



| Parameter | Rating | Units |
|------------------------|--------|----------------|
| Blocking Voltage | 60 | V _p |
| Load Current | 400 | mA |
| Max On-resistance | 2 | Ω |
| LED Current to operate | 2 | mA |

Features

- Designed for use in security systems complying with EN50130-4
- Small 4-Pin SOP Package
- TTL/CMOS Compatible input
- Arc-Free With No Snubbing Circuits
- 1500V_{rms} Input/Output Isolation
- 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
 - Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Aerospace
- Industrial Controls

Description

The CPC1014N is a miniature 1-Form-A solid state relay in a 4-Pin SOP package that employs optically coupled MOSFET technology to provide 1500V_{rms} of input/output isolation. The super efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS architecture. The optically coupled output is controlled by a highly efficient GaAlAs infrared LED. The CPC1014N uses Clare's state of the art, double-molded vertical construction packaging to produce one of the world's smallest relays. The CPC1014N offers board space savings of at least 20% over the competitor's larger 4-Pin SOP relay.

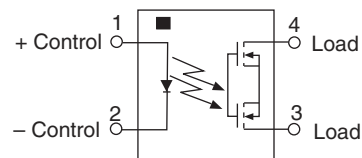
Approvals

- UL Recognized Component: File # E76270
- EN/IEC 60950-1 Compliant
- CSA Certified Component: Certificate # 1172007

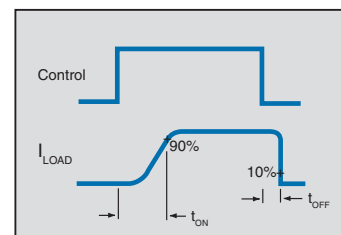
Ordering Information

| Part # | Description |
|------------|-----------------------|
| CPC1014N | 4-Pin SOP (100/tube) |
| CPC1014NTR | 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 | 60 | V _P |
| Reverse Input Voltage | 5 | V |
| Input Control Current Peak (10ms) | 50 | mA |
| | 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

| Parameter | Conditions | Symbol | Min | Typ | Max | Units |
|--------------------------------------|--|-------------------|-----|------|-----|----------------|
| Output Characteristics @ 25°C | | | | | | |
| Load Current | I _F =2mA | I _L | - | - | 400 | mA |
| | | | | | | |
| Peak | t =10ms | I _{LPK} | - | - | 1 | A _P |
| On-Resistance ² | I _L =400mA | R _{ON} | - | - | 2 | Ω |
| Off-State Leakage Current | V _L =60V _P | I _{LEAK} | - | - | 1 | μA |
| Switching Speeds | | | | | | |
| Turn-On | I _F =5mA, V _L =10V | t _{ON} | - | 0.47 | 2 | ms |
| Turn-Off | | t _{OFF} | - | 0.22 | 1 | |
| Output Capacitance | 50V; f=1MHz | C _{OUT} | - | 40 | - | pF |
| Capacitance Input to Output | - | - | - | 1 | - | pF |
| Input Characteristics @ 25°C | | | | | | |
| Input Control Current ³ | I _L =400mA | I _F | - | 0.25 | 2 | mA |
| Input Dropout Current | - | I _F | 0.1 | 0.2 | - | 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 |

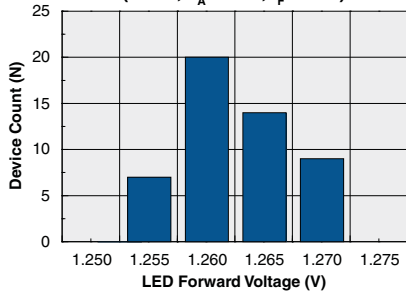
¹ Load current derates linearly from 400mA @ 25°C to 200mA @ 80°C.

² Measurement taken within 1 second of on time.

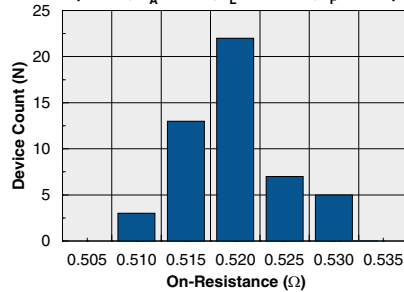
³ For applications requiring high temperature operation (greater than 60°C) an LED drive current of 4mA is recommended.

