INTEGRATED CIRCUITS DIVISION

PLA110
Single Pole, Normally Open OptoMOS® Relay

Parameters	Ratings	Units
Blocking Voltage	400	V_P
Load Current	150	mA_{rms} / mA_{DC}
On-Resistance (max)	22	Ω

Features

- $3750V_{rms}$ Input to Output Isolation
- Low Drive Power Requirements
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- FCC Compatible
- VDE Compatible
- Small 6-Pin Package
- Flammability Rating UL 94 V-0

Applications

- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, PocketSize)
  - Hook Switch
  - Dial Pulsing
  - Ground Start
  - Ringing Injection
- Instrumentation
- Multiplexers
- Data Acquisition
- Electronic Switching
- I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

Description

PLA110 is a normally open (1-Form-A) solid state relay that uses optically coupled MOSFET technology to provide $3750V_{rms}$ of input to output isolation. Its optically coupled outputs, which use the patented OptoMOS architecture, are controlled by a highly efficient infrared LED.

The PLA110 can be used to replace mechanical relays, and offers the superior reliability associated with semiconductor devices. Because it has no moving parts, it offers faster, bounce-free switching in a more compact surface mount or thru-hole package.

Approvals

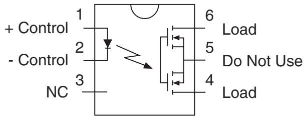
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component: Certificate available on our website

Ordering Information

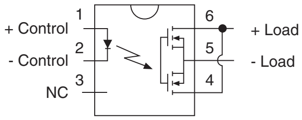
Part #	Description
PLA110	6-Lead DIP (50/Tube)
PLA110S	6-Lead Surface Mount (50/Tube)
PLA110STR	6-Lead Surface Mount (1000/Reel)

Pin Configuration

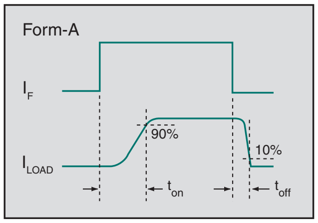
AC/DC Configuration



DC Only Configuration



Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Min	Max	Units
Blocking Voltage	-	400	V_P
Reverse Input Voltage	-	5	V
Input Control Current	-	50	mA
Peak (10ms)	-	1	A
Input Power Dissipation [1]	-	150	mW
Total Package Dissipation [2]	-	800	mW
Isolation Voltage, Input to Output	3750	-	V_{rms}
Operational Temperature	-40	+85	ºC
Storage Temperature	-40	+125	ºC

[1] Derate linearly 1.33 mW / ºC

[2] Derate 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.

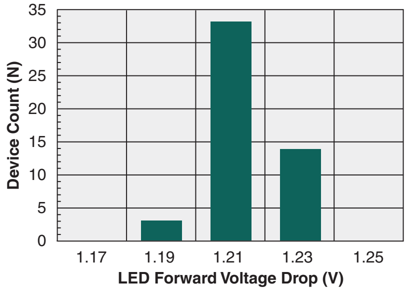
Typical values are characteristic of the device at +25°C, and are the result of engineering evaluations. They are provided for information purposes only, and are not part of the manufacturing testing requirements.

Electrical Characteristics @ 25ºC

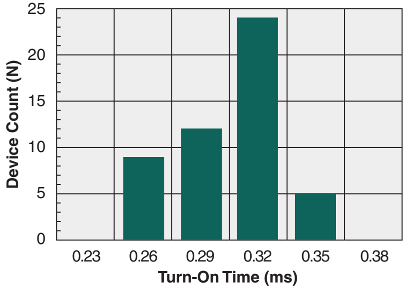
Parameters	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
Continuous, AC/DC Configuration	-	I_L	-	-	150	mA_{rms} / mA_{DC}
Continuous, DC Configuration	-		-	-	250	mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	±400	mA_P
On-Resistance						
AC/DC Configuration	I_L=150mA	R_{ON}	-	-	22	Ω
DC Configuration	I_L=250mA		-	-	7	
Off-State Leakage Current	V_L=400V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	-	1	ms
Turn-Off		t_{off}	-	-	0.5	
Output Capacitance	I_F=0mA, V_L=50V, f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics						
Input Control Current to Activate	I_L=150mA	I_F	-	-	5	mA
Input Control Current to Deactivate	-	I_F	0.4	0.7	-	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						
Input to Output Capacitance	V_{IO}=0V, f=1MHz	C_{IO}	-	3	-	pF

