IXYS
INTEGRATED CIRCUITS DIVISION



CPC1150N
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)	50	Ω

Features
- 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 CPC1150N is a miniature single-pole, normally closed (1-Form-B) solid state relay that uses optically coupled MOSFET technology to provide 1500V_{rms} of input to output isolation.

Its optically coupled output, which uses the patented OptoMOS architecture, is controlled by a highly efficient GaAlAs infrared LED.

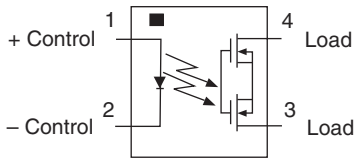
State of the art double-molded vertical construction packaging enables the CPC1150N to be one of the world's smallest 4-pin solid state relays. It offers board space savings over the competitor's larger 4-pin SOP relay.

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

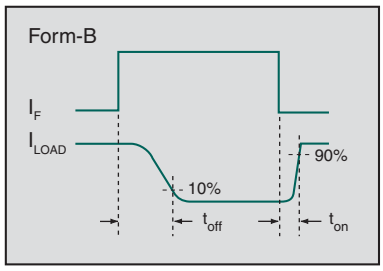
Ordering Information

Part #	Description
CPC1150N	4-Pin SOP (100/tube)
CPC1150NTR	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	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 / 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.

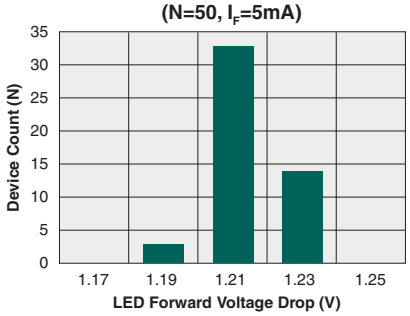
Electrical Characteristics @ 25ºC

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	I_L=120mA	R_{ON}	-	-	50	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}	-	-	1	ms
Turn-Off		t_{off}	-	-	2	
Output Capacitance	I_F=2mA, V_L=50V, f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics						
Input Control Current to Activate [2]	I_L=120mA	I_F	-	0.6	2	mA
Input Control Current to Deactivate	-	I_F	0.3	0.55	-	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

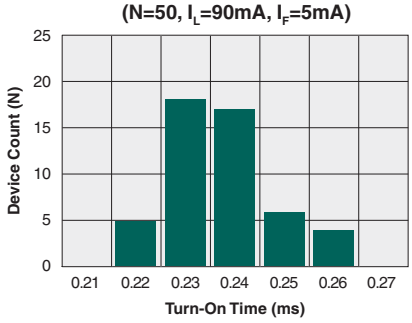
[1] Load current derates linearly from 120mA @ 25ºC to 85mA @ 85ºC.
[2] For applications requiring high temperature operation (greater than 60°C) a LED drive current of 4mA is recommended.

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

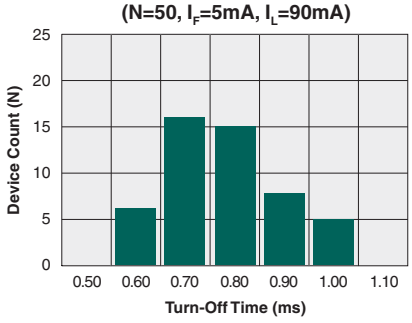
Typical LED Forward Voltage Drop
(N=50, I_F=5mA)



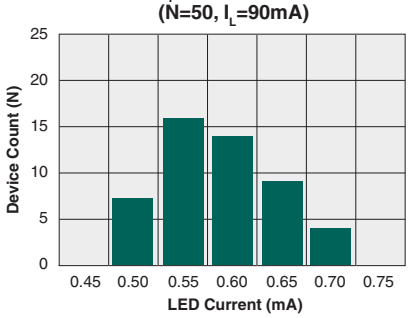
Typical Turn-On Time
(N=50, I_L=90mA, I_F=5mA)



