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
- TTL and CMOS Compatible
- Low EMI and RFI Generation
- High Noise Immunity
- Machine Insertable, Wave Solderable
- Flammability classification rating of 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.

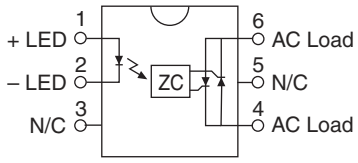
Approvals

- UL 508 Recognized Component: File #: E69938
- CSA Certified Component: Certificate # 1172007
- EN/IEC 60950 Compliant

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

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

Electrical absolute maximum ratings are at 25°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.

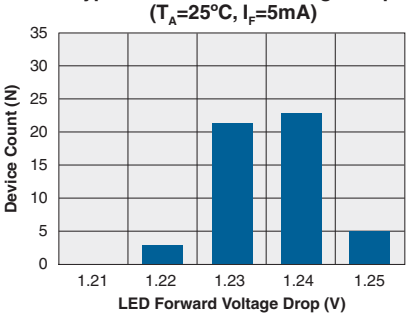
Electrical Characteristics

Parameters	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
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	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 @ 25°C						
Input Control Current [3]	-	I_F	-	-	5	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Input Drop-out Voltage	-	-	0.8	-	-	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics @ 25°C						
Input to Output Capacitance	-	$C_{I/O}$	-	3	-	pF

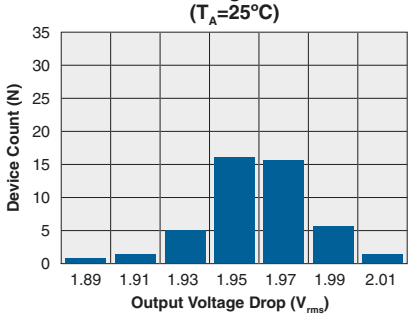
[1] Zero Cross 1st half-cycle @ <100Hz
[2] Snubber circuits may be required at low power factors.
[3] For high noise environment use at least 10mA LED current

PERFORMANCE DATA*

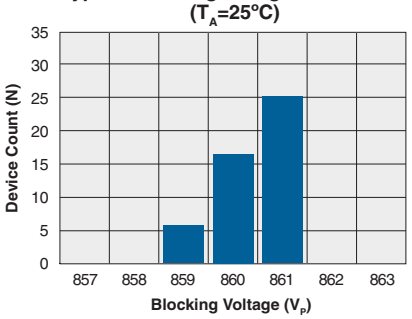
Typical LED Forward Voltage Drop
(T_A=25°C, I_F=5mA)



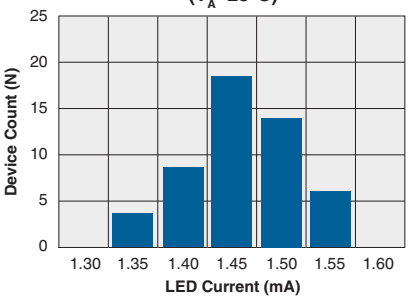
Typical On-State Output
Forward Voltage Distribution
(T_A=25°C)



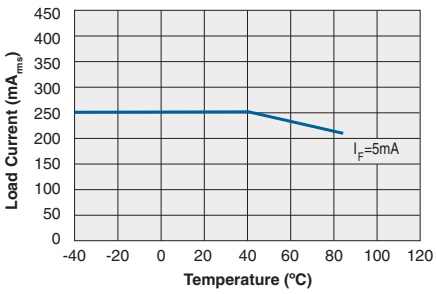
Typical Blocking Voltage Distribution
(T_A=25°C)



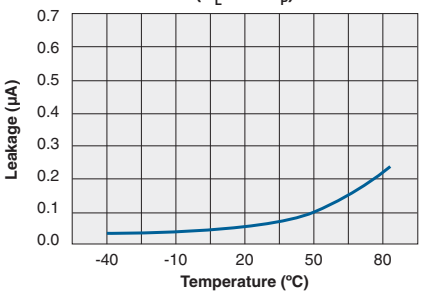
Typical I_F for Switch Operation
(T_A=25°C)



