



Parameter	Ratings	Units
Load Voltage	100	V_P
Load Current	150	$\text{mA}_{\text{rms}} / \text{mA}_{\text{DC}}$
On-Resistance (max)	8	Ω
Output Leakage, Off-State	20	nA

Features

- Extremely Low Output Leakage: 20nA
- 1500V_{rms} 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

- 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-pin SOP package.

The MOSFET switches and photovoltaic die use IXYS Integrated Circuits Division's patented OptoMOS® architecture to provide 1500 V_{rms} of input to output isolation. The optically coupled output is controlled by a highly efficient 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-pin relays, which offers board space savings of 20% over the competitor's larger 4-pin SOP relay.

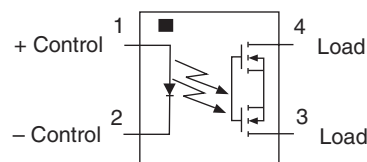
Approvals

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

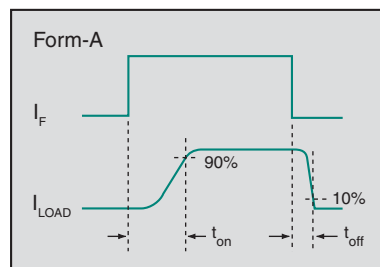
Ordering Information

Part #	Description
CPC1009N	4-Pin SOP (100/tube)
CPC1009NTR	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
Isolation voltage, Input to Output	1500	V _{rms}
Operational Temperature	-40 to +85	°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.

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 (Unless Otherwise Noted)

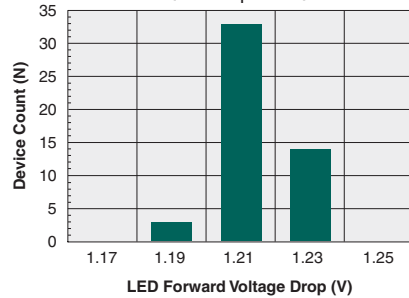
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
Continuous ¹	-	I _L	-	-	150	mA _{rms} / mA _{DC}
Peak	t=10ms	I _{LPK}	-	-	±350	mA _P
On-Resistance ²	I _L =150mA	R _{ON}	-	5	8	Ω
Off-State Leakage Current	V _L =100V _P , T=115°C	I _{LEAK}	-	-	20	nA
Switching Speeds						
Turn-On	I _F =5mA, V _L =10V	t _{on}	-	-	2	ms
Turn-Off		t _{off}	-	-	0.5	
Output Capacitance	I _F =0mA, V _L =50V, f=1MHz	C _{OUT}	-	6	-	pF
Input Characteristics						
Input Control Current to Activate	I _L =150mA	I _F	-	0.87	2	mA
Input Control Current to Deactivate	-	I _F	0.3	0.86	-	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	V _{IO} =0V, f=1MHz	C _{IO}	-	1	-	pF

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

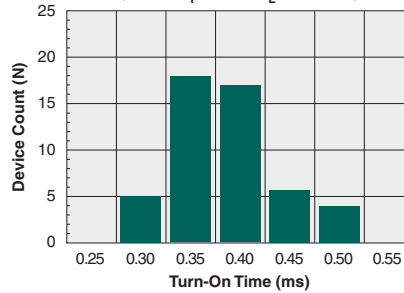
² Measurement taken within 1 second of on-time.

PERFORMANCE DATA @ 25°C (Unless Otherwise Noted)*

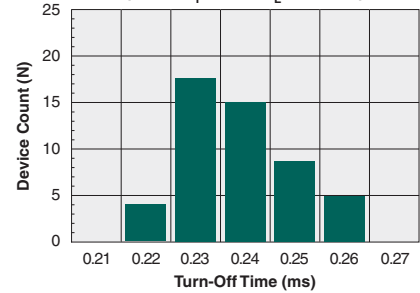
Typical LED Forward Voltage Drop
(N=50, $I_F=5\text{mA}$)



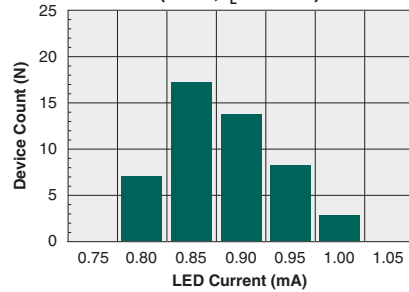
Typical Turn-On Time
(N=50, $I_F=5\text{mA}$, $I_L=150\text{mA}$)



