CPC1230N

4 Pin SOP OptoMOS® Relay

	CPC1230	Units
Load Voltage	350	V
Load Current	120	mA
Max R_{ON}	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
- FCC Compatible
- 1500VRMS Input/Output Isolation
- 0.4mm Distance Through Insulation
- FCC Compatible
- 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® architecture. The optically coupled input is controlled by a highly efficient GaAlAs 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

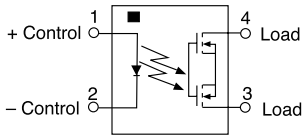
- UL/C-UL Recognized Component
  File #: E76270
- BSI Certified - Certificate #: 8416
  (Supplementary Isolation Requirement of EN60950)

Ordering Information

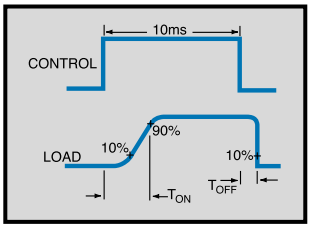
Part #	Description
CPC1230N	4 Pin SOP (100/tube)
CPC1230NTR	4 Pin SOP (2,000/reel)

Pin Configuration

CPC1030N Pinout



Switching Characteristics of Normally Open (Form A) Devices



Absolute Maximum Ratings (@ 25° C)

Parameter	Min	Typ	Max	Units
Input Power Dissipation	-	-	150[1]	mW
Input Control Current	-	-	50	mA
Peak (10ms)	-	-	1	A
Reverse Input Voltage	-	-	5	V
Total Power Dissipation	-	-	400[2]	mW
Capacitance				
Input to Output	-	1	-	pF
Isolation Voltage				
Input to Output	1500	-	-	V_{RMS}
Operational Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C
Soldering Temperature	-	-	+220	°C
(10 Seconds Max.)				

[1] Derate Linearly 1.33 mw / °C

[2] Derate Linearly 6.67 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
Output Characteristics @ 25°C						
Load Voltage (Peak)	-	V_L	-	-	350	V
Load Current (Continuous)						
AC Peak [1]		I_L	-	-	120	mA
Peak Load Current	10ms	I_{LPK}	-	-	350	mA
On-Resistance[2]	I_L=120mA	R_{ON}	-	25	30	Ω
Off-State Leakage Current	V_L=350V	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}	-		1.0	ms
Output Capacitance	50V; f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics @ 25°C						
Input Control Current [3]	I_L=120mA	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

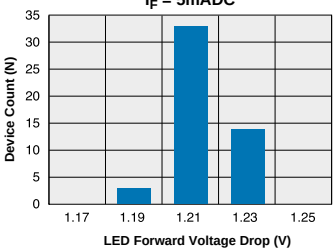
[1] Load current derates linearly from 120mA @ 25°C to 80mA @ 85°C.

[2] Measurement taken within 1 second of on time.

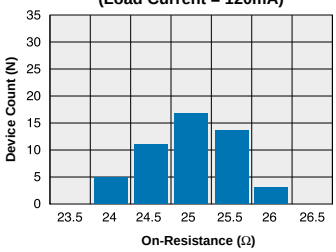
[3] For applications requiring high temperature operation (greater than 60°C) an LED drive current of 10mA is recomended.

PERFORMANCE DATA*

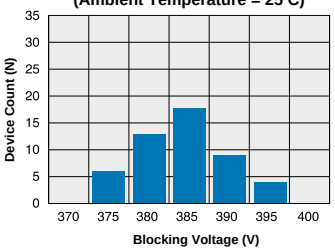
CPC1230N
Typical LED Forward Voltage Drop
(Ambient Temperature = 25°C)
I_F = 5mADC



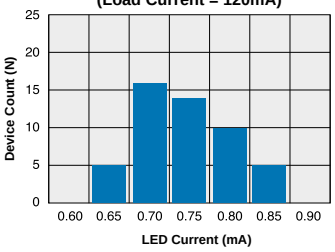
CPC1230N
Typical On-Resistance Distribution
(Ambient Temperature = 25°C)
(Load Current = 120mA)



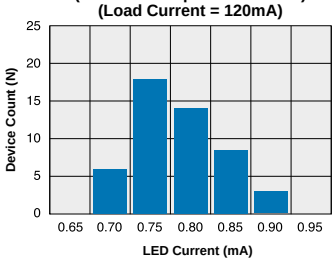
CPC1230N
Typical Blocking Voltage Distribution
(Ambient Temperature = 25°C)



