CPC1004N
4 Pin SOP OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage (DC)	100	V_P
Load Current (DC)	300	mA
Max On-resistance	4	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
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
  - Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security Systems
- Aerospace
- Industrial Controls
- Reed Relay Replacement

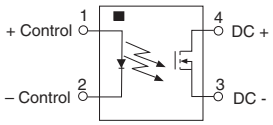
Description
CPC1004N is a miniature, low-voltage, low on-resistance 1-Form-A DC solid state relay in a 4-pin SOP package. The relay uses optically coupled MOSFET technology to provide $1500V_{rms}$ of input/output isolation. The efficient MOSFET switch and photovoltaic die use Clare's patented OptoMOS architecture. The optically coupled input is controlled by a highly efficient GaAlAs infrared LED. The CPC1004N uses Clare's state of the art double-molded vertical construction packaging to produce one of the world's smallest relays. The CPC1004N is ideal for replacing larger, less-reliable reed and electromechanical relays.

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

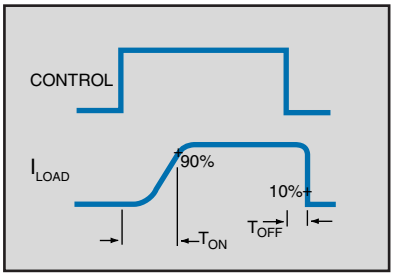
Ordering Information

Part #	Description
CPC1004N	4 Pin SOP (100/tube)
CPC1004NTR	4 Pin SOP (2000/reel)

Pin Configuration



Switching Characteristics of Normally Open (Form A) Devices



Absolute Maximum Ratings (@ 25˚C)

Parameter	Ratings	Units
Blocking Voltage	100	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation	70	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 +110	°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.

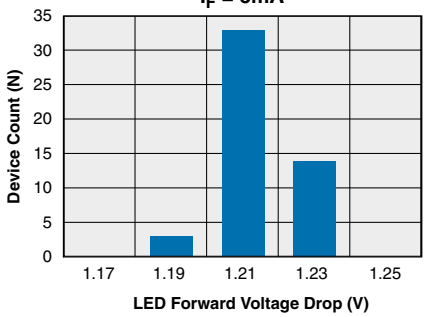
Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C (Unless Otherwise Specified)						
Load Current						
Continuous [1]	-	I_L	-	-	300	mA_{DC}
Continuous	T=110°C, I_F=10mA		-	-	100	
Peak	t=10ms	I_{LPK}	-	-	500	
On-Resistance [2]	I_L=300mA	R_{ON}	-	-	4	Ω
Off-State Leakage Current	V_L=100V	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	T_{ON}	-	-	3	ms
Turn-Off		T_{OFF}	-	-	1	
Output Capacitance	50V; f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics @ 25°C						
Input Control Current	I_L=300mA	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

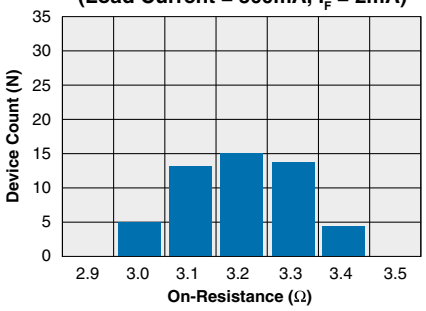
[1] Load current derates linearly from 300mA @ 25ºC to 100mA @ 110ºC.
[2] Measurement taken within 1 second of on time.

PERFORMANCE DATA*

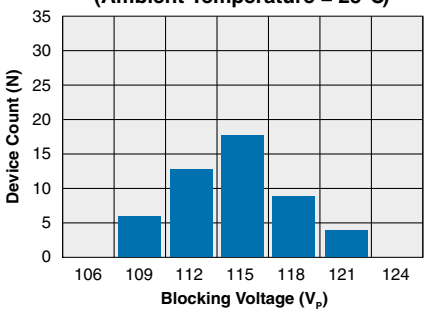
CPC1004N
Typical LED Forward Voltage Drop
(Ambient Temperature = 25°C)
I_F = 5mA



