



Parameter	Ratings	Units
Load Voltage	100	V <sub>P</sub>
Load Current	150	mA
Max On-Resistance	8	Ω
Output Leakage, Off-State	20	nA

#### Features

- Extremely Low Output Leakage
- 1500V<sub>rms</sub> Input/Output Isolation
- Small 4-Pin SOP Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Tape & Reel Version Available

#### Applications

- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
  - Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security Systems
- Aerospace
- Industrial Controls

#### Description

CPC1009N is a miniature low voltage, low on-resistance, low off-state leakage, 1-Form-A solid state relay in a 4-Pin SOP package.

The MOSFET switches and photovoltaic die use Clare's patented OptoMOS® architecture to provide 1500 V<sub>rms</sub> of input-to-output isolation. The optically coupled output is controlled by a highly efficient GaAIAs infrared LED.

The CPC1009N uses Clare's state of the art double-molded vertical construction to produce one of the world's smallest 4-pin relays, which offers board space savings of 20% over the competitor's larger 4-pin SOP relay.

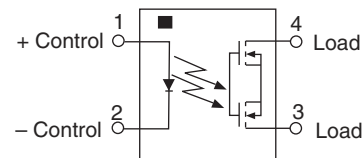
#### Approvals

- UL Recognized Component: File # E76270
- EN/IEC 60950 Compliant

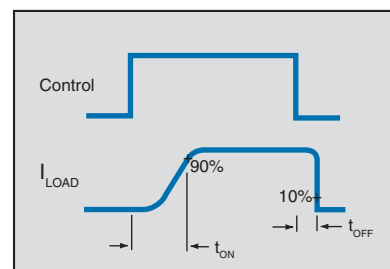
#### Ordering Information

Part #	Description
CPC1009N	4-Pin SOP (100/tube)
CPC1009NTR	4-Pin SOP (2000/reel)

#### Pin Configuration



#### Switching Characteristics of Normally Open (Form A) Devices



### Absolute Maximum Ratings (@ 25°C)

Parameter	Ratings	Units
Blocking Voltage	100	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation	70	mW
Total Power Dissipation <sup>1</sup>	400	mW
Isolation voltage Input to Output	1500	V <sub>rms</sub>
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

<sup>1</sup> 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

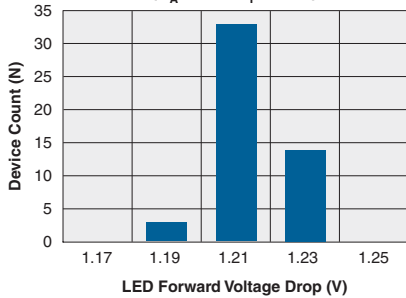
Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics @ 25°C (Unless otherwise noted)</b>						
Load Current						
Continuous <sup>1</sup>	-	I <sub>L</sub>	-	-	150	mA
Peak	t = 10ms	I <sub>LPK</sub>	-	-	350	
On-Resistance <sup>2</sup>	I <sub>L</sub> =150mA	R <sub>ON</sub>	-	5	8	Ω
Off-State Leakage Current	V <sub>L</sub> =100V <sub>P</sub> , T=115°C	I <sub>LEAK</sub>	-	-	20	nA
Switching Speeds						
Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	t <sub>ON</sub>	-	-	2	ms
Turn-Off	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	t <sub>OFF</sub>	-	-	0.5	
Output Capacitance	50V, f=1MHz	C <sub>OUT</sub>	-	25	-	pF
<b>Input Characteristics @ 25°C</b>						
Input Control Current	I <sub>L</sub> =150mA	I <sub>F</sub>	-	0.87	2	mA
Input Dropout Current	-	I <sub>F</sub>	0.3	0.86	-	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.2	1.4	V
Reverse Input Current	V <sub>R</sub> =5V	I <sub>R</sub>	-	-	10	μA
<b>Input/Output Characteristics @ 25°C</b>						
Capacitance Input to Output	-	-	-	1	-	pF

<sup>1</sup> Load current derates linearly from 150mA @ 25°C to 120mA @ 85°C.

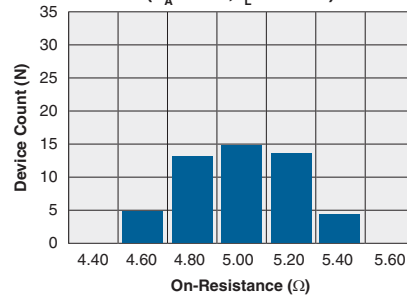
<sup>2</sup> Measurement taken within 1 second of on time.

