



Parameter	Rating	Units
Blocking Voltage	350	V <sub>p</sub>
Load Current	120	mA
Max On-resistance	30	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
- 0.4mm Distance Through Insulation (Supplementary Isolation Requirement of EN60950)
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Tape & Reel Version Available

### Applications

- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - Hook Switch
  - Dial Pulsing
  - Ground Start
  - Ringing Injection
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
  - Meters (Watt-Hour, Water, Gas)
- Medical Equipment
  - Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

### Description

The CPC1231N is a miniature 1-Form-B solid state relay in a 4-pin SOP package that employs optically coupled MOSFET technology to provide 1500V<sub>rms</sub> of input-to-output isolation and is compliant with supplementary isolation in accordance with EN/IEC 60950-1. The efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS® architecture. The optically coupled output is controlled by a highly efficient GaAIAs infrared LED.

The CPC1231N uses Clare's state of the art double molded vertical construction packaging to produce one of the world's smallest 4-pin relays.

The CPC1231N offers board space savings of at least 20% over the competitor's larger 4-pin SOP relay.

### Approvals

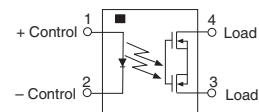
- UL Recognized Component: File #E76270
- EN/IEC 60950-1 Supplementary Isolation compliant
- CSA Certified Component: Certificate # 1172007

### Ordering Information

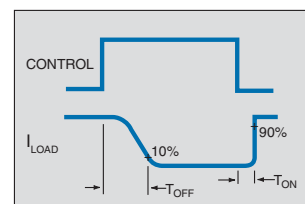
Part #	Description
CPC1231N	4-Pin SOP (100/tube)
CPC1231NTR	4-Pin SOP (2000/reel)

### Pin Configuration

CPC1231N Pinout



Switching Characteristics of Normally Closed (Form B) Devices



### Absolute Maximum Ratings (@ 25°C)

Parameter	Ratings	Units
Blocking Voltage	350	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation	150	mW
Total Power Dissipation <sup>1</sup>	400	mW
Capacitance Input to Output	1	pF
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

