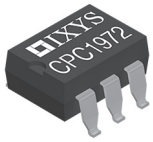
IXYS
INTEGRATED CIRCUITS DIVISION



CPC1972
AC Power Switch

Parameter	Ratings	Units
Blocking Voltage	800	V_P
Load Current	250	mA_{rms}
On State Voltage Drop	3	V_{rms} (at I_L = 250 mA_{rms})
Operating Voltage	550	V_{rms}

Features
- Load Current up to 250mA_{rms}
- 800V_P Blocking Voltage
- 5mA Sensitivity
- Zero-Crossing Detection
- 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

Description
The CPC1972 is an AC Solid State Switch using optical coupling with dual power silicon controlled rectifier (SCR) outputs to produce an alternative to optocoupler and Triac circuits. The CPC1972 switches are robust enough to provide a blocking voltage of up to 800V_P .

In addition, tightly controlled zero cross circuitry ensures switching of AC loads without the generation of transients.

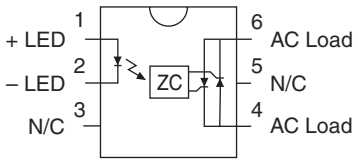
The input and output circuits are optically coupled to provide 3750V_{rms} of isolation and noise immunity between the control and load circuits. As a result the CPC1972 is well suited for industrial environments where electromagnetic interference could disrupt the operation of electromechanical relays.

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

Ordering Information

Part Number	Description
CPC1972G	6-Pin DIP (50/Tube)
CPC1972GS	6-Pin Surface Mount (50/Tube)
CPC1972GSTR	6-Pin Surface Mount (1000/Reel)

Pin Configuration



Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Blocking Voltage	800	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation [1]	150	mW
Total Package Dissipation [2]	800	mW
Isolation Voltage, Input to Output	3750	V_{rms}
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 1.33 mW / °C
[2] Derate linearly 6.67 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.

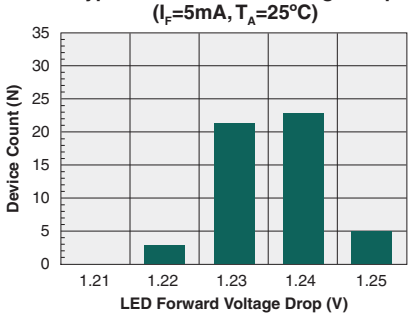
Electrical Characteristics @ 25ºC

Parameters	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Operating Voltage Range	-	V_L	5	-	550	V_{rms}
Load Current						
Continuous	-	I_L	5	-	250	mA_{rms}
Peak	t = 10ms	I_{TSM}	-	-	2	A_P
Off State Leakage Current	V_L=800V_P	I_{LEAK}	-	-	1	µA
On-State Voltage Drop	I_L = 250mA_{rms}	V_{ON}	-	-	3	V_{rms}
Critical Rate of Rise	-	dV/dt	500	-	-	V/µs
Holding Current	I_F=5mA	I_H	-	300	-	µA
Switching Speeds						
Turn-on	I_F=5mA	t_{on}	-	-	0.5	cycles
Turn-off		t_{off}	-	-	0.5	
Zero-Cross Turn-On Voltage [1]	1st half-cycle	-	-	5	20	V
	Subsequent half-cycle	-	-	1	-	V
Operating Frequency	-	-	20	-	500	Hz
Load Power Factor for Guaranteed Turn-On [2]	f=60Hz	PF	0.25	-	-	-
Input Characteristics						
Input Control Current to Activate [3]	-	I_F	-	-	5	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.5	V
Input Drop-out Voltage	-	-	0.8	-	-	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics						
Input to Output Capacitance	V_{IO}=0V, f=1MHz	C_{IO}	-	3	-	pF

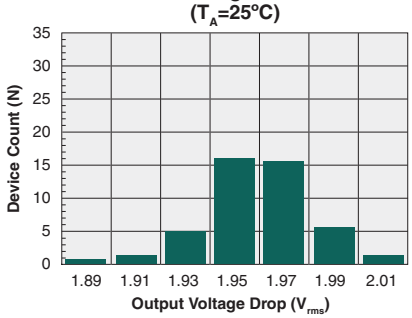
[1] Zero Cross 1st half-cycle @ <100Hz
[2] Snubber circuits may be required at low power factors.
[3] For high noise environments an LED drive current of at least 10mA is recommended.

