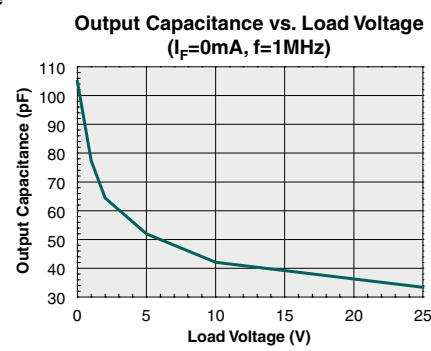
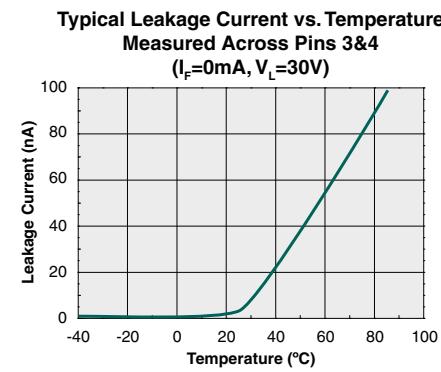
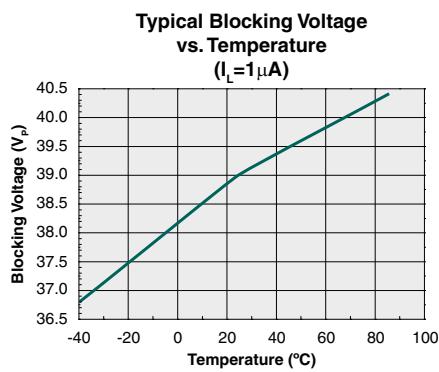
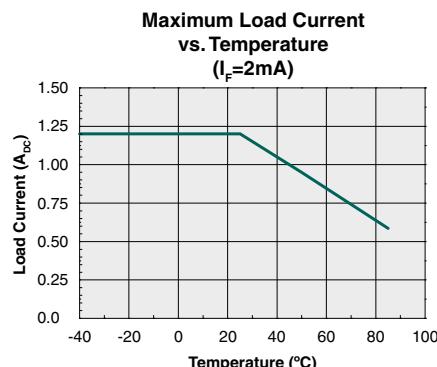
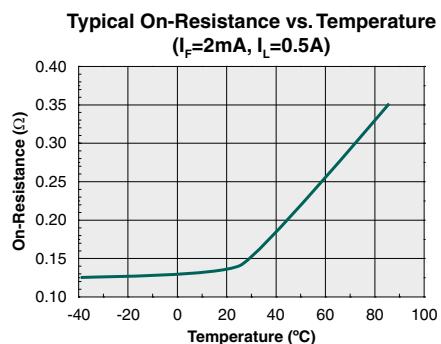
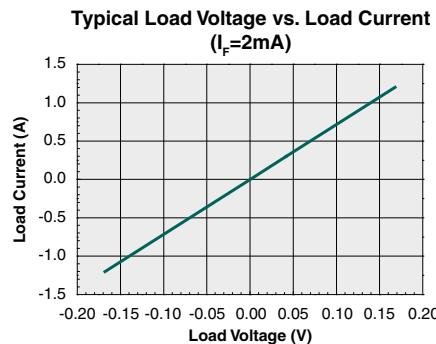
<sup>2</sup> Measurement taken within 1 second of on-time.

**ESD Rating**

| ESD Rating (Human Body Model) |
|-------------------------------|
| 1000 Volts                    |

