



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
- Low EMI and RFI Generation
- High Noise Immunity

### 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.

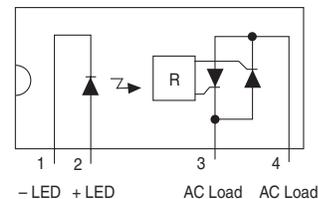
### Approvals

- UL Recognized Component: File E69938
- CSA Certified Component: Certificate 1172007
- EN IEC 62368-1: TUV Certificate B 082667 0008

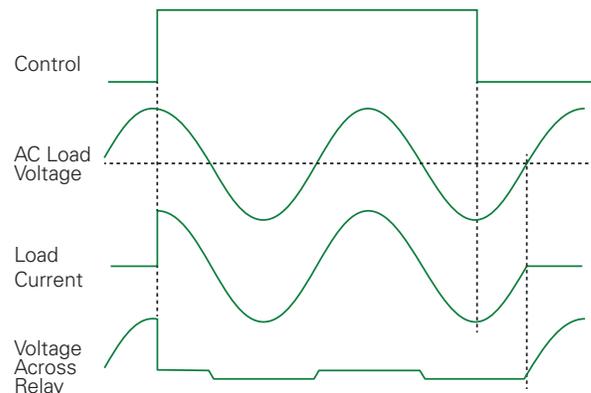
### Ordering Information

Part #	Description
CPC1976YX6	4-Pin (8-Pin Body) Power SIP Package (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)	1	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

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

<sup>2</sup> Derate linearly 20 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.

Typical values are characteristic of the device at +25°C, and are the result of engineering evaluations. They are provided for information purposes only, and are not part of the manufacturing testing requirements.

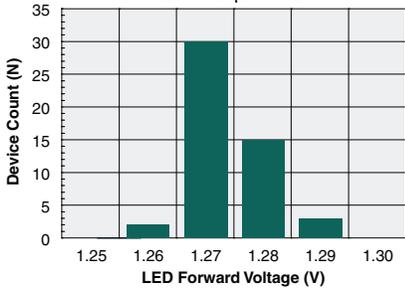
### Electrical Characteristics @ 25°C

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	$I_F = 5 \text{ mA, Resistive}$ $V_L=20V, 60Hz$	$t_{on}$	-	20	500	$\mu$ s
Turn-on		$t_{off}$	-	-	0.5	cycle
Turn-off						
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	1.5	V
Reverse Input Current	$V_B=5V$	$I_B$	-	-	10	$\mu$ A
<b>Common Characteristics</b>						
Input to Output Capacitance	$V_{IO}=0V, f=1MHz$	$C_{IO}$	-	-	3	pF

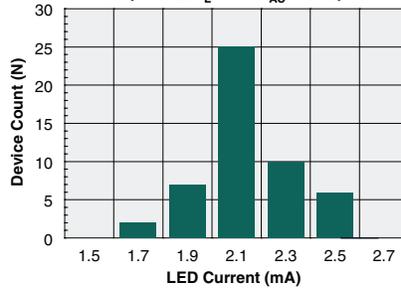
<sup>1</sup> For high-noise environments, or for high-frequency operation, a minimum LED drive current of 10mA is recommended.

**PERFORMANCE DATA\***

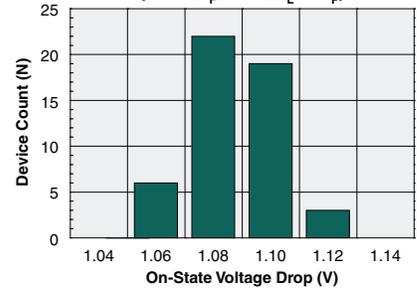
**LED Forward Voltage Distribution**  
(N=50,  $I_f=5\text{mA}$ )



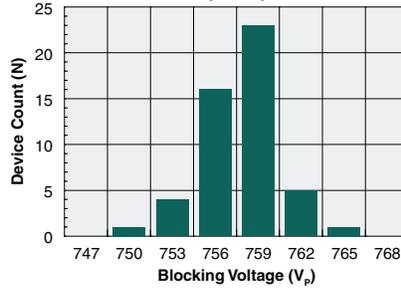
**LED Current to Operate Distribution**  
(N=50,  $V_L=120\text{V}_{AC}/60\text{Hz}$ )



