



| Parameter | Rating | Units |
|---------------------|--------|-----------------|
| Blocking Voltage | 30 | V _P |
| Load Current | 1.2 | A _{DC} |
| On-Resistance (max) | 0.25 | Ω |

Features

- 1500V_{rms} Input/Output Isolation
- Small 4-Lead 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

- 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_{rms} input to output isolation. Control of the isolated output is accomplished by means of the highly effective GaAlAs infrared LED at the input.

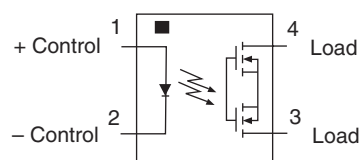
Approvals

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

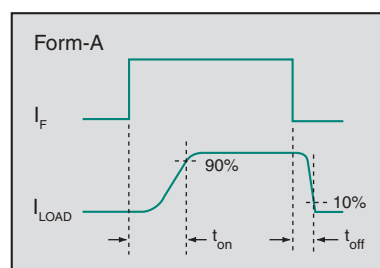
Ordering Information

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

Pin Configuration



Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25°C

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

¹ Derate linearly 1.33 mW / °C

² 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

| Parameter | Conditions | Symbol | Min | Typ | Max | Units |
|-------------------------------------|--|-------------------|-----|-------|------|-----------------|
| Output Characteristics | | | | | | |
| Load Current | | | | | | |
| Continuous ¹ | I _F =2mA | I _L | - | - | 1.2 | A _{DC} |
| Peak | t ≤ 10ms | I _{LPK} | - | - | 3 | A |
| On-Resistance ² | I _L =1A | R _{ON} | - | 0.116 | 0.25 | Ω |
| Off-State Leakage Current | V _L =30V _P | I _{LEAK} | - | - | 1 | μA |
| Switching Speeds | | | | | | |
| Turn-On | I _F =5mA, V _L =10V | t _{on} | - | 0.48 | 3 | ms |
| Turn-Off | | t _{off} | - | 0.65 | 3 | |
| Output Capacitance | V _L =15V, f=1MHz | C _{OUT} | - | 70 | - | pF |
| Input Characteristics | | | | | | |
| Input Control Current to Activate | I _L =1A | I _F | - | 0.13 | 2 | mA |
| Input Control Current to Deactivate | - | I _F | 0.1 | - | - | 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 |
| Input/Output Characteristics | | | | | | |
| Capacitance, Input to Output | - | C _{IO} | - | 3 | - | pF |

