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IXYS
INTEGRATED CIRCUITS DIVISION



CPC1907B
Single-Pole, Normally Open Power SOIC OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage	60	V_P
Load Current	±6	A_{DC}
On-Resistance	0.06	Ω

Features
- Handle Load Currents Up to ±6A_{DC} or 6A_{rms}
- 5000V_{rms} Input/Output Isolation
- Power SOIC Package
- 12.5mm External Creepage Distance with Appropriate Layout
- High Reliability
- No Moving Parts
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation

Applications
- Industrial Controls
- Security: Door Latches, Solenoids, Annunciators
- Motor Control
- Heating, Ventilation, and Air Conditioning Control (HVAC)
- Robotics
- Starter Ignition Circuits
- Medical Equipment—Patient/Equipment Isolation
- Instrumentation
  - Multiplexers
  - Electronic Switching
  - I/O Subsystems
- Home Appliances
- DC Power Supplies
- Aerospace

Description
The CPC1907B is a single-pole, normally open (1-Form-A) solid state relay that employs optically coupled MOSFET technology to provide 5000V_{rms} of input to output isolation.

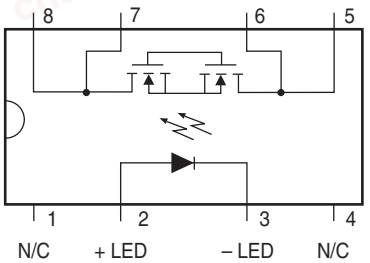
Switching of the efficient MOSFET switches is controlled by the photovoltaic die using the patented OptoMOS architecture while activation of the output is controlled by a highly efficient GaAlAs infrared LED. The combination of low on-resistance and high load current handling capabilities makes the relay suitable for a variety of high-performance switching applications.

Approvals
- UL 508 Certified Component: File E69938
- CSA Industrial Control Switches Approval: Pending

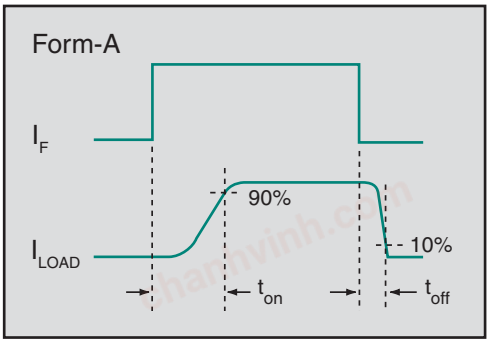
Ordering Information

Part #	Description
CPC1907B	8-Pin Power SOIC Package (25 per tube)

Pin Configuration



Switching Characteristics of Normally Open Devices



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Absolute Maximum Ratings @ 25ºC (Unless Otherwise Noted)

Parameter	Ratings	Units
Blocking Voltage	60	V
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 (60 Seconds Maximum)	5000	V_{rms}
ESD, Human Body Model	8	kV
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 3.33mW / °C

[2] Derate linearly 20mW / °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 @ 25ºC (Unless Otherwise Noted)

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current, Continuous	free air	I_L	-	-	6	$\pm A_{DC}$, A_{rms}
Peak Load Current	t = 10ms	I_{LPK}	-	-	20	$\pm A_P$
On-Resistance[1]	I_L=1A	R_{ON}	-	-	0.06	Ω
Off-State Leakage Current	V_L=60V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, I_L=100mA	t_{on}	-	2.7	5	ms
Turn-Off		t_{off}	-	0.14	1	
Output Capacitance	V_L=50V, f=1MHz	C_{OUT}	-	340	-	pF
Input Characteristics						
LED Current to Activate [2]	I_L=1A	I_F	-	1.5	5	mA
LED Current to Deactivate	-	I_F	0.6	-	-	mA
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
Input/Output Characteristics						
Capacitance, Input/Output	f=1MHz	$I_{I/O}$	-	2	-	pF

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

[2] For high temperature operation (T_A>60ºC), a LED current of 10mA is recommended.

