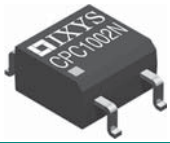
IXYS
INTEGRATED CIRCUITS DIVISION



CPC1002N
Single-Pole, Normally Open 4-Pin SOP OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage	60	V_P
Load Current	700	mA_{DC}
On-Resistance (max)	0.55	Ω
LED Current to operate	2	mA

Features

- Designed for use in security systems complying with EN50130-4
- Only 2mA of LED current required to operate
- Small 4-Pin SOP Package
- TTL/CMOS Compatible input
- 100% Solid State
- High Reliability
- Arc-Free With No Snubbing Circuits
- $1500V_{rms}$ Input/Output Isolation
- No EMI/RFI Generation
- Immune to radiated EM fields
- SMD Pick & Place, Wave Solderable
- Tape & Reel Version Available

Applications

- Security
  - Passive Infrared Detectors (PIR)
  - Data Signalling
  - 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 CPC1002N is a miniature, normally open (1-Form-A) DC solid state relay in a 4-Pin SOP package that employs optically coupled MOSFET technology to provide $1500V_{rms}$ of input to output isolation. The super-efficient MOSFET switches and photovoltaic die use IXYS Integrated Circuits Division's patented OptoMOS architecture. The optically coupled output is controlled by the input's highly efficient GaAlAs infrared LED.

The CPC1002N 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 CPC1002N offers board space savings of at least 20% over the competitor's larger 4-Pin SOP relay.

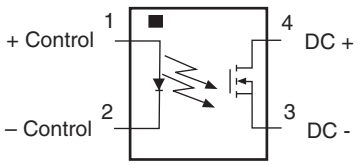
Approvals

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

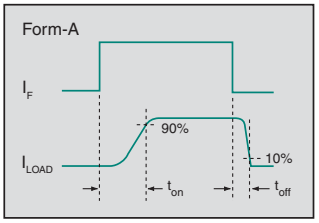
Ordering Information

Part #	Description
CPC1002N	4-Pin SOP (100/tube)
CPC1002NTR	4-Pin SOP (2000/reel)

Pin Configuration



Switching Characteristics of Normally Open Devices



Pb RoHS e3

ПРОМЭЛЕКТРОНИКА / sales@prom-elec.com

Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Blocking Voltage	60	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.

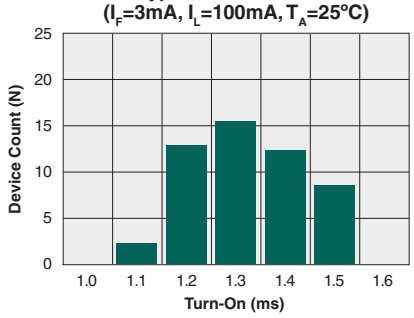
Electrical Characteristics @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current, Continuous [1]	I_F=2mA	I_L	-	-	700	mA_{DC}
Peak Load Current	t=10ms	I_{LPK}	-	-	1	A_P
On-Resistance [2]	I_L=100mA	R_{ON}	-	0.35	0.55	Ω
Off-State Leakage Current	V_L=60V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=3mA, V_L=10V	t_{on}	-	1.3	5	ms
Turn-Off		t_{off}	-	0.41	2	
Output Capacitance	V_L=50V; f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics						
Input Control Current to Activate [3]	I_L=100mA	I_F	-	0.55	2	mA
Input Control Current to Deactivate	-	I_F	0.3	-	-	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
Common Characteristics						
Capacitance Input to Output	-	$C_{I/O}$	-	1	-	pF

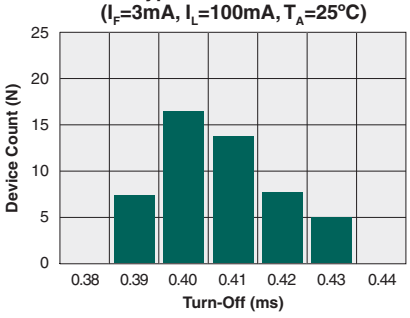
[1] Load current derates linearly from 700mA @ 25ºC to 420mA @80ºC.
[2] Measurement taken within 1 second of on-time.
[3] For applications requiring high temperature operation (greater than 60ºC) a LED drive current of 3mA is recommended.