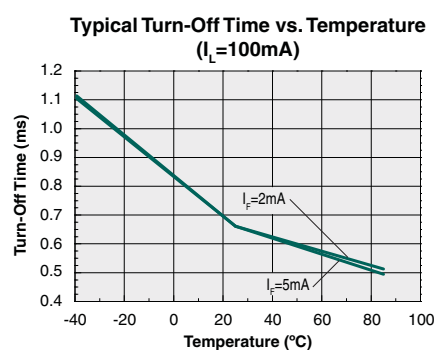
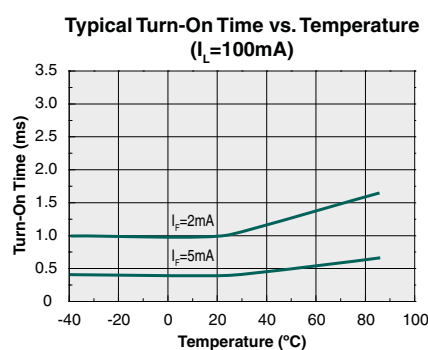
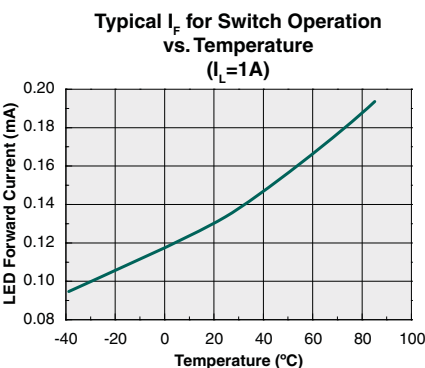
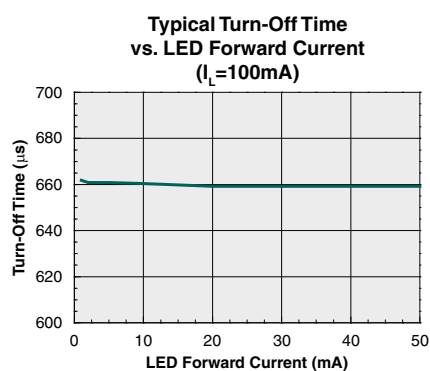
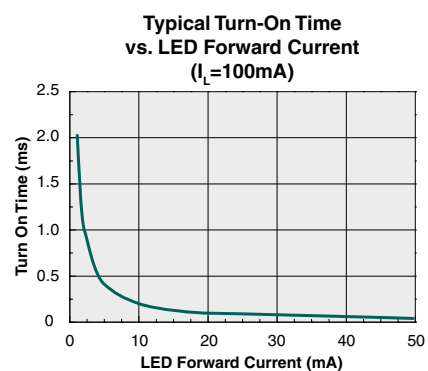
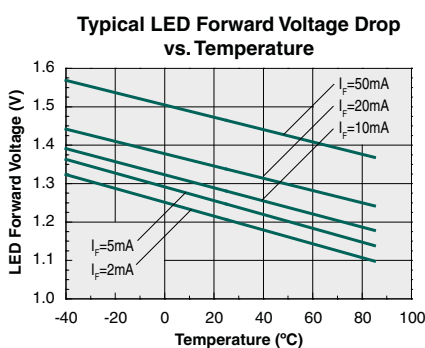
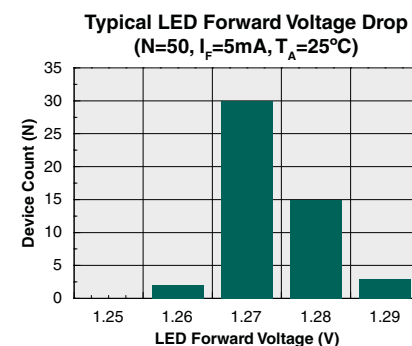
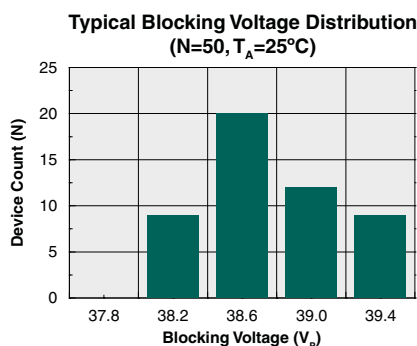
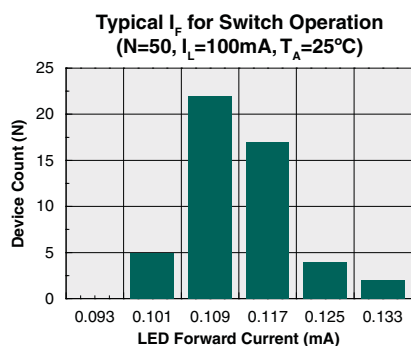
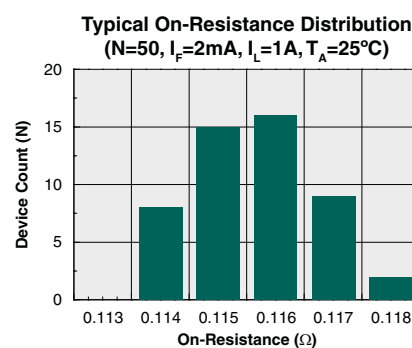
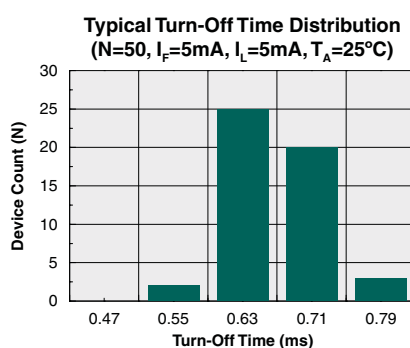
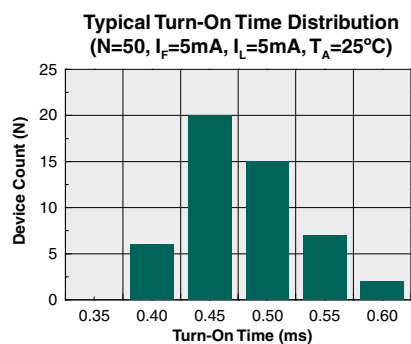
¹ Load current derates linearly from 1.2A @ 25°C to 0.58A @ 85°C.

² Measurement taken within 1 second of on-time.

ESD Rating

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

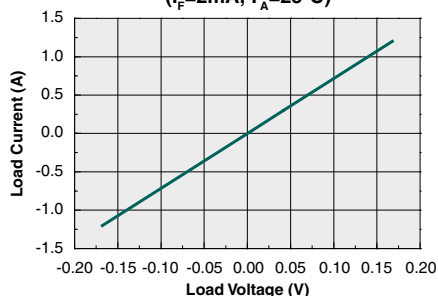
PERFORMANCE DATA*



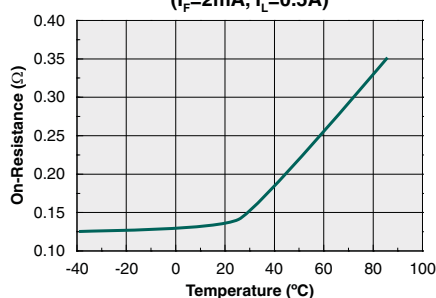
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

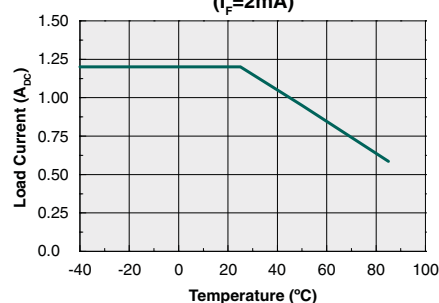
Typical Load Voltage vs. Load Current
($I_F=2\text{mA}$, $T_A=25^\circ\text{C}$)



