



| Parameter             | Rating   | Units                    |
|-----------------------|----------|--------------------------|
| AC Operating Voltage  | 20 - 240 | $V_{rms}$                |
| Load Current          | 2        | $A_{rms}$                |
| On-State Voltage Drop | 1.25     | $V_P$ (at $I_L = 2A_P$ ) |
| Blocking Voltage      | 600      | $V_P$                    |

### Features

- Load Current up to  $2A_{rms}$
- $600V_P$  Blocking Voltage
- High Surge Current: 20A
- Rapid Turn-On (Non-Zero-Cross Turn-On)
- 5mA Sensitivity
- Creepage Distance: 0.125" on Output Pins
- DC Control, AC Output
- Optically Isolated
- TTL and CMOS Compatible
- Low EMI and RFI Generation
- High Noise Immunity
- Machine Insertable, Wave Solderable

### Applications

- HVAC Control (Heating, Ventilation, Air Conditioning)
- Lighting
- Programmable Control
- Process Control
- Power Control Panels
- Remote Switching
- Gas Pump Electronics
- Contactors
- Large Relays
- Solenoids
- Motors
- Heaters

### Description

CPC1976YX6 is an AC Solid State Switch utilizing dual power SCR outputs. This device features Rapid Turn-On (non-zero-cross) control of the output SCRs, which makes it ideal for precisely switching AC loads independent of the load voltage phase.

The optically coupled input and output circuits provide  $3750V_{rms}$  of isolation and noise immunity between the control and load circuits. As a result, the CPC1976YX6 is well suited for industrial environments where electromagnetic interference would disrupt the operation of plant facility communication and control systems.

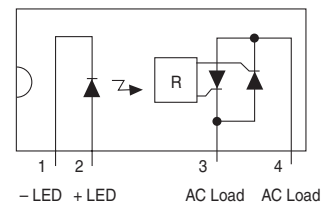
### Approvals

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

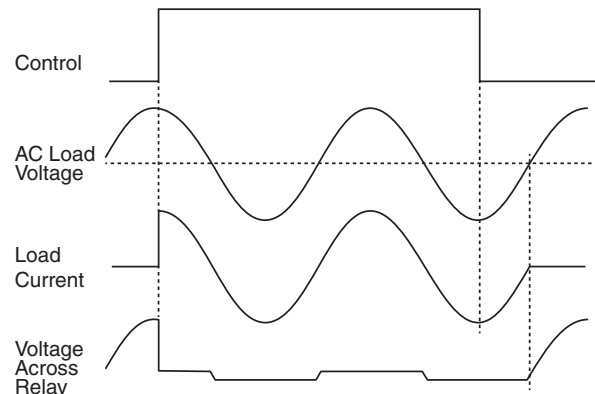
### Ordering Information

| Part #     | Description                      |
|------------|----------------------------------|
| CPC1976YX6 | 4-Pin (8-Pin Body) SIP (25/Tube) |

### Pin Configuration



### Rapid Turn-On (Non-Zero-Cross) Waveforms



### Absolute Maximum Ratings @ 25°C

| Parameter                                       | Ratings     | Units            |
|---|-------------|------------------|
| Blocking Voltage ( $V_{DRM}$ )                  | 600         | $V_P$            |
| Reverse Input Voltage                           | 5           | V                |
| Input Control Current                           | 50          | mA               |
|   | Peak (10ms) | A                |
| di/dt Critical Rate of Rise of On-State Current | 40          | A/ $\mu$ s       |
| Input Power Dissipation <sup>1</sup>            | 150         | mW               |
| Total Power Dissipation <sup>2</sup>            | 2400        | mW               |
| ESD, Human Body Model                           | 4           | kV               |
| $i^2t$ for Fusing (1/2 Sine Wave, 60Hz)         | 3.5         | A <sup>2</sup> s |
| Isolation Voltage, Input to Output              | 3750        | $V_{rms}$        |
| 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.

