



Parameter	Ratings	Units
Blocking Voltage	250	$V_P$
Load Current	150	$mA_{rms} / mA_{DC}$
On-Resistance (max)	25	$\Omega$

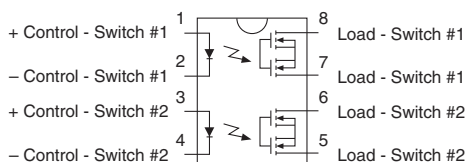
### Features

- Two Current Limited Relays in One Package
- $3750V_{rms}$  Input/Output Isolation
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Small 8-Pin Package
- Machine Insertable, Wave Solderable
- Surface Mount and Tape & Reel Versions Available

### Applications

- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - 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

### Pin Configuration



### Description

LAA120L is a dual normally open (1-Form-A) Solid State Relay that has two independently controlled, optically coupled MOSFET switches with an additional current limiting circuit. The MOSFET switches and photovoltaic die employ optically coupled MOSFET technology to provide  $3750V_{rms}$  of input/output isolation.

The optically coupled outputs, that use patented OptoMOS architecture, are controlled by a highly efficient GaAlAs infrared LED.

This dual switch OptoMOS relay provides a more compact design solution than discrete single-pole relays in a variety of applications and saves board space by incorporating both switches in a single 8-Pin package.

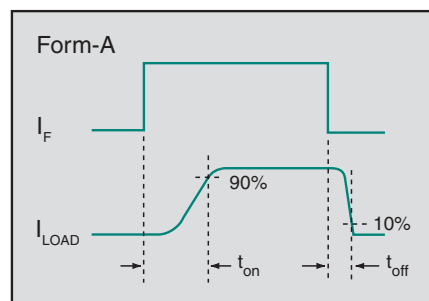
### Approvals

- UL Certified Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component:  
TUV Certificate B 10 05 49410 006

### Ordering Information

Part #	Description
LAA120L	8-Pin DIP (50/Tube)
LAA120LS	8-Pin Surface Mount (50/Tube)
LAA120LSTR	8-Pin Surface Mount (1,000/Reel)
LAA120PL	8-Pin Flat Pack (50/Tube)
LAA120PLTR	8-Pin Flat Pack (1,000/Reel)

Switching Characteristics of  
Normally Open (Form A) Devices



## Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Blocking Voltage	250	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation <sup>1</sup>	150	mW
Total Power Dissipation <sup>2</sup>	800	mW
Isolation Voltage, Input to Output	3750	V <sub>rms</sub>
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

<sup>1</sup> Derate linearly 1.33 mW / °C

<sup>2</sup> Derate linearly 6.67 mW / °C

*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 @ 25°C

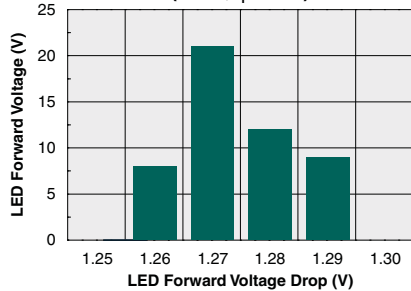
Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics</b>						
Load Current, Continuous <sup>1</sup>	-	I <sub>L</sub>	-	-	150	mA <sub>rms</sub> / mA <sub>DC</sub>
On-Resistance <sup>2</sup>	I <sub>L</sub> =150mA	R <sub>ON</sub>	-	12	25	Ω
Off-State Leakage Current	V <sub>L</sub> =250V <sub>P</sub>	I <sub>LEAK</sub>	-	-	1	μA
Switching Speeds	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	t <sub>on</sub>	-	-	5	ms
Turn-On						
Turn-Off		t <sub>off</sub>	-	-	5	
Output Capacitance	V <sub>L</sub> =50V, f=1MHz	C <sub>OUT</sub>	-	50	-	pF
Load Current Limiting	-	I <sub>CL</sub>	190	235	280	mA
<b>Input Characteristics</b>						
Input Control Current to Activate	I <sub>L</sub> =Load Current	I <sub>F</sub>	-	-	5	mA
Input Control Current to Deactivate	-	-	0.4	0.7	-	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.2	1.4	V
Reverse Input Current	V <sub>R</sub> =5V	I <sub>R</sub>	-	-	10	μA
<b>Common Characteristics</b>						
Input to Output Capacitance	-	C <sub>I/O</sub>	-	3	-	pF

<sup>1</sup> If both poles operate, then the load current must be derated so that it does not exceed the package power dissipation value.

