



| Parameter | Rating | Units |
|---------------------|--------|-----------------|
| Blocking Voltage | 600 | V _P |
| Load Current | 0.5 | A _{DC} |
| On-Resistance (max) | 6 | Ω |

Features

- Handle Load Currents Up to 0.5A
- 600V_P Blocking Voltage
- 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

IXYS Integrated Circuits Division 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 this family, the CPC1983 single-pole, normally open (1-Form-A) Solid State Power Relay is rated for up to 0.5A_{DC} continuous load current.

The CPC1983 employs optically coupled MOSFET technology to provide 2500V_{rms} of input to output isolation. The optically coupled outputs, that use patented OptoMOS architecture, are controlled by a highly efficient GaAlAs infrared LED.

This combination of low on-resistance and high load current handling capability makes this relay suitable for a variety of high performance switching applications.

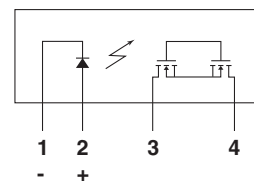
Approvals

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

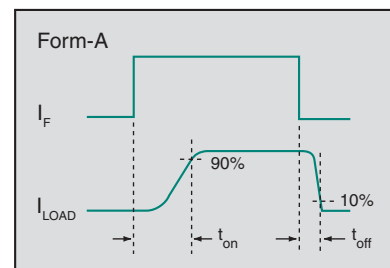
Ordering Information

| Part # | Description |
|----------|---------------------------------|
| CPC1983Y | Power SIP Package (25 per tube) |

Pin Configuration



Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25°C

| Parameter | Ratings | Units |
|--------------------------------------|-------------|------------------|
| Blocking Voltage | 600 | V _P |
| Reverse Input Voltage | 5 | V |
| Input Control Current | 50 | mA |
| Peak (10ms) | 1 | A |
| Input Power Dissipation ¹ | 150 | mW |
| Total Power Dissipation ² | 1600 | mW |
| Isolation Voltage, Input to Output | 2500 | V _{rms} |
| ESD Rating, Human Body Model | 8 | kV |
| Operational Temperature | -40 to +85 | °C |
| Storage Temperature | -40 to +125 | °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.

¹ Derate linearly 3.33 mW / °C
² Derate linearly 16.667 mW / °C

Electrical Characteristics @ 25°C

| Parameter | Conditions | Symbol | Min | Typ | Max | Units |
|-------------------------------------|--|-------------------|-----|------|-----|-----------------|
| Output Characteristics | | | | | | |
| Load Current, Continuous | I _F =5mA, Free air | I _L | - | - | 0.5 | A _{DC} |
| Peak Load Current | I _F =5mA, t=10ms | I _{LPK} | - | - | 3 | A |
| On-Resistance ¹ | I _F =5mA, I _L =0.5A | R _{ON} | - | 3.5 | 6 | Ω |
| Off-State Leakage Current | I _F =0mA, V _L =600V _P | I _{LEAK} | - | - | 1 | μA |
| Switching Speeds | | | | | | |
| Turn-On | I _F =5mA, V _L =10V | t _{on} | - | 2.2 | 5 | ms |
| Turn-Off | | t _{off} | - | 0.15 | 2 | |
| Output Capacitance | I _F =0mA, V _L =50V, f=1MHz | C _{OUT} | - | 41 | - | pF |
| Input Characteristics | | | | | | |
| Input Control Current to Activate | I _L =0.5A | I _F | - | 1.3 | 5 | mA |
| Input Control Current to Deactivate | - | I _F | 0.5 | - | - | 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 _{I/O} | - | 2 | - | pF |

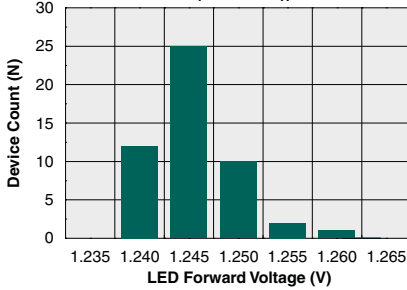
¹ Measurement taken within 1 second of on-time.

