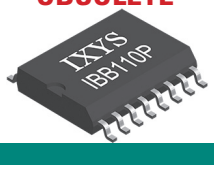
OBSOLETE



IBB110P
Multifunction Telecom Circuits:
SSR 1-Form-B (2) / Optocoupler (1)

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 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
- Industrial Controls

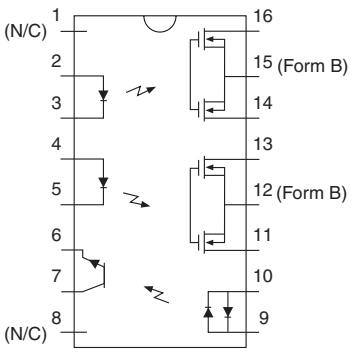
Description
The IBB110P Multifunction Telecom switch combines two 350V normally closed (1-Form-B) relays and one optocoupler in a single package. The relays use optically coupled MOSFET technology to provide 1500V_{rms} of input to output isolation. The efficient MOSFET switches and photovoltaic die use IXYS Integrated Circuits Division's patented OptoMOS architecture, while the optically coupled output is controlled by highly efficient infrared LEDs. Circuit designers using the IBB110P can combine three discrete functions in a single package, thus using less space than traditional discrete component solutions.

Approvals
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1305490
- TUV EN 62368-1: Certificate B 082667 0008

Ordering Information

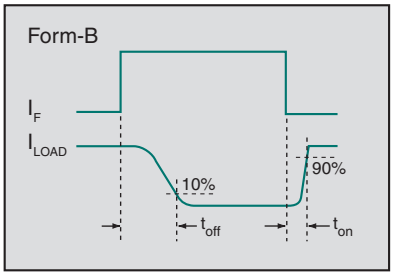
Part #	Description
IBB110P	16-Pin SOIC (50/Tube)
IBB110PTR	16-Pin SOIC (1000/Reel)

Pin Configuration



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

Switching Characteristics of Normally Closed 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 / °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.

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

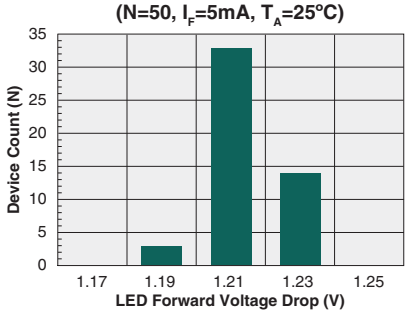
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Blocking Voltage (Peak)	-	V_L	-	-	350	V_P
Load Current						
Continuous	-	I_L	-	-	100	mA_{rms} / mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	350	mA_P
On-Resistance	I_L=100mA	R_{ON}	-	-	35	Ω
Off-State Leakage Current	V_L=350V, T_J=25ºC	I_{LEAK}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

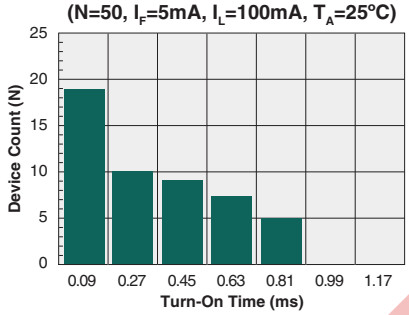
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Phototransistor Blocking Voltage	I_C=10µA	BV_{CEO}	20	50	-	V
Phototransistor Dark Current	V_{CE}=5V, I_F=0mA	I_{CEO}	-	50	500	nA
Saturation Voltage	I_C=2mA, I_F=16mA	V_{SAT}	-	0.3	0.5	V
Current Transfer Ratio	I_F=6mA, V_{CE}=0.5V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

RELAY PERFORMANCE DATA*

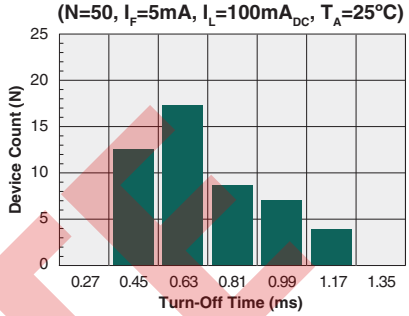
Typical LED Forward Voltage Drop
(N=50, I_F=5mA, T_A=25°C)



