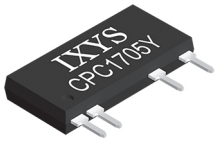
IXYS
INTEGRATED CIRCUITS DIVISION



CPC1705Y
60V, 3.25A$_{DC}$ Single-Pole Normally Closed DC-Only Relay

Parameter	Rating	Units
Blocking Voltage	60	V_P
Load Current	3.25	A_{DC}
On-Resistance (max)	0.09	Ω

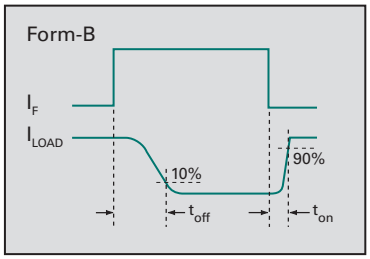
Features

- 3.25A$_{DC}$ Load Current
- 60V Blocking Voltage
- 90mΩ Maximum On-Resistance
- 5mA Input Control Current to Activate
- 2500V$_{rms}$ Input/Output Isolation
- Power SIP Package
- Greater Reliability than Electromechanical Relays
- No EMI/RFI Generation

Applications

- Transportation Railroad Controls
- Security
- Battery Backup Systems
- Industrial Controls
- Robotics
- Instrumentation

Switching Characteristics of Normally Closed Devices



Description

The CPC1705Y is a 60V, 3.25A$_{DC}$, 0.09Ω DC-switching, normally closed (1-Form-B) Solid State Relay. To minimize printed circuit board space, this device is provided in IXYS Integrated Circuits' Power Single In-line package (PowerSIP).

Employing optically coupled MOSFET technology, the CPC1705Y provides 2500V$_{rms}$ of input to output isolation. The relay output is constructed with an efficient MOSFET switch that utilizes IXYS Integrated Circuits' patented OptoMOS architecture. A highly efficient infrared LED at the input controls the optically coupled output.

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

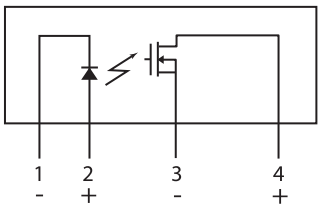
Approvals

- UL 508 Certified Component: File E69938
- EN IEC 62368-1: TUV Certificate B 082667 0008

Ordering Information

Part #	Description
CPC1705Y	4-Pin (8-Pin Body) Power SIP Package (25/Tube)
CPC1705Y-PET	4-Pin (8-Pin Body) Power SIP Package, PET Material Tube (25/Tube)

Pin Configuration



Absolute Maximum Ratings @ T_A=25ºC (Unless Otherwise Noted)

Parameter	Ratings	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]	1175	mW
Isolation Voltage, Input to Output	2500	V_{rms}
ESD Rating (Human Body Model)	4	kV
Operational Temperature, Ambient	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 1.33 mW / ºC
[2] Derate Output Power linearly 11.8 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 @ T_A=25ºC (Unless Otherwise Noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Blocking Voltage	I_L=1µA	V_{DRM}	60	-	-	V
Load Current						
Continuous [1]	Free Air	I_L	-	-	3.25	A_{DC}
Peak	t=10ms	I_{LPK}	-	-	3.25	A
On-Resistance [2]	I_L=1A	R_{ON}	-	0.059	0.09	Ω
Off-State Leakage Current	I_F=5mA, V_L=60V_{DC}	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=10mA, V_L=10V	t_{on}	-	0.6	2	ms
Turn-Off		t_{off}	-	2.84	12	
Output Capacitance	I_F=10mA, V_L=20V_{DC}, f=1MHz	C_{OUT}	-	1	-	nF
Input Characteristics						
Input Control Current to Activate [3]	I_L=0A	I_F	-	0.8	5	mA
Input Control Current to Deactivate	I_L=1A	I_F	0.1	0.8	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.36	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

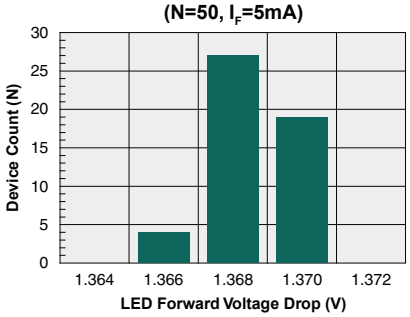
[1] Derate linearly 20.5 mA/ºC.
[2] Measurement taken within 1 second of on-time.
[3] For high-temperature operation (T_A > 60ºC) a minimum LED drive current of 10mA is recommended.

