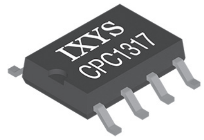
INTEGRATED CIRCUITS DIVISION



CPC1317

Single-Pole OptoMOS® Relay with Bidirectional Transient Protection

Parameter	Rating	Units
Load Voltage, AC/DC	70	V_P
Load Current	150	mA_{rms} / mA_{DC}
On-Resistance (max)	16	Ω
LED Current to Operate	1	mA

Transient Protection Characteristics

Peak Pulse Power	V_{WM}
600W	40.2V

Features

- Meets Requirements of EN50130-4 (Installation Class 3)
- 3750V_{rms} Input/Output Isolation
- 100% Solid State
- Low Drive Power Requirements
- High Reliability
- No EMI/RFI Generation
- Flammability Rating UL 94 V-0

Applications

- Security
- Sensor Circuitry
- Instrumentation
- Multiplexers
- Data Acquisition
- Electronic Switching
- I/O Subsystems
- Industrial Controls

Description

The CPC1317 is a single-pole, normally open (1-Form-A) solid state relay with bi-directional transient voltage suppressor (TVS) relay protection, which is designed to meet the requirements of EN50130-4 (installation class 3).

The relay output is constructed with efficient MOSFET switches and photovoltaic die that use IXYS Integrated Circuits Division's patented OptoMOS architecture. The input, a highly efficient infrared LED, controls the optically coupled output.

The CPC1317 is available in a space-saving 8-pin SOIC package.

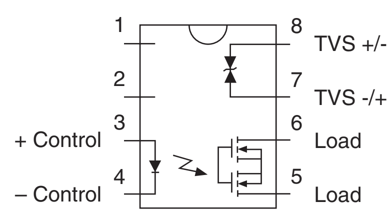
Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- EN/IEC 62368-1 Certified Component: TUV Certificate B 082667 0008

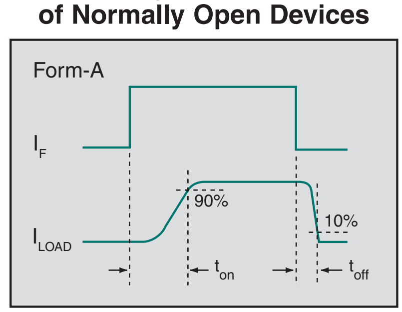
Ordering Information

Part #	Description
CPC1317P	8-Pin SOIC (Flatpack) (50/tube)
CPC1317PTR	8-Pin SOIC (Flatpack) (1000/reel)

Pin Configuration



Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
SSR Output Blocking Voltage	70	V_P
TVS Working Voltage, Maximum	40.2	V
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation [1]	150	mW
SSR Output Power Dissipation [2]	400	mW
TVS Peak Pulse Power (I_{PP}=9.3A, 10/1000µs pulse)	600	W
Isolation Voltage, Input to Output	3750	V_{rms}
Operating Temperature, Ambient	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 1.33 mW / ºC

[2] Derate output linearly 6.67 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.

TVS Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Clamping Voltage	I_{PP}=9.3A	V_C	-	-	66.5	V
Reverse Breakdown Voltage	I=1mA	V_{BR}	44.4	-	-	V
Reverse Leakage Current	V_{WM}=40.2V	I_L	-	-	5	µA

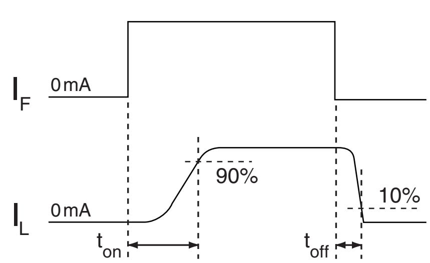
SSR Electrical Characteristics @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Blocking Voltage	I_L=1µA	V_{DRM}	70	-	-	V_P
Load Current, AC/DC						
Continuous	-	I_L	-	-	150	mA_{rms} / mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	±400	mA_P
On-Resistance [1]	I_L=150mA, I_F=1mA	R_{ON}	-	7	16	Ω
Off-State Leakage Current	V_L=70V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V (See Timing Diagram)	t_{on}	-	-	2.5	ms
Turn-Off		t_{off}	-	-	2.5	
Output Capacitance	I_F=0mAV_L=50V, f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics						
Input Control Current to Activate [2]	I_L=150mA	I_F	-	-	1	mA
Input Dropout Current to Deactivate	-	I_F	0.1	-	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Common Characteristics						
Capacitance, Input to Output	V_{IO}=0V, f=1MHz	C_{IO}	-	3	-	pF

[1] Measurement taken within 1 second of turn-on time.

