



Parameter	Ratings	Units
Load Voltage	100	V <sub>P</sub>
Load Current	150	mA <sub>rms</sub> / mA <sub>DC</sub>
On-Resistance (max)	8	Ω
Output Leakage, Off-State	20	nA

### Features

- Extremely Low Output Leakage: 20nA
- 1500V<sub>rms</sub> 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

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

### Description

CPC1009N is a miniature low voltage, low on-resistance, low off-state leakage, normally open (1-Form-A) solid state relay in a 4-lead SOP package.

The MOSFET switches and photovoltaic die use IXYS Integrated Circuits Division's patented OptoMOS® architecture to provide 1500 V<sub>rms</sub> of input-to-output isolation. The optically coupled output is controlled by a highly efficient GaAlAs infrared LED.

The CPC1009N uses IXYS Integrated Circuits Division's state of the art double-molded vertical construction to produce one of the world's smallest 4-lead relays, which offers board space savings of 20% over the competitor's larger 4-lead SOP relay.

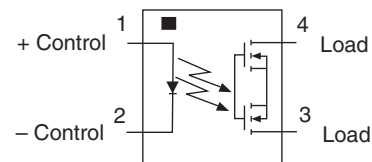
### Approvals

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

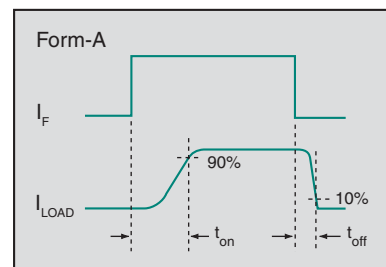
### Ordering Information

Part #	Description
CPC1009N	4-Lead SOP (100/tube)
CPC1009NTR	4-Lead SOP (2000/reel)

### Pin Configuration



### Switching Characteristics of Normally Open Devices



**Absolute Maximum Ratings @ 25°C**

Parameter	Ratings	Units
Blocking Voltage	100	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current	50	mA
	Peak (10ms)	A
Input Power Dissipation	70	mW
Total Power Dissipation <sup>1</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 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.*

