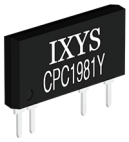
IXYS
INTEGRATED CIRCUITS DIVISION



CPC1981Y
1000V, 0.18A_{rms} Single-Pole Normally Open Power SIP Relay

Parameter	Rating	Units
Blocking Voltage	1000	V_P
Load Current	0.18	A_{rms}
On-Resistance (max)	18	Ω

Features

- Handle Load Currents Up to 0.25A
- 2500V_{rms} Input/Output Isolation
- Power SIP Package
- High Reliability
- Low Drive Power Requirements
- No EMI/RFI Generation
- Flammability Rating UL 94 V-0

Applications

- Industrial Controls
- Motor Control
- Robotics
- Medical Equipment—Patient/Equipment Isolation
- Instrumentation
- Multiplexers
- Data Acquisition
- Electronic Switching
- I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- IC Equipment
- Home Appliances

Description

IXYS Integrated Circuits brings OptoMOS technology, reliability, and compact size to a new family of high power solid state relays. As part of that family, the CPC1981Y is a 1-Form-A solid state relay.

The CPC1981Y employs optically coupled MOSFET technology to provide 2500V_{rms} of input to output isolation.

The optically coupled outputs, that use patented OptoMOS architecture, are controlled by a highly efficient infrared LED. The combination of low on-resistance and high load current handling capabilities makes the relay suitable for a variety of high performance switching applications.

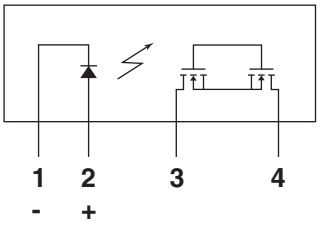
Approvals

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

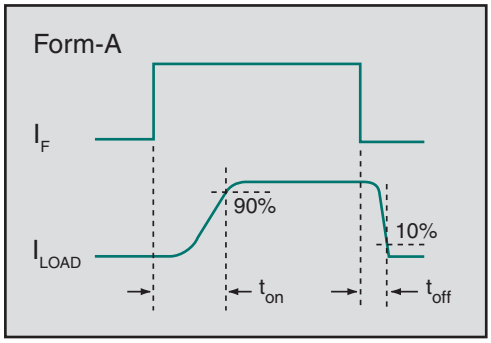
Ordering Information

Part #	Description
CPC1981Y	4-Pin (8-Pin Body) Power SIP Package (25 per tube)

Pin Configuration



Switching Characteristics of Normally Open (Form A) Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Symbol	Rating	Unit
Blocking Voltage	V_L	1000	V_P
Reverse Input Voltage	V_R	5	V
Input control Current	I_F	50	mA
Peak (10ms)		1	A
Input Power Dissipation [1]	P_{IN}	150	mW
Total Power Dissipation [2]	P_T	2400	mW
Isolation Voltage, Input to Output	V_{ISO}	2500	V_{rms}
Operational Temperature, Ambient	T_A	-40 to +85	°C
Storage Temperature	T_{STG}	-40 to +125	°C

[1] Derate linearly 1.33 mW / °C
[2] Derate output power 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 @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Blocking Voltage	I_L=1µA	V_{DRM}	1000	-	-	V
Operating Voltage	-	V_L	5	-	600	V_{rms} or V_{DC}
Load Current	I_F=10mA, Free Air					
Continuous	-	I_L	-	-	0.18	A_{rms}
Peak	t=10ms	I_{LPK}	-	-	1.1	A_{rms}
On-Resistance[1]	I_L=10mA	R_{ON}	-	12.3	18	Ω
Off-State Leakage Current	V_L=1000V	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=10mA, V_L=10V	t_{on}	-	-	10	ms
Turn-Off		t_{off}	-	-	5	
Output Capacitance	I_F=0mA, V_L=30V, f=10MHz	C_{OUT}	-	31	-	pF
Input Characteristics						
Input Control Current to Activate	I_L=1.0A	I_F	-	-	10	mA
Input Control Current to Deactivate	-	I_F	0.6	-	-	mA
Input Voltage Drop	I_F=10mA	V_F	0.9	1.42	1.56	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Input/Output Characteristics						
Capacitance, Input to Output	V_{IO}=0V, f=1MHz	C_{IO}	-	2	-	pF

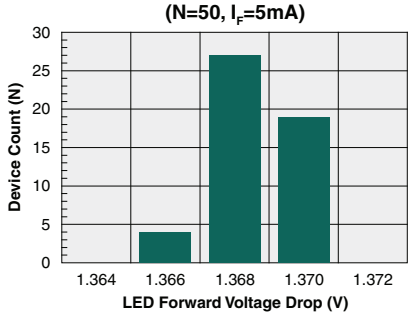
[1] Measurement taken within 1 second of on-time.