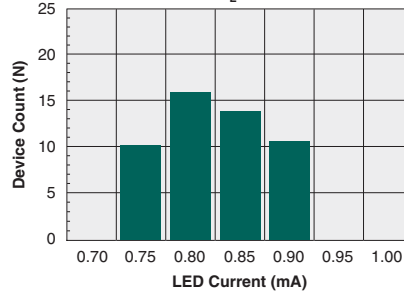
Typical Turn-Off Time
(N=50, $I_F=5\text{mA}$, $I_L=150\text{mA}$)



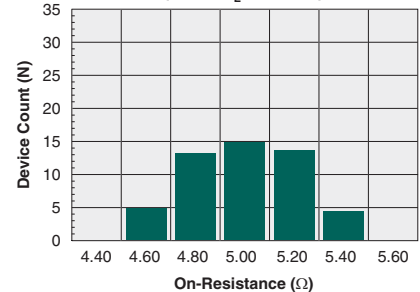
Typical I_F for Switch Operation
(N=50, $I_L=100\text{mA}$)



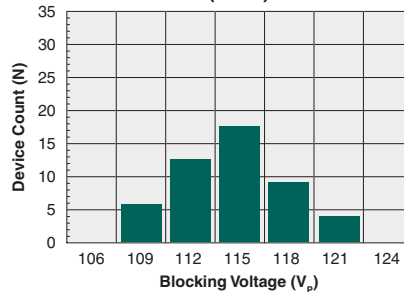
Typical I_F for Switch Dropout
(N=50, $I_L=100\text{mA}$)



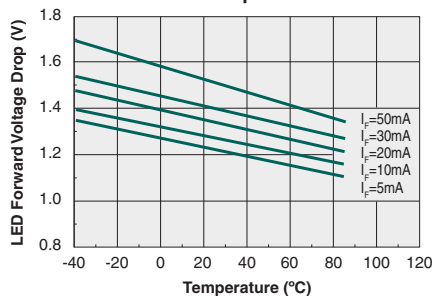
Typical On-Resistance Distribution
(N=50, $I_L=150\text{mA}$)



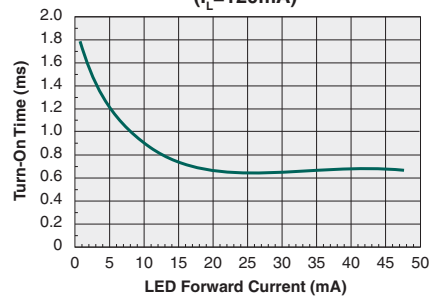
Typical Blocking Voltage Distribution
(N=50)



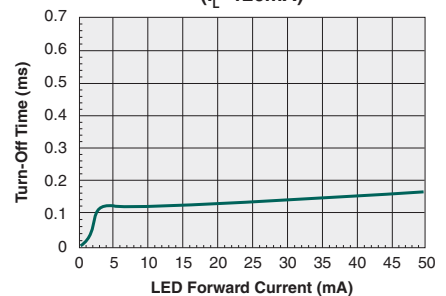
Typical LED Forward Voltage Drop
vs. Temperature



Typical Turn-On Time
vs. LED Forward Current
($I_L=120\text{mA}$)

