



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
- Bidirectional Current Sensing
- Bidirectional Current Switching
- Replaces up to Three or Four Components
- Three Functions in One Package
- Small 16-Pin SOIC Package (PCMCIA Compatible)
- FCC Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- 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

Description

The IAD110P Multifunction Telecom switch combines a 350V normally open (1-Form-A) relay and two optocouplers in a single package. The relay uses optically coupled MOSFET technology to provide 3750V_{rms} of input to output isolation. The efficient MOSFET switch and photovoltaic die use IXYS Integrated Circuits Division's patented OptoMOS® architecture. The optically coupled output is controlled by highly efficient GaAIAs infrared LEDs. The IAD110P enables telecom circuit designers to combine three discrete functions in a single component that uses less space than traditional discrete component solutions.

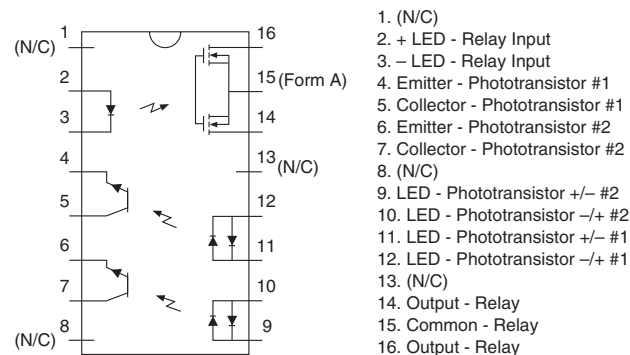
Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1305490
- EN/IEC 60950-1 Certified Component:
TUV Certificate: B 12 11 82667 002

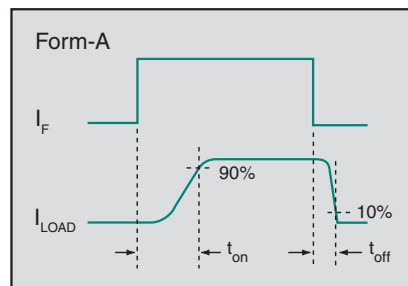
Ordering Information

Part #	Description
IAD110P	16-Pin SOIC (50/Tube)
IAD110PTR	16-Pin SOIC (1000/Reel)

Pin Configuration



Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Input Control Current, Relay	50	mA
Total Package Dissipation ¹	1	W
Isolation Voltage, Input to Output	3750	V _{rms}
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

¹ Derate linearly 1.67 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: Relay Section

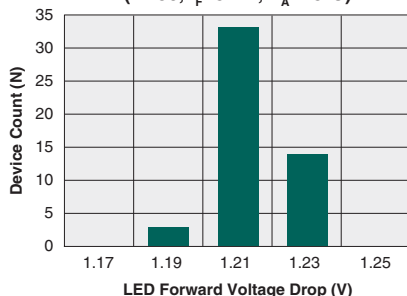
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Blocking Voltage (Peak)	I _L =1μA	V _L	-	-	350	V _P
Load Current						
Continuous	-	I _L	-	-	100	mA _{rms} / mA _{DC}
Peak	t=10ms	I _{LPK}	-	-	350	mA _P
On-Resistance	I _L =100mA	R _{ON}	-	-	35	Ω
Off-State Leakage Current	V _L =350V, T _J =25°C	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 @25°C: Detector Section

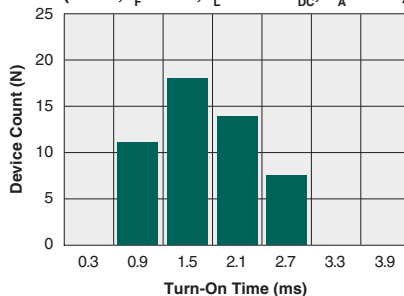
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Phototransistor Blocking Voltage	I _C =10μA	BV _{CEO}	20	50	-	V
Phototransistor Dark Current	V _{CE} =5V, I _F =0mA	I _{CEO}	-	50	500	nA
Saturation Voltage	I _C =2mA, I _F =16mA	V _{SAT}	-	0.3	0.5	V
Current Transfer Ratio	I _F =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 _{IO}	-	3	-	pF
Isolation, Input to Output	-	V _{IO}	3750	-	-	V _{rms}

