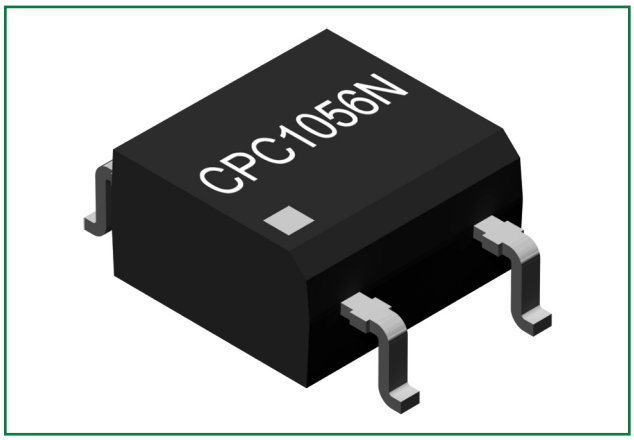
CPC1056N

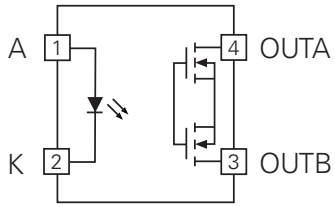
60 V, 75 mA_{RMS}/mA_{DC} Normally Open Relay

Key Attributes

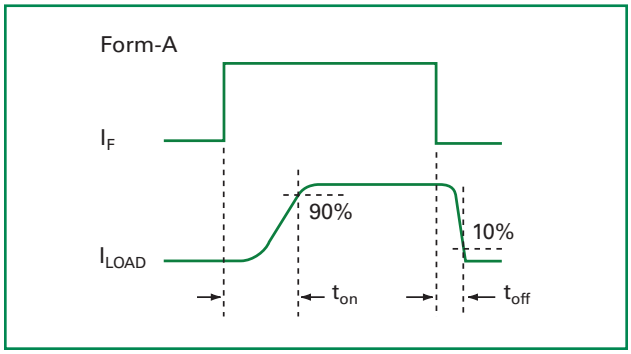
Characteristic	Rating	Unit
Blocking Voltage	60	V_P
Load Current	75	mA_{RMS}/mA_{DC}
On-Resistance (max.)	10	Ω
LED Current to Operate	0.5	mA



Pin Configuration



Switching Characteristics



Description

The CPC1056N is a bi-directional single-pole, normally open (1-Form-A) solid state relay in a 4-Pin SOP package that employs optically coupled MOSFET technology to provide 1500 V_{RMS} of input to output isolation.

The relay outputs are constructed with efficient MOSFET switches and a photovoltaic generator/driver that uses Littelfuse's patented OptoMOS® architecture while the input, a highly efficient infrared LED, provides the optically coupled control.

Using Littelfuse's state of the art double-molded vertical construction packaging, the CPC1056N offers board space savings of at least 20 % over the competitor's larger 4-Pin SOP relay.

Features

- 60 V, 75 mA, output switching capacity
- Input/Output Isolation 1500 V_{RMS}
- Compliant with EN50130-4 standard
- AC or DC load operation
- t_{on}/t_{off} = 3 ms
- Low LED current of 0.5 mA, low output leakage current
- TTL/CMOS compatible logic inputs
- Solid state design with no moving parts

Applications

- Security
- Passive Infrared Detectors (PIR)
- Data Signalling
- Sensor Circuitry
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Industrial Controls

Approvals

- UL 1577 Recognized Component: File E76270
- EN 62368-1: TUV Certificate # B 082667 0008

Ordering Information

Part Number	Description
CPC1056N	4-Pin SOP (100/Tube)
CPC1056NTR	4-Pin SOP (2000/Reel)

SC 11/10/2025
CPC1056N_R03

Specifications

Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage	60	V_P
Reverse Input Voltage	5	V
Input Control Current		
Continuous	50	mA
Peak (10 ms)	1	A
Power Dissipation		
Input	70	mW
Package Total [1]	400	
Isolation Voltage, Input to Output (60 s)	1500	V_{RMS}
ESD Rating, Human Body Model (HBM)	4	kV
Operating Temperature, Ambient (T_A)	–40 to +85	°C
Storage Temperature (T_{STG})	–40 to +125	

[1] *Derate output power linearly 3.3 mW/°C*

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.