PERFORMANCE DATA*

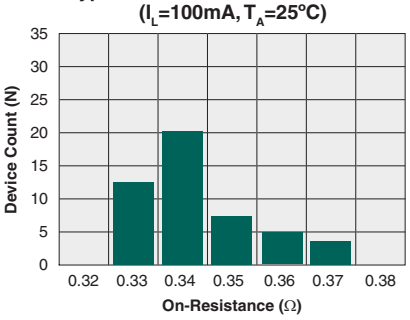
Typical Turn-On Time (I_F=3mA, I_L=100mA, T_A=25°C)



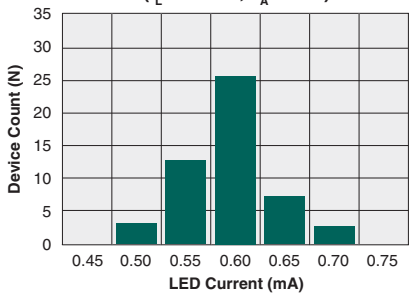
Typical Turn-Off Time (I_F=3mA, I_L=100mA, T_A=25°C)



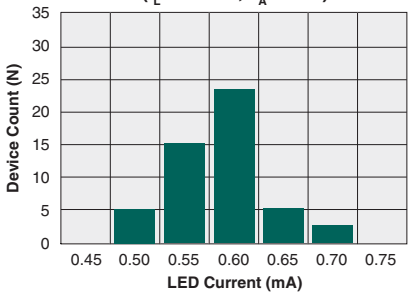
Typical On-Resistance Distribution (I_L=100mA, T_A=25°C)



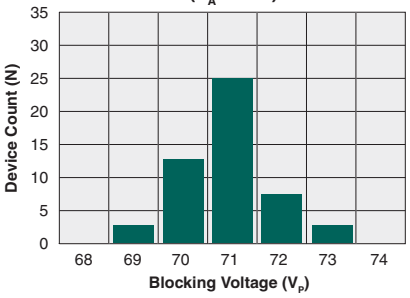
Typical I_F for Switch Operation (I_L=100mA, T_A=25°C)



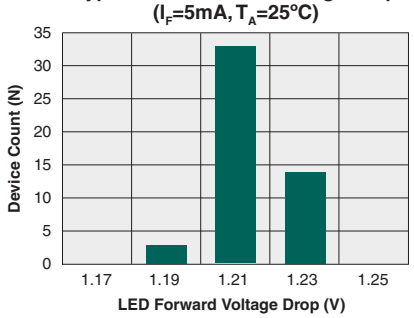
Typical I_F for Switch Dropout (I_L=100mA, T_A=25°C)



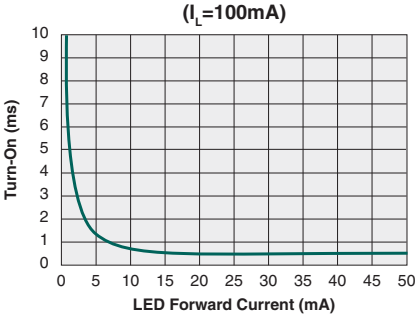
Typical Blocking Voltage Distribution (T_A=25°C)



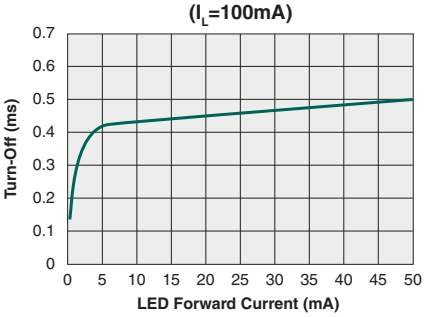
Typical LED Forward Voltage Drop (I_F=5mA, T_A=25°C)



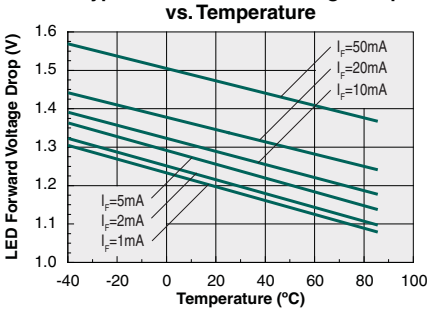
Typical Turn-On vs. LED Forward Current (I_L=100mA)



