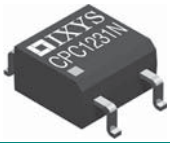
IXYS
INTEGRATED CIRCUITS DIVISION



CPC1231N
Single-Pole, Normally Closed 4-Pin SOP OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage	350	V_P
Load Current	120	mA_{rms} / mA_{DC}
On-Resistance (max)	30	Ω

Features
- 0.4mm Distance Through Insulation (Supplementary Isolation Requirement of EN60950)
- 1500V_{rms} Input/Output Isolation
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Small 4-Pin SOP Package
- Machine Insertable, Wave Solderable
- Tape & Reel Version Available

Applications
- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - Hook Switch
  - Dial Pulsing
  - Ground Start
  - Ringing Injection
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

Description
The CPC1231N is a miniature single-pole, normally closed (1-Form-B) 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 optically coupled outputs, which use patented OptoMOS architecture, are controlled by a highly efficient GaAlAs infrared LED.

The device is compliant with supplementary isolation in accordance with EN/IEC 60950-1.

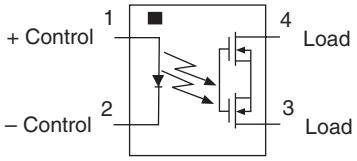
IXYS Integrated Circuits Division's state of the art double molded vertical construction packaging enables the CPC1231N to be one of the world's smallest 4-pin relays, which offers board space savings approaching 20% over the competitor's larger 4-pin SOP relay.

Approvals
- UL 1577 Approved Component: File E76270
- CSA Certified Component: Certificate 1172007
- EN 60950 Certified Component: TUV Certificate B 10 05 49410 006

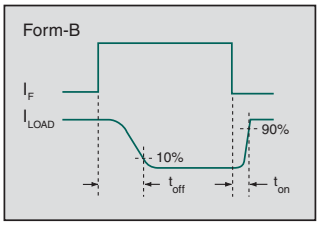
Ordering Information

Part #	Description
CPC1231N	4-Pin SOP (100/tube)
CPC1231NTR	4-Pin SOP (2000/reel)

Pin Configuration



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Blocking Voltage	350	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation	150	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 +85	°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.

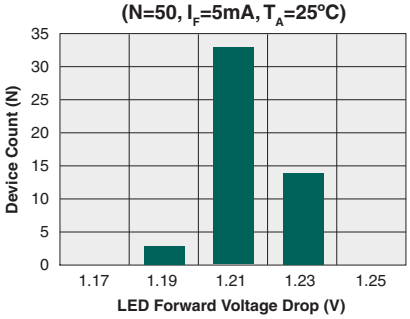
Electrical Characteristics @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
Continuous [1]	-	I_L	-	-	120	mA_{rms} / mA_{DC}
Peak	t =10ms	I_{LPK}	-	-	±350	mA_P
On-Resistance [2]	I_L=120mA	R_{ON}	-	25	30	Ω
Off-State Leakage Current	I_F=2mA, V_L=350V_P	I_{LEAK}	-	-	5	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	-	2	ms
Turn-Off		t_{off}	-	-	2	
Output Capacitance	V_L=50V, f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics						
Input Control Current to Activate [3]	I_L=120mA	I_F	-	0.6	2	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

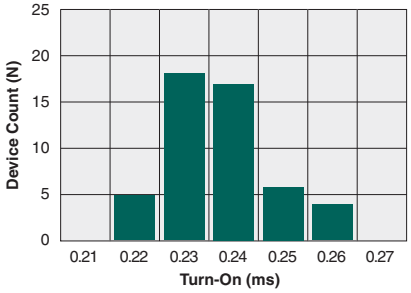
[1] Load current derates linearly from 120mA @ 25ºC to 80mA @ 85ºC.
[2] Measurement taken within 1 second of on-time.
[3] For applications requiring high temperature operation (greater than 60°C) a LED drive current of 5mA is recomended.

