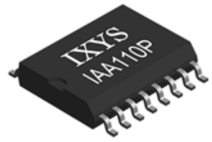


IAA110P
Integrated Telecom Circuits

Parameter	Rating	Units
Blocking Voltage	350	V_P
Load Current	100	mA_{rms} / mA_{DC}
On-Resistance (max)	35	Ω

Features

- 3750V_{rms} Input/Output Isolation
- Three Functions in One Package
- Bidirectional Current Sensing
- Bidirectional Current Switching
- FCC Compatible
- No EMI/RFI Generation
- Small 16-Pin SOIC Package
- Tape & Reel Version 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
- Industrial Controls

Description

The IAA110P Multifunction Telecom switch combines two 350V normally open (1-Form-A) relays and one optocoupler in a single package. The relays use optically coupled MOSFET technology to provide 3750V_{rms} of input to output isolation. The efficient MOSFET switches and photovoltaic die use IXYS Integrated Circuits Division's patented OptoMOS architecture while the inputs' highly efficient infrared LEDs control the outputs. The IAA110P allows telecom circuit designers to combine three discrete functions in a single component that occupies less space than traditional discrete component solutions.

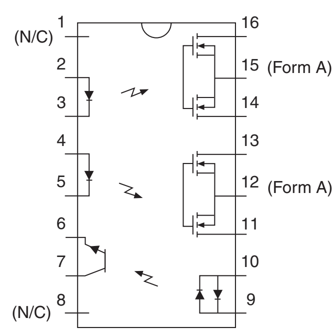
Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1305490
- EN62368-1 Certified Component:
  TUV Certificate: B 082667 0008 Rev 00

Ordering Information

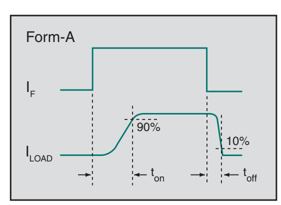
Part #	Description
IAA110P	16-Pin SOIC (50/Tube)
IAA110PTR	16-Pin SOIC (1000/Reel)

Pin Configuration



1. (N/C)
2. + LED - Form A Relay #1
3. – LED - Form A Relay #1
4. + LED - Form A Relay #2
5. – LED - Form A Relay #2
6. Emitter - Phototransistor
7. Collector - Phototransistor
8. (N/C)
9. LED - Phototransistor +/–
10. LED - Phototransistor –/+
11. Output - Form A Relay #2
12. Common Source Relay #2
13. Output - Form A Relay #2
14. Output - Form A Relay #1
15. Common Source Relay #1
16. Output - Form A Relay #1

Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Symbol	Ratings	Units
Input Control Current, Relay	I_F	50	mA
Total Package Dissipation [1]	P_T	1	W
Isolation Voltage, Input to Output	V_{ISO}	3750	V_{rms}
Operational Temperature	T_A	-40 to +85	°C
Storage Temperature	T_{STG}	-40 to +125	°C

[1] Derate linearly 1.67 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: Relay Section

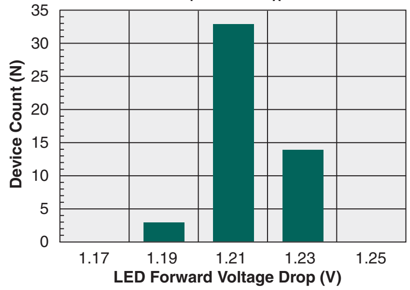
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Blocking Voltage (Peak)	I_L=1µA	V_L	-	-	350	V_P
Load Current						
Continuous	-	I_L	-	-	100	mA_{rms} / mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	350	mA_P
On-Resistance	I_L=100mA	R_{ON}	-	-	35	Ω
Off-State Leakage Current	V_L=350V, T_J=25ºC	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	-	3	ms
Turn-Off		t_{off}	-	-	3	ms
Output Capacitance	V_L=50V, f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics						
Input Control Current to Activate	I_L=100mA	I_F	-	-	5	mA
Input Control Current to Deactivate	I_L=1mA	I_F	0.4	-	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Reverse Input Voltage	-	V_R	-	-	5	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA

