IXYS
INTEGRATED CIRCUITS DIVISION

CPC1706
Single-Pole, Normally Open 4-Pin OptoMOS® DC Power SIP Relay

Parameter	Rating	Units
Blocking Voltage	60	V_P
Load Current	4	A_{DC}
On-Resistance (max)	0.09	Ω

Features

- Handle Load Currents Up to $4A_{DC}$
- $2500V_{rms}$ Input/Output Isolation
- Power SIP Package
- High Reliability
- Low Drive Power Requirements
- Arc-Free With No Snubbing Circuits
- 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. The CPC1706, a DC-switching, normally open (1-Form-A) Solid State Relay, is part of that family.

Employing optically coupled MOSFET technology, the CPC1706 provides $2500V_{rms}$ of input to output isolation. The relay output is constructed with efficient MOSFET switches that use IXYS Integrated Circuits' patented OptoMOS architecture. The input, a highly efficient infrared LED, controls the optically coupled output.

The combination of low on-resistance and high load current handling capability makes this relay suitable for a variety of high performance switching applications.

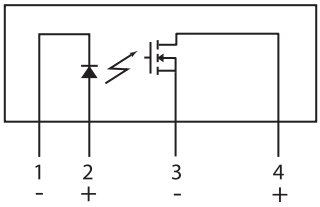
Approvals

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

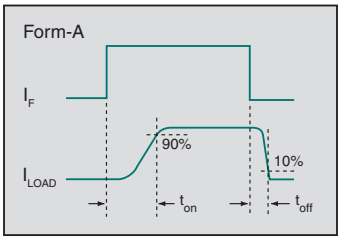
Ordering Information

Part #	Description
CPC1706Y	4-Pin (8-Pin Body) Power SIP Package (25 per tube)

Pin Configuration



Switching Characteristics of Normally Open Devices



Pb RoHS e3

Absolute Maximum Ratings @ 25ºC

Parameter	Min	Max	Units
Blocking Voltage	-	60	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	-	2500	V_{rms}
Operational Temperature	-40	+85	°C
Storage Temperature	-40	+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.

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 (Unless Otherwise Noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current, Continuous	I_F=5mA, Free air	I_L	-	-	4	A_{DC}
Peak Load Current	I_F=5mA, t=10ms	I_{LPK}	-	-	9	A
On-Resistance [1]	I_F=5mA, I_L=1A	R_{ON}	-	0.07	0.09	Ω
Off-State Leakage Current	I_F=0mA, V_L=60V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	0.5	5	ms
Turn-Off		t_{off}	-	0.085	2	
Output Capacitance	I_F=0mA, V_L=50V, f=1MHz	C_{OUT}	-	75	-	pF
Input Characteristics						
Input Control Current to Activate	I_L=1A	I_F	-	1.4	5	mA
Input Control Current to Deactivate	-	I_F	0.4	-	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.5	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

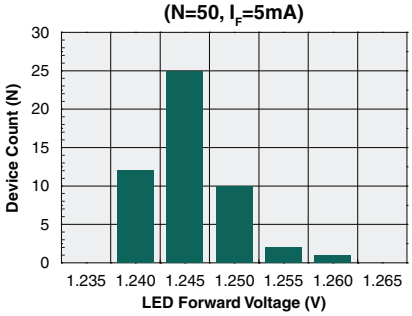
[1] Measurement taken within 1 second of on-time.

Thermal Characteristics

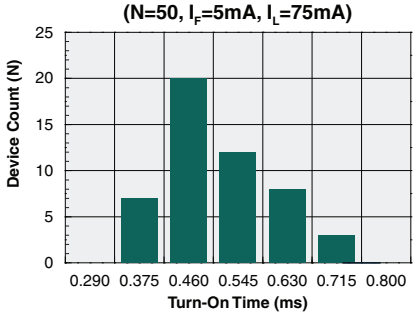
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Thermal Impedance (junction to case)	-	θ_{JC}	-	1.5	-	°C/W