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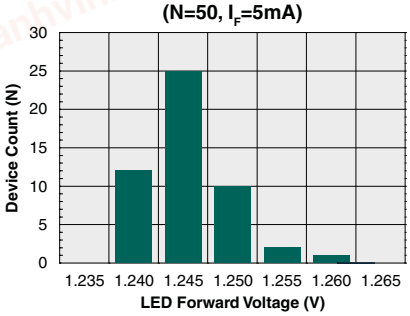
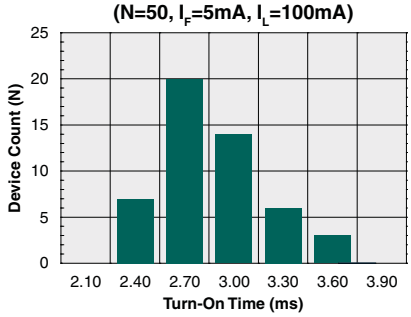
PERFORMANCE DATA @25°C (Unless Otherwise Noted)*

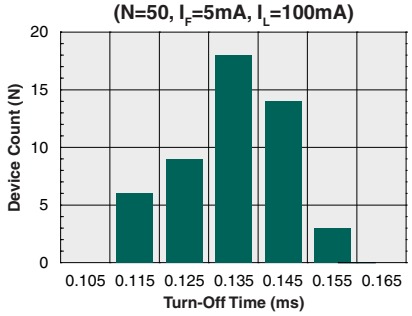
Typical LED Forward Voltage Drop (N=50, I_F=5mA)



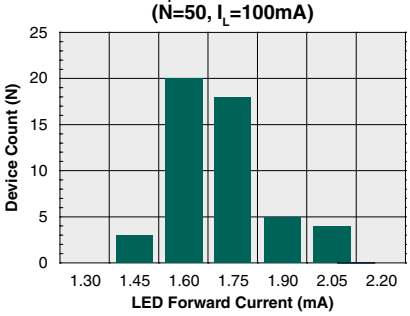
Typical Turn-On Time (N=50, I_F=5mA, I_L=100mA)



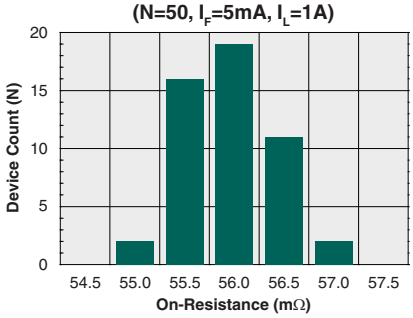
Typical Turn-Off Time (N=50, I_F=5mA, I_L=100mA)



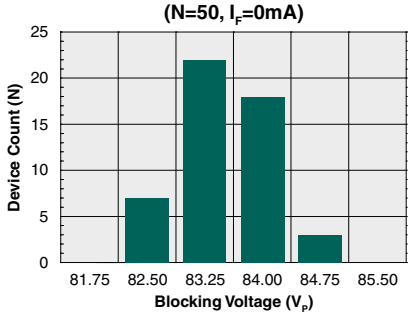
Typical I_F for Switch Operation (N=50, I_L=100mA)



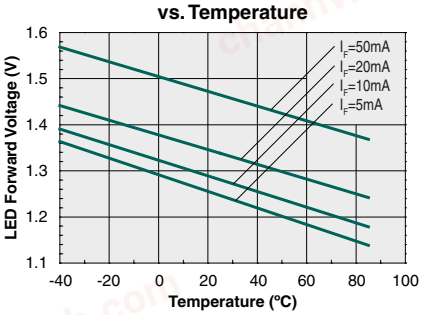
Typical On-Resistance Distribution (N=50, I_F=5mA, I_L=1A)



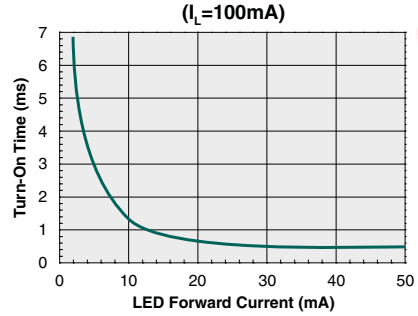
Typical Blocking Voltage Distribution (N=50, I_F=0mA)



