PLA172P
800V, 100mA Single-Pole Normally Open Relay

IXYS INTEGRATED CIRCUITS DIVISION



Parameter	Rating	Units
Blocking Voltage	800	V_P
Load Current	100	mA_{rms}
	85	mA_{DC}
On-Resistance (max)	50	Ω
Input Control Current	2	mA

Features

- Guaranteed Specifications at 105ºC
- -40ºC to +105ºC Operational Temperature Range
- 5mA Input Control Current Over Operating Temperature Range
- $800V_P$ Blocking Voltage
- 6.8mm Pad-to-Pad Separation of Output Pins
- $5000V_{rms}$ Input/Output Isolation
- Small Surface Mount Package
- No EMI/RFI Generation
- Flammability Rating UL 94 V-0

Applications

- Industrial Controls
- Instrumentation
- Multiplexers
- Data Acquisition
- Electronic Switching
- I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation

Description

IXYS Integrated Circuits' PLA172P is a single-pole, normally-open (1-Form-A) Solid State Relay, rated for operation up to 105ºC, that uses optically coupled MOSFET technology to provide an enhanced input to output isolation of $5000V_{rms}$.

The unique device pinout provides more than 6.8mm of pad-to-pad separation between the high voltage output pins.

Control of the optically coupled output is by the input infrared LED. The PLA172P is designed to replace electromechanical relays, and provides bounce-free switching in a compact, surface-mount package.

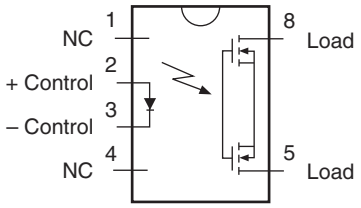
Approvals

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

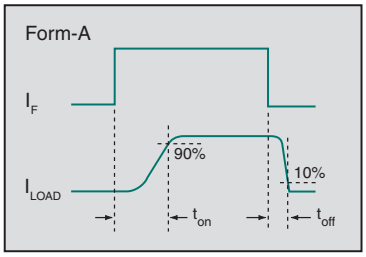
Ordering Information

Part #	Description
PLA172P	6-Pin (8-Pin Body) Flatpack (50/Tube)
PLA172PTR	6-Pin (8-Pin Body) Flatpack, Tape & Reel (1000/Reel)

Pin Configuration



Switching Characteristics of Normally-Open Devices



Absolute Maximum Ratings
(@ 25ºC Unless otherwise noted)

Parameter	Ratings	Units
Blocking Voltage (-40ºC to +105ºC)	800	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation [1]	150	mW
Output Power Dissipation		
AC Load Current [2]	890	mW
DC Load Current [3]	667	
Isolation Voltage, Input to Output (60 Seconds)	5000	V_{rms}
Operational Temperature, Ambient	-40 to +105	ºC
Storage Temperature	-40 to +125	ºC

[1] Derate linearly 1.33 mW / ºC
[2] Derate output power linearly 8.9 mW / ºC
[3] Derate output power 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 the specified temperatures and are the result of engineering evaluations. They are provided for information purposes only and are not part of the manufacturing testing requirements.