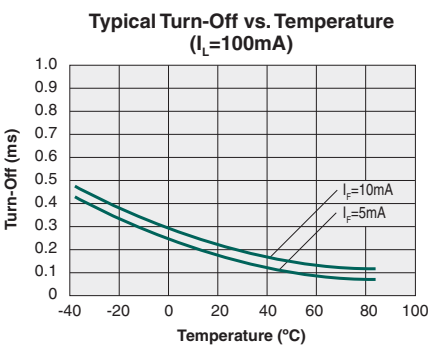
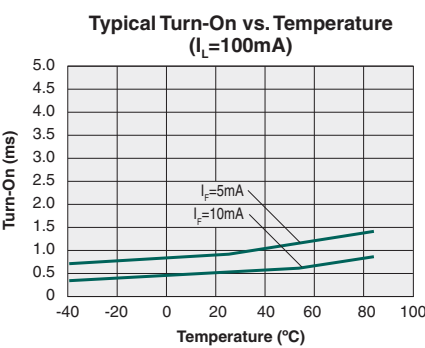
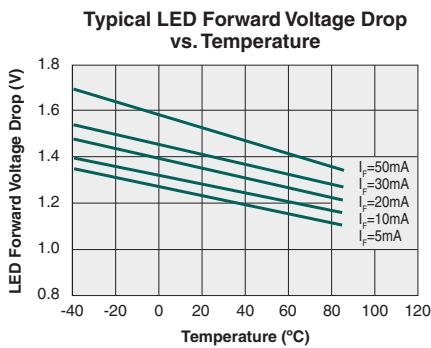
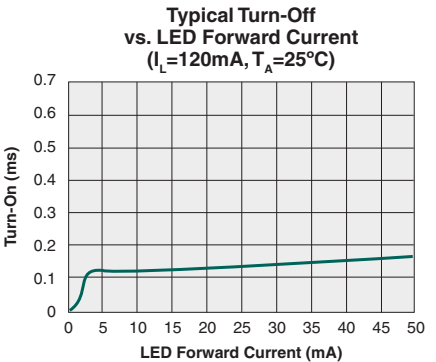
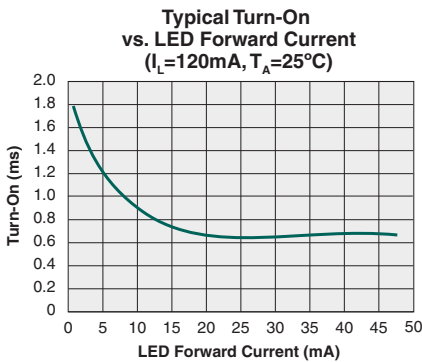
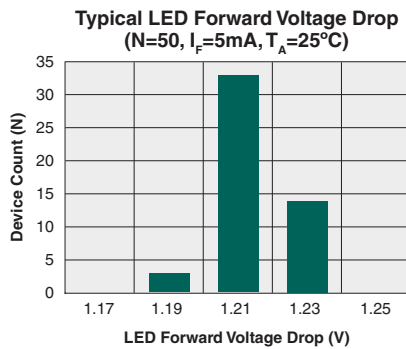
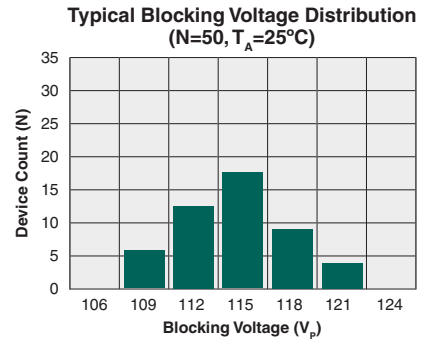
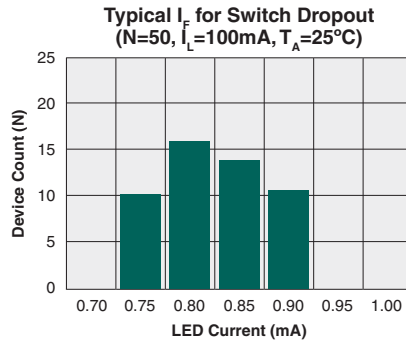
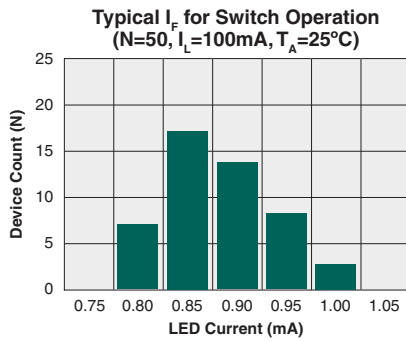
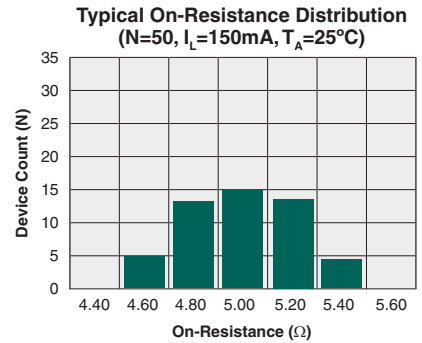
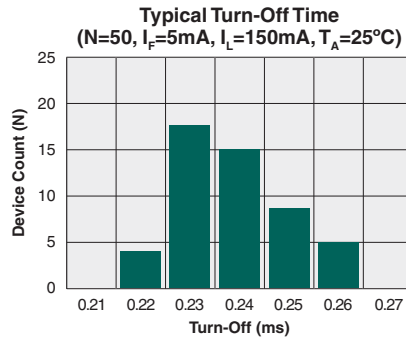
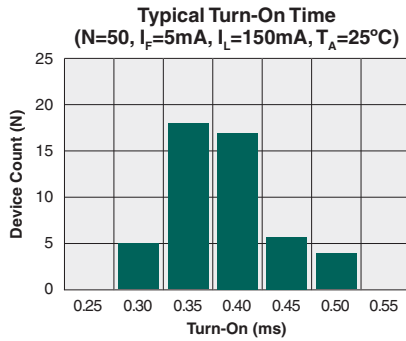
**Electrical Characteristics @ 25°C (Unless Otherwise Noted)**

Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics</b>						
Load Current	-	I <sub>L</sub>	-	-	150	mA <sub>rms</sub> / mA <sub>DC</sub>
Peak	t=10ms	I <sub>LPK</sub>	-	-	±350	mA <sub>P</sub>
On-Resistance <sup>2</sup>	I <sub>L</sub> =150mA	R <sub>ON</sub>	-	5	8	Ω
Off-State Leakage Current	V <sub>L</sub> =100V <sub>P</sub> , T=115°C	I <sub>LEAK</sub>	-	-	20	nA
<b>Switching Speeds</b>						
Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	t <sub>on</sub>	-	-	2	ms
Turn-Off		t <sub>off</sub>	-	-	0.5	
Output Capacitance	V <sub>L</sub> =50V, f=1MHz	C <sub>OUT</sub>	-	25	-	pF
<b>Input Characteristics</b>						
Input Control Current to Activate	I <sub>L</sub> =150mA	I <sub>F</sub>	-	0.87	2	mA
Input Control Current to Deactivate	-	I <sub>F</sub>	0.3	0.86	-	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	-	-	-	1	-	pF

<sup>1</sup> Load current derates linearly from 150mA @ 25°C to 120mA @ 85°C.

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

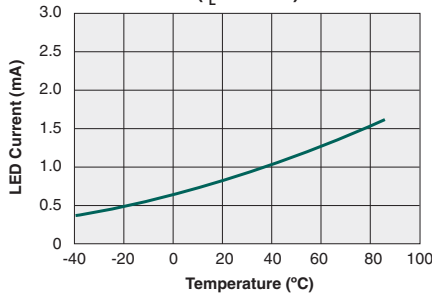
**PERFORMANCE DATA\***



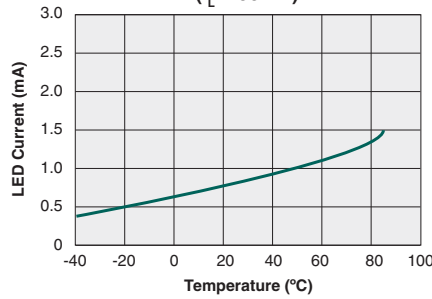
\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

**PERFORMANCE DATA\***

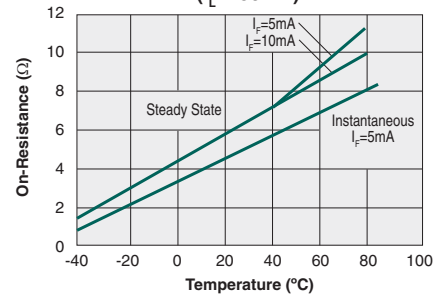
**Typical  $I_F$  for Switch Operation vs. Temperature**  
( $I_L=100\text{mA}$ )



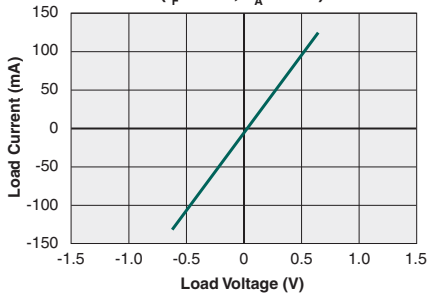
**Typical  $I_F$  for Switch Dropout vs. Temperature**  
( $I_L=100\text{mA}$ )



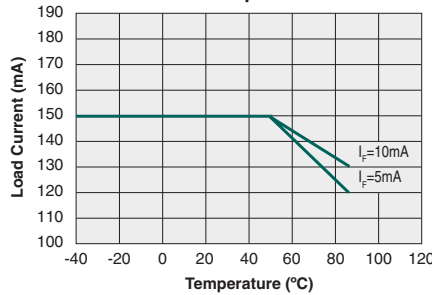
**Typical On-Resistance vs. Temperature**  
( $I_L=150\text{mA}$ )



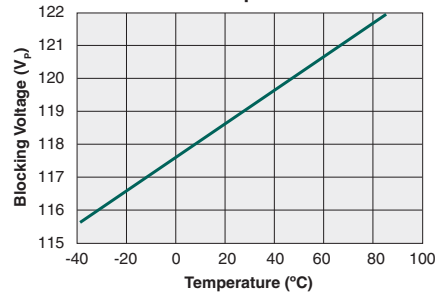
**Typical Load Current vs. Load Voltage**  
( $I_F=5\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