PERFORMANCE DATA*

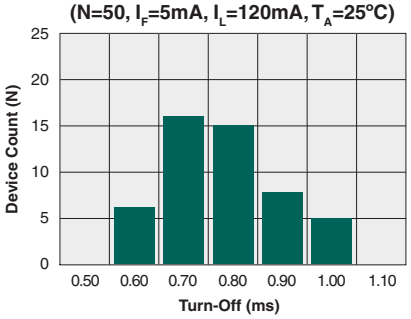
Typical LED Forward Voltage Drop
(N=50, I_F=5mA, T_A=25°C)



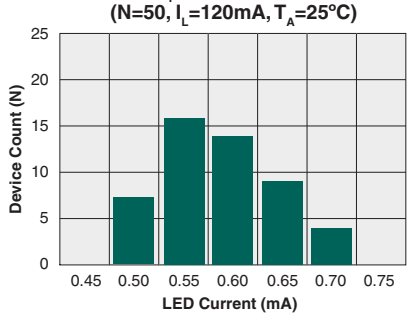
Typical Turn-On Time
(N=50, I_F=5mA, I_L=120mA, T_A=25°C)



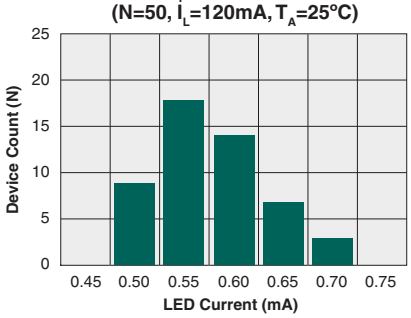
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=120mA, T_A=25°C)



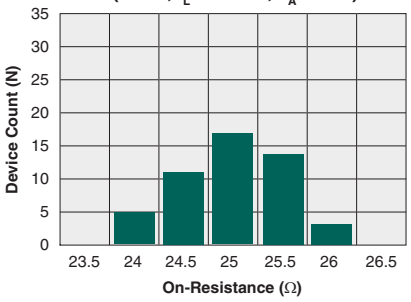
Typical I_F for Switch Operation
(N=50, I_L=120mA, T_A=25°C)



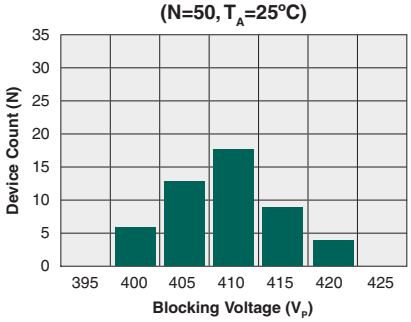
Typical I_F for Switch Dropout
(N=50, I_L=120mA, T_A=25°C)



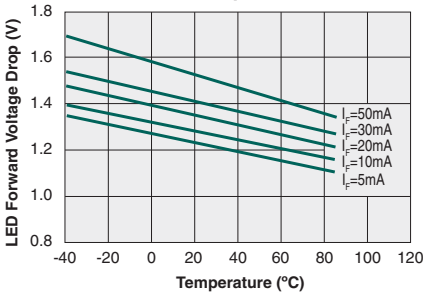
Typical On-Resistance Distribution
(N=50, I_L=120mA, T_A=25°C)



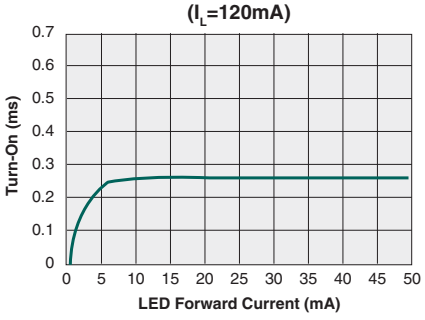
Typical Blocking Voltage Distribution
(N=50, T_A=25°C)



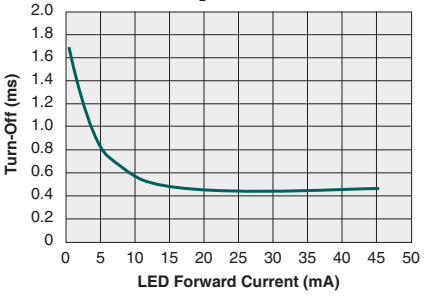
Typical LED Forward Voltage Drop
vs. Temperature



Typical Turn-On
vs. LED Forward Current
(I_L=120mA)



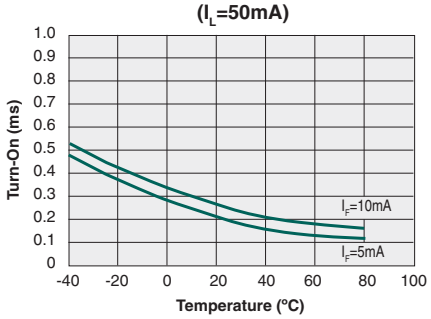
Typical Turn-Off
vs. LED Forward Current
(I_L=120mA)



