IXYS
INTEGRATED CIRCUITS DIVISION

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 (PCMCIA Compatible)
- Machine Insertable, Wave Solderable
- 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
- Aerospace
- 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 GaAlAs 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.

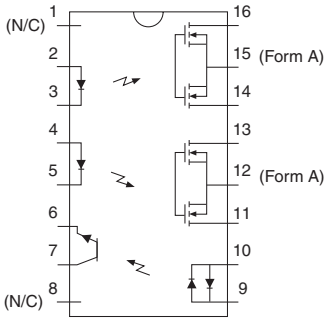
Approvals

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

Ordering Information

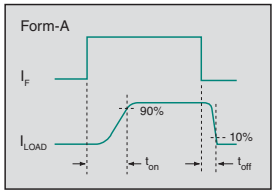
Part #	Description
IAA110P	16-Pin SOIC (50/Tube)
IAA110PTR	16-Pin SOIC (1000/Reel)

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	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 @25ºC: Relay Section

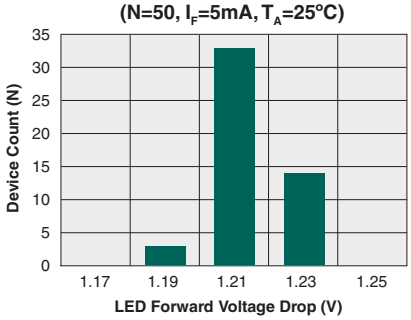
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Blocking Voltage (Peak)	I_L=1µA	V_L	-	-	350	V_P
Load Current						
Continuous	-	I_L	-	-	100	mA_{rms} / mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	350	mA_P
On-Resistance	I_L=100mA	R_{ON}	-	-	35	Ω
Off-State Leakage Current	V_L=350V, T_J=25ºC	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

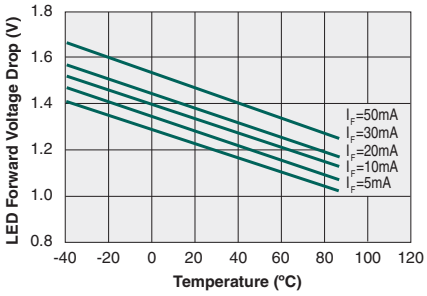
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Phototransistor Blocking Voltage	I_C=10µA	BV_{CEO}	20	50	-	V
Phototransistor Dark Current	V_{CE}=5V, I_F=0mA	I_{CEO}	-	50	500	nA
Saturation Voltage	I_C=2mA, I_F=16mA	V_{SAT}	-	0.3	0.5	V
Current Transfer Ratio	I_F=6mA, V_{CE}=0.5V	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=25°C)

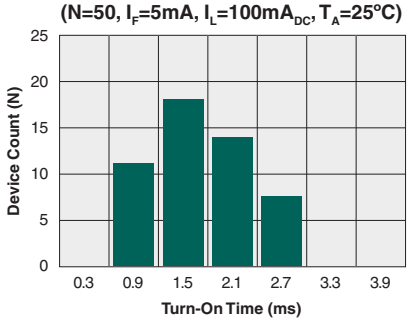


Typical LED Forward Voltage Drop vs. Temperature

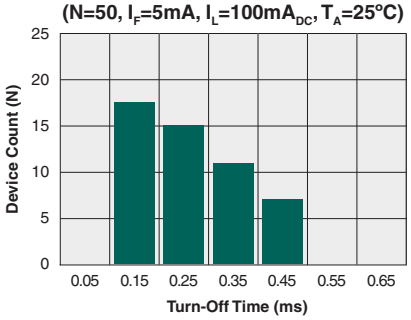


RELAY PERFORMANCE DATA*

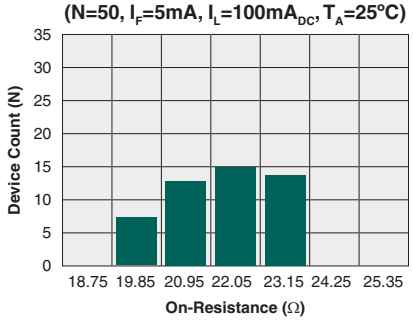
Typical Turn-On Time (N=50, I_F=5mA, I_L=100mA$_{DC}$, T_A=25°C)



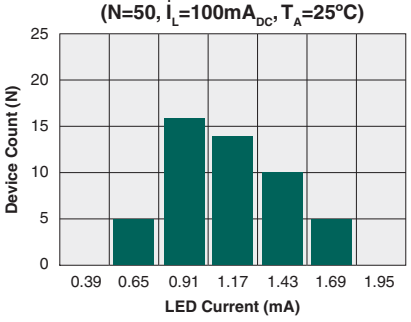
Typical Turn-Off Time (N=50, I_F=5mA, I_L=100mA$_{DC}$, T_A=25°C)



