



Parameter	Rating	Units
Blocking Voltage	1000	V_P
Load Current	0.18	A_{rms}
On-Resistance	18	Ω

Features

- Handle Load Currents Up to 0.25A
- 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 CPC1981 is a 1-Form-A solid state relay. The CPC1981 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.

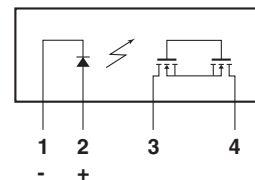
Approvals

- UL 508 Recognized Component: File E69938
- CSA Certified Component: Certificate 1172007

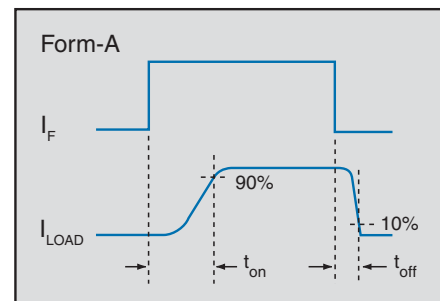
Ordering Information

Part #	Description
CPC1981Y	Power SIP Package (25 per tube)

Pin Configuration



Switching Characteristics of Normally Open (Form A) Devices



Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Blocking Voltage	1000	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						
Operating Voltage	-	V _L	5	-	600	V _{rms} or V _{DC}
Load Current, Continuous	free air	I _L	-	-	0.18	A _{rms}
Peak Load Current	t=10ms	I _{LPK}	-	-	1.1	A _{rms}
On-Resistance ¹	I _L =10mA	R _{ON}	-	12.3	18	Ω
Off-State Leakage Current	V _L =1000V	I _{LEAK}	-	-	1	μA
Switching Speeds	I _F =10mA, V _L =10V	t _{on}	-	-	10	ms
Turn-On		t _{off}	-	-	5	
Turn-Off						
Output Capacitance	V _L =30V, f=10MHz	C _{OUT}	-	31	-	pF
Input Characteristics						
Input Control Current	I _L =1.0A	I _F	-	-	10	mA
Input Dropout Current	-	I _F	0.6	-	-	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
Input/Output Characteristics						
Capacitance, Input to Output	f=1MHz	C _{IO}	-	2	-	pF

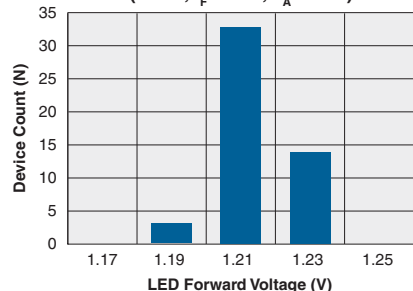
¹ Measurement taken within 1 second of on-time.

Thermal Characteristics

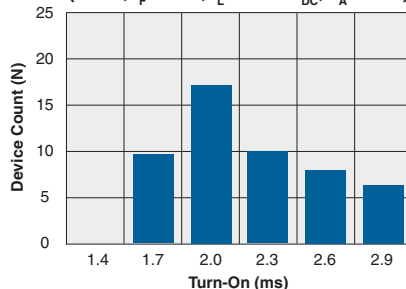
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Thermal Resistance (junction to case)	-	R _{θJC}	-	1.5	-	°C/W

PERFORMANCE DATA*

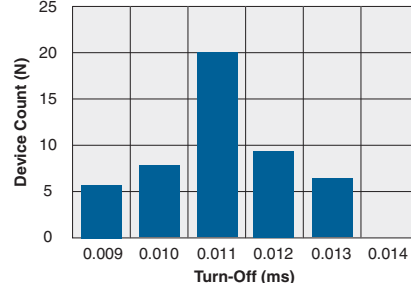
Typical LED Forward Voltage Drop
(N=50, $I_F=5\text{mA}$, $T_A=25^\circ\text{C}$)



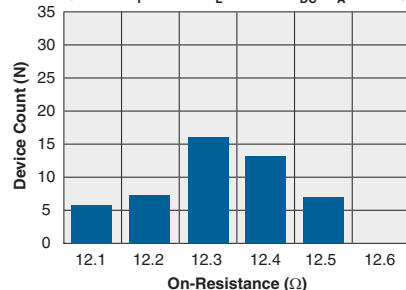
Typical Turn-On Time
(N=50, $I_F=5\text{mA}$, $I_L=120\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



