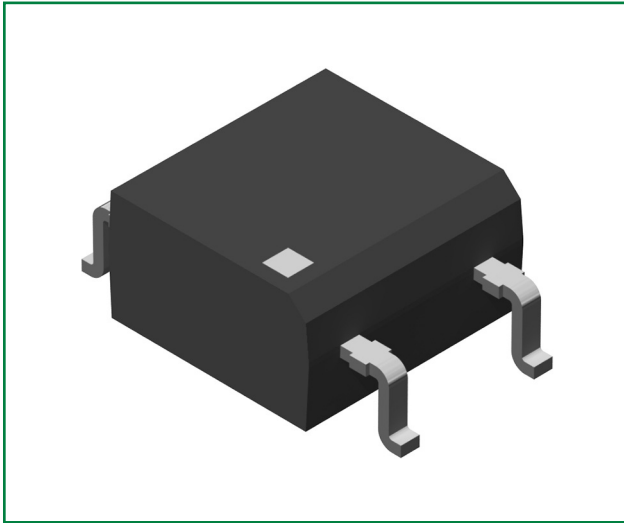


CPC1230N

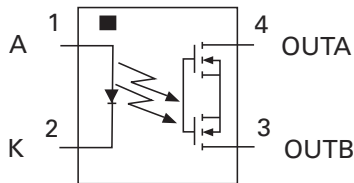
350V, 120 mA_{RMS} / mA_{DC} 1-Form-A SSR

Key Attributes

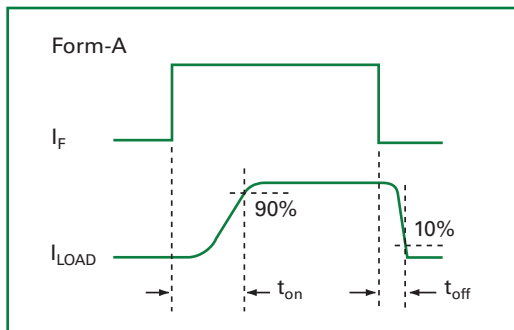
Characteristic	Rating	Unit
Blocking Voltage	350	V _P
Load Current	120	mA _{RMS} / mA _{DC}
On-resistance (max.)	30	Ω



Pin Configuration



Switching Characteristics of Normally Open Devices



Description



The CPC1230N is a miniature normally-open (1-Form-A), single-pole 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 optically coupled outputs, that use patented OptoMOS architecture, are controlled by a highly efficient infrared LED.

The device is compliant with supplementary isolation in accordance with EN/IEC 60950-1.

The CPC1230N uses Littelfuse's state of the art double molded vertical construction packaging to produce one of the world's smallest 4-pin relays. It offers board space savings approaching 20 % over the competitor's larger 4-pin SOP relay.

Features

- 0.4 mm Distance Through Insulation (Supplementary Isolation Requirement of EN60950)
- 1500V_{RMS} Input/Output Isolation
- Low Drive Power Requirements
- Small 4-Pin SOP Package
- High Reliability
- No EMI/RFI Generation
- Tape & Reel Version Available

Applications

- Telecommunications
 - Telecom Switching
 - Tip/Ring Circuit
 - Modern Switching (Laptop, Notebook, Pocket size)
 - Hook Switch
 - Dial Pulsing
 - Ground Start
 - Ringing Injection
- Instrumentation
 - Multiplexers
 - Data Acquisition
 - Electronic Switching
 - I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security
- Industrial Controls

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
CPC1230N	4-Pin SOP (100/tube)
CPC1230NTR	4-Pin SOP (2000/Reel)

Specifications

Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage (Peak)	350	V _P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10 ms)	1	A
Input Power Dissipation ¹	70	mW
Total Power Dissipation ²	400	
Capacitance, Input to Output	1	pF
Isolation Voltage, Input to Output	1500	V _{RMS}
Operating Temperature, Ambient	-40 to +85	°C
Storage Temperature	-40 to +125	