PERFORMANCE DATA*

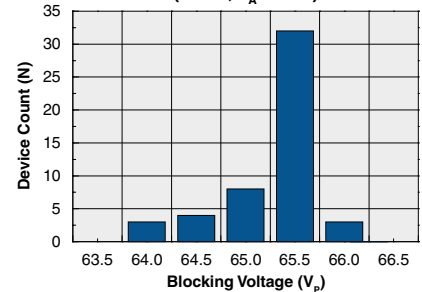
Typical LED Forward Voltage Drop
(N=50, $T_A=25^\circ\text{C}$, $I_F=5\text{mA}$)



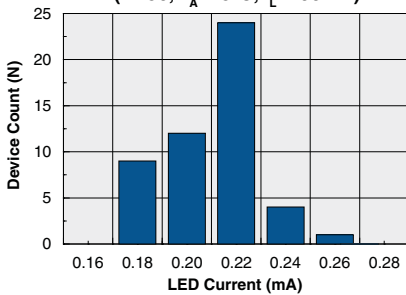
Typical On-Resistance Distribution
(N=50, $T_A=25^\circ\text{C}$, $I_L=400\text{mA}$, $I_F=1\text{mA}$)



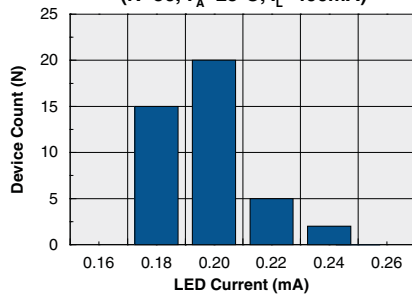
Typical Blocking Voltage Distribution
(N=50, $T_A=25^\circ\text{C}$)



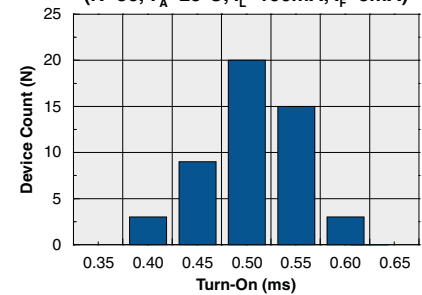
Typical I_F for Switch Operation
(N=50, $T_A=25^\circ\text{C}$, $I_L=400\text{mA}$)



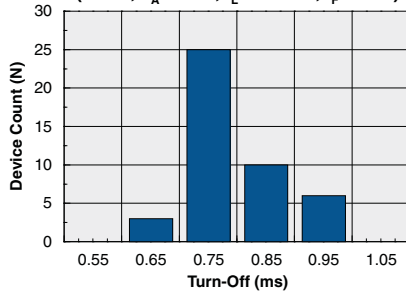
Typical I_F for Switch Dropout
(N=50, $T_A=25^\circ\text{C}$, $I_L=400\text{mA}$)



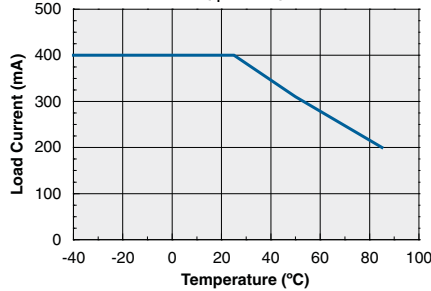
Typical Turn-On Time
(N=50, $T_A=25^\circ\text{C}$, $I_L=100\text{mA}$, $I_F=5\text{mA}$)



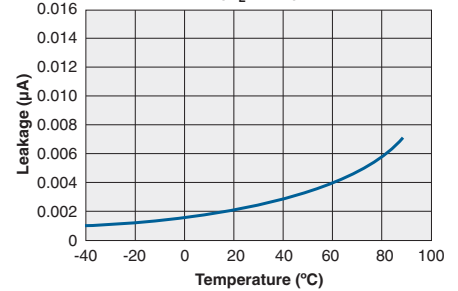
Typical Turn-Off Time
(N=50, $T_A=25^\circ\text{C}$, $I_L=100\text{mA}$, $I_F=5\text{mA}$)



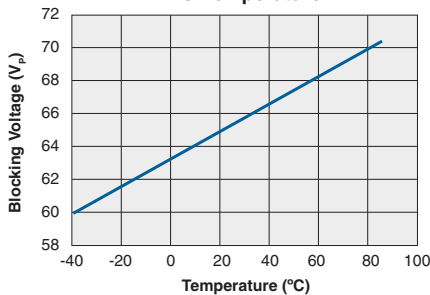
Maximum Load Current vs. Temperature
($I_F=2\text{mA}$)



