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
- Wave Solderable
- Tape & Reel Version Available

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 Division's patented OptoMOS architecture. The optically coupled output is controlled by the input's highly efficient infrared LED.

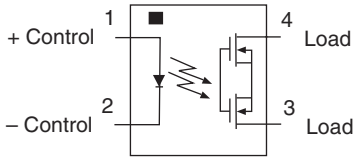
IXYS Integrated Circuits Division's state of the art double-molded vertical construction packaging makes the CPC1117N one of the world's smallest relays. It offers board space savings of at least 20% over the competitor's larger 4-pin SOP relay.

Approvals
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- EN/IEC 60950-1 Certified Component: Certificate B 13 12 82667 003

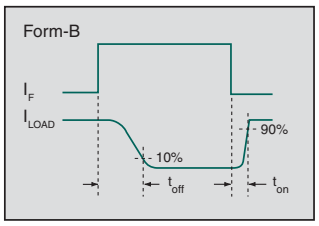
Ordering Information

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

Pin Configuration



Switching Characteristics of Normally-Closed Devices



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	70	mW
Total Power Dissipation [1]	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 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.

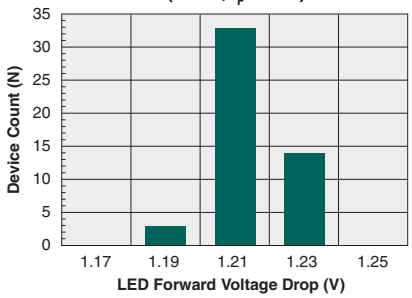
Electrical Characteristics @ 25ºC

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	1.4	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

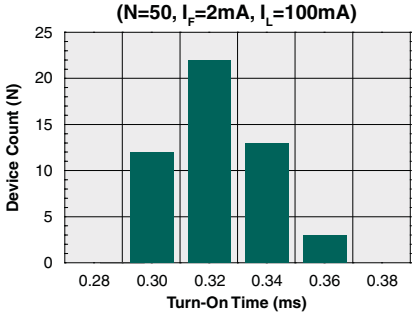
[1] Load current derates linearly from 150mA @ 25ºC to 100mA @85ºC.
[2] Measurement taken within 1 second of on-time.
[3] For applications requiring high temperature operation (greater than 60ºC) a minimum LED drive current of 3mA is recommended.

PERFORMANCE DATA @ 25°C (Unless Otherwise Noted)*

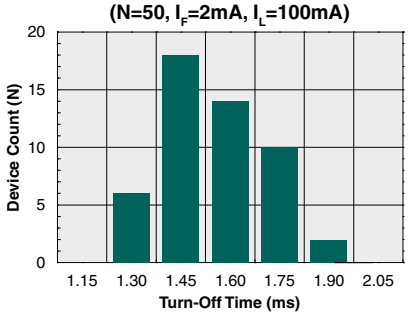
Typical LED Forward Voltage Drop
(N=50, I_F=5mA)



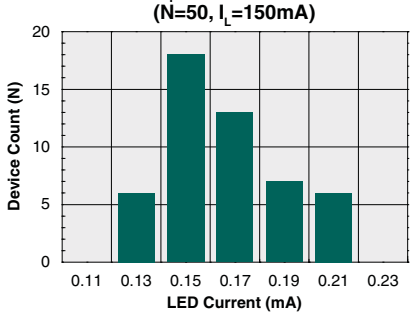
Typical Turn-On Time
(N=50, I_F=2mA, I_L=100mA)



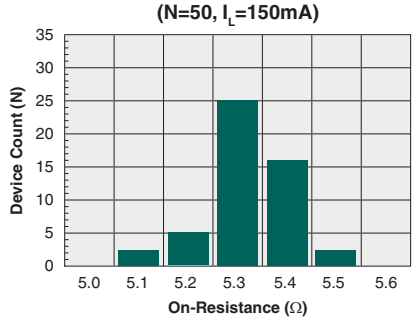
Typical Turn-Off Time
(N=50, I_F=2mA, I_L=100mA)



