

| 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
- Tape & Reel Version Available
- Flammability Rating UL 94 V-0

### 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' 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.

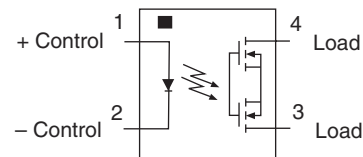
### Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- EN/IEC 60950-1 Certified Component:  
Certificate available on our website

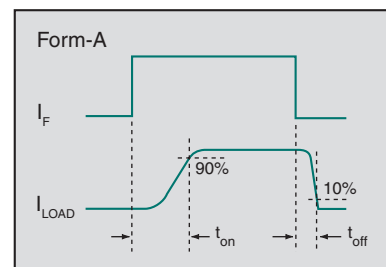
### Ordering Information

| 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                | 50          | mA               |
| Peak (10ms)                          | 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   | 1.5  | 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=1MHz                      | C <sub>IO</sub>   | -   | 3     | -    | pF              |

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

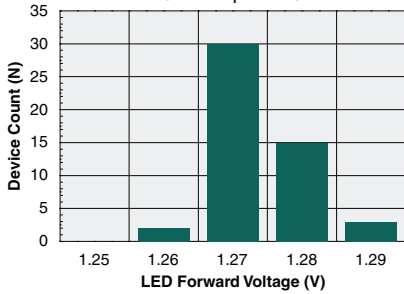
<sup>2</sup> Measurement taken within 1 second of on-time.

**ESD Rating**

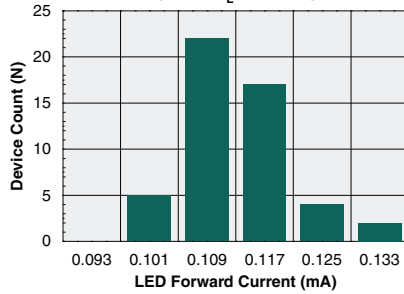
|                                      |
|--------------------------------------|
| <b>ESD Rating (Human Body Model)</b> |
| 1000 Volts                           |

**PERFORMANCE DATA\***

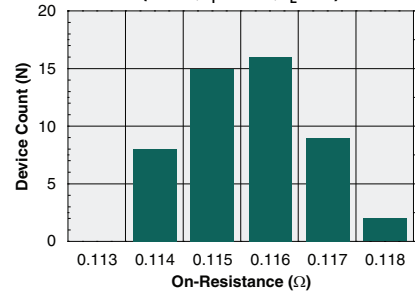
**Typical LED Forward Voltage Drop**  
(N=50,  $I_F=5\text{mA}$ )



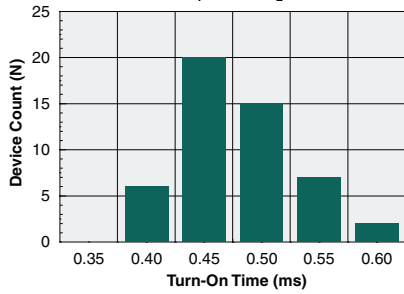
**Typical  $I_F$  for Switch Operation**  
(N=50,  $I_L=100\text{mA}$ )



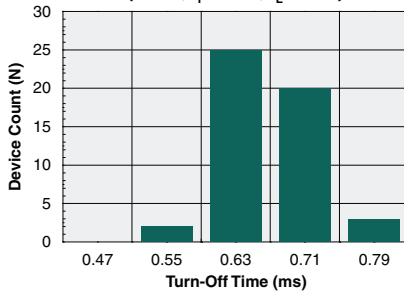
**Typical On-Resistance Distribution**  
(N=50,  $I_F=2\text{mA}$ ,  $I_L=1\text{A}$ )



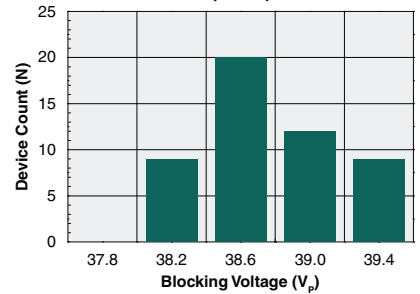
**Typical Turn-On Time Distribution**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=5\text{mA}$ )



