IXYS
INTEGRATED CIRCUITS DIVISION

CPC1983B
Single-Pole, Normally Open OptoMOS® Power SOIC Relay

Parameter	Rating	Units
Blocking Voltage	600	V_P
Load Current	0.5	A_{DC} / A_{rms}
On-Resistance (max)	6	Ω

Features

- 12.5mm of Creepage (with Appropriate Layout)
- Continuous Load Currents Up to 0.5A
- 600V_P Blocking Voltage
- 5000V_{rms} Input/Output Isolation
- Power SOIC 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.

As part of this family, the CPC1983B single-pole, normally open (1-Form-A) Solid State Power Relay is rated for up to 0.5 A_{DC} / A_{rms} continuous load current.

The CPC1983B employs optically coupled MOSFET technology to provide 5000V_{rms} of input to output isolation. The optically coupled outputs, that use patented OptoMOS architecture, are controlled by a highly efficient infrared LED.

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

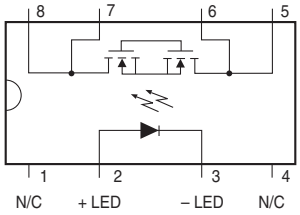
Approvals

- UL 508 Recognized Component: File E69938

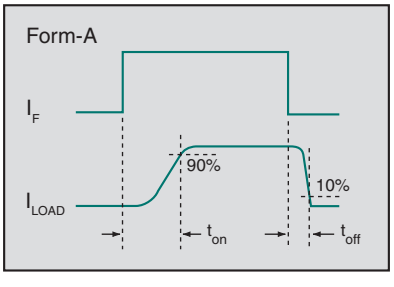
Ordering Information

Part #	Description
CPC1983B	Power SOIC Package (25 per tube)

Pin Configuration



Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25°C

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 Power Dissipation [2]	2400	mW
Isolation Voltage, Input to Output	5000	V_{rms}
ESD Rating, Human Body Model	8	kV
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 3.33 mW / °C
[2] Derate 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 @ 25°C

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current, Continuous	I_F=5mA, Free air	I_L	-	-	0.5	A_{DC} / A_{rms}
Peak Load Current	I_F=5mA, t≤10ms	I_{LPK}	-	-	±3	A
On-Resistance[1]	I_F=5mA, I_L=0.5A	R_{ON}	-	3.5	6	Ω
Off-State Leakage Current	I_F=0mA, V_L=600V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	2.2	5	ms
Turn-Off		t_{off}	-	0.15	2	
Output Capacitance	I_F=0mA, V_L=50V, f=1MHz	C_{OUT}	-	41	-	pF
Input Characteristics						
Input Control Current to Activate	I_L=0.5A	I_F	-	1.3	5	mA
Input Control Current to Deactivate	-	I_F	0.5	-	-	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

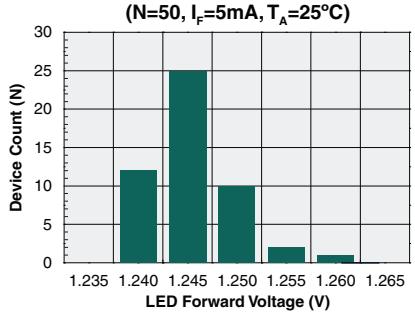
[1] Measurement taken within 1 second of on-time.

Thermal Characteristics

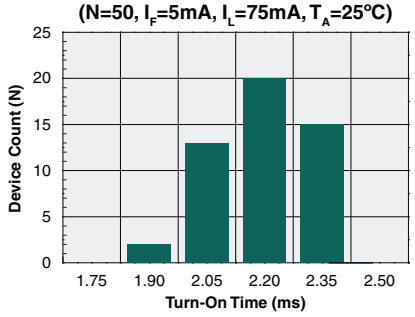
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Thermal Impedance (junction to case)	-	$R_{\theta JC}$	-	1.5	-	°C/W

PERFORMANCE DATA*

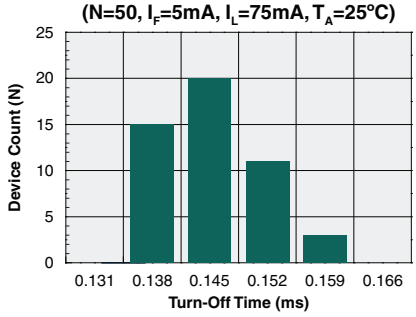
Typical LED Forward Voltage Drop
(N=50, I_F=5mA, T_A=25°C)



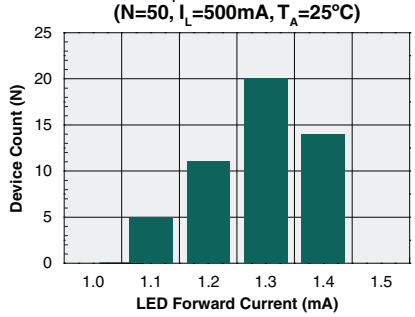
Typical Turn-On Time
(N=50, I_F=5mA, I_L=75mA, T_A=25°C)