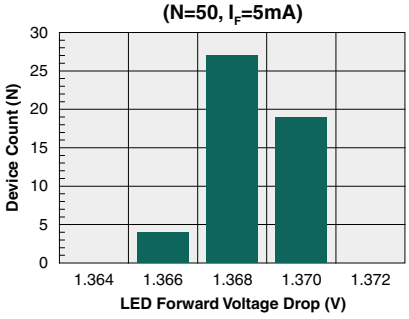
Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Blocking Voltage	I_L=1µA	V_{DRM}	800	-	-	V_P
Load Current						
Continuous, AC [1]	I_F=2mA	I_L	-	-	100	mA_{rms}
Continuous, DC [2]			-	-	85	mA_{DC}
Peak	I_F=2mA, t=10ms	I_{LPK}	-	-	±350	mA_P
On-Resistance [3]	I_F=2mA, I_L= 100mA	R_{ON}	-	37	50	Ω
	I_F=2mA, I_L=1mA		-	57	85	
Off-State Leakage Current	V_L=800V	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, I_L=100mA	t_{on}	-	1.2	5	ms
Turn-Off		t_{off}	-	0.5	5	
Output Capacitance	I_F=0mA, V_L=20V, f=1MHz	C_{OUT}	-	10	-	pF
Output Characteristics @ 105°C						
On-Resistance [3]	I_F=5mA, I_L=30mA	R_{ON}	-	70	110	Ω
	I_F=5mA, I_L=1mA		-	110	140	
Off-State Leakage Current	V_L=800V	I_{LEAK}	-	-	5	µA
Switching Speeds						
Turn-On	I_F=5mA, I_L=30mA	t_{on}	-	-	10	ms
Turn-Off		t_{off}	-	-	10	
Input Characteristics @ 25°C						
Input Control Current to Activate [4]	I_L=100mA	I_F	-	0.35	2	mA
Input Control Current to Deactivate	-	I_F	0.05	-	-	mA
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
Input Characteristics @ 105°C						
Input Control Current to Activate	I_L=30mA	I_F	-	-	5	mA
Common Characteristics @ 25°C						
Input to Output Capacitance	V_{IO}=0V, f=1MHz	C_{IO}	-	1	-	pF

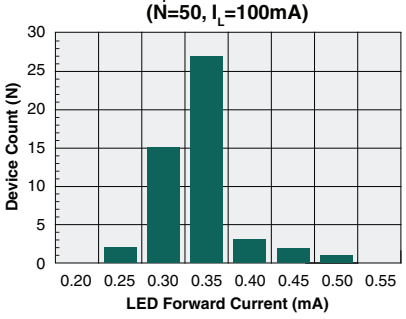
[1] Load derates linearly from 100mA @ 25ºC to 44mA @105ºC (0.7mA/ºC).
[2] Load derates linearly from 85mA @ 25ºC to 38mA @ 105ºC (0.59mA/ºC).
[3] Measurement taken within 1 second of on-time.
[4] For applications requiring high temperature operation (greater than 60ºC) a minimum LED drive current of 5mA is recommended.

PERFORMANCE DATA*

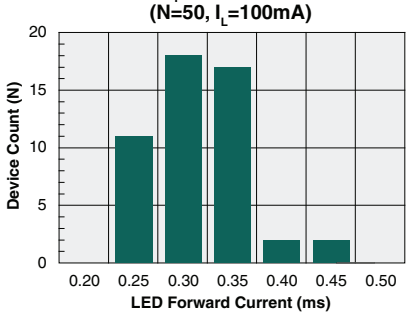
Typical LED Forward Voltage Drop (N=50, I_F=5mA)



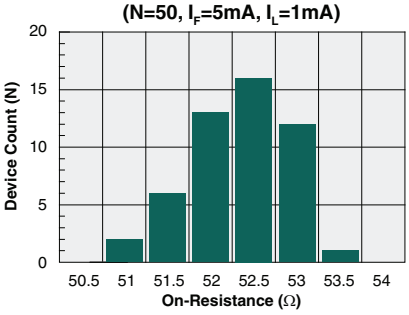
Typical I_F for Switch Operation (N=50, I_L=100mA)



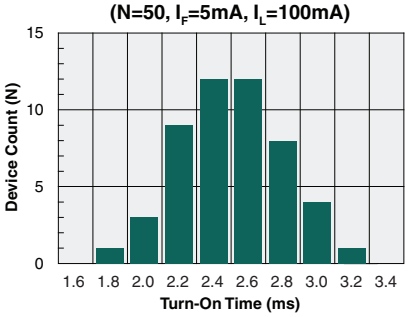
Typical I_F for Switch Dropout (N=50, I_L=100mA)



