CPC1009N
4-Pin SOP OptoMOS® Relay

Parameter	Ratings	Units
Load Voltage	100	V_P
Load Current	150	mA
Max On-Resistance	8	Ω
Output Leakage, Off-State	20	nA

Features
- Extremely Low Output Leakage
- 1500V_{rms} 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_{rms} of input-to-output isolation. The optically coupled output is controlled by a highly efficient GaAlAs infrared LED.

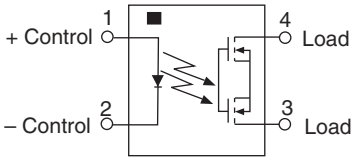
The CPC1009N uses Clare's state of the art double-molded vertical construction to produce one of the world's smallest 4-pin relays, which offers board space savings of 20% over the competitor's larger 4-pin SOP relay.

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

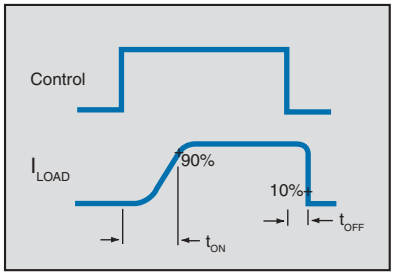
Ordering Information

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_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation	70	mW
Total PowerDissipation [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.

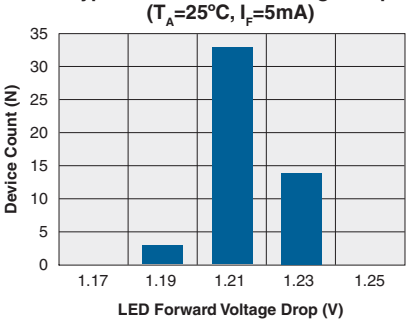
Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C (Unless otherwise noted)						
Load Current						
Continuous [1]	-	I_L	-	-	150	mA
Peak	t = 10ms	I_{LPK}	-	-	350	
On-Resistance [2]	I_L=150mA	R_{ON}	-	5	8	Ω
Off-State Leakage Current	V_L=100V_P, T=115ºC	I_{LEAK}	-	-	20	nA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{ON}	-	-	2	ms
Turn-Off	I_F=5mA, V_L=10V	t_{OFF}	-	-	0.5	
Output Capacitance	50V, f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics @ 25°C						
Input Control Current	I_L=150mA	I_F	-	0.87	2	mA
Input Dropout Current	-	I_F	0.3	0.86	-	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
Input/Output Characteristics @ 25°C						
Capacitance Input to Output	-	-	-	1	-	pF

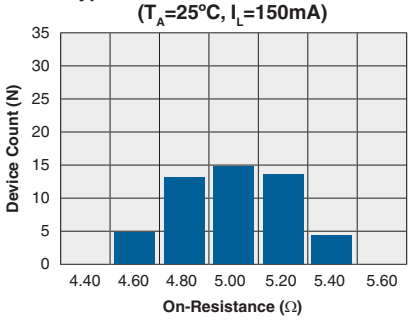
[1] Load current derates linearly from 150mA @ 25ºC to120mA @85ºC.
[2] Measurement taken within 1 second of on time.

PERFORMANCE DATA*

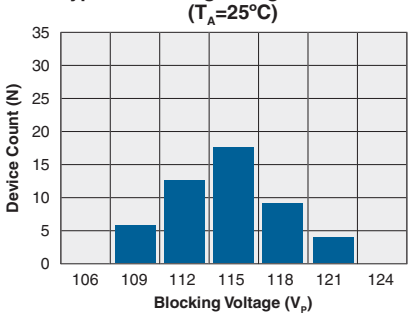
Typical LED Forward Voltage Drop (T_A=25°C, I_F=5mA)