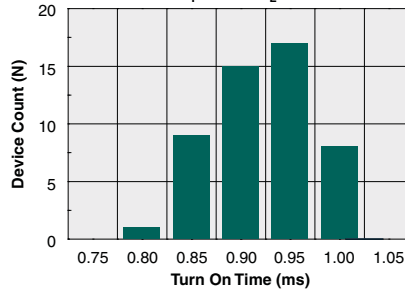
<sup>2</sup> Measurement taken within one second of on-time.

# PERFORMANCE DATA @25°C (Unless Otherwise Noted)\*

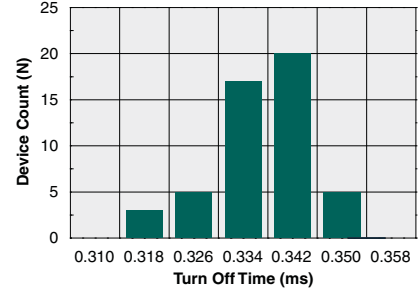
Typical LED Forward Voltage Drop  
(N=50,  $I_F=5\text{mA}$ )



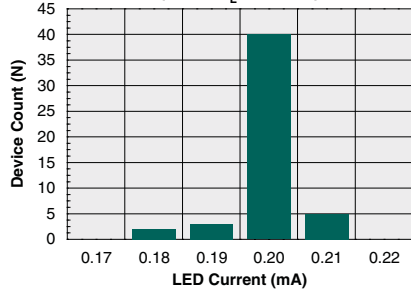
Typical Turn-On Time  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=120\text{mA}$ )



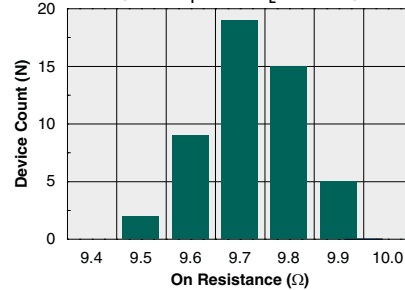
Turn-Off Time  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=120\text{mA}$ )



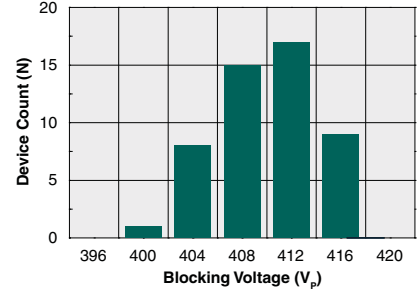
Typical  $I_F$  for Switch Operation  
(N=50,  $I_L=120\text{mA}$ )



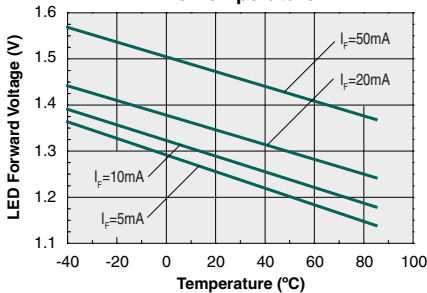
Typical On-Resistance Distribution  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=120\text{mA}$ )



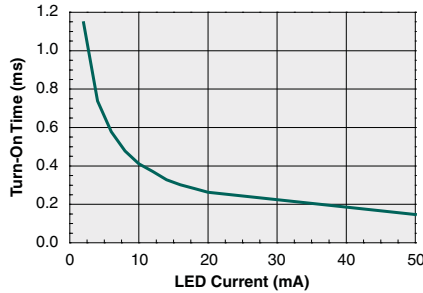
Typical Blocking Voltage Distribution  
(N=50)



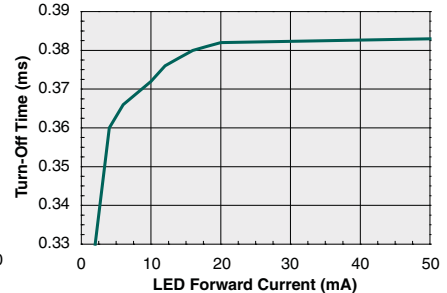
Typical LED Forward Voltage Drop  
vs. Temperature



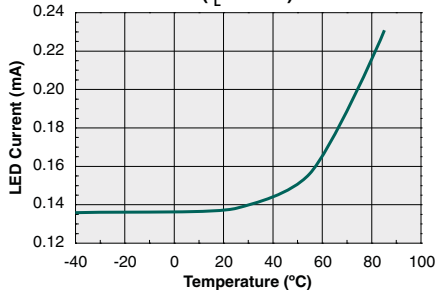
Typical Turn-On Time  
vs. LED Forward Current



