

Parameter	Rating	Units
AC Operating Voltage	20 - 280	$V_{rms}$
Load Current	1.5	$A_{rms}$
On-State Voltage Drop	1.4	$V_p$ (at $I_L = 1.5A_p$ )
Blocking Voltage	800	$V_p$

### Features

- Load Current up to  $1.5A_{rms}$
- $800V_p$  Blocking Voltage
- 5mA Sensitivity
- $5000V_{rms}$  Input to Output Isolation
- Off-State  $dV/dt$ :  $1000V/\mu s$  Minimum
- 12.5mm External Creepage Distance with Appropriate Layout
- Zero-Cross Switching
- DC Control, AC Output
- Optically Isolated
- Low EMI and RFI Generation
- High Noise Immunity
- Flammability Rating UL 94 V-0

### Applications

- Programmable Control
- Process Control
- Power Control Panels
- Remote Switching
- Gas Pump Electronics
- Contactors
- Large Relays
- Solenoids
- Motors
- Heaters
- Meters

### Description

CPC1964B is an AC Solid State Switch utilizing dual power SCR outputs. This device also includes zero-cross turn-on circuitry and is specified with a blocking voltage of  $800V_p$ .

In addition, the tightly controlled zero-cross circuitry ensures low noise switching of AC loads by minimizing the generation of transients. The optically coupled input and output circuits provide  $5000V_{rms}$  of isolation between the control and load circuits. As a result, the CPC1964B is well suited for industrial environments where electromagnetic interference would disrupt the operation of plant facility communication and control systems.

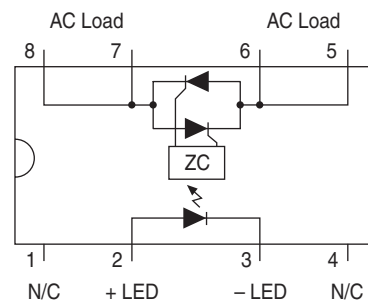
### Approvals

- UL 508 Certified Component: File E69938
- CSA Industrial Control Switches Approval: Pending

### Ordering Information

Part #	Description
CPC1964B	8-Pin Power SOIC (25/Tube)

### Pin Configuration



### Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Blocking Voltage ( $V_{DRM}$ )	800	$V_P$
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation <sup>1</sup>	150	mW
Total Power Dissipation <sup>2</sup>	2400	mW
Isolation Voltage Input to Output	5000	$V_{rms}$
ESD, Human Body Model	4	kV
$i^2t$ for Fusing (1/2 Sine Wave, 50Hz)	1.6	$A^2s$
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	$V_L=120-280V_{rms}$	$I_L$	0.1	-	1.5	$A_{rms}$
Maximum Surge Current	$t \leq 20ms$	$I_P$	-	-	16	$A_P$
Off State Leakage Current	$I_F=0mA, V_L=V_{DRM}$	$I_{LEAK}$	-	-	100	$\mu A_P$
On-State Voltage Drop <sup>1</sup>	$I_F=5mA, I_L=1.5A_P$	-	-	1.21	1.4	$V_P$
Off-State dV/dt	$I_F=0mA$	dV/dt	1000	-	-	V/ $\mu s$
Switching Speeds	$I_F = 5 mA$	$t_{on}$	-	-	0.5	cycles
Turn-on						
Turn-off	$t_{off}$	-	-	0.5	cycles	
Zero-Cross Turn-On Voltage <sup>2</sup>	1st half cycle	-	-	5	20	V
	Subsequent half cycle	-	-	-	5	V
Holding Current	-	$I_H$	-	-	75	mA
Latching Current	-	$I_L$	-	-	75	mA
Operating Frequency	-	-	20	-	500	Hz
Load Power Factor for Guaranteed Turn-On <sup>3</sup>	$f=60Hz$	PF	0.25	-	-	-
<b>Input Characteristics</b>						
Input Control Current to Activate <sup>4</sup>	$f=60Hz, I_L=1A$ Resistive	$I_F$	-	-	5	mA
Input Drop-out Voltage to Deactivate	-	-	0.8	-	-	V
Input Voltage Drop	$I_F=5mA$	$V_F$	0.9	1.2	1.5	V
Reverse Input Current	$V_R=5V$	$I_R$	-	-	10	$\mu A$
<b>Common Characteristics</b>						
Input to Output Capacitance	$V_{IO}=0V, f=1MHz$	$C_{IO}$	-	-	3	pF

<sup>1</sup> Tested at a peak value equivalent.