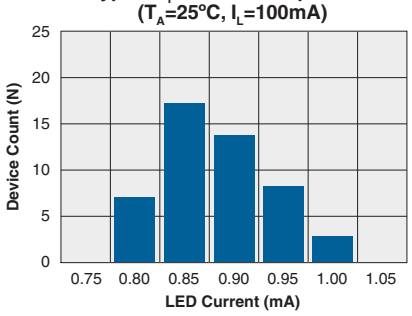
Typical On-Resistance Distribution (T_A=25°C, I_L=150mA)



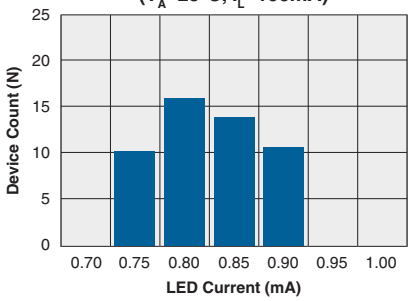
Typical Blocking Voltage Distribution (T_A=25°C)



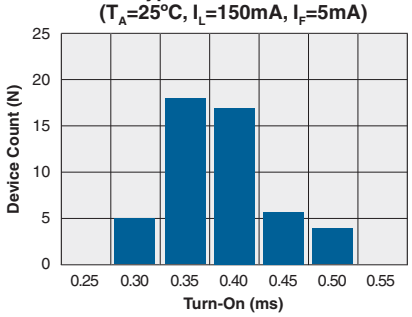
Typical I_F for Switch Operation (T_A=25°C, I_L=100mA)



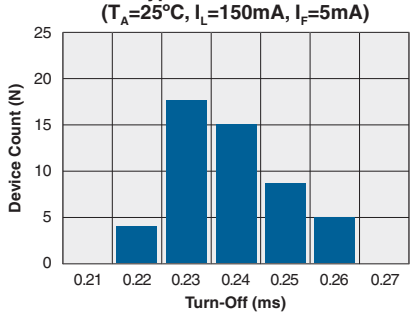
Typical I_F for Switch Dropout (T_A=25°C, I_L=100mA)



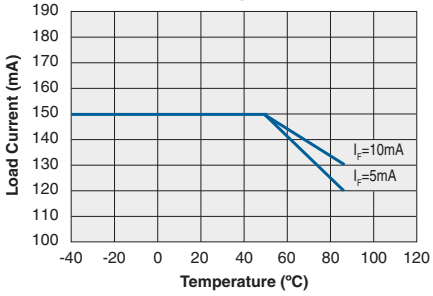
Typical Turn-On Time (T_A=25°C, I_L=150mA, I_F=5mA)



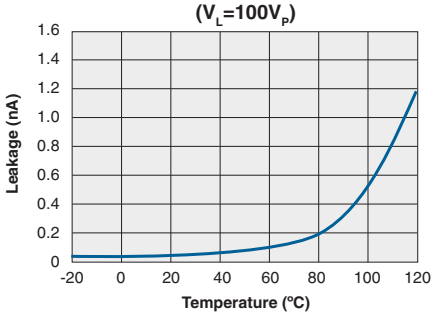
Typical Turn-Off Time (T_A=25°C, I_L=150mA, I_F=5mA)



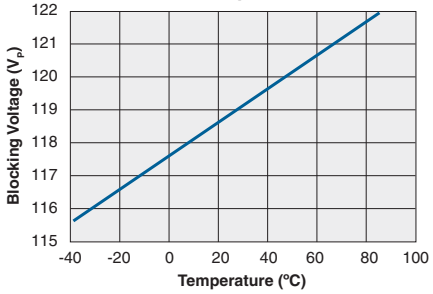
Typical Maximum Load Current vs. Temperature



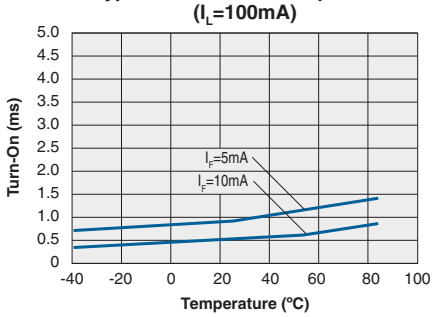
Typical Leakage vs. Temperature Measured Across Pins 3&4 (V_L=100V_P)