Thermal Characteristics

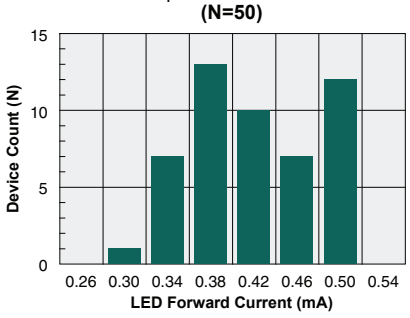
Parameter	Symbol	Rating	Units
Thermal Impedance (Junction to Ambient)	θ_{JA}	85	°C/W

PERFORMANCE DATA*

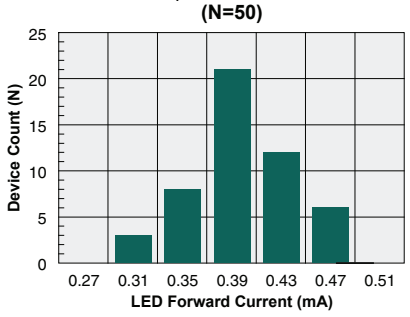
Typical LED Forward Voltage Drop (N=50, I_F=5mA)



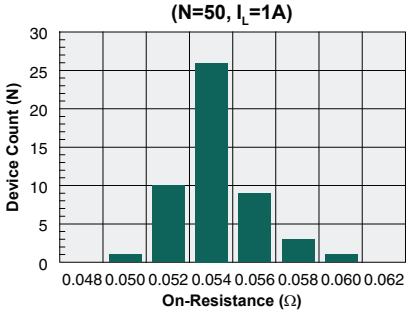
Typical I_F for Switch Operation (N=50)



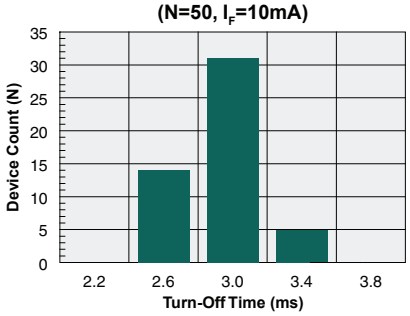
Typical I_F for Switch Dropout (N=50)



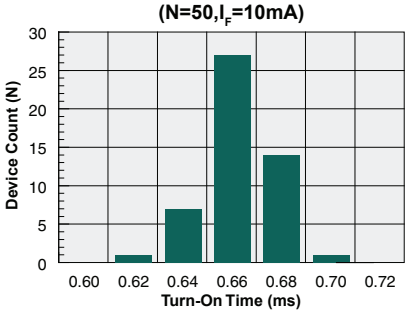
Typical On-Resistance Distribution (N=50, I_L=1A)



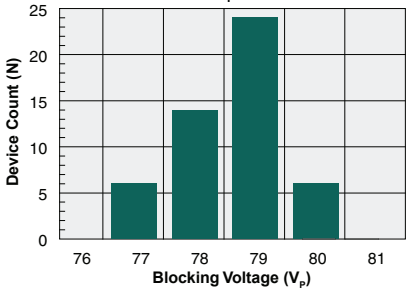
Typical Turn-Off Time (N=50, I_F=10mA)



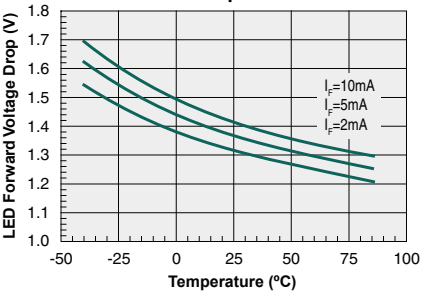
Typical Turn-On Time (N=50,I_F=10mA)



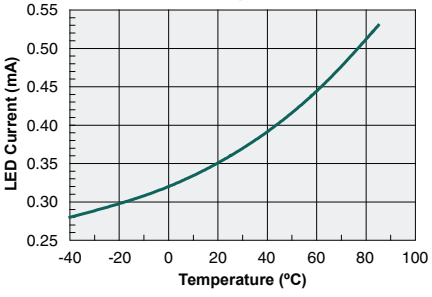
Typical Blocking Voltage Distribution (N=50, I_F=10mA)



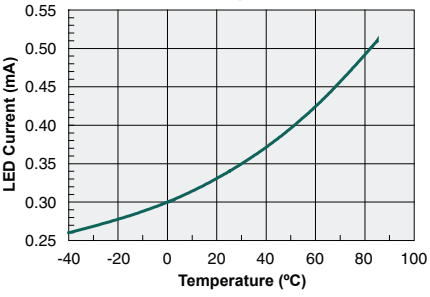
Typical LED Forward Voltage Drop vs. Temperature



