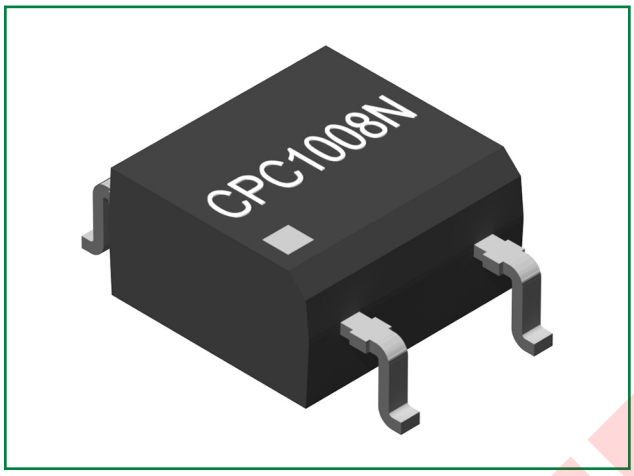
CPC1008N

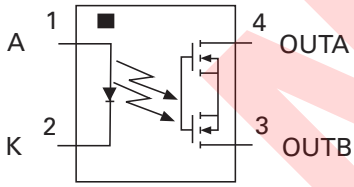
100V, 150 mA_{RMS} / mA_{DC} 1-Form-A SSR

Key Attributes

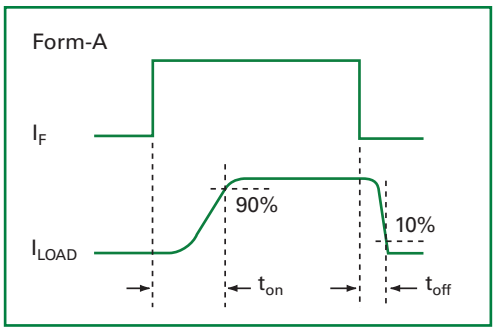
Characteristic	Rating	Unit
Blocking Voltage	100	V_P
Load Current	150	mA_{RMS} / mA_{DC}
On-resistance (max)	8	Ω



Pin Configuration



Switching Characteristics of Normally Open Devices



Description

The CPC1008N is a miniature, low-voltage, low on-resistance, single-pole, normally open (1-Form-A) solid state relay in a 4-Pin SOP package. It uses Littelfuse' patented OptoMOS architecture to optically control the isolated MOSFET switches while the optical coupling provides 1500V_{RMS} of input/output isolation.

Using Littelfuse's state of the art double-molded vertical construction packaging, the CPC1008N is one of the world's smallest relays. It is ideal for replacing larger, less-reliable reed and electromechanical relays.

Features

- 1500V_{RMS} Input/Output Isolation
- Small 4-Pin SOP Package
- Low Drive Power Requirements
- No EMI/RFI Generation
- Halogen-Free
- Tape & Reel Version

Applications

- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security Systems
- Industrial Controls
- Reed Relay Replacement

Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- IEC EN 62368-1: TUV Certificate B 082667 0008

Ordering Information

Part Number	Description
CPC1008N	4-Pin SOP (100/tube)
CPC1008NTR	4-Pin SOP (2000/Reel)

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Specifications

Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage	100	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10 ms)	1	A
Input Power Dissipation	70	mW
Total Power Dissipation [1]	400	
Isolation Voltage, Input to Output (60 s)	1500	V_{RMS}
Operating Temperature, Ambient	–40 to +85	°C
Storage Temperature	–40 to +125	

[1] Derate output power linearly 3.33 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 @ 25ºC