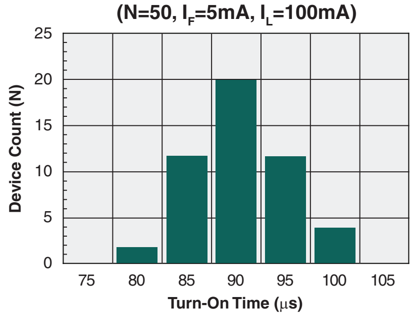
[2] For applications requiring high temperature operation (> 60ºC) a minimum LED drive current of 3mA is recommended.

Timing Diagram

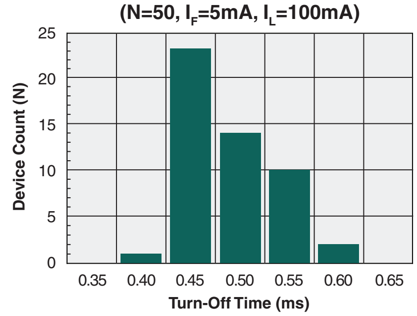


PERFORMANCE DATA*

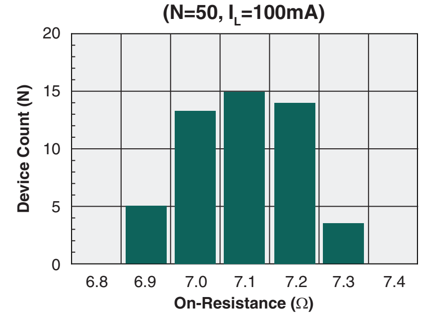
Typical Turn-On Time
(N=50, I_F=5mA, I_L=100mA)



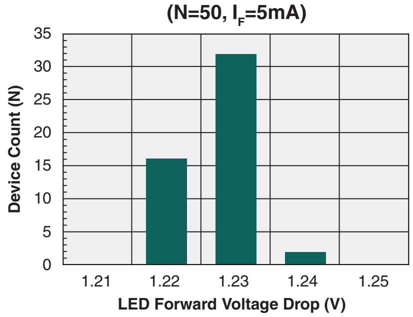
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=100mA)



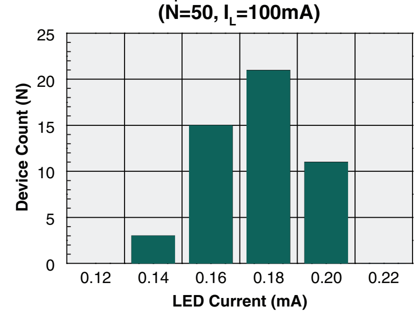
Typical On-Resistance Distribution
(N=50, I_L=100mA)



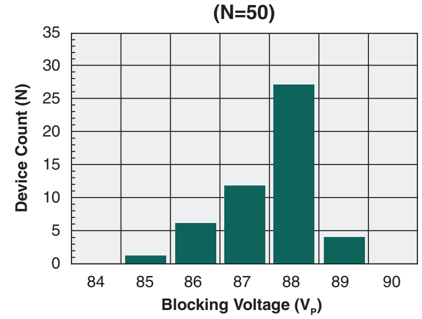
Typical LED Forward Voltage Drop
(N=50, I_F=5mA)



