



CPC1019N

Single-Pole, Normally Open 4-Lead SOP OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage	60	V _P
Load Current	750	mA
Load Current, Peak AC	1	A
Max On-resistance	0.6	Ω
LED Current to operate	2	mA

Features

- Low On-Resistance: 0.6Ω
- Low Drive Current: 2mA
- High Load Current: 750mA
- 1500V_{rms} Input/Output Isolation
- 100% Solid State
- Compact 4-Lead SOP Package
- TTL/CMOS Compatible input
- Arc-Free With No Snubbing Circuits
- 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
 - Utility Meters (gas, oil, electric and water)
- Medical Equipment—Patient/Equipment Isolation
- Aerospace
- Industrial Controls
- ATE

Description

CPC1019N is a miniature, low-voltage, low on-resistance, single-pole, normally open (1-Form-A) solid state relay in a small 4-lead SOP package.

Embodying Clare's patented OptoMOS technology, the CPC1019N comprises a highly efficient GaAlAs infrared LED that is optically coupled to efficient MOSFET output switches to provide 1500V_{rms} of input-to-output isolation.

Clare's state of the art double-molded vertical construction packaging produces a very compact solid state relay that is ideal for replacing larger, less-reliable reed and electromechanical relays.

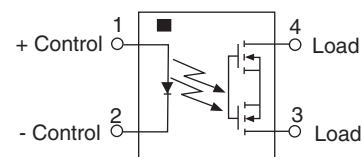
Approvals

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

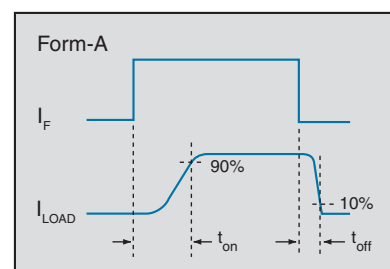
Ordering Information

Part #	Description
CPC1019N	4-Lead SOP (100/tube)
CPC1019NTR	4-Lead SOP (2000/reel)

Pin Configuration



Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25°C

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 @ 25°C

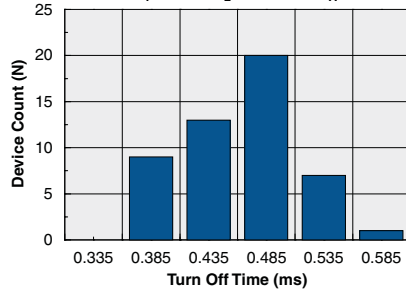
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current	I _F =2mA	I _L	-	-	750	mA _{DC}
Continuous			-	-	1	A
Continuous, AC Peak		I _{LPK}	-	-	3	A
Peak	t ≤ 10ms	I _{LPK}	-	-	3	A
On-Resistance ¹	I _L =750mA	R _{ON}	-	0.35	0.6	Ω
Off-State Leakage Current	V _L =60V _P	I _{LEAK}	-	-	1	μA
Switching Speeds	I _F =5mA, V _L =10V	t _{on}	-	0.4	3	ms
Turn-On			-	0.4	3	ms
Turn-Off		t _{off}	-	0.4	3	ms
Output Capacitance	V _L =50V, f=1MHz	C _{OUT}	-	60	-	pF
Input Characteristics						
Input Control Current ²	I _L =750mA	I _F	-	0.15	2	mA
Input Dropout Current	-	I _F	0.1	0.14	-	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 _{IO}	-	1	-	pF

¹ Measurement taken within 1 second of on-time.

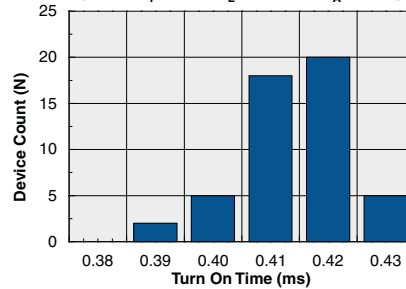
² For applications requiring high temperature operation (greater than 60°C) a LED drive current of 4mA is recommended.