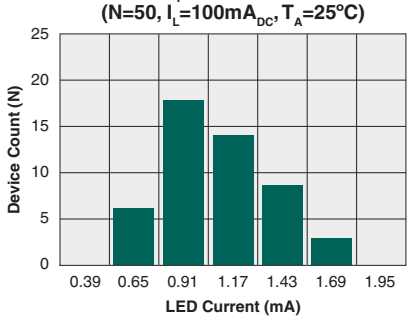
Typical On-Resistance Distribution (N=50, I_F=5mA, I_L=100mA$_{DC}$, T_A=25°C)



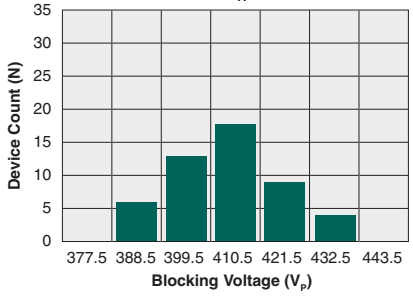
Typical I_F for Switch Operation (N=50, I_L=100mA$_{DC}$, T_A=25°C)



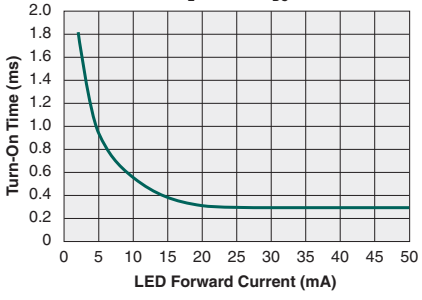
Typical I_F for Switch Dropout (N=50, I_L=100mA$_{DC}$, T_A=25°C)



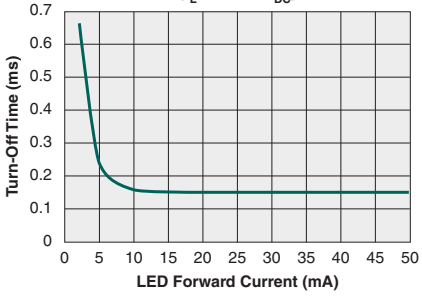
Typical Blocking Voltage Distribution (N=50, T_A=25°C)



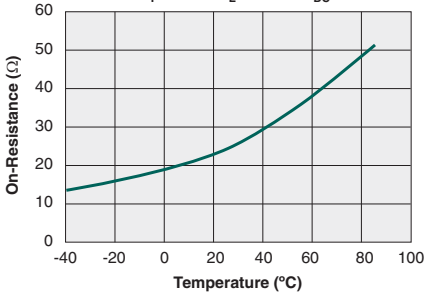
Typical Turn-On Time vs. LED Forward Current (I_L=100mA$_{DC}$)



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



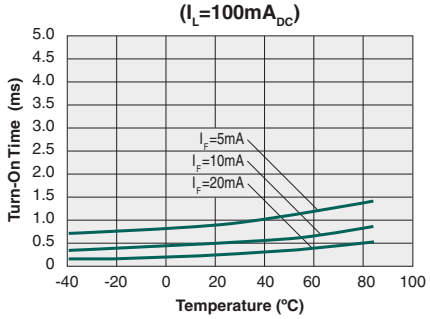
Typical On-Resistance vs. Temperature (I_F=5mA, I_L=100mA$_{DC}$)



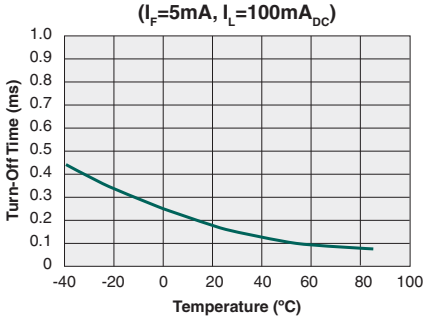
* The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

RELAY PERFORMANCE DATA (cont.)*

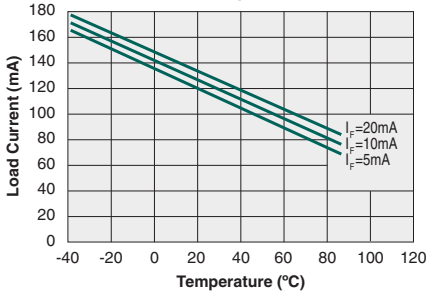
Typical Turn-On Time vs. Temperature (I_L=100mA$_{DC}$)



