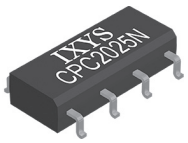
IXYS
INTEGRATED CIRCUITS DIVISION



CPC2025N
400V, 120mA Dual Single-Pole Normally Open Relay

Parameter	Rating	Units
Blocking Voltage	400	V_P
Load Current	120	mA_{rms} / mA_{DC}
On-Resistance (max)	30	Ω
LED Forward Current (to Activate)	2	mA

Features
- 1500V_{rms} Input/Output Isolation
- No EMI/RFI Generation
- Immune to Radiated EM Fields
- Tape & Reel Version Available
- Small 8-Pin SOIC Package

Applications
- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - Hook Switch
  - Dial Pulsing
  - Ground Start
  - Ringing Injection
- Security
  - Passive Infrared Detectors (PIR)
  - Data Signaling
  - Sensor Circuitry
- Instrumentation
- Multiplexers
- Data Acquisition
- Electronic Switching
- I/O Subsystems
- Medical Equipment—Patient/Equipment Isolation
- Industrial Controls

Description
The CPC2025N is a miniature device with two independent, normally-open (1-Form-A) solid state relays in an 8-pin SOIC package that employs optically coupled MOSFET technology to provide 1500V_{rms} of input to output isolation.

Optically coupled outputs that use the patented OptoMOS architecture are controlled by a highly efficient infrared LED.

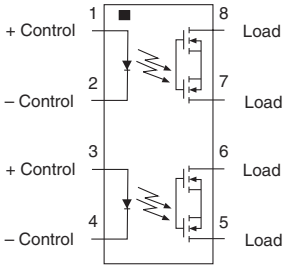
The CPC2025N uses IXYS Integrated Circuits' state of the art, double-molded vertical construction packaging to produce one of the world's smallest relays. It offers substantial board space savings over the competitor's larger 8-pin SOIC relay.

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

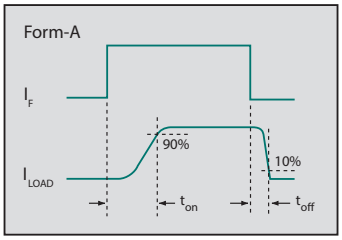
Ordering Information

Part #	Description
CPC2025N	8-Pin SOIC (50/tube)
CPC2025NTR	8-Pin SOIC (2000/reel)

Pin Configuration



Switching Characteristics of Normally-Open (Form-A) Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Blocking Voltage (Peak)	400	V_P
Reverse Input Voltage	5	V
LED Forward Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation	70	mW
Total Power Dissipation [1]	600	mW
Isolation Voltage, Input to Output (60 Seconds)	1500	V_{rms}
ESD Rating, Human Body Model	8	kV
Operational Temperature, Ambient	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 5mW / °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.

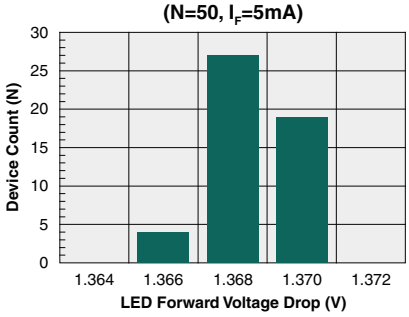
Electrical Characteristics @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Blocking Voltage	I_L=1µA	V_{DRM}	400	-	-	V
Load Current						
Continuous [1]	-	I_L	-	-	120	mA_{rms} / mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	±350	mA_P
On-Resistance [2]	I_L=120mA	R_{ON}	-	20	30	Ω
Off-State Leakage Current	V_L=400V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	0.76	2	ms
Turn-Off		t_{off}	-	0.36	1	
Output Capacitance	I_F=0mA, V_L=50V, f=1MHz	C_{OUT}	-	9	-	pF
Input Characteristics						
LED Forward Current						
To Activate [3]	I_L=120mA	I_F	-	0.6	2	mA
To Deactivate	-		0.3	0.55	-	
Input Voltage Drop	I_F=5mA	V_F	0.9	1.36	1.5	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics						
Capacitance, Input to Output	V_{IO}=0V, f=1MHz	C_{IO}	-	1	-	pF

