CPC1016N

4 Pin SOP OptoMOS® Relay

	CPC1016N	Units
Load Voltage	100	V
Load Current	100	mA
Max R_{ON}	16	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
- FCC Compatible
- 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

CPC1016N is a miniature low voltage, low on resistance 1-Form-A solid state relay in a 4 pin SOP package. The relay uses optically coupled MOSFET technology to provide 1500V 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 CPC1016N uses Clare's state of the art double molded vertical construction packaging to produce the world's smallest relay. The CPC1016N is ideal for replacing larger less reliable reed and electromechanical relays.

Approvals

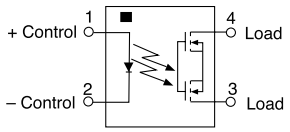
- UL/C-UL Recognized Component File #: E76270
- BSI Certified - Certificate #: 8416

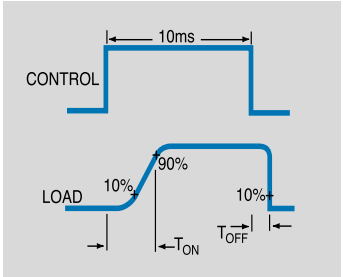
Ordering Information

Part #	Description
CPC1016N	4 Pin SOP (100/Tube)
CPC1016NTR	4 Pin SOP (2,000/Reel)

Pin Configuration

CPC1016N Pinout





Absolute Maximum Ratings (@ 25° C)

Parameter	Min	Typ	Max	Units
Input Power Dissipation	-	-	70	mW
Input Control Current Peak (10ms)	- -	- -	50 1	mA A
Reverse Input Voltage	-	-	5	V
Total Power Dissipation	-	-	400[1]	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 (10 Seconds Max.)			+220	°C

1 Derate Linearly 3.33 mw / oC

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

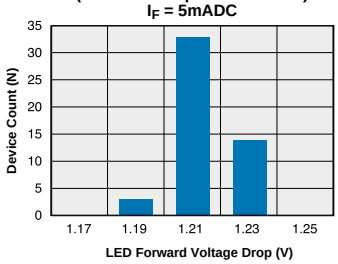
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Voltage (Peak)	-	V_L	-	-	100	V
Load Current (Continuous)[1]		I_L	-	-	100	mA
Peak Load Current	10ms	I_{LPK}	-	-	350	mA
On-Resistance [2]	I_L=100mA	R_{ON}	-	-	16	Ω
Off-State Leakage Current	V_L=100V	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	T_{ON}	-	-	2	ms
Turn-Off	I_F=5mA, V_L=10V	T_{OFF}	-		0.5	ms
Output Capacitance	50V; f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics @ 25°C						
Input Control Current	I_L=100mA	I_F	2	-	50	mA
Input Dropout Current	-	I_F	0.3	0.9	-	mA
Input Voltage Drop	I_F=5mA	VF	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 100mA @ 25ºC to approximately 85mA @ 85ºC.

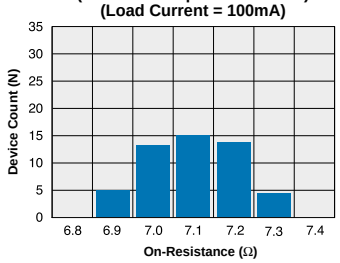
2 Measurement taken within 1 second of on time.

PERFORMANCE DATA*

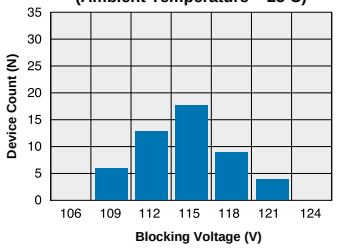
CPC1016N
Typical LED Forward Voltage Drop
(Ambient Temperature = 25°C)
I_F = 5mADC



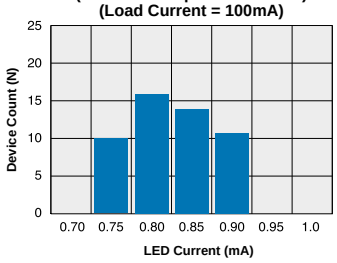
CPC1016N
Typical On-Resistance Distribution
(Ambient Temperature = 25°C)
(Load Current = 100mA)



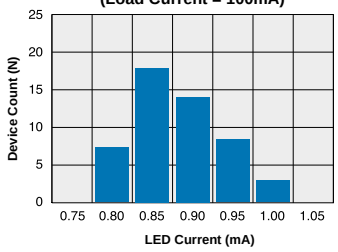
CPC1016N
Typical Blocking Voltage Distribution
(Ambient Temperature = 25°C)



