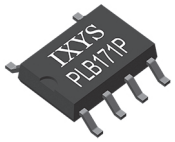
IXYS
INTEGRATED CIRCUITS DIVISION



PLB171
800V, 80mA Single-Pole, Normally Closed Relay

Parameter	Rating	Units
Blocking Voltage	800	V_P
Load Current	80	mA_{rms} / mA_{DC}
On-Resistance (max)	55	Ω
Input Control Current	2	mA

Features

- 7mm Separation of Output Pins
- 800V_P Blocking Voltage
- 5000V_{rms} Input/Output Isolation
- Low Drive Power Requirements
- No EMI/RFI Generation
- Surface Mount Package

Applications

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

Description

Specially designed to provide 7mm of separation between the two output pins, IXYS Integrated Circuits' PLB171 is a single-pole, normally closed (1-Form-B) Solid State Relay that uses optically coupled MOSFET technology to provide an enhanced input-to-output isolation of 5000V_{rms}.

Its optically coupled outputs, which use the patented OptoMOS architecture, are controlled by a highly efficient infrared LED.

The PLB171 is designed to replace, and offers superior reliability over, electromechanical relays. This device provides bounce-free switching in a compact surface-mount package.

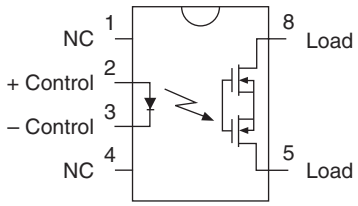
Approvals

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

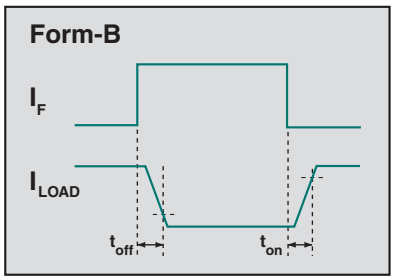
Ordering Information

Part #	Description
PLB171P	6-Pin (8-Pin Body) Flatpack (50/Tube)
PLB171PTR	6-Pin (8-Pin Body) Flatpack, Tape & Reel (1000/Reel)

Pin Configuration



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Blocking Voltage	800	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation [1]	150	mW
Total Power Dissipation [2]	800	mW
ESD, Human Body Model	8	kV
Isolation Voltage, Input to Output (60 Seconds)	5000	V_{rms}
Operational Temperature, Ambient	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 1.33 mW / ºC
[2] 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.

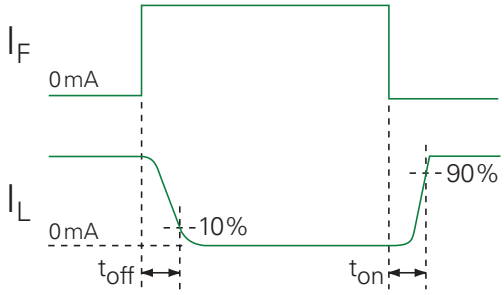
Typical values are characteristic of the device at +25°C, and are the result of engineering evaluations. They are provided for information purposes only, and are not part of the manufacturing testing requirements.

Electrical Characteristics @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Blocking Voltage	I_L=1µA	V_{DRM}	800	-	-	V_P
Load Current						
Continuous [1]	I_F=0mA	I_L	-	-	80	mA_{rms} / mA_{DC}
Peak	I_F=0mA , t=10ms	I_{LPK}	-	-	±250	mA_P
On-Resistance [2]	I_F=0mA, I_L= 10mA	R_{ON}	-	58	90	Ω
	I_F=0mA, I_L= 80mA		-	38	55	
Off-State Leakage Current	I_F=5mA, V_L=800V	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, I_L=80mA (See Timing Diagram)	t_{on}	-	0.42	5	ms
Turn-Off		t_{off}	-	0.5	5	
Output Capacitance	I_F=2mA, V_L=20V_{DC}, f=1MHz	C_{OUT}	-	8	-	pF
Input Characteristics						
Input Control Current to Activate [3]	I_L=80mA	I_F	-	0.2	2	mA
Input Control Current to Deactivate			50	-	-	µA
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						
Input to Output Capacitance	V_{IO}=0, f=1MHz	C_{IO}	-	3	-	pF

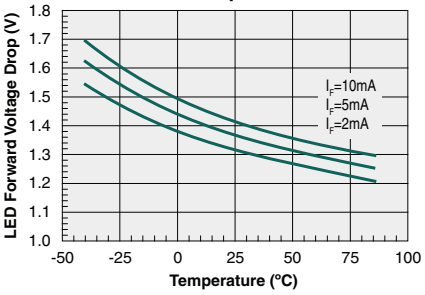
[1] Load derates linearly from 80mA @ 25ºC to 59mA @85ºC.
[2] Measurement taken within one second of on-time.
[3] For applications requiring high temperature operation (greater than 60ºC) a minimum LED drive current of 5mA is recommended.

