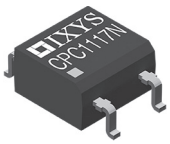
IXYS
INTEGRATED CIRCUITS DIVISION



CPC1117N
60V Normally-Closed Single-Pole 4-Pin SOP OptoMOS® Relay

Parameter	Rating	Units
Blocking Voltage	60	V_P
Load Current	150	mA_{rms} / mA_{DC}
On-Resistance (max)	16	Ω
LED Current to Operate	1	mA

Features
- Designed for use in security systems complying with EN50130-4
- Only 1mA of LED current required to operate
- 1500V_{rms} Input/Output Isolation
- Small 4-Pin SOP Package
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Immune to radiated EM fields
- Tape & Reel Version Available
- Flammability Rating UL 94 V-0

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
- Aerospace
- Industrial Controls

Description
The CPC1117N is a miniature normally-closed single-pole (1-Form-B) solid state relay in a 4-pin SOP package that employs optically coupled MOSFET technology to provide 1500V_{rms} of input/output isolation. The efficient MOSFET switches and photovoltaic die use IXYS Integrated Circuits' patented OptoMOS architecture. The optically coupled output is controlled by the input's highly efficient infrared LED.

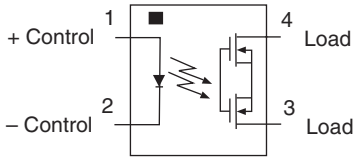
IXYS Integrated Circuits' state of the art double-molded vertical construction packaging makes the CPC1117N one of the world's smallest relays. It offers board space savings of at least 20% over the competitor's larger 4-pin SOP relay.

Approvals
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- EN/IEC 60950-1 Certified Component: Certificate available on our website

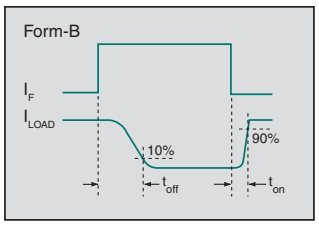
Ordering Information

Part #	Description
CPC1117N	4-Pin SOP (100/tube)
CPC1117NTR	4-Pin SOP (2000/reel)

Pin Configuration



Switching Characteristics of Normally-Closed Devices



Pb RoHS e3

Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Blocking Voltage	60	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Disipation [1]	70	mW
Total Power Dissipation [2]	400	mW
Isolation Voltage, Input to Output	1500	V_{rms}
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 1.33 mW / ºC

[2] Derate linearly 3.33 mW / ºC

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.

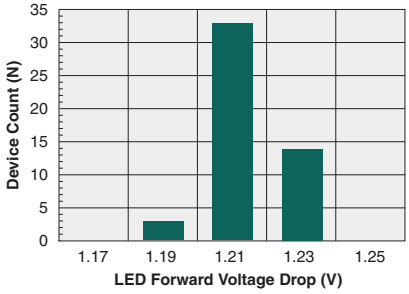
Electrical Characteristics @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
Continuous [1]	I_F=0mA	I_L	-	-	150	mA_{rms} / mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	±350	mA_P
On-Resistance [2]	I_F=0mA, I_L=120mA	R_{ON}	-	5	16	Ω
Off-State Leakage Current	I_F=1mA, V_L=60V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=2mA, V_L=10V	t_{on}	-	0.316	10	ms
Turn-Off		t_{off}	-	1.55	10	
Output Capacitance	I_F=0.5mA, V_L=50V, f=1MHz	C_{OUT}	-	10	-	pF
Input Characteristics						
Input Control Current to Activate (Output Open) [3]	-	I_F	-	0.16	1	mA
Input Control Current to Deactivate (Output Closed)	I_L=120mA	I_F	0.1	0.14	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	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

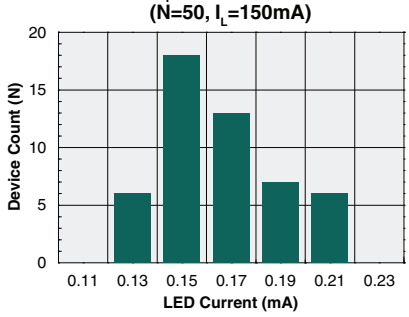
[1] Load current derates linearly from 150mA @ 25ºC to 100mA @85ºC.
[2] Measurement taken within 1 second of on-time.
[3] For applications requiring high temperature operation (greater than 60ºC) a minimum LED drive current of 3mA is recommended.

