



	CPC1230N	Units
Load Voltage	350	V
Load Current	120	mA
Max R <sub>ON</sub>	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
- Supplemental Isolation
- 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)
  - Hookswitch
  - Dial Pulsing
  - Ground Start
  - Ringer 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 CPC1230N is a miniature 1-Form-A solid state relay in a 4 pin SOP package that employs optically coupled MOSFET technology to provide 1500V of input to output isolation and is **BSI certified for supplemental insulation in accordance with EN60950**. The efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS<sup>®</sup> architecture. The optically coupled input is controlled by a highly efficient GaAIAs infrared LED. The CPC1230N uses Clare's state of the art double molded vertical construction packaging to produce the world's smallest 4 pin relay. The CPC1230N offers board space savings of at least 20% over the competitor's larger 4 pin SOP relay.

### Approvals

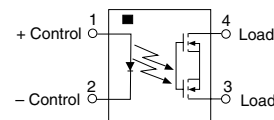
- UL Recognized Component File #: E76270
- Certified to: Supplementary Isolation Requirement of EN60950

### Ordering Information

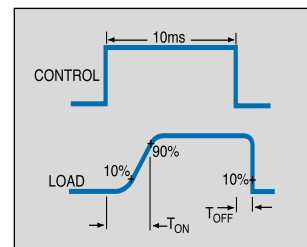
Part #	Description
CPC1230N	4 Pin SOP (100/tube)
CPC1230NTR	4 Pin SOP (2,000/reel)

### Pin Configuration

CPC1230N Pinout



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



**Absolute Maximum Ratings (@ 25° C)**

Parameter	Min	Typ	Max	Units
Input Power Dissipation	-	-	150	mW
Input Control Current	-	-	50	mA
Peak (10ms)	-	-	1	A
Reverse Input Voltage	-	-	5	V
Total Power Dissipation	-	-	400 <sup>1</sup>	mW
Capacitance				
Input to Output	-	1	-	pF
Isolation Voltage				
Input to Output	1500	-	-	V <sub>RMS</sub>
Operational Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C
Soldering Temperature (10 Seconds Max.)	-	-	+220	°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 these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to the absolute maximum ratings for an extended period may degrade the device and effect its reliability.*

**Electrical Characteristics**

Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics @ 25°C</b>						
Load Voltage (Peak)	-	V <sub>L</sub>	-	-	350	V
Load Current (Continuous) AC Peak <sup>1</sup>		I <sub>L</sub>	-	-	120	mA
Peak Load Current	10ms	I <sub>LPK</sub>	-	-	350	mA
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>LEAK</sub>	-	-	1	μA
Switching Speeds						
Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	T <sub>ON</sub>	-	-	2	ms
Turn-Off	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	T <sub>OFF</sub>	-	-	1.0	ms
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	-	50	mA
Input Dropout Current	-	I <sub>F</sub>	0.3	0.9	-	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.2	1.4	V
Reverse Input Voltage	-	V <sub>R</sub>	-	-	5	V
Reverse Input Current	V <sub>R</sub> =5V	I <sub>R</sub>	-	-	10	μA

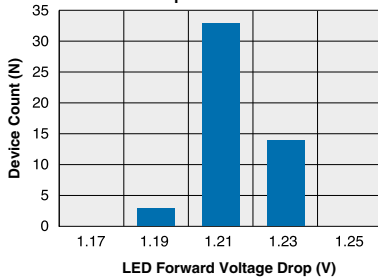
<sup>1</sup> Load current derates linearly from 120mA @ 25°C to 80mA @ 85°C.

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

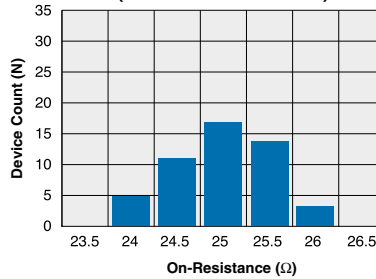
<sup>3</sup> For applications requiring high temperature operation (greater than 60°C) an LED drive current of 10mA is recommended.

PERFORMANCE DATA\*

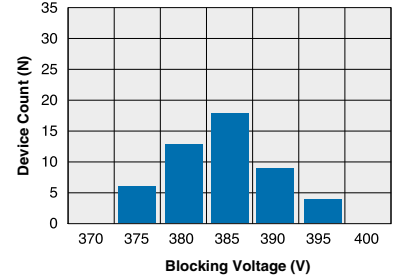
**CPC1230N**  
Typical LED Forward Voltage Drop  
(Ambient Temperature = 25°C)  
 $I_F = 5\text{mA}$



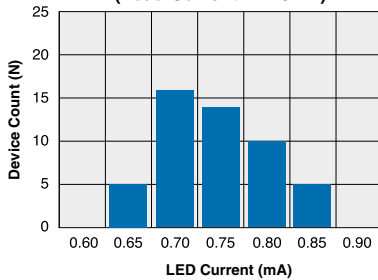
**CPC1230N**  
Typical On-Resistance Distribution  
(Ambient Temperature = 25°C)  
(Load Current = 120mA)