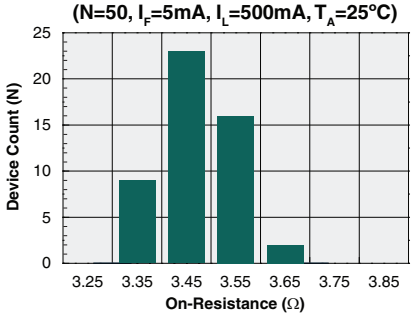
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=75mA, T_A=25°C)



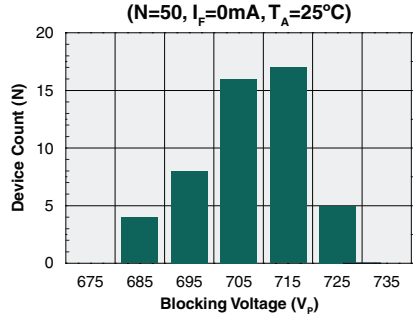
Typical I_F for Switch Operation
(N=50, I_L=500mA, T_A=25°C)



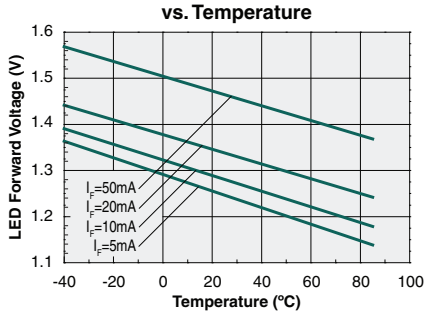
Typical On-Resistance Distribution
(N=50, I_F=5mA, I_L=500mA, T_A=25°C)



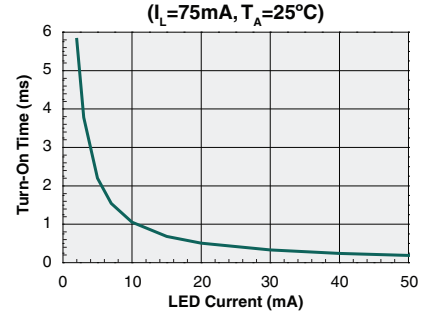
Typical Blocking Voltage Distribution
(N=50, I_F=0mA, T_A=25°C)



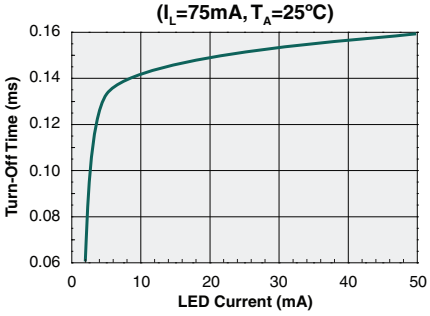
Typical LED Forward Voltage Drop
vs. Temperature



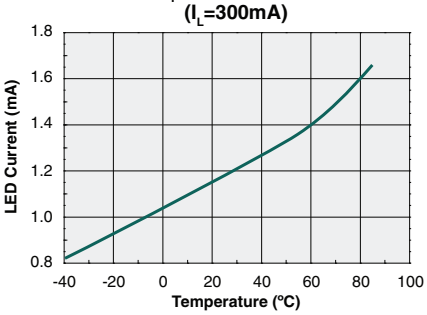
Typical Turn-On Time
vs. LED Forward Current
(I_L=75mA, T_A=25°C)



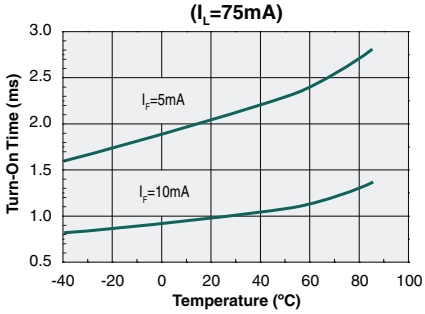
Typical Turn-Off Time
vs. LED Forward Current
(I_L=75mA, T_A=25°C)



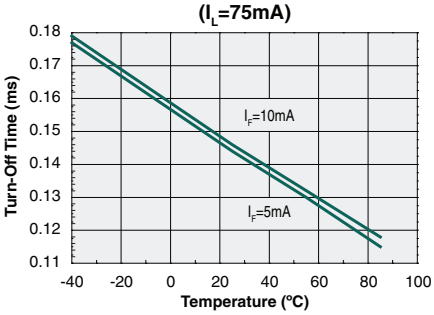
Typical I_F for Switch Operation
(I_L=300mA)



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



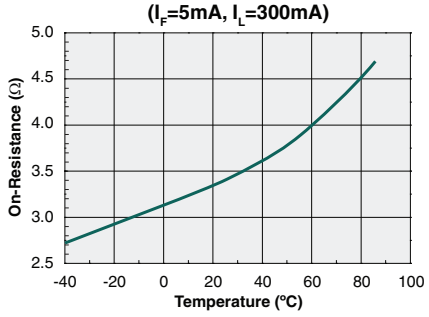
Typical Turn-Off Time
vs. Temperature
(I_L=75mA)



