CPC1150N
4-Pin SOP OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage	350	V_P
Load Current	120	mA
Max On-resistance	50	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_{rms} Input/Output Isolation
- 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 CPC1150N is a miniature 1-Form-B solid state relay which uses optically coupled MOSFET technology to provide 1500V_{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 CPC1150N uses Clare's state of the art double molded vertical construction packaging to produce the world's smallest 4-Pin SOP package. The CPC1150N offers board space savings of at least 20% over the competitor's larger 4-Pin SOP relay.

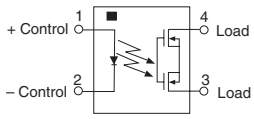
Approvals
- UL Recognized Component: File #E76270
- Certified to EN60950

Ordering Information

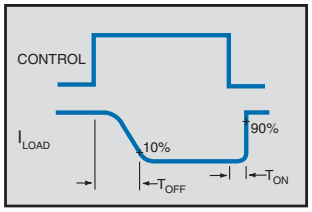
Part #	Description
CPC1150N	4-Pin SOP (100/tube)
CPC1150NTR	4-Pin SOP (2000/reel)

Pin Configuration

CPC1150N Pinout



Switching Characteristics of Normally Closed (Form B) Devices



Absolute Maximum Ratings (@ 25˚C)

Parameter	Ratings	Units
Blocking Voltage	350	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation	150	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.

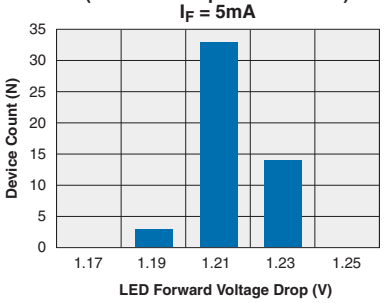
Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current						
Continuous [1]	-	I_L	-	-	120	mA
Peak	t = 10ms	I_{LPK}	-	-	350	
On-Resistance	I_L=120mA	R_{ON}	-	-	50	Ω
Off-State Leakage Current	V_L=350V, I_F=2mA	I_{LEAK}	-	-	5	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	T_{ON}	-	-	1	ms
Turn-Off		T_{OFF}	-	-	2	
Output Capacitance	50V; f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics @ 25°C						
Input Control Current [2]	I_L=120mA	I_F	-	-	2	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 Current	V_R=5V	I_R	-	-	10	µA

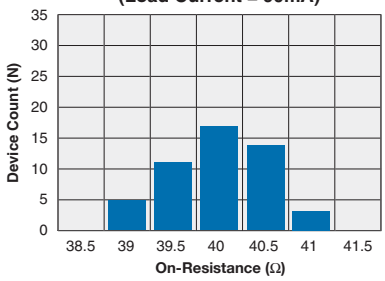
[1] Load current derates linearly from 120mA @ 25ºC to 85mA @ 85ºC.
[2] For applications requiring high temperature operation (greater than 60°C) an LED drive current of 8mA is recommended.

PERFORMANCE DATA*

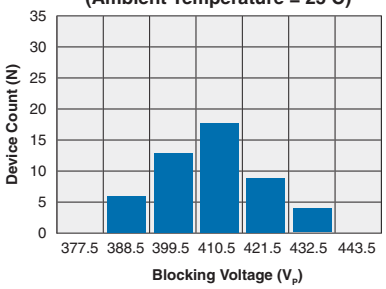
CPC1150N
Typical LED Forward Voltage Drop
(Ambient Temperature = 25°C)
I_F = 5mA



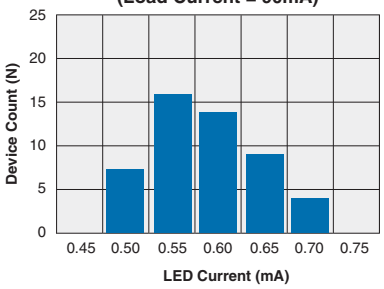
CPC1150N
Typical On-Resistance Distribution
(Ambient Temperature = 25°C)
(Load Current = 90mA)



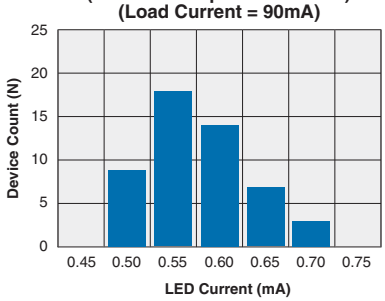
CPC1150N
Typical Blocking Voltage Distribution
(Ambient Temperature = 25°C)



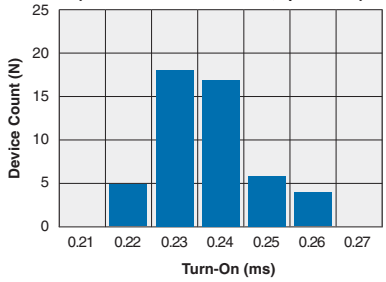
CPC1150N
Typical I_F for Switch Operation
(Ambient Temperature = 25°C)
(Load Current = 90mA)



