# CPC1016N
## 4-Pin SOP OptoMOS® Relay

| | CPC1016N | Units |
|---|---|---|
| Blocking Voltage | 100 | V |
| Load Current | 100 | mA |
| Max On-resistance | 16 | Ω |

### Features
- Small 4-Pin SOP Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- 1500$V_{rms}$ Input/Output Isolation
- 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
- Reed Relay Replacement

### Description
CPC1016N is a miniature low voltage, low on resistance 1-Form-A solid state relay in a 4-Pin SOP package. The relay uses optically coupled MOSFET technology to provide 1500$V_{rms}$ of input to output isolation. The efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS® architecture. The optically-coupled input is controlled by a highly efficient GaAlAs infrared LED. The CPC1016N uses Clare's state of the art double molded vertical construction packaging to produce the world's smallest relay. The CPC1016N is ideal for replacing larger less reliable reed and electromechanical relays.

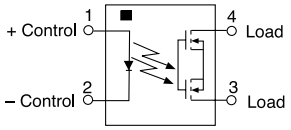
### Approvals
- UL Recognized Component
  File #: E76270
- Certified to: EN 60950

### Ordering Information

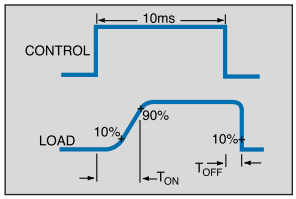
| Part # | Description |
|---|---|
| CPC1016N | 4-Pin SOP (100/tube) |
| CPC1016NTR | 4-Pin SOP (2000/reel) |

### Pin Configuration

**CPC1016N Pinout**




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



## Absolute Maximum Ratings (@ 25˚C)

| Parameter | Ratings | Units |
|---|---|---|
| Blocking Voltage | 100 | V |
| 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 |
| Capacitance Input to Output | 1 | pF |
| 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.*

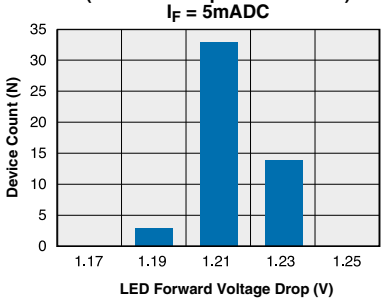
## Electrical Characteristics

| Parameter | Conditions | Symbol | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Output Characteristics @ 25°C** | | | | | | |
| Load Current [1], Continuous | - | $I_L$ | - | - | 100 | mA |
| Peak Load Current | 10ms | $I_{LPK}$ | - | - | 350 | mA |
| On-Resistance [2] | $I_L$=100mA | $R_{ON}$ | - | - | 16 | Ω |
| Off-State Leakage Current | $V_L$=100V | $I_{LEAK}$ | - | - | 1 | µA |
| 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 | ms |
| Output Capacitance | 50V; f=1MHz | $C_{OUT}$ | - | 25 | - | pF |
| **Input Characteristics @ 25°C** | | | | | | |
| Input Control Current | $I_L$=100mA | $I_F$ | 2 | - | 50 | mA |
| Input Dropout Current | - | $I_F$ | 0.3 | 0.9 | - | mA |
| Input Voltage Drop | $I_F$=5mA | $V_F$ | 0.9 | 1.2 | 1.4 | V |
| Reverse Input Voltage | - | $V_R$ | - | - | 5 | V |
| Reverse Input Current | $V_R$=5V | $I_R$ | - | - | 10 | µA |

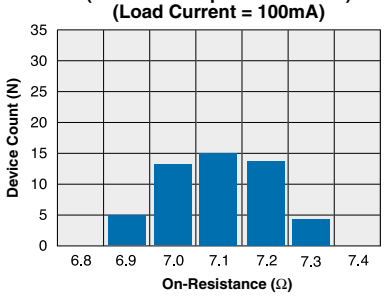
[1] Load current derates linearly from 120mA @ 25ºC to 80mA @ 85ºC.
[2] Measurement taken within 1 second of on time.

