IXYS
INTEGRATED CIRCUITS DIVISION




# CPC1966YX8
# Rapid Turn-On AC Power Switch

| Parameter | Rating | Units |
|---|---|---|
| AC Operating Voltage | 20 - 240 | $V_{rms}$ |
| Continuous Load Current | 3 | $A_{rms}$ |
| On-State Voltage Drop | 1.1 | $V_P$ (at $I_L = 2A_P$) |
| Typical Turn-On Time | 20 | µs |
| Blocking Voltage | 800 | $V_P$ |

## Features

- Load Current up to $3A_{rms}$
- $800V_P$ Blocking Voltage
- Rapid Turn-On (Non-Zero-Cross Turn-On)
- Typical Turn-On Time: 20µs
- 5mA Sensitivity
- DC Input Switches AC Signal
- Optically Isolated
- Low EMI and RFI Generation
- High Noise Immunity
- Flammability Rating UL 94 V-0

## Applications

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

## Description

CPC1966YX8 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 CPC1966YX8 is well suited for industrial environments where electromagnetic interference would disrupt the operation of plant facility communication and control systems.

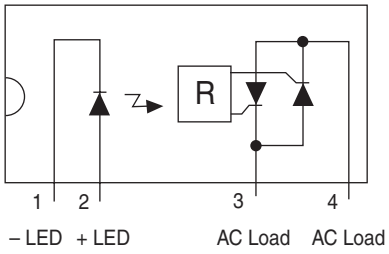
## Approvals

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

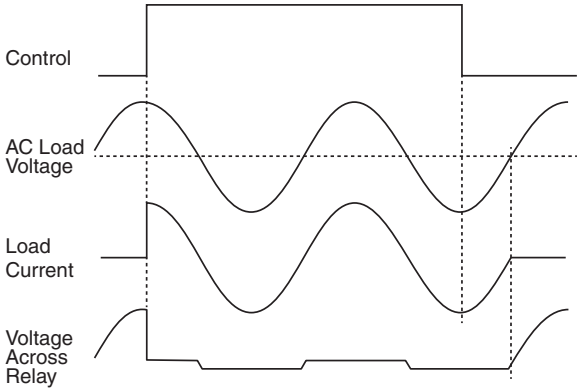
## Ordering Information

| Part # | Description |
|---|---|
| CPC1966YX8 | 4-Pin (8-Pin Body) Power SIP Package (25/Tube) |

## Pin Configuration




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



## Absolute Maximum Ratings @ 25ºC

| Parameter | Symbol | Ratings | Units |
|---|---|---|---|
| Blocking Voltage | $V_{DRM}$ | 800 | $V_P$ |
| Reverse Input Voltage | $V_R$ | 5 | V |
| Input Control Current | $I_F$ | 50 | mA |
| Peak (10ms) | | 1 | A |
| Input Power Dissipation [1] | - | 150 | mW |
| Total Power Dissipation [2] | $P_D$ | 2400 | mW |
| $i^2t$ Fusing Current (1/2 Sine Wave, 60Hz) | - | 8 | $A^2s$ |
| ESD, Human Body Model | - | 4 | kV |
| Isolation Voltage, Input to Output | $V_{IO}$ | 3750 | $V_{rms}$ |
| Operational Temperature | $T_A$ | -40 to +85 | °C |
| Storage Temperature | $T_A$ | -40 to +125 | °C |