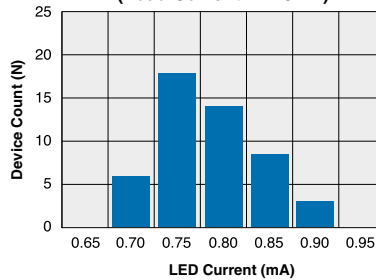
**CPC1230N**  
Typical Blocking Voltage Distribution  
(Ambient Temperature = 25°C)



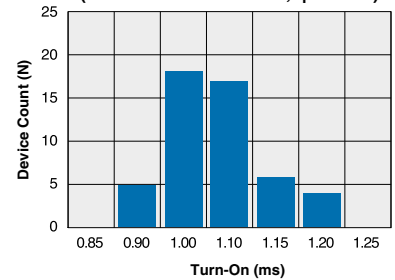
**CPC1230N**  
Typical  $I_F$  for Switch Operation  
(Ambient Temperature = 25°C)  
(Load Current = 120mA)



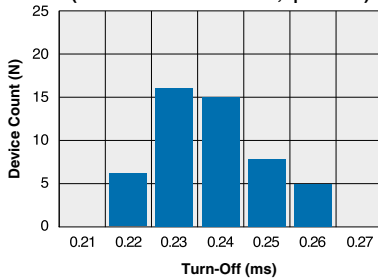
**CPC1230N**  
Typical  $I_F$  for Switch Dropout  
(Ambient Temperature = 25°C)  
(Load Current = 120mA)



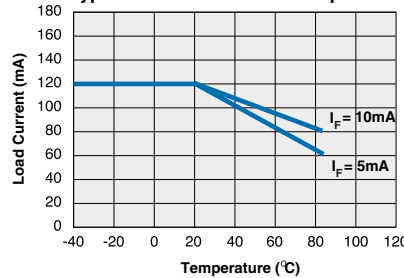
**CPC1230N**  
Typical Turn-On Time  
(Ambient Temperature = 25°C)  
(Load Current = 120mA;  $I_F = 5\text{mA}$ )



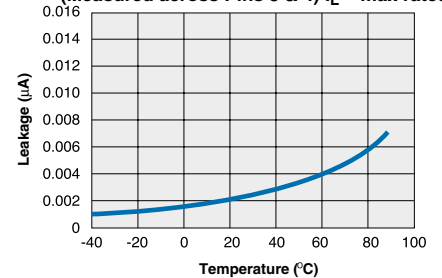
**CPC1230N**  
Typical Turn-Off Time  
(Ambient Temperature = 25°C)  
(Load Current = 120mA;  $I_F = 5\text{mA}$ )



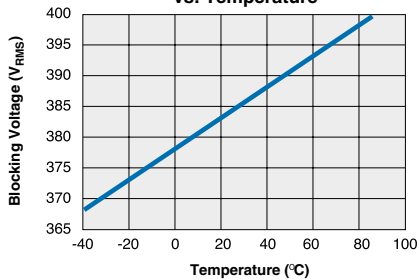
**CPC1230N**  
Typical Load Current vs. Temperature



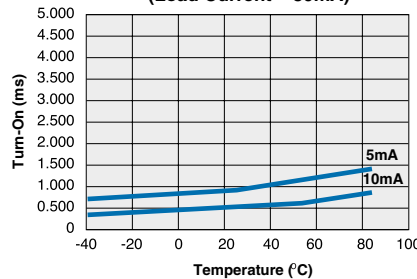
**CPC1230N**  
Typical Leakage vs. Temperature  
(Measured across Pins 3 & 4)  $I_L = \text{max rated}$



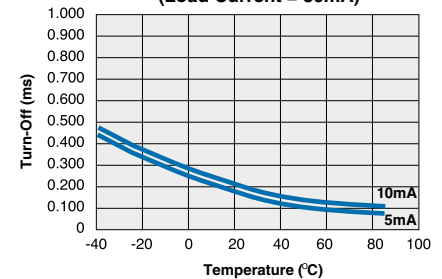
**CPC1230N**  
Typical Blocking Voltage vs. Temperature