<sup>1</sup> Derate linearly 1.33 mW / °C

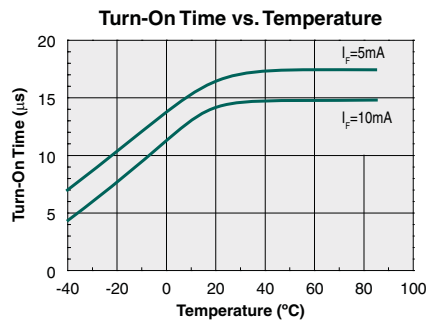
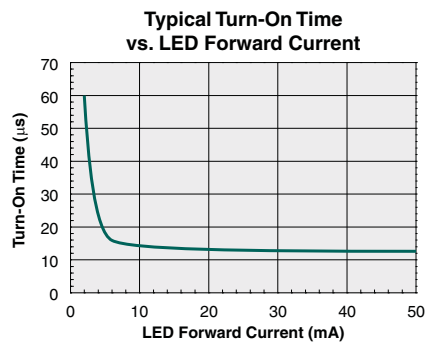
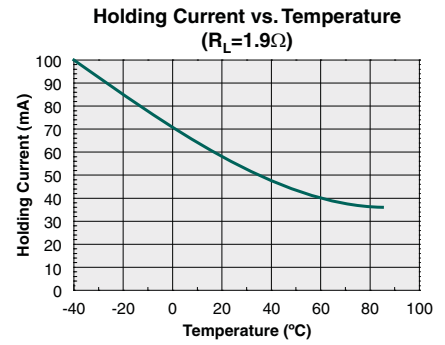
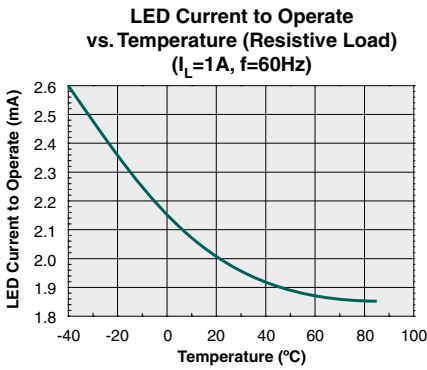
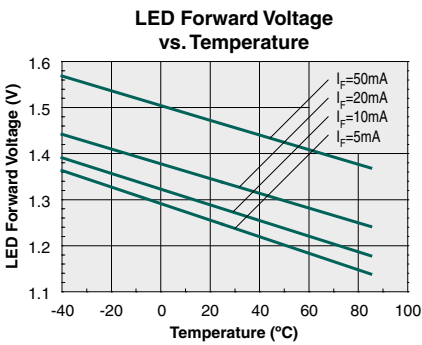
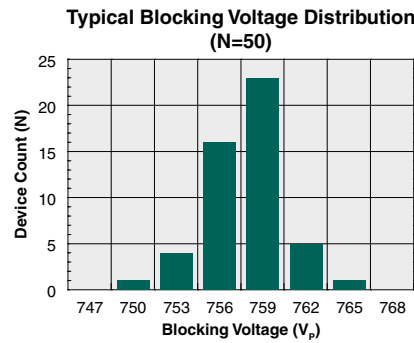
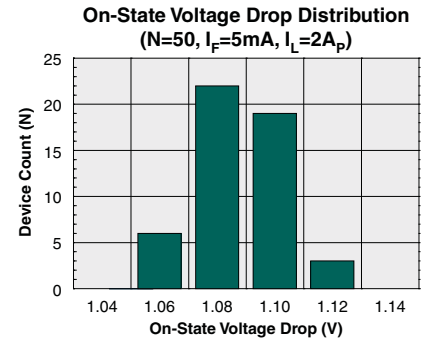
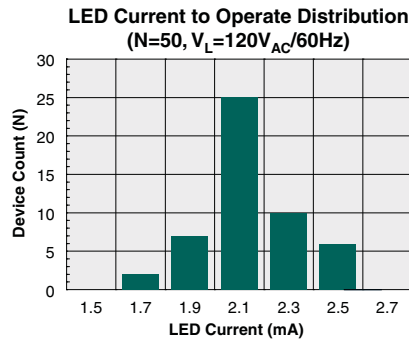
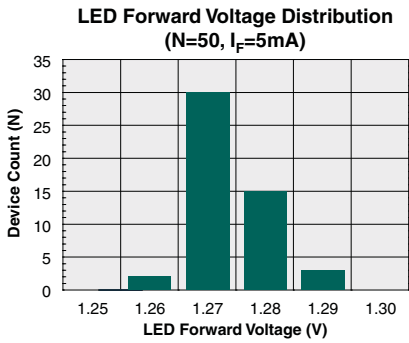
<sup>2</sup> Derate linearly 20 mW / °C