Thermal Characteristics

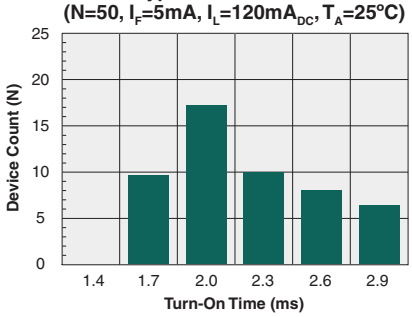
Parameter	Conditions	Symbol	Rating	Units
Thermal Impedance (junction to case)	-	θ_{JC}	1.5	°C/W

PERFORMANCE DATA*

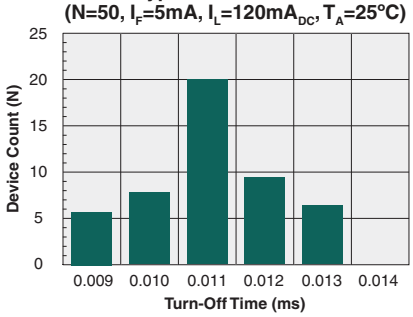
Typical LED Forward Voltage Drop (N=50, I_F=5mA)



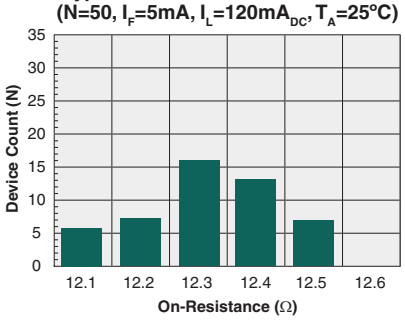
Typical Turn-On Time (N=50, I_F=5mA, I_L=120mA$_{DC}$, T_A=25°C)



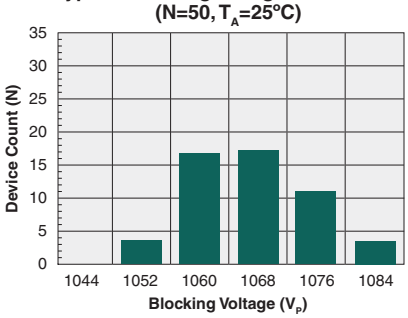
Typical Turn-Off Time (N=50, I_F=5mA, I_L=120mA$_{DC}$, T_A=25°C)



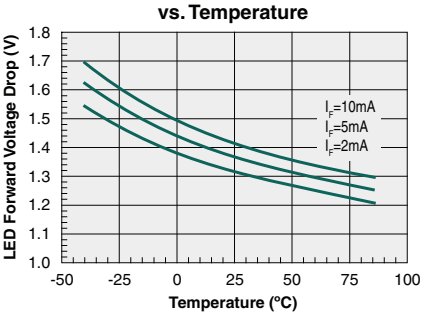
Typical On-Resistance Distribution (N=50, I_F=5mA, I_L=120mA$_{DC}$, T_A=25°C)



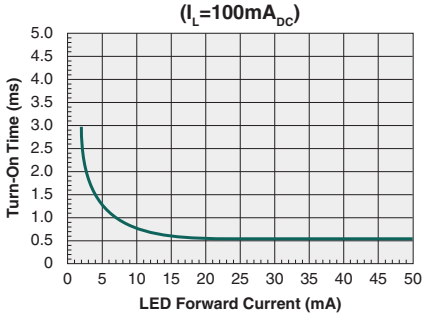
Typical Blocking Voltage Distribution (N=50, T_A=25°C)



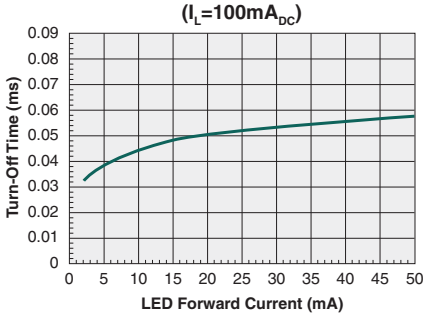
Typical LED Forward Voltage Drop vs. Temperature