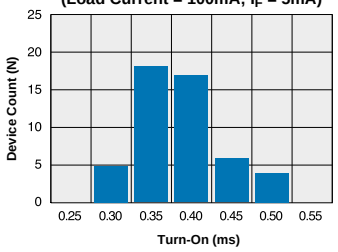
CPC1016N
Typical I_F for Switch Operation
(Ambient Temperature = 25°C)
(Load Current = 100mA)



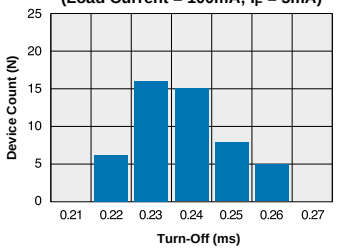
CPC1016N
Typical I_F for Switch Dropout
(Ambient Temperature = 25°C)
(Load Current = 100mA)



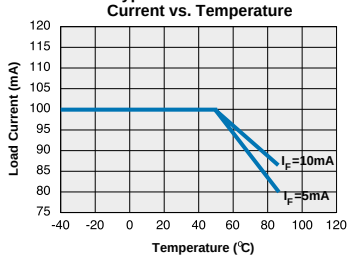
CPC1016N
Typical Turn-On Time
(Ambient Temperature = 25°C)
(Load Current = 100mA; I_F = 5mA)



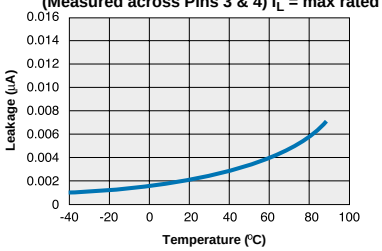
CPC1016N
Typical Turn-Off Time
(Ambient Temperature = 25°C)
(Load Current = 100mA; I_F = 5mA)



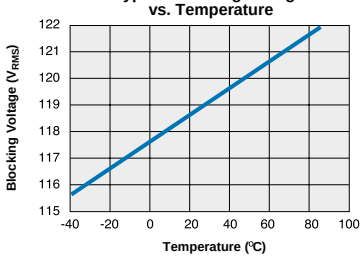
CPC1016N
Typical MaximumLoad
Current vs. Temperature



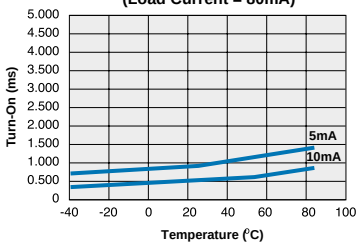
CPC1016N
Typical Leakage vs. Temperature
(Measured across Pins 3 & 4) I_L = max rated



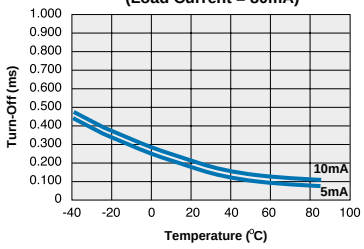
CPC1016N
Typical Blocking Voltage
vs. Temperature



CPC1016N
Typical Turn-On vs. Temperature
(Load Current = 80mA)



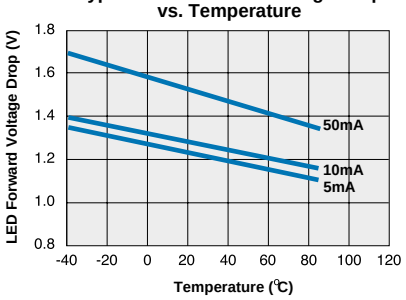
CPC1016N
Typical Turn-Off vs. Temperature
(Load Current = 80mA)



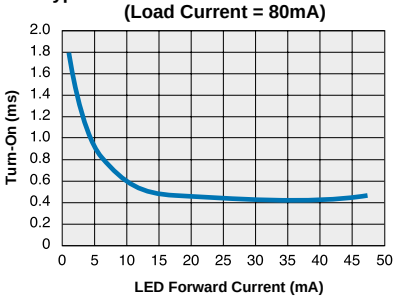
The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

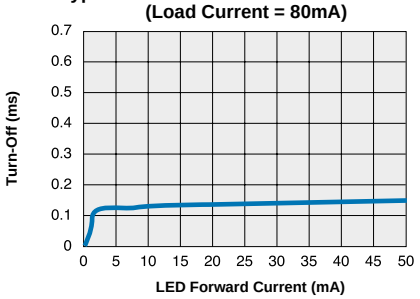
CPC1016N
Typical LED Forward Voltage Drop vs. Temperature