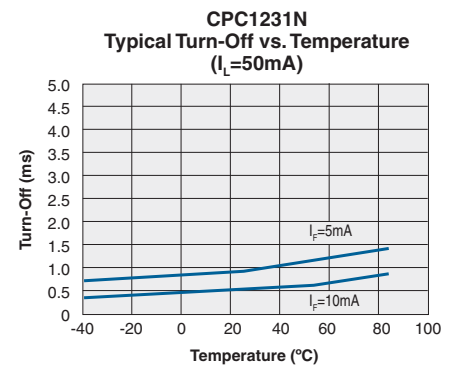
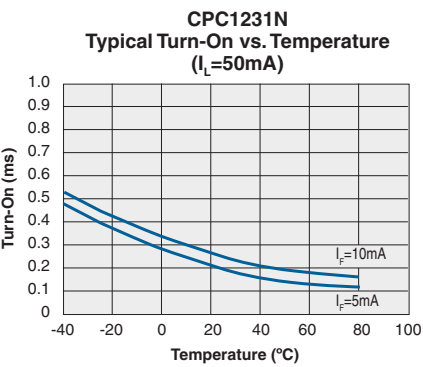
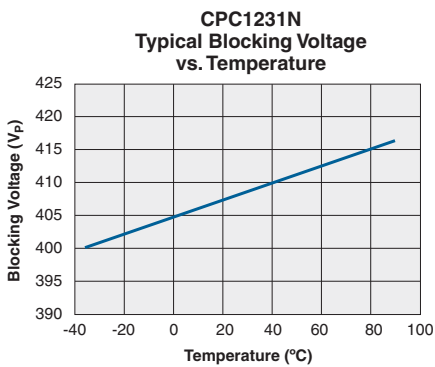
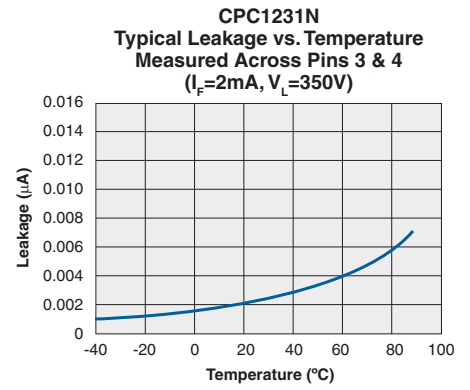
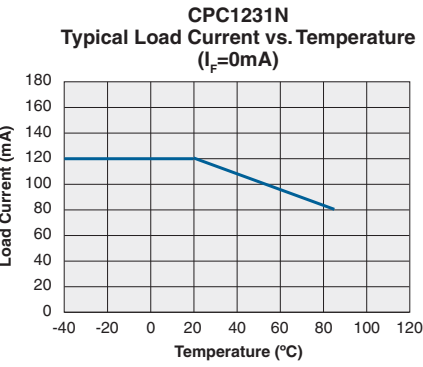
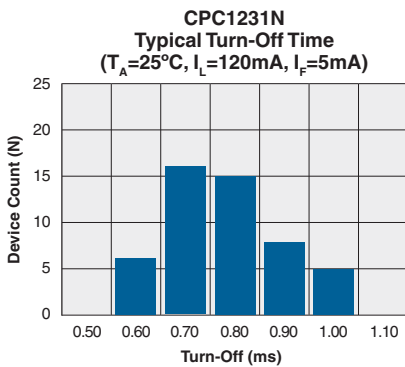
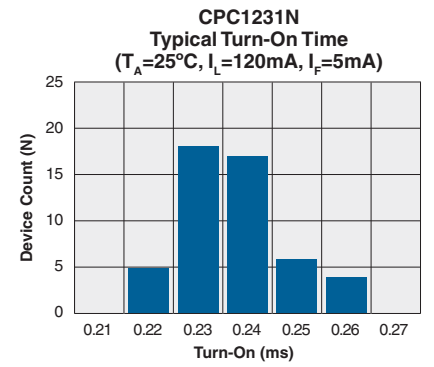
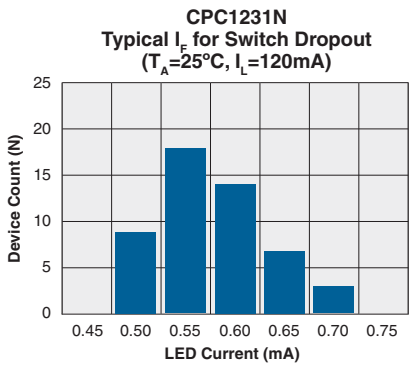
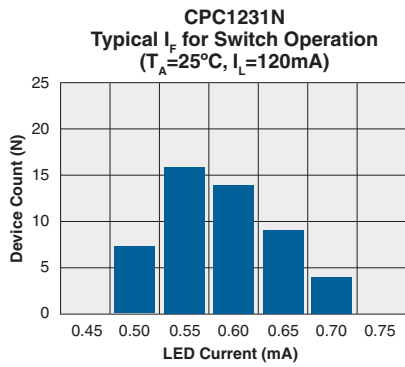
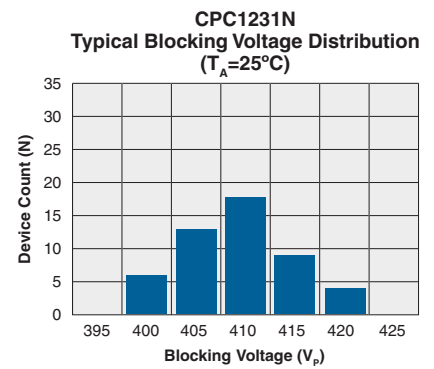
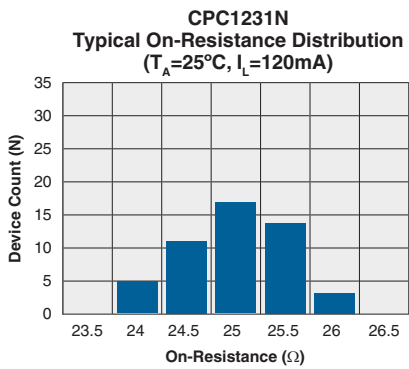
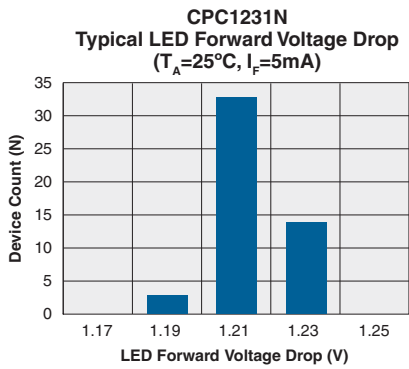
Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics @ 25°C</b>						
Load Current						
Continuous <sup>1</sup>	-	I <sub>L</sub>	-	-	120	mA
Peak	t = 10ms	I <sub>LPK</sub>	-	-	350	
On-Resistance <sup>2</sup>	I <sub>L</sub> = 120mA	R <sub>ON</sub>	-	25	30	Ω
Off-State Leakage Current	V <sub>L</sub> = 350V, I <sub>F</sub> = 2mA	I <sub>LEAK</sub>	-	-	5	μA
Switching Speeds						
Turn-On	I <sub>F</sub> = 5mA, V <sub>L</sub> = 10V	T <sub>ON</sub>	-	-	2	ms
Turn-Off		T <sub>OFF</sub>	-	-	2	
Output Capacitance	50V; f = 1MHz	C <sub>OUT</sub>	-	25	-	pF
<b>Input Characteristics @ 25°C</b>						
Input Control Current <sup>3</sup>	I <sub>L</sub> = 120mA	I <sub>F</sub>	-	-	2	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