PERFORMANCE DATA*

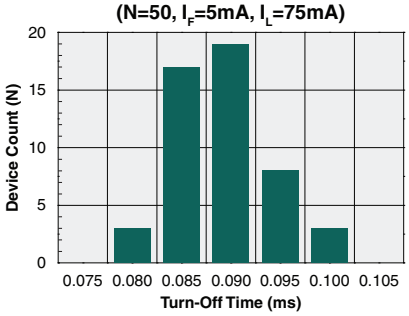
Typical LED Forward Voltage Drop (N=50, I_F=5mA)



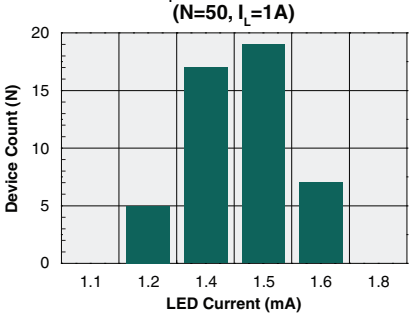
Typical Turn-On Time (N=50, I_F=5mA, I_L=75mA)



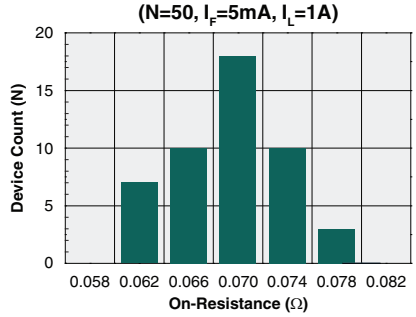
Typical Turn-Off Time (N=50, I_F=5mA, I_L=75mA)



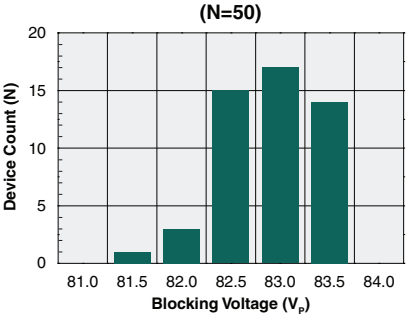
Typical I_F for Switch Operation (N=50, I_L=1A)



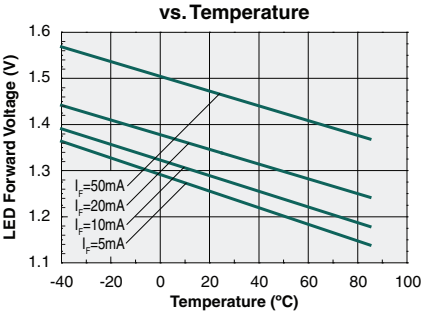
Typical On-Resistance Distribution (N=50, I_F=5mA, I_L=1A)



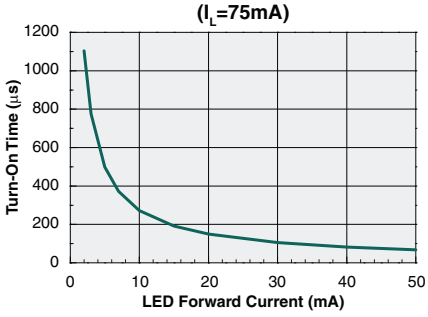
Typical Blocking Voltage Distribution (N=50)



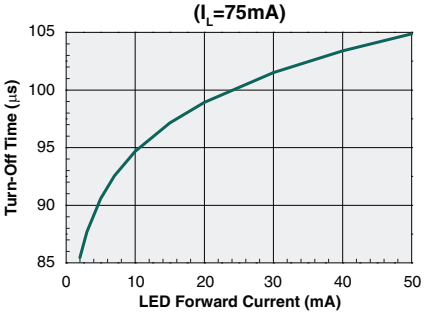
Typical LED Forward Voltage Drop vs. Temperature



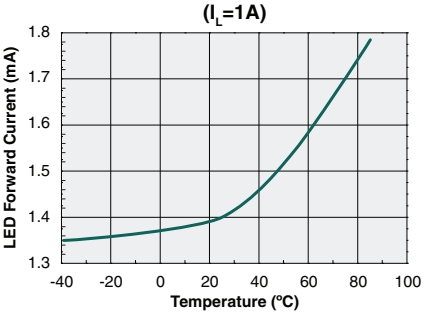
Typical Turn-On vs. LED Forward Current (I_L=75mA)