PERFORMANCE DATA*

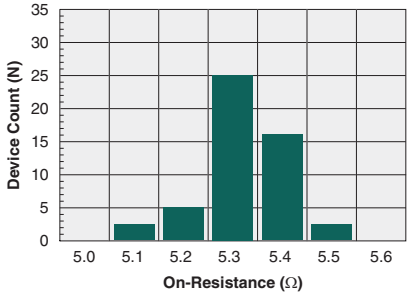
Typical LED Forward Voltage Drop
(N=50, I_F=5mA)



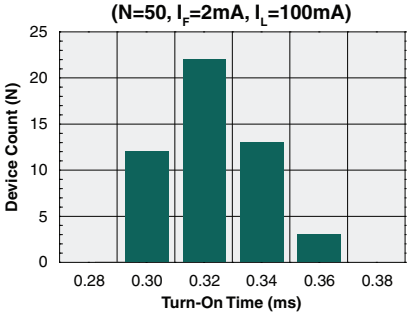
Typical I_F for Switch Operation
(N=50, I_L=150mA)



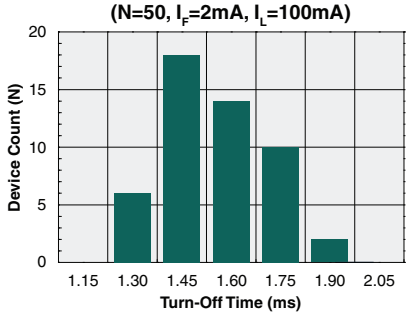
Typical On-Resistance Distribution
(N=50, I_L=150mA)



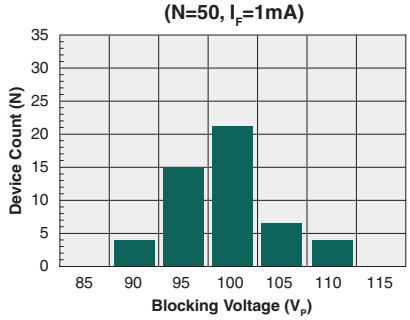
Typical Turn-On Time
(N=50, I_F=2mA, I_L=100mA)



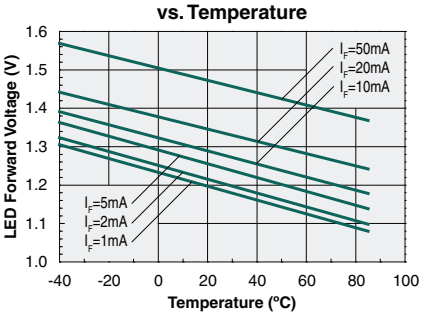
Typical Turn-Off Time
(N=50, I_F=2mA, I_L=100mA)



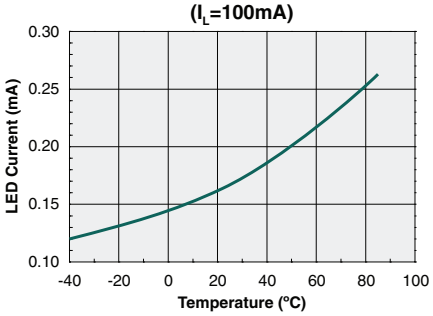
Typical Blocking Voltage Distribution
(N=50, I_F=1mA)



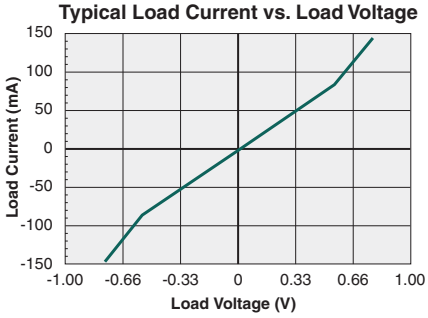
Typical LED Forward Voltage Drop
vs. Temperature



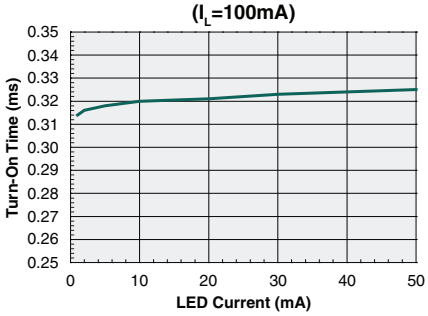
Typical I_F for Switch Operation
vs. Temperature
(I_L=100mA)