<sup>1</sup> Load current derates linearly from 120mA @ 25°C to 80mA @ 85°C.

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

<sup>3</sup> For applications requiring high temperature operation (greater than 60°C) an LED drive current of 5mA is recommended.

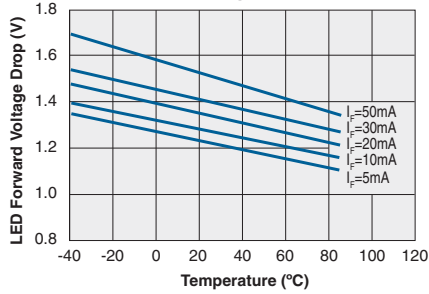
**PERFORMANCE DATA\***



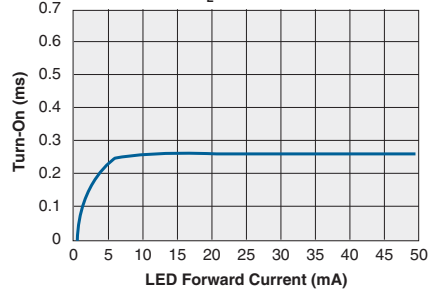
\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA\*

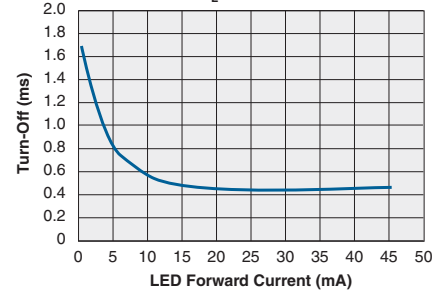
CPC1231N  
Typical LED Forward Voltage Drop  
vs. Temperature



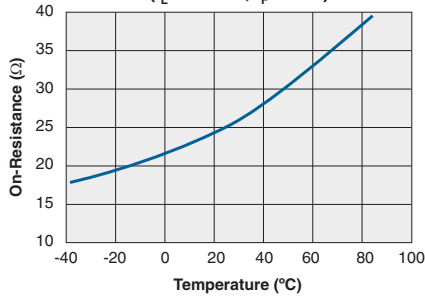
CPC1231N  
Typical Turn-On vs. LED Forward Current  
( $I_L=120mA$ )



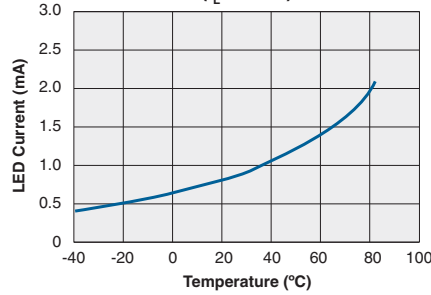
CPC1231N  
Typical Turn-Off vs. LED Forward Current  
( $I_L=120mA$ )



