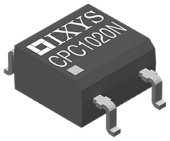
IXYS
INTEGRATED CIRCUITS DIVISION



CPC1020N
30V Normally-Open Single-Pole 4-Pin SOP OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage	30	V_P
Load Current	1.2	A_{DC}
On-Resistance (max)	0.25	Ω

Features
- 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
- Tape & Reel Version Available
- Flammability Rating UL 94 V-0

Applications
- 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 CPC1020N is a 30V, single-pole, normally-open (1-Form-A) Solid State Relay. The ultra-low on-resistance, 0.25Ω, of this relay allows for high-current operation.

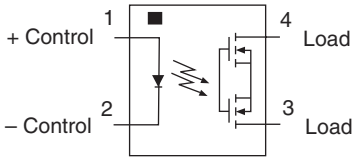
IXYS Integrated Circuits' patented OptoMOS architecture makes available the optically coupled technology necessary to activate the output's efficient MOSFET switches while providing 1500V_{rms} input to output isolation. Control of the isolated output is accomplished by means of the highly efficient infrared LED at the input.

Approvals
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- EN/IEC 60950-1 Certified Component: Certificate available on our website

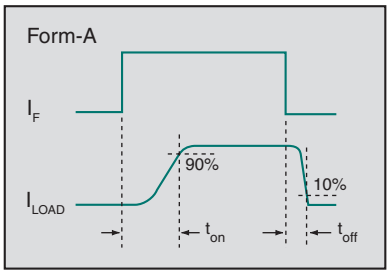
Ordering Information

Part #	Description
CPC1020N	4-Pin SOP (100/tube)
CPC1020NTR	4-Pin SOP (2000/reel)

Pin Configuration



Switching Characteristics of Normally-Open Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Blocking Voltage	30	V_P
Input Power Dissipation [1]	75	mW
Input Control Current	50	mA
Peak (10ms)	1	A
Reverse Input Voltage	5	V
Total Power Dissipation [2]	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 1.33 mW / ºC
[2] 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 @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
Continuous [1]	I_F=2mA	I_L	-	-	1.2	A_{DC}
Peak	t ≤ 10ms	I_{LPK}	-	-	3	A
On-Resistance [2]	I_L=1A	R_{ON}	-	0.116	0.25	Ω
Off-State Leakage Current	V_L=30V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	0.48	3	ms
Turn-Off		t_{off}	-	0.65	3	
Output Capacitance	I_F=0mA, V_L=25V, f=1MHz	C_{OUT}	-	33	-	pF
Input Characteristics						
Input Control Current to Activate	I_L=1A	I_F	-	0.13	2	mA
Input Control Current to Deactivate	-	I_F	0.1	-	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.5	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}	-	3	-	pF

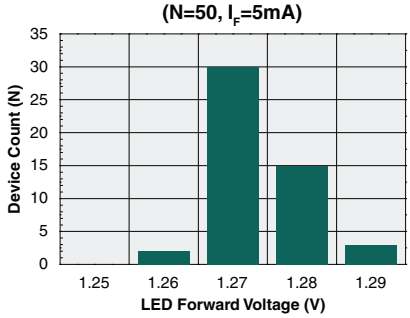
[1] Load current derates linearly from 1.2A @ 25ºC to 0.58A @85ºC.
[2] Measurement taken within 1 second of on-time.

ESD Rating

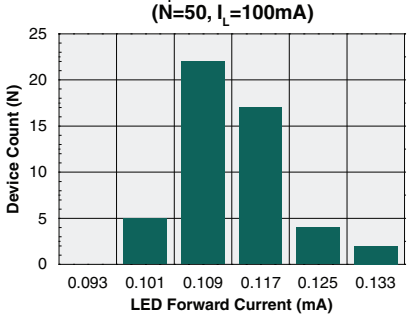
ESD Rating (Human Body Model)
1000 Volts

PERFORMANCE DATA*

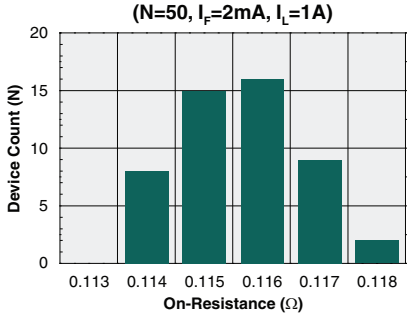
Typical LED Forward Voltage Drop (N=50, I_F=5mA)



