CPC1916
Single-Pole, Normally Open OptoMOS® Power SIP Relay

Parameter	Rating	Units
Blocking Voltage	100	V_P
Load Current	2.5	A_{DC}/A_{rms}
On-Resistance	0.34	Ω

Features

- Handle Load Currents Up to $2.5A_{DC}/A_{rms}$
- $2500V_{rms}$ Input/Output Isolation
- Power SIP Package
- High Reliability
- No Moving Parts
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable

Applications

- Industrial Controls
- Motor Control
- Robotics
- Medical Equipment—Patient/Equipment Isolation
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
  - Meters (Watt-Hour, Water, Gas)
- IC Equipment
- Home Appliances

Description

Clare and IXYS have combined to bring OptoMOS® technology, reliability, and compact size to a new family of high-power, solid state relays. As part of that family, the CPC1916 is a single-pole, normally open (1-Form-A) solid state relay. The CPC1916 employs optically coupled MOSFET technology to provide $2500V_{rms}$ of input to output isolation. The efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS architecture, while the output is controlled by a highly efficient GaAlAs infrared LED. The combination of low on-resistance and high load-current handling capabilities makes the relay suitable for a variety of high-performance switching applications.

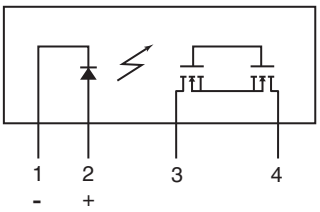
Approvals

- UL 508 Certified Component: File E69938

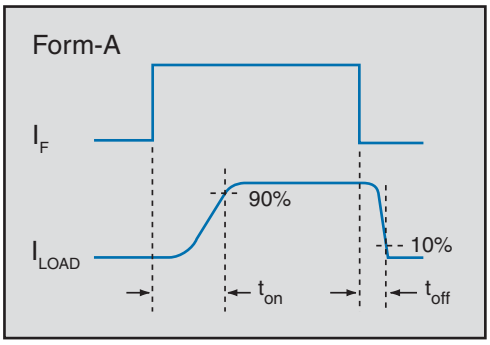
Ordering Information

Part #	Description
CPC1916Y	4-Pin (8-Pin Body) Power SIP Package (25 per tube)

Pin Configuration



Switching Characteristics of Normally Open 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 [1]	150	mW
Isolation Voltage, Input to Output	2500	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 @ 25°C

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current, Continuous	Free air	I_L	-	-	2.5	A_{DC}/A_{rms}
Peak Load Current	t ≤ 10ms	I_{LPK}	-	-	6	A_P
On-Resistance [1]	I_L=1A	R_{ON}	-	-	0.34	Ω
Off-State Leakage Current	V_L=100V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=10mA, V_L=10V	t_{on}	-	-	5	ms
Turn-Off		t_{off}	-	-	3	
Input Characteristics						
Input Control Current	I_L=1A	I_F	-	3.3	10	mA
Input Dropout Current	-	I_F	0.3	-	-	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
Common Characteristics						
Capacitance, Input/Output	-	-	-	2	-	pF

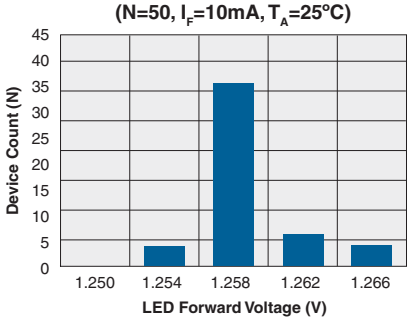
[1] Measurement taken within 1 second of on-time.

Thermal Characteristics

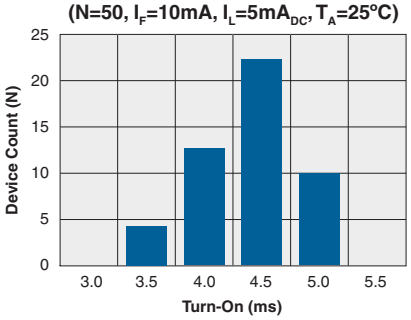
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Thermal Resistance (junction to case)	-	$R_{\theta JC}$	-	1.5	-	°C/W

PERFORMANCE DATA*

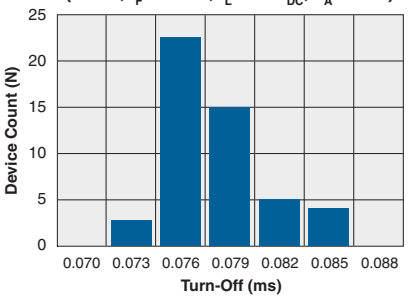
Typical LED Forward Voltage Drop
(N=50, I_F=10mA, T_A=25°C)



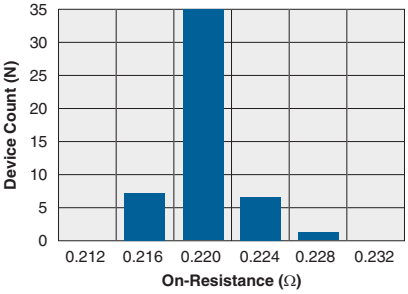
Typical Turn-On Time
(N=50, I_F=10mA, I_L=5mA$_{DC}$, T_A=25°C)



