CPC1963
AC Power Switch

Parameter	Ratings	Units
Blocking Voltage	600	V_P
Load Current	500	mA_{rms}
On State Voltage Drop	1.4	V_{rms} (at I_L = 500mA)

Features

- Load Current up to $0.5A_{rms}$
- $600V_P$ 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
- 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 CPC1963 is an AC Solid State Switch using optical coupling with dual power SCR outputs to produce an alternative to optocoupler and Triac circuits. The CPC1963 switches are robust enough to provide a blocking voltage of up to $600V_P$. 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 control and load circuits. As a result, the CPC1963 is well suited for industrial environments where electromagnetic interference could disrupt the operation of electromechanical relays.

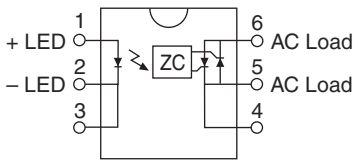
Approvals

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

Ordering Information

Part Number	Description
CPC1963G	6-Pin DIP (50/Tube)
CPC1963GS	6-Pin Surface Mount (50/Tube)
CPC1963GSTR	6-Pin Surface Mount (1000/Reel)

Pin Configuration



Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage	600	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.

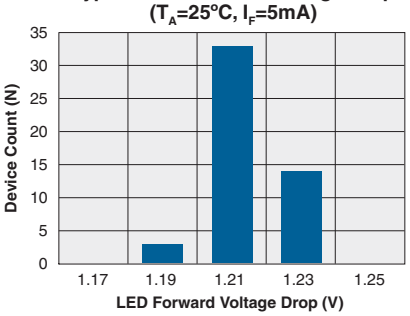
Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Operating Voltage Range	V_T	-	20	-	260	V_{rms}
Load Current, Continuous	V_L=120V_{rms}	I_L	0.005	-	0.5	A_{rms}
Off State Leakage Current	V = 600V	I_{LEAK}	-	-	1	mA
On-State Voltage Drop	I_L=500 mA_{rms}	V_{ON}	-	-	1.4	V_{rms}
Critical Rate of Rise [3]	-	dV/dt	1000	-	-	V/µs
Switching Speeds						
Turn-on	I_F=5 mA	t_{ON}	-	-	0.5	cycles
Turn-off		t_{OFF}	-	-	0.5	
Zero-Cross Turn-On Voltage [1]	1st half cycle		-	2	10	V
	Subsequent half cycle	-	-	1	-	
Operating Frequency	-		20	-	500	Hz
Load Power Factor for Guaranteed Turn-On [2]	-	PF	0.25	-	-	-
Input Characteristics @ 25°C						
Input Control Current [4]	-	I_F	-	0.23	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

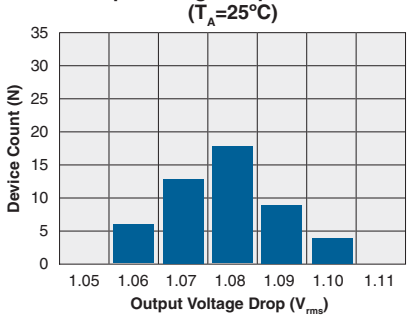
[1] Zero Cross 1st half cycle @ <100Hz
[2] Snubber circuits may be required at low power factors.
[3] Tested in accordance with EIA/NARM standard RS-443.
[4] For high noise environments use at least 10mA LED current.

PERFORMANCE DATA*

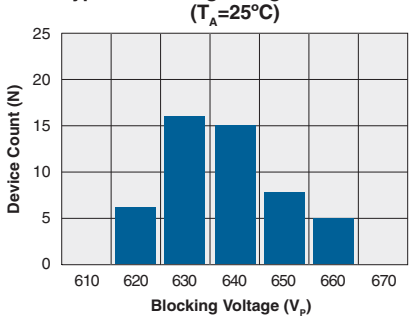
Typical LED Forward Voltage Drop (T_A=25°C, I_F=5mA)



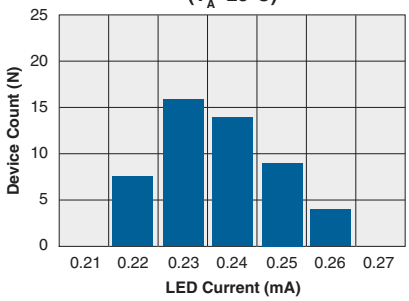
Typical On-State Output Voltage Drop Distribution (T_A=25°C)



