CPC1004N
4 Pin SOP OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage	100	V_P
Load Current	300	mA_{DC}
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

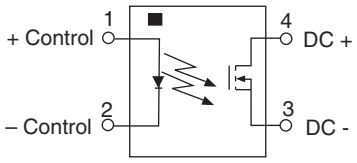
Description
CPC1004N is a miniature, low-voltage, low on-resistance 1-Form-A DC solid state relay in a 4-pin SOP package. The relay uses optically coupled MOSFET technology to provide $1500V_{rms}$ of input/output isolation. The efficient MOSFET switch and photovoltaic die use Clare's patented OptoMOS 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

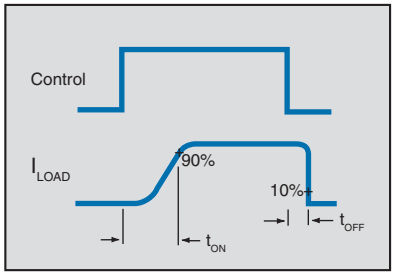
Ordering Information

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

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

Electrical absolute maximum ratings are at 25°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.

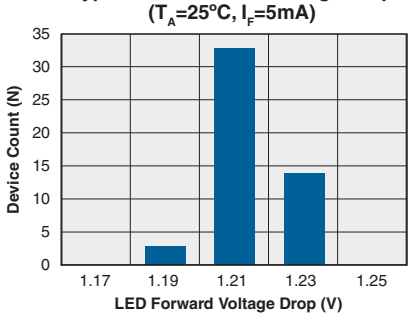
Electrical Characteristics

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	-	0.9	2	mA
Input Dropout Current	-	I_F	0.3	0.8	-	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

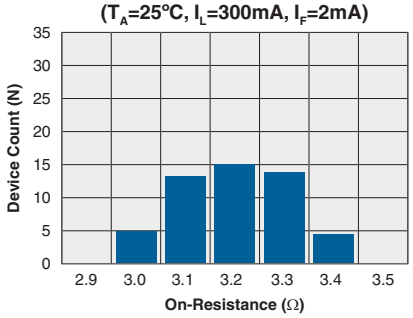
[1] Load current derates linearly from 300mA @ 25°C to 100mA @ 110°C.
[2] Measurement taken within 1 second of on time.

PERFORMANCE DATA*

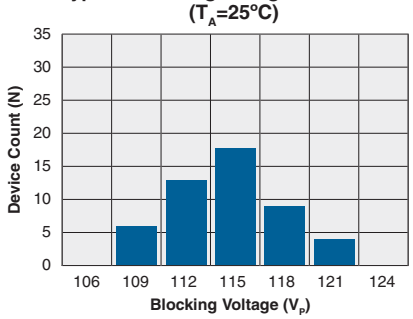
Typical LED Forward Voltage Drop (T_A=25°C, I_F=5mA)



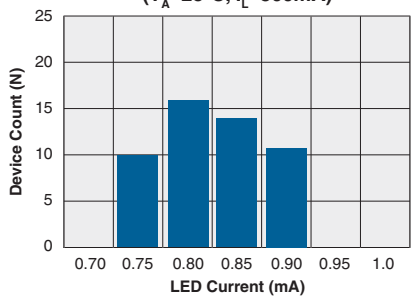
Typical On-Resistance Distribution (T_A=25°C, I_L=300mA, I_F=2mA)



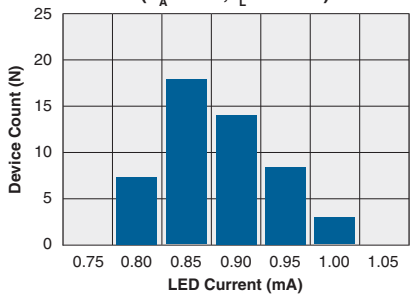
Typical Blocking Voltage Distribution (T_A=25°C)



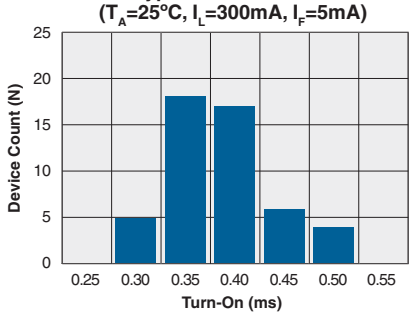
Typical I_F for Switch Operation (T_A=25°C, I_L=300mA)



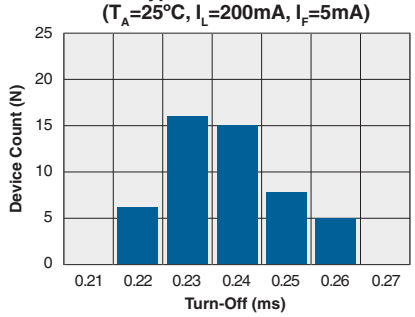
Typical I_F for Switch Dropout (T_A=25°C, I_L=300mA)