## PERFORMANCE DATA*

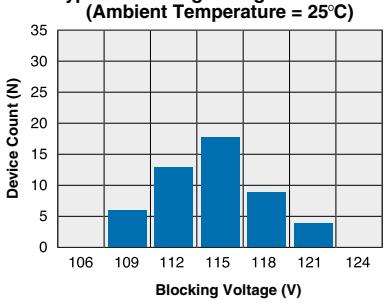
**CPC1016N**
**Typical LED Forward Voltage Drop**
**(Ambient Temperature = 25°C)**
**$I_F$ = 5mADC**



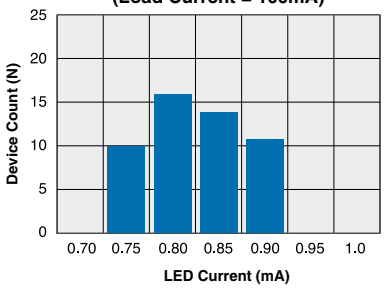

**CPC1016N**
**Typical On-Resistance Distribution**
**(Ambient Temperature = 25°C)**
**(Load Current = 100mA)**



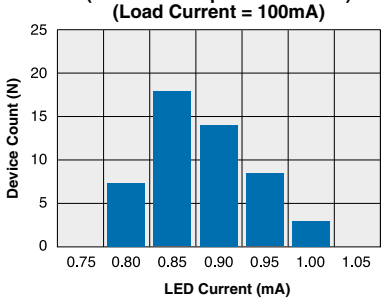

**CPC1016N**
**Typical Blocking Voltage Distribution**
**(Ambient Temperature = 25°C)**



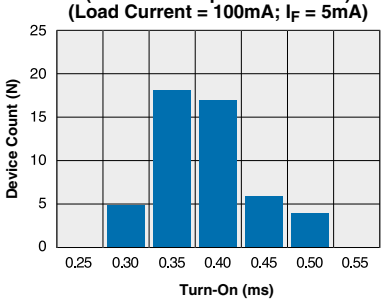

**CPC1016N**
**Typical $I_F$ for Switch Operation**
**(Ambient Temperature = 25°C)**
**(Load Current = 100mA)**



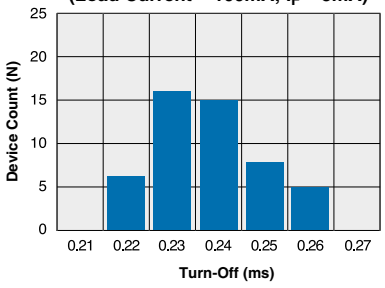

**CPC1016N**
**Typical $I_F$ for Switch Dropout**
**(Ambient Temperature = 25°C)**
**(Load Current = 100mA)**



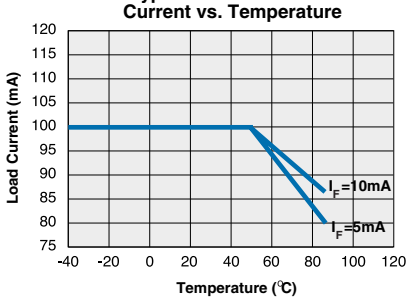

**CPC1016N**
**Typical Turn-On Time**
**(Ambient Temperature = 25°C)**
**(Load Current = 100mA; $I_F$ = 5mA)**



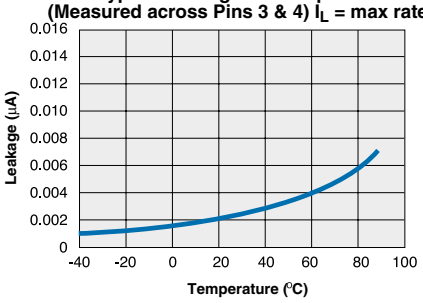

