IXYS
INTEGRATED CIRCUITS DIVISION

PLA192
Single Pole, Normally Open OptoMOS® Relay

Parameters	Ratings	Units
Blocking Voltage	600	V_P
Load Current	150	mA_{rms} / mA_{DC}
On-Resistance (max)	22	Ω
LED Current to Operate	5	mA

Features

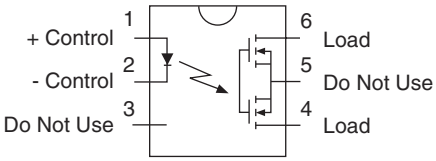
- PLA192E is 100% Tested for Partial Discharge: DIN EN 60747-5-5
- 5000V_{rms} Input/Output Isolation
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Small 6-Pin Package
- Machine Insertable, Wave Solderable

Applications

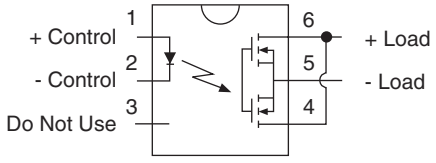
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment: Patient/Equipment Isolation
- Aerospace
- Industrial Controls

Pin Configuration

AC/DC Configuration



DC Only Configuration



Description

IXYS Integrated Circuits Division's PLA192 is a single-pole, normally open (1-Form-A) solid state relay that provides 5000V_{rms} of input to output isolation.

In addition to all the features and benefits of the PLA192, the PLA192E meets the partial discharge demands of DIN EN 60747-5-5 (previously VDE 0884).

All versions of the PLA192 can be used to replace mechanical relays, while offering the superior reliability associated with semiconductor devices. Optically coupled outputs that use the patented OptoMOS architecture are controlled by a highly efficient GaAlAs infrared LED. Because they have no moving parts, they offer bounce-free switching in more compact surface mount or thru-hole packages.

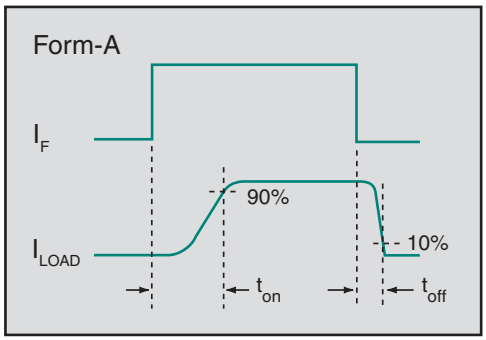
Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component: TUV Certificate B 12 11 82667 002
- DIN EN 60747-5-5 Certified ("E" Suffix Only) VDE Certificate 40036603

Ordering Information

Part #	Description
PLA192E	6-Pin DIP (50/Tube)
PLA192ES	6-Pin Surface Mount (50/Tube)
PLA192ESTR	6-Pin Surface Mount (1000/Reel)
PLA192	6-Pin DIP (50/Tube)
PLA192S	6-Pin Surface Mount (50/Tube)
PLA192STR	6-Pin Surface Mount (1000/Reel)

Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25ºC (Unless Otherwise Noted)

Parameter	Rating	Units
Blocking Voltage	600	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 (60 Seconds)	5000	V_{rms}
ESD Rating, Human Body Model	4	kV
Operational Temperature	-40 to +85	ºC
Storage Temperature	-40 to +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.

Electrical Characteristics @ 25ºC (Unless Otherwise Noted)