Timing Diagram

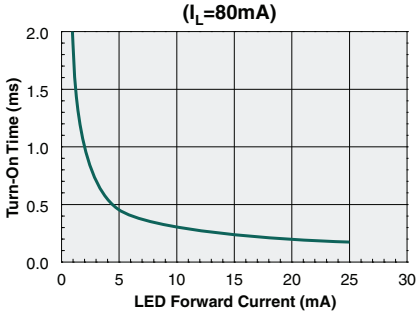


PERFORMANCE DATA*

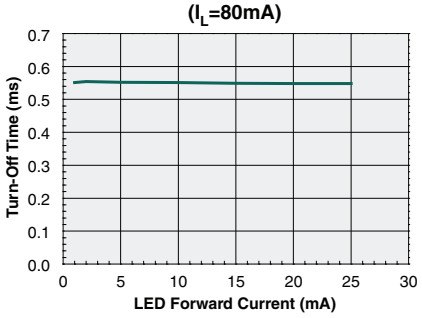
Typical LED Forward Voltage Drop vs. Temperature



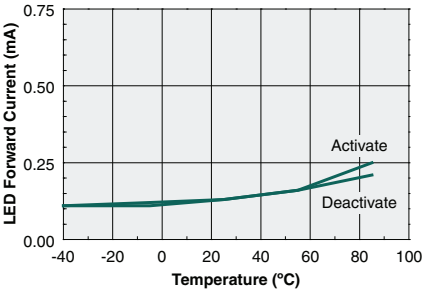
Turn-On Time vs. LED Forward Current (I_L=80mA)



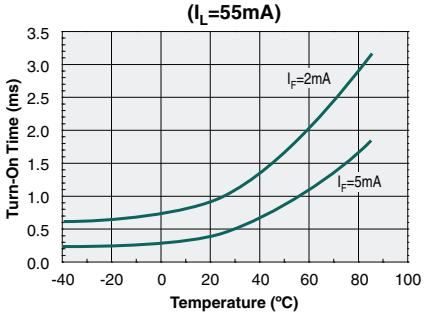
Turn-Off Time vs. LED Forward Current (I_L=80mA)



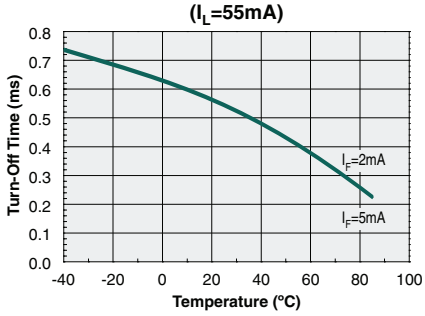
LED Current to Activate vs. Temperature



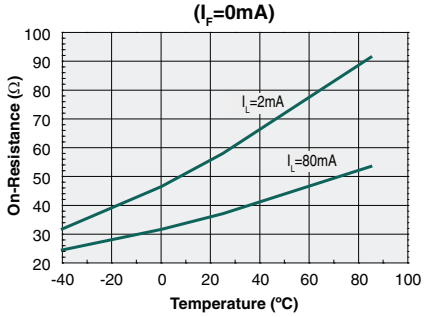
Turn-On Time vs. Temperature (I_L=55mA)



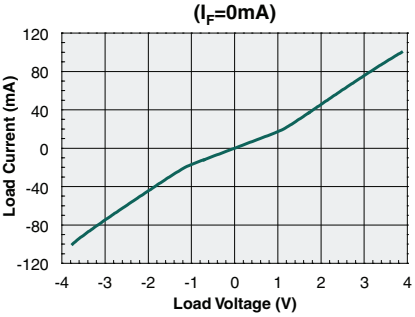
Turn-Off Time vs. Temperature (I_L=55mA)



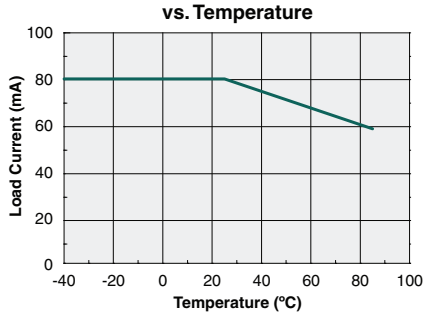
On-Resistance vs. Temperature (I_F=0mA)



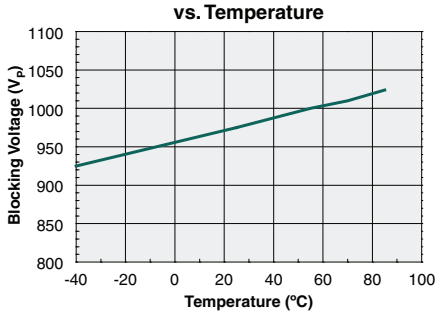
Load Current vs. Load Voltage (I_F=0mA)