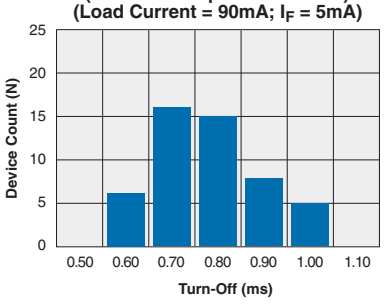
CPC1150N
Typical I_F for Switch Dropout
(Ambient Temperature = 25°C)
(Load Current = 90mA)



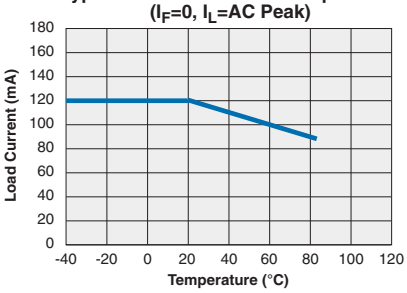
CPC1150N
Typical Turn-On Time
(Ambient Temperature = 25°C)
(Load Current = 90mA; I_F = 5mA)



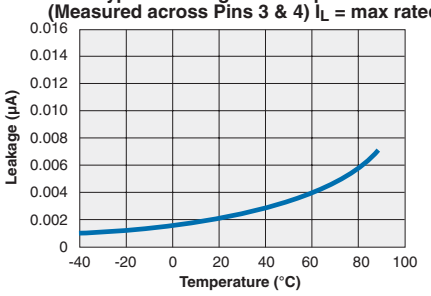
CPC1150N
Typical Turn-Off Time
(Ambient Temperature = 25°C)
(Load Current = 90mA; I_F = 5mA)



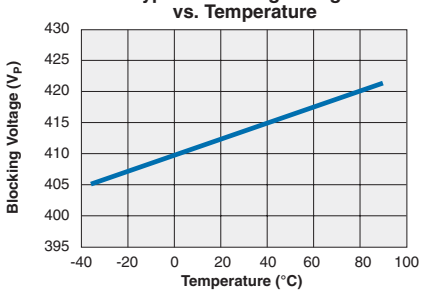
CPC1150N
Typical Load Current vs. Temperature
(I_F=0, I_L=AC Peak)



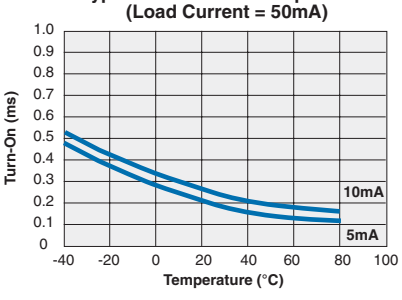
CPC1150N
Typical Leakage vs. Temperature
(Measured across Pins 3 & 4) I_L = max rated



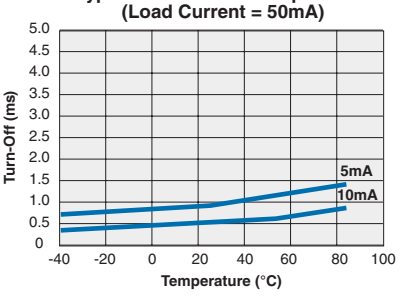
CPC1150N
Typical Blocking Voltage
vs. Temperature



CPC1150N
Typical Turn-On vs. Temperature
(Load Current = 50mA)



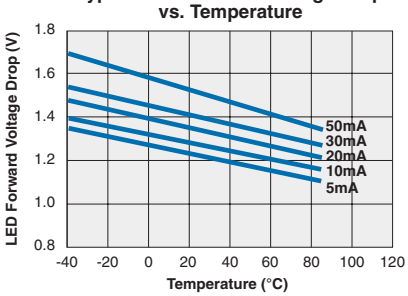
CPC1150N
Typical Turn-Off vs. Temperature
(Load Current = 50mA)



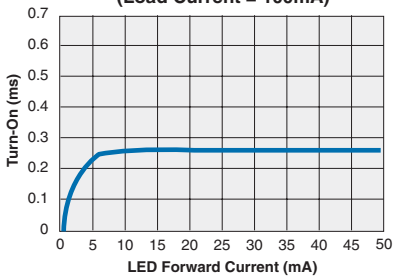
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

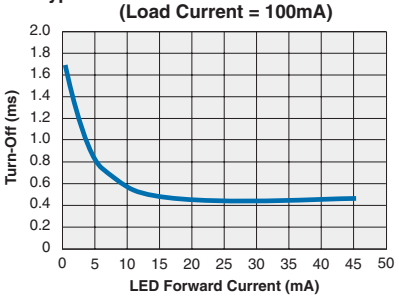
CPC1150N
Typical LED Forward Voltage Drop vs. Temperature



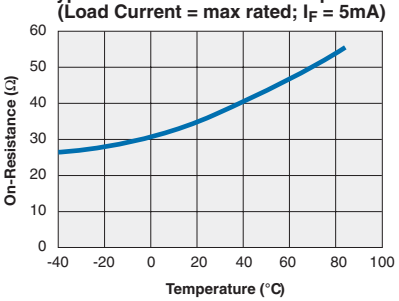
CPC1150N
Typical Turn-On vs. LED Forward Current (Load Current = 100mA)