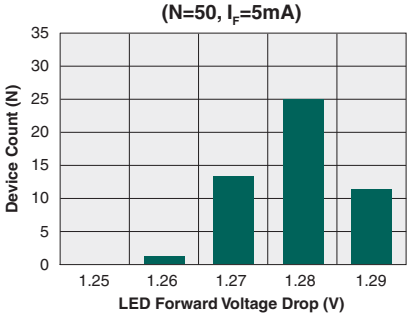
Parameters	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
Continuous, AC/DC Configuration	-	I_L	-	-	150	mA_{rms} / mA_{DC}
Continuous, DC-Only Configuration	-		-	-	220	mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	±400	mA_P
On-Resistance						
AC/DC Configuration	I_L=150mA	R_{ON}	-	13.3	22	Ω
DC-Only Configuration	I_L=220mA		-	4.15	8	
Off-State Leakage Current	V_L=600V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	-	5	ms
Turn-Off		t_{off}	-	-	5	
Output Capacitance	V_L=50V, f=1MHz	C_{OUT}	-	10	-	pF
Input Characteristics						
Input Control Current to Activate	I_L=100mA	I_F	-	0.22	5	mA
Input Control Current to Deactivate	-	I_F	0.1	0.21	-	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						
Input to Output Capacitance	-	$C_{I/O}$	-	3	-	pF

PLA192E Safety and Insulation Ratings

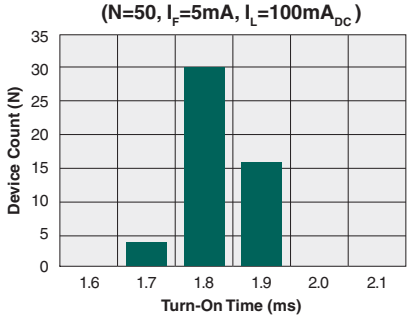
Parameters	Conditions	Symbol	Min	Max	Units
Pollution Degree 2 according to DIN VDE 0109	-	-	-	-	-
Highest Allowable Over-Voltage	Transient Voltage	V_{IOTM}	7071	-	V_P
Maximum Working Insulation Voltage	Recurring Voltage	V_{IORM}	1000	-	V_P
Partial Discharge Test Voltage	DIN EN 60747-5-5 Method B	V_{PR}	-	1875	V_P
Isolation Test Voltage	-	V_{ISO}	-	5000	V_{rms}
Creepage Distance	-	-	7.6	-	mm
Clearance Distance	-	-	7.6	-	mm

PERFORMANCE DATA (@ 25ºC Unless Otherwise Noted)*

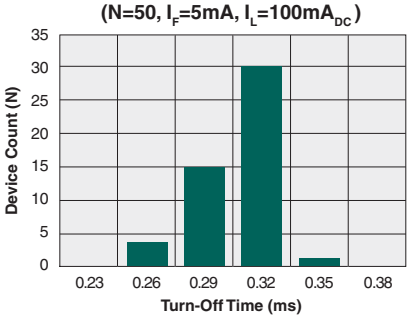
Typical LED Forward Voltage Drop (N=50, I_F=5mA)



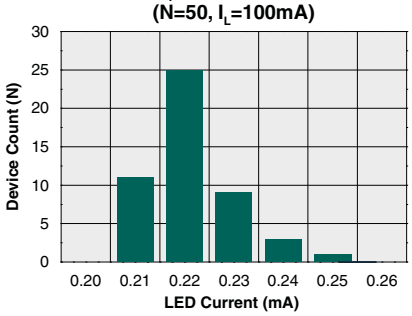
Typical Turn-On Time (N=50, I_F=5mA, I_L=100mA$_{DC}$)



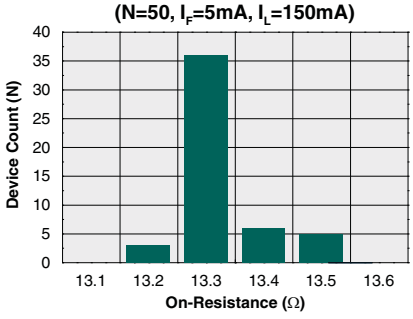
Typical Turn-Off Time (N=50, I_F=5mA, I_L=100mA$_{DC}$)