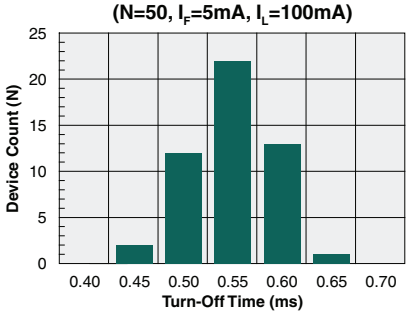
Typical On-Resistance (N=50, I_F=5mA, I_L=1mA)



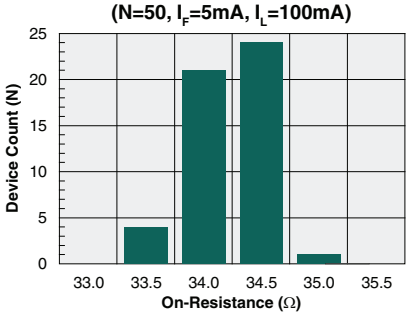
Typical Turn-On Time (N=50, I_F=5mA, I_L=100mA)



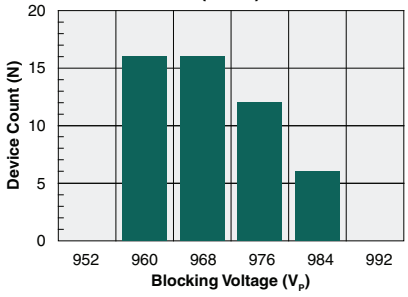
Typical Turn-Off Time (N=50, I_F=5mA, I_L=100mA)



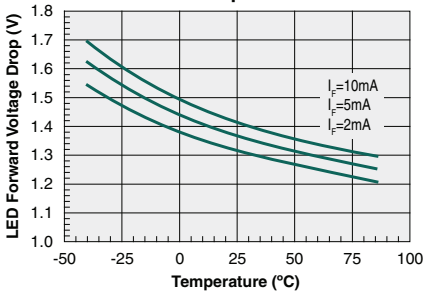
Typical On-Resistance (N=50, I_F=5mA, I_L=100mA)



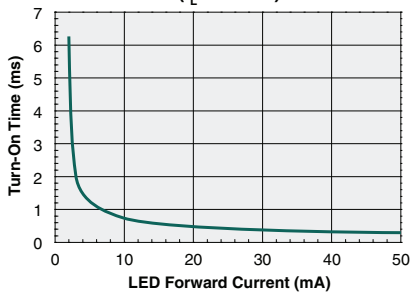
Typical Blocking Voltage Distribution (N=50)



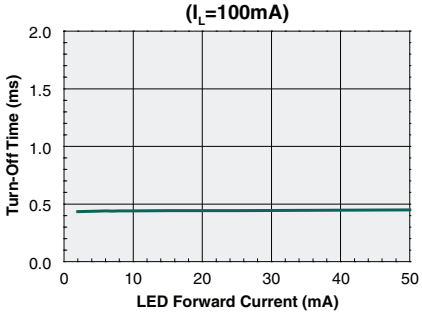
Typical LED Forward Voltage Drop vs. Temperature



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



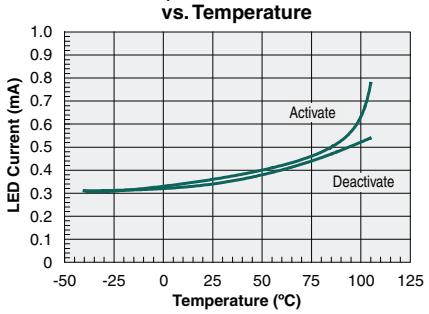
Turn-Off Time vs. LED Forward Current (I_L=100mA)



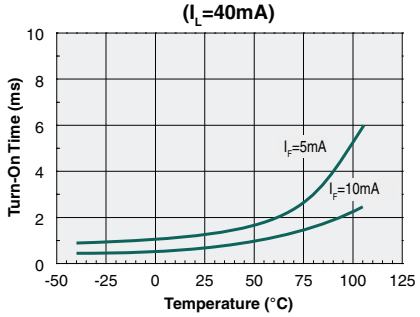
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.