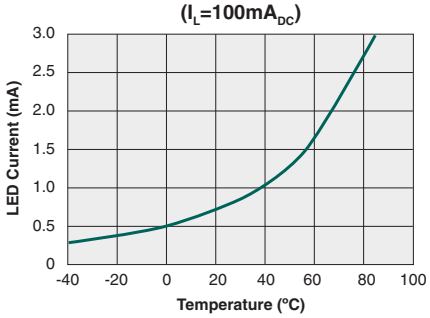
Typical Turn-Off Time vs. Temperature (I_F=5mA, I_L=100mA$_{DC}$)



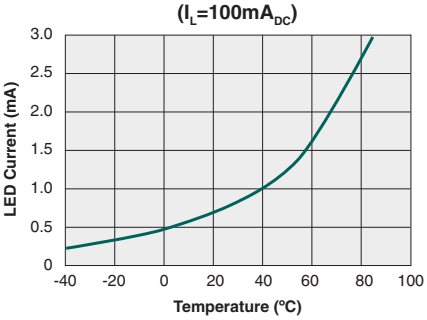
Maximum Load Current vs. Temperature



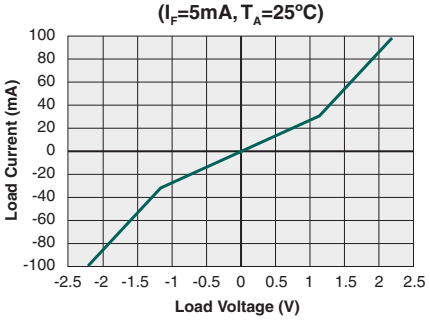
Typical I_F for Switch Operation vs. Temperature (I_L=100mA$_{DC}$)



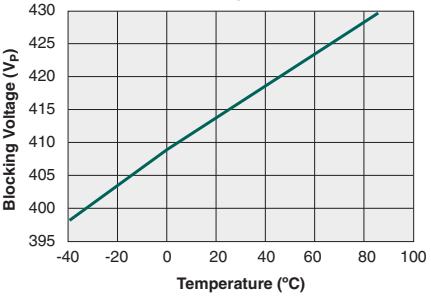
Typical I_F for Switch Dropout vs. Temperature (I_L=100mA$_{DC}$)



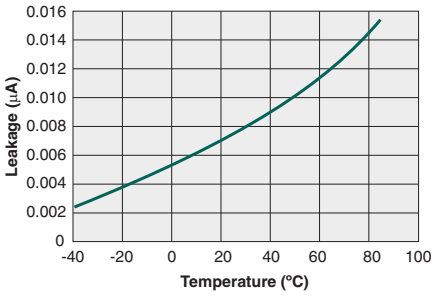
Typical Load Current vs. Load Voltage (I_F=5mA, T_A=25ºC)



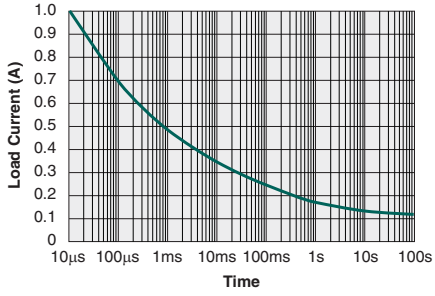
Typical Blocking Voltage vs. Temperature



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

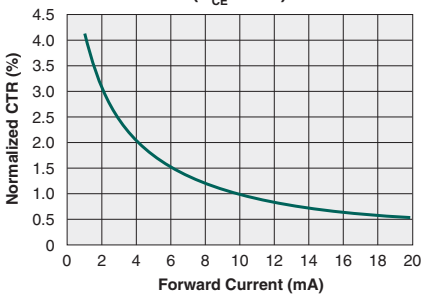


Energy Rating Curve

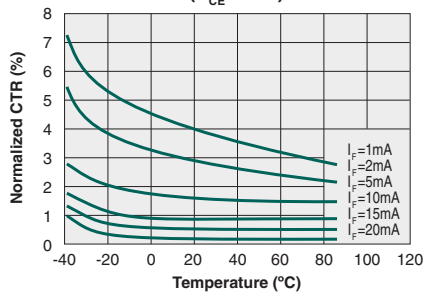


DETECTOR PERFORMANCE DATA*

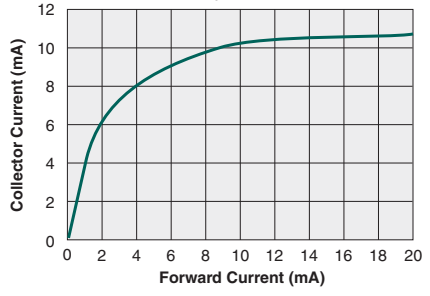
Typical Normalized CTR vs. Forward Current (V_{CE}=0.5V)



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



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



* 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
IAA110P	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.