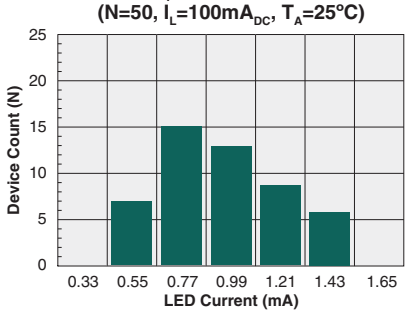
Typical Turn-On Time
(N=50, I_F=5mA, I_L=100mA, T_A=25°C)



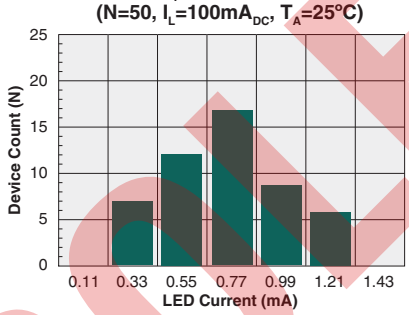
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=100mA$_{DC}$, T_A=25°C)



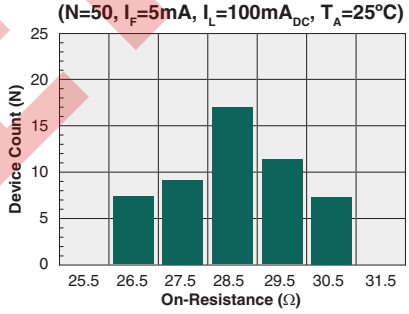
Typical I_F for Switch Operation
(N=50, I_L=100mA$_{DC}$, T_A=25°C)



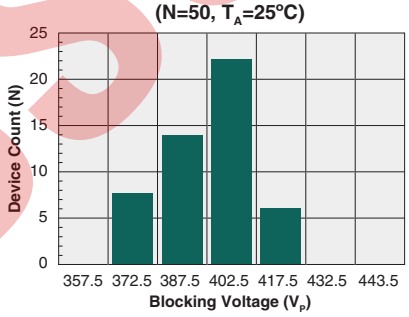
Typical I_F for Switch Dropout
(N=50, I_L=100mA$_{DC}$, T_A=25°C)



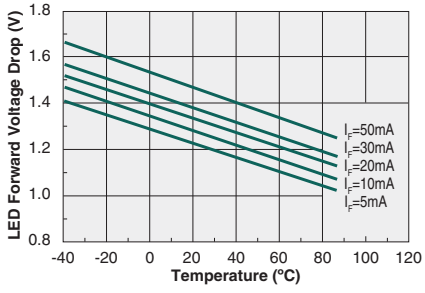
Typical On-Resistance Distribution
(N=50, I_F=5mA, I_L=100mA$_{DC}$, T_A=25°C)



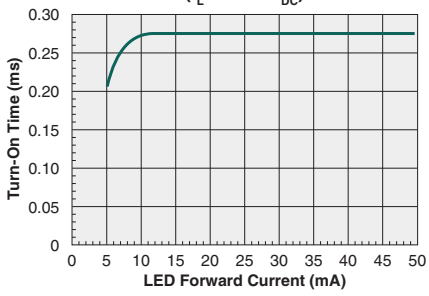
Typical Blocking Voltage Distribution
(N=50, T_A=25°C)



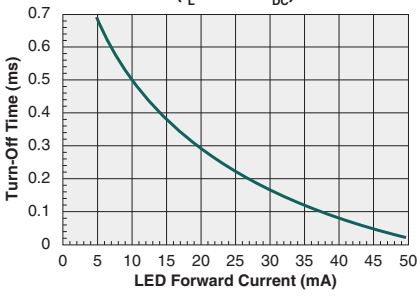
Typical LED Forward Voltage Drop
vs. Temperature



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



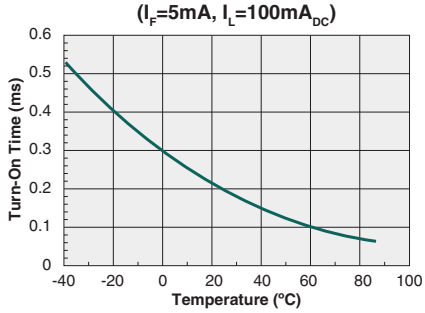
Typical Turn-Off Time
vs. LED Forward Current
(I_L=100mA$_{DC}$)



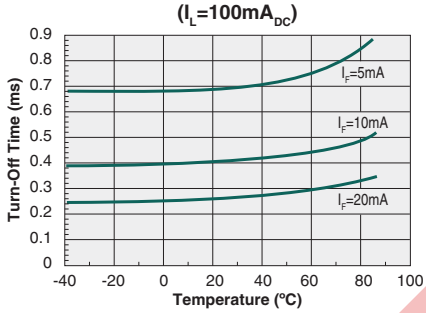
* Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.

