

# CPC1907B

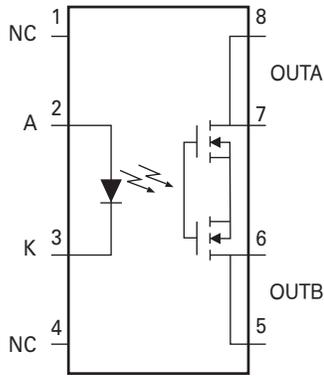
60 V, 6 A 1-Form-A SSR

## Key Attributes

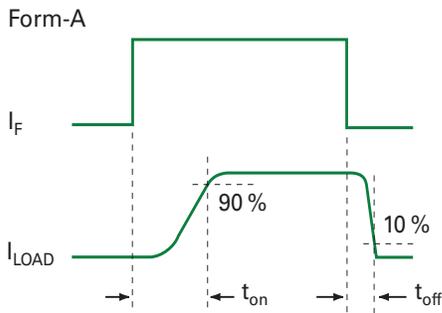
Characteristic	Rating	Unit
Blocking Voltage	60	V <sub>P</sub>
Load Current	±6	A <sub>RMS</sub> /A <sub>DC</sub>
On-resistance (max.)	0.06	Ω



## Pin Configuration



## Switching Characteristics of Normally Open Device



## Description



The CPC1907B is a single-pole, normally open (1-Form-A) solid state relay that employs optically coupled MOSFET technology to provide 5000 V<sub>RMS</sub> 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 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.

## Features

- Load Current Up to ±6A<sub>DC</sub> or 6A<sub>RMS</sub>
- 5000V<sub>RMS</sub> Input/Output Isolation
- Power SOIC Package
- 12.5 mm External Creepage Distance with Appropriate Layout
- High Reliability
- Low Drive Power Requirements
- Arc-Free With No Snubbing Circuit
- 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

## Approvals

- UL 1577 Recognized Component: File E69938
- CSA Certified Component: Certificate 1172007

## Ordering Information

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

## Specifications

### Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage	60	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10 ms)	1	A
Input Power Dissipation <sup>1</sup>	150	mW
Total Power Dissipation <sup>2</sup>	2400	
Isolation Voltage, Input to Output (60 Seconds Maximum)	5000	V <sub>RMS</sub>
ESD, Human Body Model	8	kV
Operational Temperature, Ambient	-40 to +85	°C
Storage Temperature	-40 to +125	

<sup>1</sup> Derate linearly 1.33 mW/°C

<sup>2</sup> 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 (Unless Otherwise Noted)

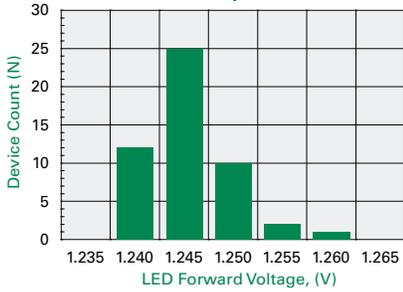
Parameter	Conditions	Symbol	Value			Units
			Minimum	Typical	Maximum	
<b>Output Characteristics</b>						
Load current:						
Continuous	free air	I <sub>L</sub>	—	—	6	A <sub>RMS</sub> /±A <sub>DC</sub>
Peak	t = 10 ms	I <sub>LPK</sub>	—	—	20	±A <sub>P</sub>
On-resistance <sup>1</sup>	I <sub>L</sub> = 1 A	R <sub>ON</sub>	—	—	0.06	Ω
Off-state leakage current	V <sub>L</sub> = 60 V <sub>P</sub>	I <sub>LEAK</sub>	—	—	1	μA
Switching speeds:						
Turn-on	I <sub>F</sub> = 5 mA, I <sub>L</sub> = 100 mA (See Timing Diagram)	t <sub>on</sub>	—	2.7	5	ms
Turn-off		t <sub>off</sub>	—	0.14	1	
Output Capacitance	I <sub>F</sub> = 0 mA, V <sub>L</sub> = 50 V, f = 1 MHz	C <sub>OUT</sub>	—	340	—	pF
<b>Input Characteristics</b>						
LED Current to Activate <sup>2</sup>	I <sub>L</sub> = 1 A	I <sub>F</sub>	—	1.5	5	mA
LED Current to Deactivate	—	I <sub>F</sub>	0.1	—	—	mA
Input Voltage Drop to Deactivate	—	V <sub>F</sub>	0.8	—	—	V
Input Voltage Drop	I <sub>F</sub> = 5 mA	V <sub>F</sub>	0.9	1.2	1.5	
Reverse Input Current	V <sub>R</sub> = 5 V	I <sub>R</sub>	—	—	10	μA
<b>Input/Output Characteristics</b>						
Capacitance, Input to Output	V <sub>IO</sub> = 0 V, f = 1 MHz	C <sub>IO</sub>	—	2	—	pF

<sup>1</sup> Measurement taken within one second of on-time.