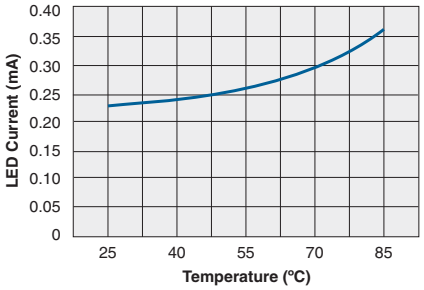
Typical Blocking Voltage Distribution (T_A=25°C)



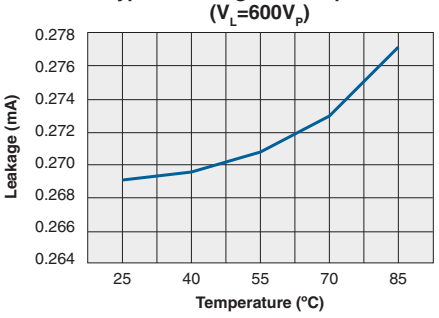
Typical I_F for Switch Operation (T_A=25°C)



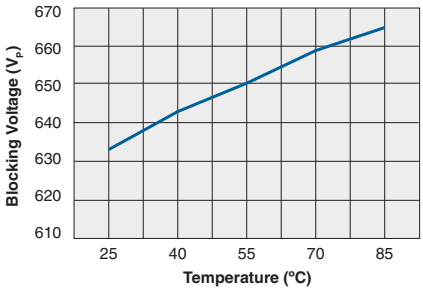
Typical I_F for Switch Operation vs. Temperature



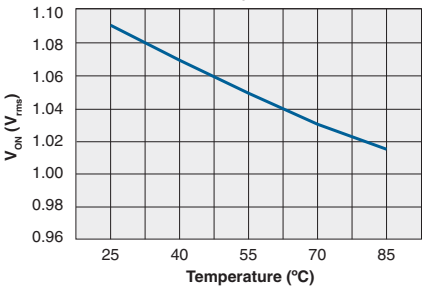
Typical Leakage vs. Temperature (V_L=600V_P)



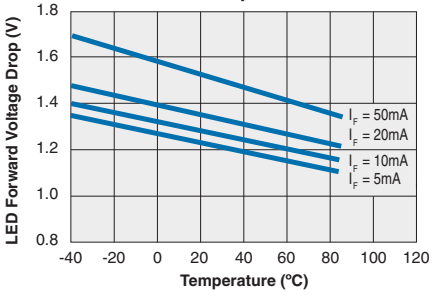
Typical Blocking Voltage vs. Temperature



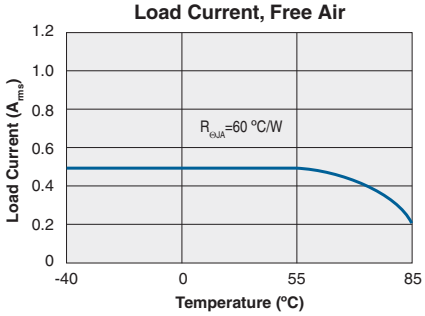
Typical Output V_{ON} vs. Temperature



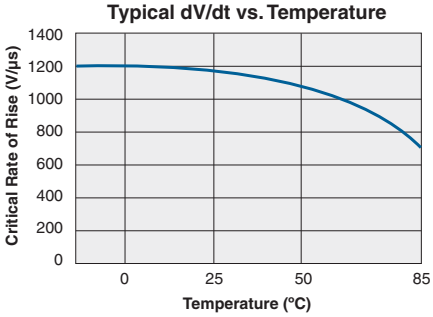
Typical LED Forward Voltage Drop vs. Temperature



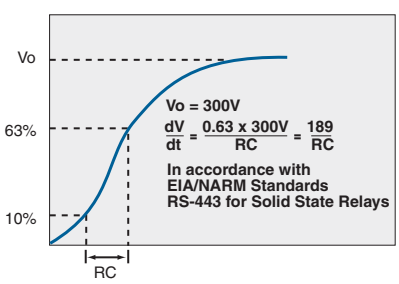
Load Current, Free Air



Typical dV/dt vs. Temperature



dV/dt Method



*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

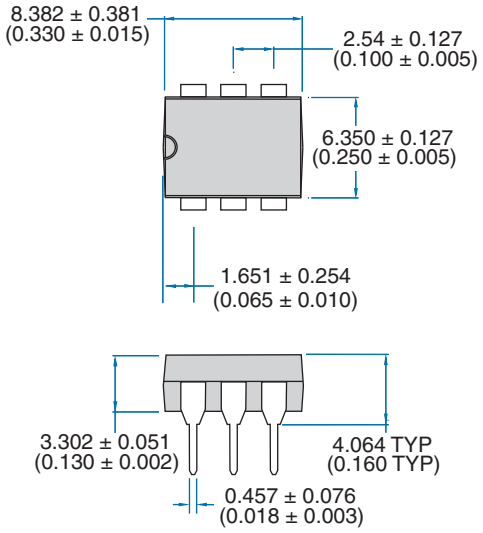
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Washing