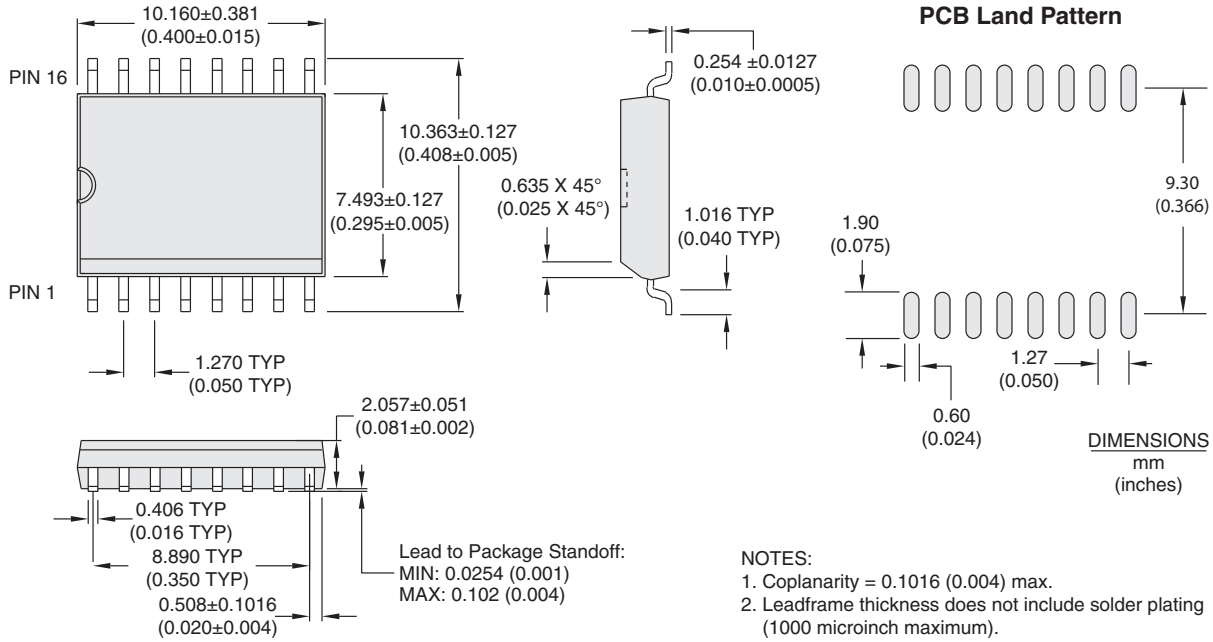
Device	Maximum Temperature x Time
IAA110P	260°C for 30 seconds

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.

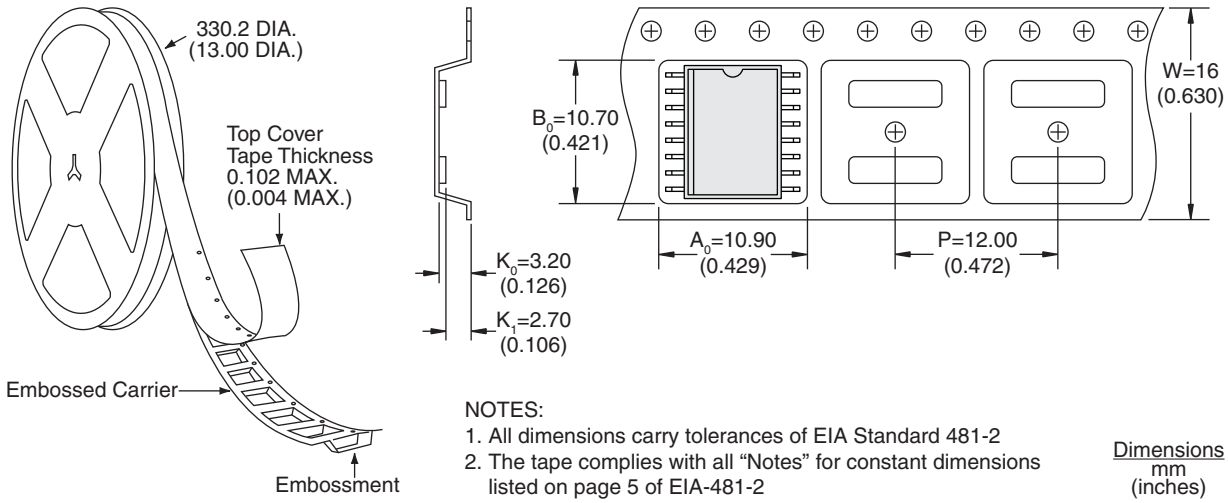
MECHANICAL DIMENSIONS

IAA110P



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: www.ixysic.com

Specification: DS-IAA110P_R06

9/27/2013

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