**CPC1016N**
**Typical Turn-Off Time**
**(Ambient Temperature = 25°C)**
**(Load Current = 100mA; $I_F$ = 5mA)**



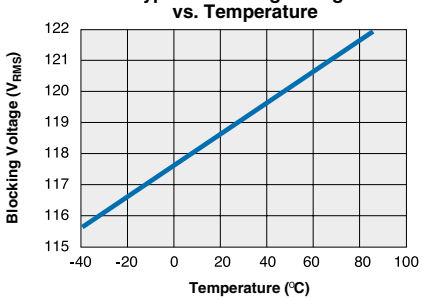

**CPC1016N**
**Typical MaximumLoad**
**Current vs. Temperature**



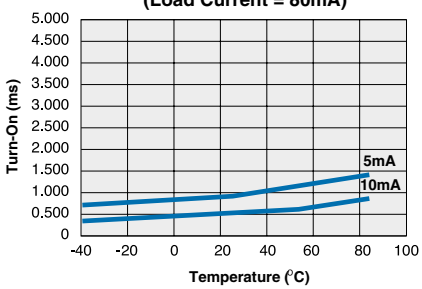

**CPC1016N**
**Typical Leakage vs. Temperature**
**(Measured across Pins 3 & 4) $I_L$ = max rated**



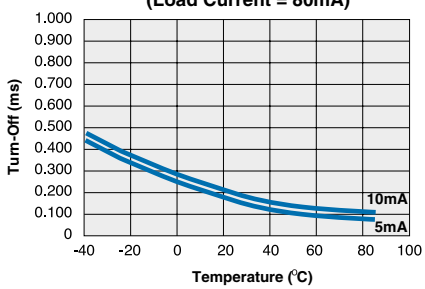

**CPC1016N**
**Typical Blocking Voltage**
**vs. Temperature**




**CPC1016N**
**Typical Turn-On vs. Temperature**
**(Load Current = 80mA)**



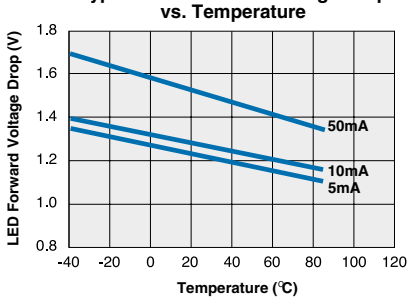

**CPC1016N**
**Typical Turn-Off vs. Temperature**
**(Load Current = 80mA)**



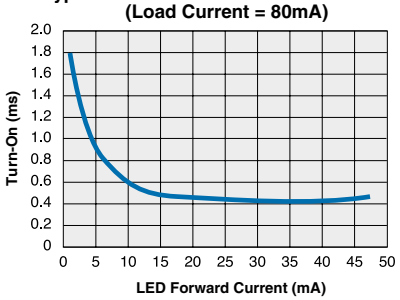

*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

## PERFORMANCE DATA*

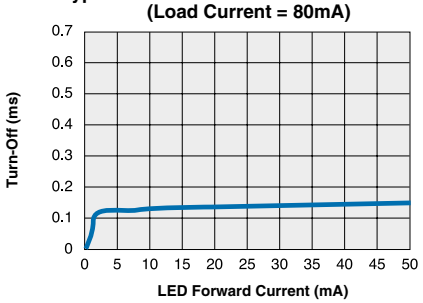
**CPC1016N**
**Typical LED Forward Voltage Drop vs. Temperature**