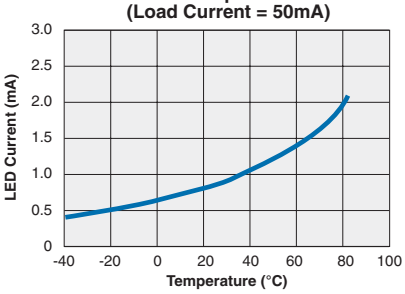
CPC1150N
Typical Turn-Off vs. LED Forward Current (Load Current = 100mA)



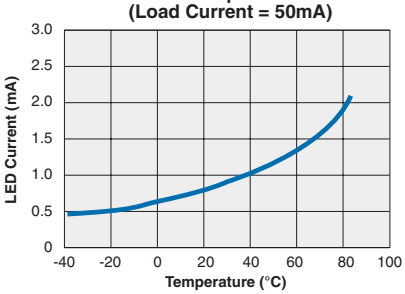
CPC1150N
Typical On-Resistance vs. Temperature (Load Current = max rated; I_F = 5mA)



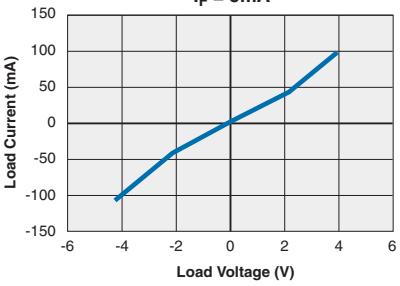
CPC1150N
Typical I_F for Switch Operation vs. Temperature (Load Current = 50mA)



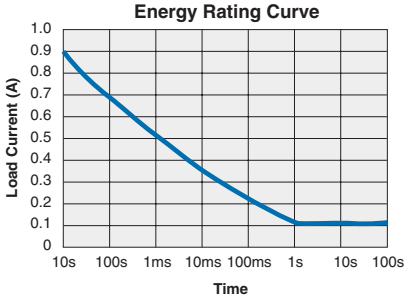
CPC1150N
Typical I_F for Switch Turn-on vs. Temperature (Load Current = 50mA)



CPC1150N
Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C) I_F = 5mA



CPC1150N
Energy Rating Curve



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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

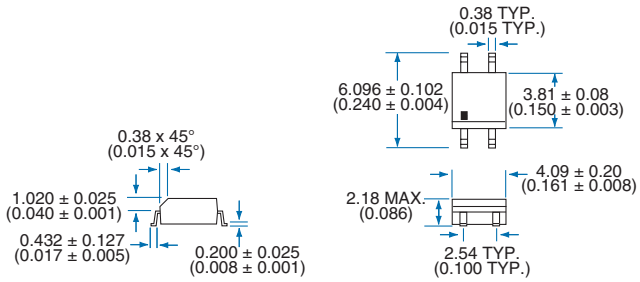
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Washing

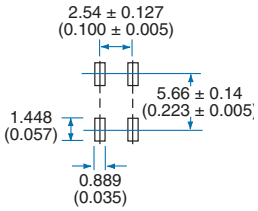
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

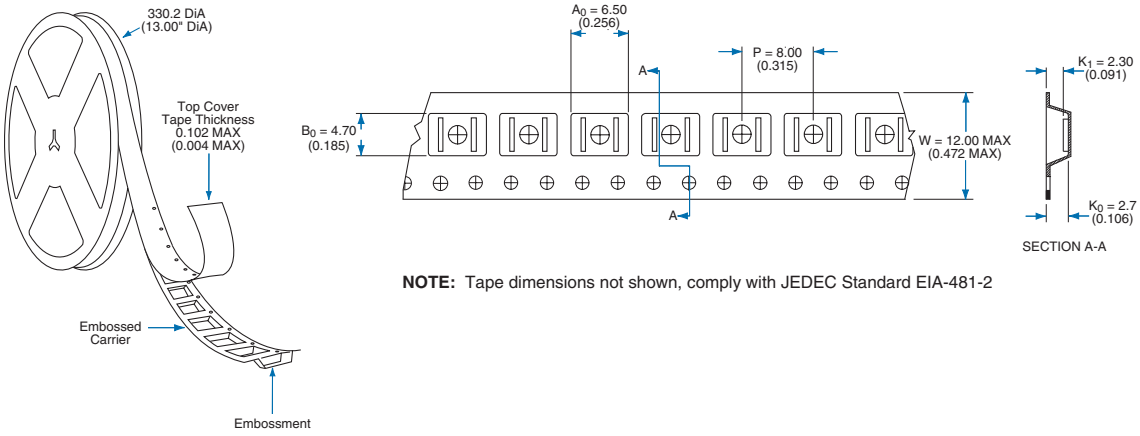
4-Pin SOIC Narrow ("N" Suffix)



PC Board Pattern (Top View)



Tape and Reel Packaging for 4-pin SOP 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-CPC1150N-R04