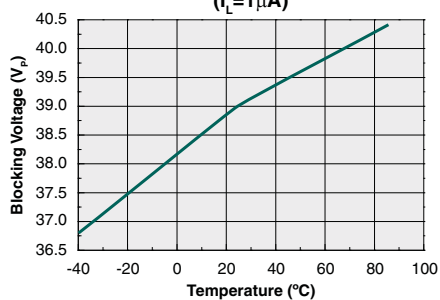
Typical On-Resistance vs. Temperature
($I_F=2\text{mA}$, $I_L=0.5\text{A}$)



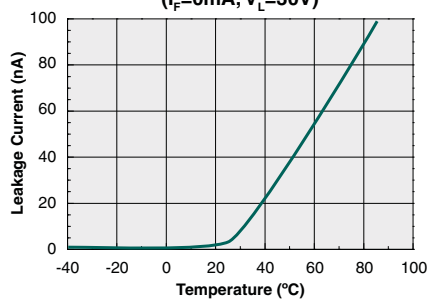
Maximum Load Current vs. Temperature
($I_F=2\text{mA}$)



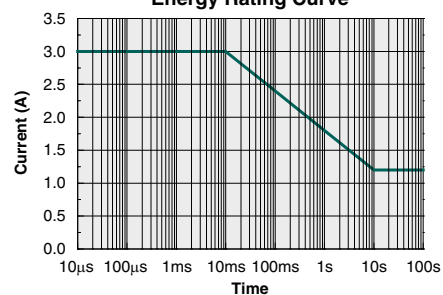
Typical Blocking Voltage vs. Temperature
($I_L=1\mu\text{A}$)



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



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 |
|----------|---|
| CPC1020N | 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 |
|----------|----------------------------|
| CPC1020N | 260°C for 30 seconds |

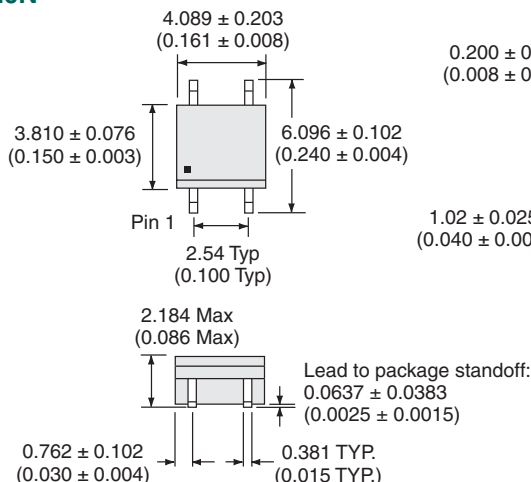
Board Wash

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.

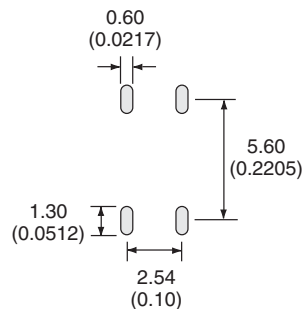


MECHANICAL DIMENSIONS

CPC1020N

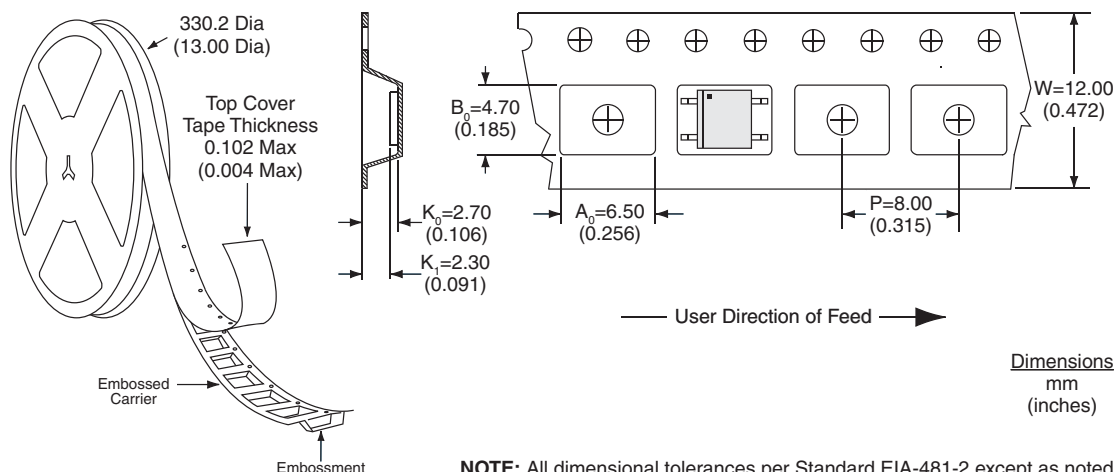


Recommended PCB Land Pattern



Dimensions
mm
(inches)

CPC1020NTR Tape & Reel



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

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