Parameter	Conditions	Symbol	Value			Units
			Minimum	Typical	Maximum	
Output Characteristics						
Blocking voltage	I_L = 1 µA	V_{DRM}	100	-	-	V
Load current:						
Continuous [1]	-	I_L	-	-	150	mA_{RMS}/mA_{DC}
Peak	t = 10 ms	I_{LPK}	-	-	±350	mA_P
On-resistance [2]	I_F = 2 mA, I_L = 150 mA	R_{ON}	-	4.8	8	Ω
Off-state leakage current	V_L = 100V	I_{LEAK}	-	-	1	µA
Switching speeds:						
Turn-on	I_F = 5 mA, V_L = 10V	t_{on}	-	1	2	ms
Turn-off		t_{off}	-	0.17	1	
Output capacitance	I_F = 0 mA, V_L = 50V, f = 1 MHz	C_{OUT}	-	6	-	pF
Input Characteristics						
Input control current to activate [3]	I_L = 150 mA	I_F	-	0.45	2	mA
Input control current to deactivate	-	I_F	0.2	-	-	
Input voltage drop	I_F = 5 mA	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 = 1 MHz	C_{IO}	-	1	-	pF

[1] Load current derates linearly from 150 mA @ 25ºC to 120 mA @ 85ºC.
[2] Measurement taken within 1 second of on-time.
[3] For applications requiring operation greater than 60ºC, a minimum LED drive current of 4 mA is recommended.

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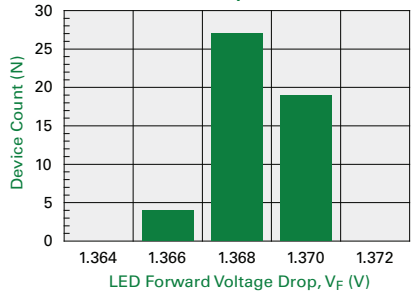
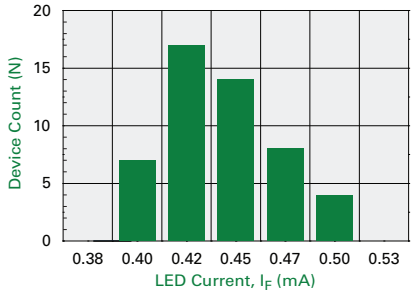
Characteristic Curves

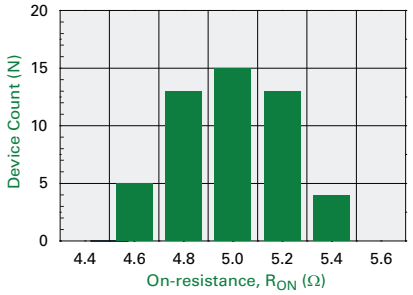
Typical LED Forward Voltage Drop (N = 50, I_F = 5 mA)



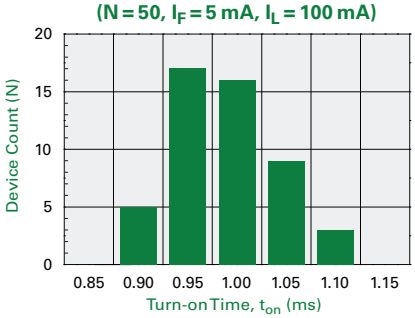
Typical I_F for Switch Operation (N = 50, I_L = 100 mA)



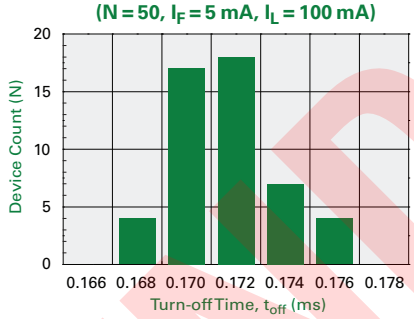
Typical On-resistance Distribution (N = 50, I_F = 2 mA, I_L = 150 mA)



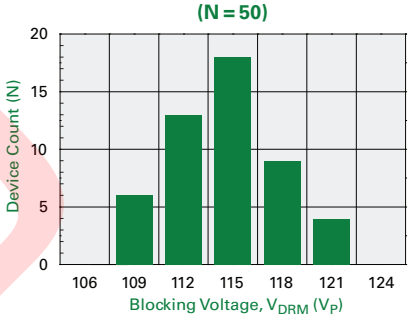
Typical Turn-on Time (N = 50, I_F = 5 mA, I_L = 100 mA)