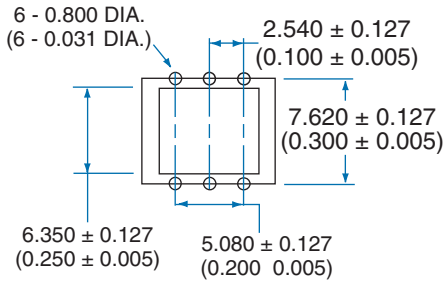
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

6-Pin DIP Thru-Hole Package

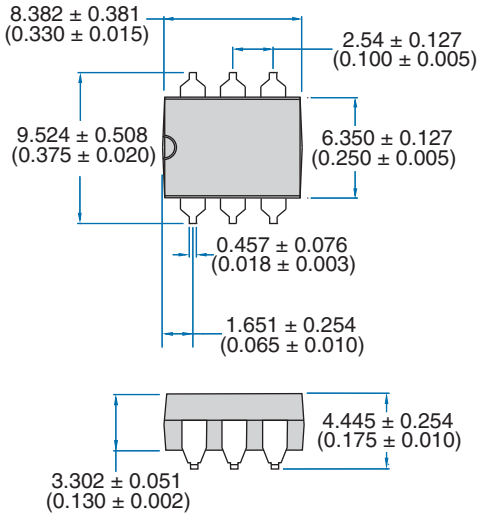


PC Board Pattern

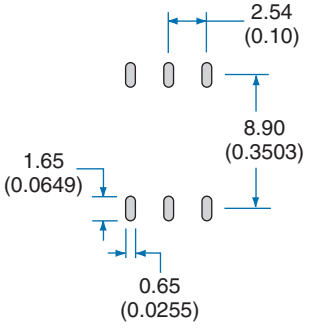


Dimensions
mm
(inches)

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

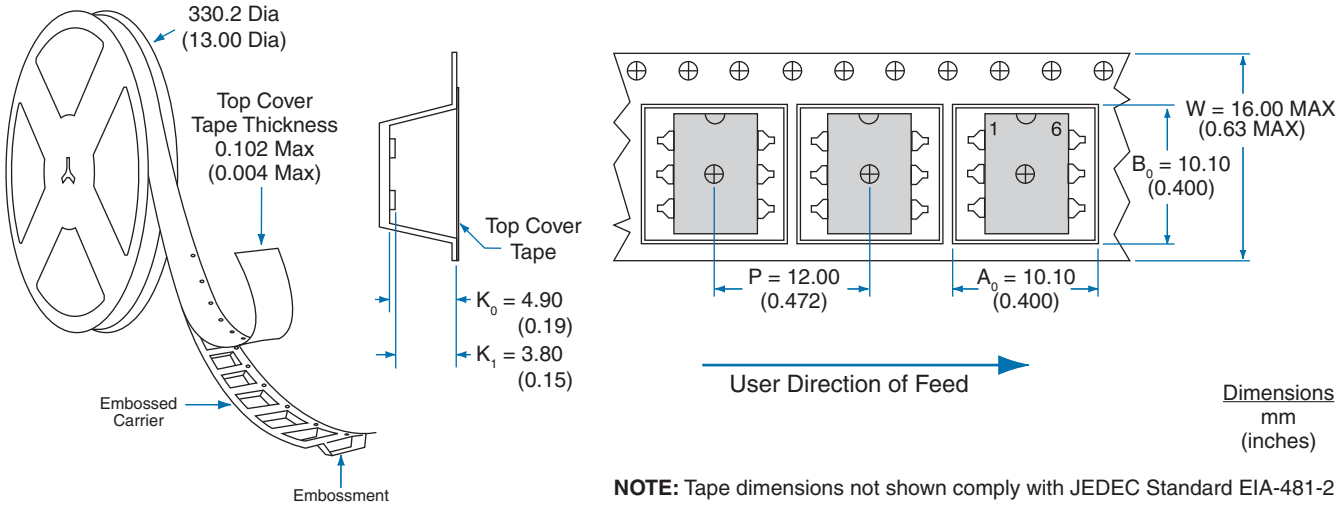


Recommended PCB Land Pattern



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-CPC1963-R03

9/16/08