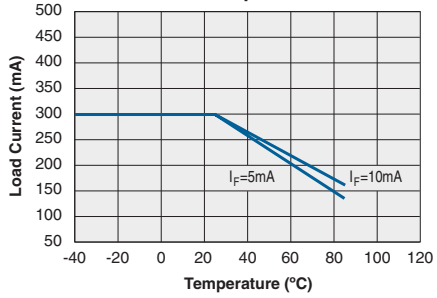
Typical Turn-On Time (T_A=25°C, I_L=300mA, I_F=5mA)



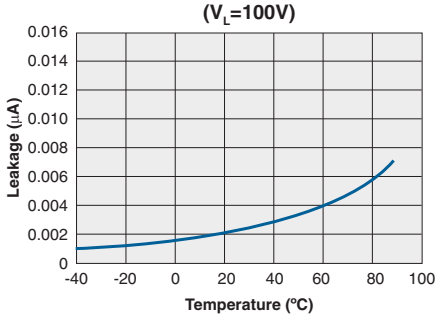
Typical Turn-Off Time (T_A=25°C, I_L=200mA, I_F=5mA)



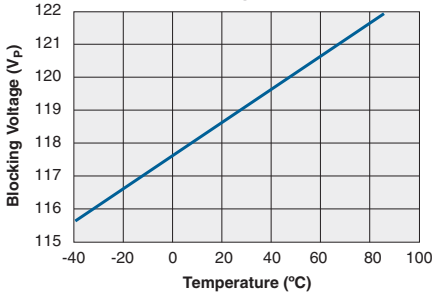
Typical Maximum Load Current vs. Temperature



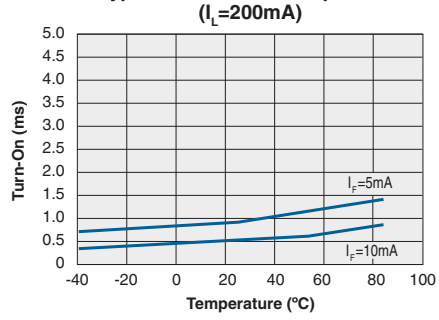
Typical Leakage vs. Temperature Measured Across Pins 3 & 4 (V_L=100V)



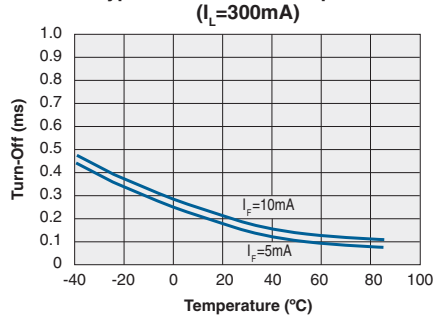
Typical Blocking Voltage vs. Temperature



Typical Turn-On vs. Temperature (I_L=200mA)



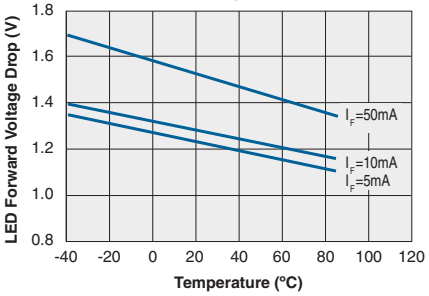
Typical Turn-Off vs. Temperature (I_L=300mA)



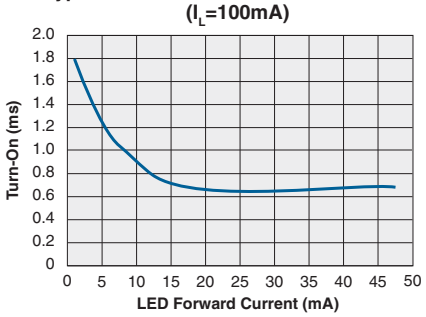
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

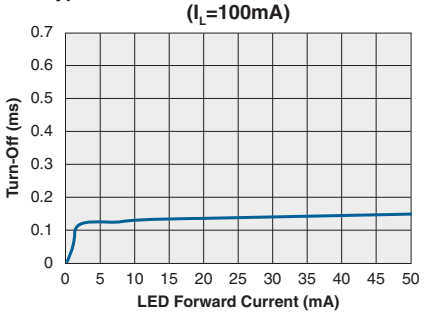
Typical LED Forward Voltage Drop vs. Temperature



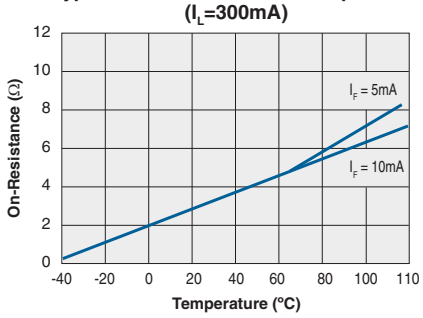
Typical Turn-On vs. LED Forward Current (I_L=100mA)