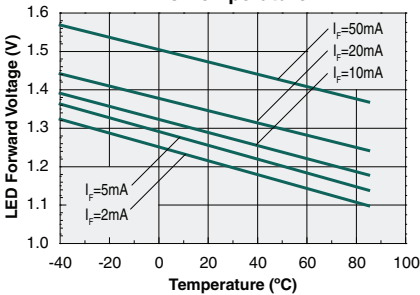
**Typical Turn-Off Time Distribution**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=5\text{mA}$ )



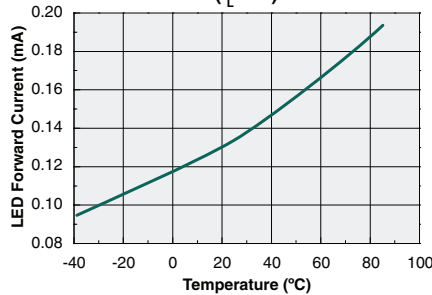
**Typical Blocking Voltage Distribution**  
(N=50)



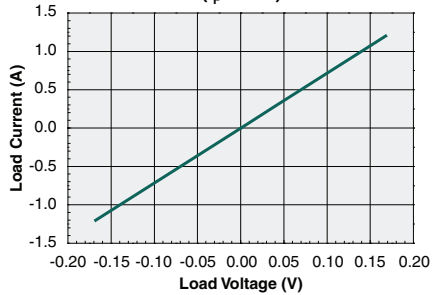
**Typical LED Forward Voltage Drop vs. Temperature**



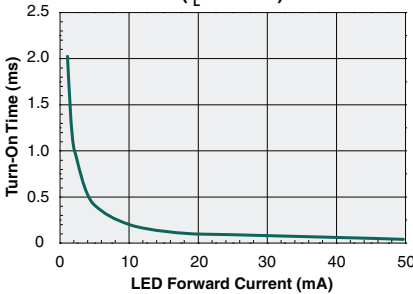
**Typical  $I_F$  for Switch Operation vs. Temperature**  
( $I_L=1\text{A}$ )



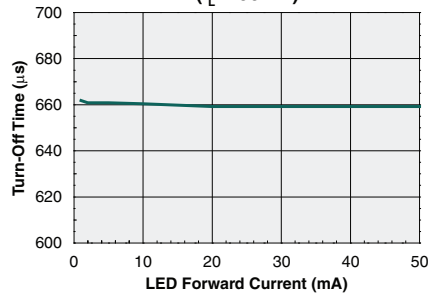
**Typical Load Voltage vs. Load Current**  
( $I_F=2\text{mA}$ )



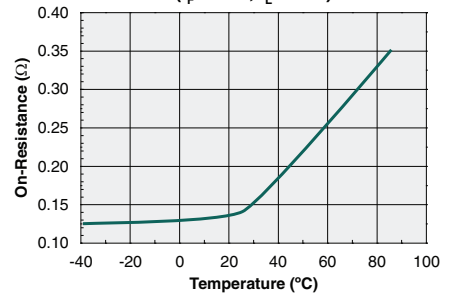
**Typical Turn-On Time vs. LED Forward Current**  
( $I_L=100\text{mA}$ )



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



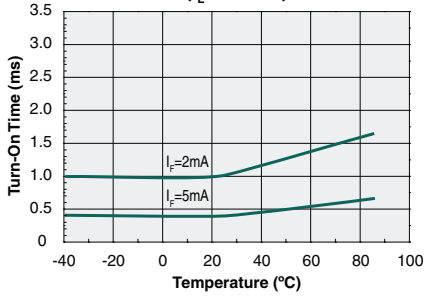
**Typical On-Resistance vs. Temperature**  
( $I_F=2\text{mA}$ ,  $I_L=0.5\text{A}$ )