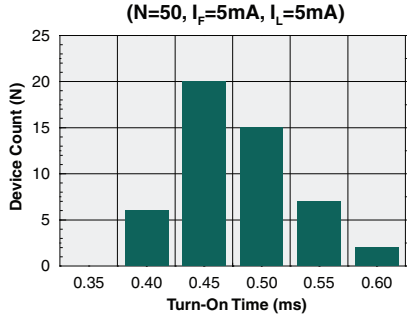
Typical I_F for Switch Operation (N=50, I_L=100mA)



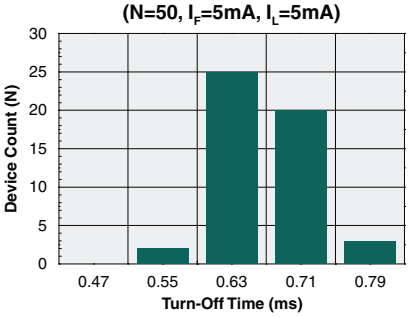
Typical On-Resistance Distribution (N=50, I_F=2mA, I_L=1A)



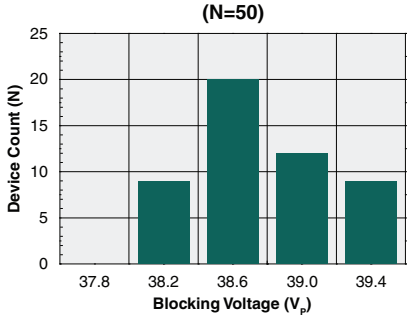
Typical Turn-On Time Distribution (N=50, I_F=5mA, I_L=5mA)



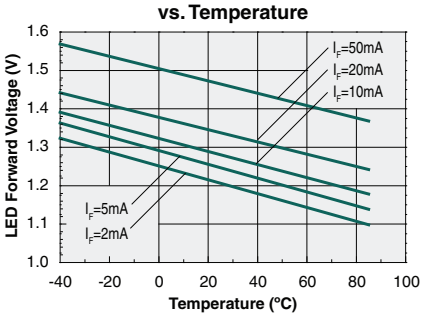
Typical Turn-Off Time Distribution (N=50, I_F=5mA, I_L=5mA)



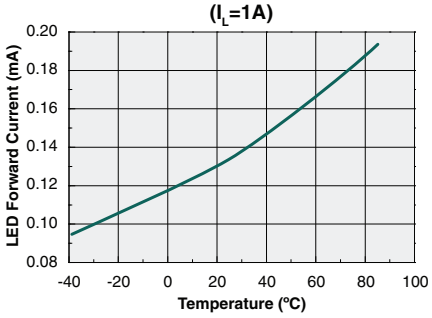
Typical Blocking Voltage Distribution (N=50)



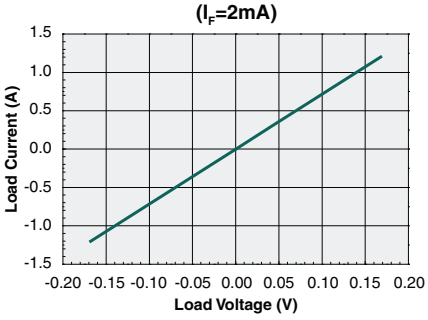
Typical LED Forward Voltage Drop vs. Temperature



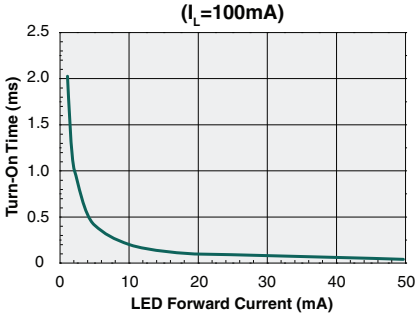
Typical I_F for Switch Operation vs. Temperature (I_L=1A)



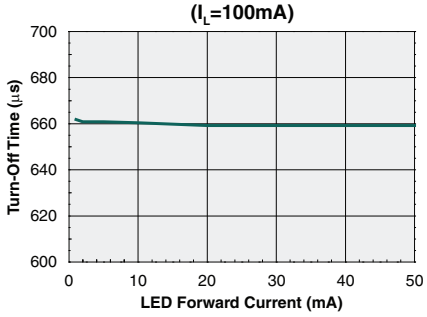
Typical Load Voltage vs. Load Current (I_F=2mA)