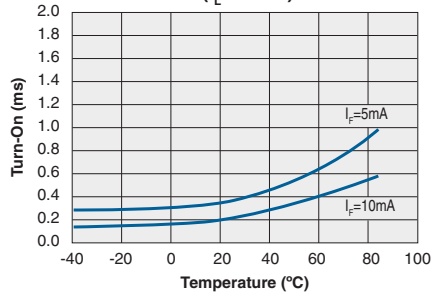
Typical Leakage vs. Temperature
Measured Across Pins 3 & 4
($V_L=60\text{V}$)



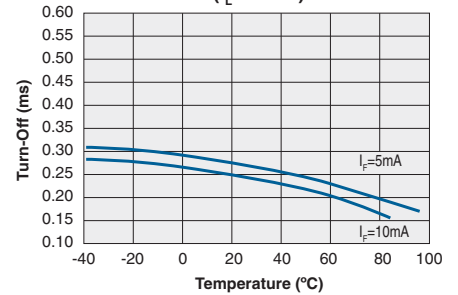
Typical Blocking Voltage vs. Temperature



Typical Turn-On vs. Temperature
($I_L=80\text{mA}$)

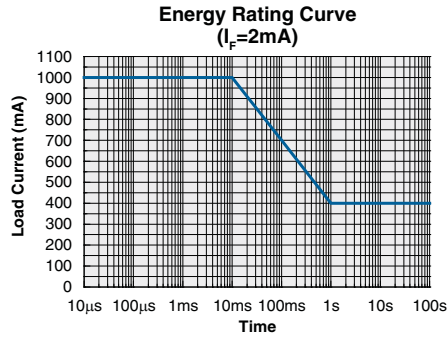
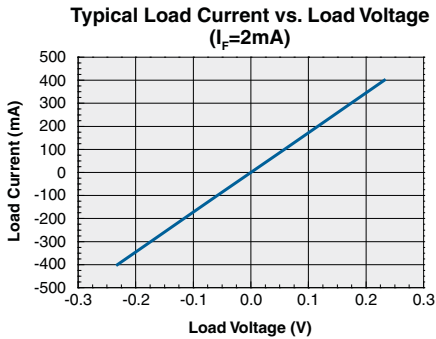
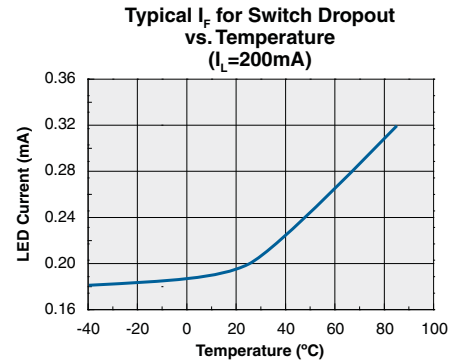
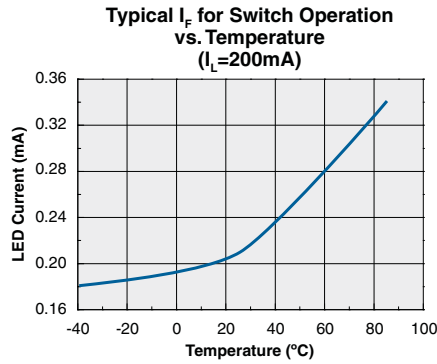
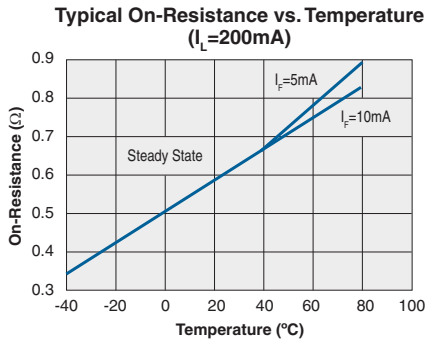
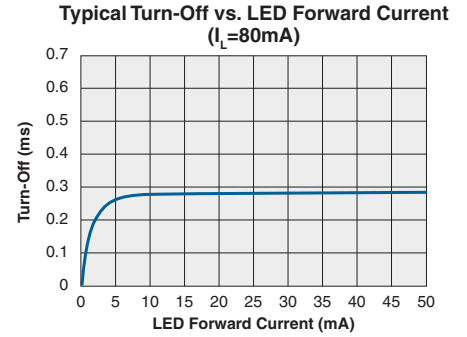
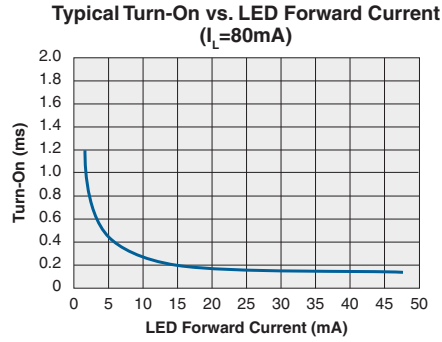
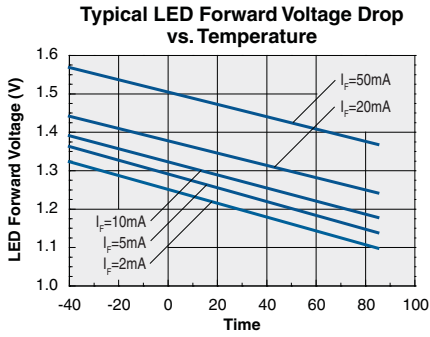