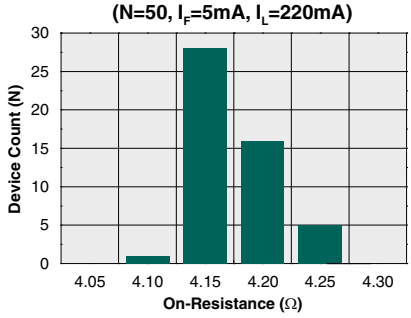
Typical I_F for Switch Operation (N=50, I_L=100mA)



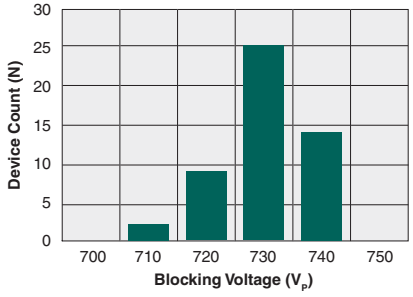
Typical On-Resistance Distribution (N=50, I_F=5mA, I_L=150mA)



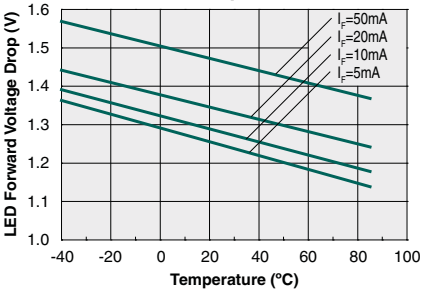
DC-Only On-Resistance Distribution (N=50, I_F=5mA, I_L=220mA)



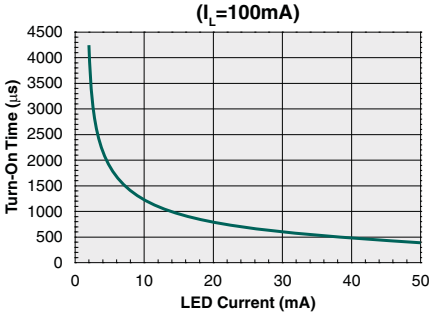
Typical Blocking Voltage Distribution (N=50)



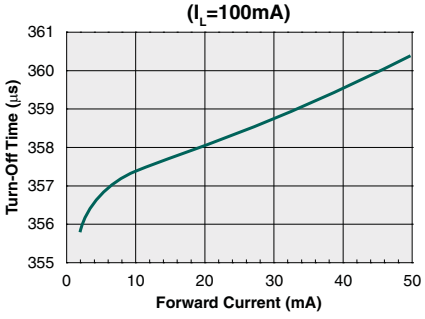
Typical LED Forward Voltage Drop vs. Temperature



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



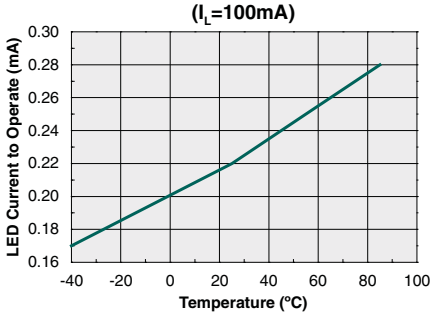
Typical Turn-Off Time vs. LED Forward Current (I_L=100mA)



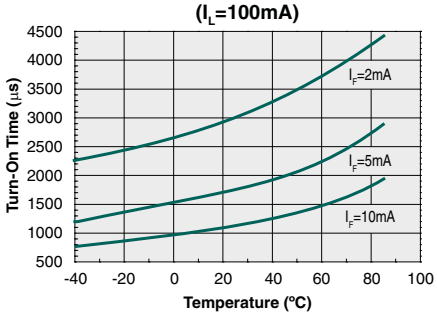
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA (@ 25ºC Unless Otherwise Noted)*

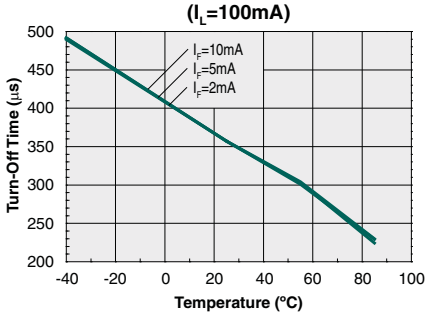
Typical I_F for Switch Operation vs. Temperature (I_L=100mA)