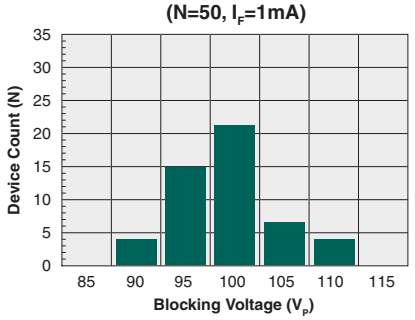
Typical I_F for Switch Operation
(N=50, I_L=150mA)



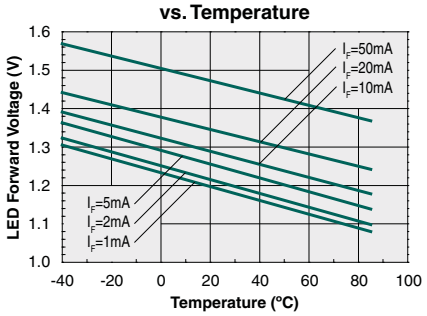
Typical On-Resistance Distribution
(N=50, I_L=150mA)



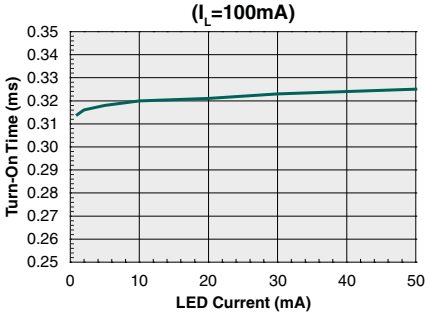
Typical Blocking Voltage Distribution
(N=50, I_F=1mA)



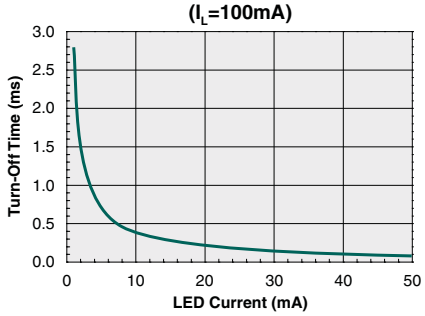
Typical LED Forward Voltage Drop
vs. Temperature



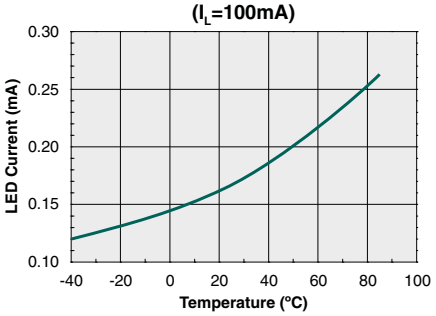
Typical Turn-On Time
vs. LED Forward Current
(I_L=100mA)



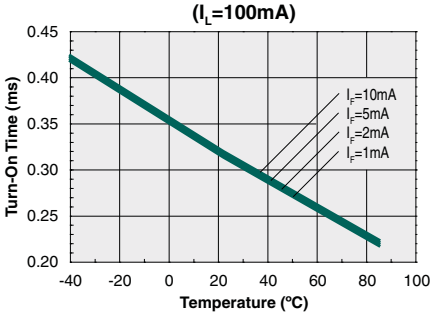
Typical Turn-Off Time
vs. LED Forward Current
(I_L=100mA)



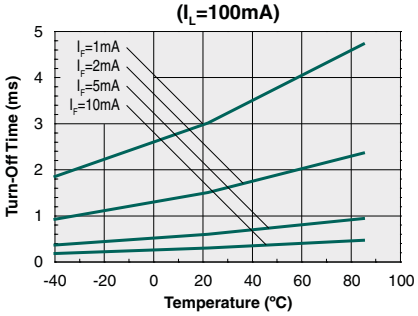
Typical I_F for Switch Operation
vs. Temperature
(I_L=100mA)



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



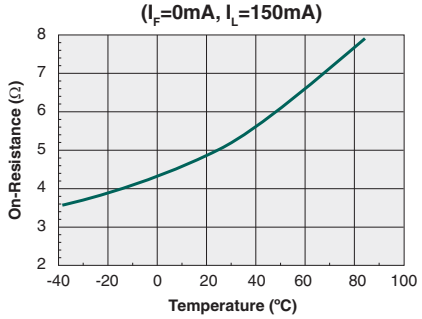
Typical Turn-Off Time
vs. Temperature
(I_L=100mA)



