



Parameter	Rating	Units
Blocking Voltage	30	V <sub>P</sub>
Load Current	1.2	A <sub>DC</sub>
On-resistance, Max	0.25	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
- 1500V<sub>rms</sub> Input/Output Isolation
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Tape & Reel Version Available

#### Applications

- 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 CPC1020N is a 30V, single-pole, normally open (1-Form-A) Solid State Relay. The ultra-low on-resistance, 0.25Ω, of this relay allows for high-current operation. Clare's patented OptoMOS architecture makes available the optically coupled technology necessary to activate the output's efficient MOSFET switches while providing 1500V<sub>rms</sub> input-to-output isolation. Control of the isolated output is accomplished by means of the highly effective GaAlAs infrared LED at the input.

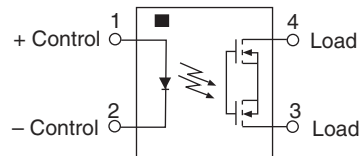
#### Approvals

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

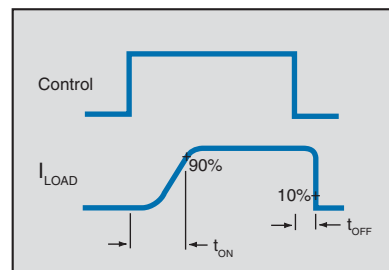
#### Ordering Information

Part #	Description
CPC1020N	4-Pin SOP (100/tube)
CPC1020NTR	4-Pin SOP (2000/reel)

#### Pin Configuration



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



### Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage	30	V <sub>P</sub>
Input Power Dissipation <sup>1</sup>	75	mW
Input Control Current	50	mA
Peak (10ms)	1	A
Reverse Input Voltage	5	V
Total Power Dissipation <sup>2</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 1.33 mW / °C

<sup>2</sup> Derate Linearly 3.33 mW / °C

Absolute Maximum Electrical Ratings are at 25°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</b>						
Load Current						
Continuous <sup>1</sup>	I <sub>F</sub> =2mA	I <sub>L</sub>	-	-	1.2	A <sub>DC</sub>
Peak	t ≤ 10ms	I <sub>LPK</sub>	-	-	3	A
On-Resistance <sup>2</sup>	I <sub>L</sub> =1A	R <sub>ON</sub>	-	0.116	0.25	Ω
Off-State Leakage Current	V <sub>L</sub> =30V	I <sub>LEAK</sub>	-	-	1	μA
Switching Speeds						
Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	t <sub>ON</sub>	-	0.48	3	ms
Turn-Off		t <sub>OFF</sub>	-	0.65	3	
Output Capacitance	V <sub>L</sub> =15V; f=1MHz	C <sub>OUT</sub>	-	70	-	pF
<b>Input Characteristics @ 25°C</b>						
Input Control Current	I <sub>L</sub> =1A	I <sub>F</sub>	-	0.13	2	mA
Input Dropout Current	-	I <sub>F</sub>	0.1	-	-	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	-	C <sub>I/O</sub>	-	3	-	pF

<sup>1</sup> Load current derates linearly from 1.2A @ 25°C to 0.58A @ 85°C.

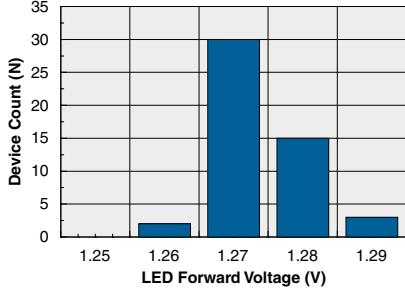
<sup>2</sup> Measurement taken within 1 second of on time.