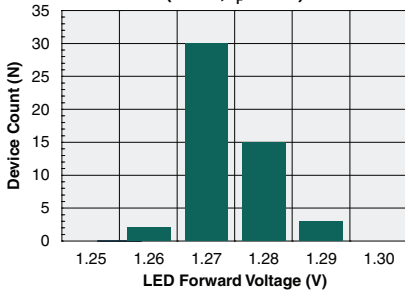
<sup>2</sup> Zero Cross 1st half cycle @ <100Hz.

<sup>3</sup> Snubber circuits may be required at low power factors.

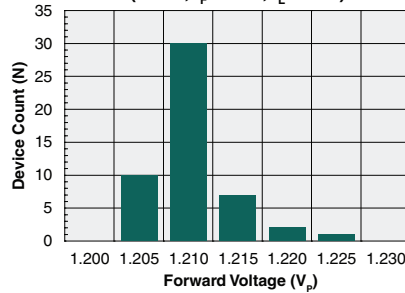
<sup>4</sup> For high-noise environments, or for high-frequency operation, use  $I_F \geq 10mA$ .

**PERFORMANCE DATA\***

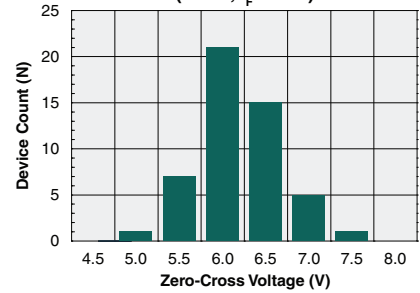
**Typical LED Forward Voltage Drop**  
(N=50,  $I_F=5\text{mA}$ )



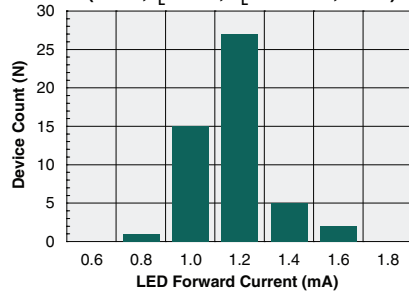
**On-State Forward Voltage Drop**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=1.5\text{A}$ )



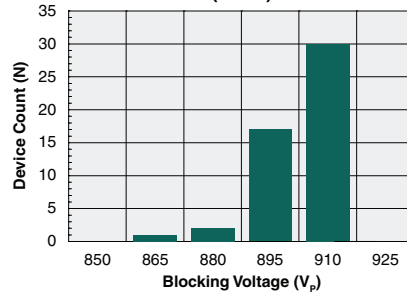
**First Zero-Cross Turn-On Voltage Distribution**  
(N=50,  $I_F=5\text{mA}$ )



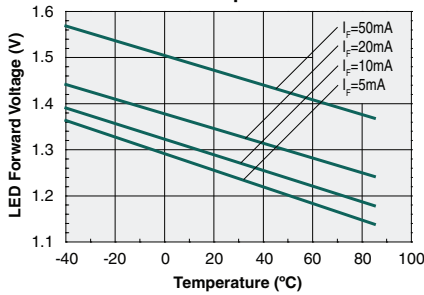
**Typical  $I_F$  for Switch Operation**  
**Resistive Load**  
(N=50,  $I_L=1.5\text{A}$ ,  $V_L=120\text{VAC}$ , 60Hz)



