CPC1976
AC Power Switch

Parameter	Rating	Units
AC Operating Voltage	20 - 240	V_{rms}
Load Current	2	A_{rms}
On-State Voltage Drop	1.15	V_{rms} (at $I_L = 2A_{rms}$)
Blocking Voltage	600	V_P

Features

- Load Current up to $2A_{rms}$
- $600V_P$ 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

Applications

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

Description

CPC1976 is an AC Solid State Switch utilizing dual power SCR thyristor outputs. This device also includes zero-cross turn-on circuitry and is specified with a blocking voltage of $600V_P$.

In addition, 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 $3750V_{rms}$ of isolation and noise immunity between the control and load circuits. As a result, the CPC1976 is well suited for industrial environments where electromagnetic interference would disrupt the operation of plant facility communication and control systems.

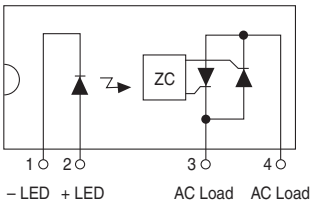
Approvals

- UL 508 Recognized Component: File #: E69938
- CSA Certified Component: Certificate #: 1172007

Ordering Information

Part #	Description
CPC1976Y	4-Pin SIP (25/Tube)

Pin Configuration



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
Input Power Dissipation [1]	150	mW
Total Power Dissipation [2]	2400	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 / 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.

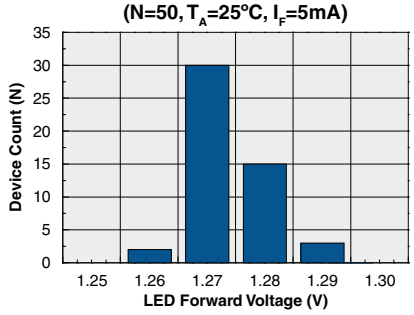
Electrical Characteristcs

Parameters	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current, Continuous	V_L=120-240V_{rms}	I_L	0.005	-	2	A_{rms}
Maximum Surge Current	t ≤ 16ms	I_{PK}	-	-	20	A
Off State Leakage Current	V_{DRM}	I_{LEAK}	-	-	1	mA
On-State Voltage Drop [1]	I_L=2A_{rms}	-	-	0.86	1.15	V_{rms}
Critical Rate of Rise	-	dv/dt	1000	1200	-	V/µs
Switching Speeds						
Turn-on	I_F = 5 mA	t_{ON}	-	-	0.5	cycles
Turn-off		t_{OFF}	-	-	0.5	cycles
Zero-Cross Turn-On Voltage	1st half cycle	-	-	2	10	V
	Subsequent half cycle	-	-	-	2	V
Holding Current	-	I_H	-	0.82	5	mA
Latching Current	-	I_L	-	0.84	6	mA
Operating Frequency [2]	-		20	-	500	Hz
Load Power Factor for Guaranteed Turn-On [3]	60Hz	PF	0.25	-	-	-
Input Characteristics @ 25°C						
Input Control Current [4]	60Hz	I_F	-	-	5	mA
Input Drop-out Voltage	-	-	0.8	-	-	V
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics @ 25°C						
Input to Output Capacitance	-	$C_{I/O}$	-	-	3	pF

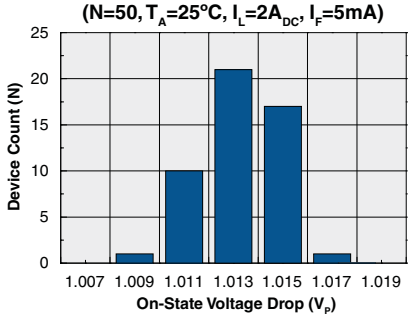
[1] Tested at a peak value equivalent.
[2] Zero Cross 1st half cycle @ <100Hz.
[3] Snubber circuits may be required at low power factors.
[4] For high-noise environments, or for high-frequency operation, use I_F ≥ 10mA.

PERFORMANCE DATA*

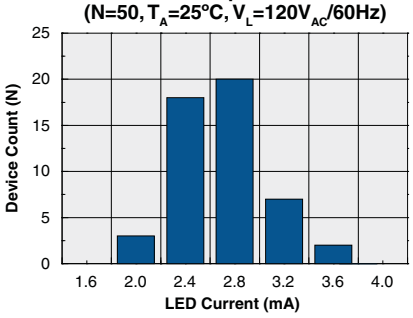
Typical LED Forward Voltage Drop Distribution
(N=50, T_A=25°C, I_F=5mA)