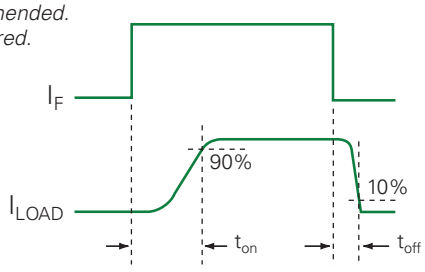
Typical values are characteristics of the device at +25 °C, and are the result of engineering evaluations. They are provided for information purposes only, and are not part of the manufacturing testing requirements.

Electrical Characteristics @ 25°C

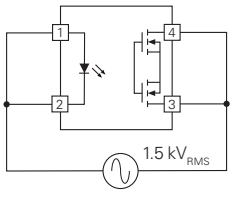
Parameter	Conditions	Symbol	Value			Units
			Minimum	Typical	Maximum	
Output Characteristics						
Blocking voltage	I_L = 1 µA	V_{DRM}	60	—	—	V
Load current						
Continuous [1]	I_F = 0.5 mA	I_L	—	—	75	mA_{RMS}/mA_{DC}
Peak	t = 10 ms	I_{LPK}	—	—	±350	mA_P
On-resistance [2]	I_F = 0.5 mA, I_L = 75 mA	R_{ON}	—	7	10	Ω
Off-state leakage current	I_F = 0 mA, V_L = 60 V	I_{LK}	—	—	1	µA
Switching speeds						
Turn-on	I_F = 2 mA, V_L = 10 V	t_{on}	—	—	3	ms
Turn-off		t_{off}	—	—	3	
Output capacitance	I_F = 0 mA, V_L = 50 V, f = 1 MHz	C_{OUT}	—	5	—	pF
Input Characteristics						
Input control current to activate [3]	I_L = 75 mA	I_F	—	0.1	0.5	mA
Input control to deactivate [4]						
Current	—	—	0.05	—	—	mA
Voltage		—	0.8	—	—	V
Input voltage drop	I_F = 5 mA	V_F	0.9	1.36	1.5	V
Reverse input current	V_R = 5 V	I_R	—	—	10	µA
Input/Output Characteristics						
Capacitance, input to output	V_{IO} = 0 V, f = 1 MHz	C_{IO}	—	1	—	pF

[1] *Load current derates linearly from 75 mA @ 55 °C to 50 mA @ 85 °C.*
[2] *Measurement taken within 1 second of on-time.*
[3] *For operation above 60 °C a minimum input current of 2 mA is recommended.*
[4] *Either condition is sufficient to deactivate the relay, both are not required.*

Timing Diagram



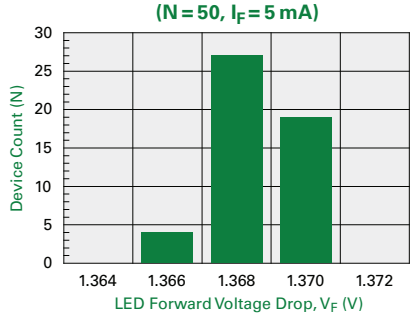
Isolation Test Circuit



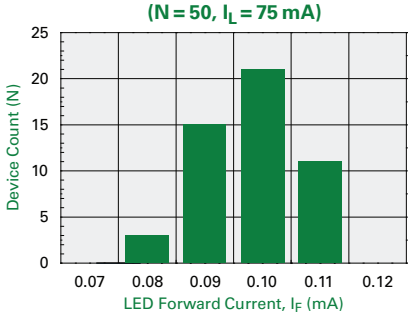
SC 11/10/2025
CPC1056N_R03

Characteristic Curves

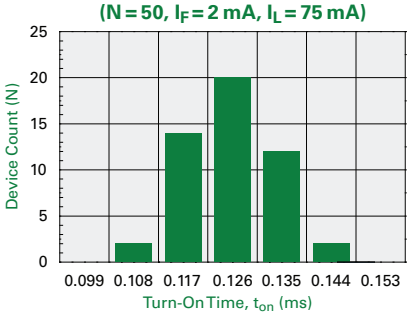
Typical LED Forward Voltage Drop (N = 50, I_F = 5 mA)



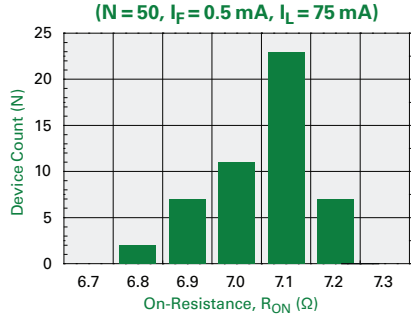
Typical I_F for Switch Operation (N = 50, I_L = 75 mA)