Typical Turn-Off vs. Temperature
($I_L=80\text{mA}$)



*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

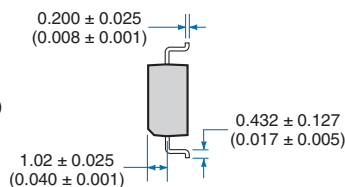
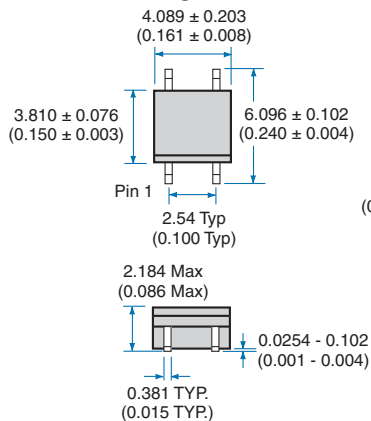
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Washing

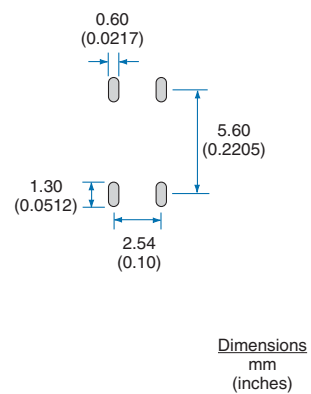
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

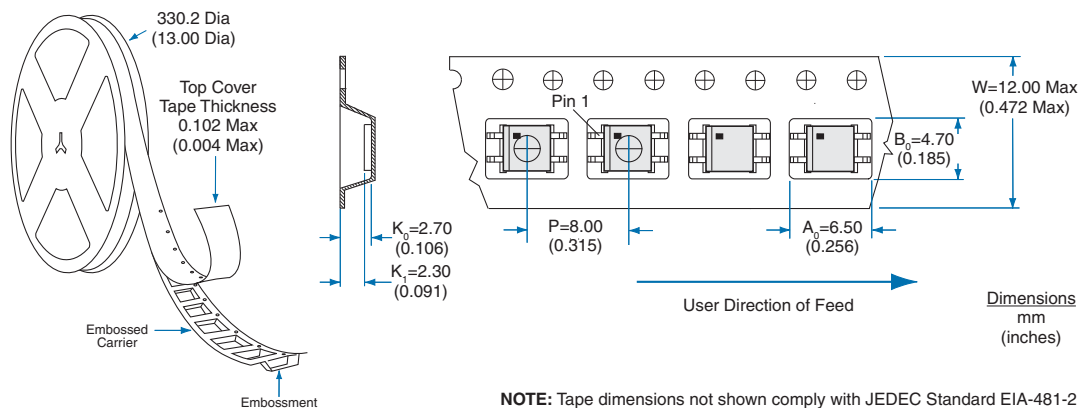
4-Pin SOP Package



Recommended PCB Land Pattern



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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Specification: DS-CPC1014N-R01
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 9/24/08