RELAY PERFORMANCE DATA (cont.)*

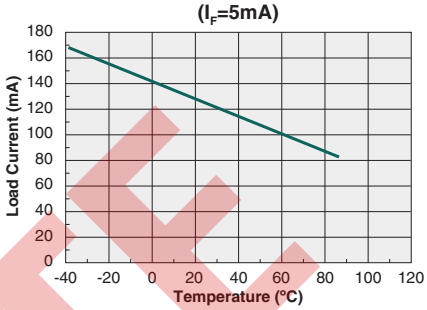
Typical Turn-On Time vs. Temperature (I_F=5mA, I_L=100mA$_{DC}$)



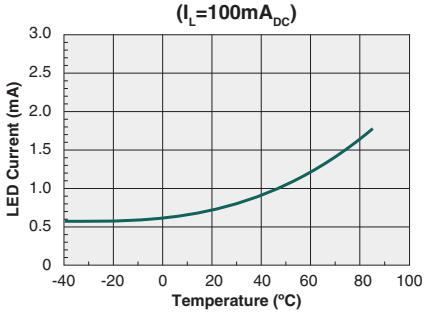
Typical Turn-Off Time vs. Temperature (I_L=100mA$_{DC}$)



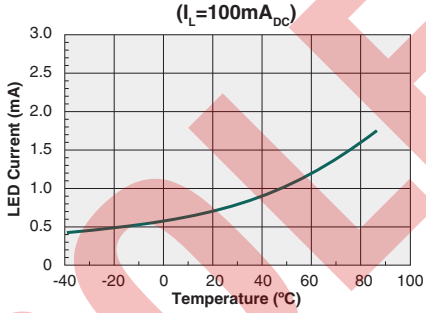
Maximum Load Current vs. Temperature (I_F=5mA)



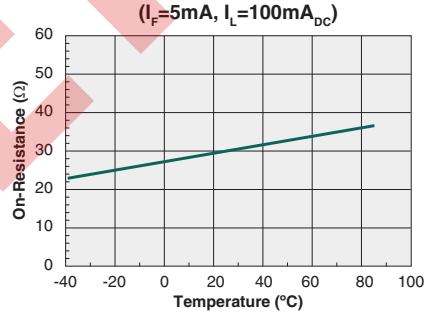
Typical I_F for Switch Operation vs. Temperature (I_L=100mA$_{DC}$)



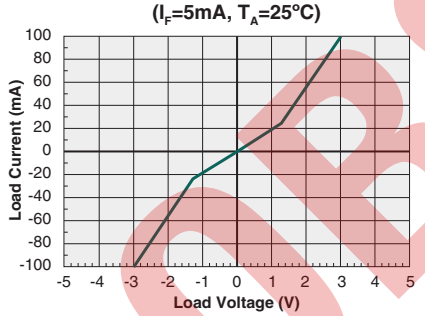
Typical I_F for Switch Dropout vs. Temperature (I_L=100mA$_{DC}$)



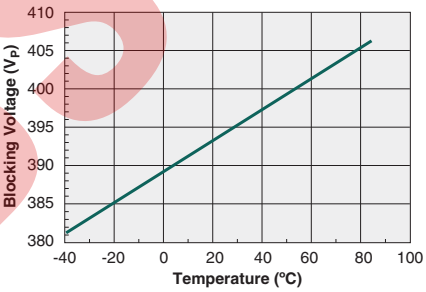
Typical On-Resistance vs. Temperature (I_F=5mA, I_L=100mA$_{DC}$)



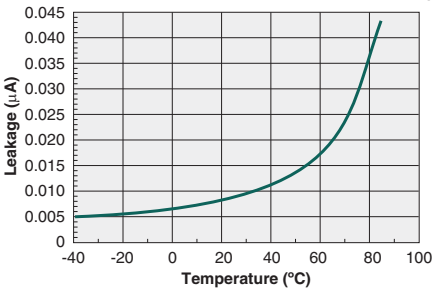
Typical Load Current vs. Load Voltage (I_F=5mA, T_A=25°C)