### ESD Rating

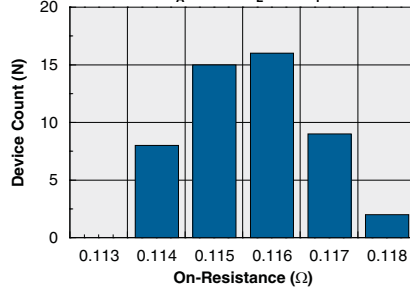
ESD Rating (Human Body Model)
1000 Volts

**PERFORMANCE DATA\***

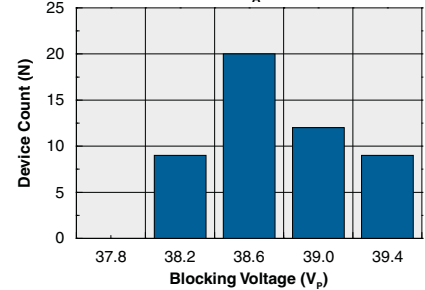
**Typical LED Forward Voltage Drop**  
(N=50,  $T_A=25^\circ\text{C}$ ,  $I_F=5\text{mA}$ )



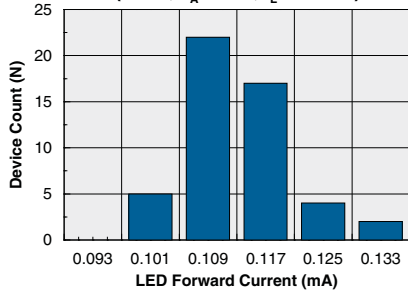
**Typical On-Resistance Distribution**  
(N=50,  $T_A=25^\circ\text{C}$ ,  $I_L=1\text{A}$ ,  $I_F=2\text{mA}$ )



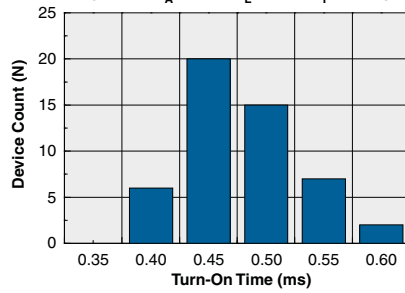
**Typical Blocking Voltage Distribution**  
(N=50,  $T_A=25^\circ\text{C}$ )



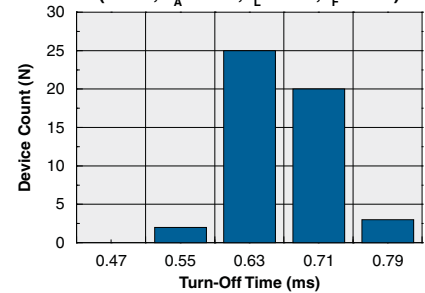
**Typical  $I_F$  for Switch Operation**  
(N=50,  $T_A=25^\circ\text{C}$ ,  $I_L=100\text{mA}$ )



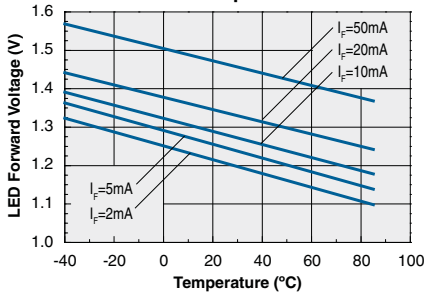
**Typical Turn-On Time Distribution**  
(N=50,  $T_A=25^\circ\text{C}$ ,  $I_L=5\text{mA}$ ,  $I_F=5\text{mA}$ )



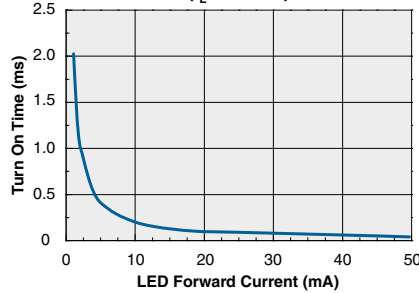
**Typical Turn-Off Time Distribution**  
(N=50,  $T_A=25^\circ\text{C}$ ,  $I_L=5\text{mA}$ ,  $I_F=5\text{mA}$ )



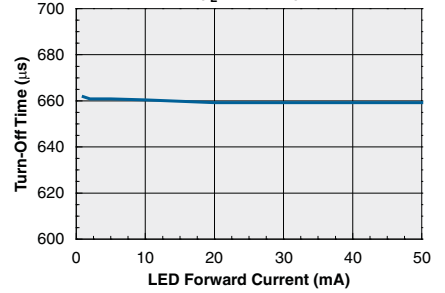
**Typical LED Forward Voltage Drop vs. Temperature**