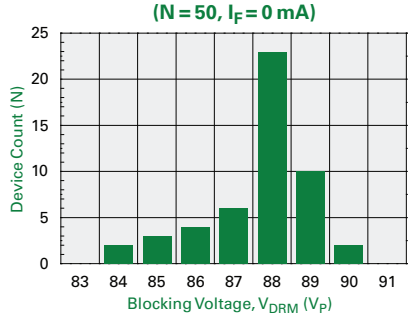
Typical Turn-On Time (N = 50, I_F = 2 mA, I_L = 75 mA)



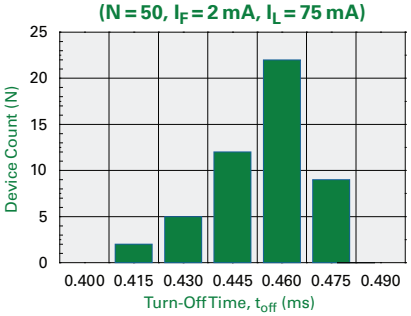
Typical On-Resistance Distribution (N = 50, I_F = 0.5 mA, I_L = 75 mA)



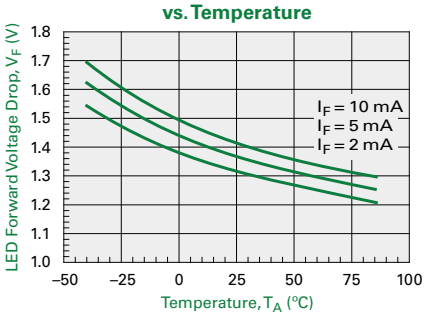
Typical Blocking Voltage Distribution (N = 50, I_F = 0 mA)



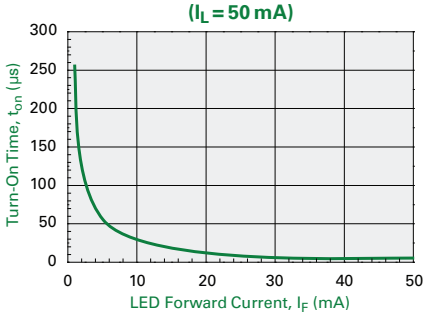
Typical Turn-Off Time (N = 50, I_F = 2 mA, I_L = 75 mA)



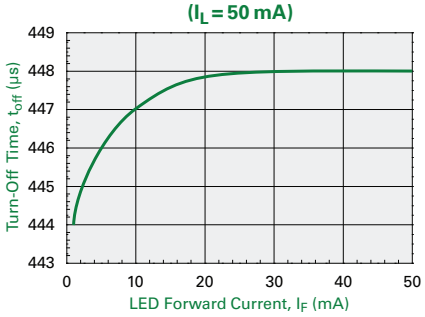
Typical LED Forward Voltage Drop vs. Temperature



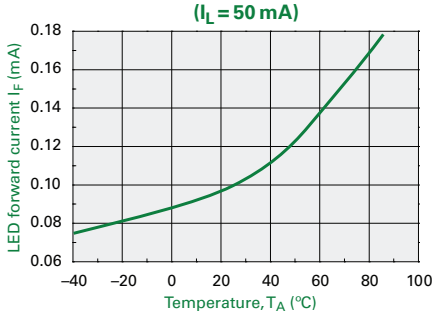
Typical Turn-On Time vs. LED Forward Current (I_L = 50 mA)



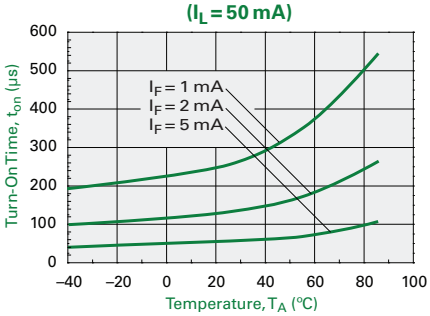
Typical Turn-Off Time vs. LED Forward Current (I_L = 50 mA)



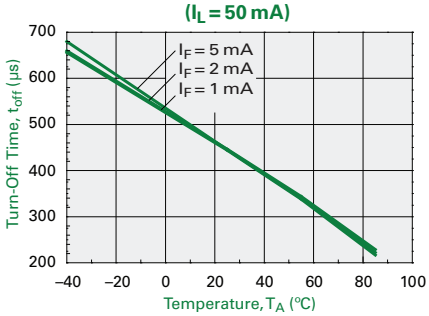
Typical I_F for Switch Operation vs. Temperature (I_L = 50 mA)