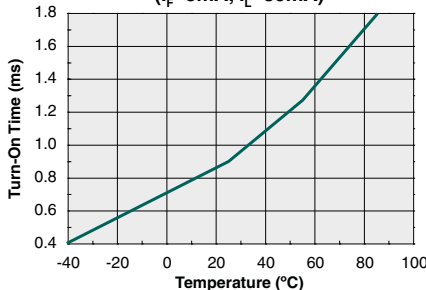
Typical Turn-Off Time  
vs. LED Forward Current



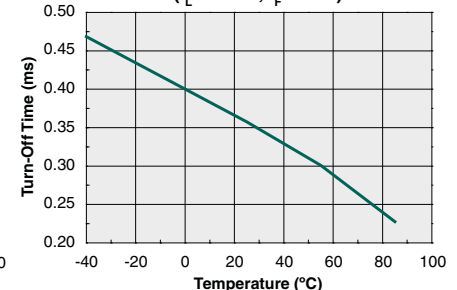
Typical  $I_F$  for Switch Operation  
( $I_L=80\text{mA}$ )



Typical Turn-On Time vs. Temperature  
( $I_F=5\text{mA}$ ,  $I_L=80\text{mA}$ )

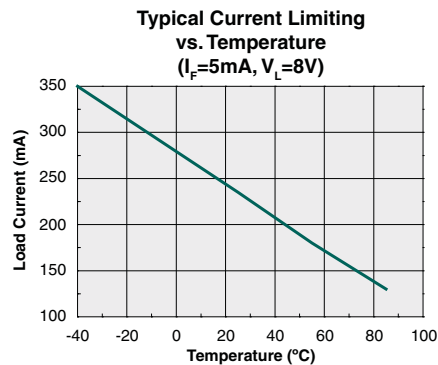
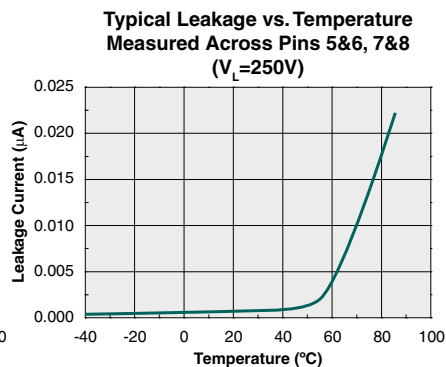
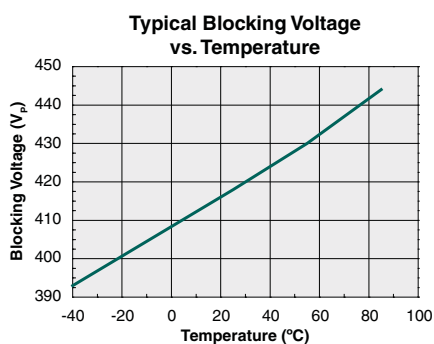
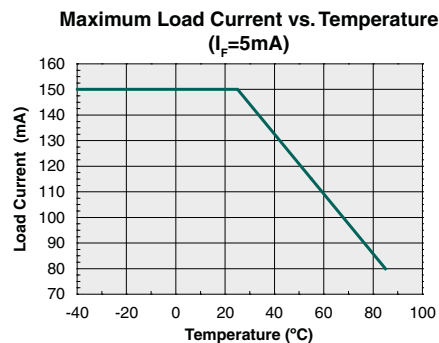
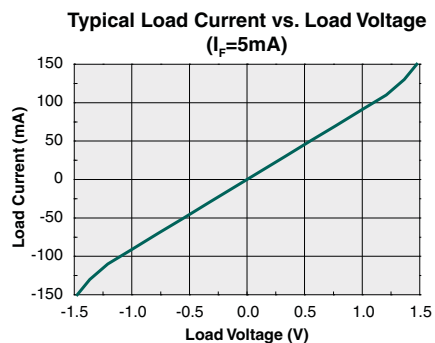
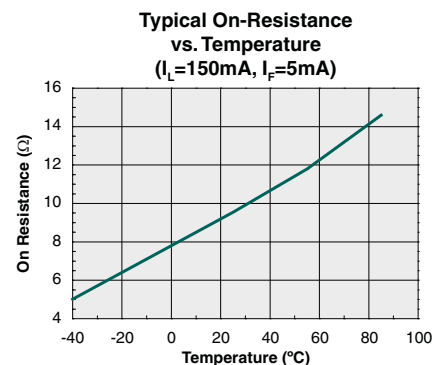