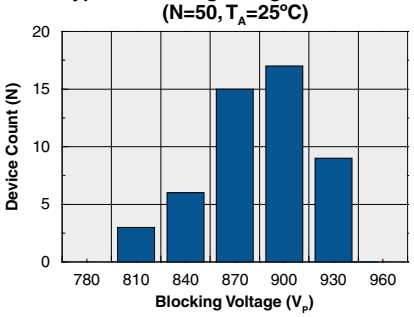
Typical On-State Voltage Drop Distribution
(N=50, T_A=25°C, I_L=2A_{DC}, I_F=5mA)



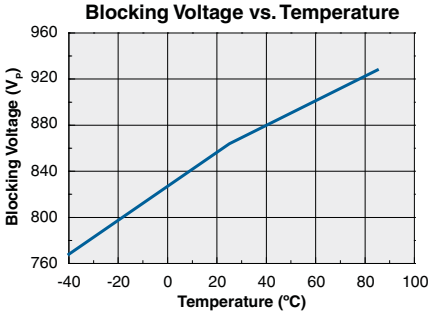
LED Current to Operate Distribution
(N=50, T_A=25°C, V_L=120V_{AC}/60Hz)



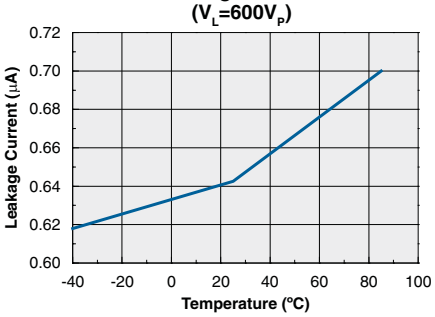
Typical Blocking Voltage Distribution
(N=50, T_A=25°C)



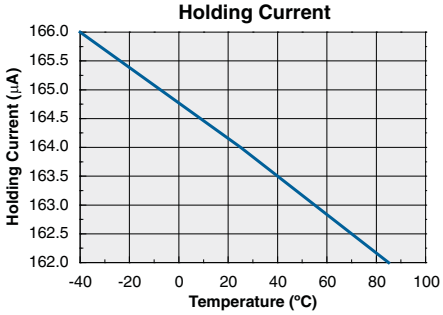
Blocking Voltage vs. Temperature



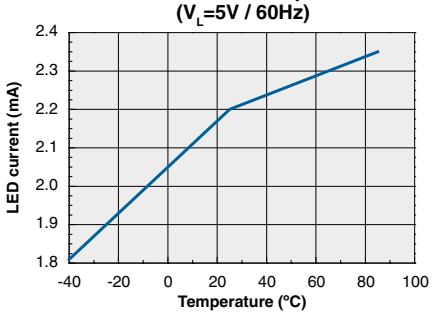
Leakage Current
(V_L=600V_P)



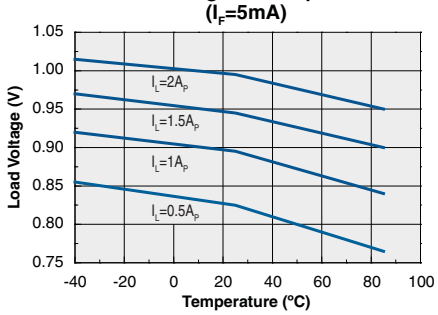
Holding Current



LED Current to Operate
(V_L=5V / 60Hz)



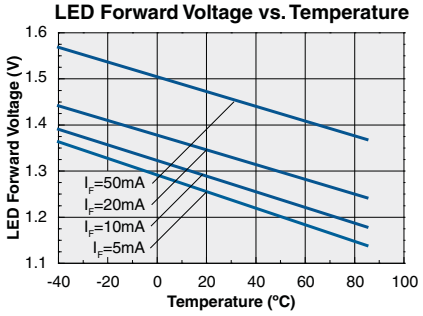
Load Voltage vs. Temperature
(I_F=5mA)



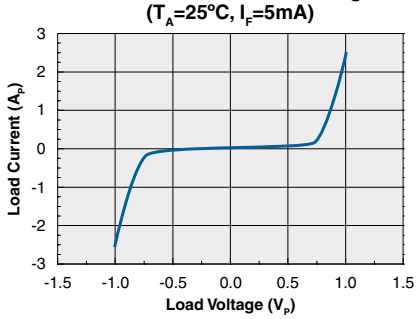
* The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

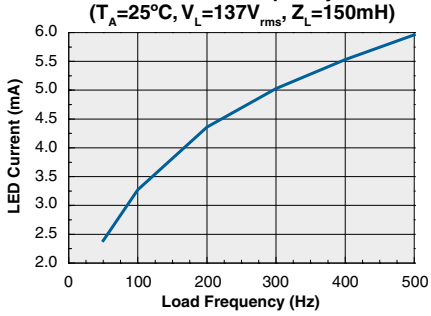
LED Forward Voltage vs. Temperature



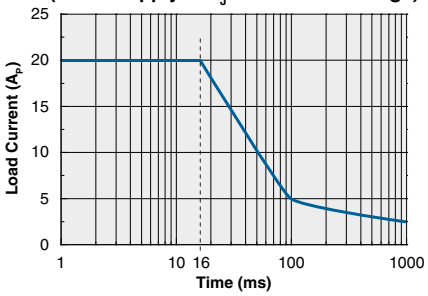
Load Current vs. Load Voltage (T_A=25°C, I_F=5mA)