RELAY PERFORMANCE DATA*

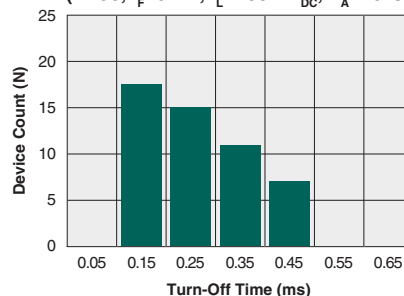
Typical LED Forward Voltage Drop
(N=50, $I_F=5\text{mA}$, $T_A=25^\circ\text{C}$)



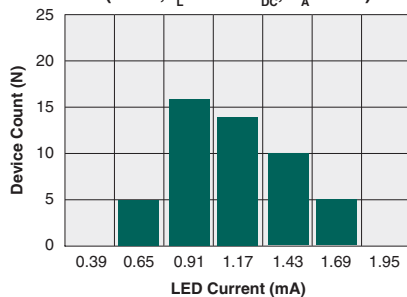
Typical Turn-On Time
(N=50, $I_F=5\text{mA}$, $I_L=100\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



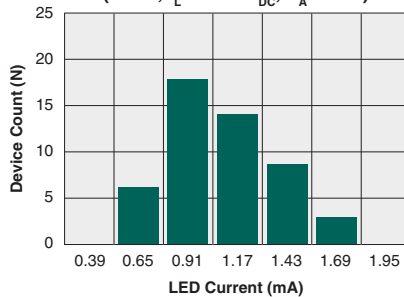
Typical Turn-Off Time
(N=50, $I_F=5\text{mA}$, $I_L=100\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



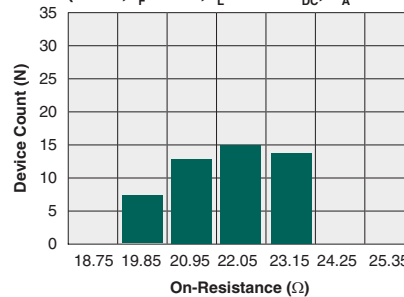
Typical I_F for Switch Operation
(N=50, $I_L=100\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



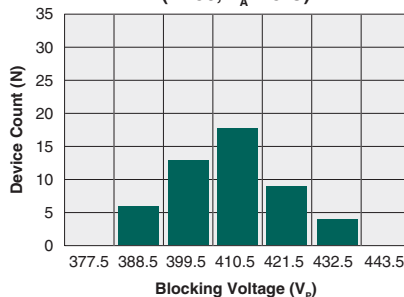
Typical I_F for Switch Dropout
(N=50, $I_L=100\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



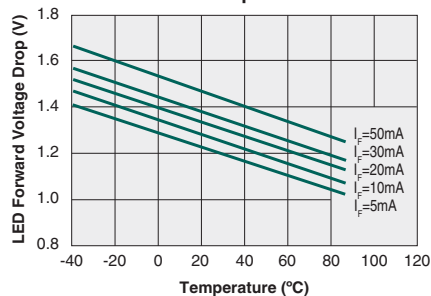
Typical On-Resistance Distribution
(N=50, $I_F=5\text{mA}$, $I_L=100\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



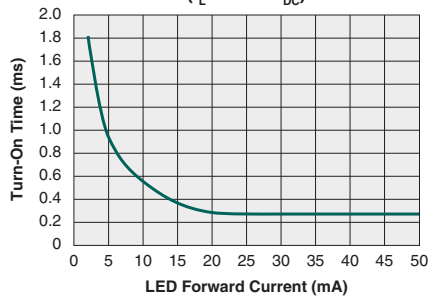
Typical Blocking Voltage Distribution
(N=50, $T_A=25^\circ\text{C}$)



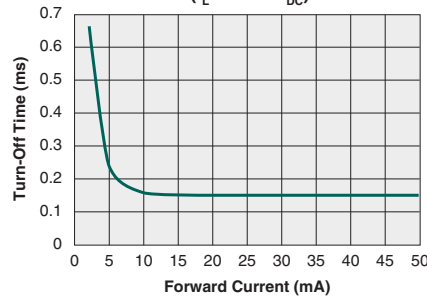
Typical LED Forward Voltage Drop
vs. Temperature