### Electrical Characteristics @ 25°C

| Parameters                                     | Conditions                                   | Symbol     | Min   | Typ  | Max  | Units      |
|--|--|------------|-------|------|------|------------|
| <b>Output Characteristics</b>                  |  |            |       |      |      |            |
| Load Current, Continuous                       | $V_L=20-240V_{rms}$                          | $I_L$      | 0.070 | -    | 2    | $A_{rms}$  |
| Maximum Surge Current                          | $t \leq 16ms$                                | $I_{PK}$   | -     | -    | 20   | A          |
| Off State Leakage Current                      | $V_{DRM}$                                    | $I_{LEAK}$ | -     | -    | 10   | $\mu$ A    |
| On-State Voltage Drop                          | $I_L=2A_P$                                   | -          | -     | 1.1  | 1.25 | $V_P$      |
| Critical Rate of Rise                          | -  | dv/dt      | 1000  | 1200 | -    | V/ $\mu$ s |
| Switching Speeds                               | $I_F = 5 mA$ , Resistive<br>$V_L=20V$ , 60Hz | $t_{on}$   | -     | 20   | 500  | $\mu$ s    |
| Turn-off                                       |  | $t_{off}$  | -     | -    | 0.5  | cycle      |
| Holding Current                                | -  | $I_H$      | -     | -    | 75   | mA         |
| Latching Current                               | -  | $I_L$      | -     | -    | 100  | mA         |
| Operating Frequency                            | -  |            | 20    | -    | 500  | Hz         |
| <b>Input Characteristics</b>                   |  |            |       |      |      |            |
| Input Control Current to Activate <sup>1</sup> | 60Hz   | $I_F$      | -     | -    | 5    | mA         |
| Input Drop-out Voltage                         | -  | -          | 0.8   | -    | -    | V          |
| Input Voltage Drop                             | $I_F=5mA$                                    | $V_F$      | 0.9   | 1.2  | 1.4  | V          |
| Reverse Input Current                          | $V_B=5V$                                     | $I_B$      | -     | -    | 10   | $\mu$ A    |
| <b>Common Characteristics</b>                  |  |            |       |      |      |            |
| Input to Output Capacitance                    | -  | $C_{IO}$   | -     | -    | 3    | pF         |