[1] Derate linearly 1.33 mW / ºC
[2] Derate linearly 20 mW / ºC

*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.*

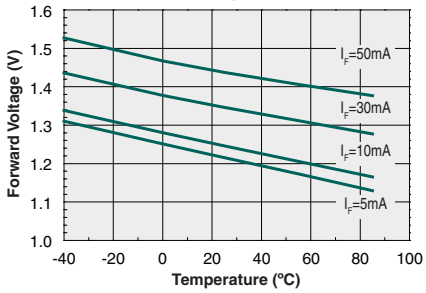
## Electrical Characteristics @ 25ºC

| Parameters | Conditions | Symbol | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Output Characteristics** | | | | | | |
| Load Current, Continuous | $V_L$=20-240$V_{rms}$ | $I_L$ | 0.1 | - | 3 | $A_{rms}$ |
| Maximum Surge Current | t ≤ 16ms | $I_P$ | - | - | 30 | A |
| Off State Leakage Current | $V_{DRM}$ | $I_{LEAK}$ | - | - | 100 | $\mu A_P$ |
| On-State Voltage Drop | $I_L$=2$A_P$ | - | - | 0.88 | 1.1 | $V_P$ |
| Critical Rate of Rise of On-State Current | - | di/dt | - | - | 75 | A/µs |
| Off-State dV/dt | - | dV/dt | 1000 | - | - | V/µs |
| Switching Speeds | | | | | | |
| Turn-on | $I_F$ = 5 mA, Resistive Load, $V_L$=20V | $t_{on}$ | - | 45 | - | µs |
| Turn-on | $I_F$ = 15 mA, Resistive Load, $V_L$=20V | | - | - | 20 | |
| Turn-off | | $t_{off}$ | - | - | 0.5 | cycles |
| Holding Current | - | $I_H$ | - | 44 | 50 | mA |
| Latching Current | - | $I_L$ | - | 48 | 75 | mA |
| Operating Frequency | - | | 20 | - | 500 | Hz |
| **Input Characteristics** | | | | | | |
| Input Control Current to Activate [1] | - | $I_F$ | - | - | 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 | $V_R$=5V | $I_R$ | - | - | 10 | µA |
| **Common Characteristics** | | | | | | |
| Input to Output Capacitance | $V_{IO}$=0, f=1MHz | $C_{IO}$ | - | 1 | - | pF |

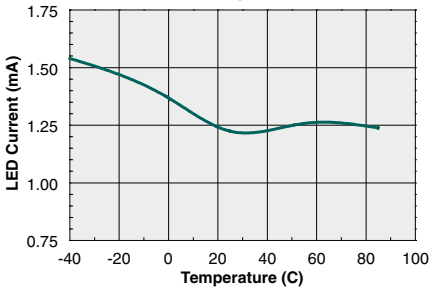
[1] For high-noise environments, or for high-frequency operation, use $I_F \geq$ 10mA.

## PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

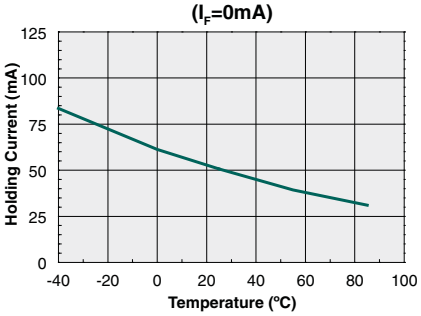
LED Forward Voltage Drop vs. Temperature



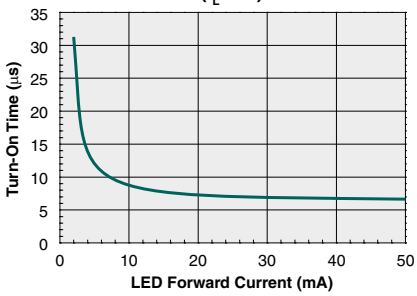

Typical $I_F$ for Switch Operation vs. Temperature



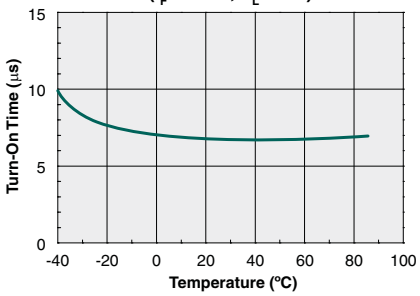

Holding Current vs. Temperature ($I_F$=0mA)



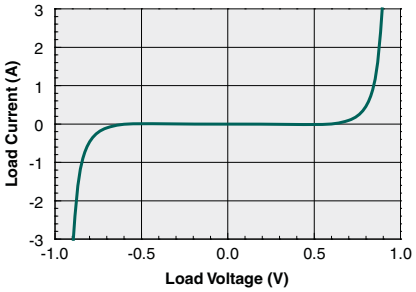

Turn-On Time vs. LED Current ($I_L$=1A)



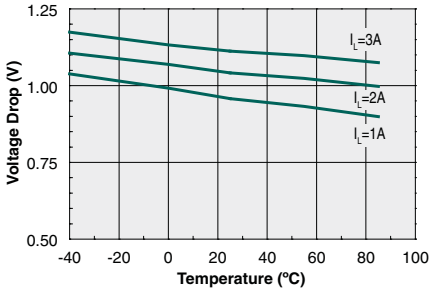

Typical Turn-On Time vs. Temperature ($I_F$=15ma, $V_L$=20V)