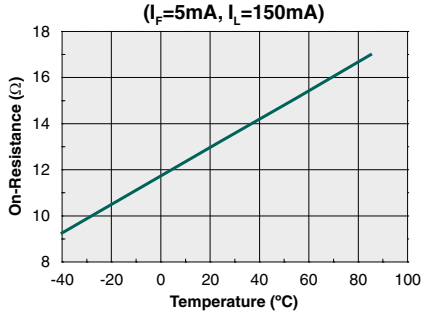
Typical Turn-On Time vs. Temperature (I_L=100mA)



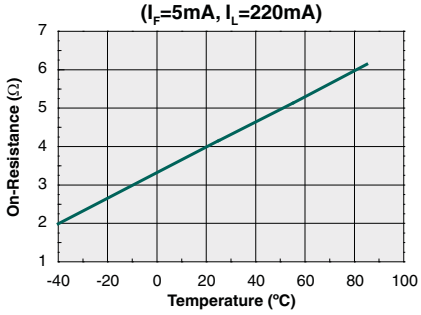
Typical Turn-Off Time vs. Temperature (I_L=100mA)



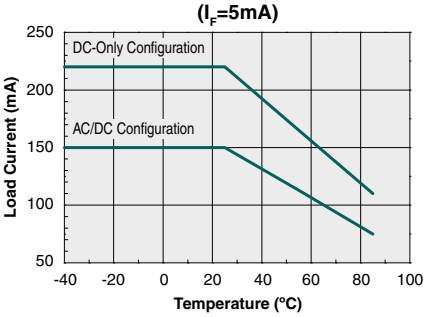
Typical AC/DC On-Resistance vs. Temperature (I_F=5mA, I_L=150mA)



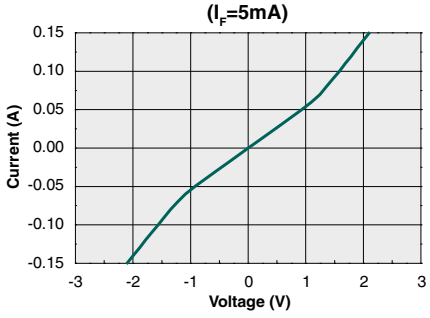
Typical DC-Only On-Resistance vs. Temperature (I_F=5mA, I_L=220mA)



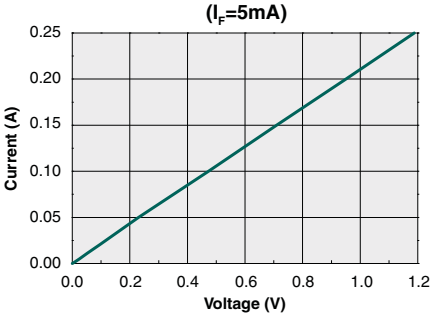
Maximum Load Current vs. Temperature (I_F=5mA)



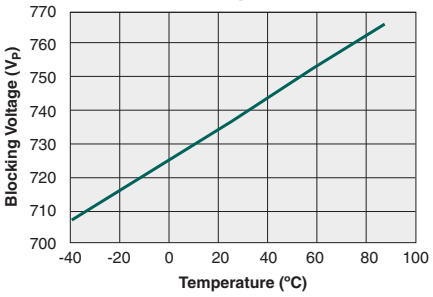
Typical Load Current vs. Load Voltage AC/DC Configuration (I_F=5mA)



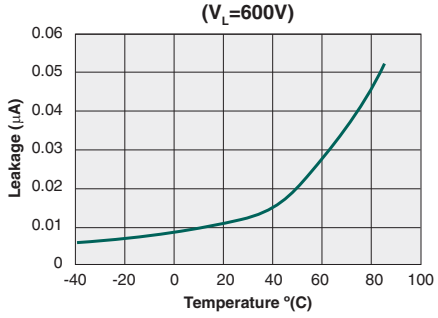
Typical Load Current vs. Load Voltage DC-Only Configuration (I_F=5mA)