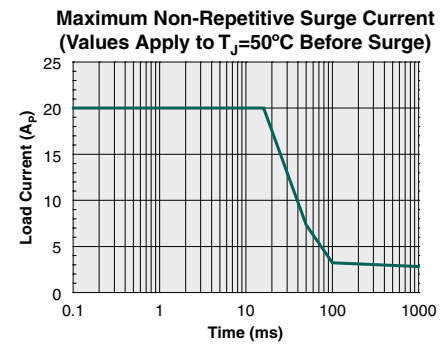
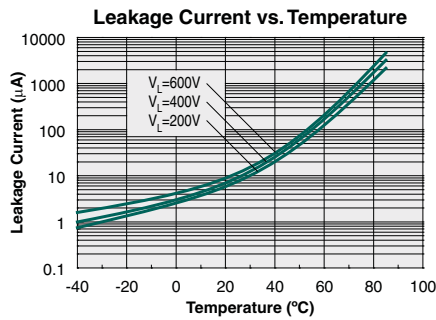
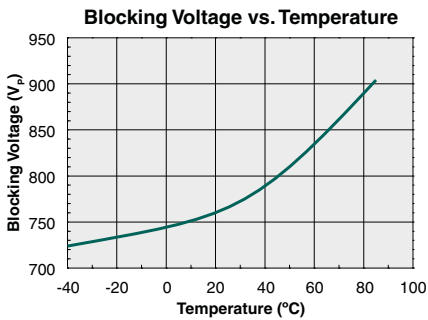
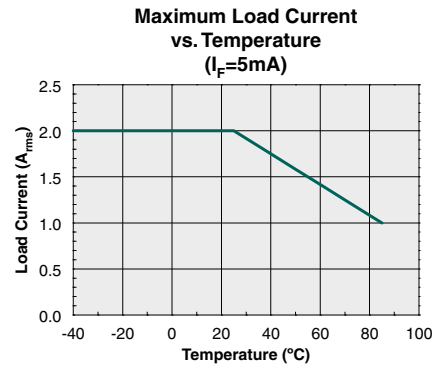
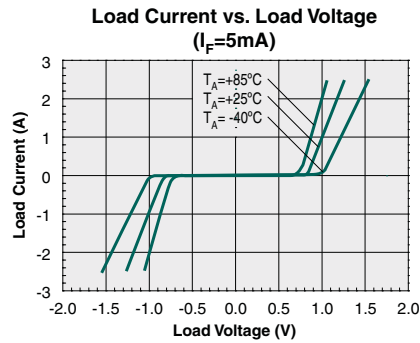
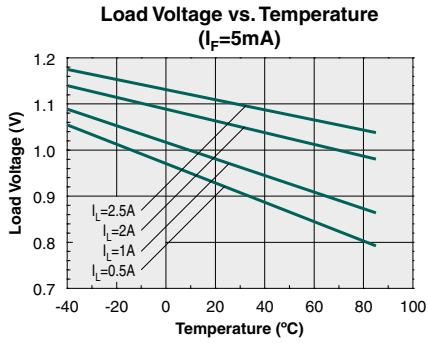
<sup>1</sup> For high-noise environments, or for high-frequency operation, use  $I_F \geq 10mA$ .

PERFORMANCE DATA @ 25°C (Unless Otherwise Noted)\*



\* 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.

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## 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 |
|------------|---|
| CPC1976YX6 | 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 |
|------------|----------------------------|
| CPC1976YX6 | 245°C for 30 seconds       |

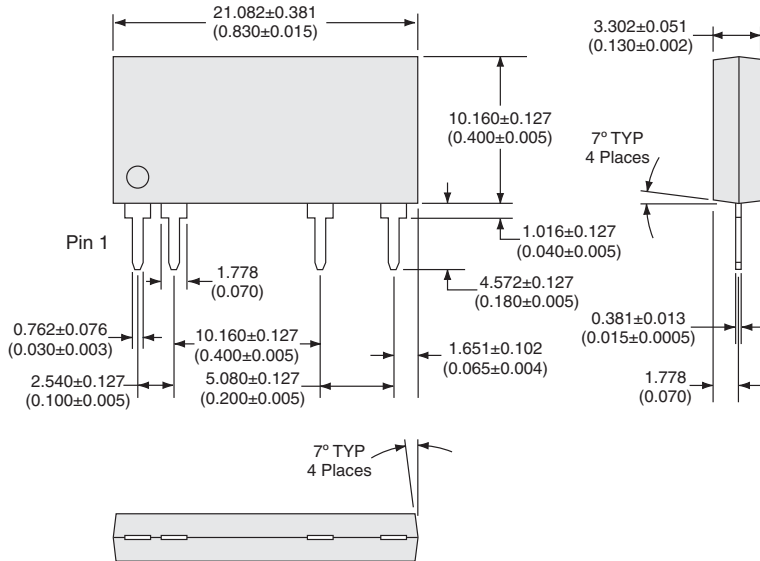
### Board Wash

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.

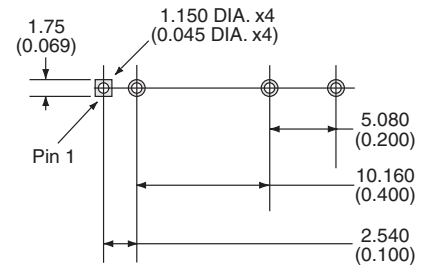


**MECHANICAL DIMENSIONS**

**CPC1976YX6**



**PCB Hole Pattern**



Dimensions  
mm  
(inches)

**For additional information please visit our website at: [www.ixysic.com](http://www.ixysic.com)**

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