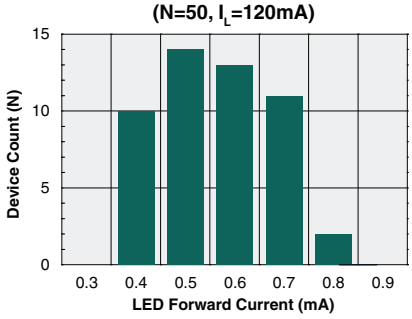
[1] Load current derates linearly from 120mA @ 25ºC to 60mA @ 85ºC, and must be derated if both poles are operating simultaneously.
[2] Measurement taken within 1 second of on-time.
[3] For applications requiring high temperature operation (greater than 60°C) a minimum LED forward current of 4mA is recomended.

PERFORMANCE DATA*

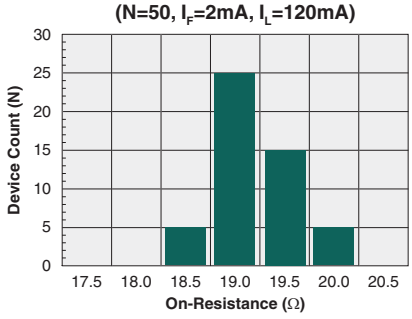
Typical LED Forward Voltage Drop
(N=50, I_F=5mA)



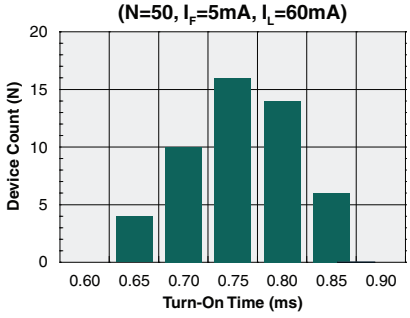
Typical LED Forward Current
to Activate
(N=50, I_L=120mA)



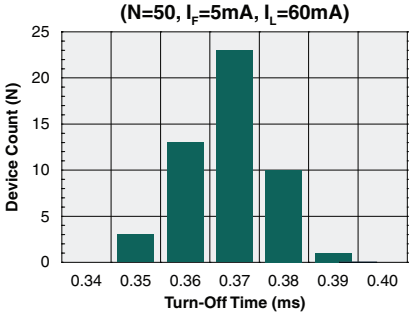
Typical On-Resistance Distribution
(N=50, I_F=2mA, I_L=120mA)



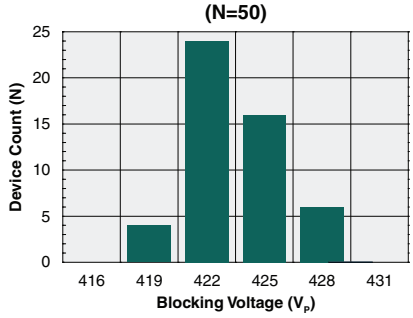
Typical Turn-On Time
(N=50, I_F=5mA, I_L=60mA)



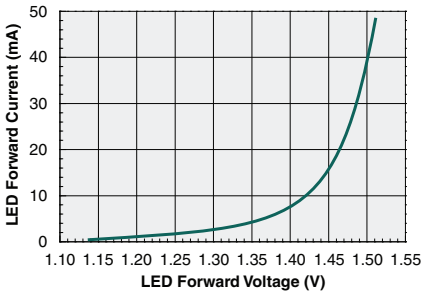
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=60mA)