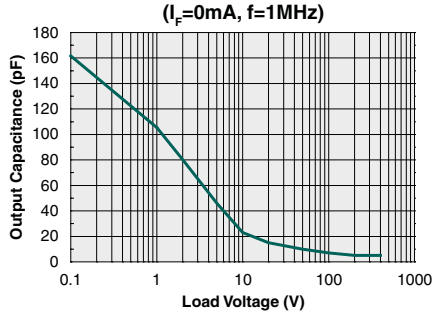
Typical Blocking Voltage vs. Temperature



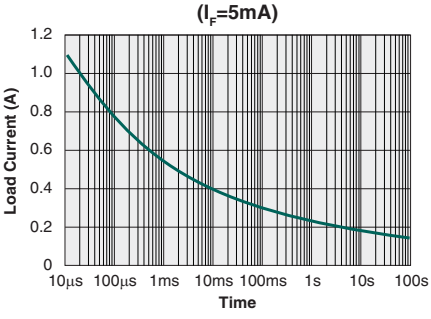
Typical Leakage vs. Temperature Measured across Pins 4&6 (V_L=600V)



Output Capacitance vs. Load Voltage (I_F=0mA, f=1MHz)



Energy Rating Curve (I_F=5mA)



*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
All Versions	MSL 1

ESD Sensitivity

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

Reflow Profile

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

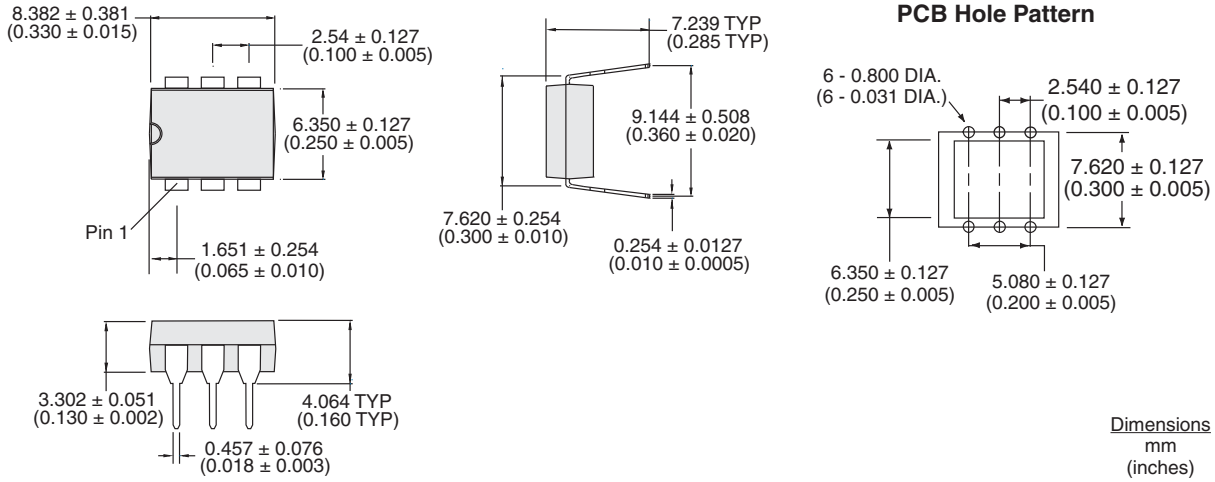
Device	Maximum Temperature x Time
All Versions	250°C for 30 seconds

Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in the standard PLA192 (without the "E" suffix); the use of a short drying bake could be necessary if a wash is used after solder reflow processes. The E-suffix product, being of double-molded construction, does not have the same necessity for a drying bake. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