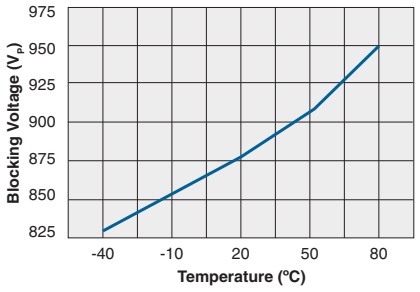
Typical Maximum Load Current
vs. Temperature



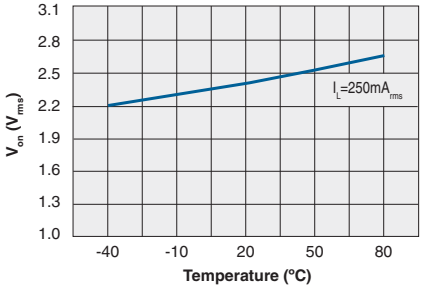
Typical Leakage vs. Temperature
(V_L=800V_P)



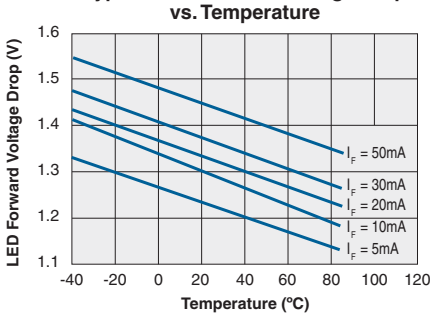
Typical Blocking Voltage
vs. Temperature



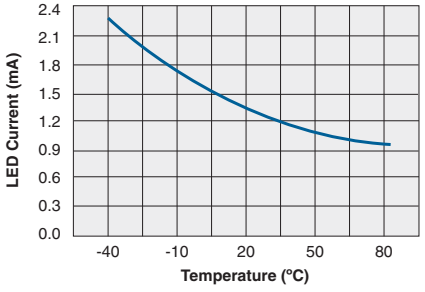
Typical Output Voltage Drop
vs. Temperature



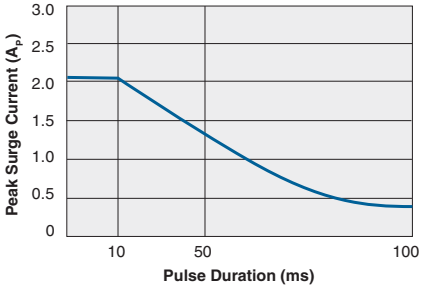
Typical LED Forward Voltage Drop
vs. Temperature



Typical I_F for Switch Operation
vs. Temperature



Maximum Surge Current (non-repetitive)
(T_J=50°C max)



*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

Soldering

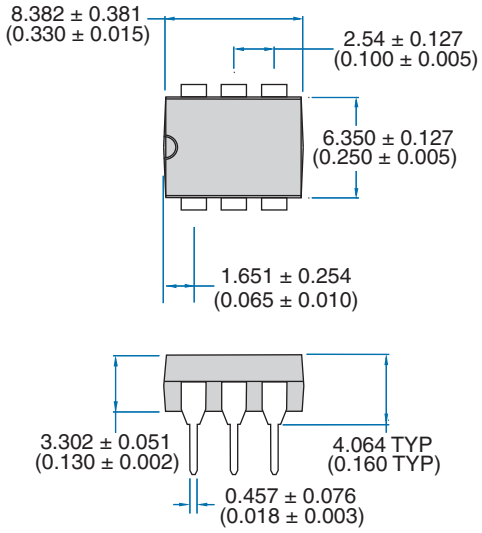
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Washing

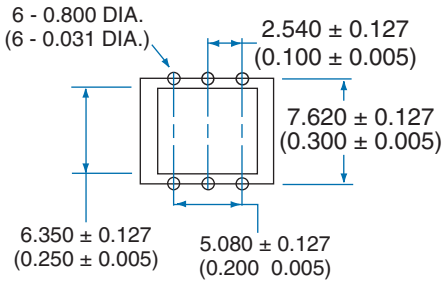
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

