IXYS
INTEGRATED CIRCUITS DIVISION

CPC1004N
100V Normally-Open Single-Pole 4-Pin SOP OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage	100	V_P
Load Current	300	mA_{DC}
On-Resistance (max)	4	Ω

Features
- Operating Temperature Range: -40ºC to +110ºC
- $1500V_{rms}$ 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
- Reed Relay Replacement

Description
CPC1004N is a miniature, low-voltage, low on-resistance, normally-open (1-Form-A) DC solid state relay in a 4-pin SOP package. The relay uses optically coupled MOSFET technology to provide $1500V_{rms}$ of input to output isolation. The efficient MOSFET switch and photovoltaic die use IXYS Integrated Circuits Division's patented OptoMOS architecture while the optically coupled output is controlled by a highly efficient infrared LED.

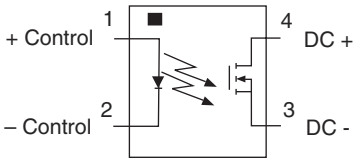
The CPC1004N uses IXYS Integrated Circuits Division's state of the art double-molded vertical construction packaging to produce one of the world's smallest relays. The CPC1004N is ideal for replacing larger, less-reliable reed and electromechanical relays.

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

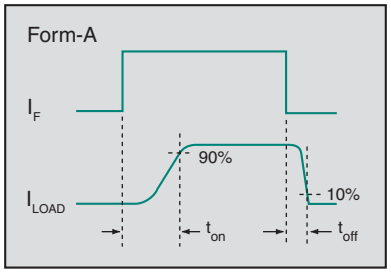
Ordering Information

Part #	Description
CPC1004N	4-Pin SOP (100/tube)
CPC1004NTR	4-Pin SOP (2000/reel)

Pin Configuration



Switching Characteristics of Normally-Open Devices



Absolute Maximum Ratings @ 25ºC

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
Capacitance Input to Output	1	pF
Isolation Voltage, Input to Output	1500	V_{rms}
Operational Temperature	-40 to +110	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 3.33 mW / ºC

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.

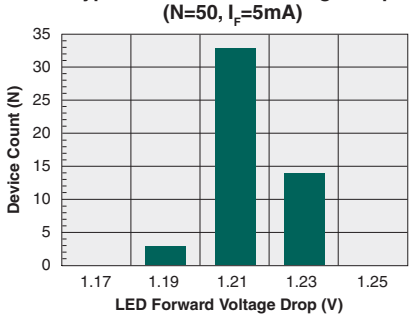
Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
Continuous [1]	-	I_L	-	-	300	mA_{DC}
Continuous	T=110°C, I_F=10mA		-	-	100	
Peak	t=10ms	I_{LPK}	-	-	500	
On-Resistance [2]	I_L=300mA	R_{ON}	-	-	4	Ω
Off-State Leakage Current	V_L=100V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	-	3	ms
Turn-Off		t_{off}	-	-	1	
Output Capacitance	I_F=0mA, V_L=50V, f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics						
Input Control Current to Activate	I_L=300mA	I_F	-	0.9	2	mA
Input Control Current to Deactivate	-	I_F	0.3	0.8	-	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

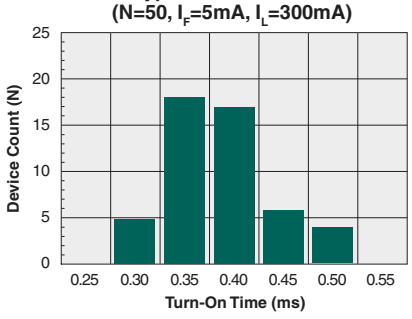
[1] Load current derates linearly from 300mA @ 25ºC to 100mA @ 110ºC.
[2] Measurement taken within 1 second of on-time.