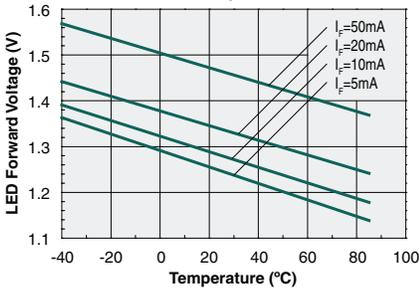
**On-State Voltage Drop Distribution**  
(N=50,  $I_f=5\text{mA}$ ,  $I_L=2\text{A}_p$ )



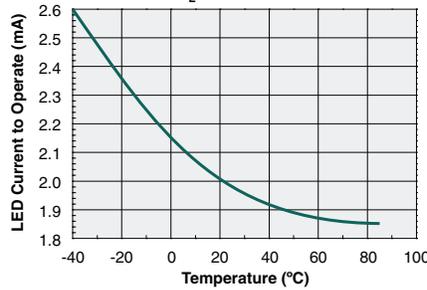
**Typical Blocking Voltage Distribution**  
(N=50)



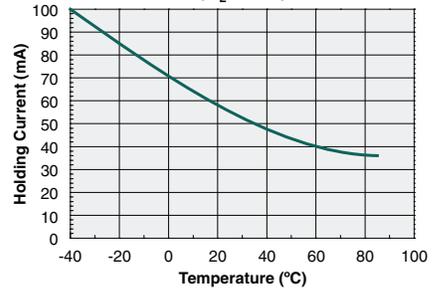
**LED Forward Voltage vs. Temperature**



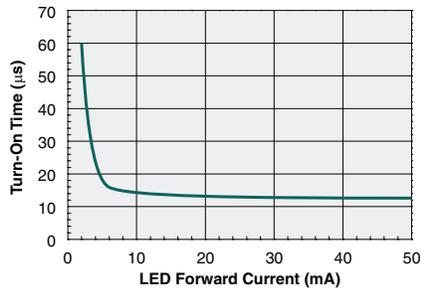
**LED Current to Operate vs. Temperature (Resistive Load)**  
( $I_L=1\text{A}$ ,  $f=60\text{Hz}$ )



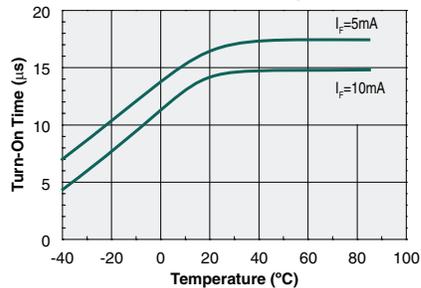
**Holding Current vs. Temperature**  
( $R_L=1.9\Omega$ )



**Typical Turn-On Time vs. LED Forward Current**

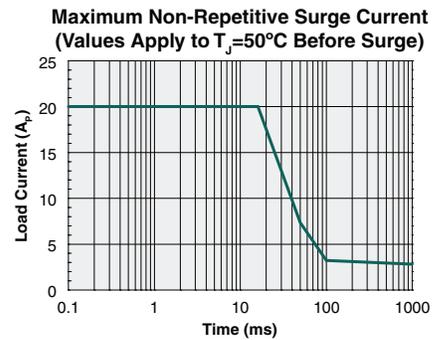
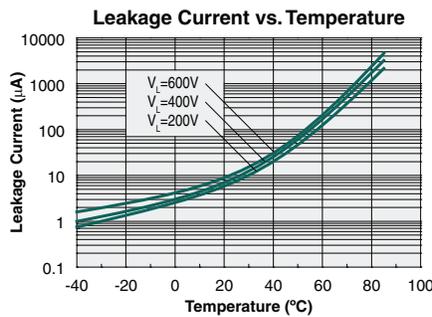
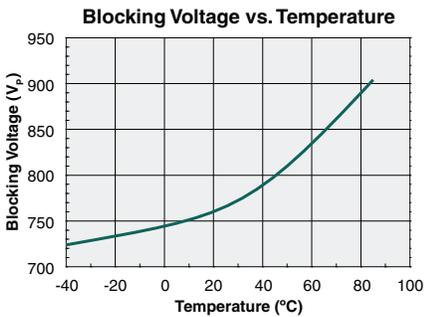
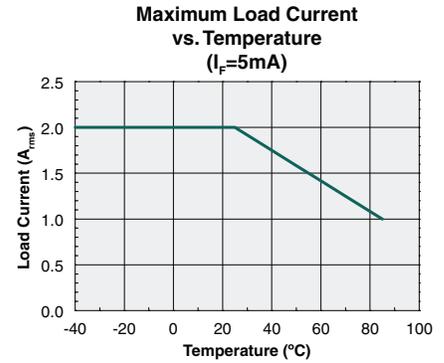
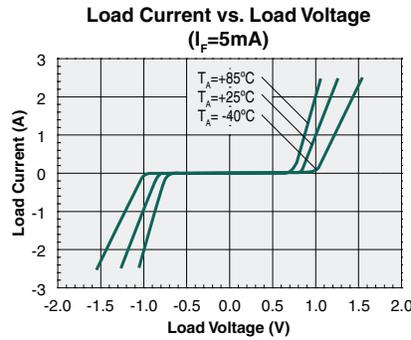
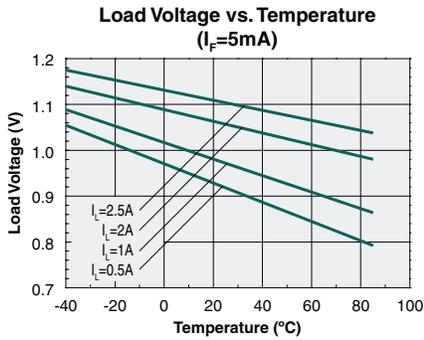