6-Pin DIP Thru-Hole Package

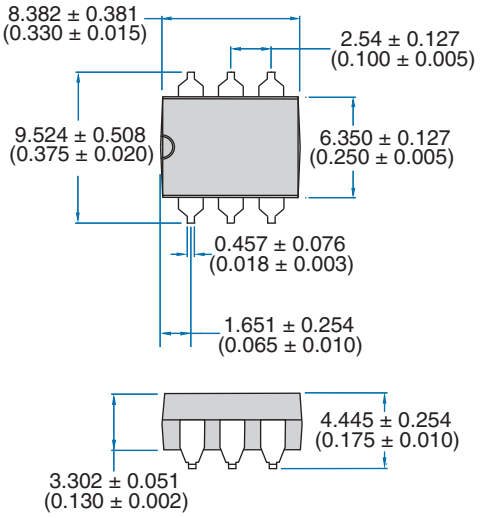


PC Board Pattern

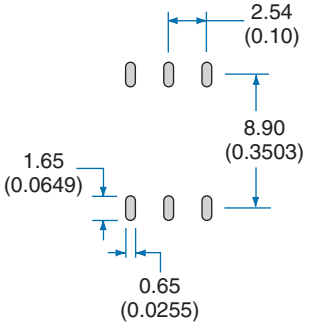


Dimensions
mm
(inches)

6-Pin Surface Mount Package ("S" Suffix)

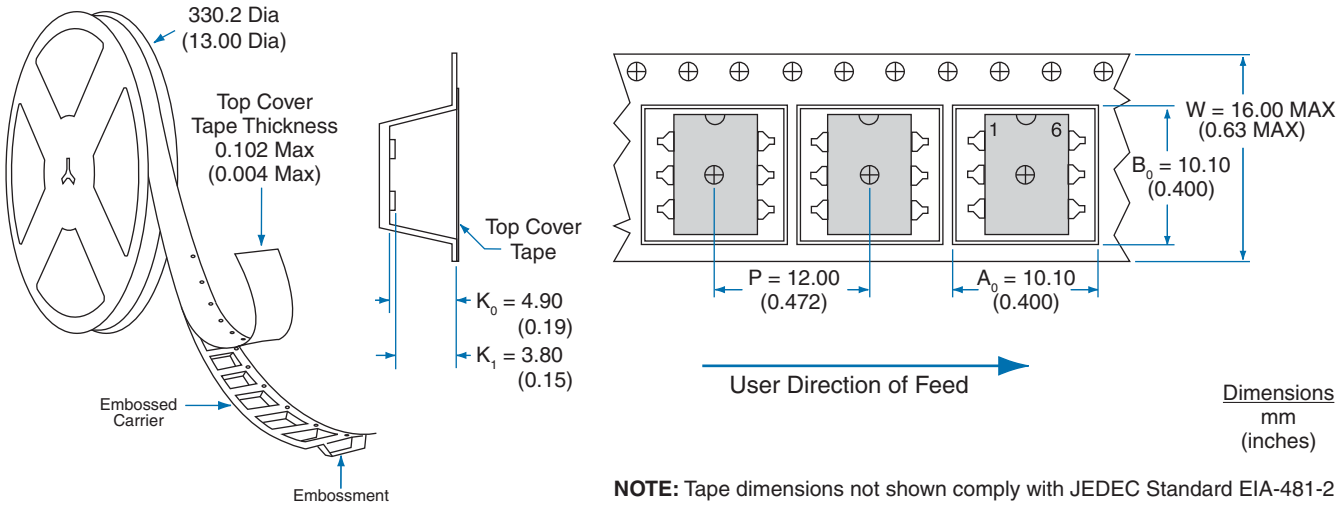


Recommended PCB Land Pattern



Dimensions
mm
(inches)

Tape and Reel Packaging for 6-Pin "S" Suffix Parts



Dimensions
mm
(inches)

NOTE: Tape dimensions not shown comply with JEDEC Standard EIA-481-2

Specification: DS-CPC1972-R03

7/20/09