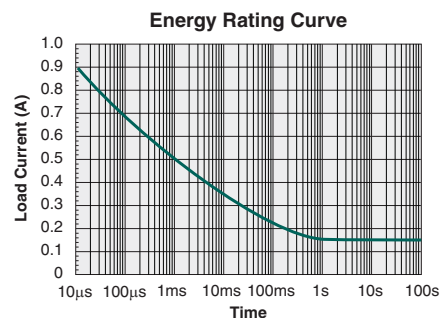
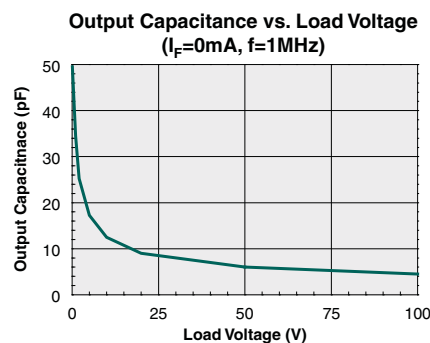
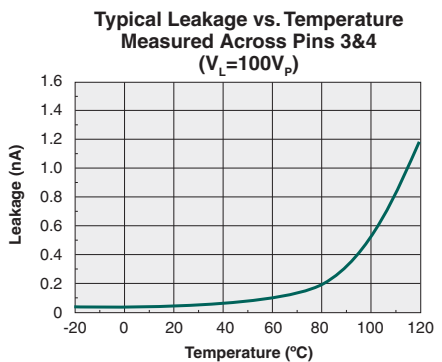
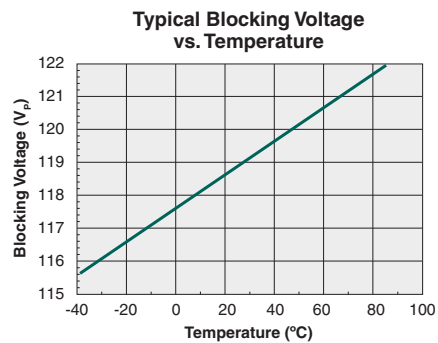
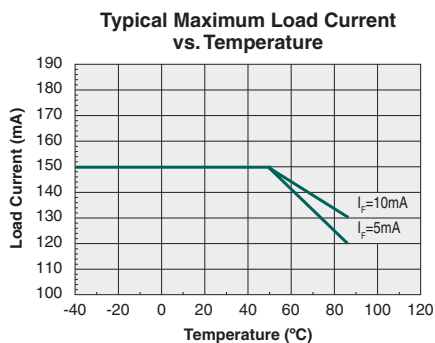
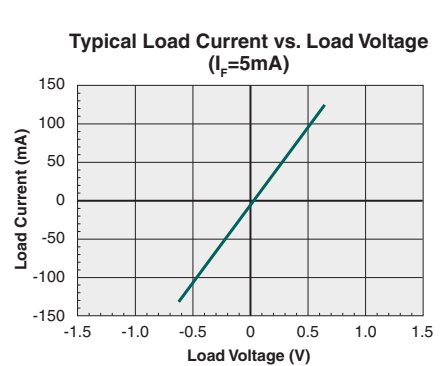
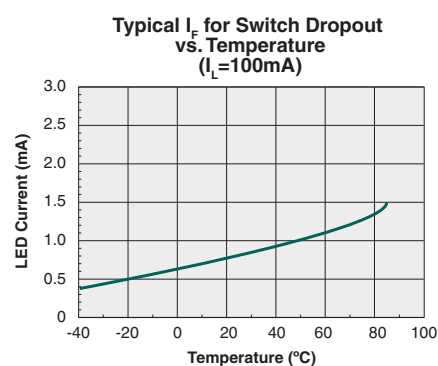
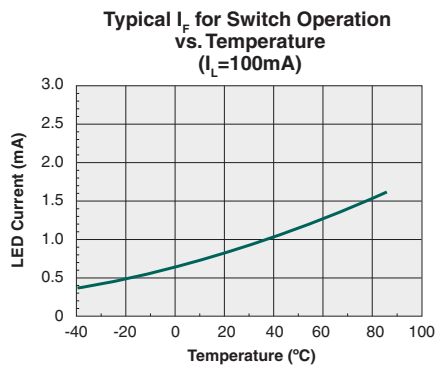
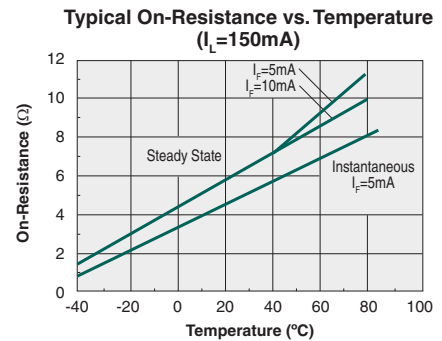
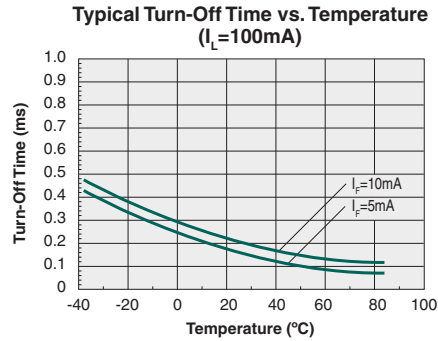
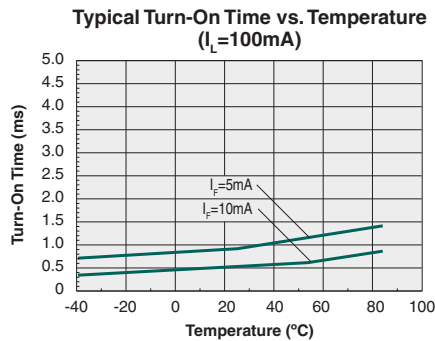