¹ Derate linearly 1.33 mW / °C

² 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 @ 25°C

Parameter	Conditions	Symbol	Value			Units
			Minimum	Typical	Maximum	
Output Characteristics						
Blocking voltage	I _L = 1 μA	V _{DRM}	350	—	—	V
Load current:						
Continuous ¹	—	I _L	—	—	120	mA _{RMS} /mA _{DC}
Peak	t = 10 ms	I _{LPK}	—	—	±350	
On-resistance ²	I _L = 120 mA	R _{ON}	—	25	30	Ω
Off-state leakage current	V _L = 350V _P	I _{LEAK}	—	—	1	μA
Switching speeds:						
Turn-on	I _F = 5 mA, V _L = 10V	t _{on}	—	—	2	ms
Turn-off		t _{off}	—	—	1	
Output capacitance	I _F = 0 mA, V _L = 50V, f = 1 MHz	C _{OUT}	—	9	—	pF
Input Characteristics						
Input control current to activate ³	I _L = 120 mA	I _F	—	0.8	2	mA
Input voltage drop to deactivate	—	V _F	0.8	—	—	V
Input voltage drop	I _F = 5 mA	V _F	0.9	1.36	1.5	
Reverse input current	V _R = 5V	I _R	—	—	10	μA

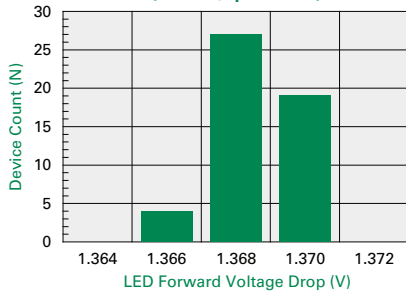
¹ Load current derates linearly from 120 mA @ 25 °C to 80 mA @ 85 °C.

² Measurement taken within 1 second of on-time.

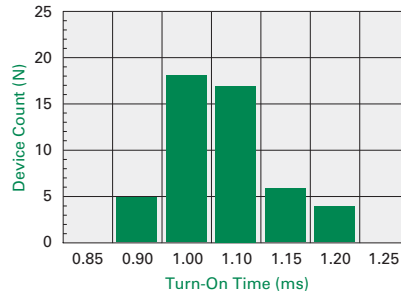
³ For applications requiring high temperature operation (greater than 60 °C) a minimum LED drive current of 4 mA is recommended.

Characteristic Curves

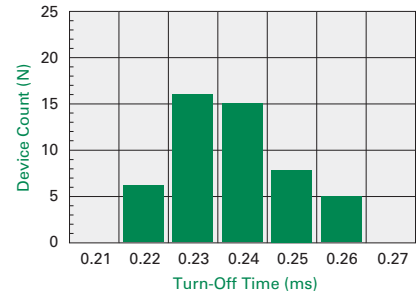
Typical LED Forward Voltage Drop
(N = 50, I_F = 5 mA)



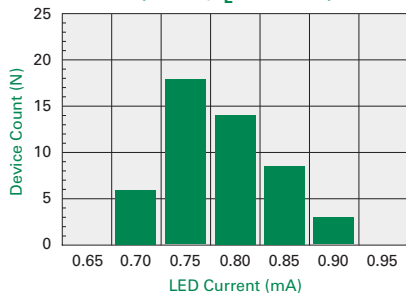
Typical Turn-On Time
(N = 50, I_F = 5 mA, I_L = 120 mA)



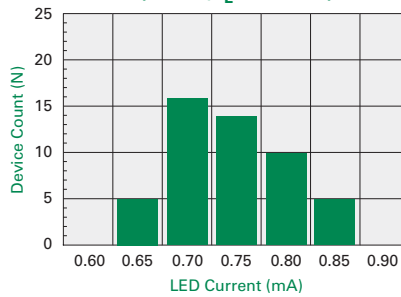
Typical Turn-Off Time
(N = 50, I_F = 5 mA, I_L = 120 mA)



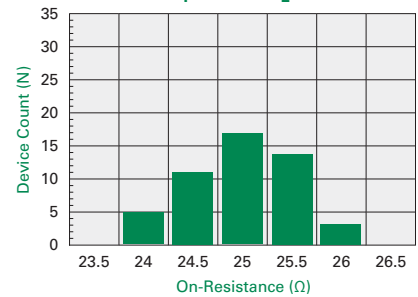
Typical I_F for Switch Operation
(N = 50, I_L = 120 mA)