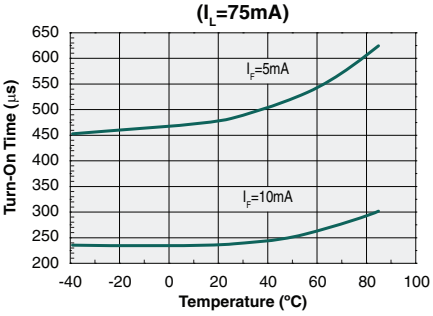
Typical Turn-Off vs. LED Forward Current (I_L=75mA)



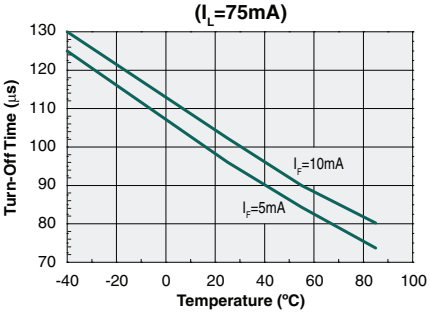
Typical I_F for Switch Operation vs. Temperature (I_L=1A)



Typical Turn-On vs. Temperature (I_L=75mA)



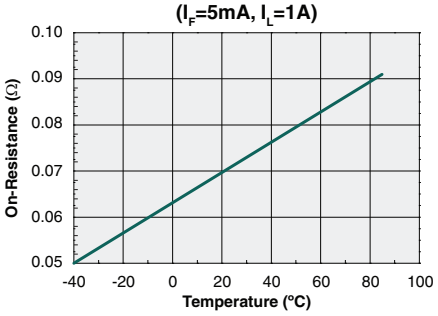
Typical Turn-Off vs. Temperature (I_L=75mA)



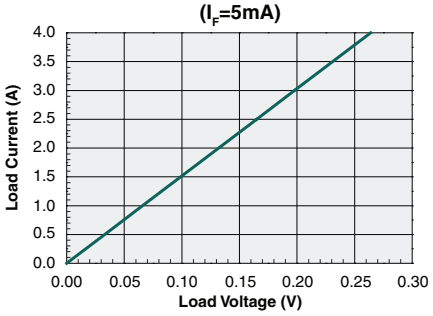
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

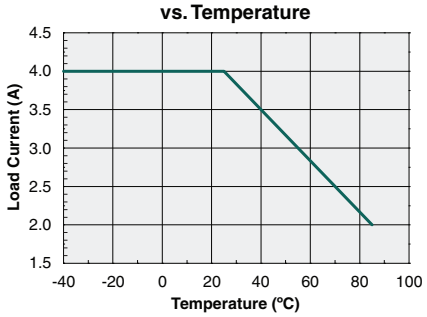
DC-Only On-Resistance vs. Temperature (I_F=5mA, I_L=1A)



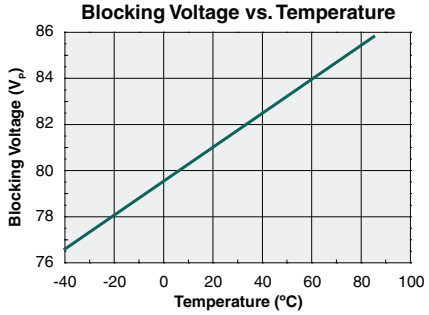
Typical Load Current vs. Load Voltage (I_F=5mA)