**PERFORMANCE DATA\***

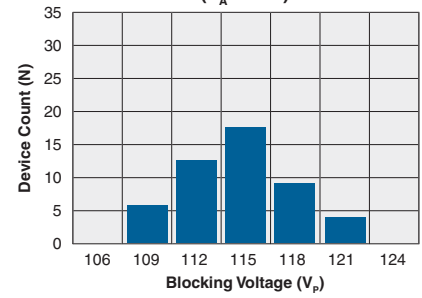
**Typical LED Forward Voltage Drop**  
( $T_A=25^\circ\text{C}$ ,  $I_F=5\text{mA}$ )



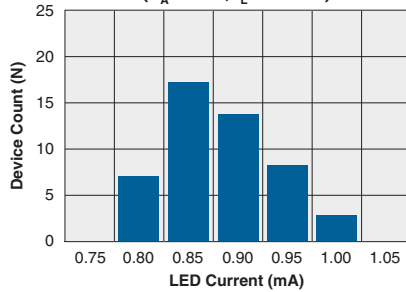
**Typical On-Resistance Distribution**  
( $T_A=25^\circ\text{C}$ ,  $I_L=150\text{mA}$ )



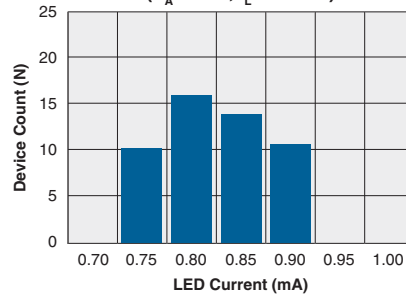
**Typical Blocking Voltage Distribution**  
( $T_A=25^\circ\text{C}$ )



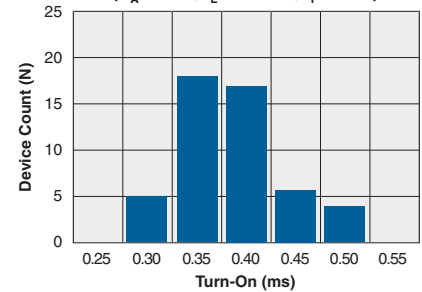
**Typical  $I_F$  for Switch Operation**  
( $T_A=25^\circ\text{C}$ ,  $I_L=100\text{mA}$ )



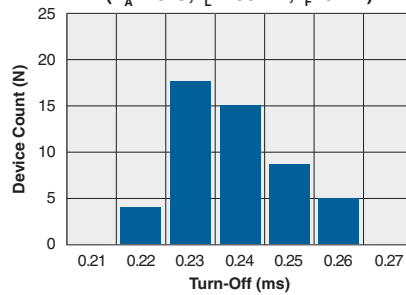
**Typical  $I_F$  for Switch Dropout**  
( $T_A=25^\circ\text{C}$ ,  $I_L=100\text{mA}$ )



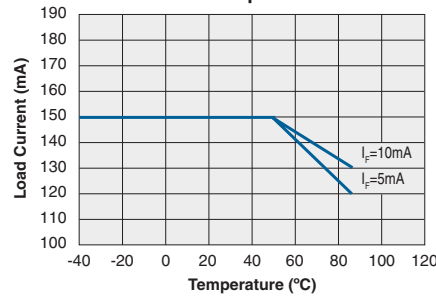
**Typical Turn-On Time**  
( $T_A=25^\circ\text{C}$ ,  $I_L=150\text{mA}$ ,  $I_F=5\text{mA}$ )



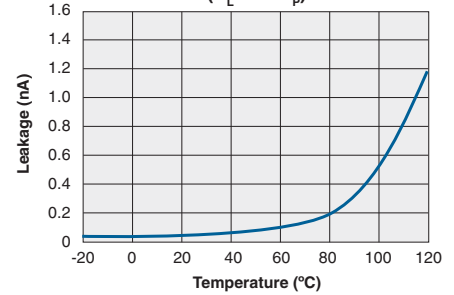
**Typical Turn-Off Time**  
( $T_A=25^\circ\text{C}$ ,  $I_L=150\text{mA}$ ,  $I_F=5\text{mA}$ )