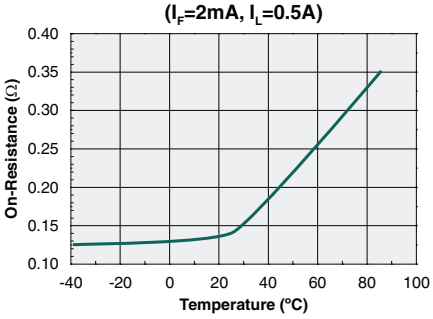
Typical Turn-On Time vs. LED Forward Current (I_L=100mA)



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



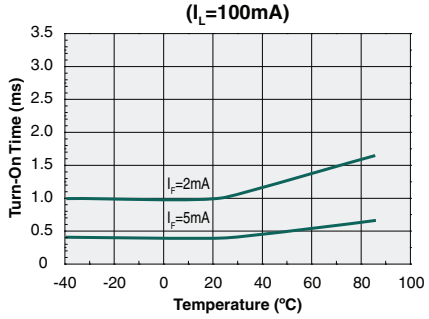
Typical On-Resistance vs. Temperature (I_F=2mA, I_L=0.5A)



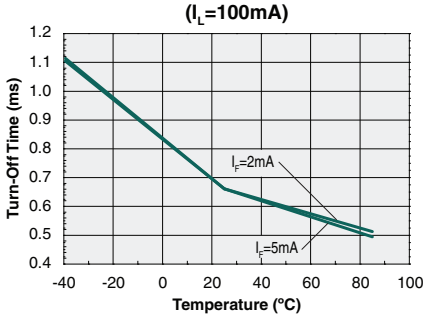
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

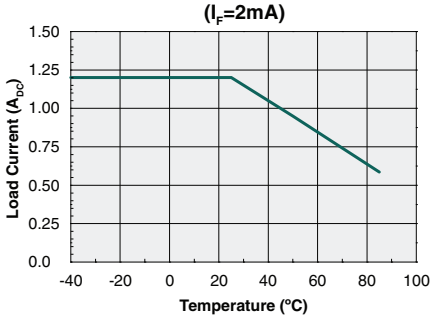
Typical Turn-On Time vs. Temperature (I_L=100mA)



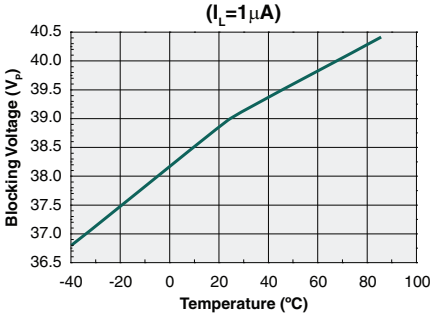
Typical Turn-Off Time vs. Temperature (I_L=100mA)



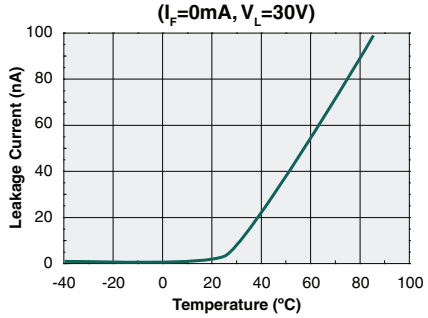
Maximum Load Current vs. Temperature (I_F=2mA)



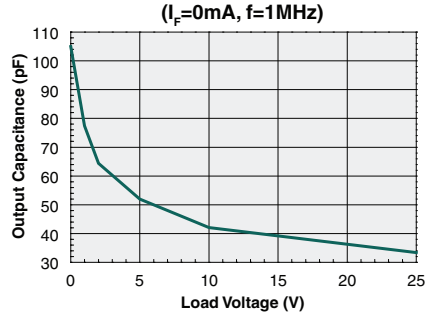
Typical Blocking Voltage vs. Temperature (I_L=1μA)



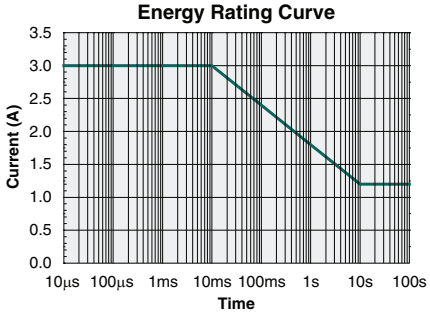
Typical Leakage Current vs. Temperature Measured Across Pins 3&4 (I_F=0mA, V_L=30V)



Output Capacitance vs. Load Voltage (I_F=0mA, f=1MHz)



Energy Rating Curve



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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 classifies 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) classification 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) Classification
CPC1020N	MSL 3

ESD Sensitivity

This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

Soldering Profile

Provided in the table below is the Classification Temperature (T_C) of this product and the maximum dwell time the body temperature of this device may be (T_C - 5)ºC or greater. The classification temperature sets the Maximum Body Temperature allowed for this device during lead-free reflow processes. For through-hole devices, and any other processes, the guidelines of **J-STD-020** must be observed.