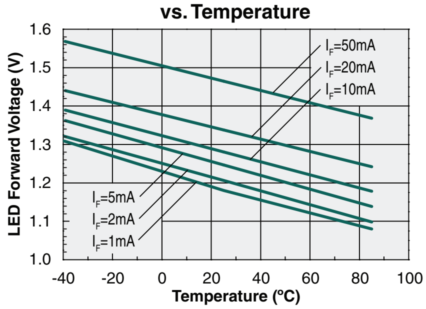
Typical I_F for Switch Operation
(N=50, I_L=100mA)



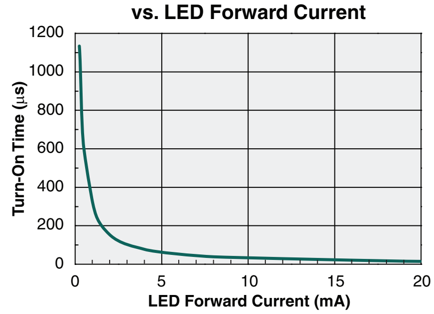
Typical Blocking Voltage Distribution
(N=50)



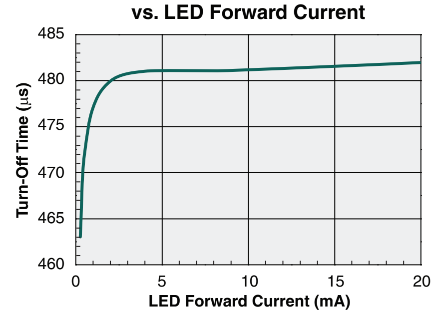
LED Forward Voltage
vs. Temperature



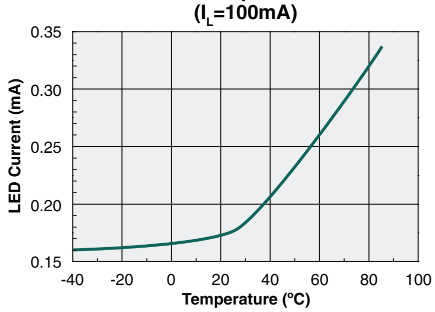
Typical Turn-On Time
vs. LED Forward Current



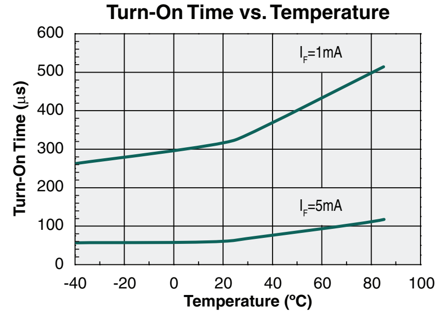
Typical Turn-Off Time
vs. LED Forward Current



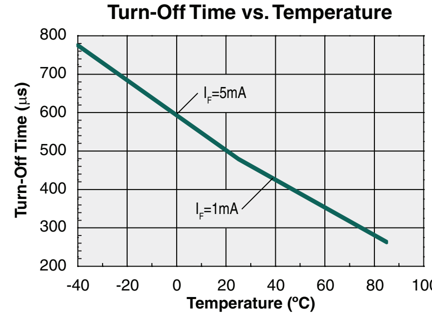
LED Current to Operate
vs. Temperature
(I_L=100mA)



Turn-On Time vs. Temperature



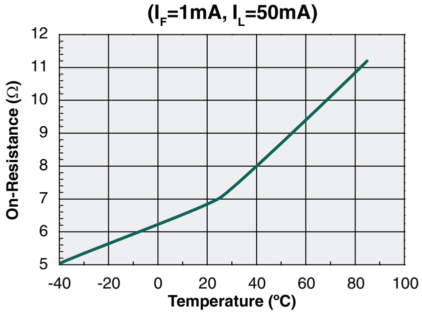
Turn-Off Time vs. Temperature



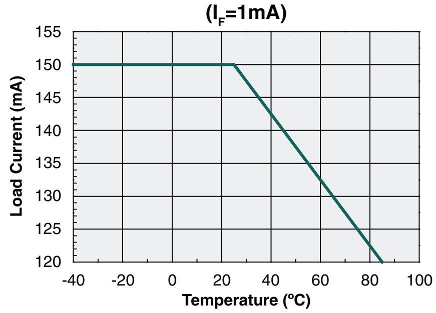
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.