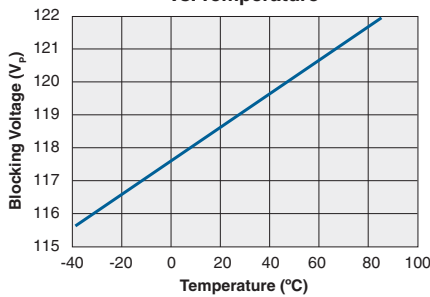
**Typical Maximum Load Current vs. Temperature**



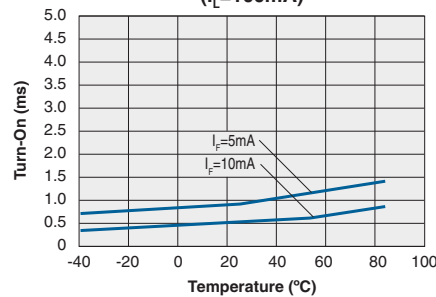
**Typical Leakage vs. Temperature Measured Across Pins 3&4**  
( $V_L=100V_p$ )



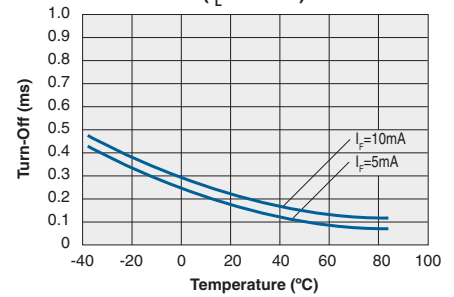
**Typical Blocking Voltage vs. Temperature**



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

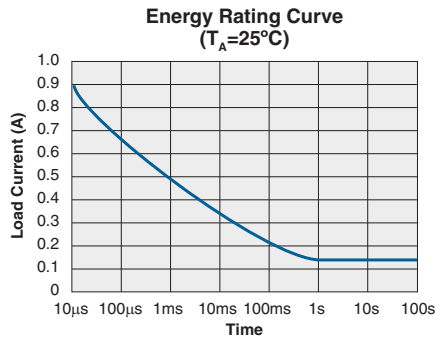
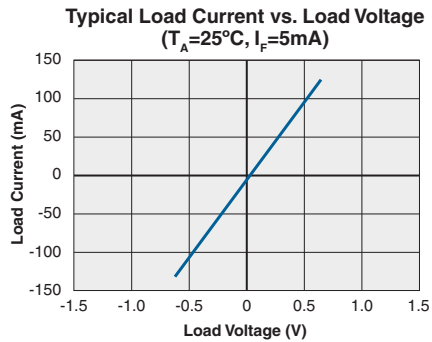
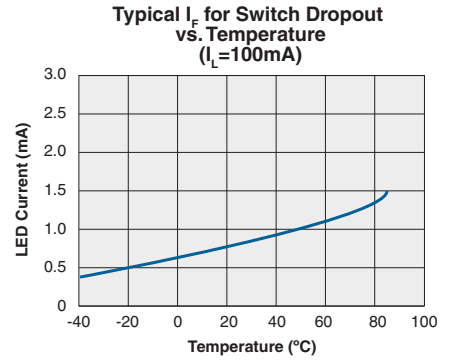
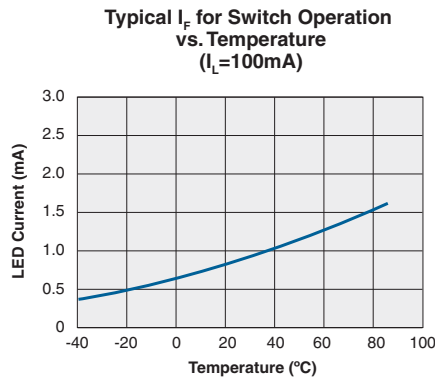
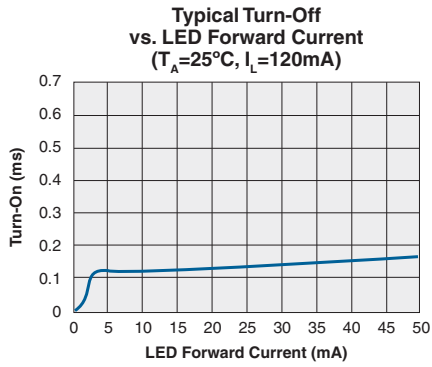
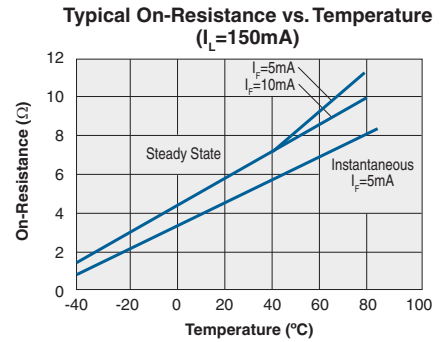
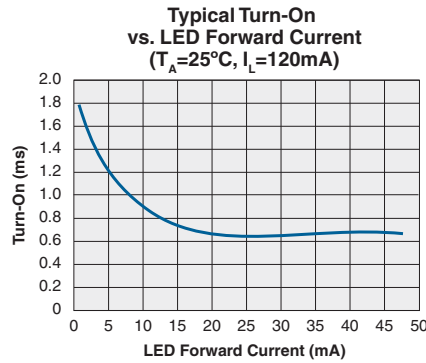
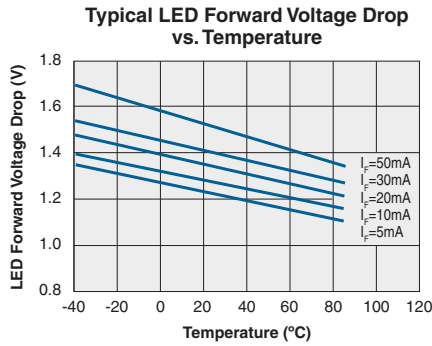