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

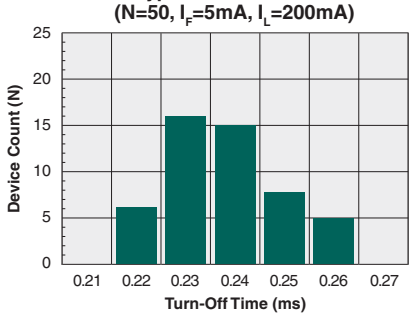
Typical LED Forward Voltage Drop (N=50, I_F=5mA)



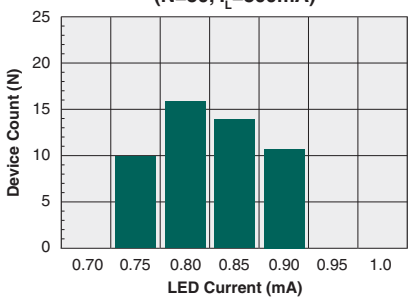
Typical Turn-On Time (N=50, I_F=5mA, I_L=300mA)



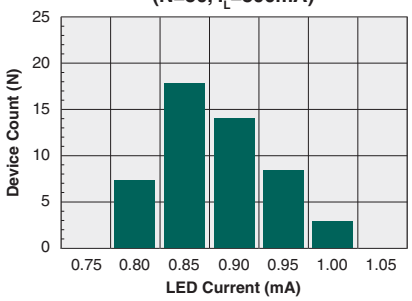
Typical Turn-Off Time (N=50, I_F=5mA, I_L=200mA)



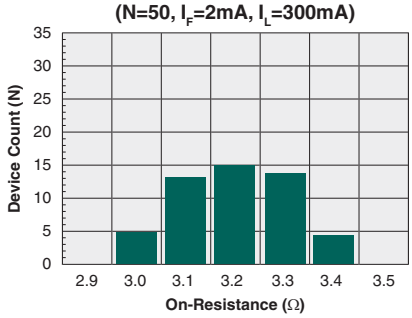
Typical I_F for Switch Operation (N=50, I_L=300mA)



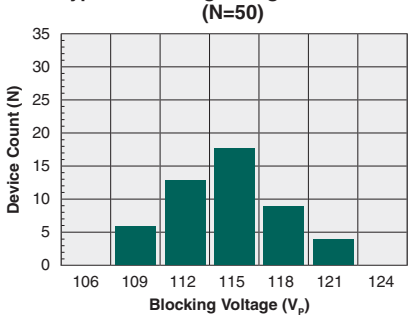
Typical I_F for Switch Dropout (N=50, I_L=300mA)



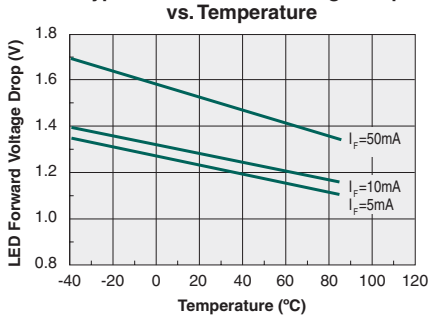
Typical On-Resistance Distribution (N=50, I_F=2mA, I_L=300mA)



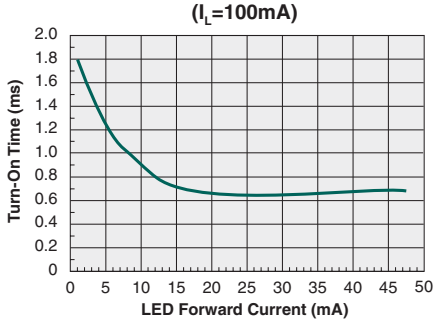
Typical Blocking Voltage Distribution (N=50)



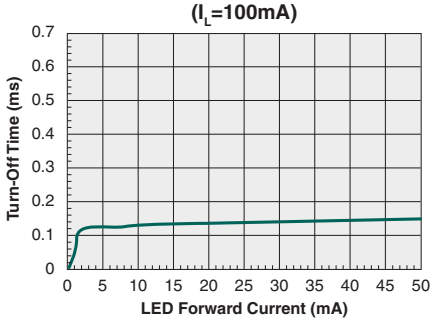
Typical LED Forward Voltage Drop vs. Temperature



Turn-On Time vs. LED Forward Current (I_L=100mA)