**Turn-On Time vs. Temperature**



\*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C. For guaranteed parameters not indicated in the written specifications, please contact our application department.

**PERFORMANCE DATA\***



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## Manufacturing Information

### Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. IXYS Integrated Circuits classifies 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) classification 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) Classification
CPC1976YX6	MSL 1

### ESD Sensitivity



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

### Soldering Profile

Provided in the table below is the Classification Temperature ( $T_C$ ) of this product and the maximum dwell time the body temperature of this device may be ( $T_C - 5$ )°C or greater. The classification temperature sets the Maximum Body Temperature allowed for this device during lead-free reflow processes. For through-hole devices, and any other processes, the guidelines of **J-STD-020** must be observed.

Device	Classification Temperature ( $T_C$ )	Dwell Time ( $t_p$ )	Max Reflow Cycles
CPC1976YX6	245°C	30 seconds	1

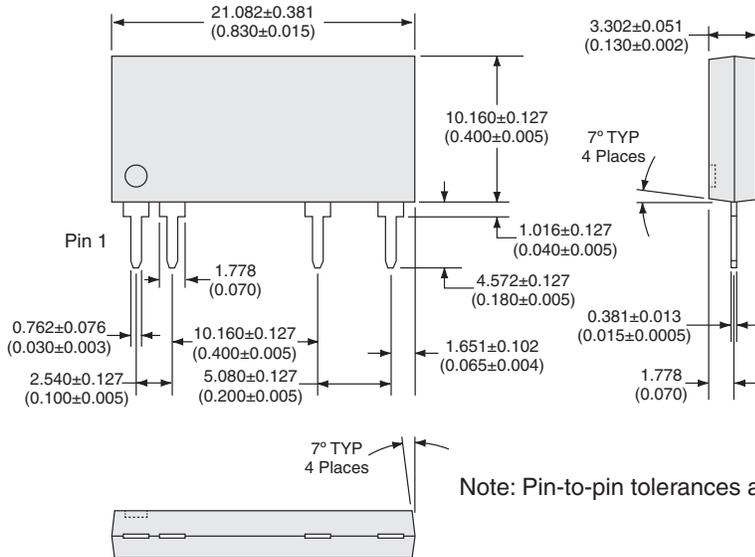
### Board Wash

IXYS Integrated Circuits recommends the use of no-clean flux formulations. Board washing to reduce or remove flux residue following the solder reflow process is acceptable provided proper precautions are taken to prevent damage to the device. These precautions include, but are not limited to: using a low pressure wash and providing a follow up bake cycle sufficient to remove any moisture trapped within the device due to the washing process. Due to the variability of the wash parameters used to clean the board, determination of the bake temperature and duration necessary to remove the moisture trapped within the package is the responsibility of the user (assembler). Cleaning or drying methods that employ ultrasonic energy may damage the device and should not be used. Additionally, the device must not be exposed to flux or solvents that are Chlorine- or Fluorine-based.

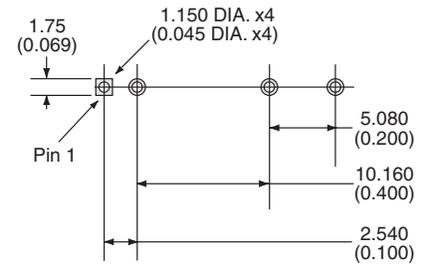


**MECHANICAL DIMENSIONS**

**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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Specification: DS-CPC1976YX6-R05

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2/10/2026