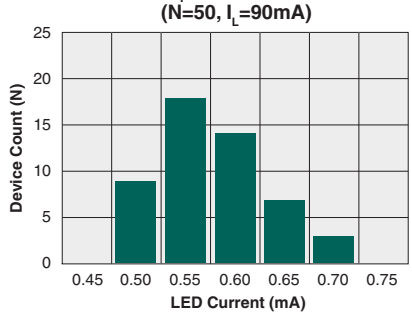
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=90mA)



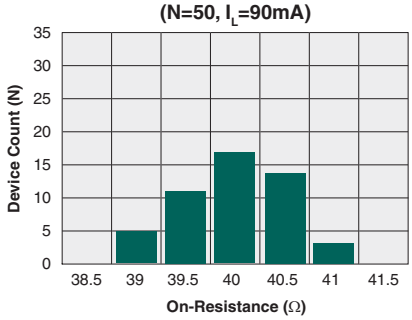
Typical I_F for Switch Operation
(N=50, I_L=90mA)



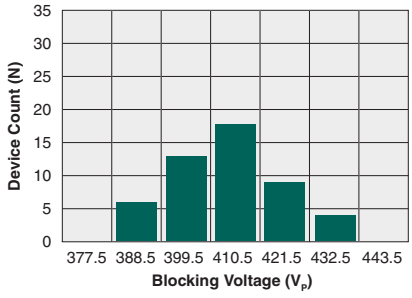
Typical I_F for Switch Dropout
(N=50, I_L=90mA)



Typical On-Resistance Distribution
(N=50, I_L=90mA)



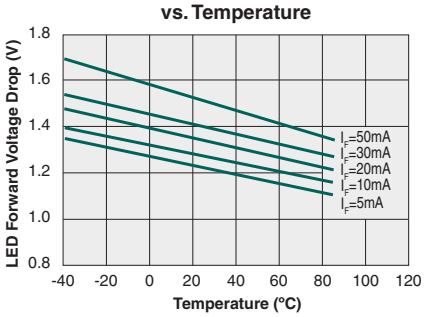
Typical Blocking Voltage Distribution
(N=50)



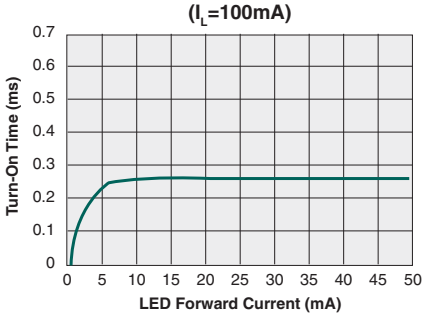
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

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

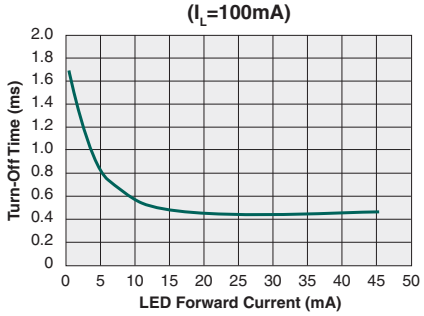
Typical LED Forward Voltage Drop vs. Temperature



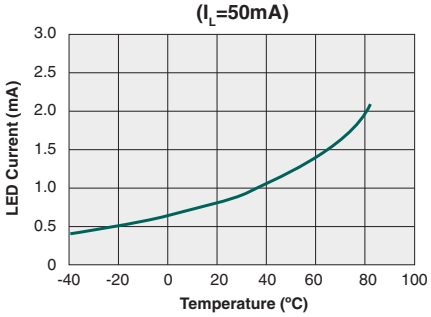
Typical Turn-On Time vs. LED Forward Current (I_L=100mA)



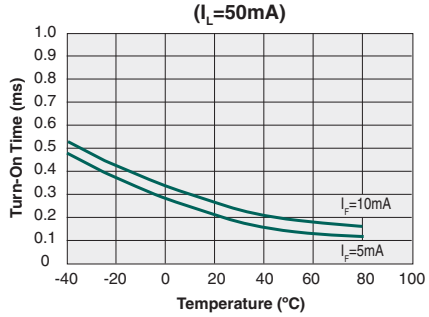
Typical Turn-Off Time vs. LED Forward Current (I_L=100mA)