**Typical Turn-Off vs. Temperature**  
( $I_L=100\text{mA}$ )



\*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\*



\*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**

Clare has characterized the moisture reflow sensitivity of this package, and has determined that this component must be handled in accordance with IPC/JEDEC standard J-STD-033 moisture sensitivity level (MSL), level 3 classification.



**Soldering Reflow Profile**

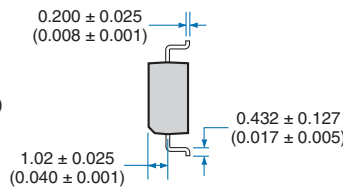
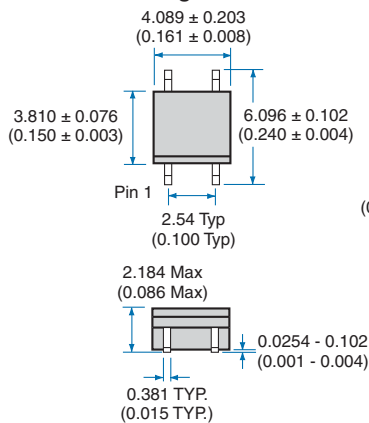
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

**Washing**

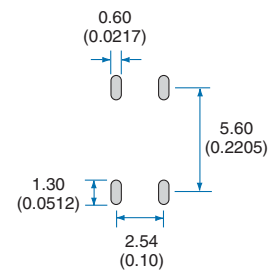
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

**MECHANICAL DIMENSIONS**

**4-Pin SOP Package**

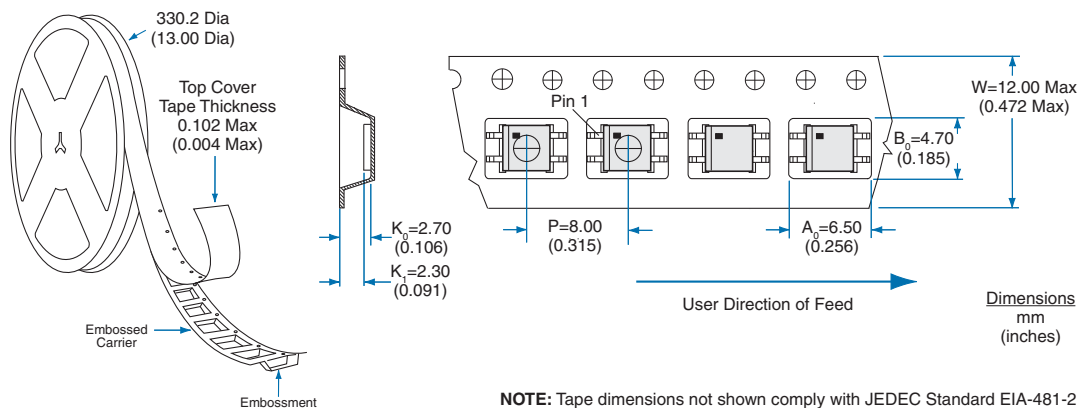


**Recommended PCB Land Pattern**



Dimensions  
mm  
(inches)

**Tape and Reel Packaging for 4-Pin SOP Package**



**NOTE:** Tape dimensions not shown comply with JEDEC Standard EIA-481-2

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