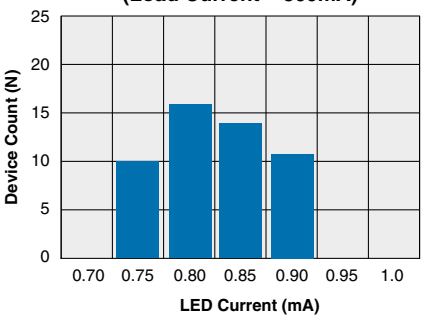
CPC1004N
Typical On-Resistance Distribution
(Ambient Temperature = 25°C)
(Load Current = 300mA, I_F = 2mA)



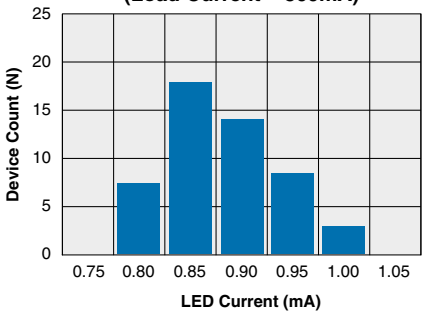
CPC1004N
Typical Blocking Voltage Distribution
(Ambient Temperature = 25°C)



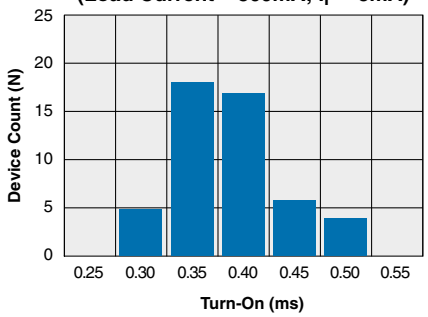
CPC1004N
Typical I_F for Switch Operation
(Ambient Temperature = 25°C)
(Load Current = 300mA)



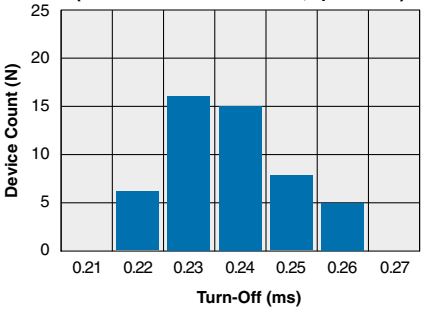
CPC1004N
Typical I_F for Switch Dropout
(Ambient Temperature = 25°C)
(Load Current = 300mA)



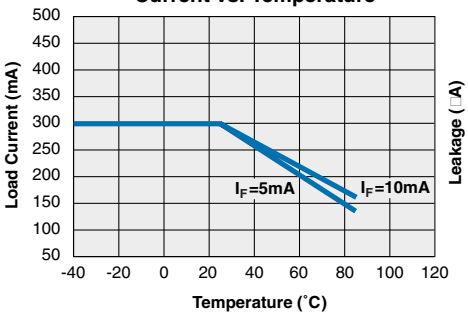
CPC1004N
Typical Turn-On Time
(Ambient Temperature = 25°C)
(Load Current = 300mA; I_F = 5mA)



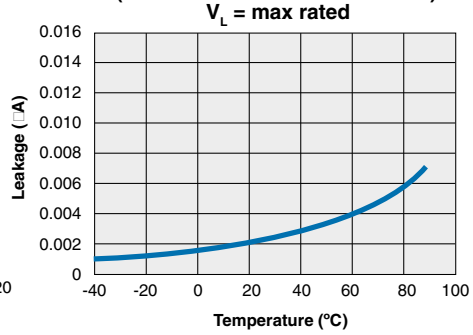
CPC1004N
Typical Turn-Off Time
(Ambient Temperature = 25°C)
(Load Current = 200mA; I_F = 5mA)



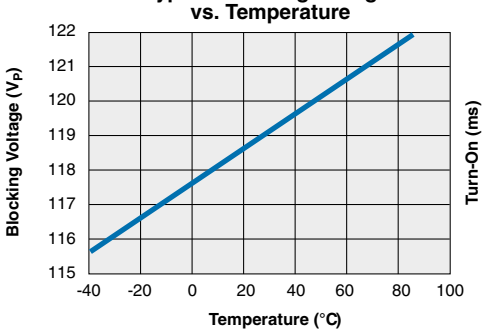
CPC1004N
Typical Maximum Load
Current vs. Temperature