Typical Turn-Off Time
vs. LED Forward Current
($I_L=120\text{mA}$)



*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
CPC1009N	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
CPC1009N	260°C for 30 seconds	3

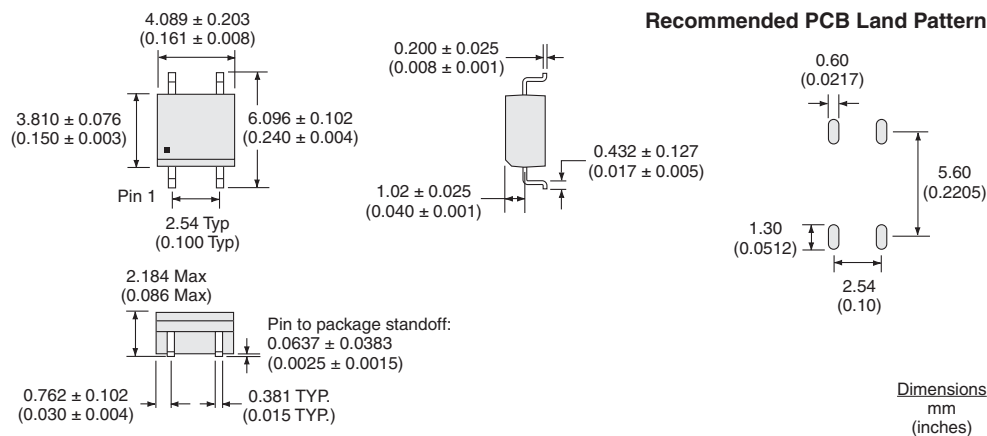
Board Wash

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.

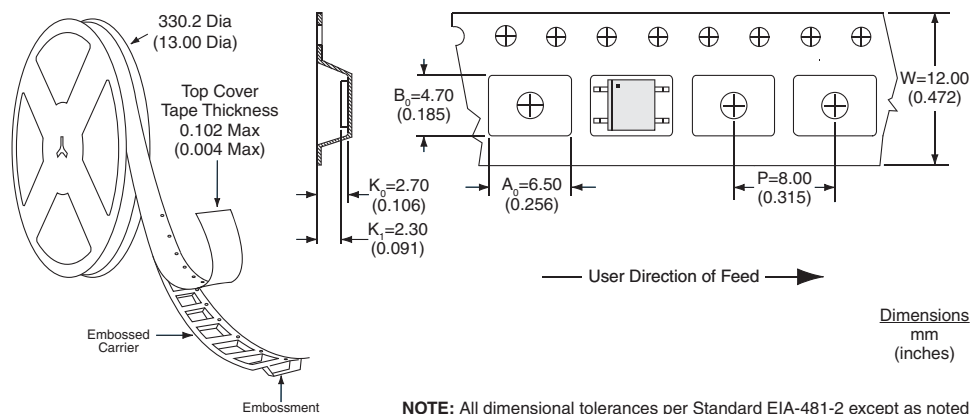


MECHANICAL DIMENSIONS

CPC1009N



CPC1009NTR Tape & Reel



For additional information please visit our website at: www.ixysic.com

IXYS Integrated Circuits Division makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication and reserves the right to make changes to specifications and product descriptions at any time without notice. Neither circuit patent licenses nor indemnity are expressed or implied. Except as set forth in IXYS Integrated Circuits Division's Standard Terms and Conditions of Sale, IXYS Integrated Circuits Division assumes no liability whatsoever, and disclaims any express or implied warranty, relating to its products including, but not limited to, the implied warranty of merchantability, fitness for a particular purpose, or infringement of any intellectual property right.

The products described in this document are not designed, intended, authorized or warranted for use as components in systems intended for surgical implant into the body, or in other applications intended to support or sustain life, or where malfunction of IXYS Integrated Circuits Division's product may result in direct physical harm, injury, or death to a person or severe property or environmental damage. IXYS Integrated Circuits Division reserves the right to discontinue or make changes to its products at any time without notice.

Specification: DS-CPC1009N-R06
 ©Copyright 2014, IXYS Integrated Circuits Division
 OptoMOS® is a registered trademark of IXYS Integrated Circuits Division
 All rights reserved. Printed in USA.
 9/24/2014