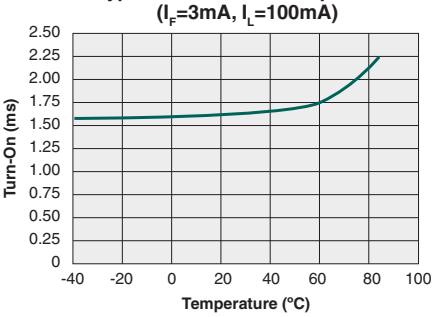
Typical Turn-Off vs. LED Forward Current (I_L=100mA)



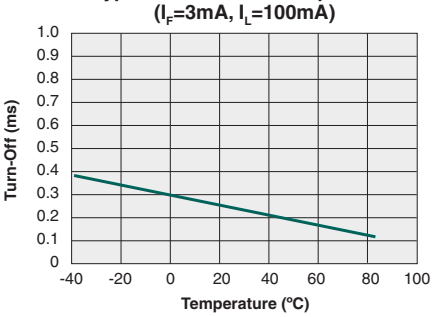
Typical LED Forward Voltage Drop vs. Temperature



Typical Turn-On vs. Temperature (I_F=3mA, I_L=100mA)



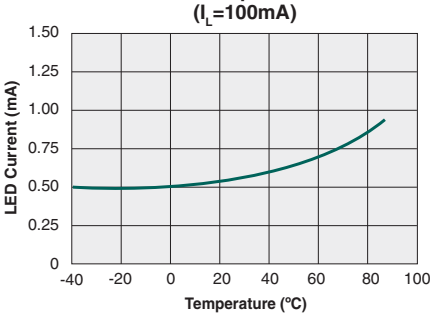
Typical Turn-Off vs. Temperature (I_F=3mA, I_L=100mA)



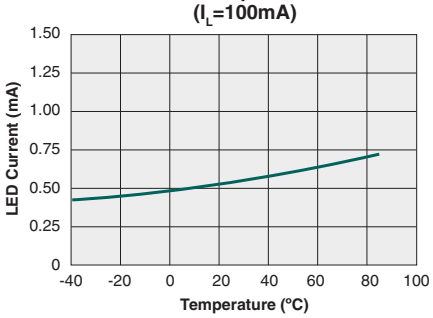
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

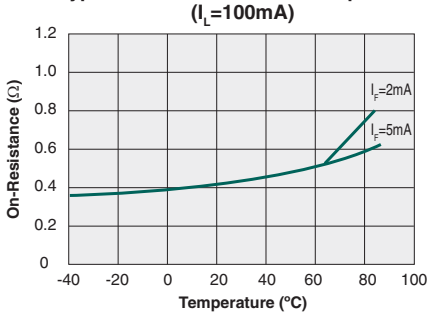
Typical I_F for Switch Operation vs. Temperature (I_L=100mA)



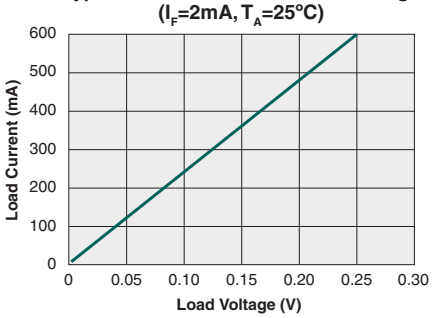
Typical I_F for Switch Dropout vs. Temperature (I_L=100mA)



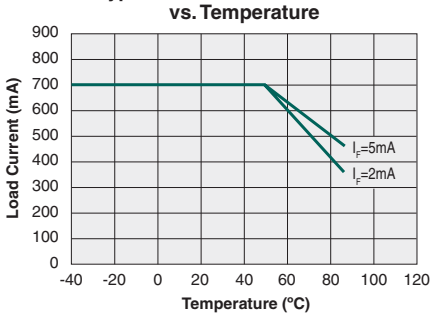
Typical On-Resistance vs. Temperature (I_L=100mA)



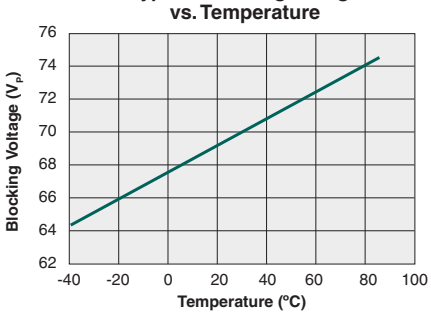
Typical Load Current vs. Load Voltage (I_F=2mA, T_A=25ºC)