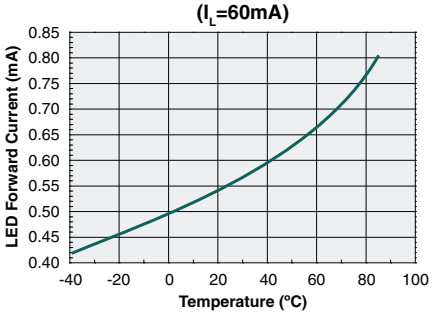
Typical Blocking Voltage Distribution
(N=50)



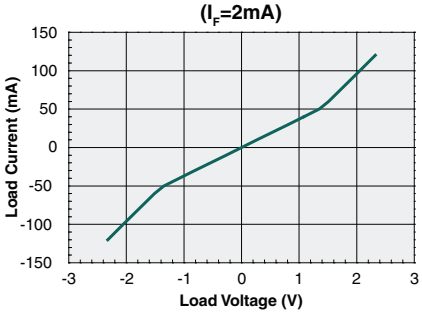
LED Forward Voltage
vs. LED Forward Current



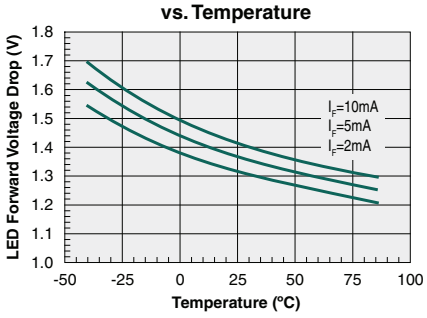
LED Forward Current to Activate
vs. Temperature
(I_L=60mA)



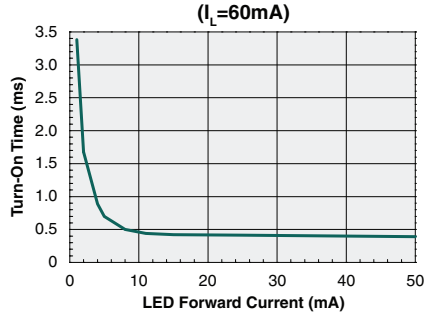
Typical Load Current
vs. Load Voltage
(I_F=2mA)



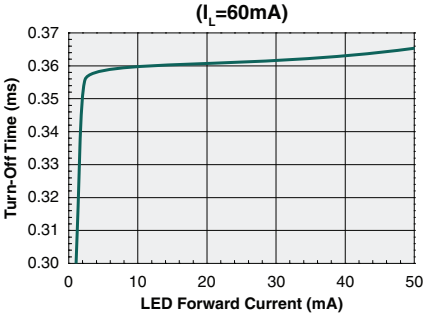
Typical LED Forward Voltage Drop
vs. Temperature



Typical Turn-On Time
vs. LED Forward Current
(I_L=60mA)



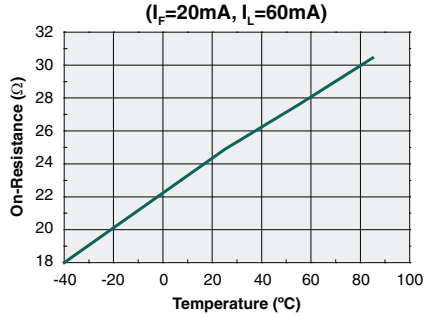
Typical Turn-Off Time
vs. LED Forward Current
(I_L=60mA)



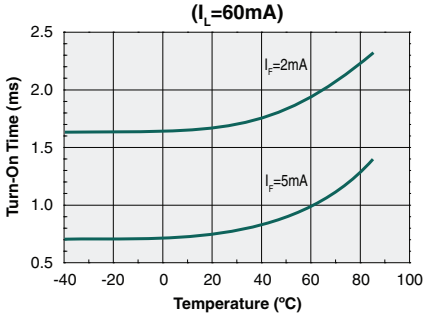
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.