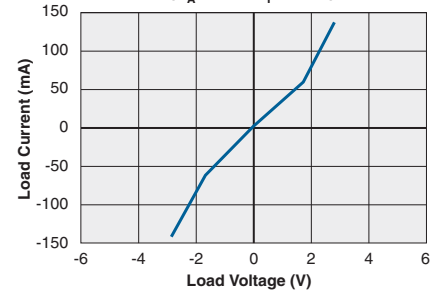
CPC1231N  
Typical On-Resistance vs. Temperature  
( $I_L=120mA, I_F=0mA$ )



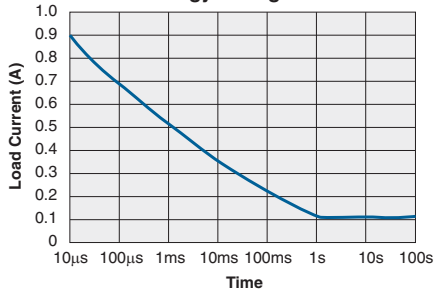
CPC1231N  
Typical  $I_F$  for Switch Operation  
vs. Temperature  
( $I_L=50mA$ )



CPC1231N  
Typical Load Current vs. Load Voltage  
( $T_A=25°C, I_F=0mA$ )



CPC1231N  
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**

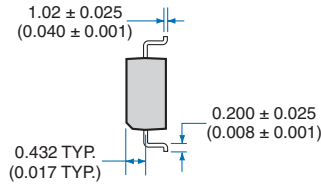
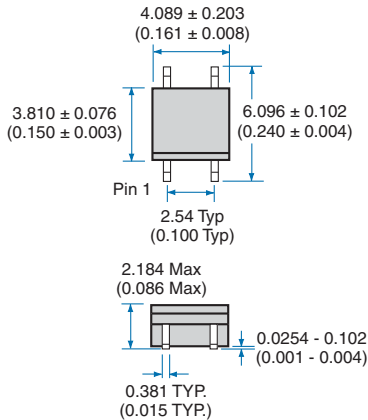
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

**Washing**

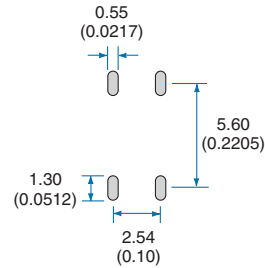
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

**MECHANICAL DIMENSIONS**

**4-Pin SOP Package**

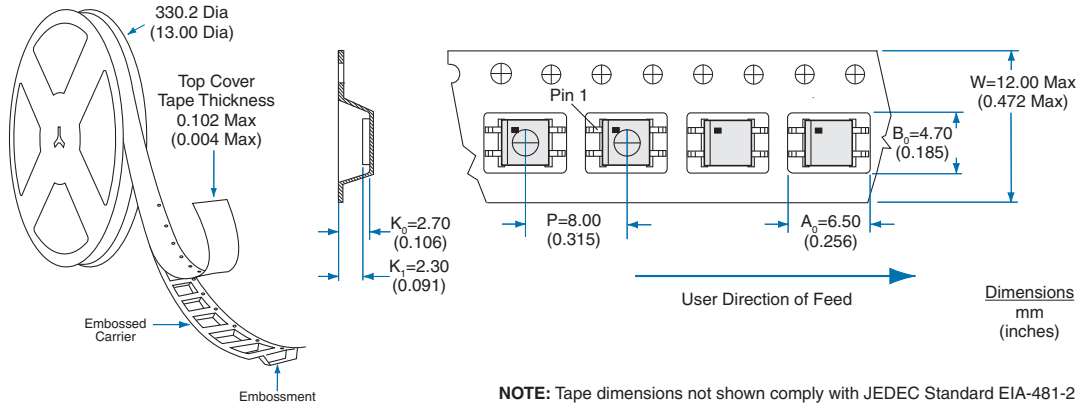


**Recommended PCB Land Pattern**



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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