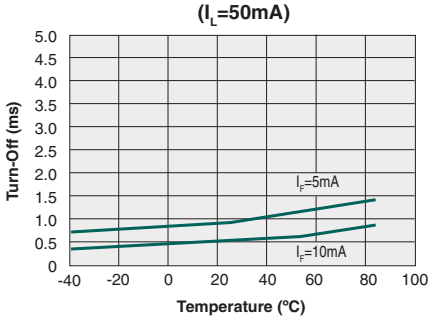
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

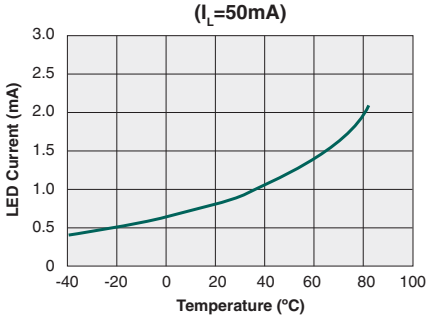
Typical Turn-On vs. Temperature (I_L=50mA)



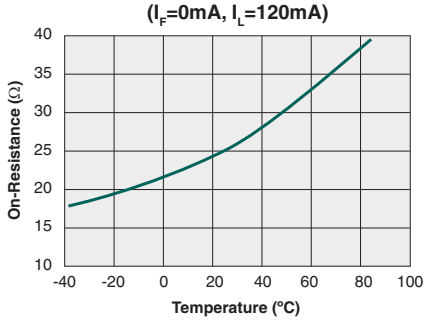
Typical Turn-Off vs. Temperature (I_L=50mA)



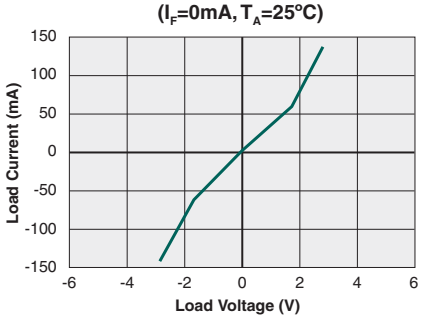
Typical I_F for Switch Operation vs. Temperature (I_L=50mA)



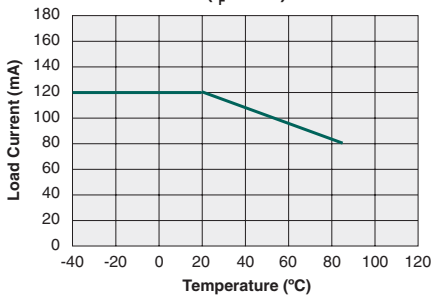
Typical On-Resistance vs. Temperature (I_F=0mA, I_L=120mA)



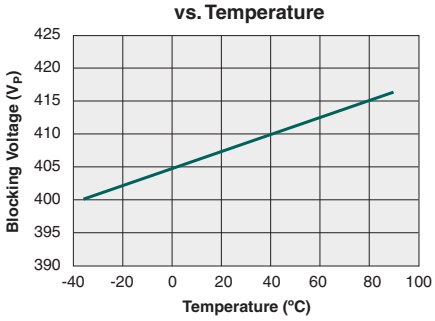
Typical Load Current vs. Load Voltage (I_F=0mA, T_A=25°C)



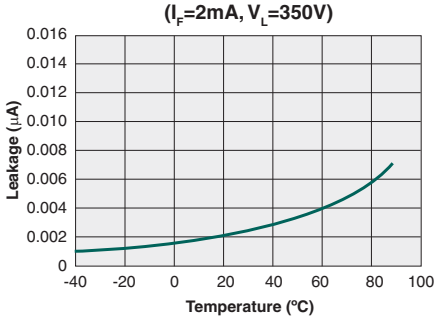
Maximum Load Current vs. Temperature (I_F=0mA)



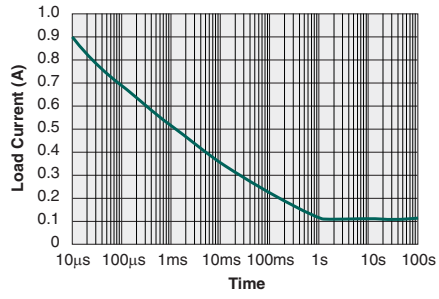
Typical Blocking Voltage vs. Temperature



Typical Leakage vs. Temperature Measured Across Pins 3&4 (I_F=2mA, V_L=350V)



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
CPC1231N	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.