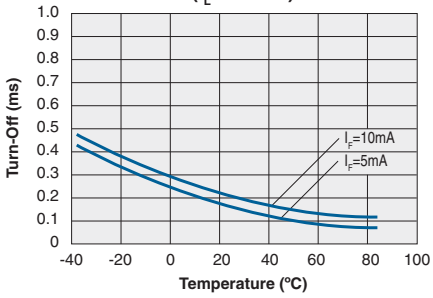
Typical Blocking Voltage vs. Temperature



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



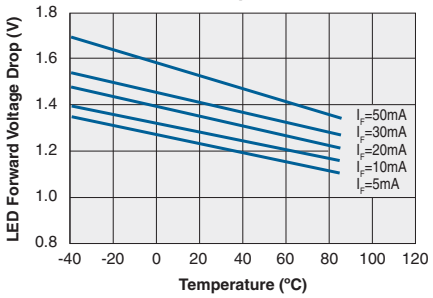
Typical Turn-Off vs. Temperature (I_L=100mA)



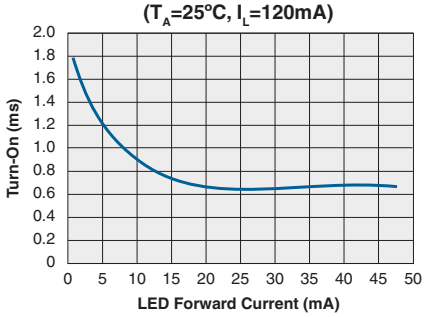
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

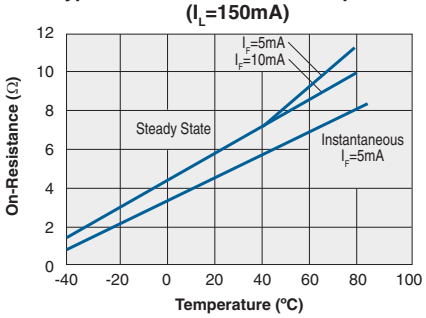
Typical LED Forward Voltage Drop vs. Temperature



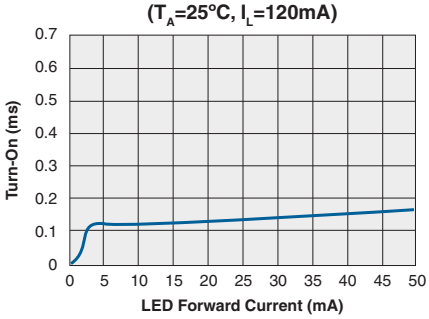
Typical Turn-On vs. LED Forward Current (T_A=25°C, I_L=120mA)



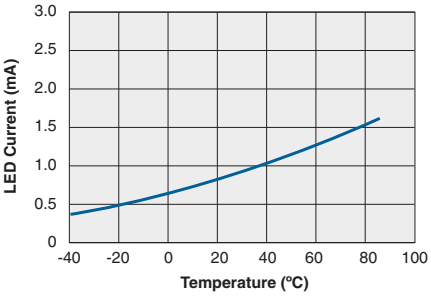
Typical On-Resistance vs. Temperature (I_L=150mA)



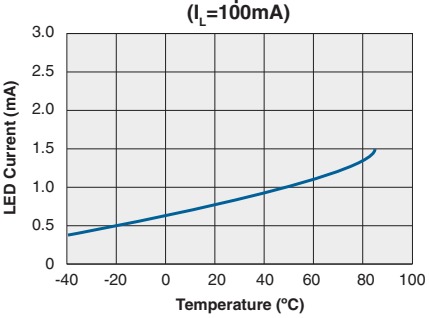
Typical Turn-Off vs. LED Forward Current (T_A=25°C, I_L=120mA)