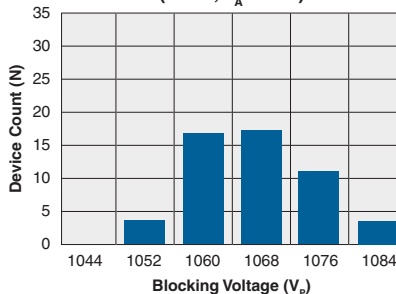
Typical Turn-Off Time
(N=50, $I_F=5\text{mA}$, $I_L=120\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



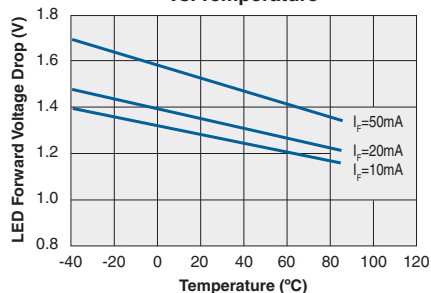
Typical On-Resistance Distribution
(N=50, $I_F=5\text{mA}$, $I_L=120\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



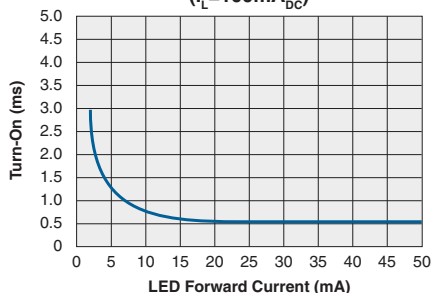
Typical Blocking Voltage Distribution
(N=50, $T_A=25^\circ\text{C}$)



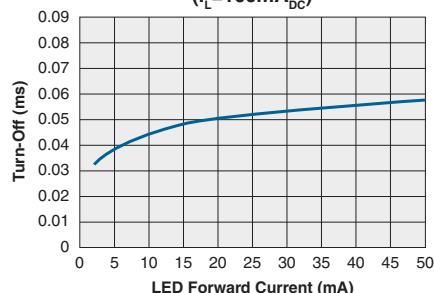
Typical LED Forward Voltage Drop vs. Temperature



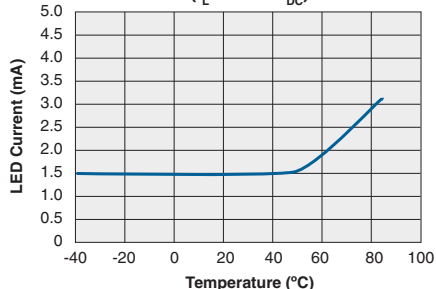
Typical Turn-On vs. LED Forward Current
($I_L=100\text{mA}_{DC}$)



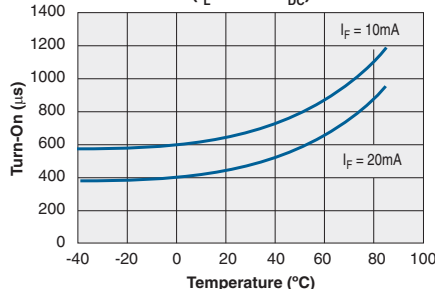
Typical Turn-Off vs. LED Forward Current
($I_L=100\text{mA}_{DC}$)



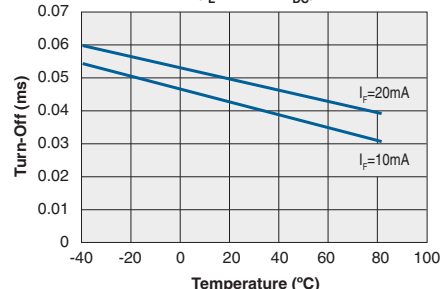
Typical I_F for Switch Operation vs. Temperature
($I_L=100\text{mA}_{DC}$)



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



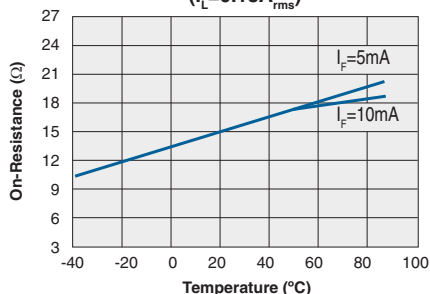
Typical Turn-Off vs. Temperature
($I_L=100\text{mA}_{DC}$)



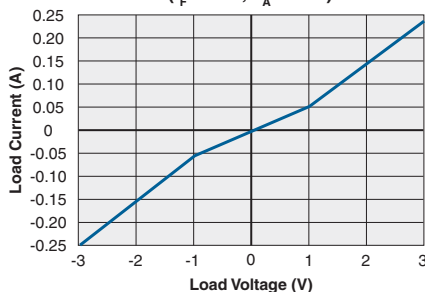
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