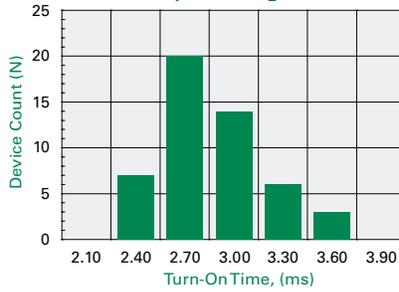
<sup>2</sup> For high temperature operation (T<sub>A</sub> > 60 °C), a minimum LED drive current of 10mA is recommended.

PERFORMANCE DATA\*

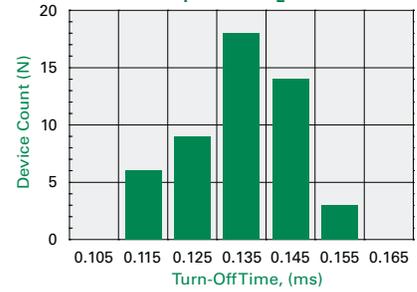
Typical LED Forward Voltage Drop  
(N = 50, I<sub>F</sub> = 5 mA)



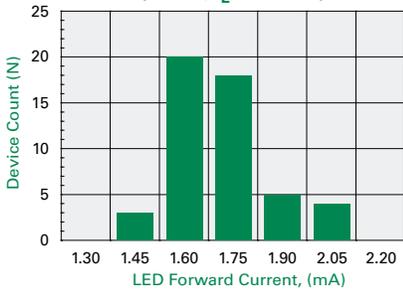
Typical Turn-On Time  
(N = 50, I<sub>F</sub> = 5 mA, I<sub>L</sub> = 100 mA)



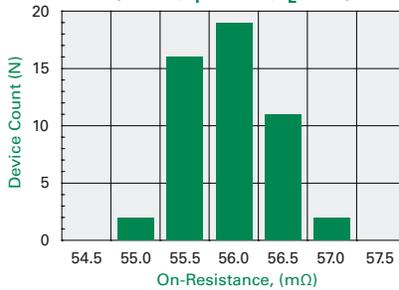
Typical Turn-Off Time  
(N = 50, I<sub>F</sub> = 5 mA, I<sub>L</sub> = 100 mA)



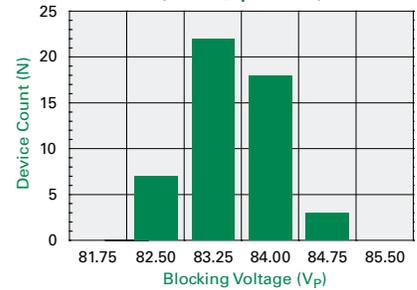
Typical I<sub>F</sub> for Switch Operation  
(N = 50, I<sub>L</sub> = 100 mA)



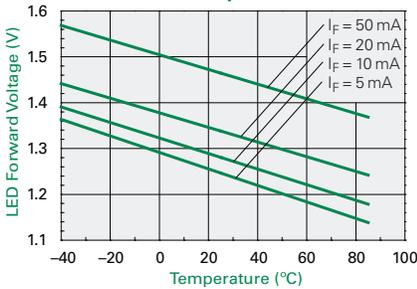
Typical On-Resistance Distribution  
(N = 50, I<sub>F</sub> = 5 mA, I<sub>L</sub> = 1 A)



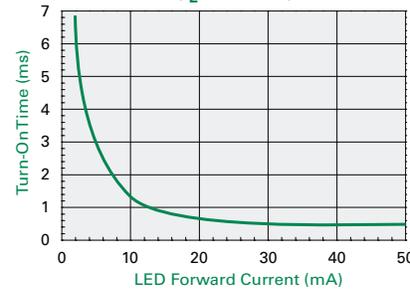
Typical Blocking Voltage Distribution  
(N = 50, I<sub>F</sub> = 0 mA)