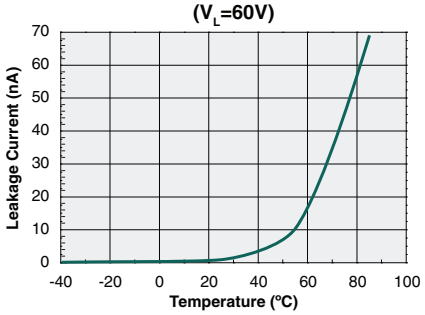
Maximum Load Current vs. Temperature



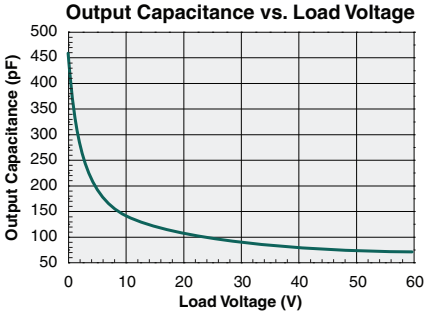
Blocking Voltage vs. Temperature



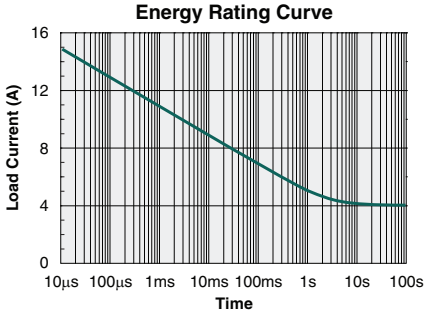
Typical Leakage vs. Temperature Measured Across Pins 3 & 4 (V_L=60V)



Output Capacitance vs. Load Voltage



Energy Rating Curve



*Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.
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
CPC1706Y	MSL 1

ESD Sensitivity

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

Soldering Profile

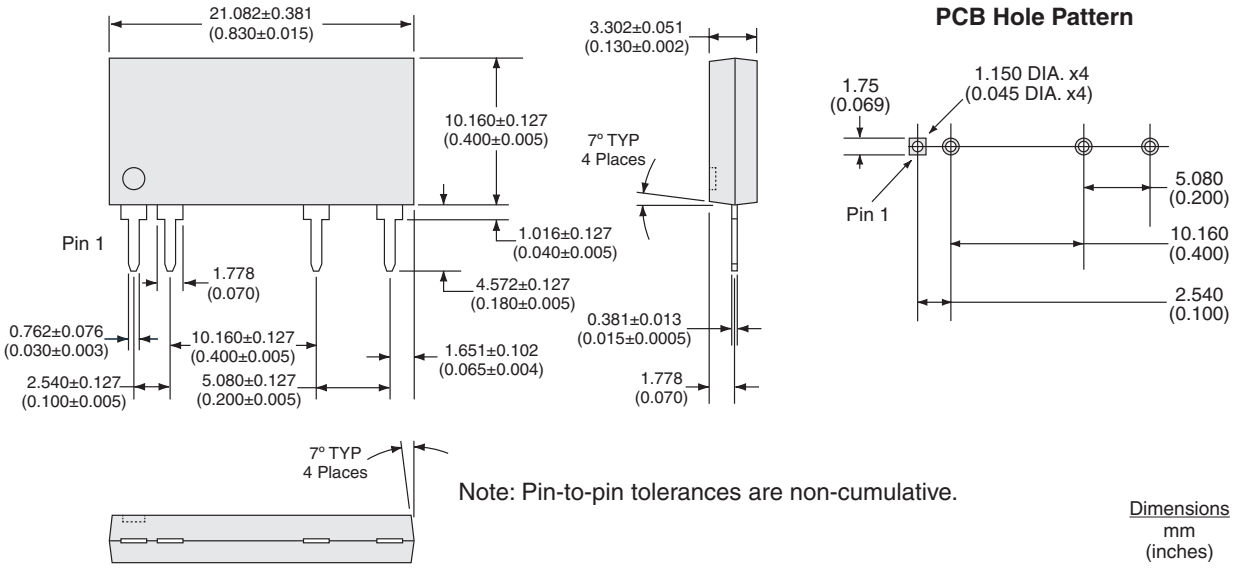
Provided in the table below is the Classification Temperature (T_C) of this product and the maximum dwell time the body temperature of this device may be (T_C - 5)ºC or greater. The classification temperature sets the Maximum Body Temperature allowed for this device during lead-free reflow processes. 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
CPC1706Y	245ºC	30 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 flux or solvents that are Chlorine- or Fluorine-based. Cleaning methods that employ ultrasonic energy should not be used.

MECHANICAL DIMENSIONS



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

Dimensions
mm
(inches)

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

Specification: DS-CPC1706-R05

6/18/2018