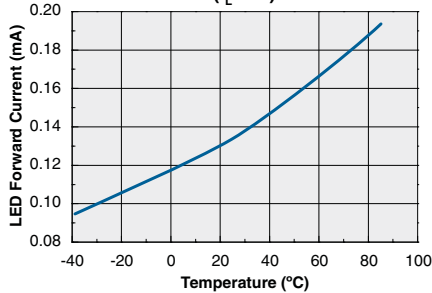
**Typical Turn-On Time vs. LED Forward Current**  
( $I_L=100\text{mA}$ )



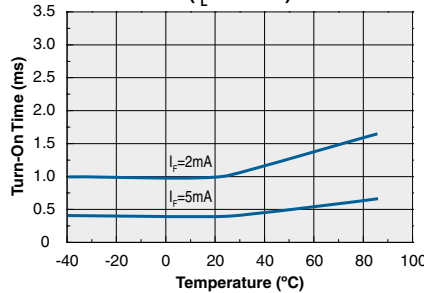
**Typical Turn-Off Time vs. LED Forward Current**  
( $I_L=100\text{mA}$ )



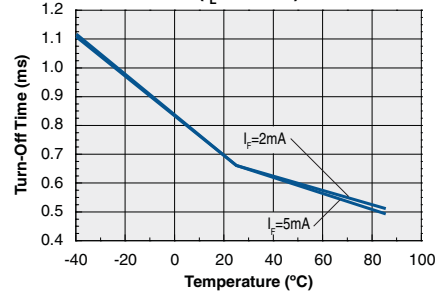
**Typical  $I_F$  for Switch Operation vs. Temperature**  
( $I_L=1\text{A}$ )



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



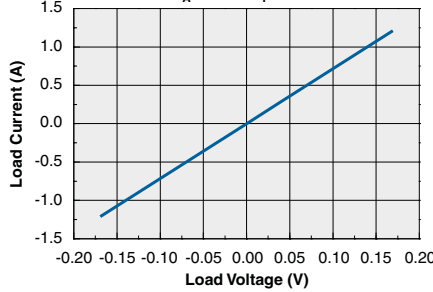
**Typical Turn-Off Time vs. Temperature**  
( $I_L=100\text{mA}$ )



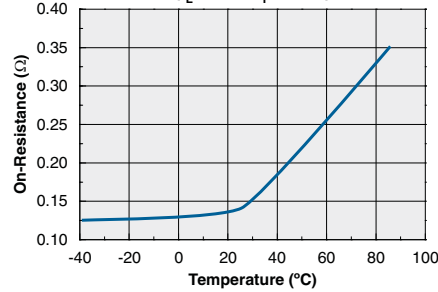
\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA\*

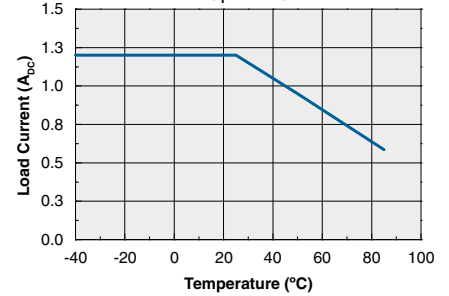
Typical Load Voltage vs. Load Current  
( $T_A=25^\circ\text{C}$ ,  $I_F=2\text{mA}$ )



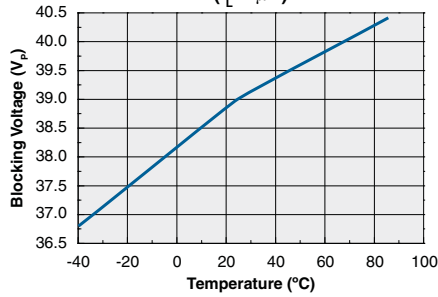
Typical On-Resistance vs. Temperature  
( $I_L=0.5\text{A}$ ,  $I_F=2\text{mA}$ )