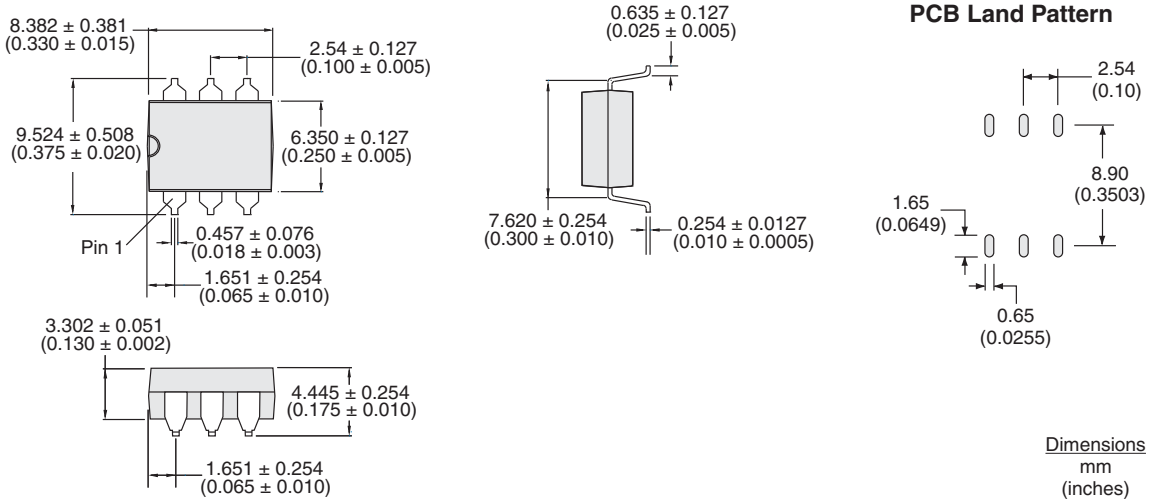
MECHANICAL DIMENSIONS

PLA192 & PLA192E



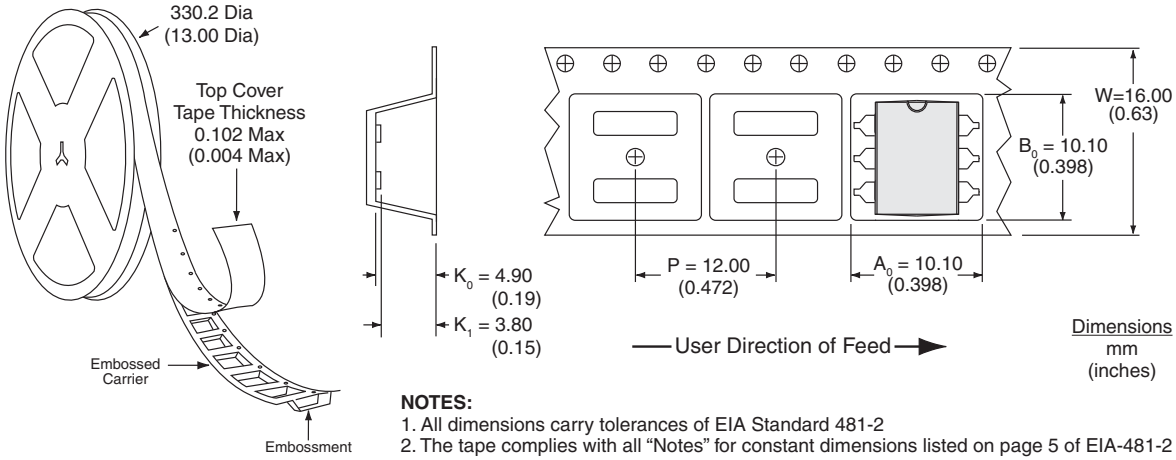
Dimensions
mm
(inches)

PLA192S & PLA192ES



Dimensions
mm
(inches)

PLA192STR & PLA192ESTR 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

Specification: DS-PLA192-R07

2/28/2013