**PERFORMANCE DATA @ 25°C (Unless Otherwise Noted)\***
**Typical LED Forward Voltage Drop  
(N=50,  $I_F=5\text{mA}$ )**

**Typical Turn-On Time Distribution  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=5\text{mA}$ )**

**Typical Turn-Off Time Distribution  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=5\text{mA}$ )**

**Typical  $I_F$  for Switch Operation  
(N=50,  $I_L=100\text{mA}$ )**

**Typical On-Resistance Distribution  
(N=50,  $I_F=2\text{mA}$ ,  $I_L=1\text{A}$ )**

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

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

**Typical Turn-On Time  
vs. LED Forward Current  
( $I_L=100\text{mA}$ )**

**Typical Turn-Off Time  
vs. LED Forward Current  
( $I_L=100\text{mA}$ )**

**Typical  $I_F$  for Switch Operation  
vs. Temperature  
( $I_L=1\text{A}$ )**

**Typical Turn-On Time vs. Temperature  
( $I_L=100\text{mA}$ )**

**Typical Turn-Off Time vs. Temperature  
( $I_L=100\text{mA}$ )**


\*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 @ 25°C (Unless Otherwise Noted)\***


\*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 |
|----------|---|
| CPC1020N | MSL 3                                   |

### ESD Sensitivity



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

### Soldering 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 | Maximum Reflow Cycles |
|----------|----------------------------|-----------------------|
| CPC1020N | 260°C for 30 seconds       | 3                     |

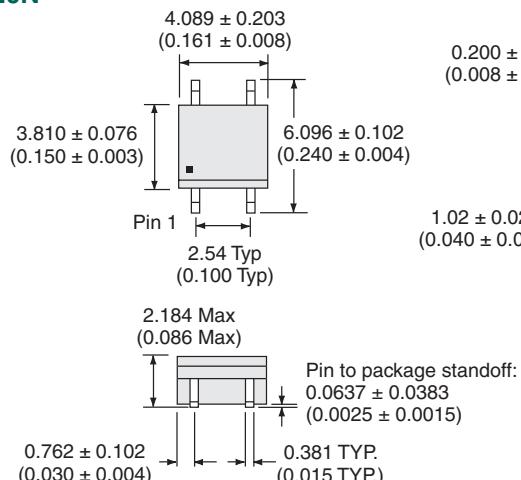
### Board Wash

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.

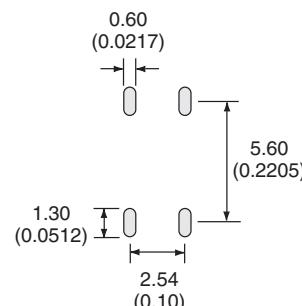


## MECHANICAL DIMENSIONS

**CPC1020N**

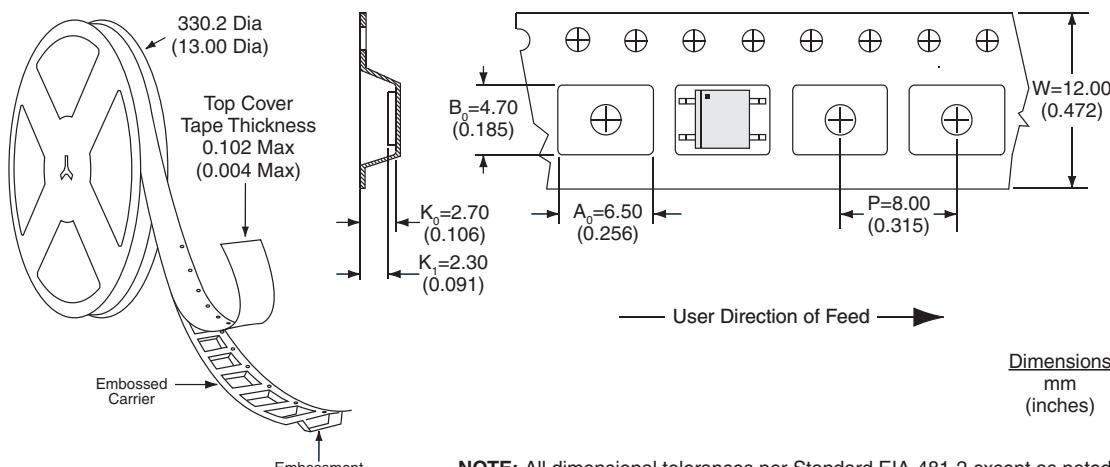


## Recommended PCB Land Pattern



Dimensions  
mm  
(inches)

CPC1020NTR Tape & Reel



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

For additional information please visit our website at: [www.ixysic.com](http://www.ixysic.com)

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