Typical Turn-Off Time vs. Temperature  
( $I_L=80\text{mA}$ ,  $I_F=5\text{mA}$ )



\*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 @25°C (Unless Otherwise Noted)\***



\*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 ingress. 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
LAA120L / LAA120LS / LAA120PL	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
LAA120L / LAA120LS	250°C for 30 seconds
LAA120PL	260°C for 30 seconds

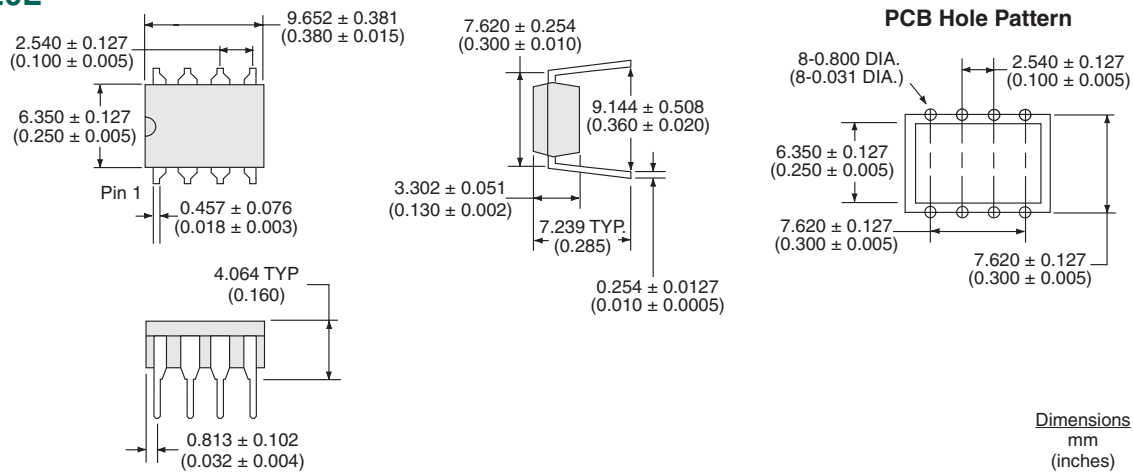
### Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used after solder reflow processes. Chlorine- or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