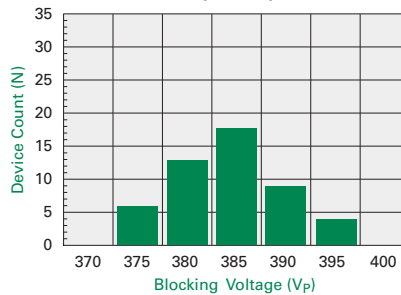
Typical I_F for Switch Dropout
(N = 50, I_L = 120 mA)



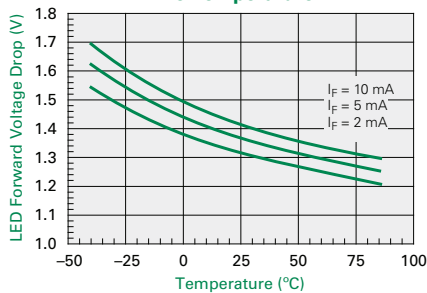
Typical On-Resistance Distribution
(N = 50, I_F = 2 mA, I_L = 120 mA)



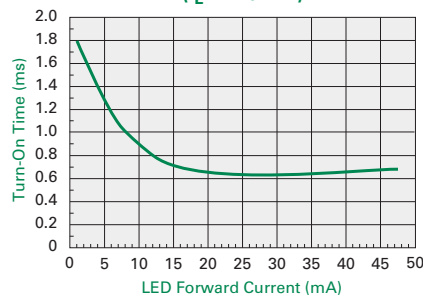
Typical Blocking Voltage Distribution
(N = 50)



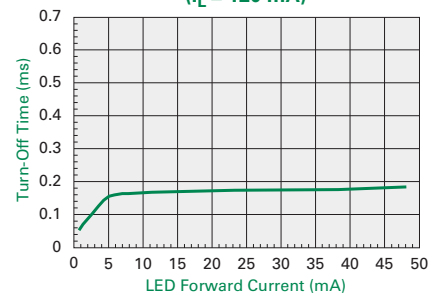
Typical LED Forward Voltage Drop vs. Temperature



Typical Turn-On Time vs. LED Forward Current
(I_L = 120 mA)