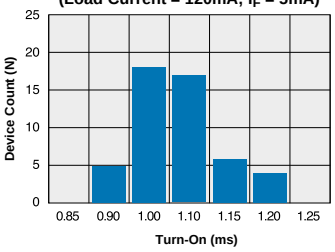
CPC1230N
Typical I_F for Switch Operation
(Ambient Temperature = 25°C)
(Load Current = 120mA)



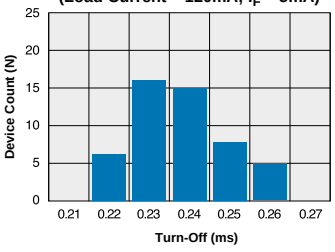
CPC1230N
Typical I_F for Switch Dropout
(Ambient Temperature = 25°C)
(Load Current = 120mA)



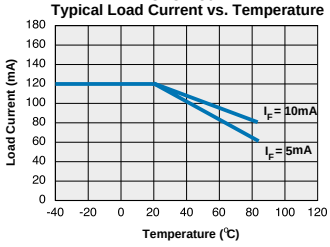
CPC1230N
Typical Turn-On Time
(Ambient Temperature = 25°C)
(Load Current = 120mA; I_F = 5mA)



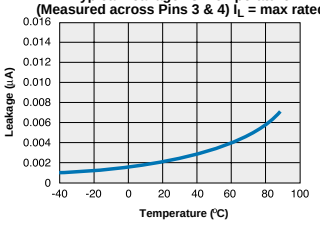
CPC1230N
Typical Turn-Off Time
(Ambient Temperature = 25°C)
(Load Current = 120mA; I_F = 5mA)



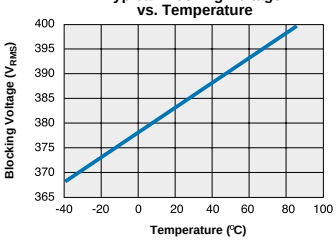
CPC1230N
Typical Load Current vs. Temperature



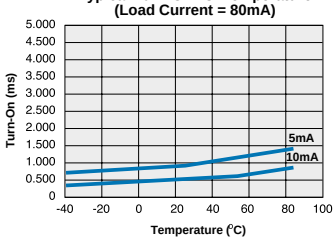
CPC1230N
Typical Leakage vs. Temperature
(Measured across Pins 3 & 4) I_L = max rated



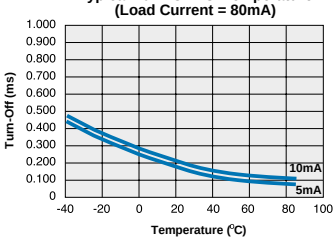
CPC1230N
Typical Blocking Voltage
vs. Temperature



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



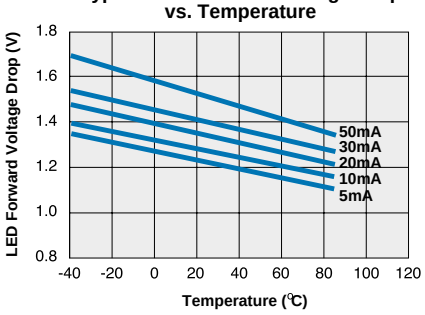
CPC1230N
Typical Turn-Off vs. Temperature
(Load Current = 80mA)



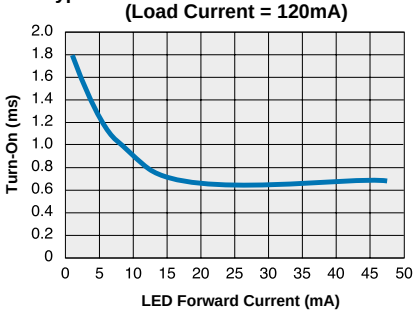
The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

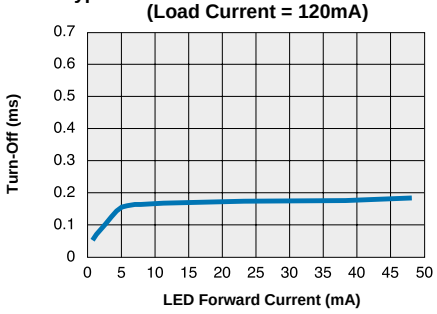
CPC1230N
Typical LED Forward Voltage Drop vs. Temperature