PERFORMANCE DATA*

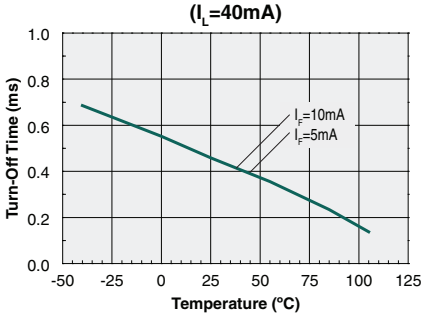
Typical I_F to Activate/Deactivate vs. Temperature



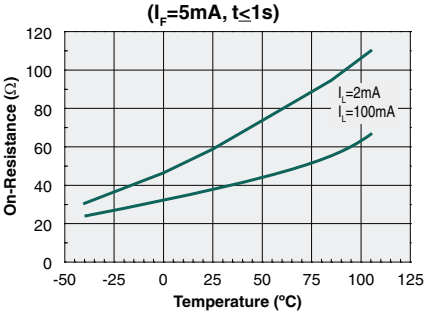
Turn-On Time vs. Temperature (I_L=40mA)



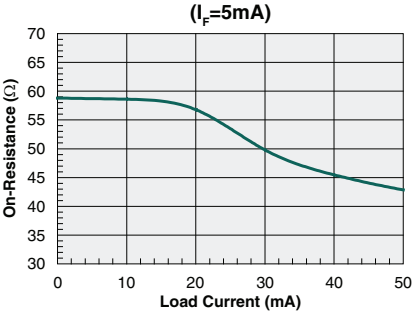
Turn-Off Time vs. Temperature (I_L=40mA)



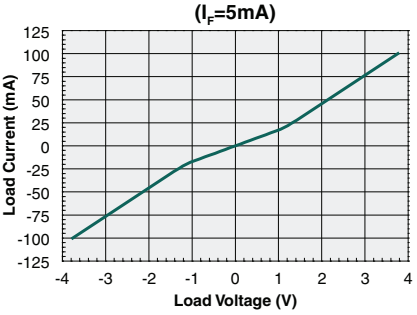
On-Resistance vs. Temperature (I_F=5mA, t≤1s)



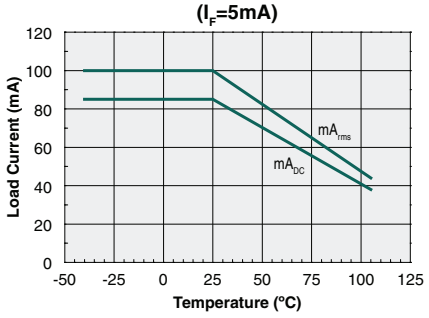
On-Resistance vs. Load Current (I_F=5mA)



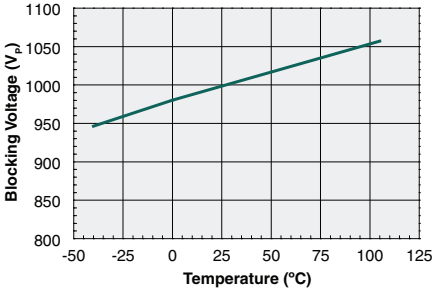
Load Current vs. Load Voltage (I_F=5mA)



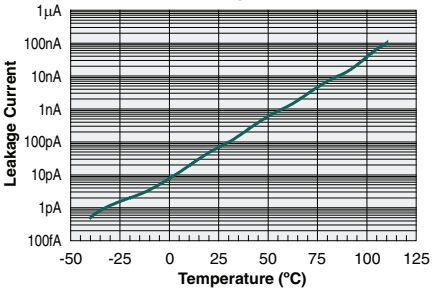
Maximum Continuous Load Current vs. Temperature (I_F=5mA)



Typical Blocking Voltage vs. Temperature



Typical Leakage Current vs. Temperature



*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
PLA172P	MSL 1

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 total dwell time (t_P) in all reflow processes that the body temperature of these surface mount devices may be (T_C - 5)°C or greater. The device's body temperature must not exceed the Classification Temperature at any time during reflow soldering processes.