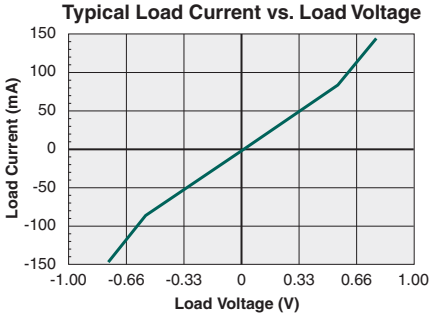
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA @ 25ºC (Unless Otherwise Noted)*

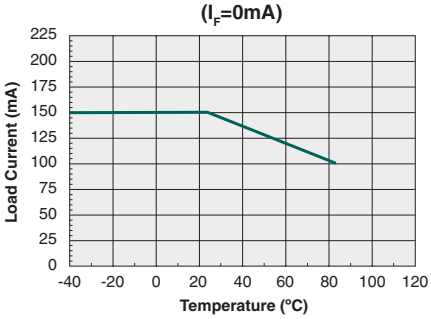
Typical On-Resistance vs. Temperature (I_F=0mA, I_L=150mA)



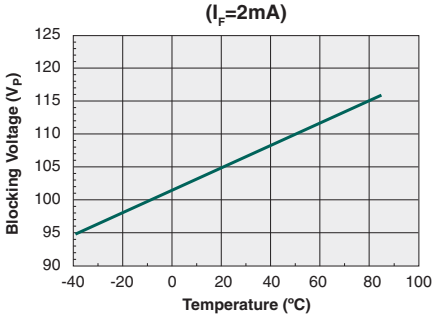
Typical Load Current vs. Load Voltage



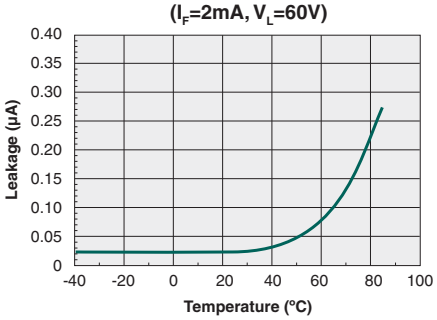
Maximum Load Current vs. Temperature (I_F=0mA)



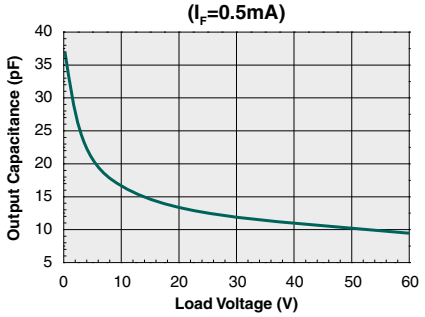
Typical Blocking Voltage vs. Temperature (I_F=2mA)



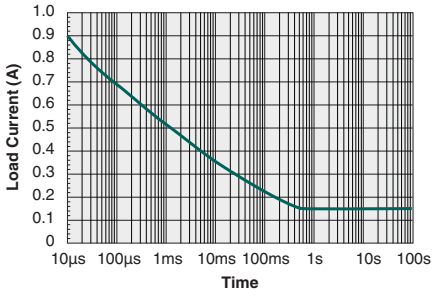
Typical Leakage vs. Temperature Measured Across Pins 3&4 (I_F=2mA, V_L=60V)



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



Energy Rating Curve



*The Performance data shown in the graphs above is typical of device performance. 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 Division classified all of 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) rating** 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) Rating
CPC1117N	MSL 3

ESD Sensitivity

This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

Soldering Profile

This product has a maximum body temperature and time rating as shown below. All other guidelines of **J-STD-020** must be observed.