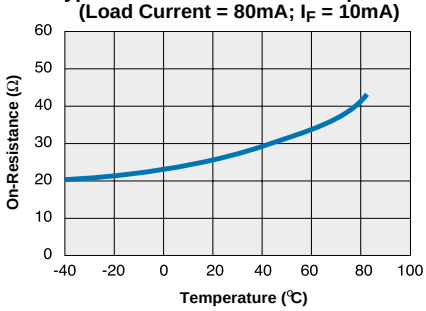
CPC1230N
Typical Turn-On vs. LED Forward Current (Load Current = 120mA)



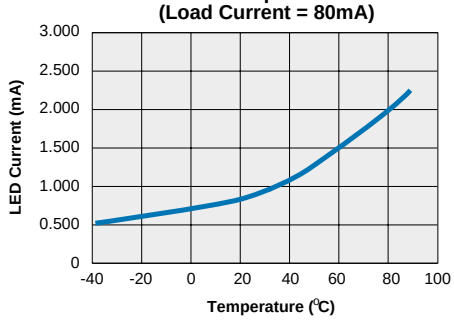
CPC1030N
Typical Turn-Off vs. LED Forward Current (Load Current = 120mA)



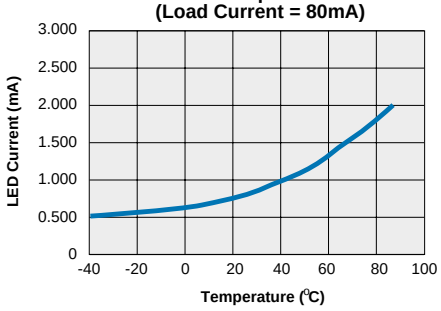
CPC1230N
Typical On-Resistance vs. Temperature (Load Current = 80mA; I_F = 10mA)



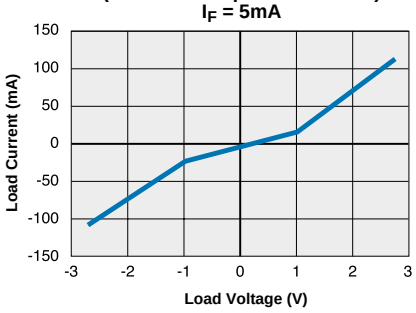
CPC1230N
Typical I_F for Switch Operation vs. Temperature (Load Current = 80mA)



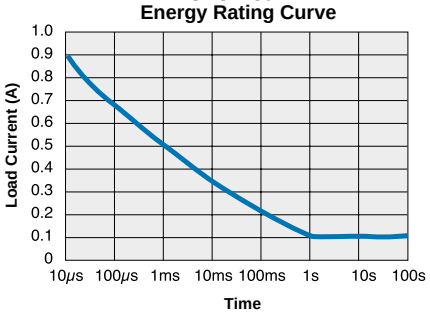
CPC1230N
Typical I_F for Switch Dropout vs. Temperature (Load Current = 80mA)



CPC1230N
Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C) I_F = 5mA



CPC1230N
Energy Rating Curve



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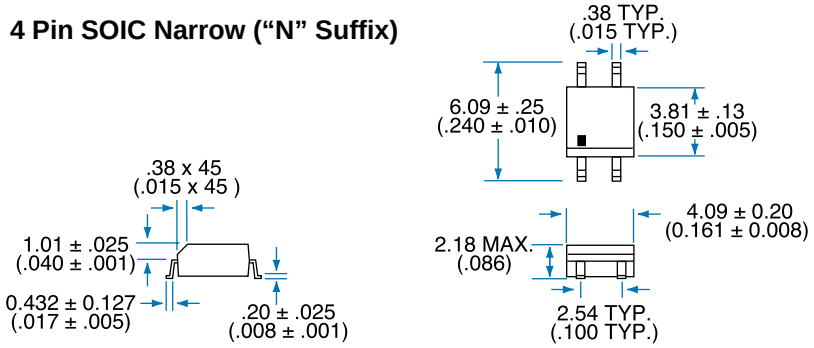
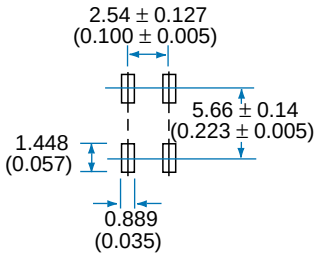
Mechanical Dimensions

4 Pin SOIC Narrow (“N” Suffix)



PC Board Pattern
(Top View)



Dimensions
mm
(inches)

CLARE

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Specification: DS-CPC1230N-R2

1/12/01