PERFORMANCE DATA*

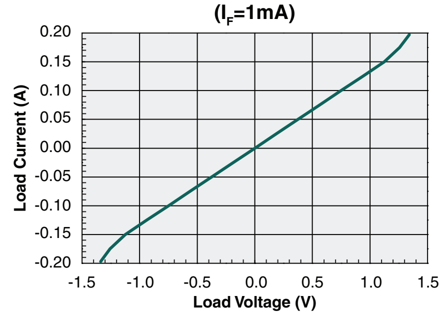
On-Resistance vs. Temperature (I_F=1mA, I_L=50mA)



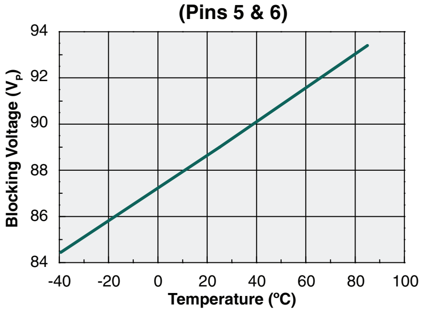
Maximum Load Current vs. Temperature (I_F=1mA)



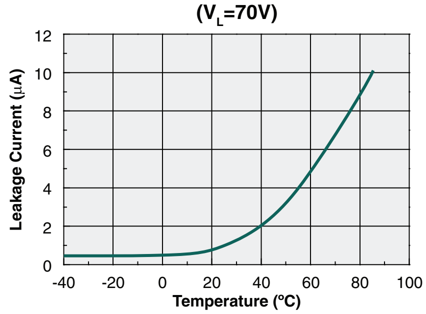
Typical Load Current vs. Load Voltage (I_F=1mA)



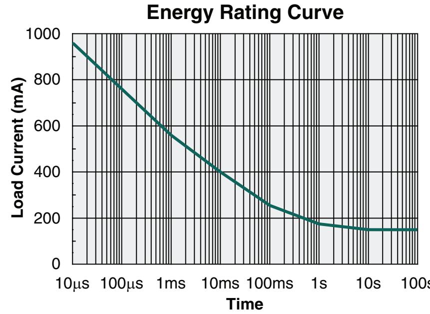
Blocking Voltage vs. Temperature (Pins 5 & 6)



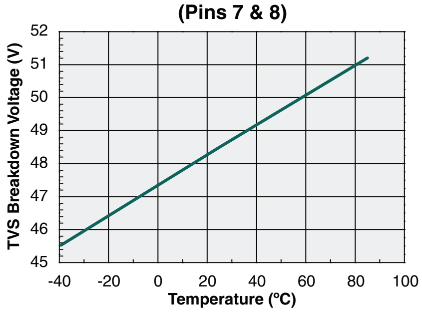
Leakage Current vs. Temperature Measured Between Pins 5 & 6 (V_L=70V)



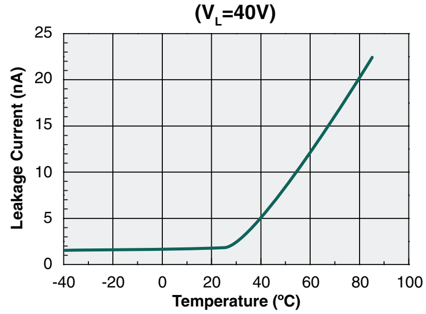
Energy Rating Curve



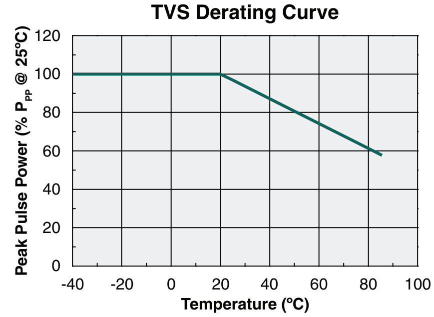
TVS Diode Breakdown Voltage vs. Temperature (Pins 7 & 8)