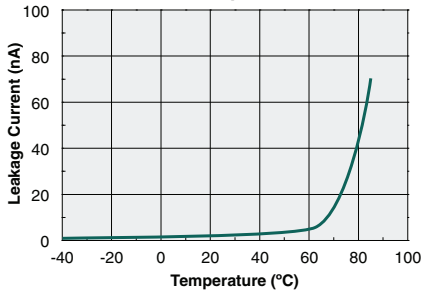
Maximum Load Current vs. Temperature



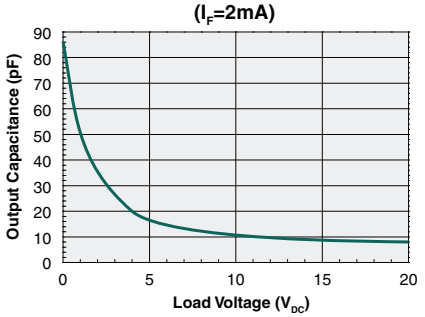
Typical Blocking Voltage vs. Temperature



Typical Leakage Current vs. Temperature



Output Capacitance vs. Load Voltage (I_F=2mA)



*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
PLB171P	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.

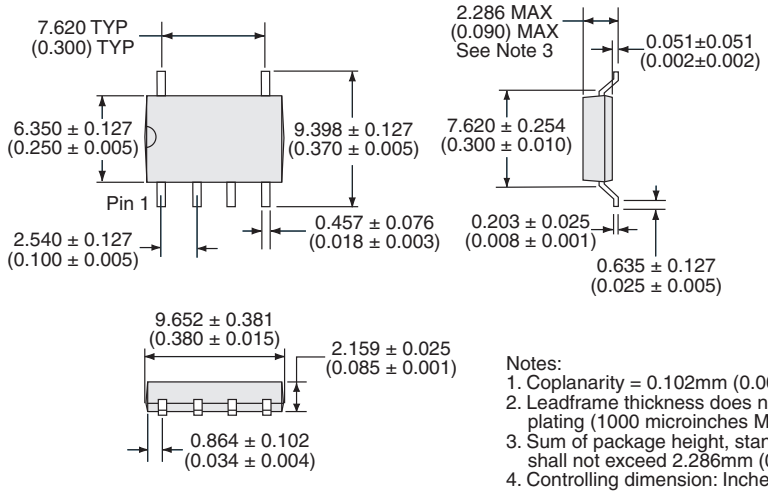
Device	Classification Temperature (T_c)	Dwell Time (t_P)	Max Reflow Cycles
PLB171P	260°C	30 seconds	3

Board Wash

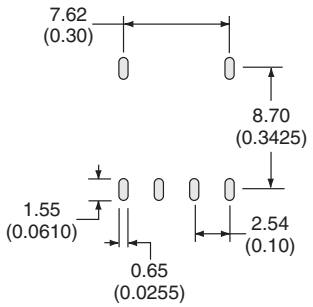
IXYS Integrated Circuits recommends the use of no-clean flux formulations. Board washing to reduce or remove flux residue following the solder reflow process is acceptable provided proper precautions are taken to prevent damage to the device. These precautions include but are not limited to: using a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

PLB171P



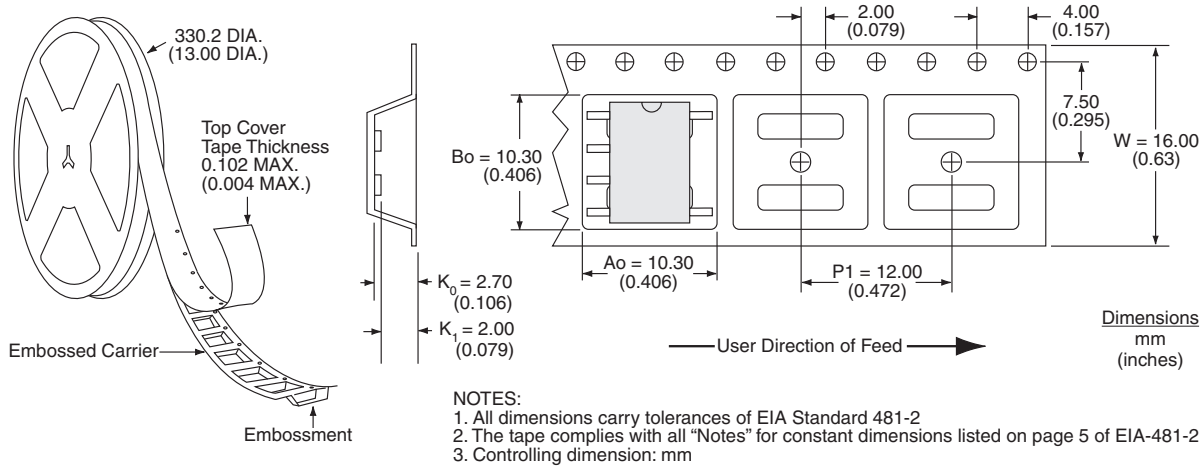
Recommended PCB Land Pattern



Notes:
1. Coplanarity = 0.102mm (0.004") MAX
2. Leadframe thickness does not include solder plating (1000 microinches MAX)
3. Sum of package height, standoff, and coplanarity shall not exceed 2.286mm (0.090")
4. Controlling dimension: Inches

Dimensions
mm
(inches)

PLB171PTR 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-PLB171-R05

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