**CPC1230N**  
Typical Turn-On vs. Temperature  
(Load Current = 80mA)

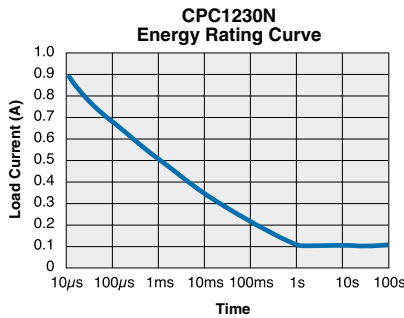
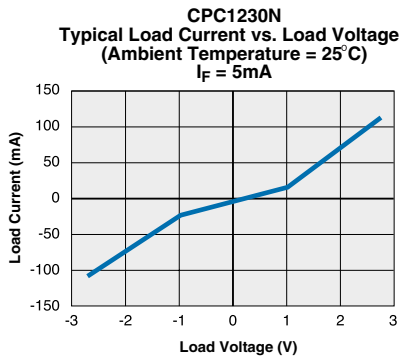
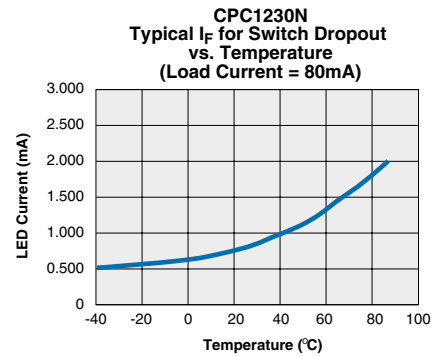
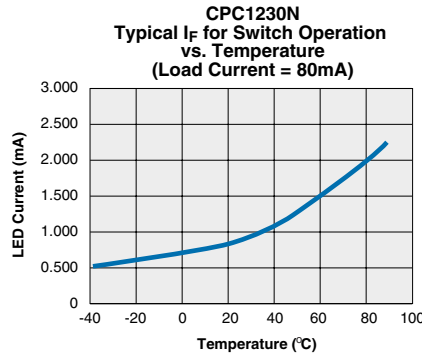
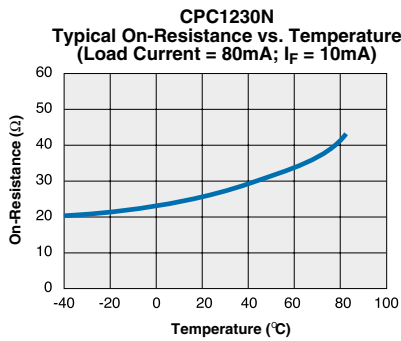
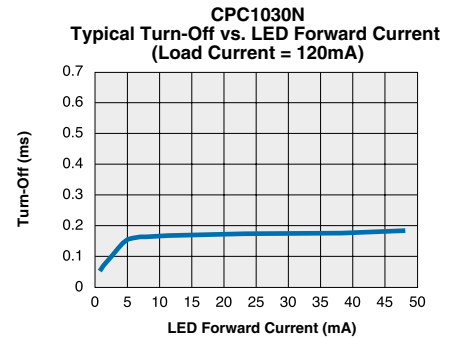
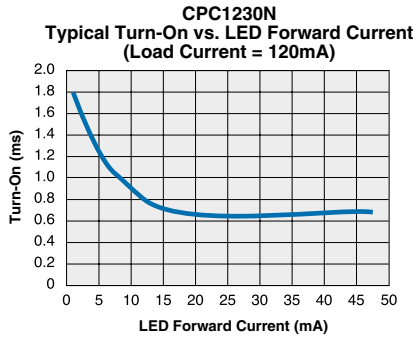
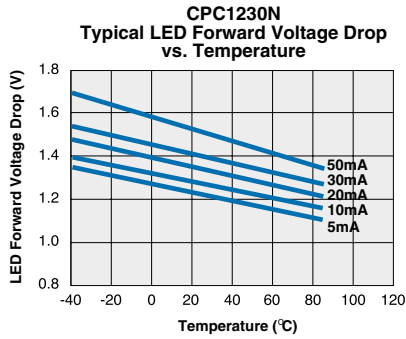


**CPC1230N**  
Typical Turn-Off vs. Temperature  
(Load Current = 80mA)



\*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.

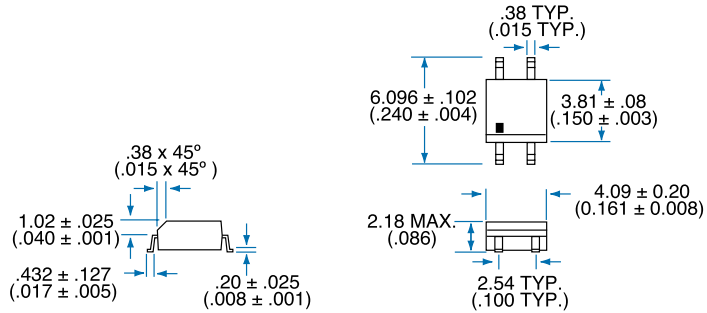
PERFORMANCE DATA\*



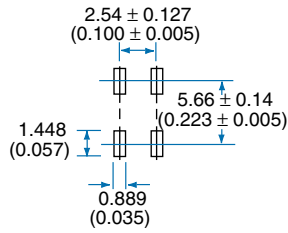
\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

MECHANICAL DIMENSIONS

4 Pin SOIC Narrow ("N" Suffix)



PC Board Pattern (Top View)



Dimensions  
mm  
(inches)



# CLARE

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