PERFORMANCE DATA*

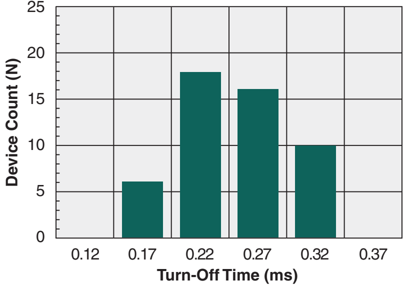
Typical LED Forward Voltage Drop
(N=50, I_F=5mA)



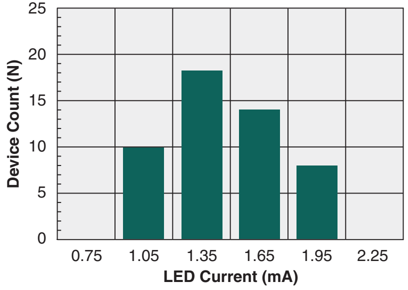
Typical Turn-On Time
(N=50, I_F=5mA, I_L=100mA$_{DC}$)



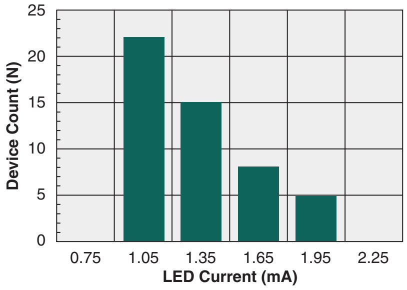
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=100mA$_{DC}$)



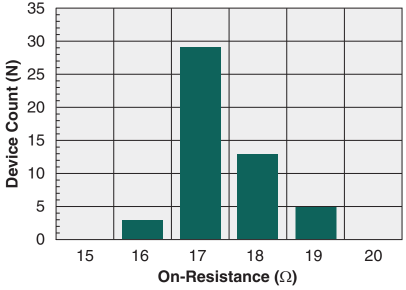
Typical I_F for Switch Operation
(N=50, I_L=150mA$_{DC}$)



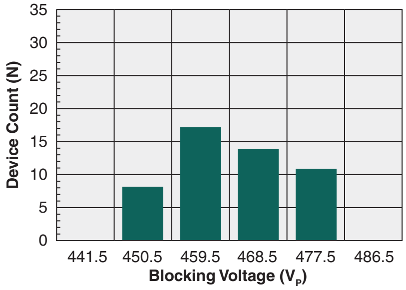
Typical I_F for Switch Dropout
(N=50)



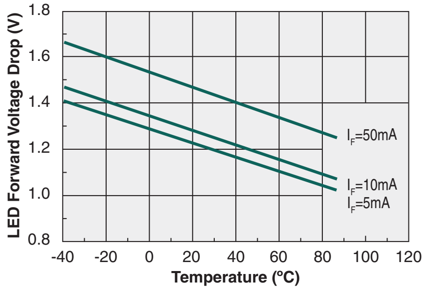
Typical On-Resistance Distribution
(N=50, I_F=5mA, I_L=150mA$_{DC}$)



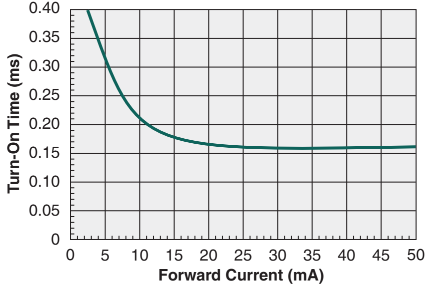
Typical Blocking Voltage Distribution
(N=50)