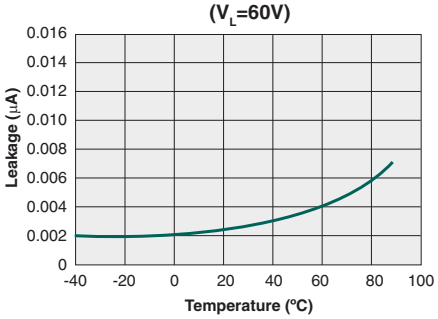
Typical Maximum Load Current vs. Temperature



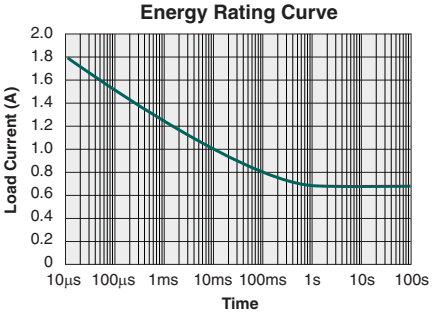
Typical Blocking Voltage vs. Temperature



Typical Leakage vs. Temperature Measured Across Pins 3&4 (V_L=60V)



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
CPC1002N	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.

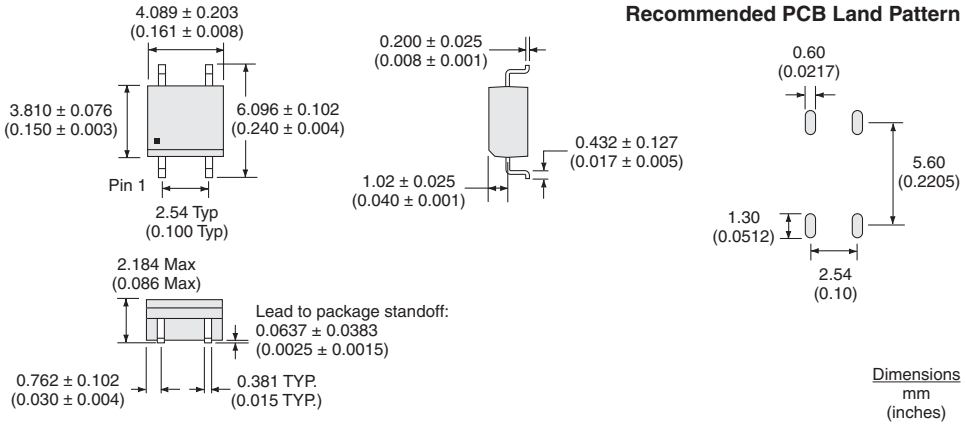
Device	Maximum Temperature x Time
CPC1002N	260°C for 30 seconds

Board Wash

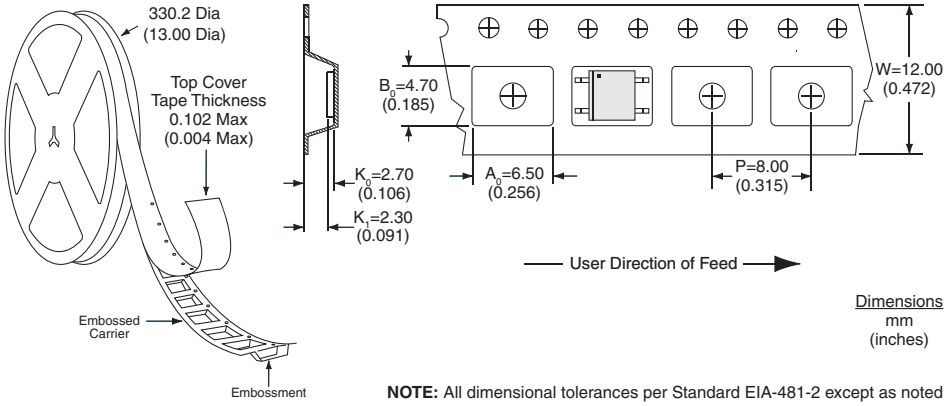
IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a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

CPC1002N



CPC1002NTR Tape & Reel



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

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