Thermal Characteristics

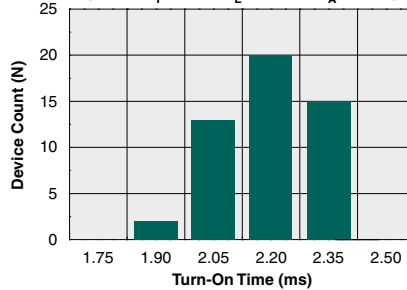
| Parameter | Conditions | Symbol | Min | Typ | Max | Units |
|---------------------------------------|------------|------------------|-----|-----|-----|-------|
| Thermal Resistance (junction to case) | - | R _{θJC} | - | 1.5 | - | °C/W |

PERFORMANCE DATA*

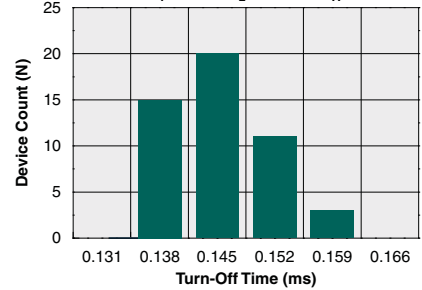
Typical LED Forward Voltage Drop
(N=50, $I_F=5\text{mA}$, $T_A=25^\circ\text{C}$)



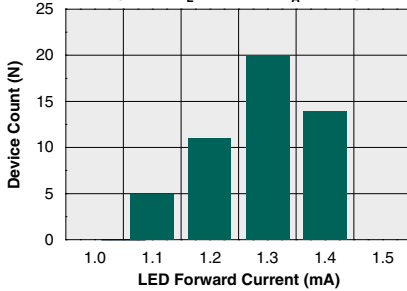
Typical Turn-On Time
(N=50, $I_F=5\text{mA}$, $I_L=75\text{mA}$, $T_A=25^\circ\text{C}$)



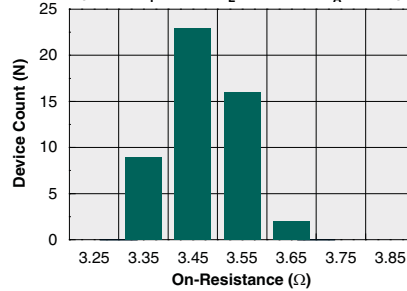
Typical Turn-Off Time
(N=50, $I_F=5\text{mA}$, $I_L=75\text{mA}$, $T_A=25^\circ\text{C}$)



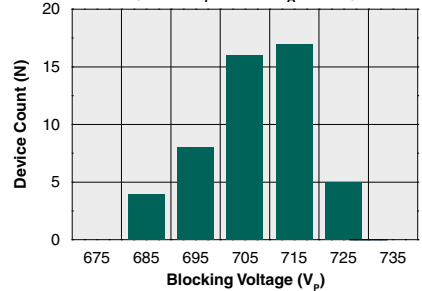
Typical I_F for Switch Operation
(N=50, $I_L=500\text{mA}$, $T_A=25^\circ\text{C}$)



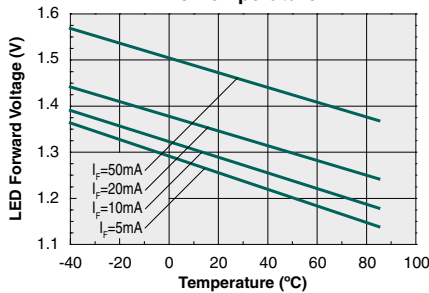
Typical On-Resistance Distribution
(N=50, $I_F=5\text{mA}$, $I_L=500\text{mA}$, $T_A=25^\circ\text{C}$)



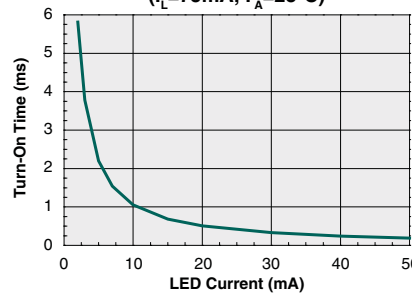
Typical Blocking Voltage Distribution
(N=50, $I_F=0\text{mA}$, $T_A=25^\circ\text{C}$)