Typical I_F for Switch Operation vs. Temperature



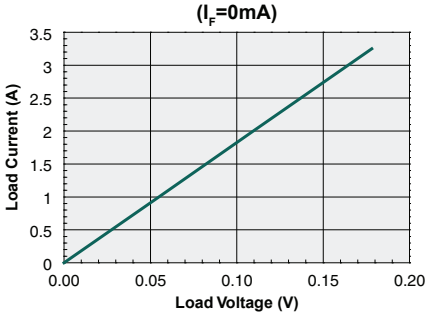
Typical I_F for Switch Dropout vs. Temperature



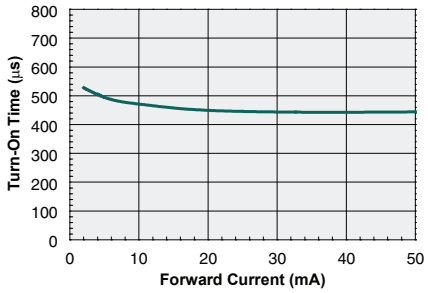
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.

PERFORMANCE DATA*

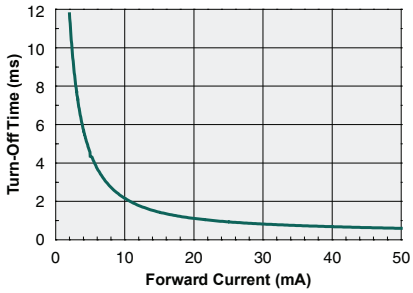
Typical Load Current vs. Load Voltage (I_F=0mA)



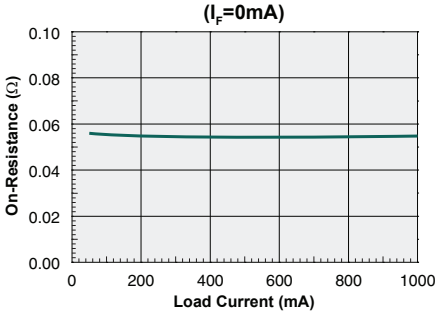
Typical Turn-On Time vs. LED Forward Current



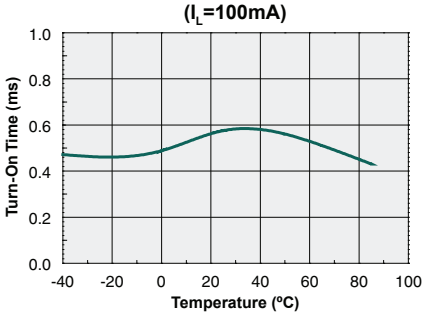
Typical Turn-Off Time vs. LED Forward Current



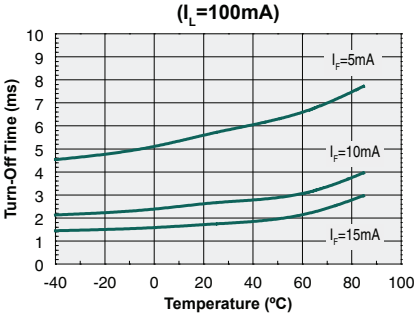
Typical On-Resistance vs. Load Current (I_F=0mA)



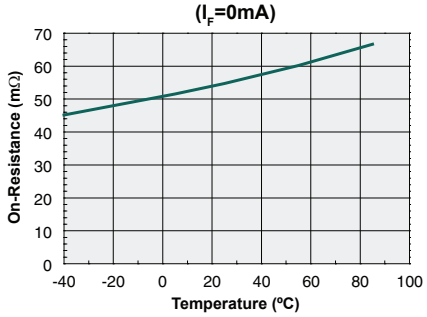
Typical Turn-On Time vs. Temperature (I_L=100mA)



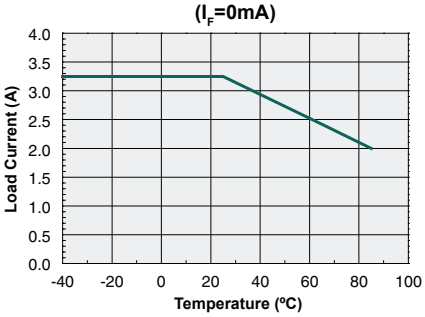
Typical Turn-Off Time vs. Temperature (I_L=100mA)



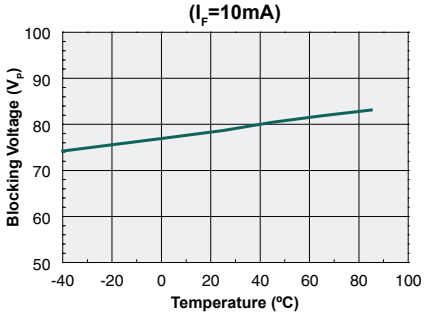
Typical On-Resistance vs. Temperature (I_F=0mA)