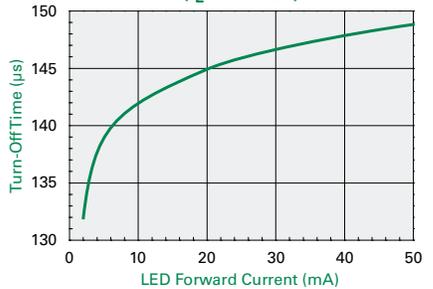
Typical LED Forward Voltage Drop vs. Temperature



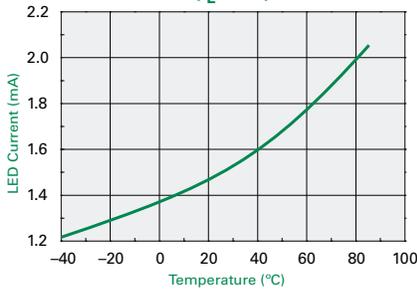
Typical Turn-On Time vs. LED Forward Current (I<sub>L</sub> = 100 mA)



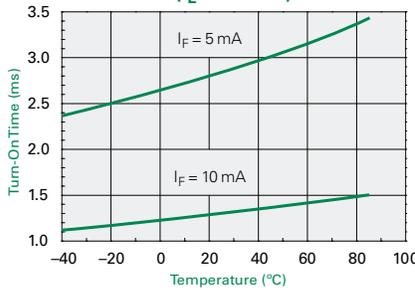
Typical Turn-Off Time vs. LED Forward Current (I<sub>L</sub> = 100 mA)



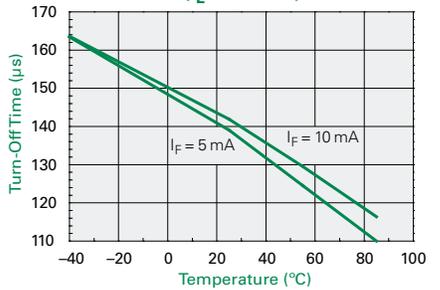
Typical I<sub>F</sub> for Switch Operation (I<sub>L</sub> = 1 A)



Typical Turn-On Time vs. Temperature (I<sub>L</sub> = 100 mA)



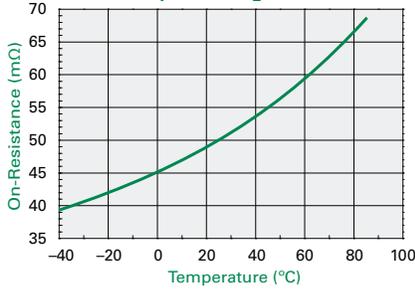
Typical Turn-Off Time vs. Temperature (I<sub>L</sub> = 100 mA)



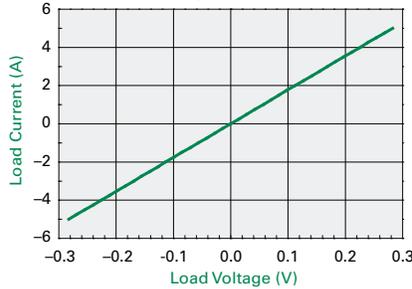
\*Unless otherwise noted, data presented in these graphs is typical of device operation at T<sub>A</sub> = 25°C.

**PERFORMANCE DATA\***

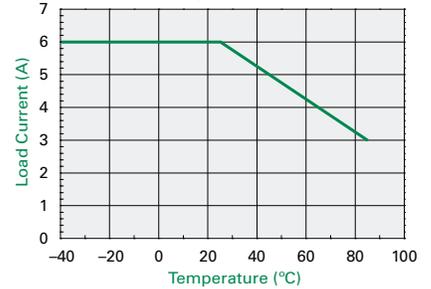
**Typical On-Resistance vs. Temperature**  
( $I_F = 5 \text{ mA}$ ,  $I_L = 1 \text{ A}$ )