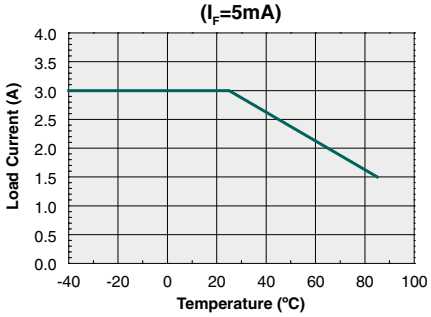

Load Current vs. Load Voltage ($I_F$=5mA)



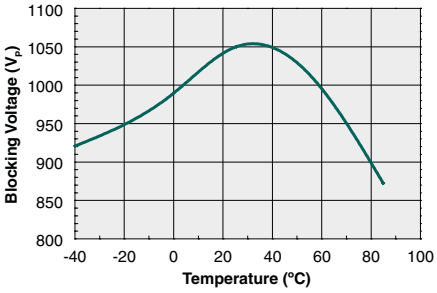

Voltage Drop vs. Temperature



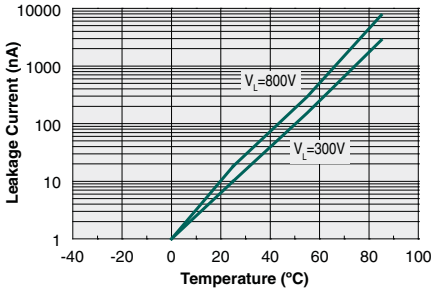

Maximum Load Current vs. Temperature ($I_F$=5mA)




Blocking Voltage vs. Temperature




Typical Leakage Current vs. Temperature




* 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. IXYS Integrated Circuits Division 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 |
|---|---|
| CPC1966YX8 | 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)ºC 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..

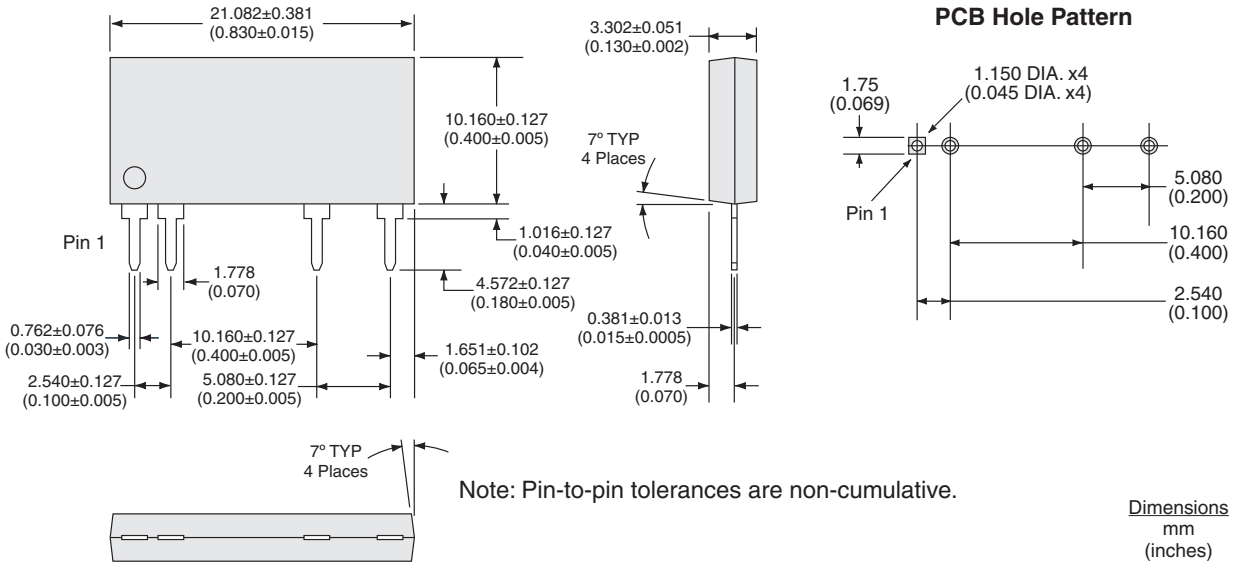
| Device | Classification Temperature ($T_c$) | Dwell Time ($t_p$) | Max Cycles |
|---|---|---|---|
| CPC1966YX8 | 245ºC | 30 seconds | 1 |

### Board Wash

IXYS Integrated Circuits Division 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

## CPC1966YX8




Note: Pin-to-pin tolerances are non-cumulative.

Dimensions
mm
(inches)

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