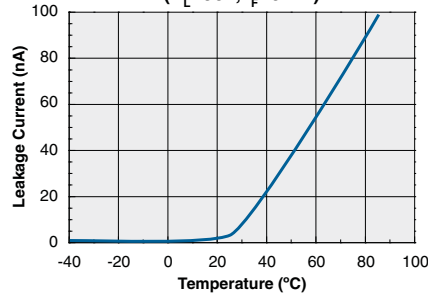
Typical Load Current vs. Temperature  
( $I_F=2\text{mA}$ )



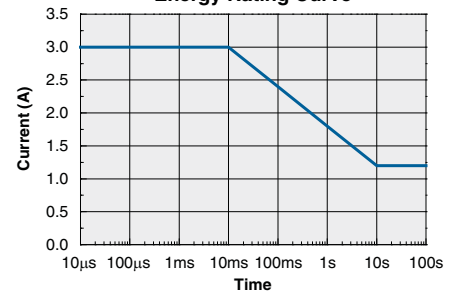
Typical Blocking Voltage vs. Temperature  
( $I_L=1\mu\text{A}$ )



Typical Leakage Current vs. Temperature  
Measured Across Pins 3 & 4  
( $V_L=30\text{V}$ ,  $I_F=0\text{mA}$ )



Energy Rating Curve



\*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**

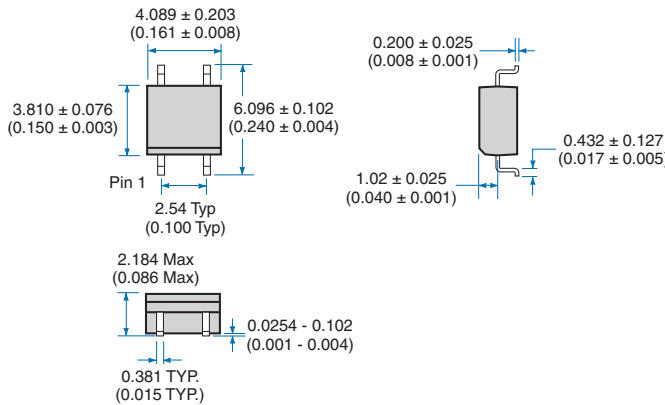
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

**Washing**

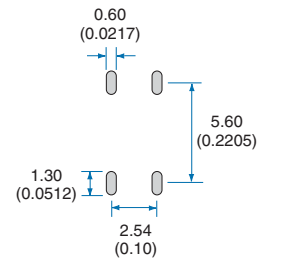
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

**MECHANICAL DIMENSIONS**

**4-Pin SOP Package**

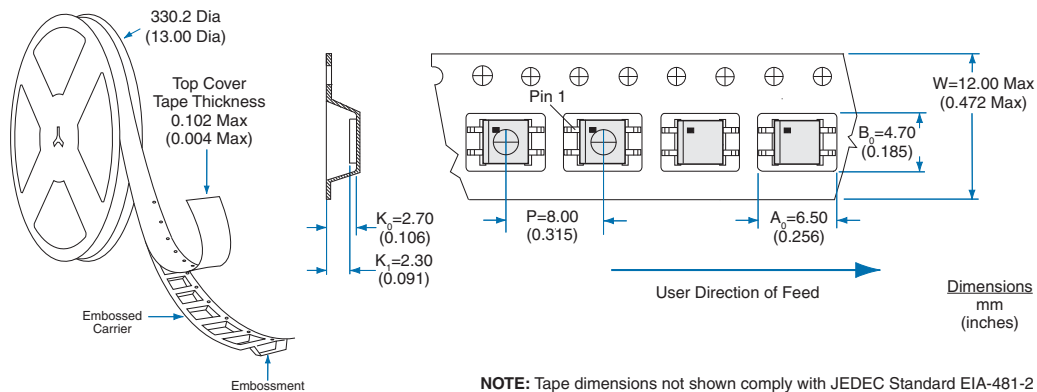


**Recommended PCB Land Pattern**



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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