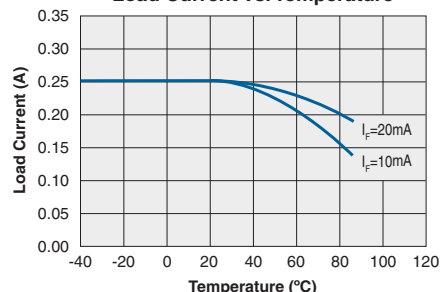
Typical On-Resistance vs. Temperature
($I_L = 0.18A_{rms}$)



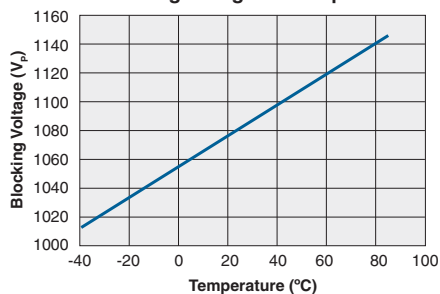
Typical Load Current vs. Load Voltage
($I_F = 5mA, T_A = 25°C$)



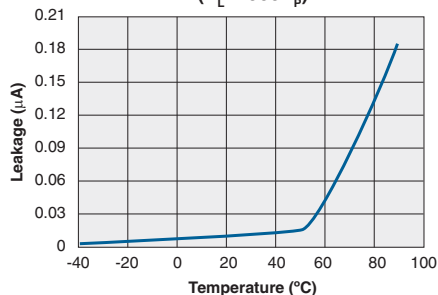
Typical Maximum DC Load Current vs. Temperature



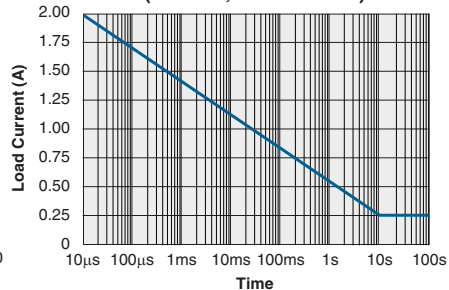
Blocking Voltage vs. Temperature



Typical Leakage vs. Temperature Measured Across Pins 3&4
($V_L = 1000V_p$)



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 ingress. 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
CPC1981Y	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
CPC1981Y	245°C for 30 seconds

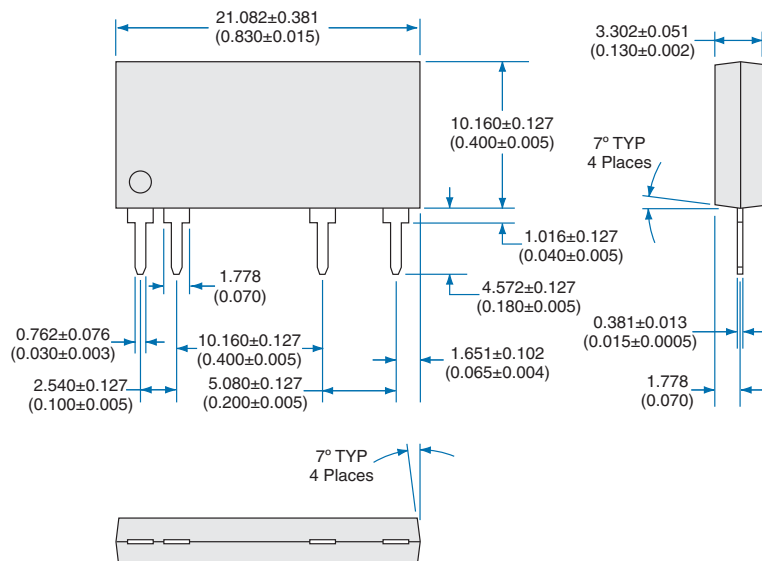
Board Wash

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 may be necessary if a wash is used after solder reflow processes. Chlorine-based or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

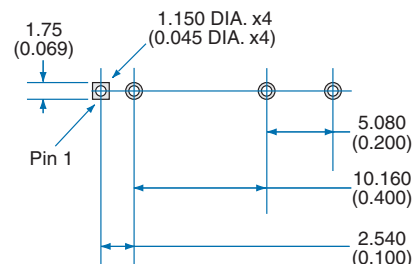


MECHANICAL DIMENSIONS

CPC1981Y



PCB Hole Pattern



Dimensions
mm
(inches)

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Specification: DS-CPC1981-R04
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