PERFORMANCE DATA*

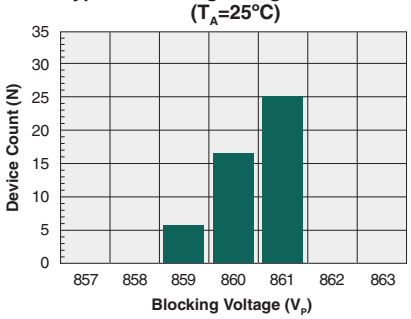
Typical LED Forward Voltage Drop (I_F=5mA, T_A=25°C)



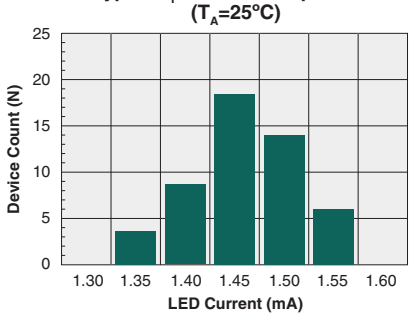
Typical On-State Output Forward Voltage Distribution (T_A=25°C)



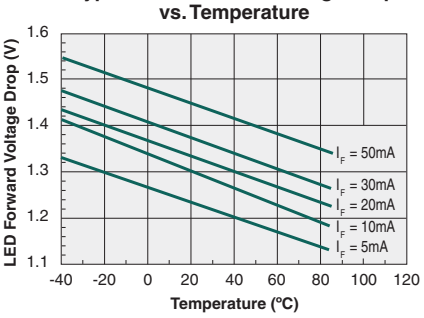
Typical Blocking Voltage Distribution (T_A=25°C)



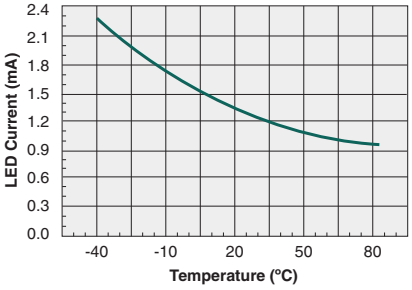
Typical I_F for Switch Operation (T_A=25°C)



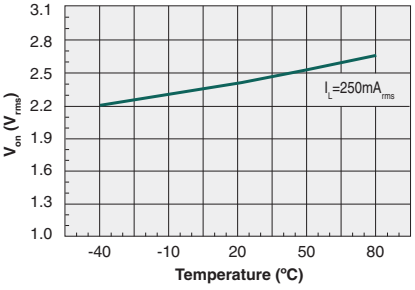
Typical LED Forward Voltage Drop vs. Temperature



Typical I_F for Switch Operation vs. Temperature



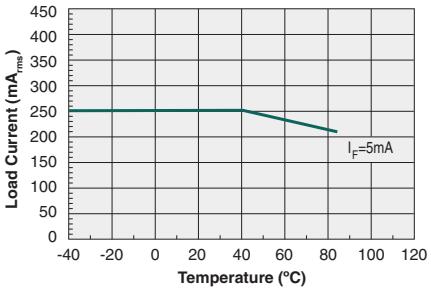
Typical Output Voltage Drop vs. Temperature



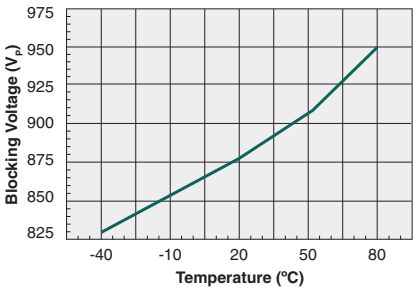
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

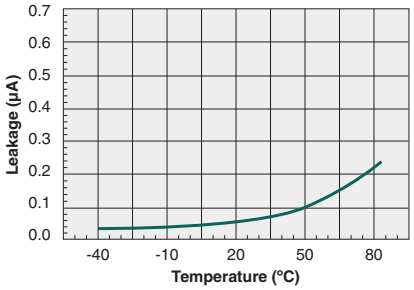
Typical Maximum Load Current vs. Temperature



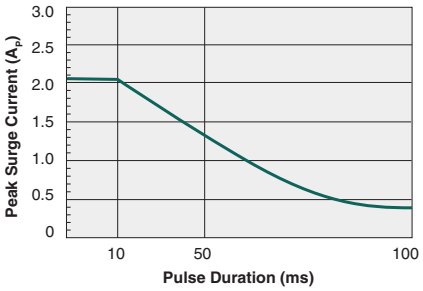
Typical Blocking Voltage vs. Temperature



Typical Leakage vs. Temperature (V$_L$=800V$_P$)



Maximum Surge Current (Non-Repetitive) (T$_J$=50ºC max)



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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 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
CPC1972G / CPC1972GS	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.

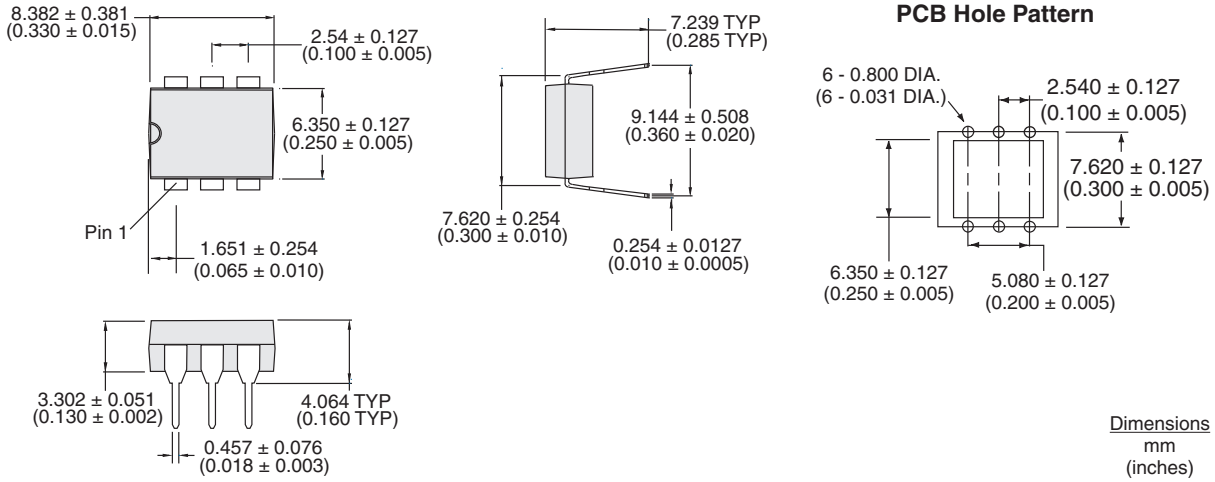
Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
CPC1972G	250ºC	30 seconds	1
CPC1972GS	250ºC	30 seconds	3