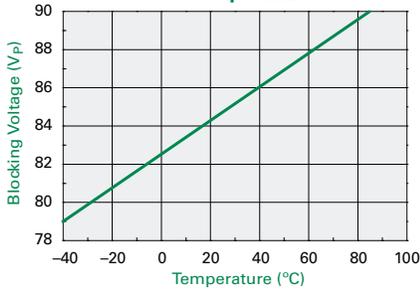
**Typical Load Current vs. Load Voltage**  
( $I_F = 5 \text{ mA}$ )



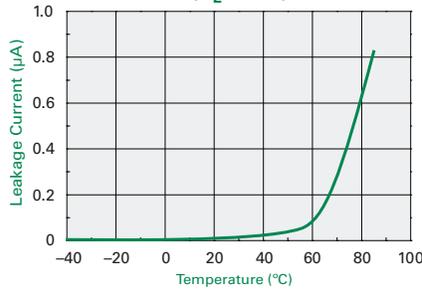
**Maximum Load Current vs. Temperature**  
( $I_F = 5 \text{ mA}$ )



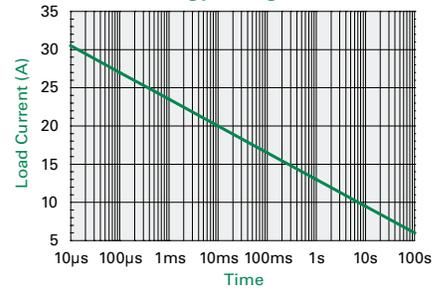
**Typical Blocking Voltage vs. Temperature**



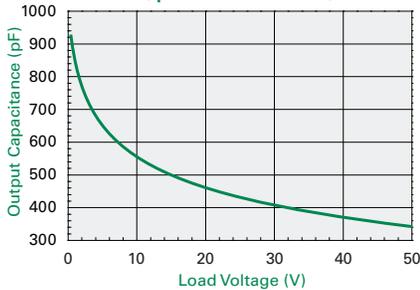
**Leakage Current vs. Temperature Across Pins 5&6, 7&8**  
( $V_L = 60 \text{ V}$ )



**Energy Rating Curve**



**Output Capacitance vs. Load Voltage**  
( $I_F = 0 \text{ mA}$ ,  $f = 1 \text{ MHz}$ )



\*Unless otherwise noted, data presented in these graphs is typical of device operation at  $T_A = 25^\circ\text{C}$ .

## Manufacturing Information

### Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. Littelfuse 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
CPC1907B	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 **IPC/JEDEC J-STD-020** Classification Temperature ( $T_C$ ) and the maximum dwell time ( $T_C - 5^\circ\text{C}$ ). The Classification Temperature sets the Maximum Body Temperature allowed for these devices during reflow soldering processes.

Device	Classification Temperature ( $T_C$ )	Dwell Time ( $T_P$ )	Max Reflow Cycles
CPC1907B	245 °C	30 seconds	3

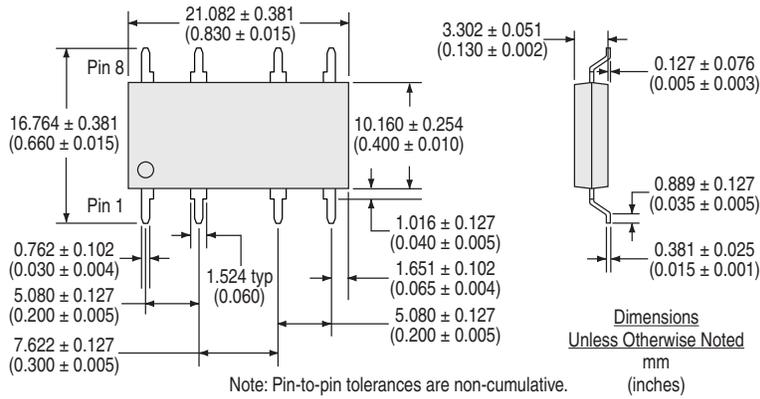
### Board Wash

Littelfuse 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.

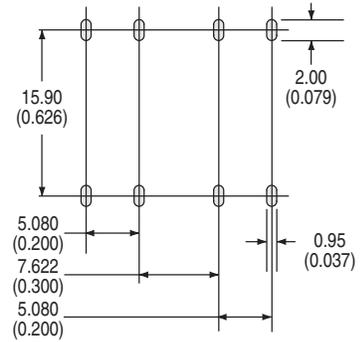


### Mechanical Dimensions

CPC1907B



### Recommended PCB Pattern



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