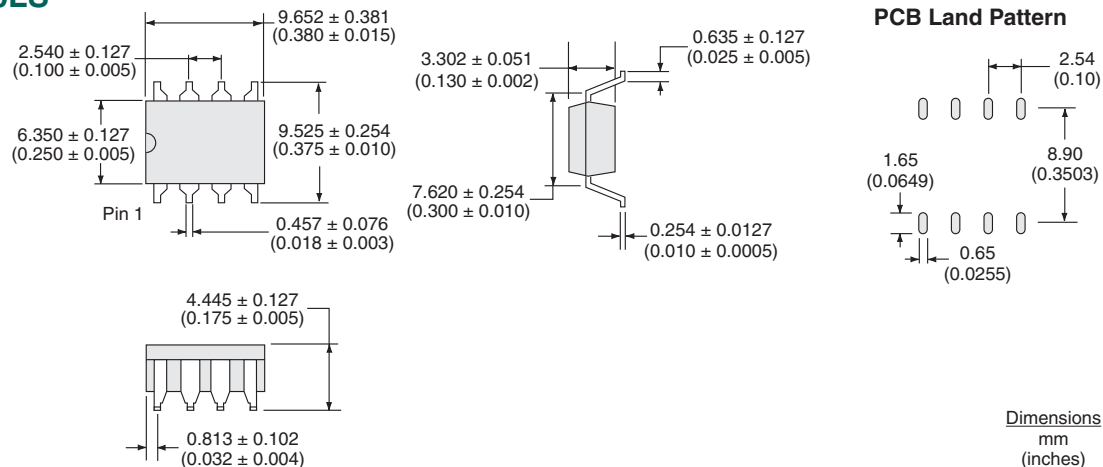


## MECHANICAL DIMENSIONS

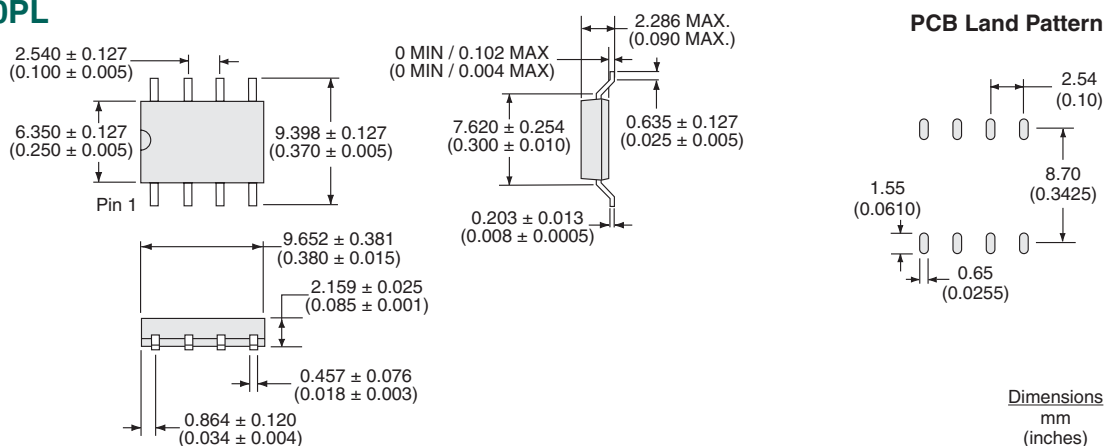
### LAA120L



### LAA120LS

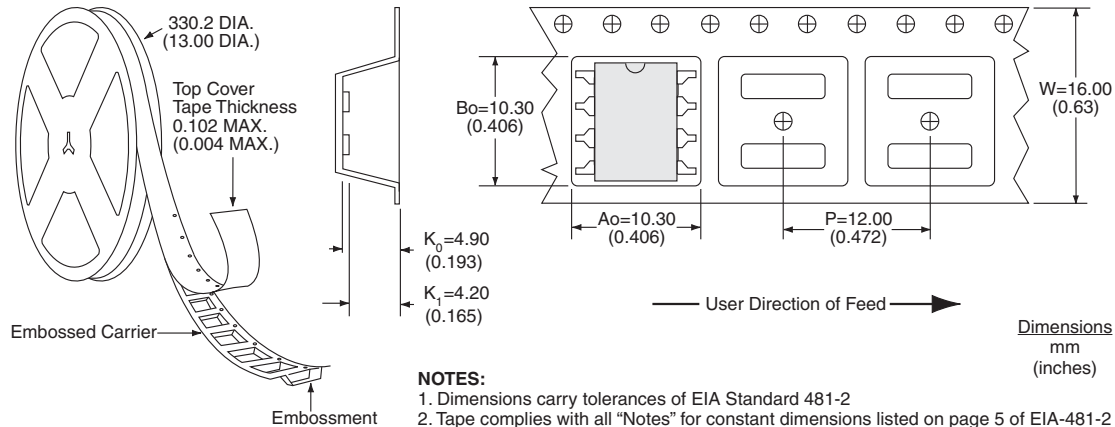


### LAA120PL

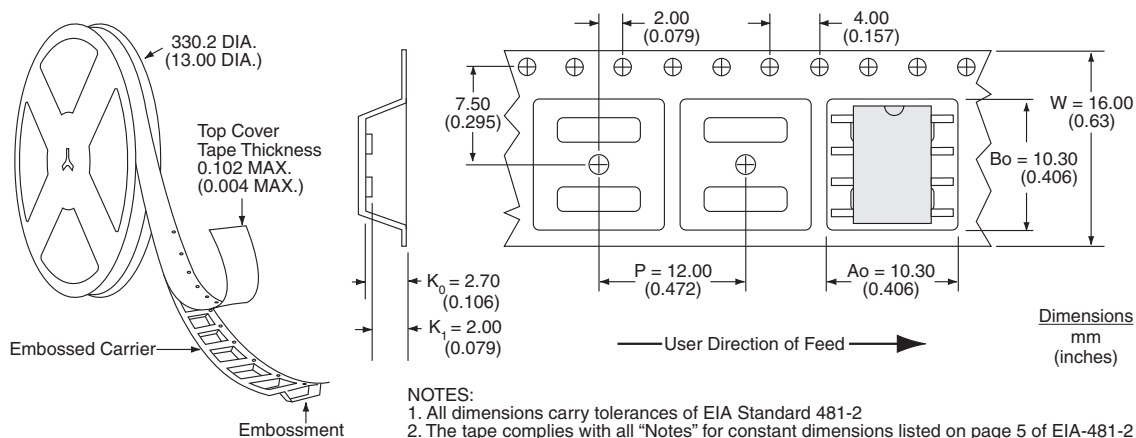


## MECHANICAL DIMENSIONS

### LAA120LSTR Tape & Reel



### LAA120PLTR Tape & Reel



For additional information please visit our website at: [www.ixysic.com](http://www.ixysic.com)

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