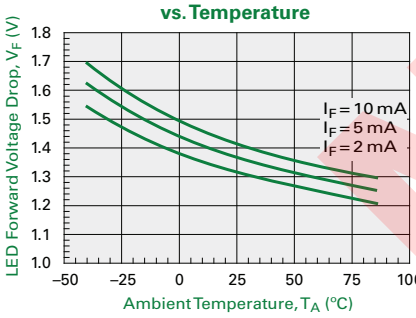
Typical Turn-off Time (N = 50, I_F = 5 mA, I_L = 100 mA)



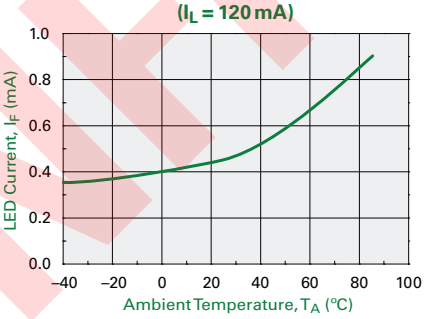
Typical Blocking Voltage Distribution (N = 50)



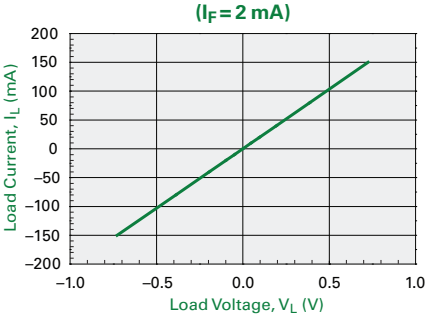
Typical LED Forward Voltage Drop vs. Temperature



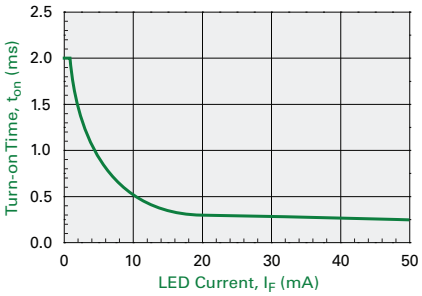
Typical I_F for Switch Operation vs. Temperature (I_L = 120 mA)



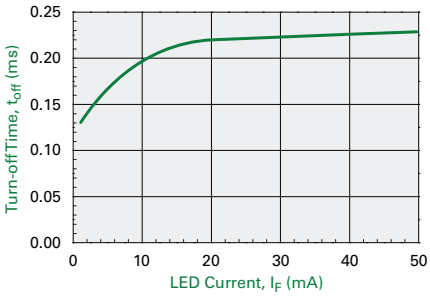
Typical Load Current vs. Load Voltage (I_F = 2 mA)



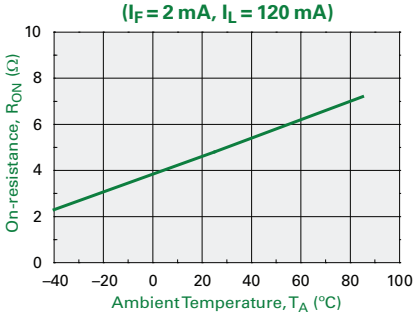
Typical Turn-on Time vs. LED Forward Current



Typical Turn-off Time vs. LED Forward Current



Typical On-resistance vs. Temperature (I_F = 2 mA, I_L = 120 mA)



*Unless otherwise noted, data presented in these graphs is typical of device operation at T_A = 25°C.

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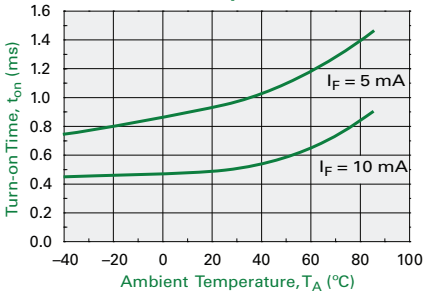
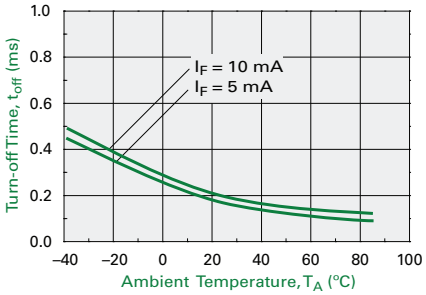
Characteristic Curves