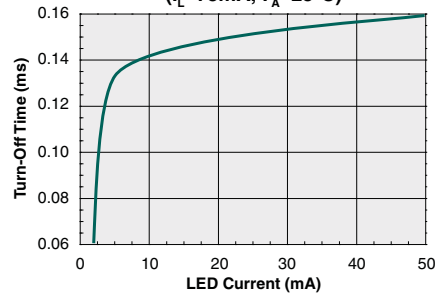
Typical LED Forward Voltage Drop vs. Temperature



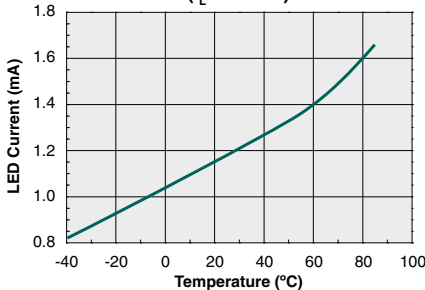
Typical Turn-On Time vs. LED Forward Current
($I_L=75\text{mA}$, $T_A=25^\circ\text{C}$)



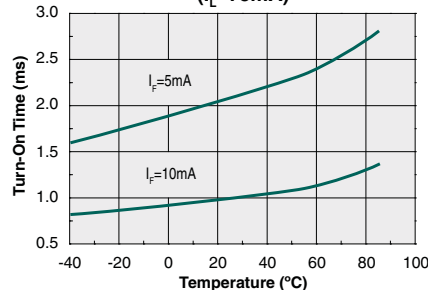
Typical Turn-Off Time vs. LED Forward Current
($I_L=75\text{mA}$, $T_A=25^\circ\text{C}$)



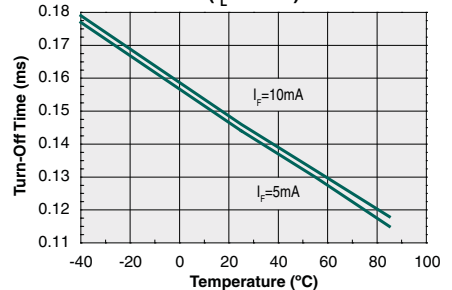
Typical I_F for Switch Operation
($I_L=300\text{mA}$)



Typical Turn-On Time vs. Temperature
($I_L=75\text{mA}$)

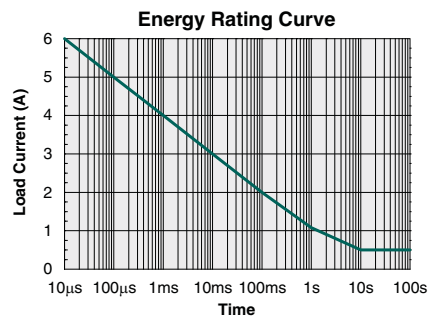
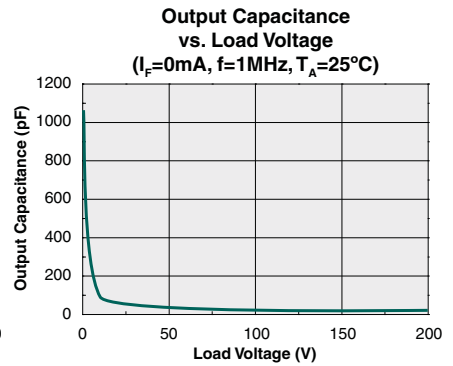
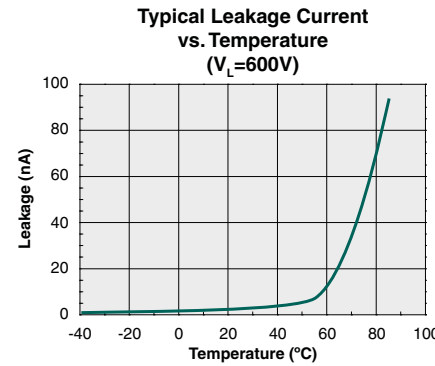
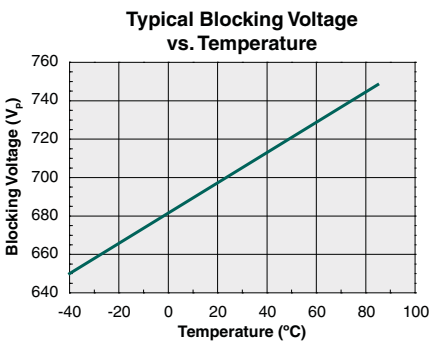
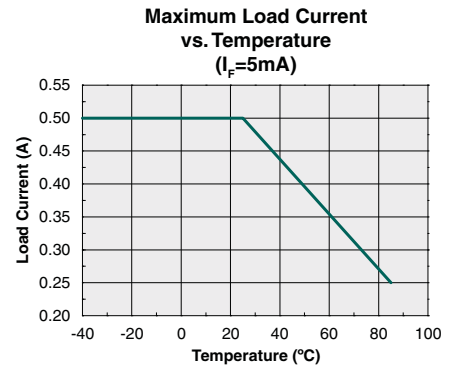
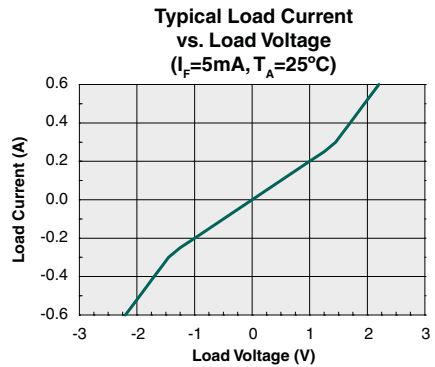
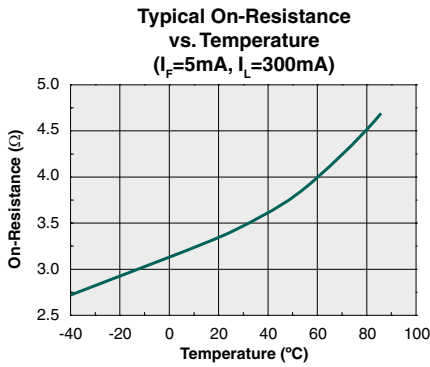