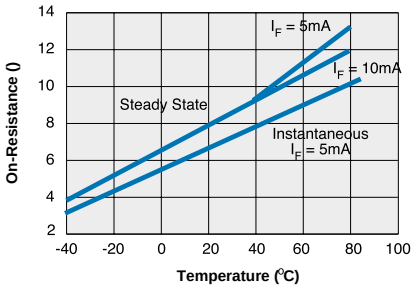
CPC1016N
Typical Turn-On vs. LED Forward Current (Load Current = 80mA)



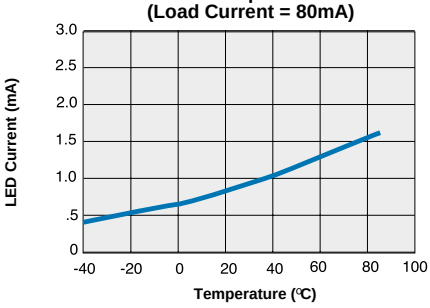
CPC1016N
Typical Turn-Off vs. LED Forward Current (Load Current = 80mA)



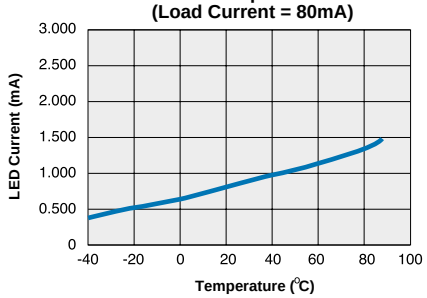
CPC1016N
Typical On-Resistance vs. Temperature (Load Current = max rated @ temperature)



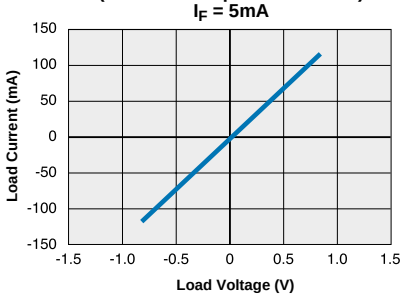
CPC1016N
Typical I_F for Switch Operation vs. Temperature (Load Current = 80mA)



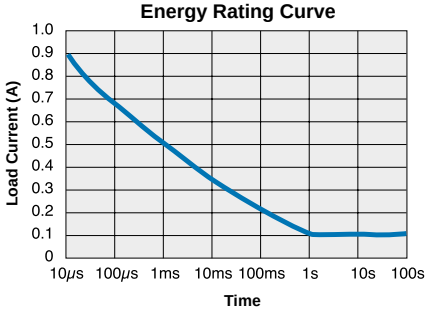
CPC1016N
Typical I_F for Switch Dropout vs. Temperature (Load Current = 80mA)



CPC1016N
Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C)
I_F = 5mA



CPC1016N
Energy Rating Curve



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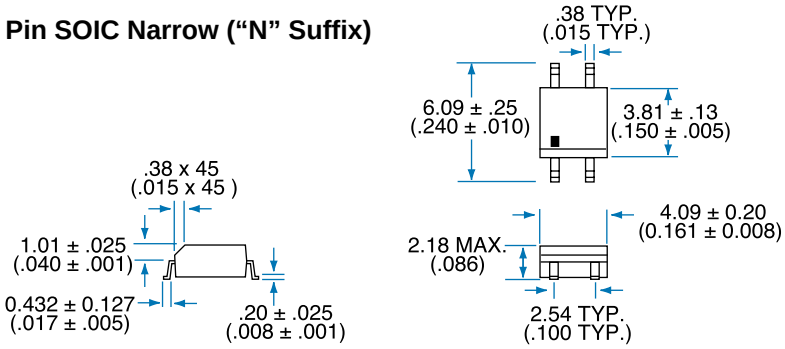
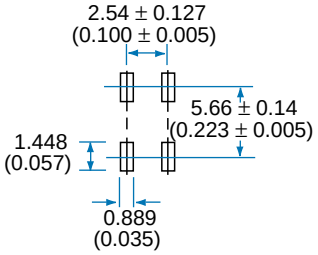
Mechanical Dimensions

4 Pin SOIC Narrow (“N” Suffix)



PC Board Pattern
(Top View)



Dimensions
mm
(inches)

CLARE

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Specification: DS-CPC1016N-R1

1/12/01