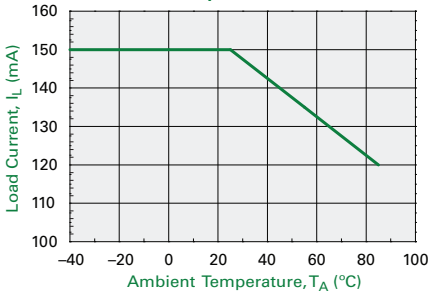
Typical Turn-on Time vs. Temperature



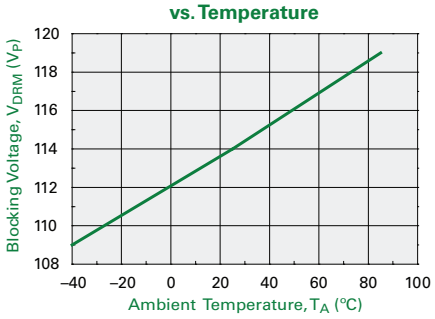
Typical Turn-off Time vs. Temperature



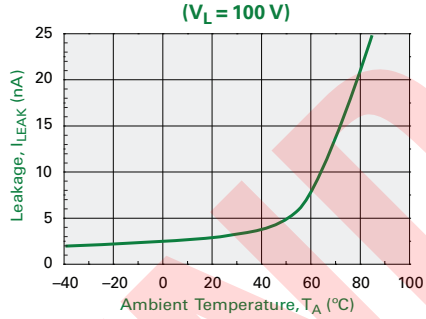
Maximum Load Current vs. Temperature (I_F = 5 mA)



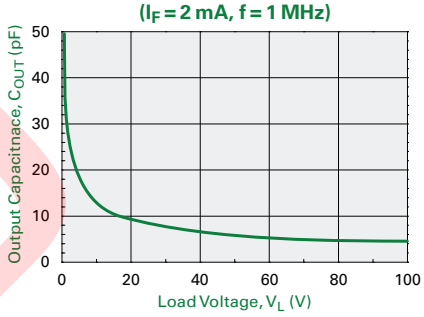
Typical Blocking Voltage vs. Temperature



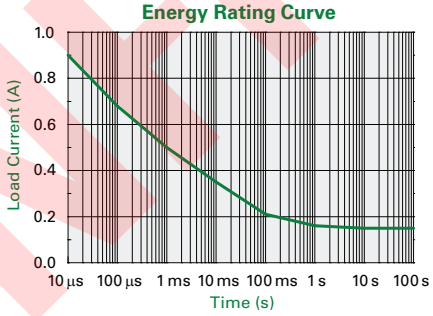
Typical Leakage vs. Temperature (V_L = 100 V)



Output Capacitance vs. Load Voltage (I_F = 2 mA, f = 1 MHz)



Energy Rating Curve



*Unless otherwise noted, data presented in these graphs is typical of device operation at T_A = 25°C.

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Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. Littelfuse classifies its plastic encapsulated devices for moisture sensitivity according to the latest revision 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 revision of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Classification
CPC1008N	MSL 3

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 the body temperature of these surface mount devices may be (T_c - 5)°C or greater. 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
CPC1008N	260 °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.