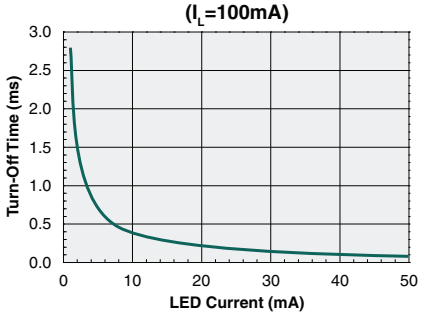
Typical Load Current vs. Load Voltage



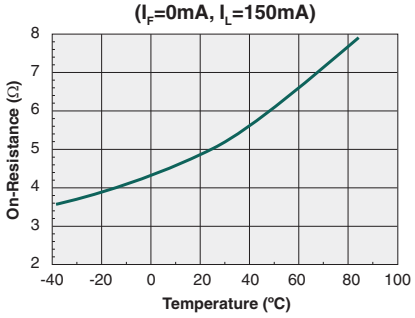
Typical Turn-On Time
vs. LED Forward Current
(I_L=100mA)



Typical Turn-Off Time
vs. LED Forward Current
(I_L=100mA)



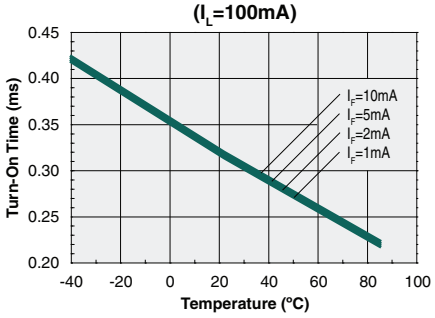
Typical On-Resistance vs. Temperature
(I_F=0mA, I_L=150mA)



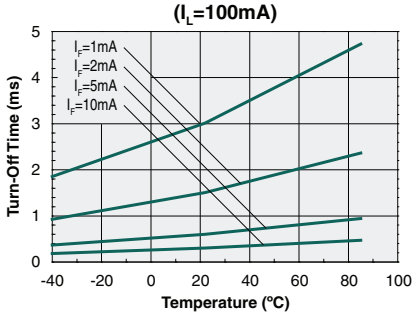
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

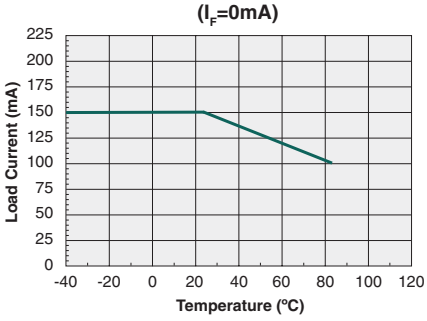
Typical Turn-On Time vs. Temperature (I_L=100mA)



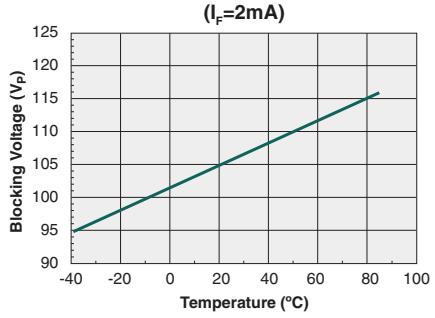
Typical Turn-Off Time vs. Temperature (I_L=100mA)



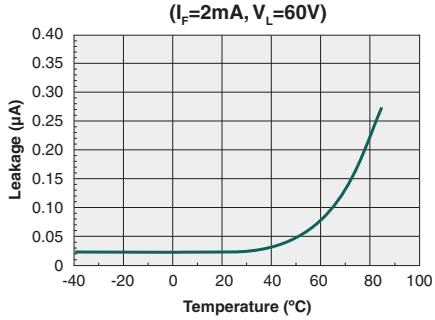
Maximum Load Current vs. Temperature (I_F=0mA)



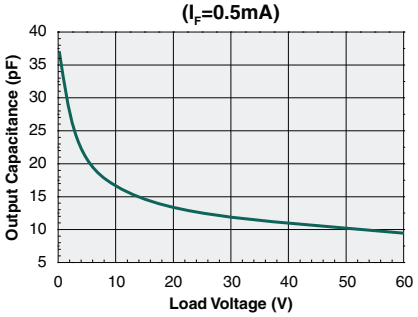
Typical Blocking Voltage vs. Temperature (I_F=2mA)



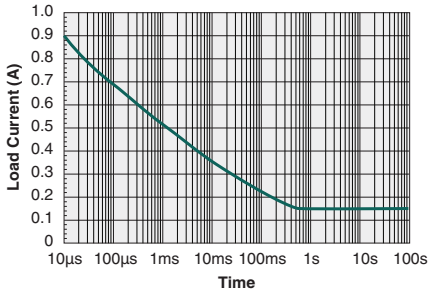
Typical Leakage vs. Temperature Measured Across Pins 3&4 (I_F=2mA, V_L=60V)