Electrical Characteristics @25ºC: Detector Section

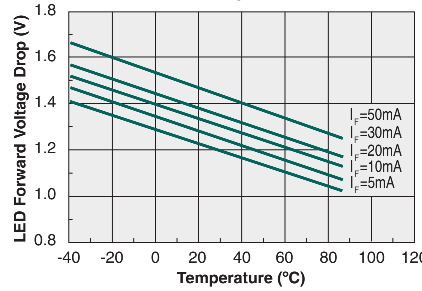
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Phototransistor Blocking Voltage	I_C=10µA	BV_{CEO}	20	50	-	V
Phototransistor Dark Current	V_{CE}=5V, I_F=0mA	I_{CEO}	-	50	500	nA
Saturation Voltage	I_C=2mA, I_F=16mA	V_{SAT}	-	0.3	0.5	V
Current Transfer Ratio	I_F=6mA, V_{CE}=0.5V	CTR	33	-	-	%
Input Characteristics						
Input Control Current	I_C=2mA, V_{CE}=0.5V	I_F	-	2	6	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Input Current (Detector Must be Off)	I_C=1µA, V_{CE}=5V	-	5	25	-	µA
Capacitance, Input to Output	V_L=50V, f=1MHz	$C_{I/O}$	-	3	-	pF
Isolation, Input to Output	-	$V_{I/O}$	3750	-	-	V_{rms}

COMMON PERFORMANCE DATA*

Typical LED Forward Voltage Drop (N=50, I_F=5mA, T_A=25ºC)

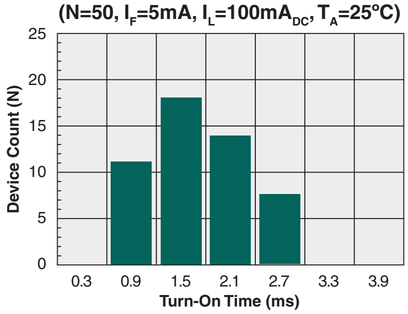


Typical LED Forward Voltage Drop vs. Temperature

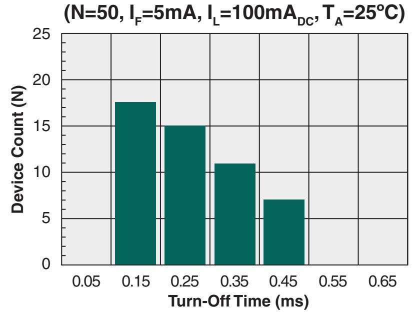


RELAY PERFORMANCE DATA*

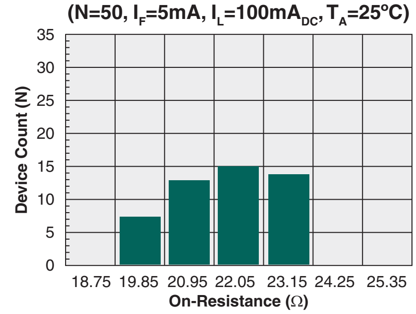
Typical Turn-On Time (N=50, I_F=5mA, I_L=100mA$_{DC}$, T_A=25ºC)



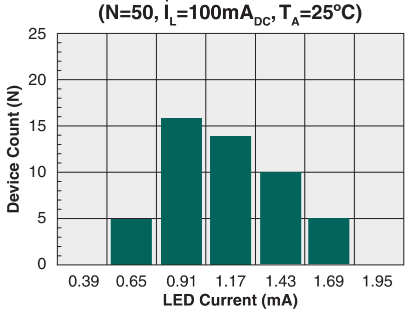
Typical Turn-Off Time (N=50, I_F=5mA, I_L=100mA$_{DC}$, T_A=25ºC)



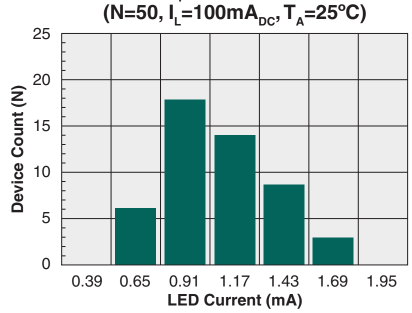
Typical On-Resistance Distribution (N=50, I_F=5mA, I_L=100mA$_{DC}$, T_A=25ºC)



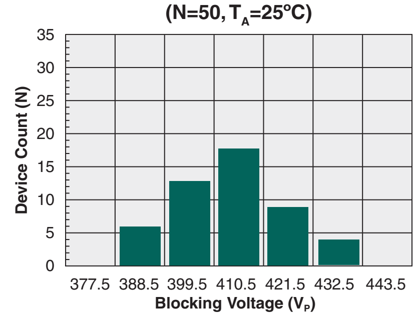
Typical I_F for Switch Operation (N=50, I_L=100mA$_{DC}$, T_A=25ºC)