Typical Turn-Off Time vs. Temperature
($I_L=75\text{mA}$)



*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*



*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. IXYS Integrated Circuits Division 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 |
|----------|---|
| CPC1983Y | 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 |
|----------|----------------------------|
| CPC1983Y | 245°C for 30 seconds |

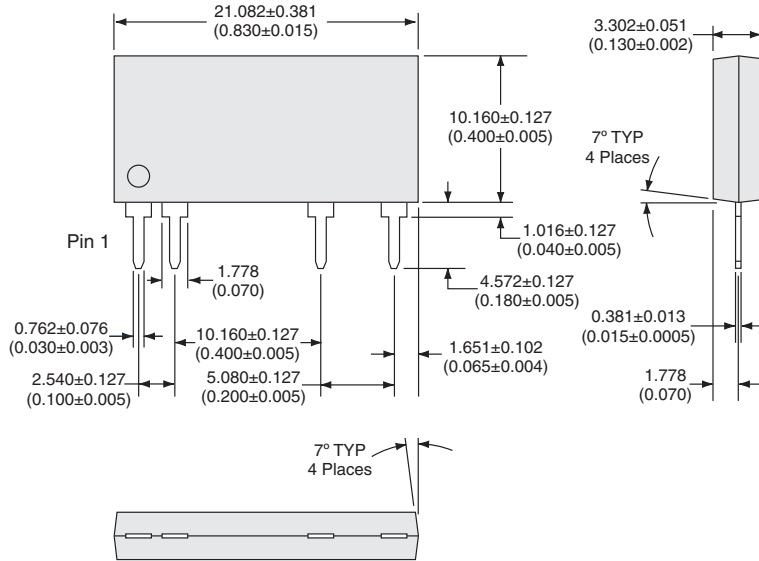
Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division 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.

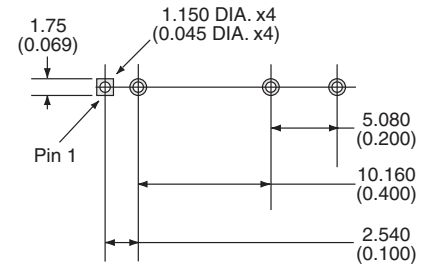


MECHANICAL DIMENSIONS

CPC1983Y



PCB Hole Pattern



Dimensions
mm
(inches)

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

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Specification: DS-CPC1983-R03
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