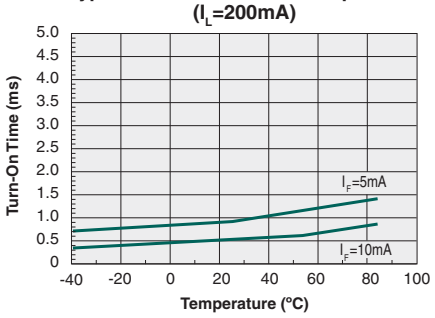
Turn-Off Time vs. LED Forward Current (I_L=100mA)



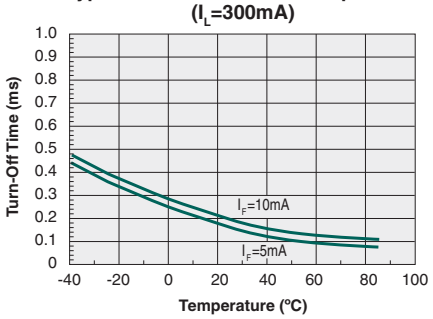
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

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

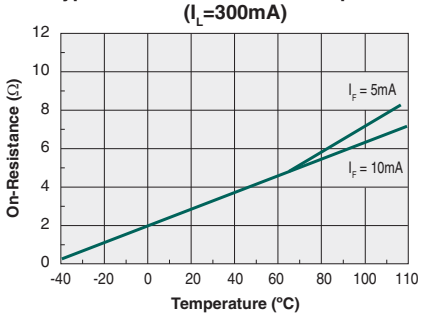
Typical Turn-On Time vs. Temperature (I_L=200mA)



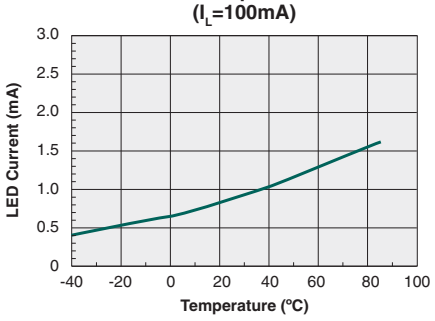
Typical Turn-Off Time vs. Temperature (I_L=300mA)



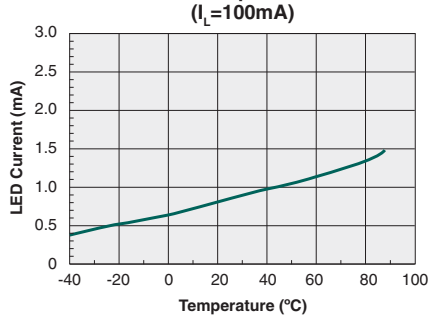
Typical On-Resistance vs. Temperature (I_L=300mA)



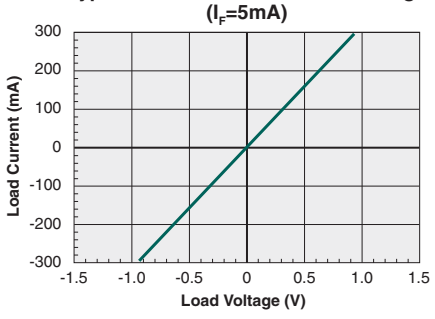
Typical I_F for Switch Operation vs. Temperature (I_L=100mA)



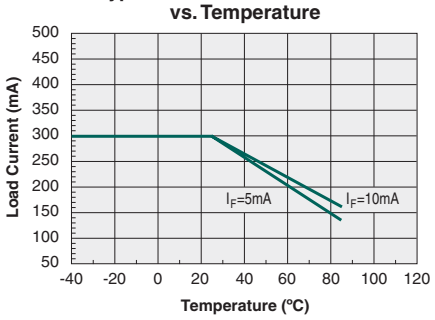
Typical I_F for Switch Dropout vs. Temperature (I_L=100mA)



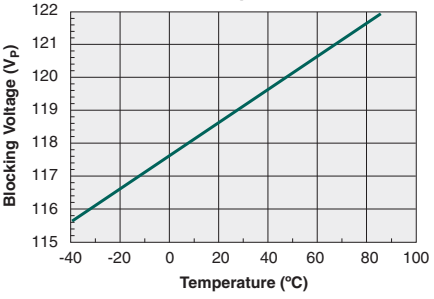
Typical Load Current vs. Load Voltage (I_F=5mA)