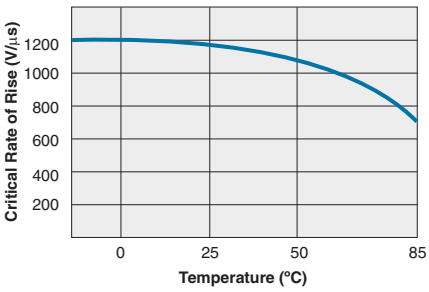
LED Current to Operate vs. Load Frequency (T_A=25°C, V_L=137V_{rms}, Z_L=150mH)



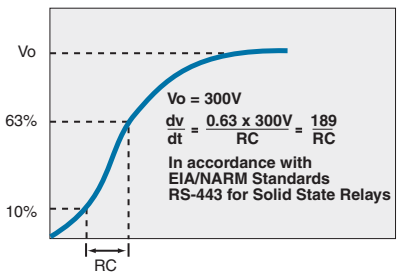
Maximum Non-Repetitive Surge Current (Values Apply to T_J=50°C Before Surge)



Typical dv/dt vs. Temperature



dv/dt Method



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MANUFACTURING INFORMATION

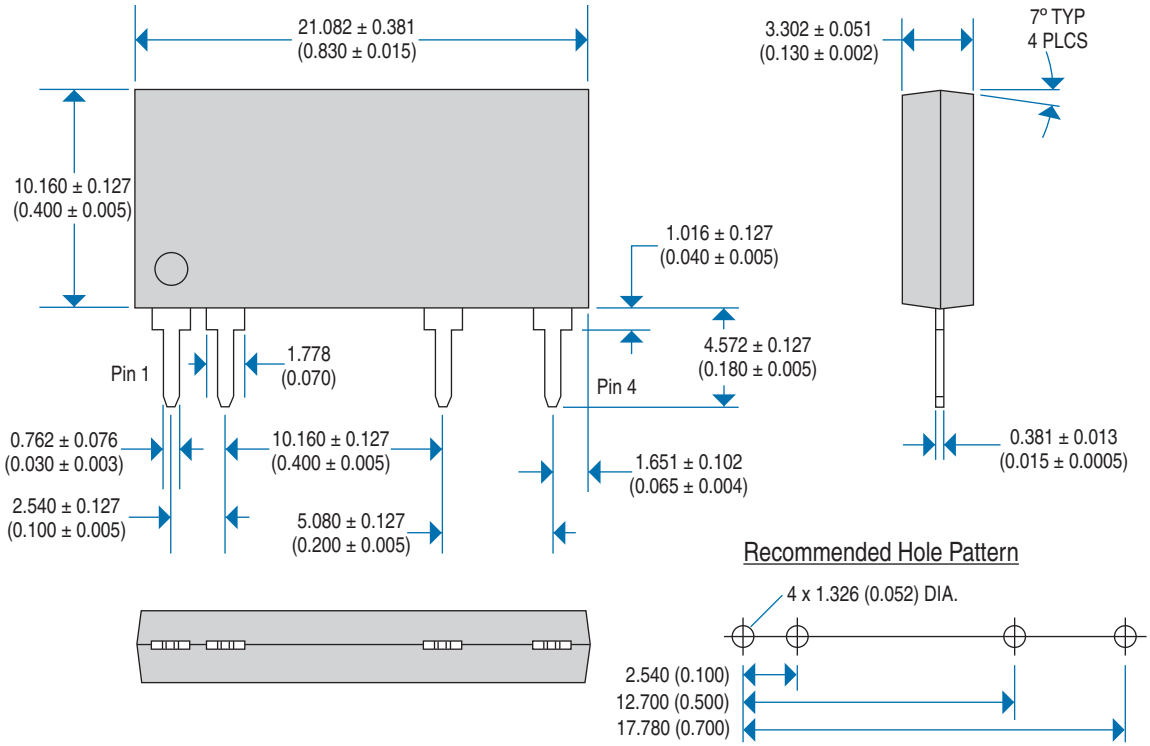
Soldering

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



Recommended Hole Pattern

Dimensions
mm
(inches)

Note: Recommended hole size is based on the maximum cross-section diagonal measure of the pin plus 0.4mm (0.016).

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

Specification: DS-CPC1976-R02

3/9/09