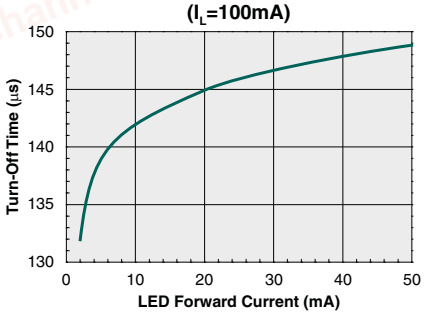
Typical LED Forward Voltage Drop vs. Temperature



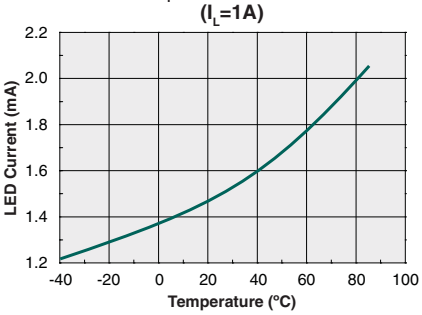
Typical Turn-On Time vs. LED Forward Current (I_L=100mA)



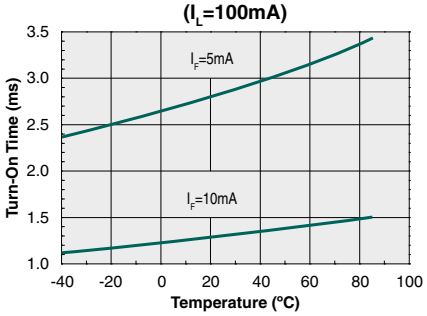
Typical Turn-Off Time vs. LED Forward Current (I_L=100mA)



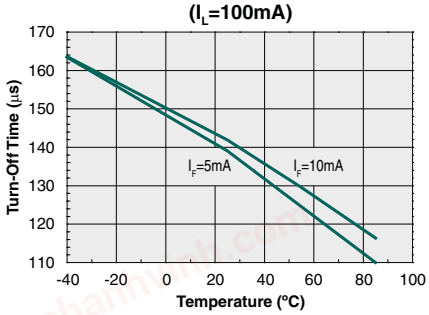
Typical I_F for Switch Operation (I_L=1A)



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



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



*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.

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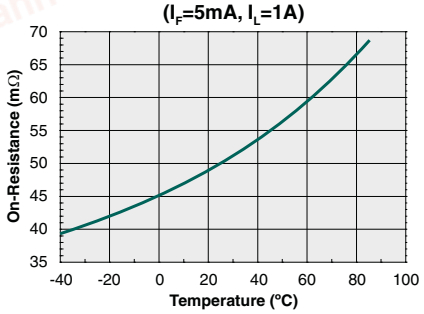
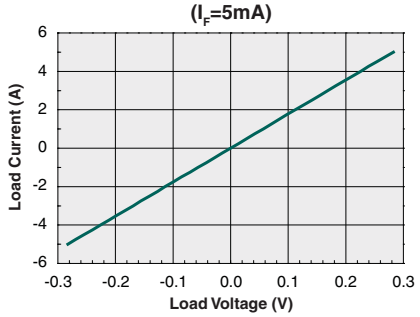
PERFORMANCE DATA @25°C (Unless Otherwise Noted)*

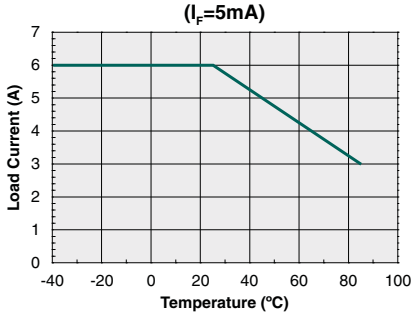
Typical On-Resistance vs. Temperature (I_F=5mA, I_L=1A)



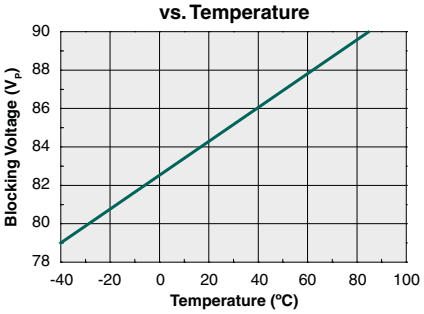
Typical Load Current vs. Load Voltage (I_F=5mA)