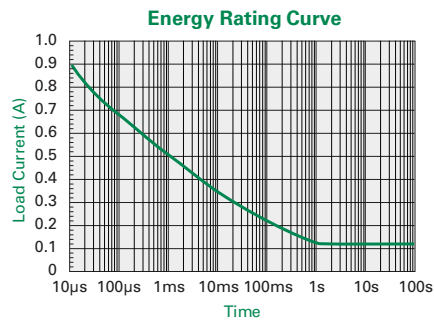
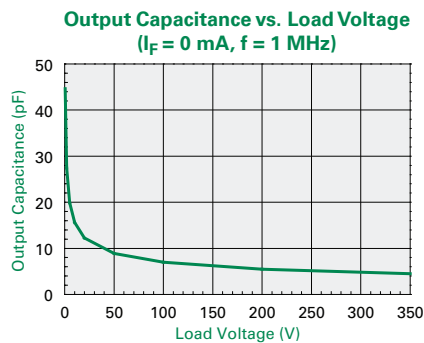
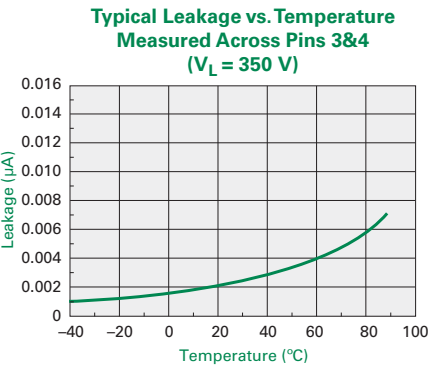
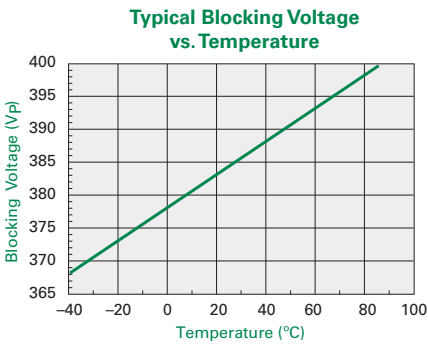
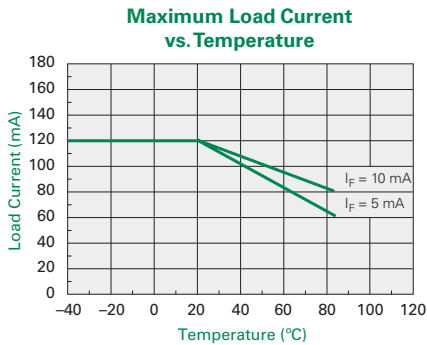
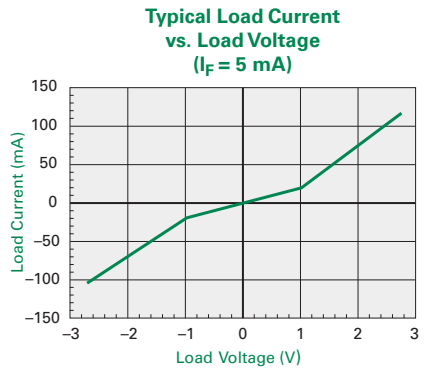
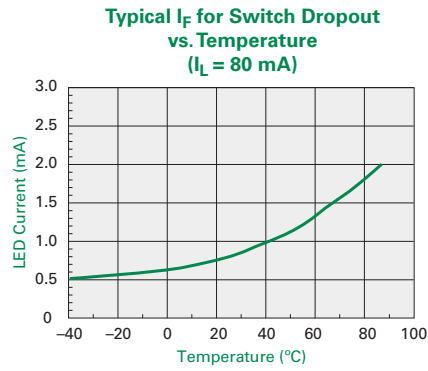
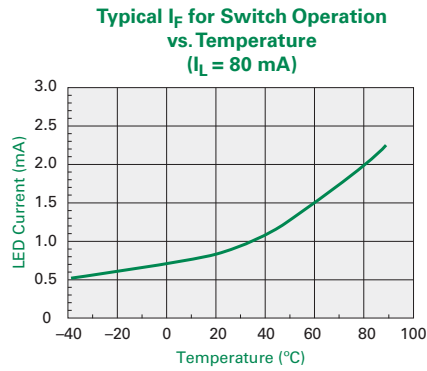
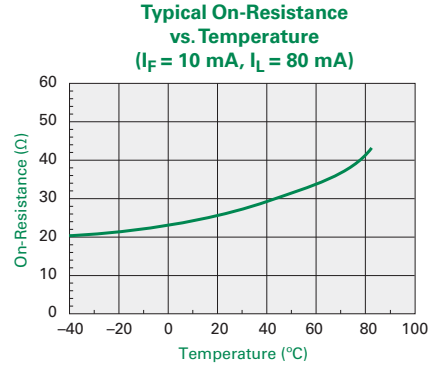
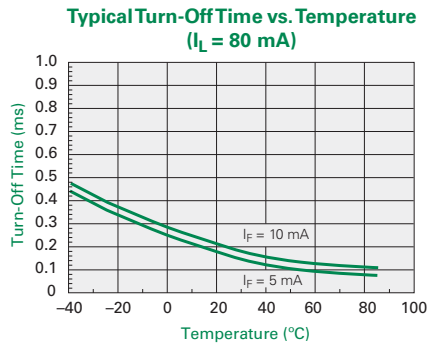
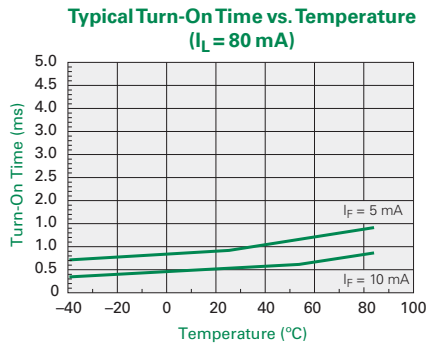