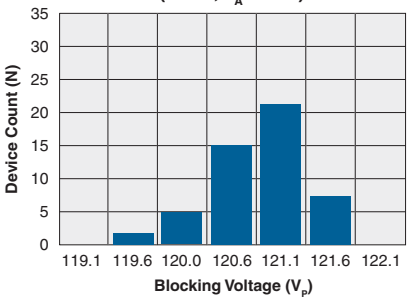
Typical Turn-Off Time
(N=50, I_F=10mA, I_L=5mA$_{DC}$, T_A=25°C)



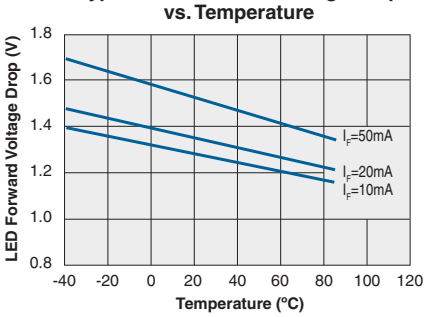
Typical On-Resistance Distribution
(N=50, I_F=10mA, I_L=1.0A$_{DC}$, T_A=25°C)



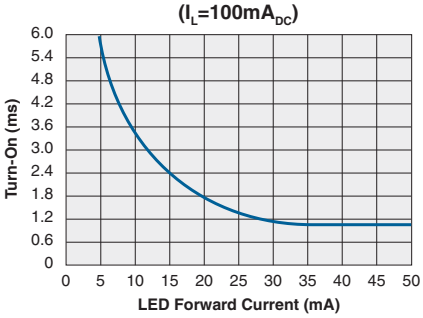
Typical Blocking Voltage Distribution
(N=50, T_A=25°C)



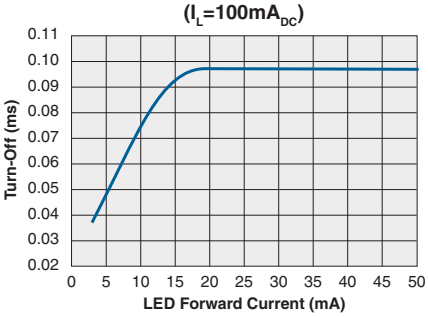
Typical LED Forward Voltage Drop vs. Temperature



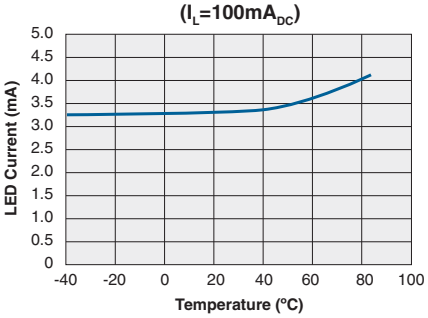
Typical Turn-On vs. LED Forward Current
(I_L=100mA$_{DC}$)



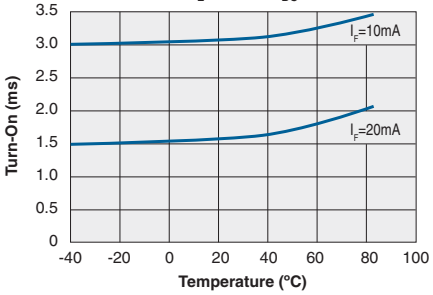
Typical Turn-Off vs. LED Forward Current
(I_L=100mA$_{DC}$)



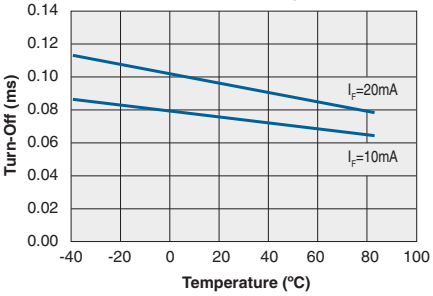
Typical I_F for Switch Operation vs. Temperature
(I_L=100mA$_{DC}$)



Typical Turn-On vs. Temperature
(I_L=100mA$_{DC}$)



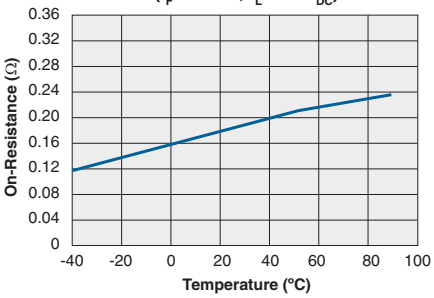
Typical Turn-Off vs. Temperature
(I_L=100mA$_{DC}$)