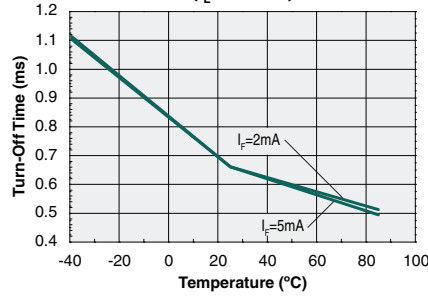
\*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C. For guaranteed parameters not indicated in the written specifications, please contact our application department.

**PERFORMANCE DATA\***

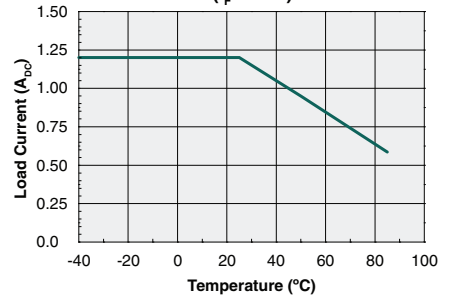
**Typical Turn-On Time vs. Temperature**  
( $I_L=100\text{mA}$ )



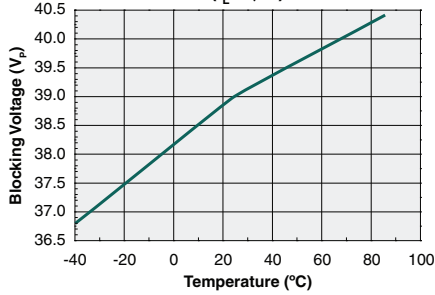
**Typical Turn-Off Time vs. Temperature**  
( $I_L=100\text{mA}$ )



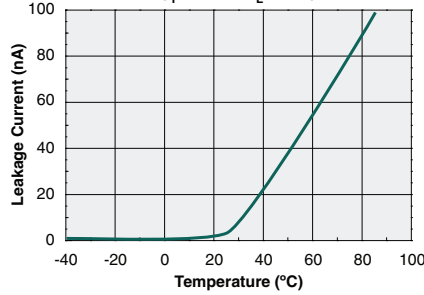
**Maximum Load Current vs. Temperature**  
( $I_F=2\text{mA}$ )



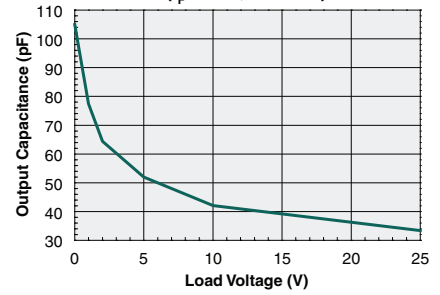
**Typical Blocking Voltage vs. Temperature**  
( $I_L=1\mu\text{A}$ )



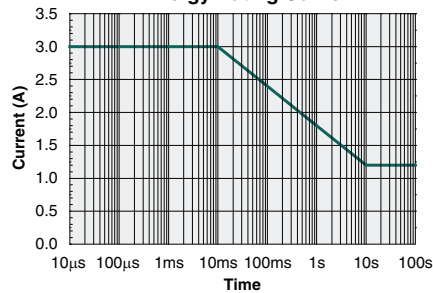
**Typical Leakage Current vs. Temperature**  
Measured Across Pins 3&4  
( $I_F=0\text{mA}$ ,  $V_L=30\text{V}$ )



**Output Capacitance vs. Load Voltage**  
( $I_F=0\text{mA}$ ,  $f=1\text{MHz}$ )



**Energy Rating Curve**



\*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.  
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 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 |
|----------|---|
| CPC1020N | 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 Classification Temperature ( $T_C$ ) of this product and the maximum dwell time the body temperature of this device may be ( $T_C - 5$ )°C or greater. The classification temperature sets the Maximum Body Temperature allowed for this device during lead-free reflow processes. For through-hole devices, and any other processes, the guidelines of **J-STD-020** must be observed.