Typical Turn-Off Time vs. LED Forward Current
(I_L = 120 mA)



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

Characteristic Curves



*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 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
CPC1230N	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
CPC1230N	260°C	30 seconds	3

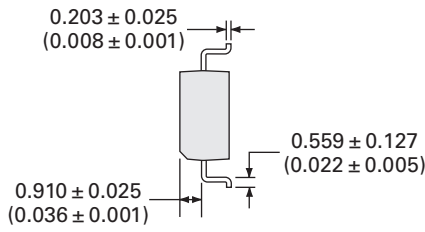
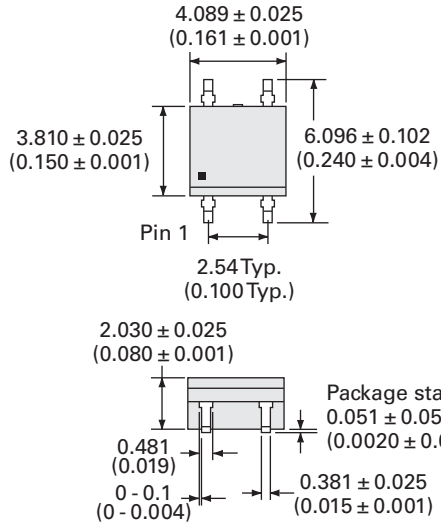
Board Wash

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.

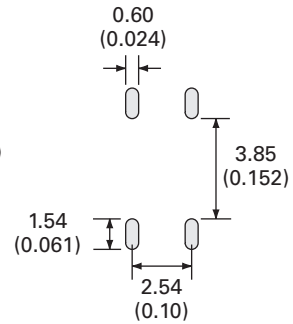


Mechanical Dimensions

CPC1230N



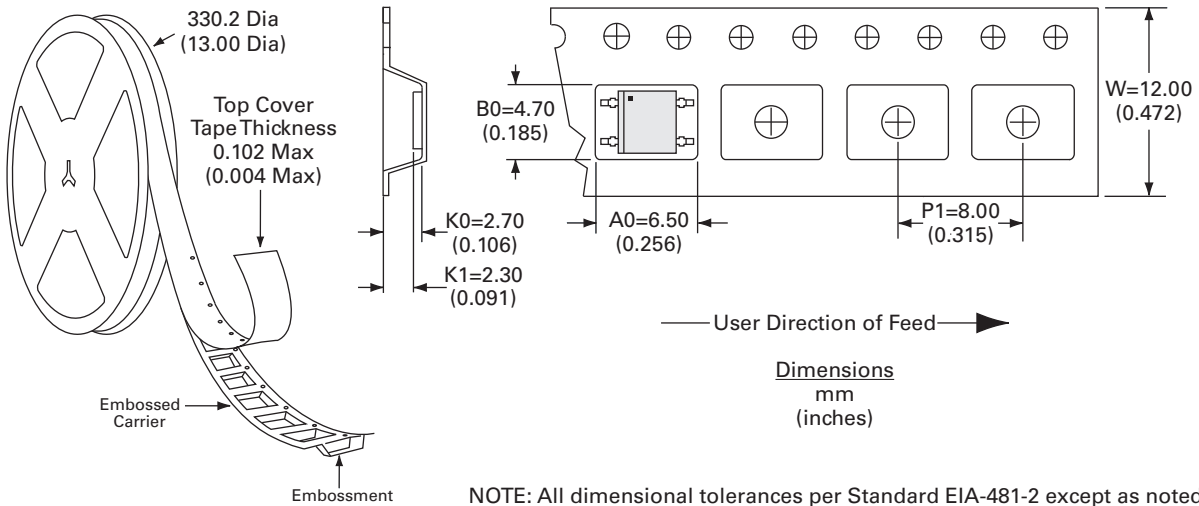
Recommended PCB Land Pattern



Dimensions
mm
(inches)

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

CPC1230NTR Tape & Reel Packaging



Dimensions
mm
(inches)

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

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <https://www.littelfuse.com/disclaimer-electronics>