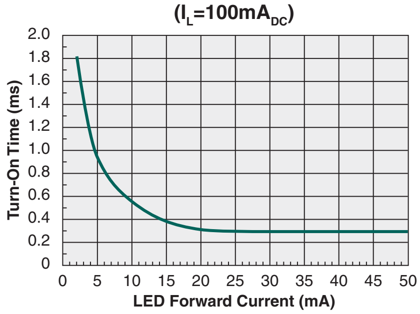
Typical I_F for Switch Dropout (N=50, I_L=100mA$_{DC}$, T_A=25ºC)



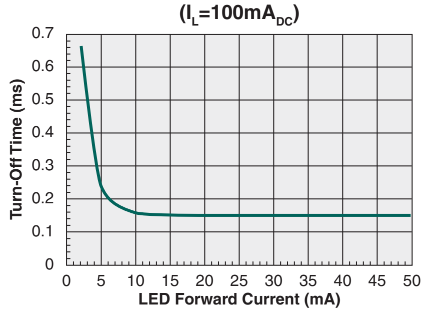
Typical Blocking Voltage Distribution (N=50, T_A=25ºC)



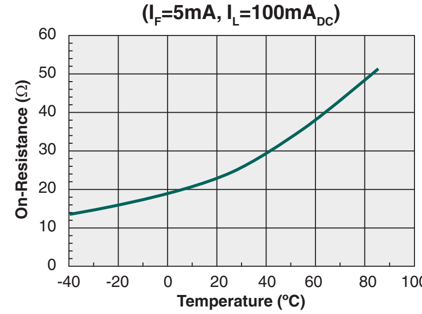
Typical Turn-On Time vs. LED Forward Current (I_L=100mA$_{DC}$)



Typical Turn-Off Time vs. LED Forward Current (I_L=100mA$_{DC}$)



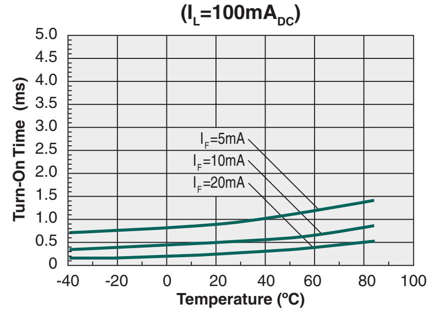
Typical On-Resistance vs. Temperature (I_F=5mA, I_L=100mA$_{DC}$)



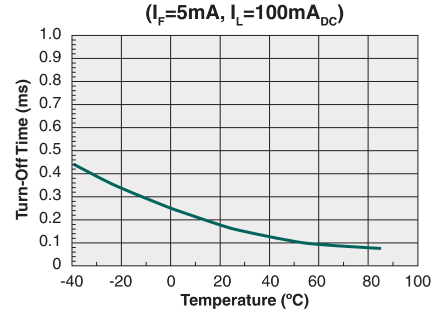
* Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.

RELAY PERFORMANCE DATA (cont.)*

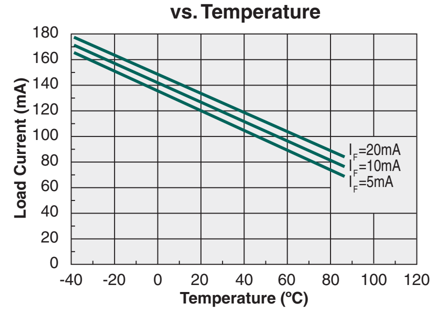
Typical Turn-On Time vs. Temperature (I_L=100mA$_{DC}$)



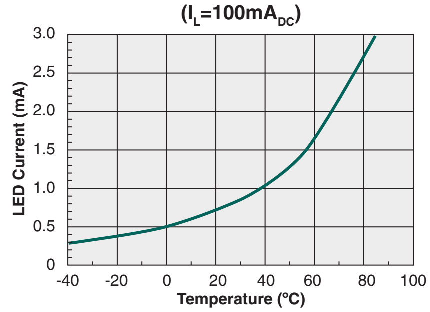
Typical Turn-Off Time vs. Temperature (I_F=5mA, I_L=100mA$_{DC}$)