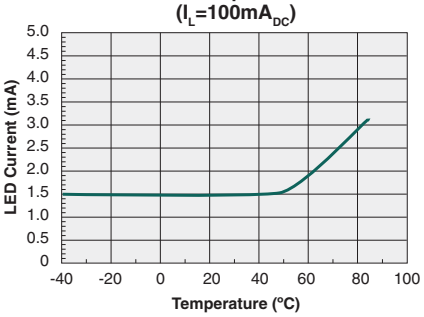
Typical Turn-On Time vs.LED Forward Current (I_L=100mA$_{DC}$)



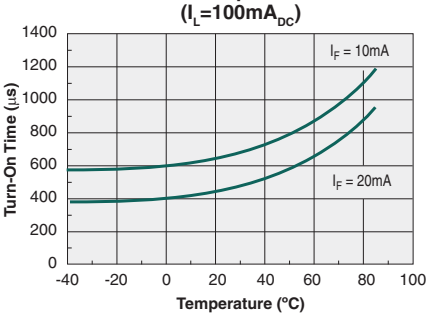
Typical Turn-Off Time vs. LED Forward Current (I_L=100mA$_{DC}$)



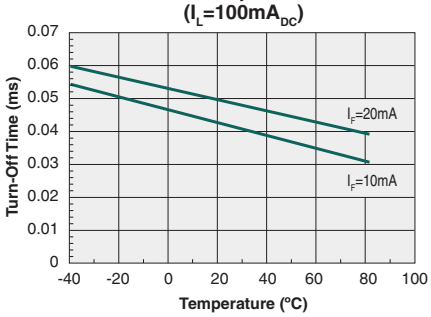
Typical I_F for Switch Operation vs. Temperature (I_L=100mA$_{DC}$)



Typical Turn-On Time vs. Temperature (I_L=100mA$_{DC}$)



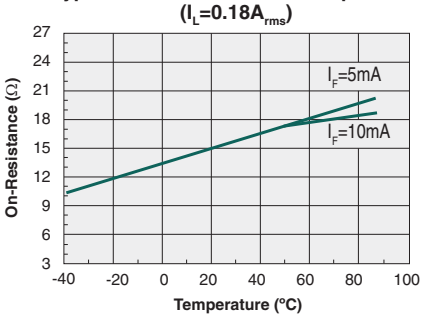
Typical Turn-Off Time vs. Temperature (I_L=100mA$_{DC}$)



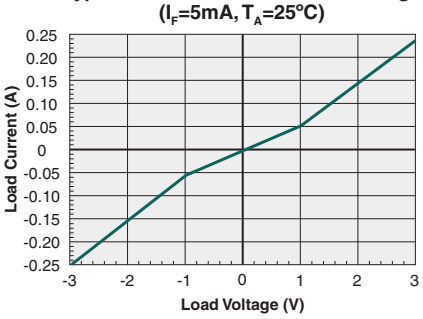
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.

PERFORMANCE DATA*

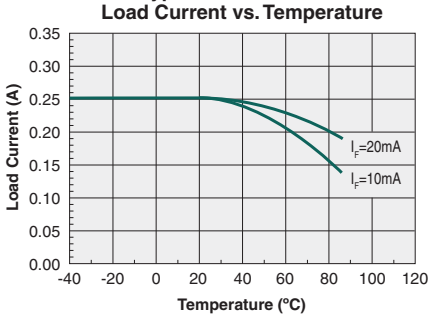
Typical On-Resistance vs. Temperature
(I_L=0.18A_{rms})



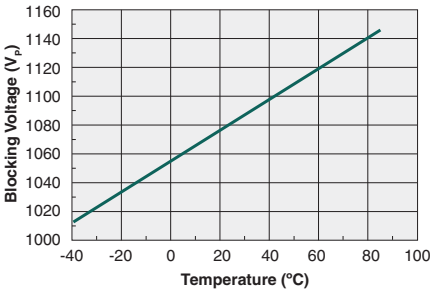
Typical Load Current vs. Load Voltage
(I_F=5mA, T_A=25°C)