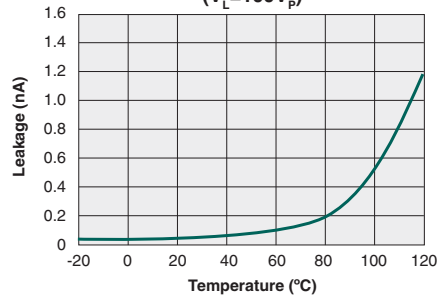
**Typical Maximum Load Current vs. Temperature**



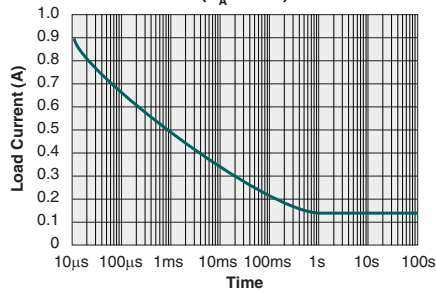
**Typical Blocking Voltage vs. Temperature**



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



**Energy Rating Curve**  
( $T_A=25^\circ\text{C}$ )



\*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
CPC1009N	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
CPC1009N	260°C for 30 seconds

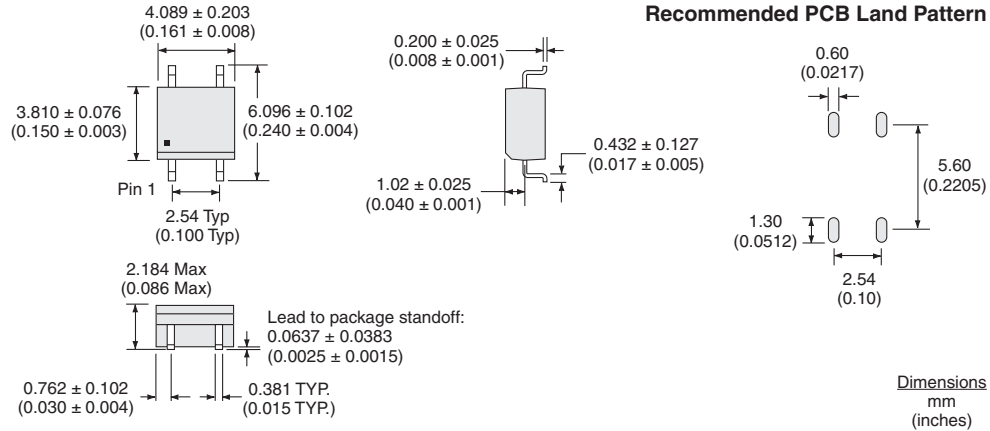
### Board Wash

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.

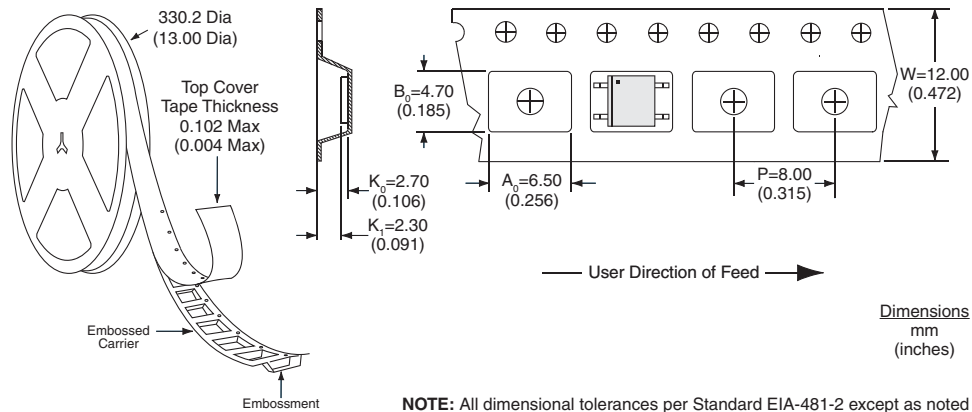


MECHANICAL DIMENSIONS

CPC1009N



CPC1009NTR Tape & Reel



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

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