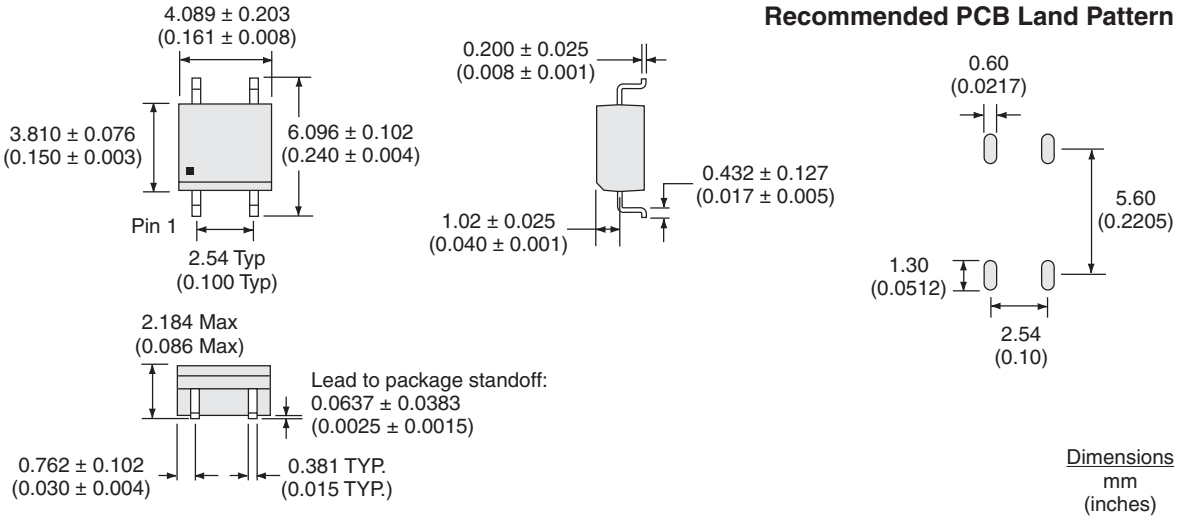
Device	Maximum Temperature x Time
CPC1231N	260°C for 30 seconds

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.

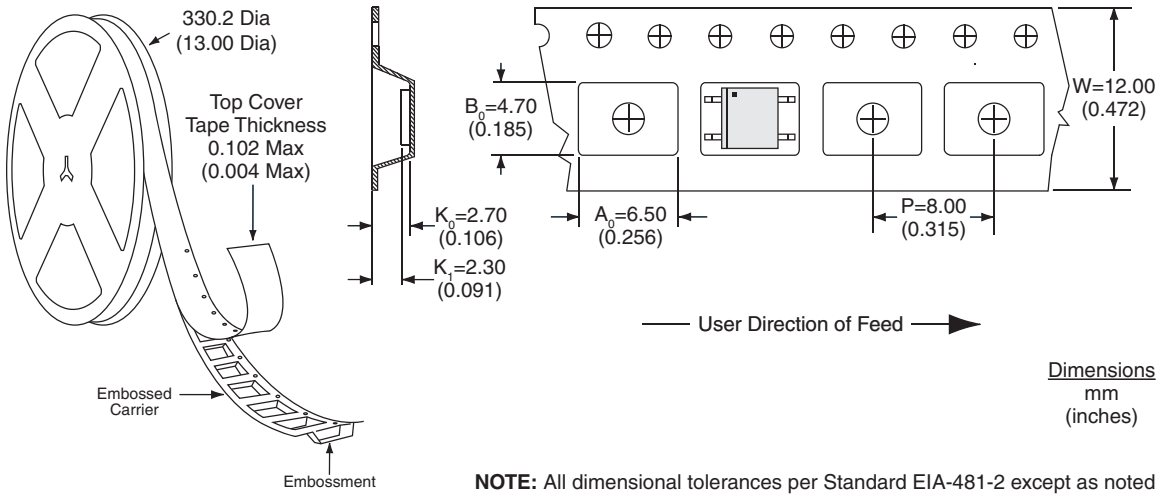
MECHANICAL DIMENSIONS

CPC1231N



Dimensions
mm
(inches)

CPC1231NTR Tape & Reel



Dimensions
mm
(inches)

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-CPC1231N-R07

12/16/2012