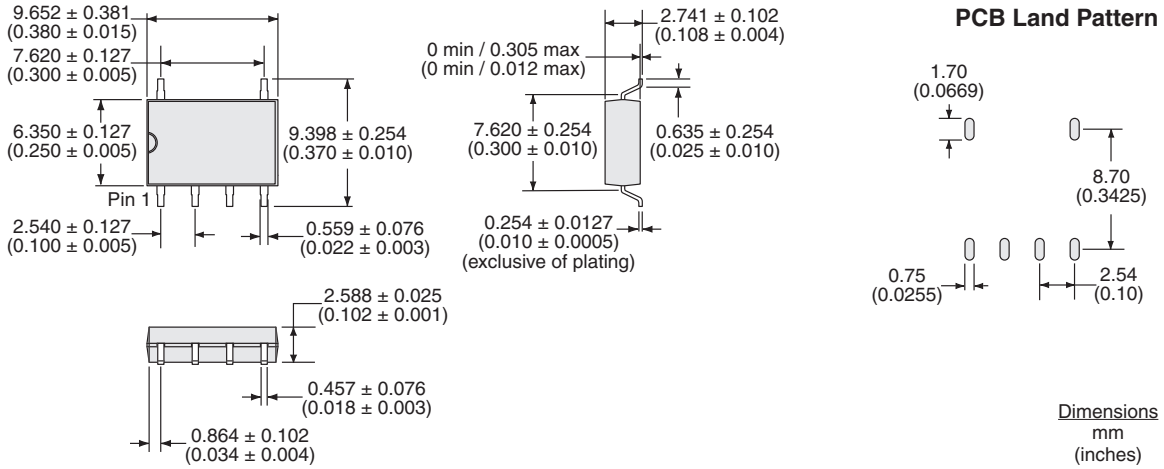
Device	Classification Temperature (T_c)	Dwell Time (t_P)	Max Reflow Cycles
PLA172P	250°C	30 seconds	3

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.

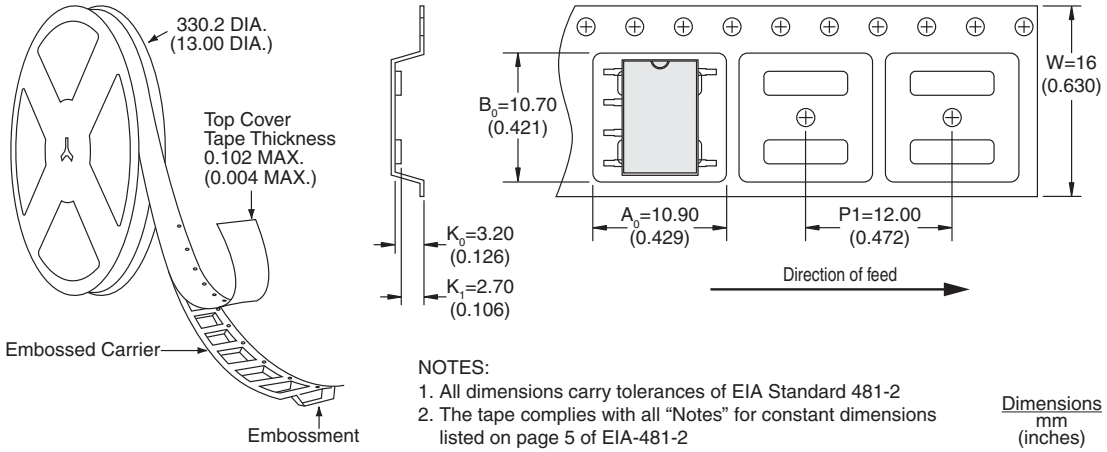
Mechanical Dimensions

PLA172P Package



Dimensions
mm
(inches)

PLA172PTR Tape & Reel



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

Dimensions
mm
(inches)

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

IXYS
A Littelfuse Technology

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