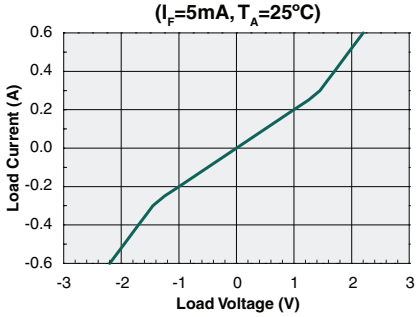
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

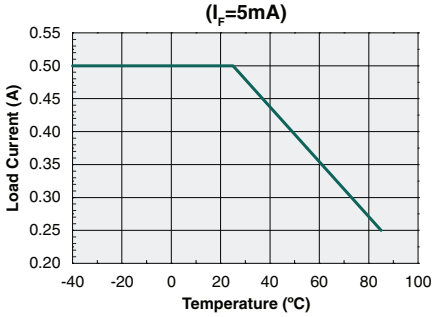
Typical On-Resistance vs. Temperature (I_F=5mA, I_L=300mA)



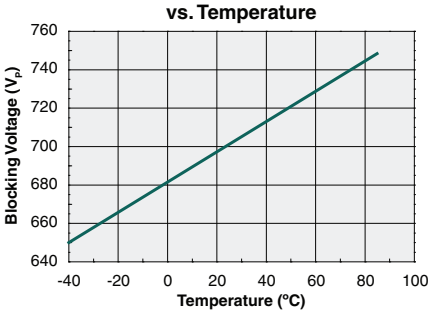
Typical Load Current vs. Load Voltage (I_F=5mA, T_A=25°C)



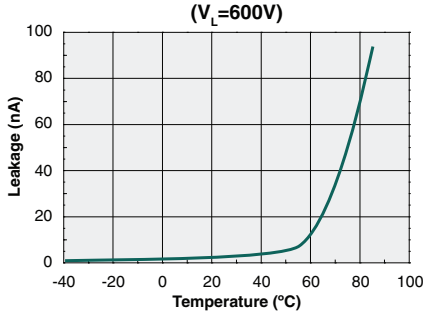
Maximum Load Current vs. Temperature (I_F=5mA)



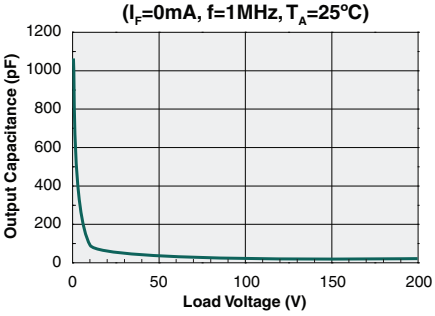
Typical Blocking Voltage vs. Temperature



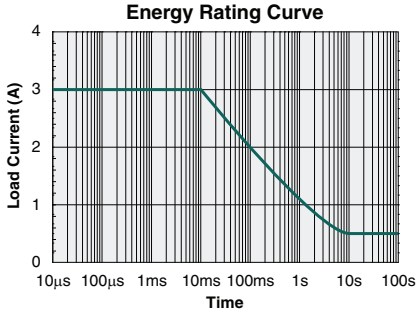
Typical Leakage Current vs. Temperature (V_L=600V)



Output Capacitance vs. Load Voltage (I_F=0mA, f=1MHz, T_A=25°C)



Energy Rating Curve



*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.

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
CPC1983B	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)°C 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.

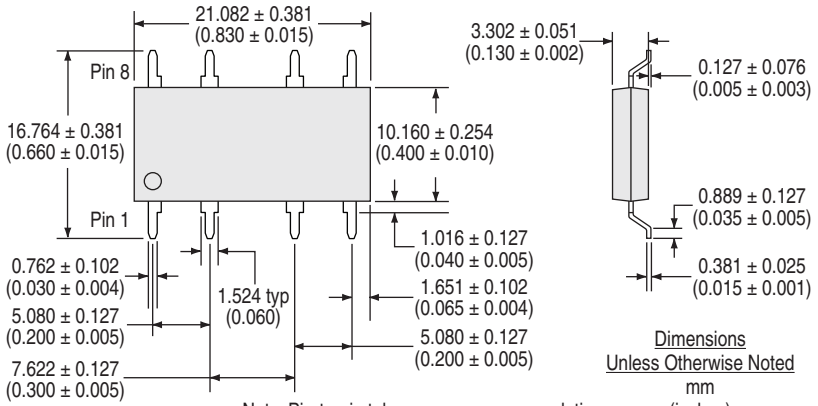
Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
CPC1983B	245°C	30 seconds	3

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.

MECHANICAL DIMENSIONS

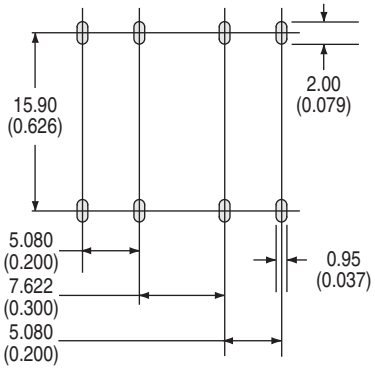
CPC1983B



Dimensions
Unless Otherwise Noted
mm
(inches)

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

Recommended PCB Pattern



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6/29/2018

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