PERFORMANCE DATA*

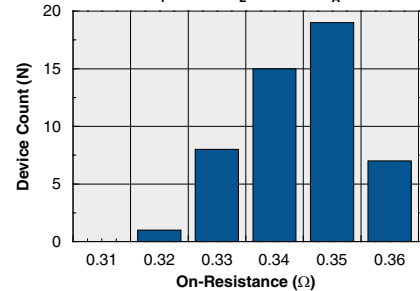
Typical Turn-On Time Distribution
(N=50, $I_F=5\text{mA}$, $I_L=100\text{mA}$, $T_A=25^\circ\text{C}$)



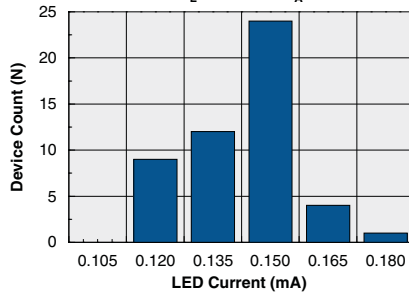
Typical Turn-Off Time Distribution
(N=50, $I_F=5\text{mA}$, $I_L=100\text{mA}$, $T_A=25^\circ\text{C}$)



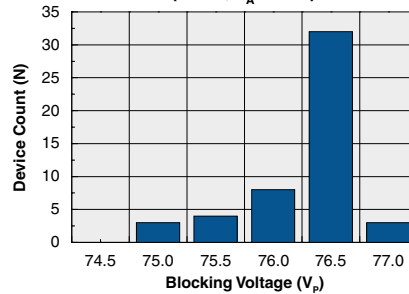
Typical On-Resistance Distribution
(N=50, $I_F=2\text{mA}$, $I_L=0.75\text{A}$, $T_A=25^\circ\text{C}$)



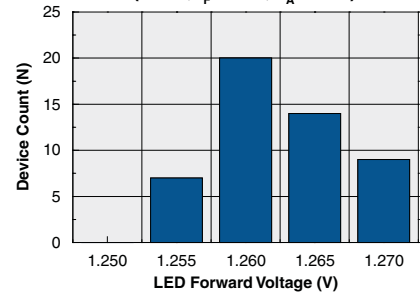
Typical I_F for Switch Operation
(N=50, $I_L=100\text{mA}$, $T_A=25^\circ\text{C}$)



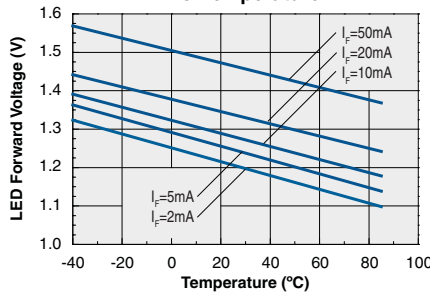
Typical Blocking Voltage Distribution
(N=50, $T_A=25^\circ\text{C}$)



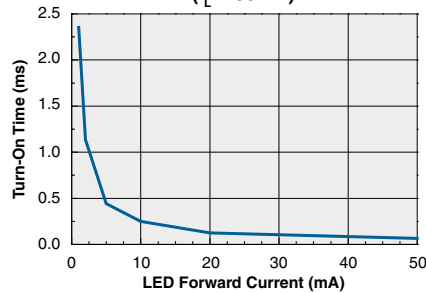
LED Forward Voltage Distribution
(N=50, $I_F=5\text{mA}$, $T_A=25^\circ\text{C}$)



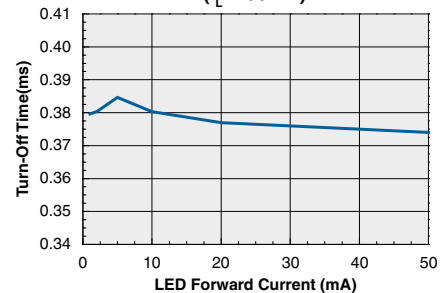
Typical LED Forward Voltage Drop vs. Temperature