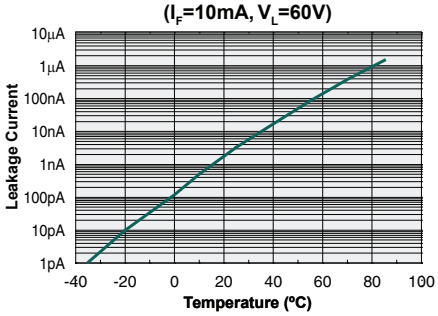
Maximum Load Current vs. Temperature (I_F=0mA)



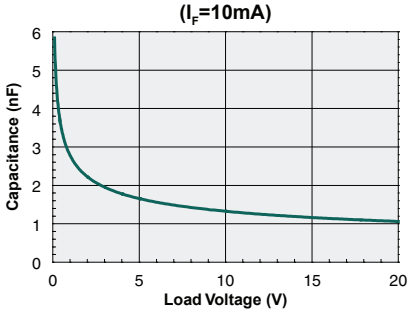
Typical Blocking Voltage vs. Temperature (I_F=10mA)



Leakage Current vs. Temperature (I_F=10mA, V_L=60V)



Output Capacitance vs. Load Voltage (I_F=10mA)



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

Manufacturing Information

ESD Sensitivity

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

Soldering Profile

For through-hole devices, the maximum pin temperature and maximum dwell time through all solder waves is provided in the table below. Dwell time is the interval beginning when the pins are initially immersed into the solder wave until they exit the solder wave. For multiple waves, the dwell time is from entering the first wave until exiting the last wave. During this time, pin temperatures must not exceed the maximum temperature given in the table below. Body temperature of the device must not exceed the limit shown in the table below at any time during the soldering process.

Device	Maximum Pin Temperature	Maximum Body Temperature	Maximum Dwell Time	Wave Cycles
CPC1705Y	260ºC	245ºC	10 seconds*	1

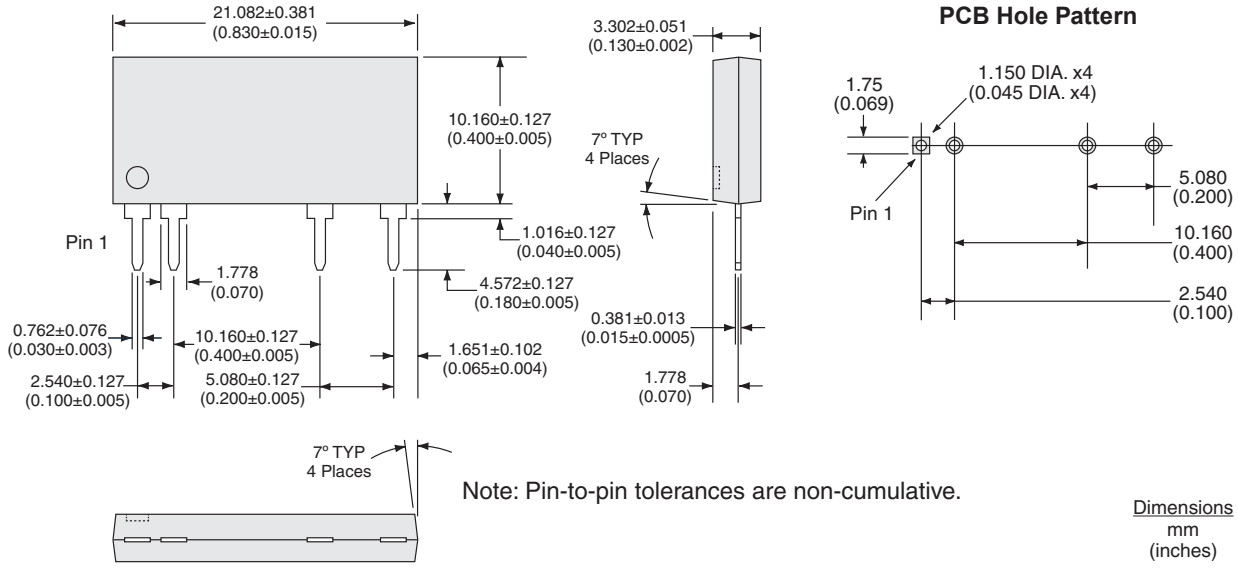
*Total cumulative duration of all waves.

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

CPC1705Y Package



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

Dimensions
mm
(inches)

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

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