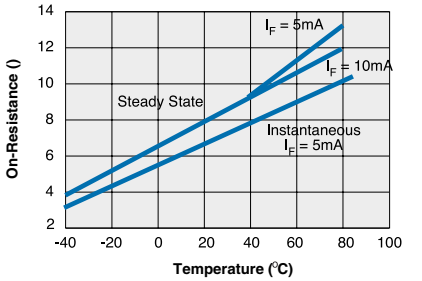

**CPC1016N**
**Typical Turn-On vs. LED Forward Current (Load Current = 80mA)**



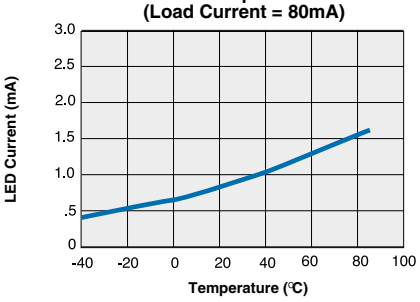

**CPC1016N**
**Typical Turn-Off vs. LED Forward Current (Load Current = 80mA)**



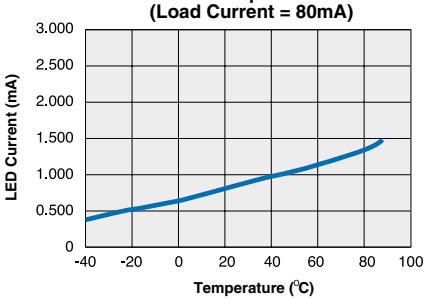

**CPC1016N**
**Typical On-Resistance vs. Temperature (Load Current = max rated @ temperature)**



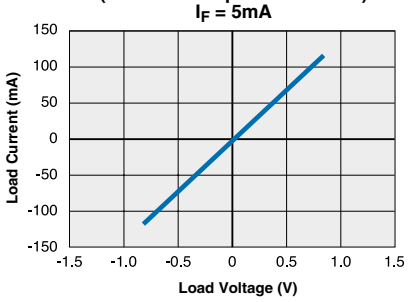

**CPC1016N**
**Typical $I_F$ for Switch Operation vs. Temperature (Load Current = 80mA)**



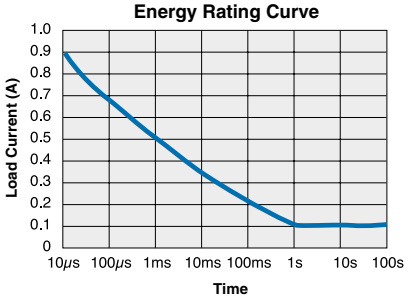

**CPC1016N**
**Typical $I_F$ for Switch Dropout vs. Temperature (Load Current = 80mA)**




**CPC1016N**
**Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C)**
**$I_F$ = 5mA**




**CPC1016N**
**Energy Rating Curve**

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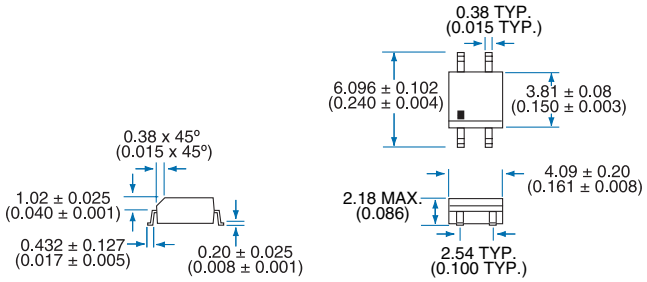
## Manufacturing Information

### Soldering
Recommended soldering processes are limited to 260ºC component body temperature for 10 seconds.

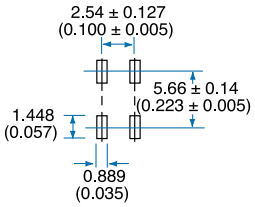
### Washing
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

## MECHANICAL DIMENSIONS

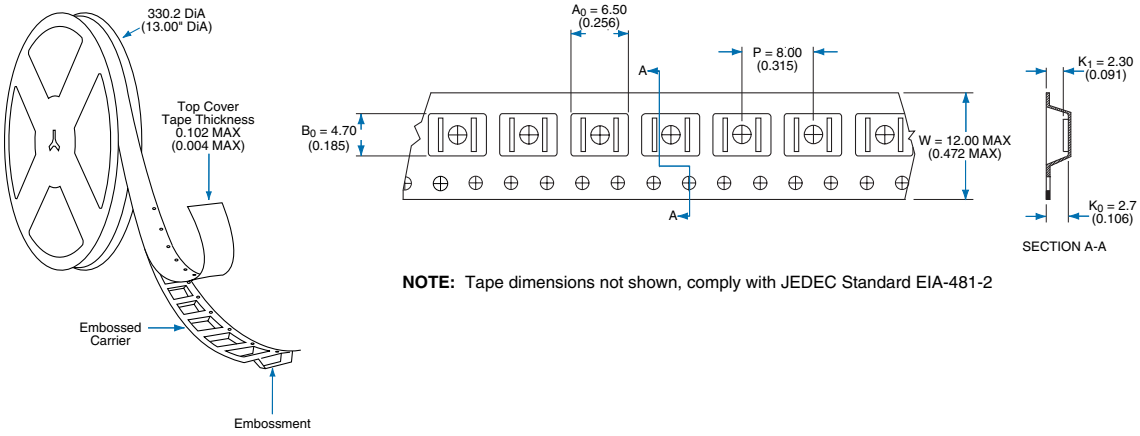
### 4-Pin SOIC Narrow ("N" Suffix)




### PC Board Pattern (Top View)




### Tape and Reel Packaging for 4 pin SOIC package




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

Dimensions:
mm
(inches)

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



Specification: DS-CPC1016N-R03