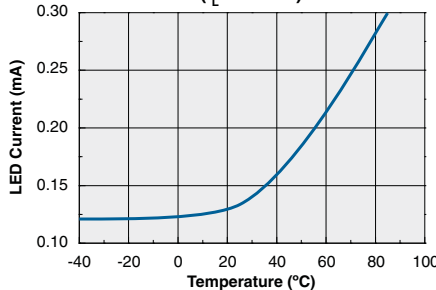
Typical Turn-On Time vs. LED Forward Current
($I_L=100\text{mA}$)



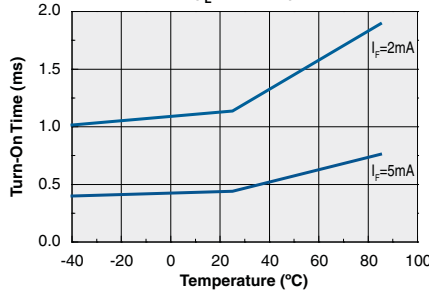
Typical Turn-Off Time vs. LED Forward Current
($I_L=100\text{mA}$)



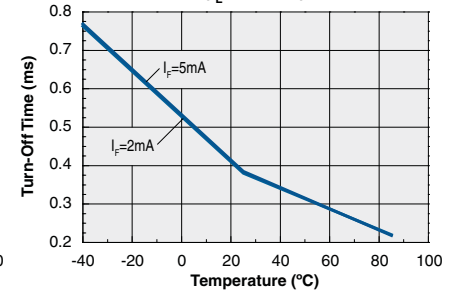
Typical LED Current to Operate vs. Temperature
($I_L=500\text{mA}$)



Typical Turn-On Time vs. Temperature
($I_L=100\text{mA}$)



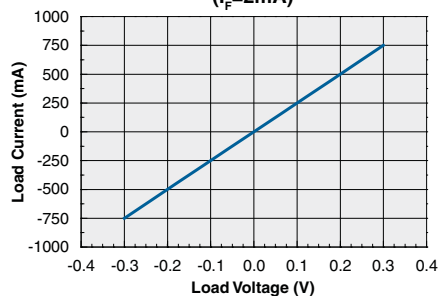
Typical Turn-Off Time vs. Temperature
($I_L=100\text{mA}$)



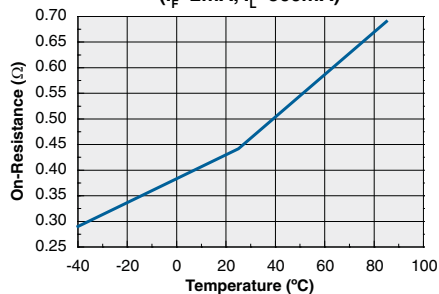
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

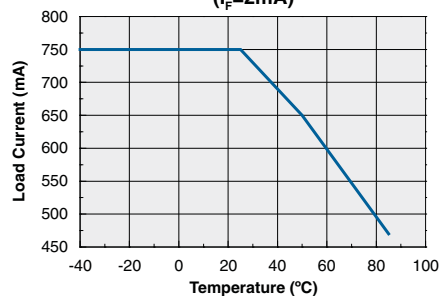
**Typical Load Current
vs. Load Voltage**
($I_F=2\text{mA}$)



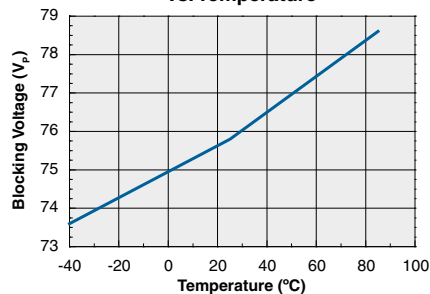
Typical On-Resistance vs. Temperature
($I_F=2\text{mA}$, $I_L=500\text{mA}$)



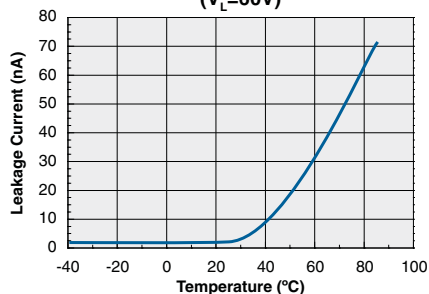
**Maximum Load Current
vs. Temperature**
($I_F=2\text{mA}$)