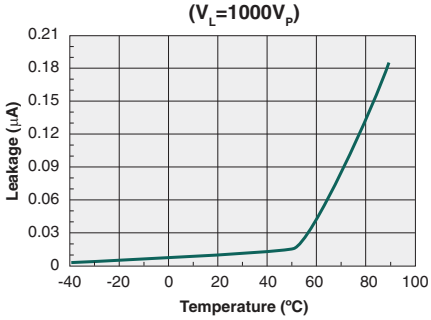
Typical Maximum DC Load Current vs. Temperature



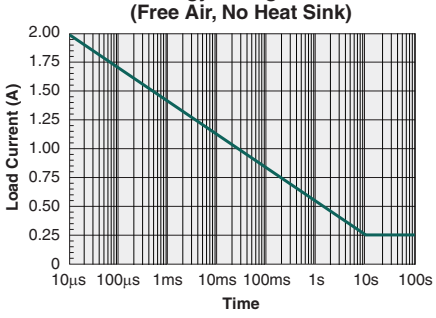
Blocking Voltage vs. Temperature



Typical Leakage vs. Temperature Measured Across Pins 3&4
(V_L=1000V_P)



Energy Rating Curve (Free Air, No Heat Sink)



*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.

Manufacturing Information

ESD Sensitivity

This product is ESD Sensitive, and should be handled according to the industry standard **JESD-625**.

Soldering Profile

The Maximum Solder Temperature and the Maximum Total Dwell Time in all solder waves the device pins (leads) may be at the Maximum Solder Temperature is given in the table below. The body temperature of the device must not exceed the Maximum Body Temperature shown below at any time during the soldering process.

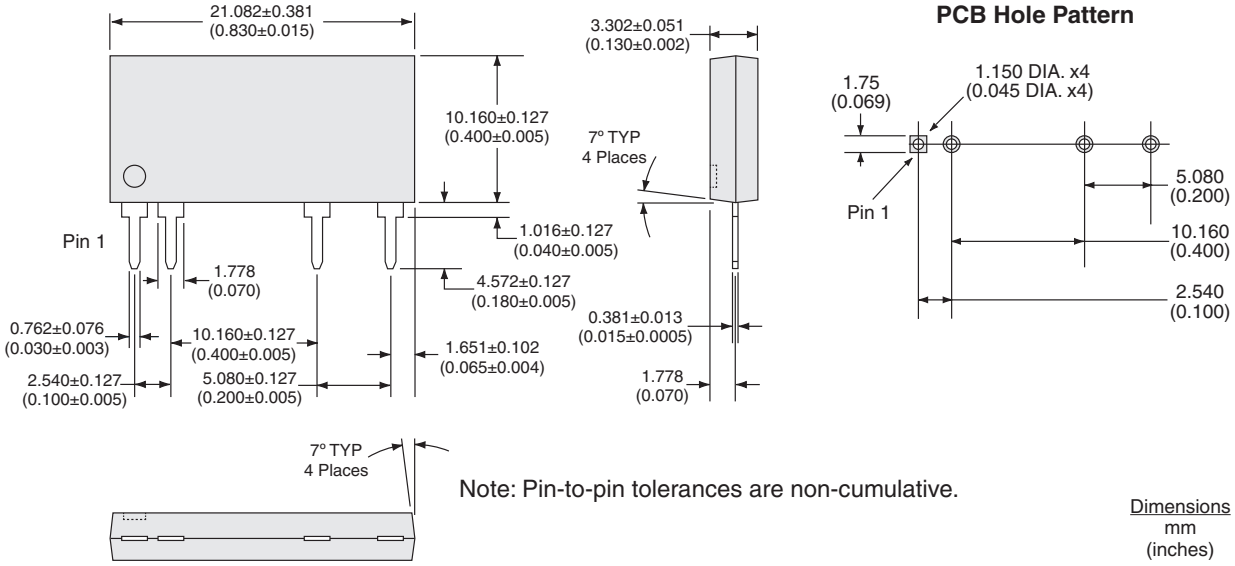
Device	Maximum Solder Temperature	Maximum Body Temperature	Maximum Total Dwell Time	Wave Cycles
CPC1981Y	260°C	245°C	10 seconds	1

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 halide flux or solvents.

MECHANICAL DIMENSIONS

CPC1981Y



Note: Pin-to-pin tolerances are non-cumulative.

Dimensions
mm
(inches)

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

IXYS
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Specification: DS-CPC1981Y-R07
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