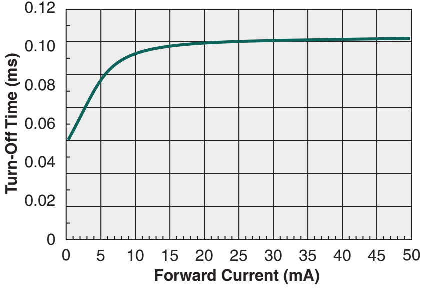
Typical LED Forward Voltage Drop
vs. Temperature



Typical Turn-On Time
vs. LED Forward Current
(I_L=150mA$_{DC}$)



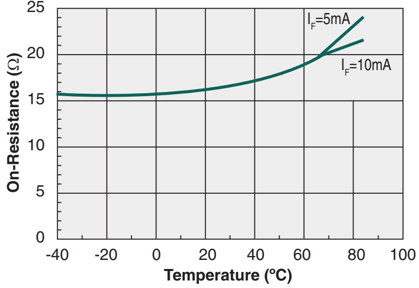
Typical Turn-Off Time
vs. LED Forward Current
(I_L=150mA$_{DC}$)



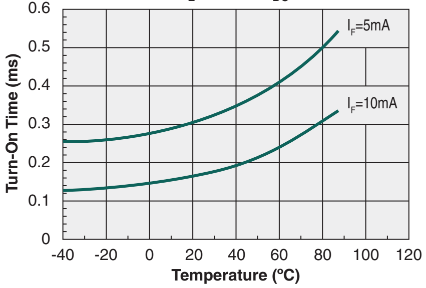
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

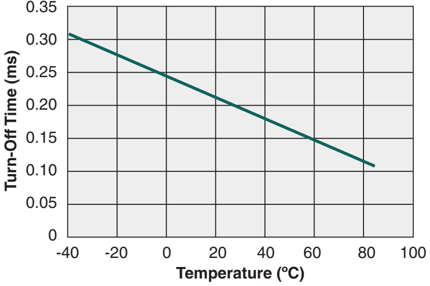
Typical On-Resistance vs. Temperature AC/DC Configuration (I_L=150mA$_{DC}$)



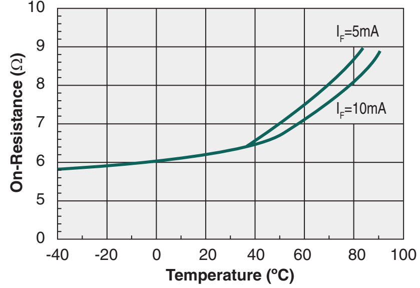
Typical Turn-On Time vs. Temperature (I_L=100mA$_{DC}$)



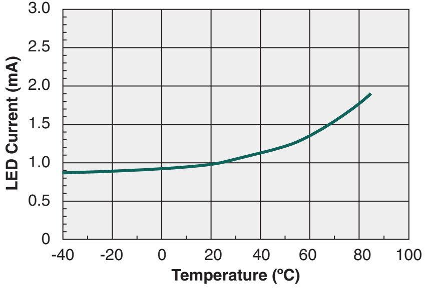
Typical Turn-Off Time vs. Temperature (I_F=5mA, I_L=100mA$_{DC}$)



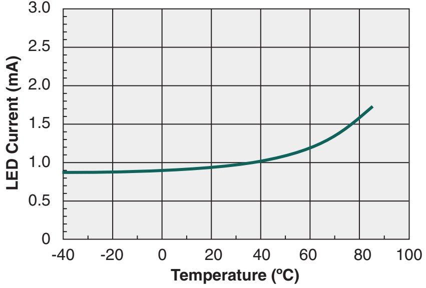
Typical On-Resistance vs. Temperature - DC Configuration (I_L=150mA$_{DC}$)