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

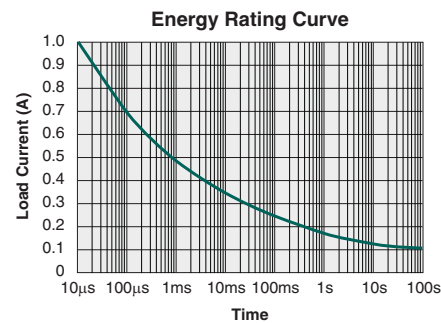
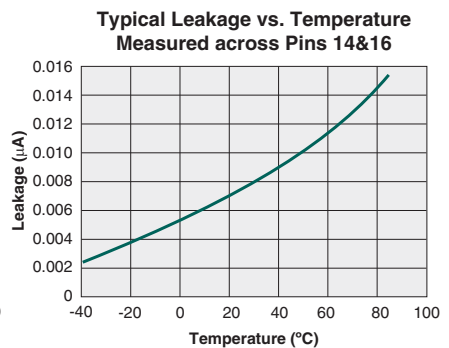
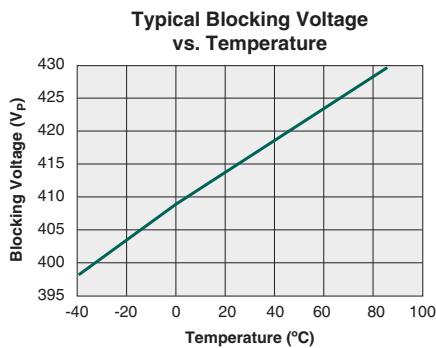
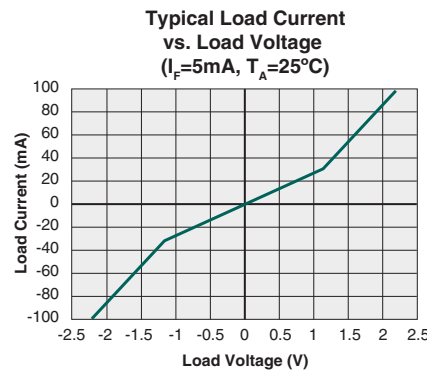
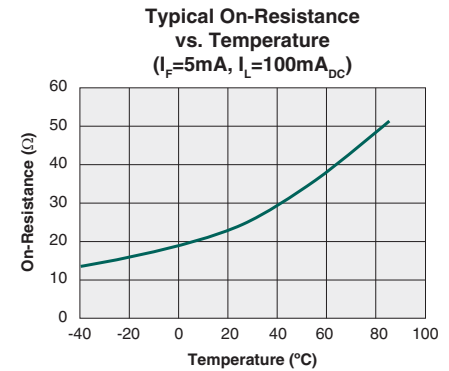
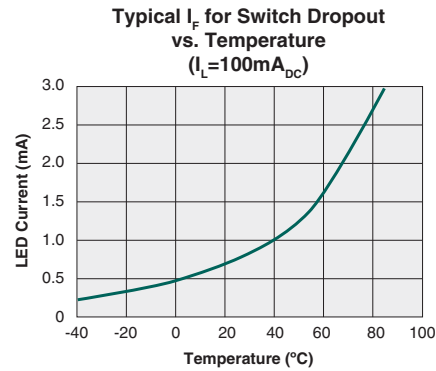
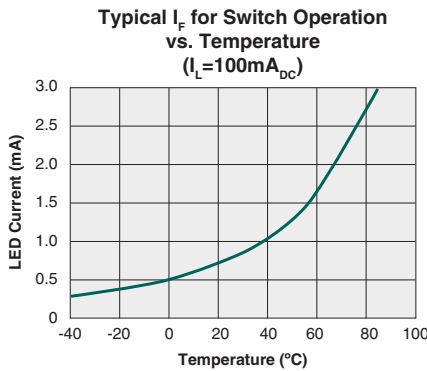
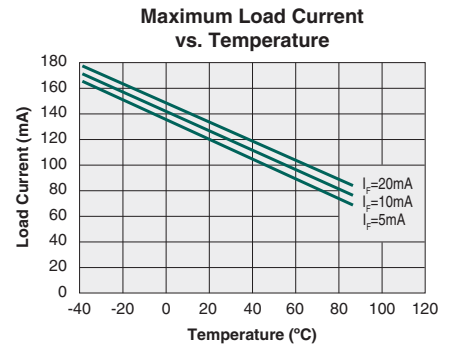
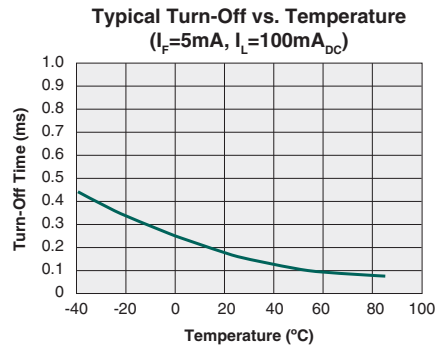
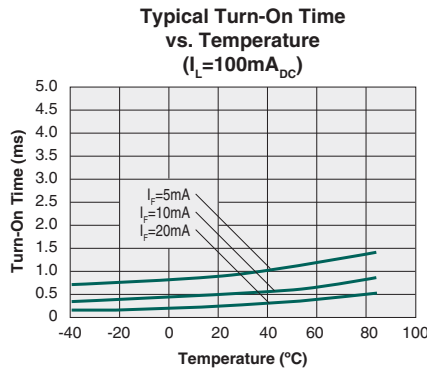