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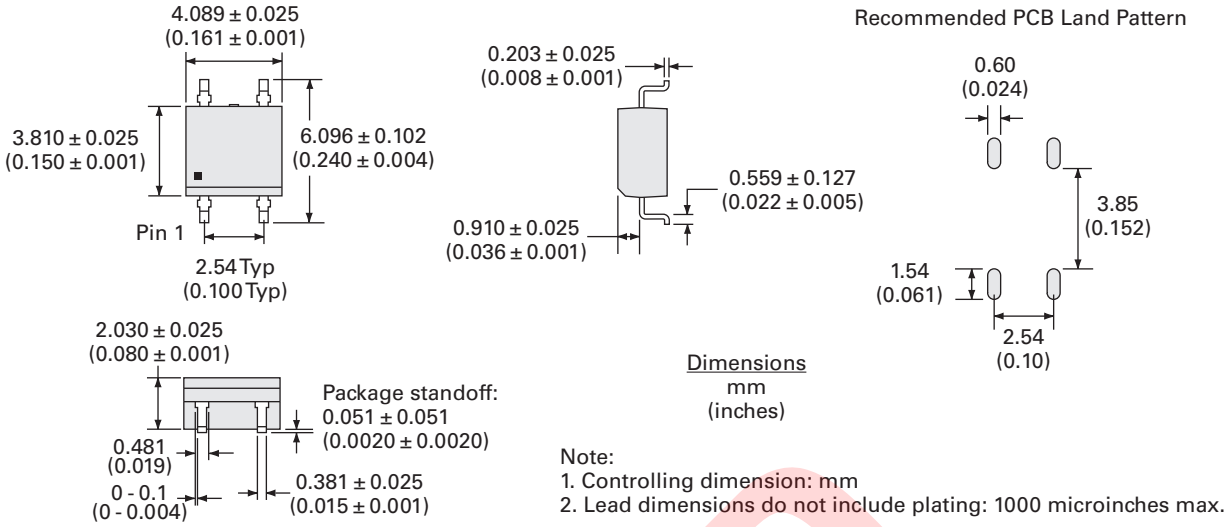
Mechanical Dimensions

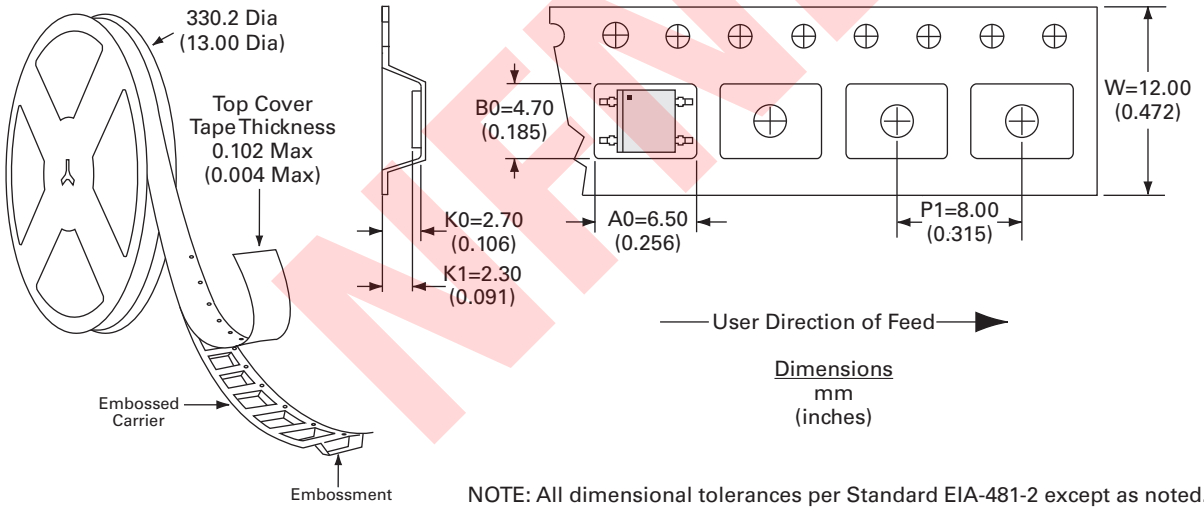
CPC1008N 4-Pin SOP



Dimensions
mm
(inches)

Note:
1. Controlling dimension: mm
2. Lead dimensions do not include plating: 1000 microinches max.

CPC1008NTR Tape & Reel Packaging



Dimensions
mm
(inches)

NOTE: All dimensional tolerances per Standard EIA-481-2 except as noted.

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