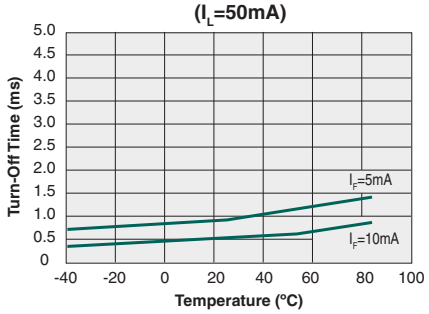
Typical I_F for Switch Operation vs. Temperature (I_L=50mA)



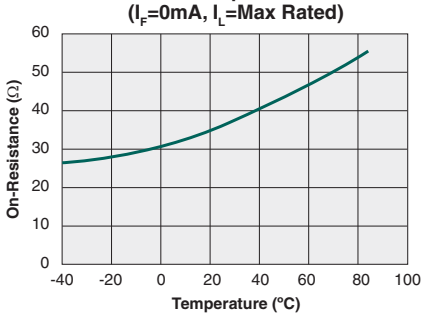
Typical Turn-On Time vs. Temperature (I_L=50mA)



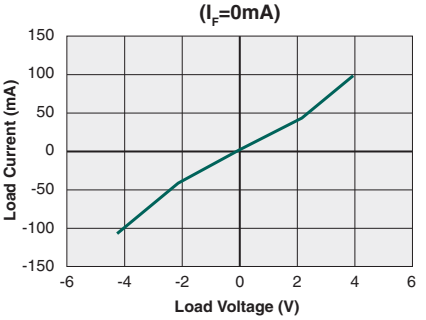
Typical Turn-Off Time vs. Temperature (I_L=50mA)



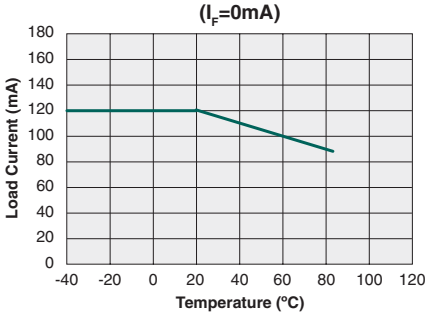
Typical On-Resistance vs. Temperature (I_F=0mA, I_L=Max Rated)



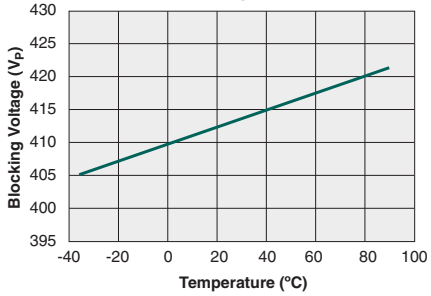
Typical Load Current vs. Load Voltage (I_F=0mA)



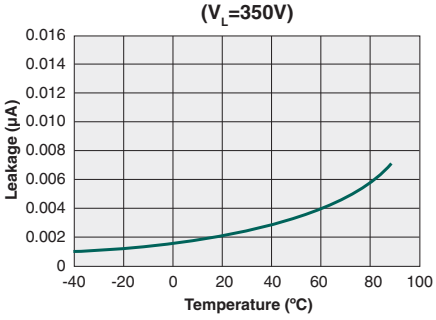
Maximum Load Current vs. Temperature (I_F=0mA)



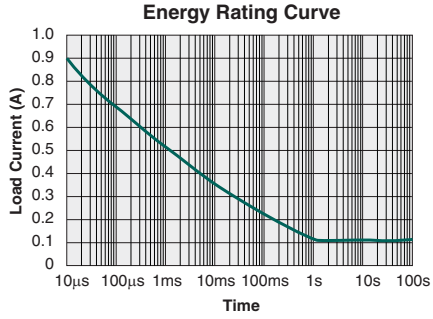
Typical Blocking Voltage vs. Temperature



Typical Leakage vs. Temperature Measured Across Pins 3&4 (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
CPC1150N	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.