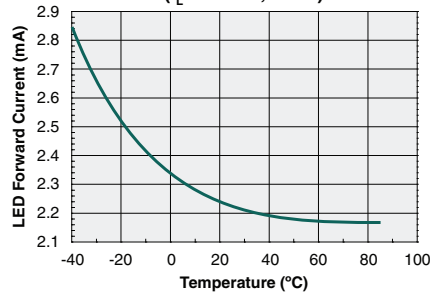
**Typical Blocking Voltage Distribution**  
(N=50)



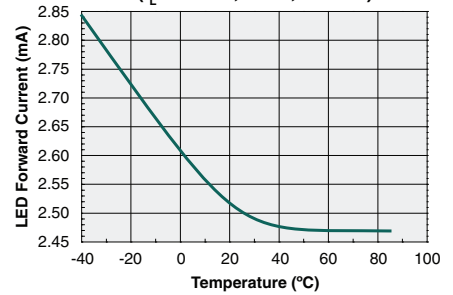
**Typical LED Forward Voltage Drop vs. Temperature**



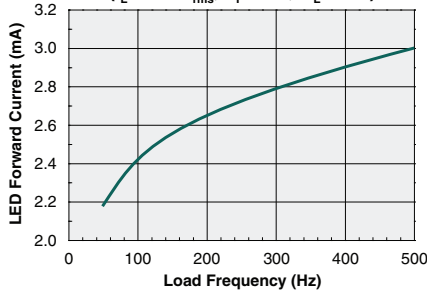
**Typical  $I_F$  for Switch Operation**  
**Resistive Load**  
( $I_L=350\text{mA}$ , 60Hz)



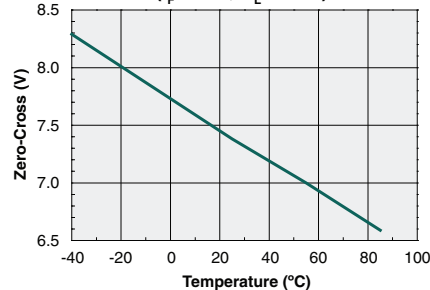
**Typical  $I_F$  for Switch Operation**  
**Inductive Load**  
( $I_L=500\text{mA}$ , 60Hz, 200mH)



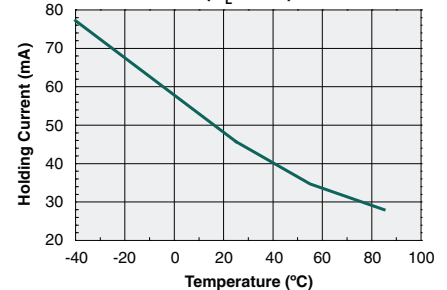
**Typical  $I_F$  for Switch Operation**  
**vs. Load Frequency (Resistive)**  
( $I_L=4.91\text{A}_{\text{rms}}$ ,  $V_P=67\text{V}$ ,  $R_L=10\Omega$ )