Typical Turn-On Time vs. Temperature (I_L = 50 mA)

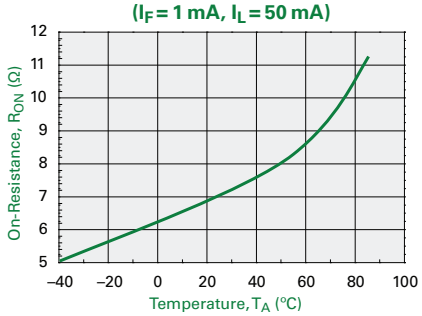


Typical Turn-Off Time vs. Temperature (I_L = 50 mA)

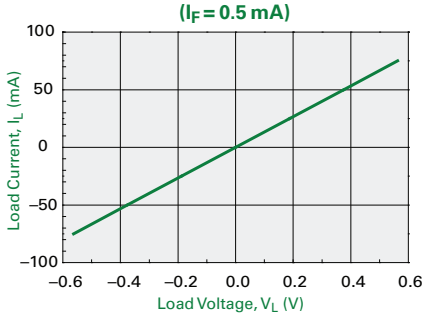


Unless otherwise noted, data presented in these graphs is typical of device operation at T_A = 25°C.

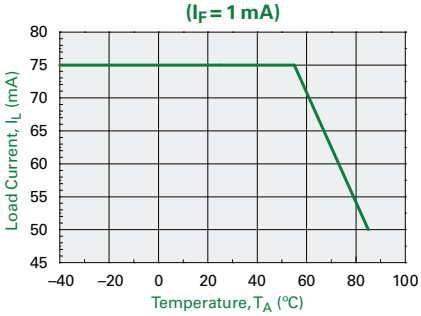
Typical On-Resistance vs. Temperature (I_F = 1 mA, I_L = 50 mA)



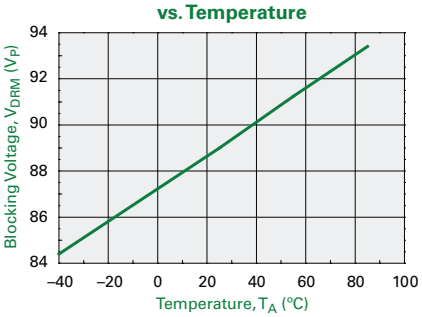
Typical Load Current vs. Load Voltage (I_F = 0.5 mA)



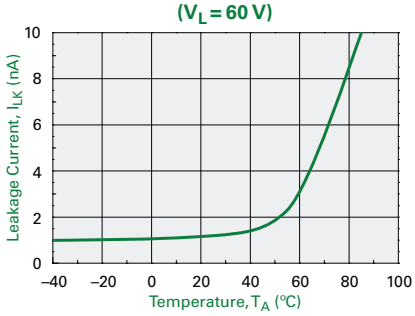
Maximum Load Current vs. Temperature (I_F = 1 mA)



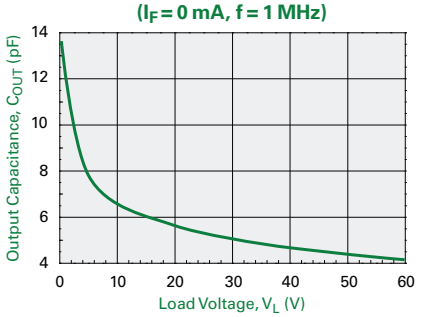
Typical Blocking Voltage vs. Temperature



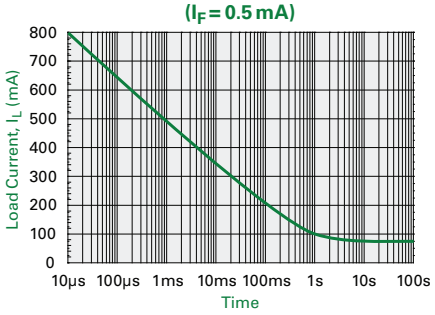
Typical Leakage vs. Temperature Measured Across Pins 3 and 4 (V_L = 60 V)



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



Energy Rating Curve (I_F = 0.5 mA)



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

SC 11/10/2025
CPC1056N_R03

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 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
CPC1056N	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 (T_C – 5 °C). The Classification Temperature sets the Maximum Body Temperature allowed for these devices during reflow soldering processes.