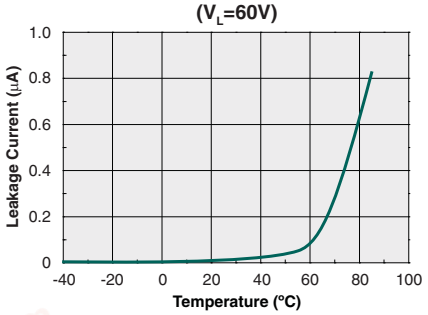
Maximum Load Current vs. Temperature (I_F=5mA)



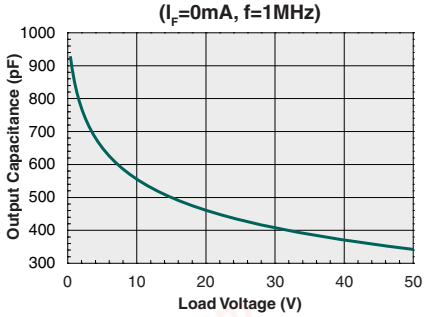
Typical Blocking Voltage vs. Temperature



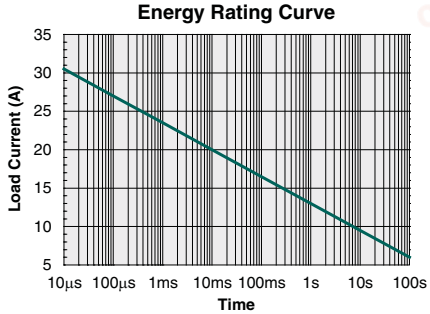
Leakage Current vs. Temperature Across Pins 5&6, 7&8 (V_L=60V)



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



Energy Rating Curve



*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.

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Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. IXYS Integrated Circuits Division classified all of 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) rating** 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) Rating
CPC1907B	MSL 1

ESD Sensitivity

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

Reflow Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

Device	Maximum Temperature x Time
CPC1907B	245°C for 30 seconds

Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used after solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

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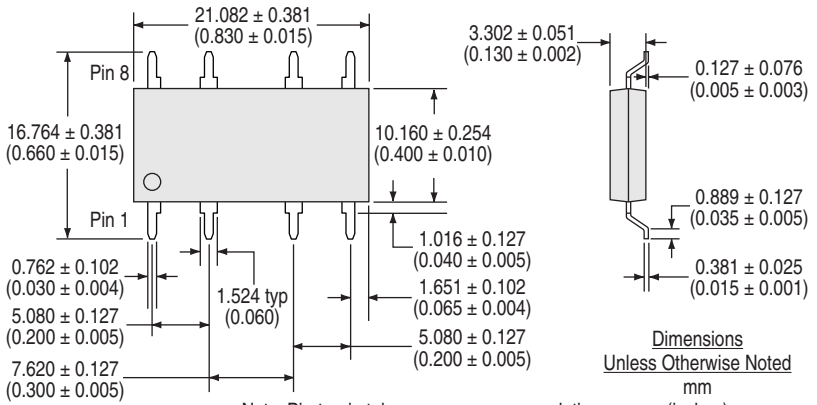
MECHANICAL DIMENSIONS

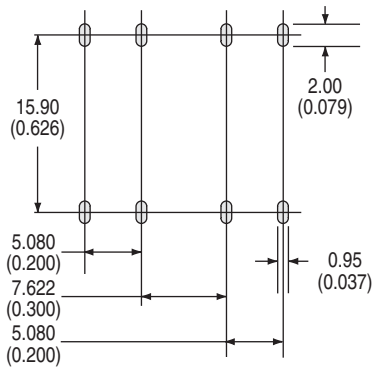
CPC1907B



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

Dimensions
Unless Otherwise Noted
mm
(inches)

Recommended PCB Pattern



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Specification: DS-CPC1907B-R02
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2/12/2013