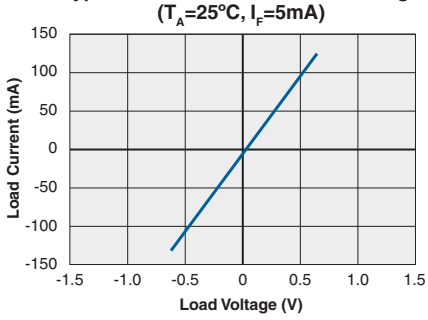
Typical I_F for Switch Operation vs. Temperature (I_L=100mA)



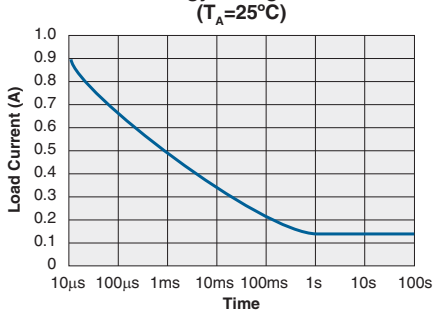
Typical I_F for Switch Dropout vs. Temperature (I_L=100mA)



Typical Load Current vs. Load Voltage (T_A=25°C, I_F=5mA)



Energy Rating Curve (T_A=25°C)



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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

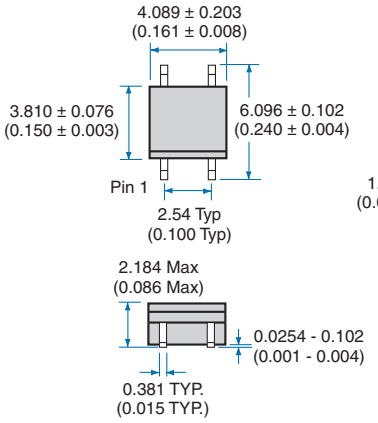
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Washing

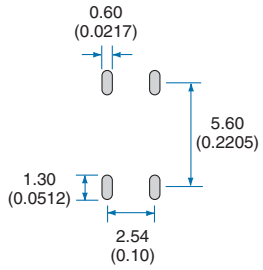
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

4-Pin SOP Package

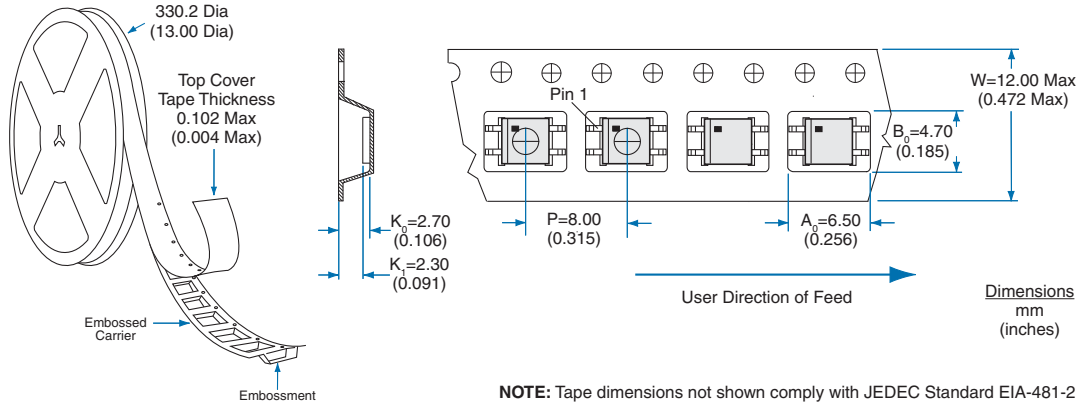


Recommended PCB Land Pattern



Dimensions
mm
(inches)

Tape and Reel Packaging for 4-Pin SOP Package



Dimensions
mm
(inches)

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

For additional information please visit our website at: www.clare.com

Specification: DS-CPC1009N-R03

12/11/08