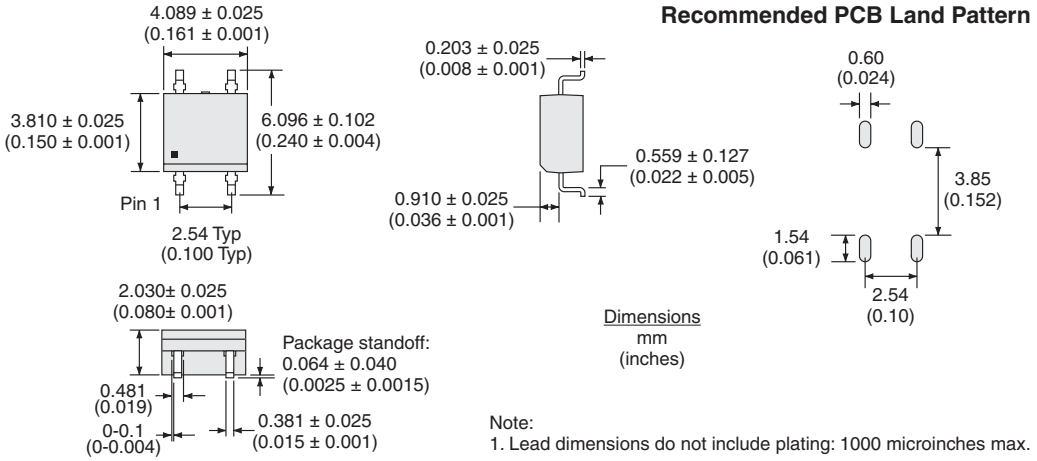
Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
CPC1020N	260ºC	30 seconds	3

Board Wash

IXYS Integrated Circuits recommends the use of no-clean flux formulations. Board washing to reduce or remove flux residue following the solder reflow process is acceptable provided proper precautions are taken to prevent damage to the device. These precautions include, but are not limited to: using a low pressure wash and providing a follow up bake cycle sufficient to remove any moisture trapped within the device due to the washing process. Due to the variability of the wash parameters used to clean the board, determination of the bake temperature and duration necessary to remove the moisture trapped within the package is the responsibility of the user (assembler). Cleaning or drying methods that employ ultrasonic energy may damage the device and should not be used. Additionally, the device must not be exposed to flux or solvents that are Chlorine- or Fluorine-based.

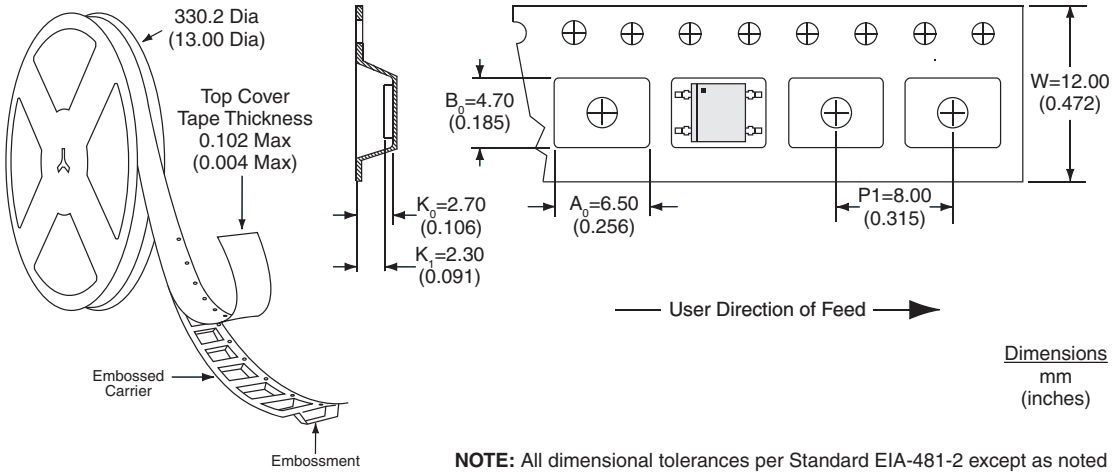
MECHANICAL DIMENSIONS

CPC1020N



Note:
1. Lead dimensions do not include plating: 1000 microinches max.

CPC1020NTR 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-CPC1020N-R05

6/1/2018