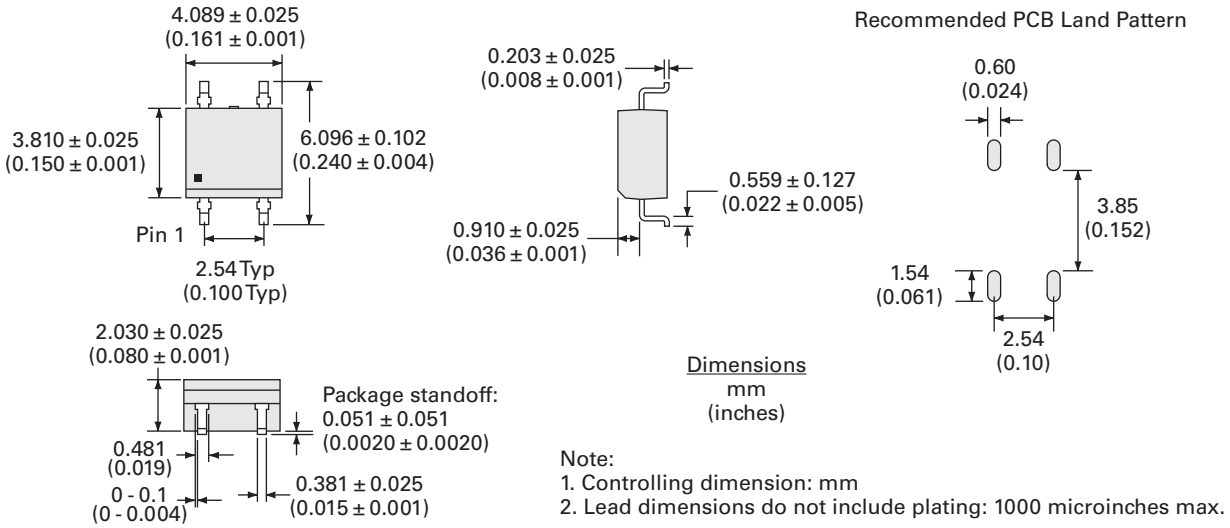
Device	Classification Temperature (T_C)	Dwell Time (T_P)	Max Reflow Cycles
CPC1056N	260 °C	30 seconds	3

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.

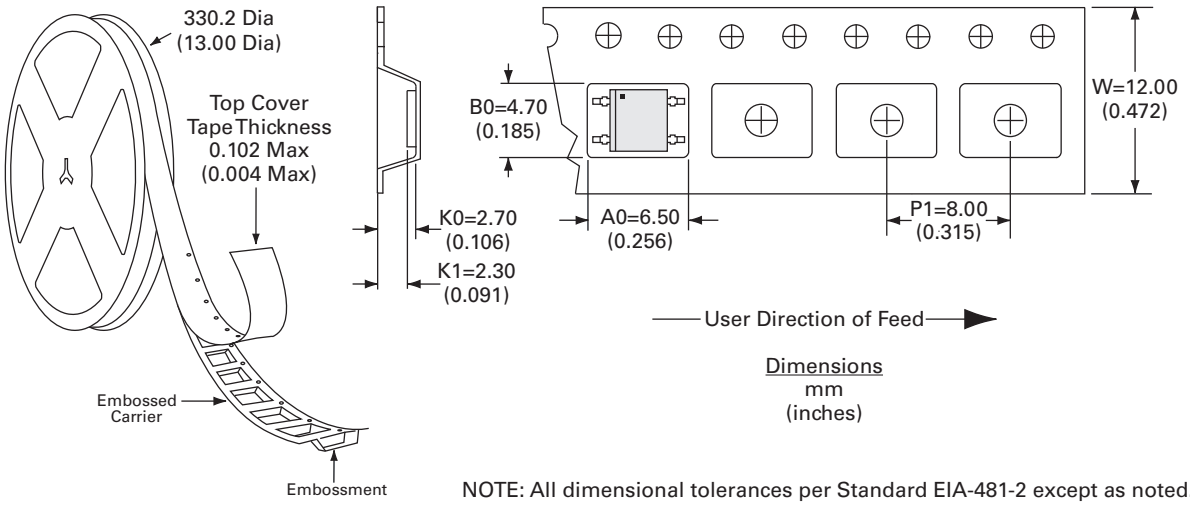
Mechanical Dimensions

CPC1056N



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

CPC1056NTR Tape and Reel Packaging



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

SC 11/10/2025
CPC1056N_R03