Typical Turn-Off Time
vs. LED Forward Current
($I_L=100\text{mA}_{DC}$)



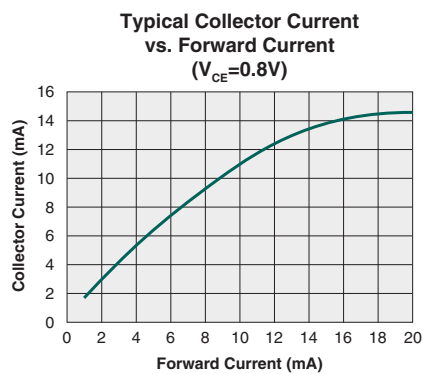
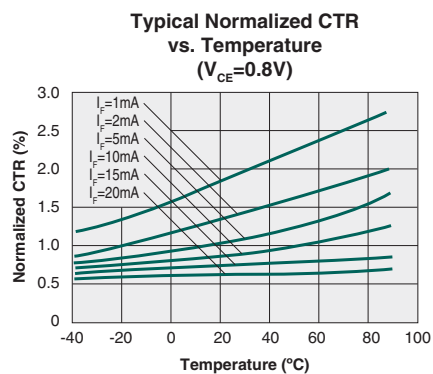
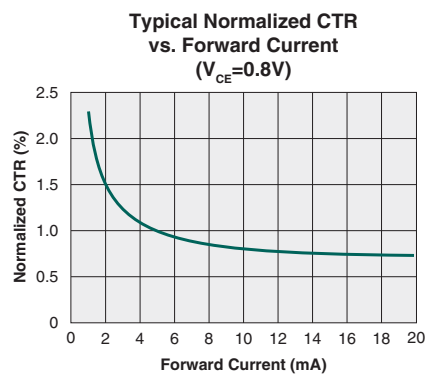
* The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

RELAY PERFORMANCE DATA (cont.)*



* 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.

DETECTOR PERFORMANCE DATA*



* 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
IAD110P	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
IAD110P	260°C for 30 seconds