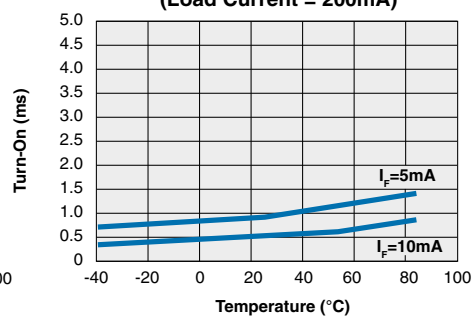
CPC1004N
Typical Leakage vs. Temperature
(Measured across Pin 4 to Pin 3)
V_L = max rated



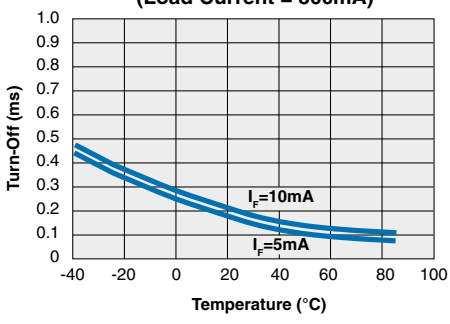
CPC1004N
Typical Blocking Voltage
vs. Temperature



CPC1004N
Typical Turn-On vs. Temperature
(Load Current = 200mA)



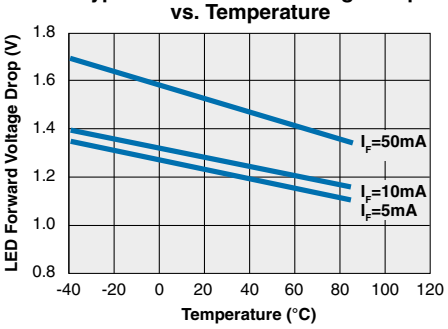
CPC1004N
Typical Turn-Off vs. Temperature
(Load Current = 300mA)



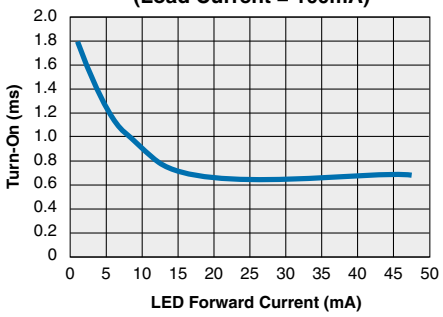
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

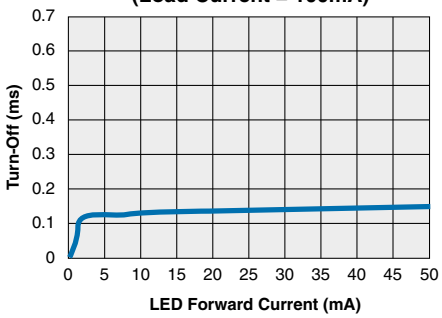
CPC1004N
Typical LED Forward Voltage Drop vs. Temperature



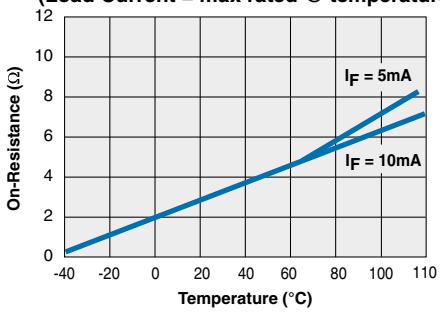
CPC1004N
Typical Turn-On vs. LED Forward Current (Load Current = 100mA)



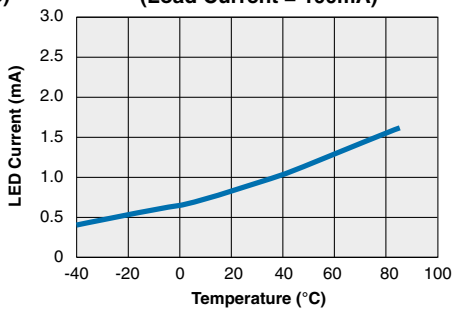
CPC1004N
Typical Turn-Off vs. LED Forward Current (Load Current = 100mA)