Output Capacitance vs. Load Voltage (I_F=0.5mA)



Energy Rating Curve



*Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

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
CPC1117N	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 Classification Temperature (T_C) of this product and the maximum dwell time the body temperature of this device may be (T_C - 5)ºC or greater. The classification temperature sets the Maximum Body Temperature allowed for this device during lead-free reflow processes. For through-hole devices, and any other processes, the guidelines of **J-STD-020** must be observed.

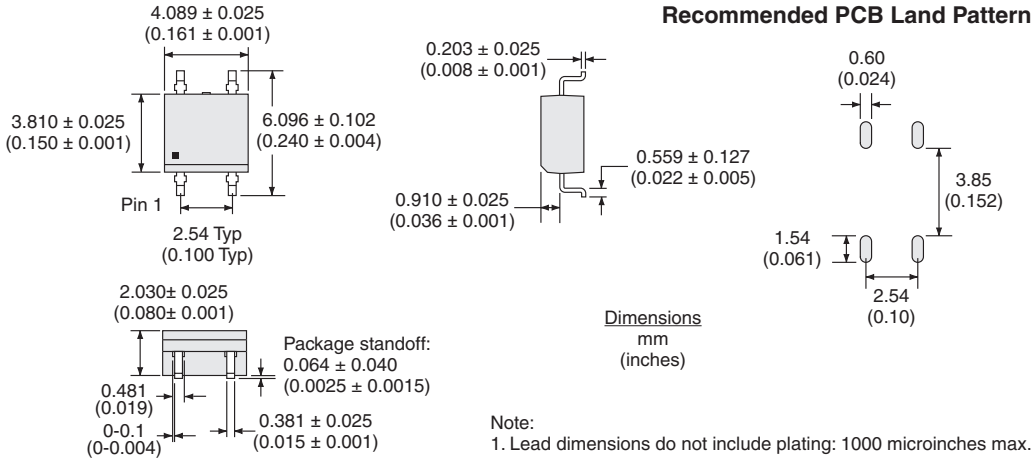
Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
CPC1117N	260ºC	30 seconds	3

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 flux or solvents that are Chlorine- or Fluorine-based.

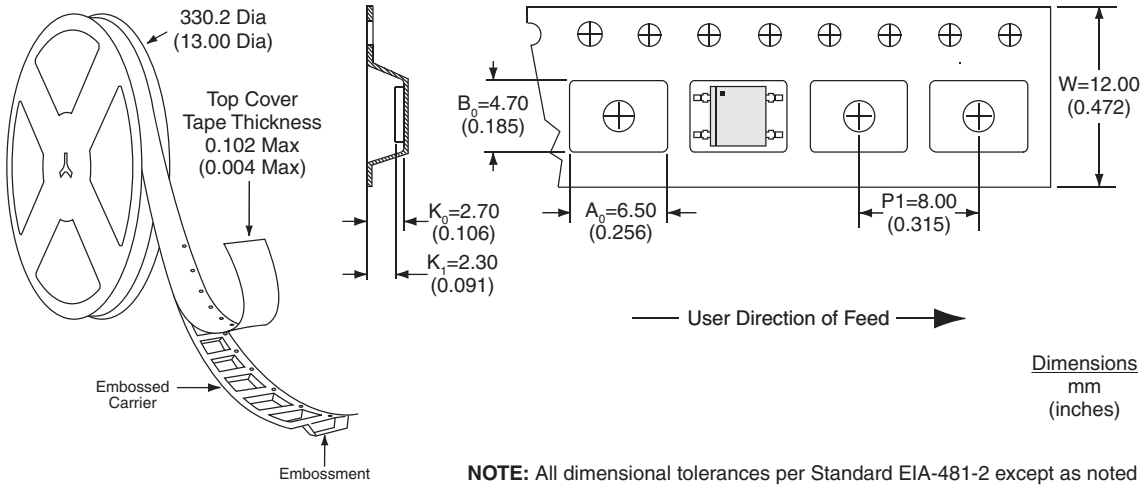
Mechanical Dimensions

CPC1117N



Note:
1. Lead dimensions do not include plating: 1000 microinches max.

CPC1117NTR Tape & Reel



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

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

Specification: DS-CPC1117N-R10

6/1/2018