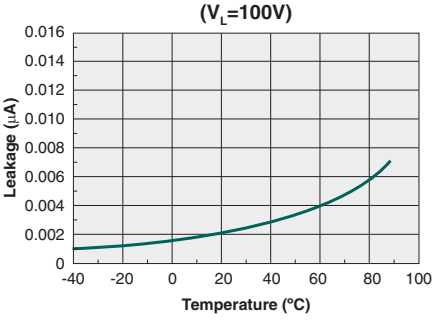
Typical Maximum Load Current vs. Temperature



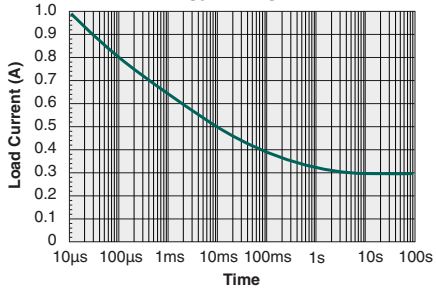
Typical Blocking Voltage vs. Temperature



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



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 ingression. 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
CPC1004N	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.

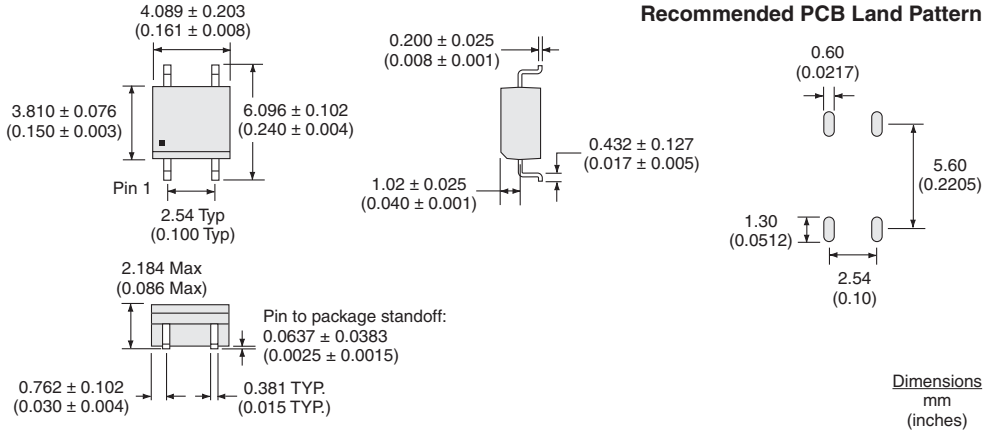
Device	Maximum Temperature x Time	Maximum Reflow Cycles
CPC1004N	260°C for 30 seconds	3

Board Wash

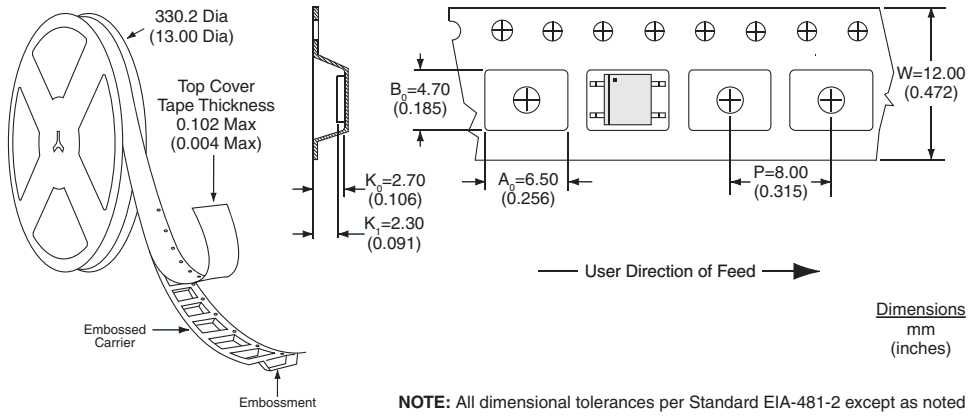
IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a 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

CPC1004N



CPC1004NTR 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

Specification: DS-CPC1004N-R08

9/24/2014