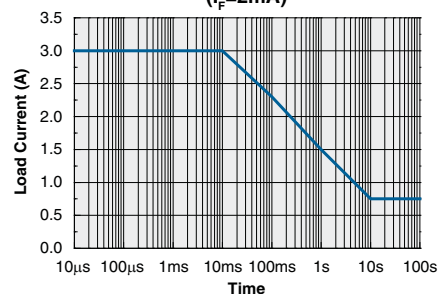
**Typical Blocking Voltage
vs. Temperature**



**Typical Leakage Current
vs. Temperature**
($V_L=60\text{V}$)



Energy Rating Curve
($I_F=2\text{mA}$)



*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 ingress. Clare 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
CPC1019N	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
CPC1019N	260°C for 30 seconds

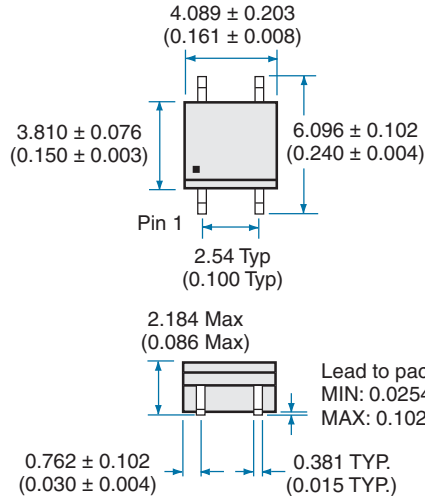
Board Wash

Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare 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.

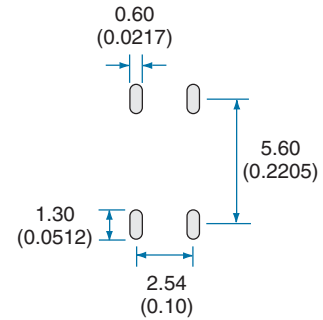


MECHANICAL DIMENSIONS

CPC1019N

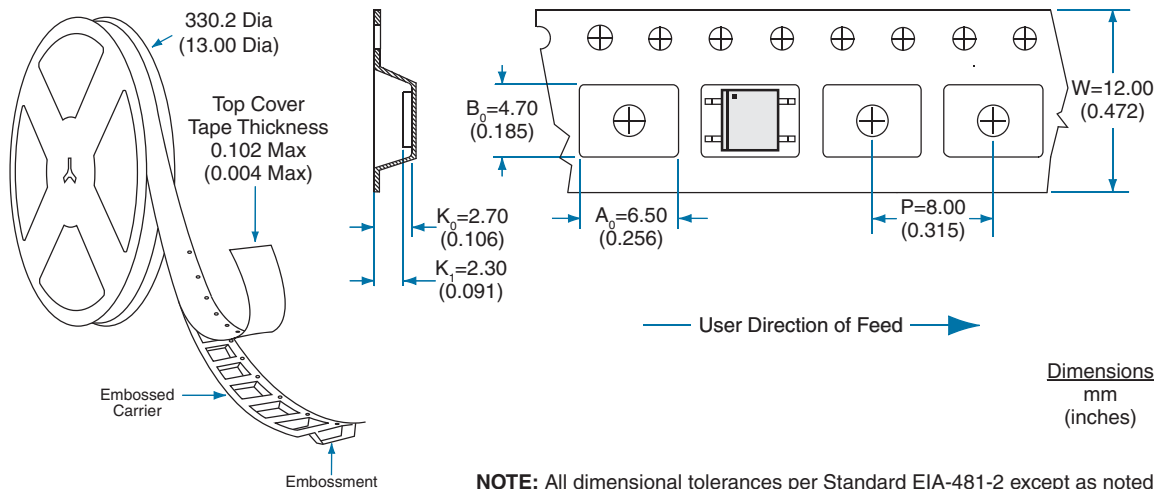


Recommended PCB Land Pattern



Dimensions
mm
(inches)

CPC1019N Tape & Reel



Dimensions
mm
(inches)

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

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