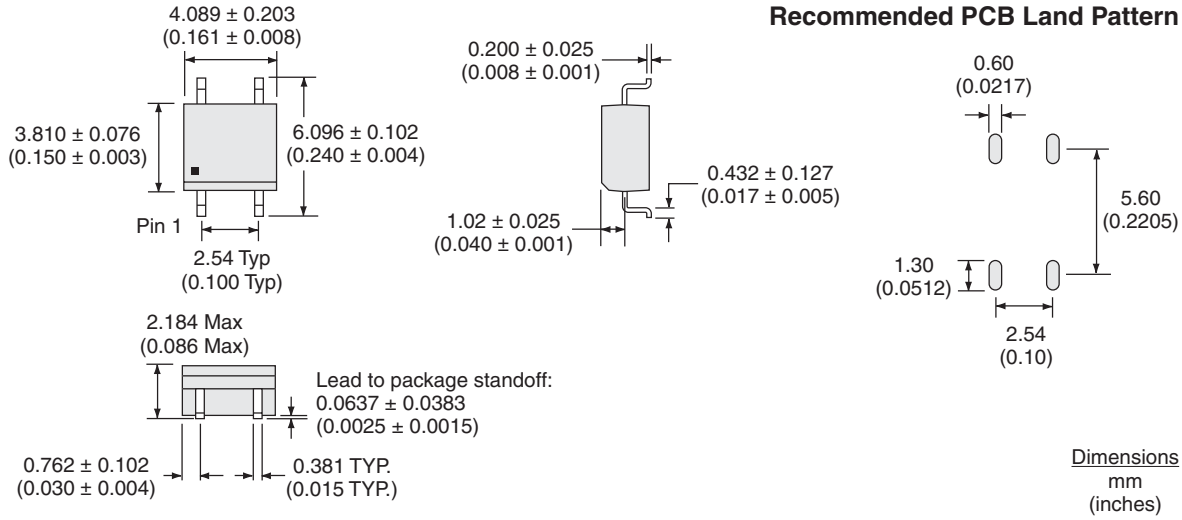
Device	Maximum Temperature x Time
CPC1150N	260°C for 30 seconds

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.

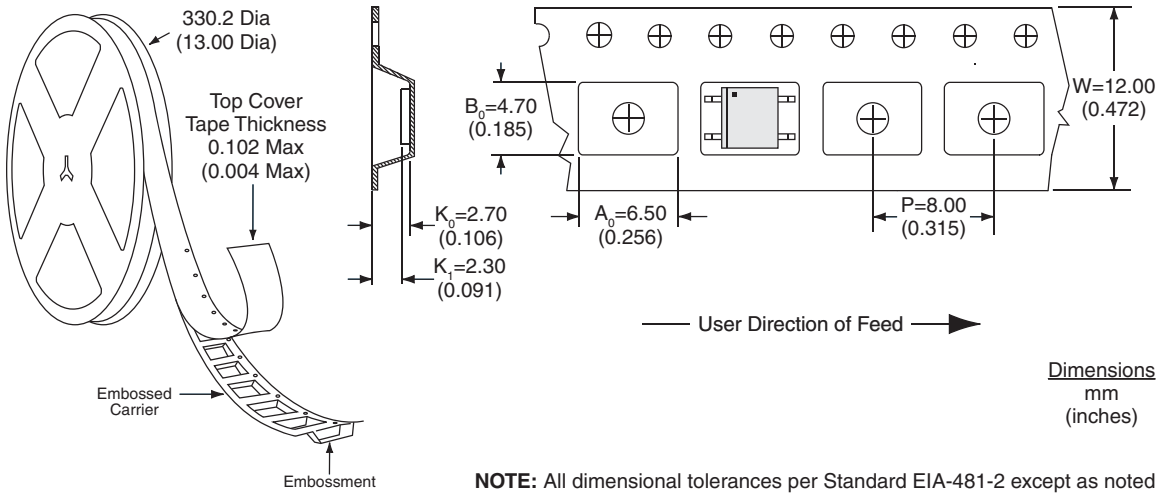
Mechanical Dimensions

CPC1150N



Dimensions
mm
(inches)

CPC1150NTR 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

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-CPC1150N-R09
©Copyright 2012, IXYS Integrated Circuits Division
OptoMOS® is a registered trademark of IXYS Integrated Circuits Division
All rights reserved. Printed in USA.
12/14/2012