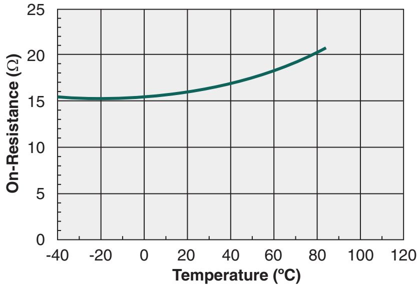
Typical I_F for Switch Operation vs. Temperature (I_L=100mA$_{DC}$)



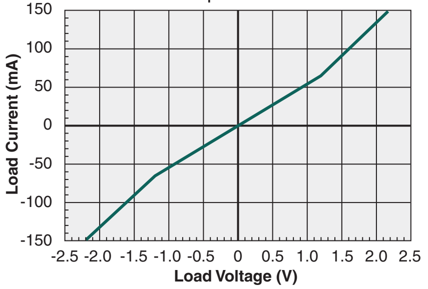
Typical I_F for Switch Dropout vs. Temperature (I_L=100mA$_{DC}$)



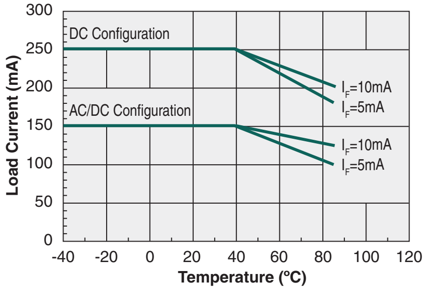
Typical On Resistance vs. Temperature (I_F=5mA; I_L=100mA Instantaneous)



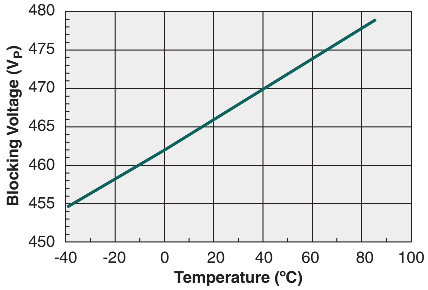
Typical Load Current vs. Load Voltage (I_F=5mA)



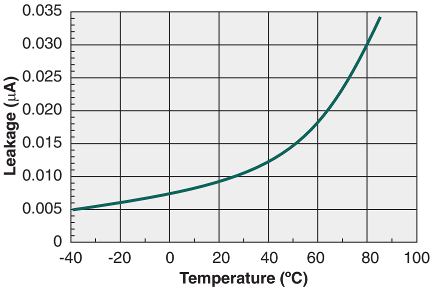
Maximum Load Current vs. Temperature (N=50)



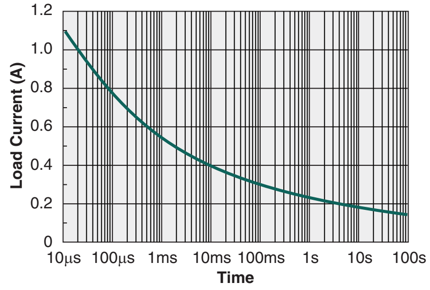
Typical Blocking Voltage vs. Temperature



Typical Leakage vs. Temperature Measured across Pins 4&6



Energy Rating Curve



*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.
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
PLA110 / PLA110S	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 Classification Temperature (T_C) of this product and the maximum dwell time the body temperature of this device may be (T_C - 5)°C 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.

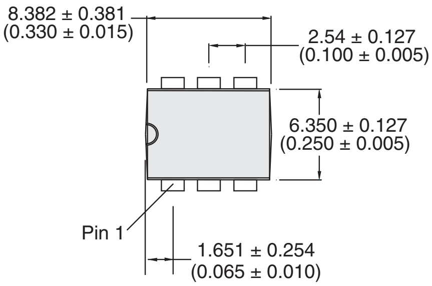
Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
PLA110	250°C	30 seconds	1
PLA110S	250°C	30 seconds	3