PERFORMANCE DATA*

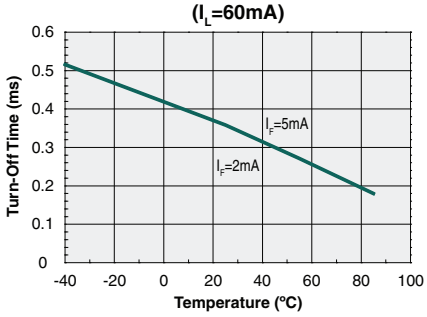
Typical On-Resistance vs. Temperature (I_F=20mA, I_L=60mA)



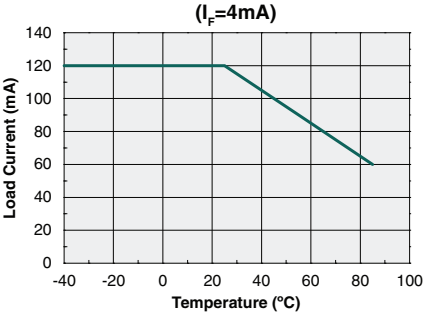
Typical Turn-On Time vs. Temperature (I_L=60mA)



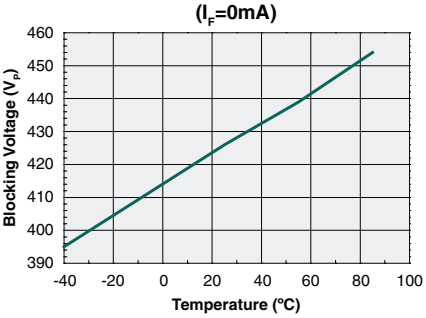
Typical Turn-Off Time vs. Temperature (I_L=60mA)



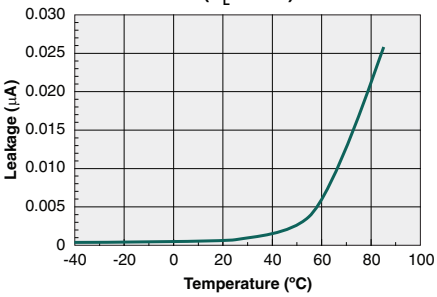
Maximum Load Current vs. Temperature (I_F=4mA)



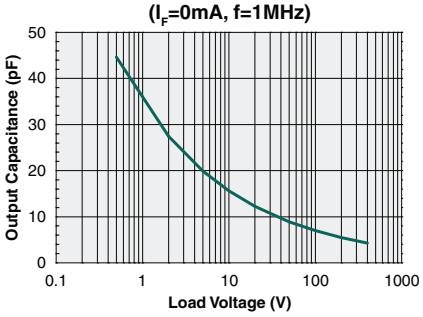
Typical Blocking Voltage vs. Temperature (I_F=0mA)



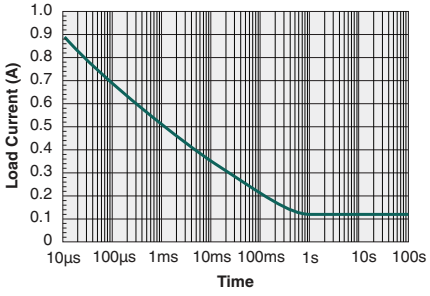
Typical Leakage vs. Temperature Measured Across Pins 5&6, 7&8 (V_L=400V)



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



Energy Rating Curve



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

Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. IXYS Integrated Circuits 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
CPC2025N	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.