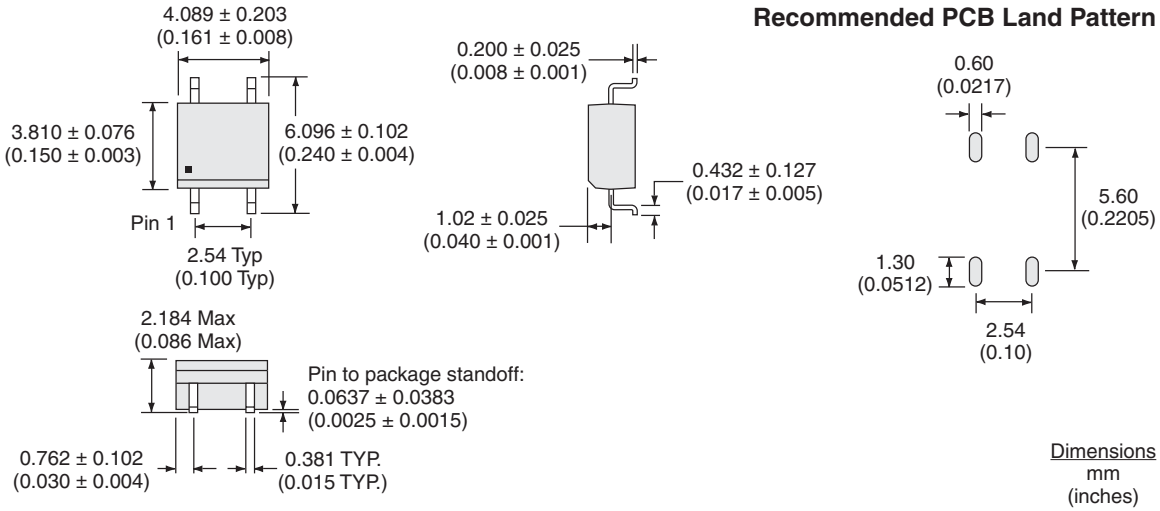
Device	Maximum Temperature x Time	Maximum Reflow Cycles
CPC1117N	260°C for 30 seconds	3

Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used after solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

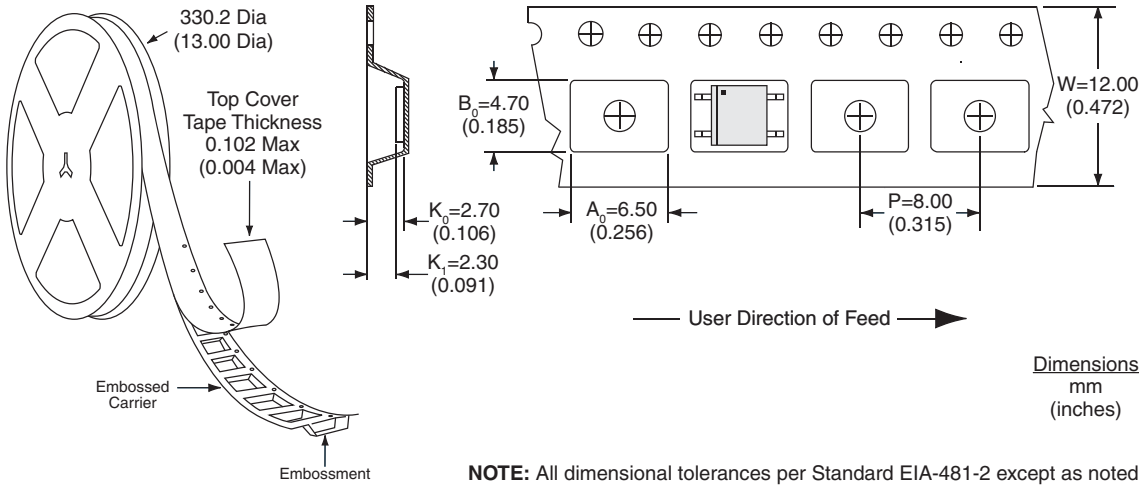
Mechanical Dimensions

CPC1117N



Dimensions
mm
(inches)

CPC1117NTR Tape & Reel



Dimensions
mm
(inches)

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-R09

11/10/2014

AMEYA360
Components Supply Platform

Authorized Distribution Brand :

Website :

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Contact Us :

- ### Address :

  401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd
  Minhang District, Shanghai , China

- ### Sales :

  Direct +86 (21) 6401-6692

  Email amall@ameya360.com

  QQ 800077892

  Skype ameyasales1 ameyasales2

- ### Customer Service :

  Email service@ameya360.com

- ### Partnership :

  Tel +86 (21) 64016692-8333

  Email mkt@ameya360.com