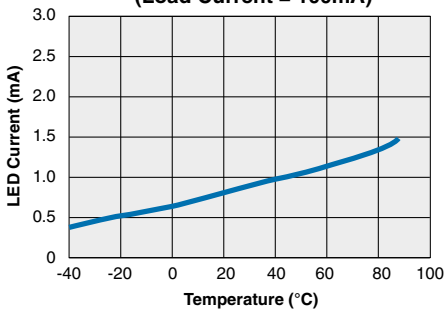
CPC1004N
Typical On-Resistance vs. Temperature (Load Current = max rated @ temperature)



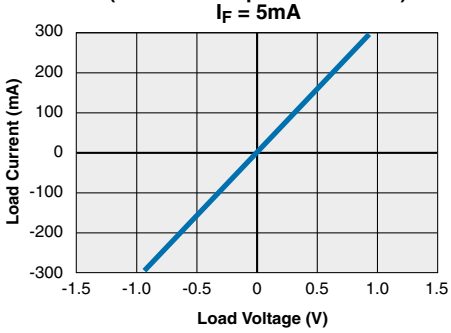
CPC1004N
Typical I_F for Switch Operation vs. Temperature (Load Current = 100mA)



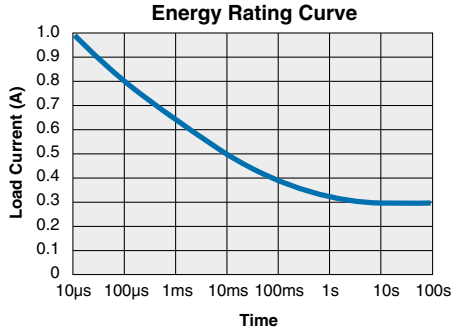
CPC1004N
Typical I_F for Switch Dropout vs. Temperature (Load Current = 100mA)



CPC1004N
Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C) I_F = 5mA



CPC1004N
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

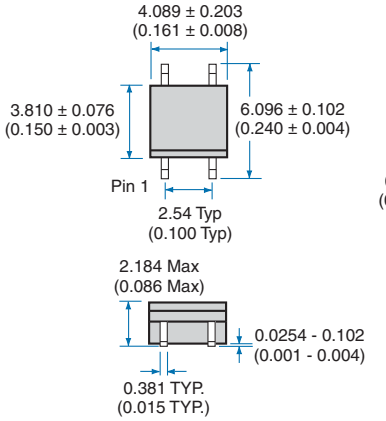
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Washing

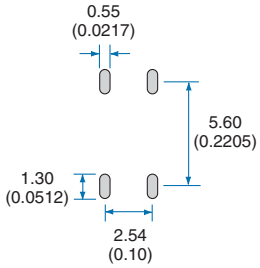
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

4-Pin SOP Package

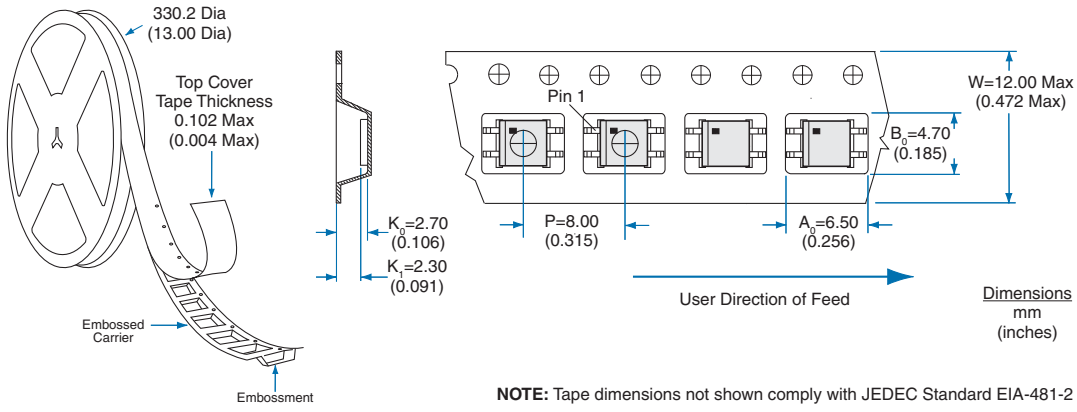


Recommended PCB Land Pattern



Dimensions
mm
(inches)

Tape and Reel Packaging for 4-Pin SOP Package



Dimensions
mm
(inches)

NOTE: Tape dimensions not shown comply with JEDEC Standard EIA-481-2

For additional information please visit our website at: www.clare.com

Specification: DS-CPC1004N-R04

2/27/08