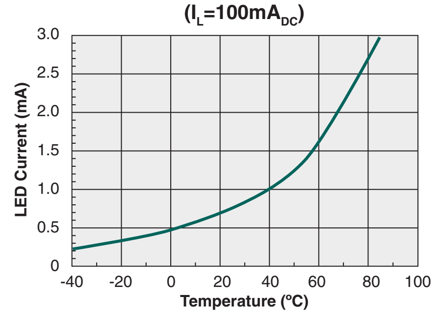
Maximum Load Current vs. Temperature



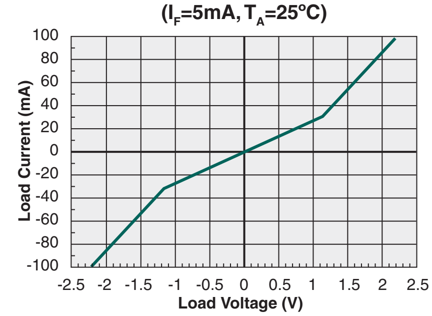
Typical I_F for Switch Operation vs. Temperature (I_L=100mA$_{DC}$)



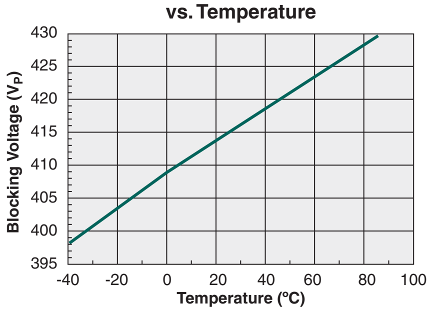
Typical I_F for Switch Dropout vs. Temperature (I_L=100mA$_{DC}$)



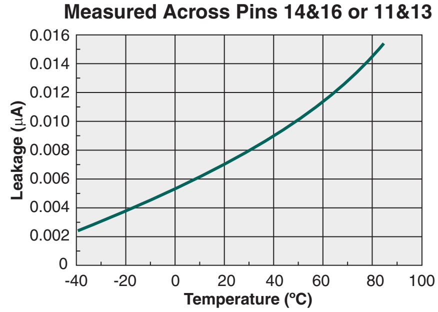
Typical Load Current vs. Load Voltage (I_F=5mA, T_A=25ºC)



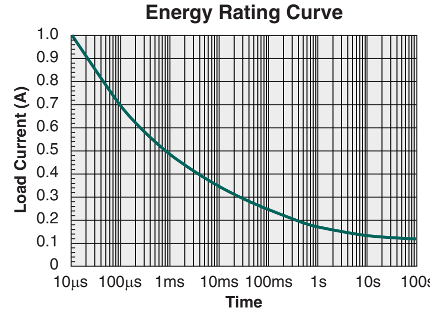
Typical Blocking Voltage vs. Temperature



Typical Leakage vs. Temperature Measured Across Pins 14&16 or 11&13

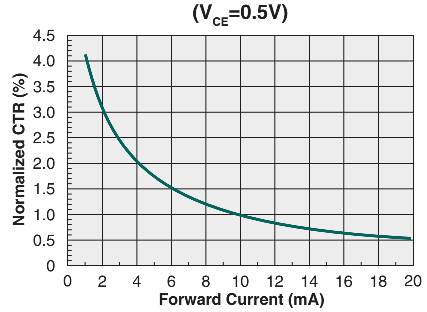


Energy Rating Curve

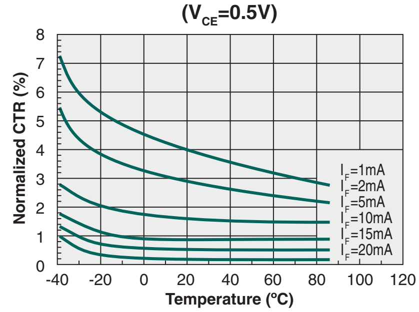


DETECTOR PERFORMANCE DATA*

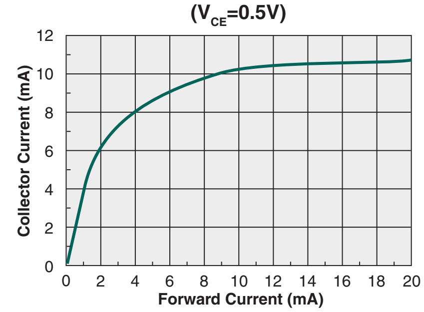
Typical Normalized CTR vs. Forward Current (V_{CE}=0.5V)



Typical Normalized CTR vs. Temperature (V_{CE}=0.5V)



Typical Collector Current vs. Forward Current (V_{CE}=0.5V)



* 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
IAA110P	MSL 3

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 dwell time the body temperature of these surface mount devices may be (T_C - 5)°C or greater. The Classification Temperature sets the Maximum Body Temperature allowed for these devices during reflow soldering processes.

Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
IAA110P	245°C	30 seconds	3

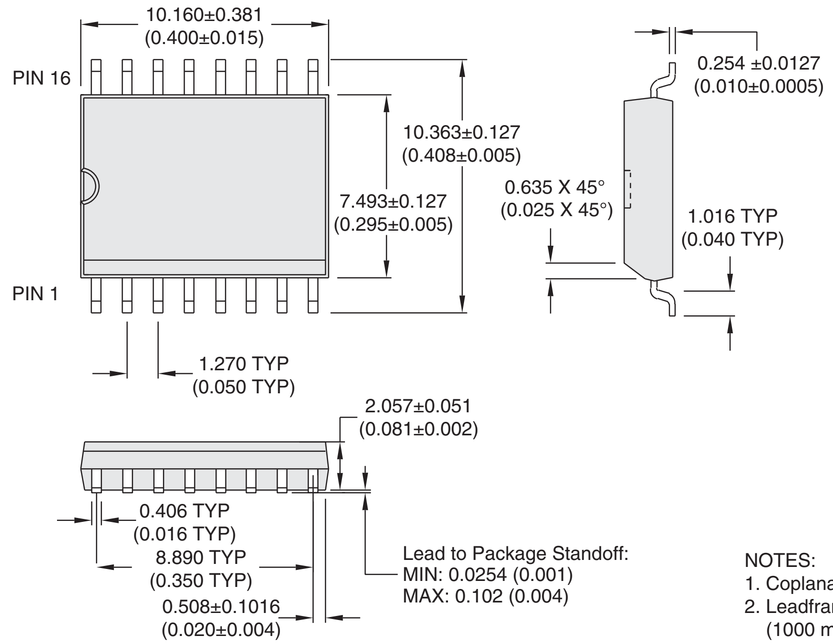
Board Wash

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.

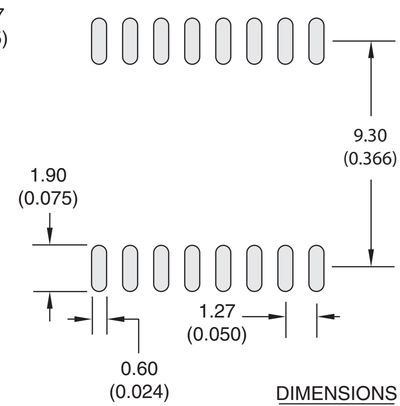
Pb RoHS e3

MECHANICAL DIMENSIONS

IAA110P



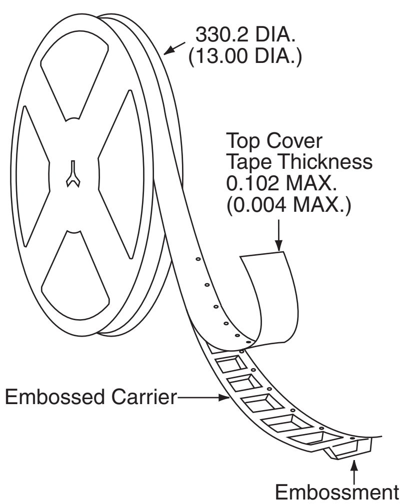
PCB Land Pattern

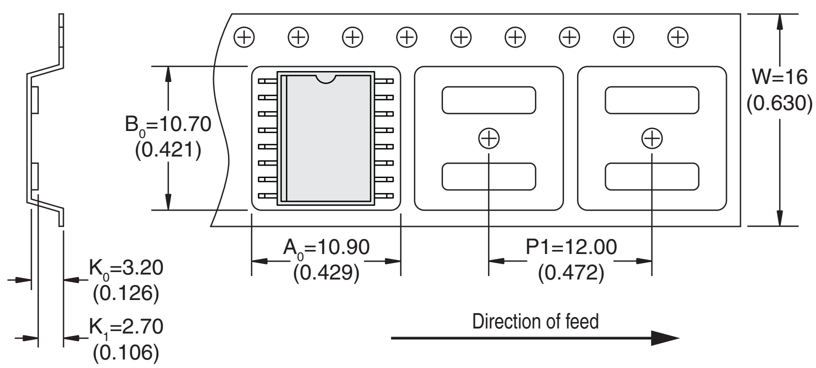


DIMENSIONS
mm
(inches)

NOTES:
1. Coplanarity = 0.1016 (0.004) max.
2. Leadframe thickness does not include solder plating (1000 microinch maximum).

IAA110PTR 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

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at https://www.littelfuse.com/disclaimer-electronics.

Specification: DS-IAA110P_R07

11/16/2020