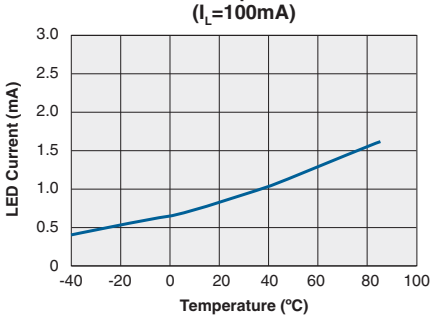
Typical Turn-Off vs. LED Forward Current (I_L=100mA)



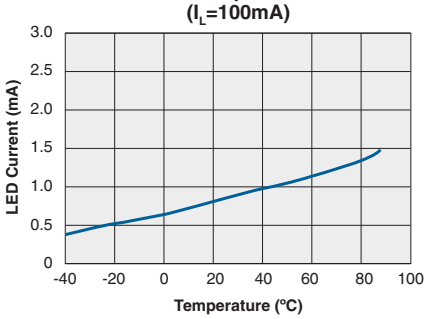
Typical On-Resistance vs. Temperature (I_L=300mA)



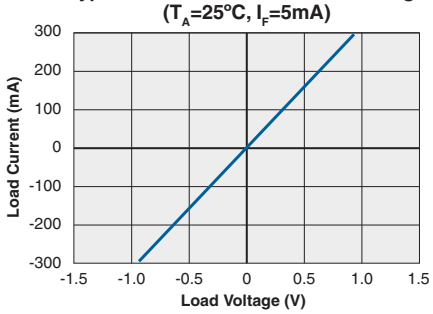
Typical I_F for Switch Operation vs. Temperature (I_L=100mA)



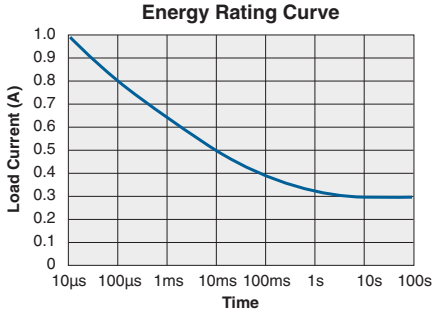
Typical I_F for Switch Dropout vs. Temperature (I_L=100mA)



Typical Load Current vs. Load Voltage (T_A=25°C, I_F=5mA)



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

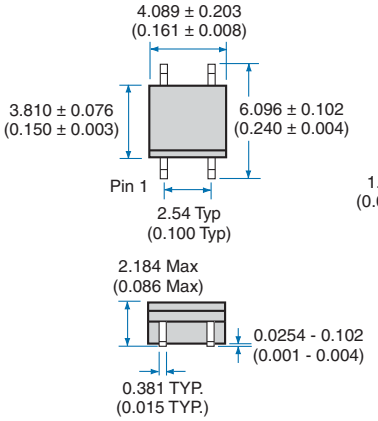
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Washing

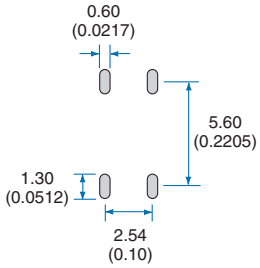
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

4-Pin SOP Package

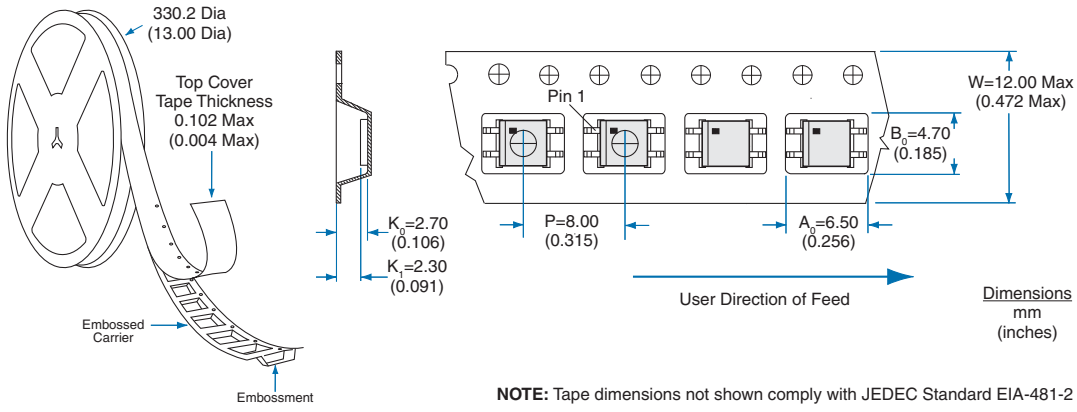


Recommended PCB Land Pattern



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-R05

9/2/08