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.

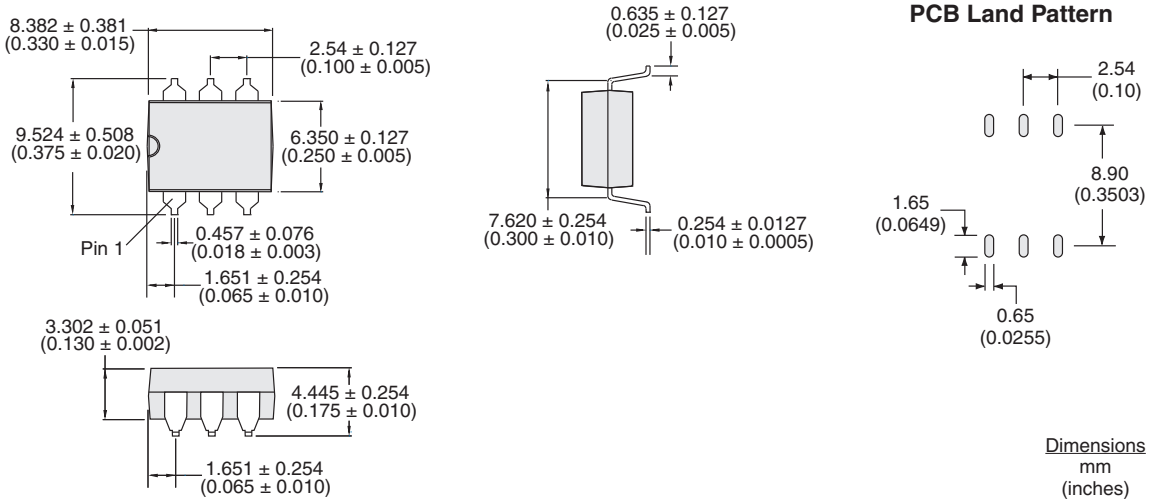
MECHANICAL DIMENSIONS

CPC1972G



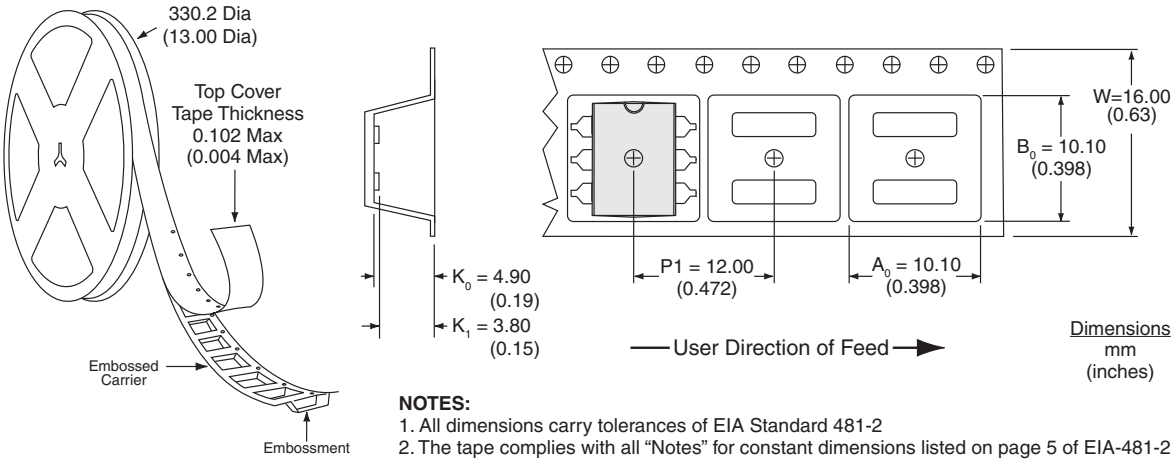
Dimensions
mm
(inches)

CPC1972GS



Dimensions
mm
(inches)

CPC1972GSTR Tape & Reel



NOTES:
1. All dimensions carry tolerances of EIA Standard 481-2
2. The tape complies with all "Notes" for constant dimensions listed on page 5 of EIA-481-2

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

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Specification: DS-CPC1972-R06
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