| Device   | Classification Temperature ( $T_C$ ) | Dwell Time ( $t_p$ ) | Max Reflow Cycles |
|----------|--------------------------------------|----------------------|-------------------|
| CPC1020N | 260°C                                | 30 seconds           | 3                 |

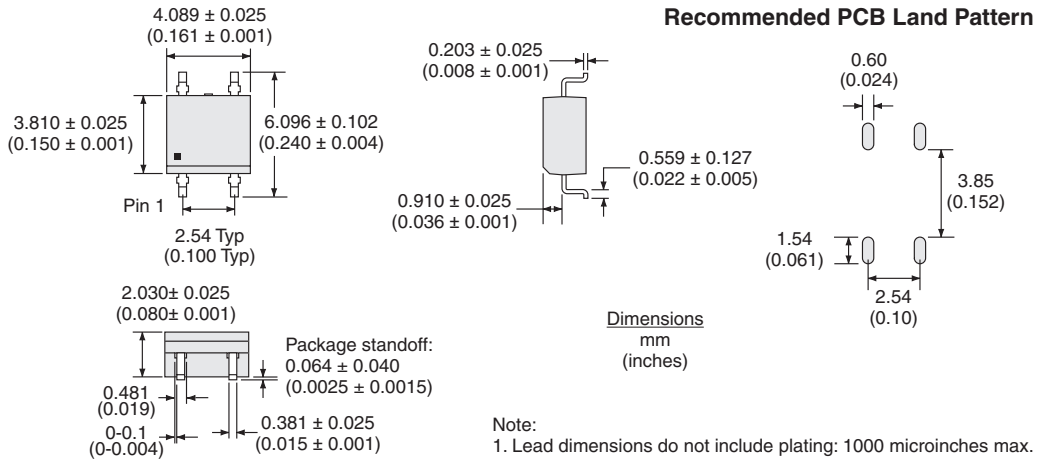
### Board Wash

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 flux or solvents that are Chlorine- or Fluorine-based.

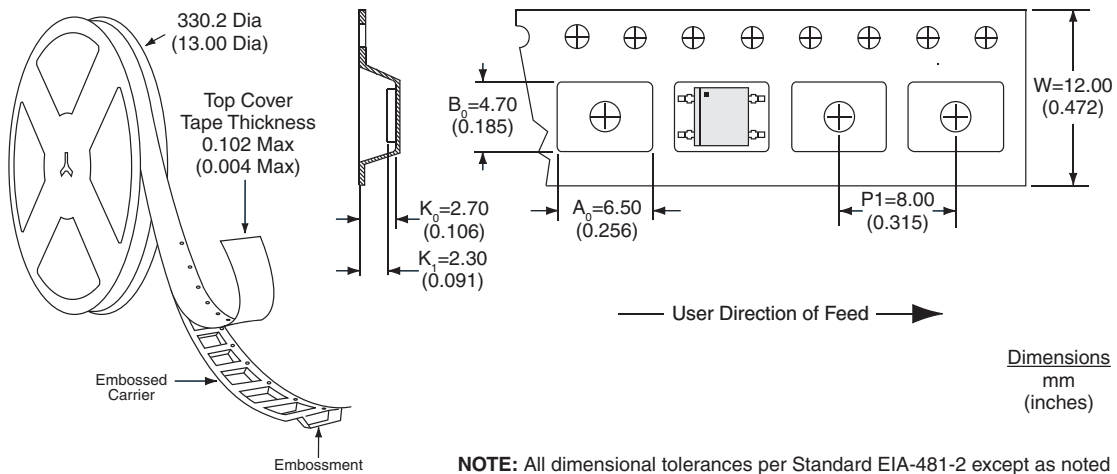


**MECHANICAL DIMENSIONS**

**CPC1020N**



**CPC1020NTR Tape & Reel**



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

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- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
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## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели,  
кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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