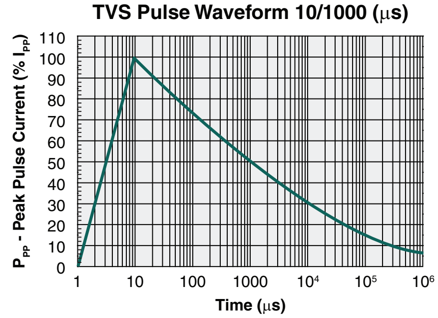
TVS Diode Leakage vs. Temperature (Pins 7 & 8) (V_L=40V)



TVS Derating Curve



TVS Pulse Waveform 10/1000 (μs)



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

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
CPC1317P	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.

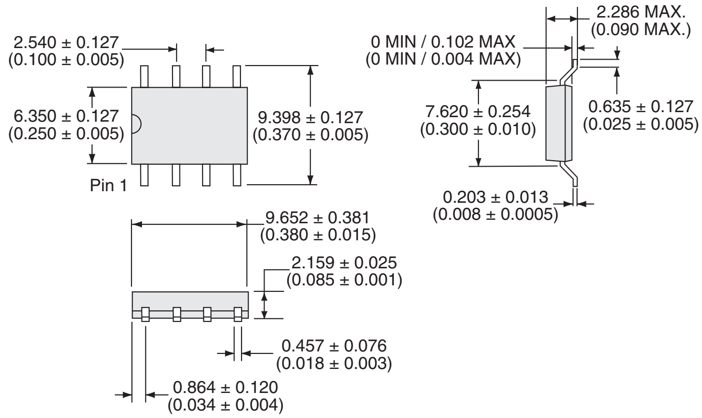
Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
CPC1317P	245°C	30 seconds	3

Board Wash

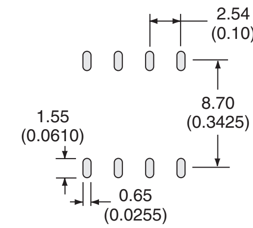
IXYS Integrated Circuits recommends the use of no-clean flux formulations. Board washing to reduce or remove flux residue following the solder reflow process is acceptable provided proper precautions are taken to prevent damage to the device. These precautions include but are not limited to: using a 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

CPC1317P

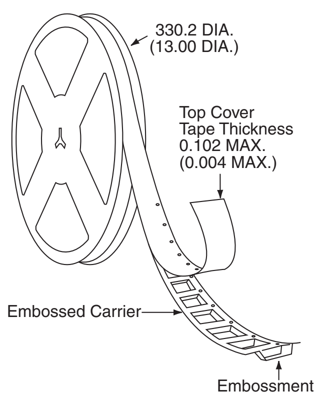


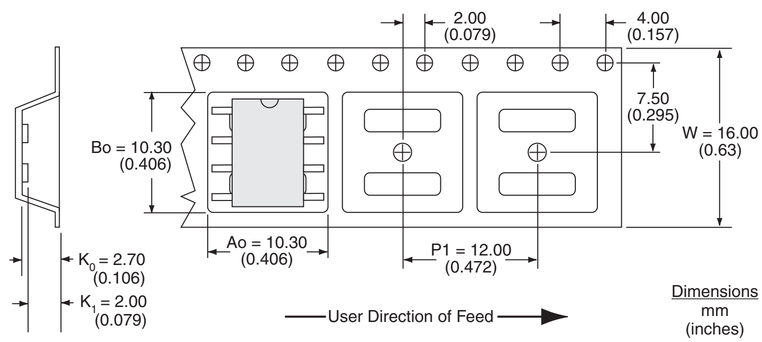
PCB Land Pattern



Dimensions
mm
(inches)

CPC1317PTR Tape & Reel





Dimensions
mm
(inches)

NOTES:
1. All dimensions carry tolerances of EIA Standard 481-2
2. The tape complies with all "Notes" for constant dimensions listed on page 5 of EIA-481-2
3. Controlling dimension: mm

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

IXYS
A Littelfuse Technology

Specification: DS-CPC1317-R06

5/4/2021