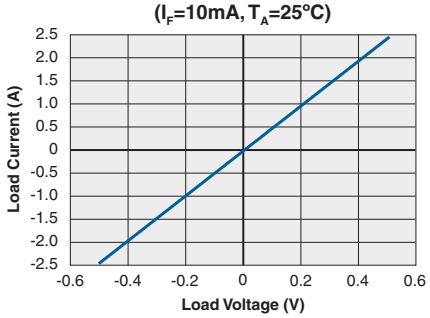
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

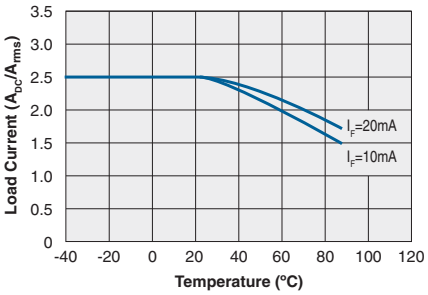
Typical On-Resistance vs. Temperature (I_F=10mA, I_L=1.0A_{DC})



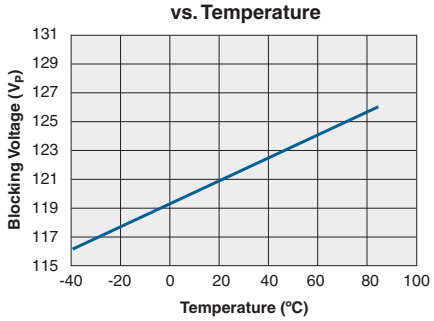
Typical Load Current vs. Load Voltage (I_F=10mA, T_A=25°C)



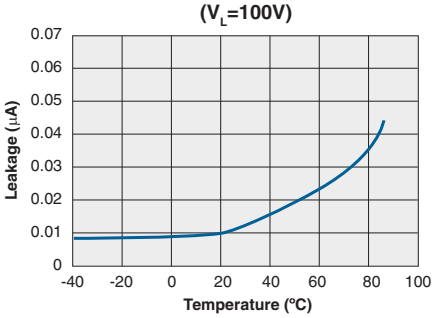
Typical Load Current vs. Temperature



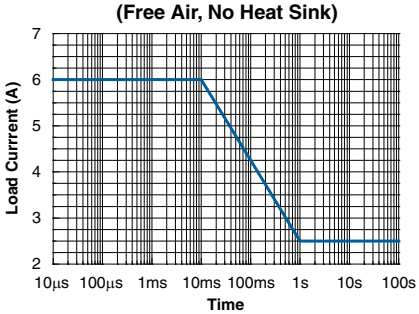
Typical Blocking Voltage vs. Temperature



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



Energy Rating Curve (Free Air, No Heat Sink)



*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.

Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. Clare classified all of its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a **Moisture Sensitivity Level (MSL) rating** as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Rating
CPC1916Y	MSL 1

ESD Sensitivity

This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

Reflow Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

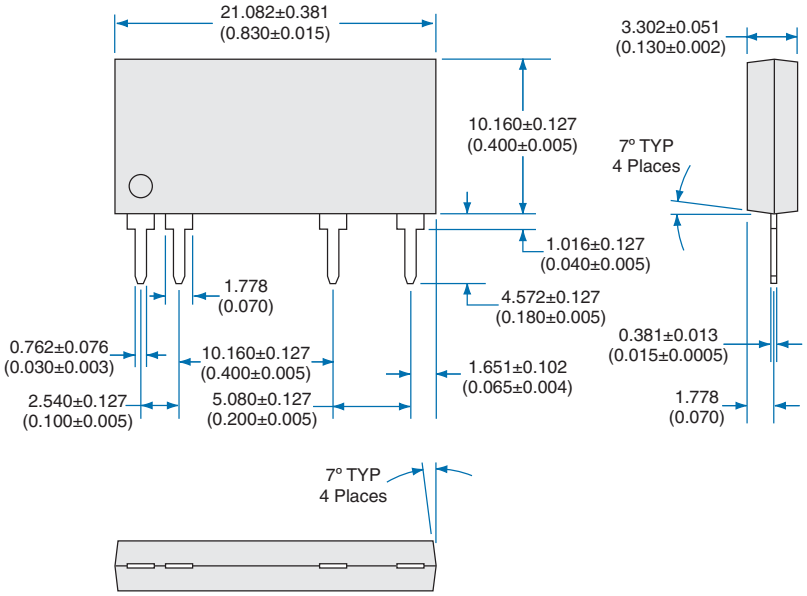
Device	Maximum Temperature x Time
CPC1916Y	245°C for 30 seconds

Board Wash

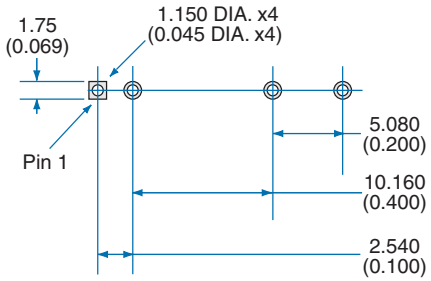
Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used after solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

MECHANICAL DIMENSIONS

CPC1916Y



PCB Hole Pattern



Dimensions
mm
(inches)

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

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