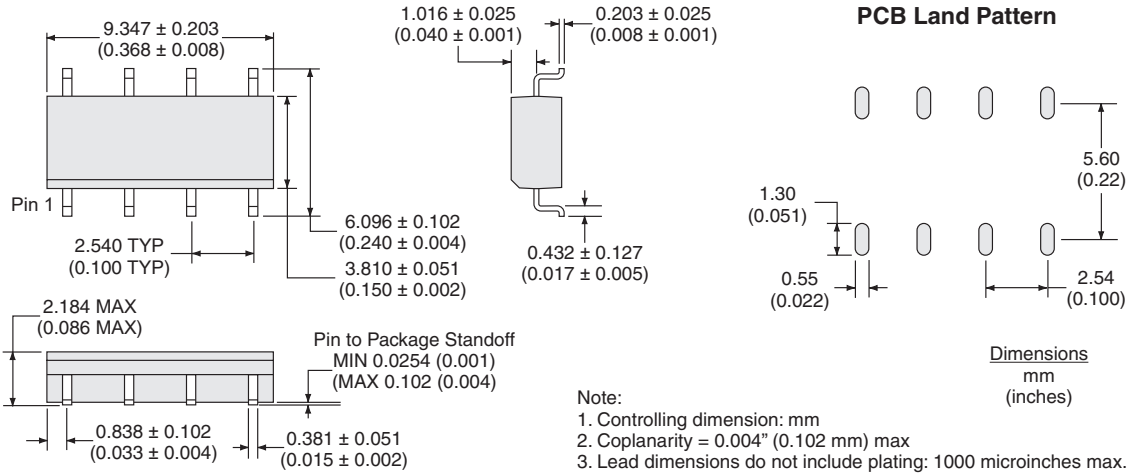
Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
CPC2025N	260°C	30 seconds	3

Board Wash

IXYS Integrated Circuits 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

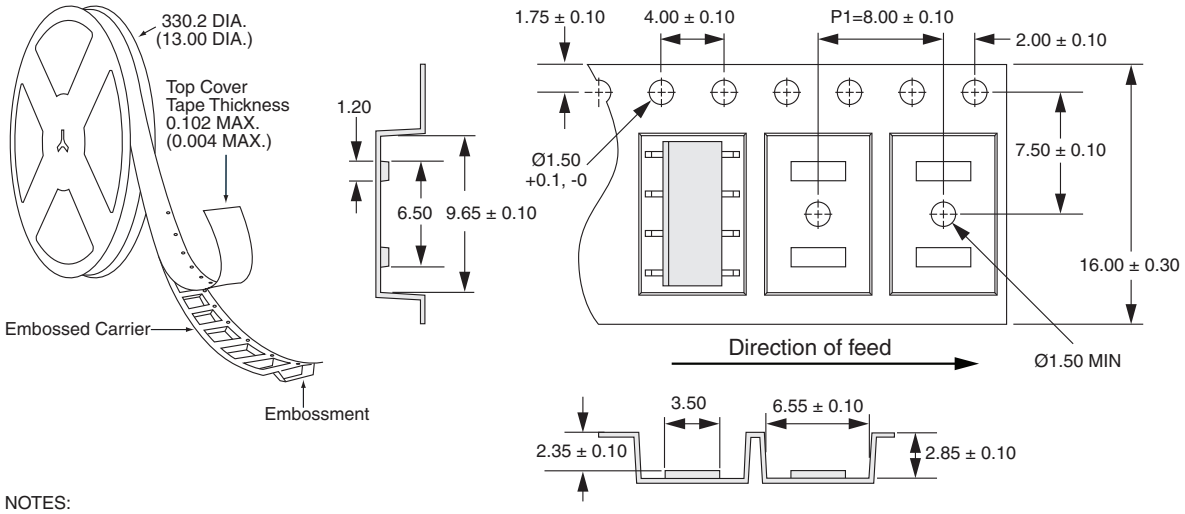
CPC2025N



Dimensions
mm
(inches)

Note:
1. Controlling dimension: mm
2. Coplanarity = 0.004" (0.102 mm) max
3. Lead dimensions do not include plating: 1000 microinches max.

CPC2025NTR Tape & Reel



NOTES:
1. All dimensions in millimeters
2. 10 sprocket hole pitch cumulative tolerance ± 0.20.
3. Carrier camber is within 1mm in 250mm.
4. Tape material : Black Conductive Polystyrene Alloy.
5. All dimensions meet EIA-481-C requirements.
6. Thickness : 0.30 ± 0.05mm.

For additional information please visit our website at: https://www.ixysic.com

IXYS
A Littelfuse Technology

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