**First Zero-Cross Turn-On Voltage**  
( $I_F=5\text{mA}$ ,  $R_L=120\Omega$ )

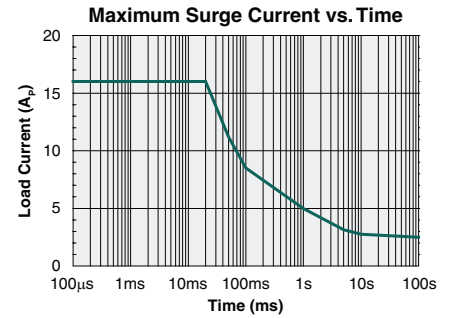
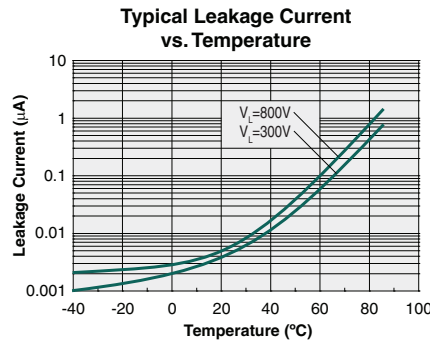
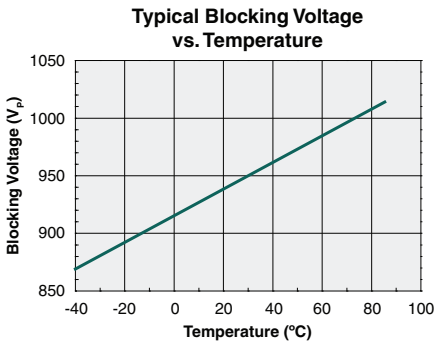
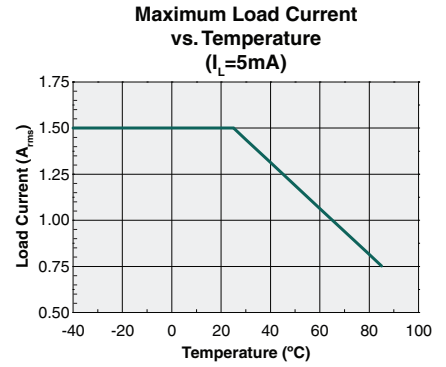
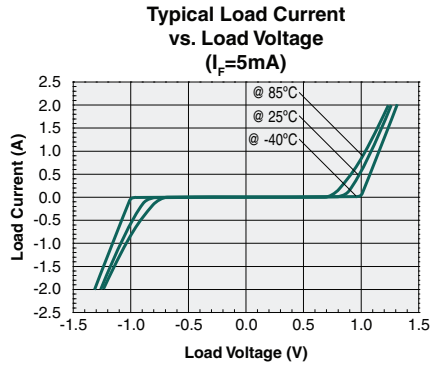
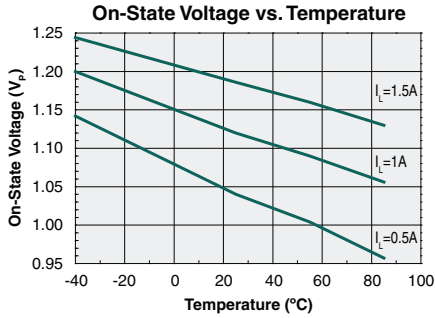


**Holding Current**  
( $R_L=1.9\Omega$ )



\*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
CPC1964B	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
CPC1964B	245°C	30 seconds	3

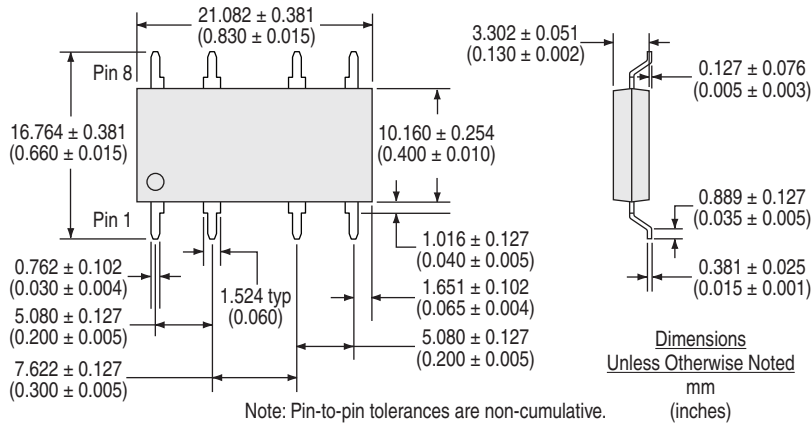
### Board Wash

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.

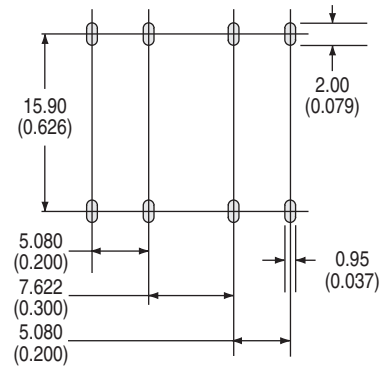


### Mechanical Dimensions

#### CPC1964B



#### Recommended PCB Pattern



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

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