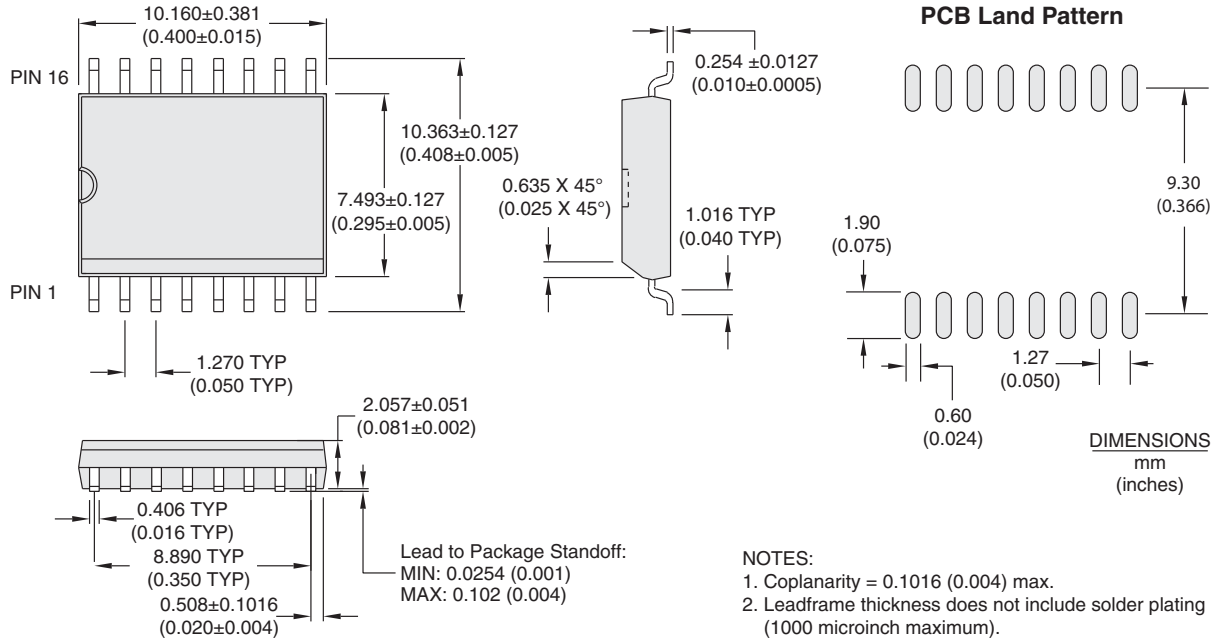
Board Wash

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.

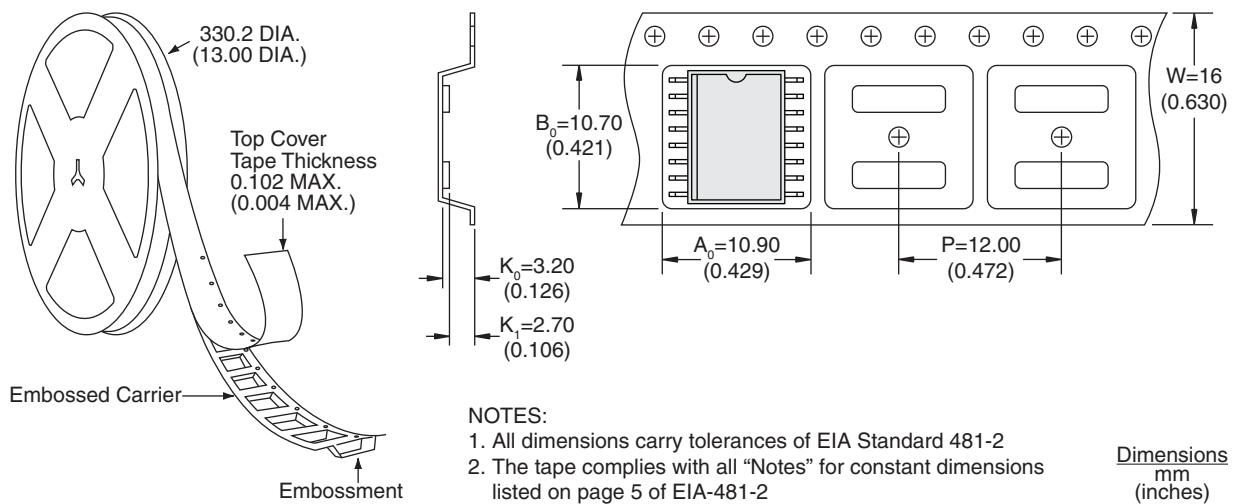


MECHANICAL DIMENSIONS

IAD110P



IAD110PTR Tape & Reel



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