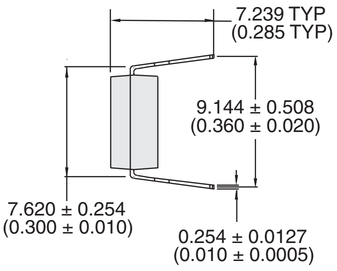
Board Wash

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

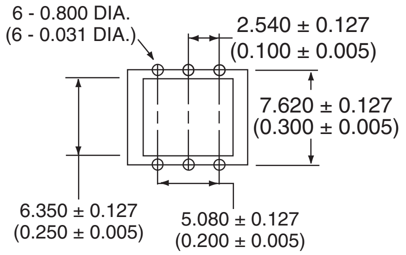
Mechanical Dimensions

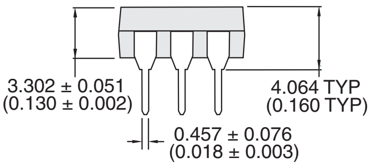
PLA110





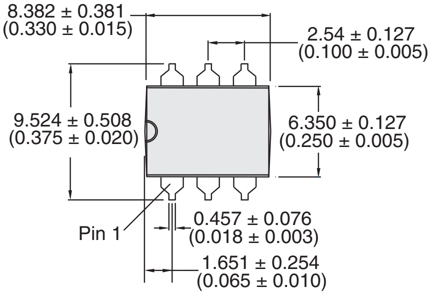
PCB Hole Pattern

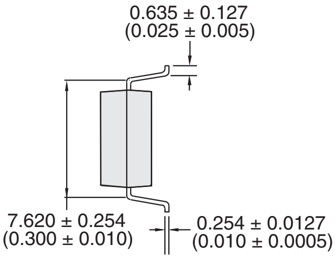




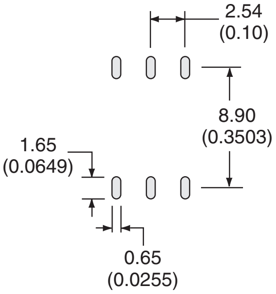
Dimensions
mm
(inches)

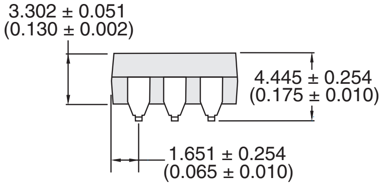
PLA110S





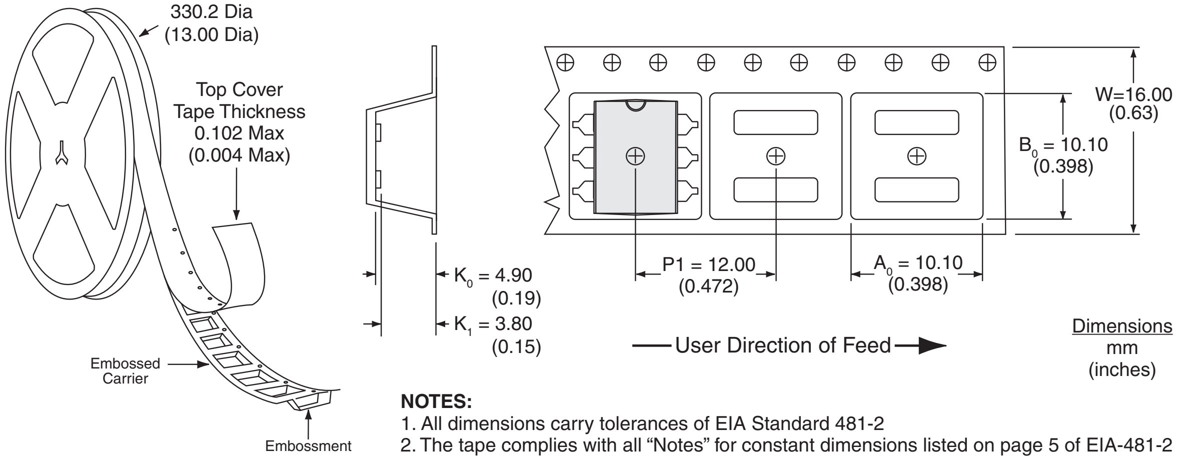
PCB Land Pattern





Dimensions
mm
(inches)

PLA110STR 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

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

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6/27/2018

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