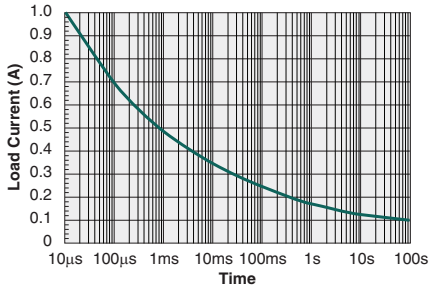
Typical Blocking Voltage vs. Temperature



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



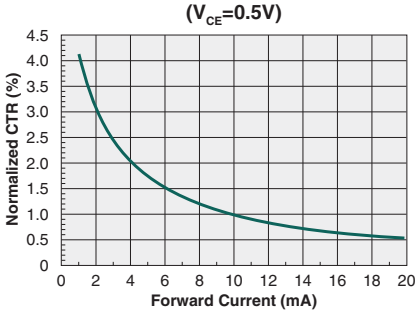
Energy Rating Curve



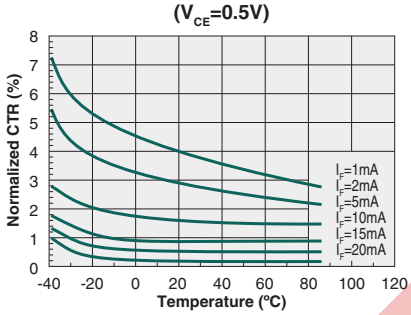
* Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.

DETECTOR PERFORMANCE DATA*

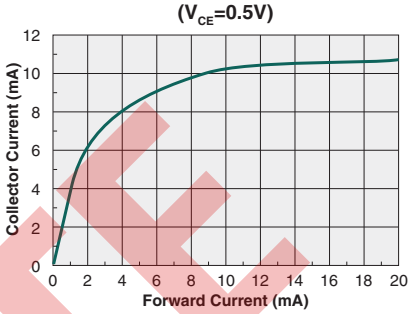
Typical Normalized CTR vs. Forward Current (V_{CE}=0.5V)



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
IBB110P	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.

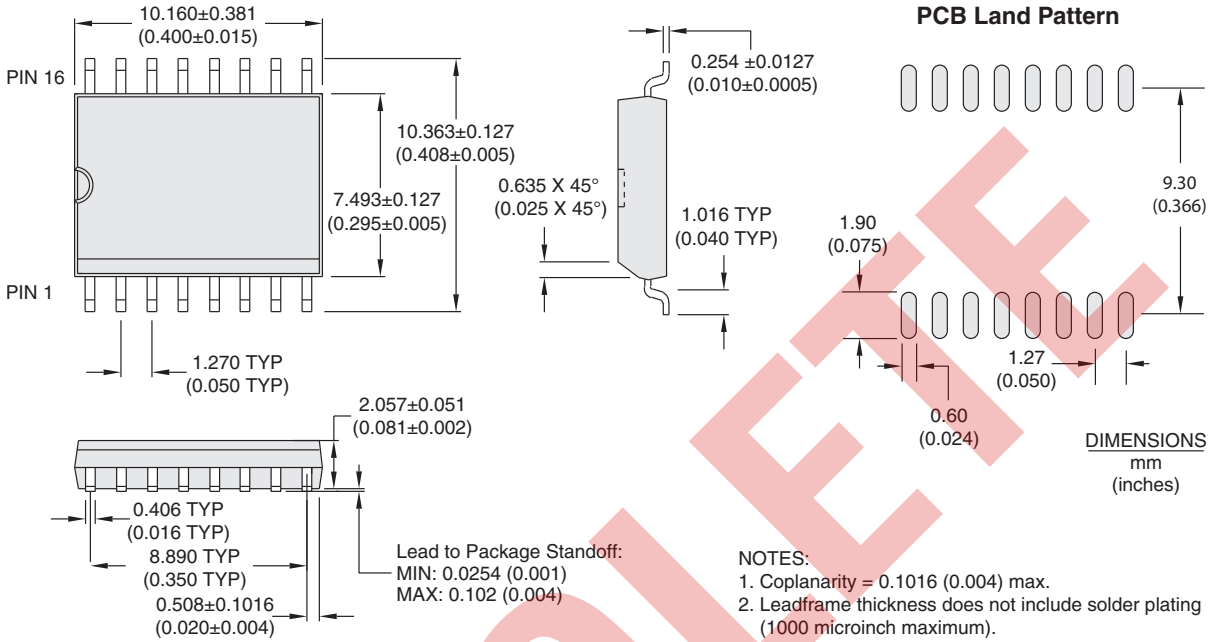
Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
IBB110P	245°C	30 seconds	3

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.

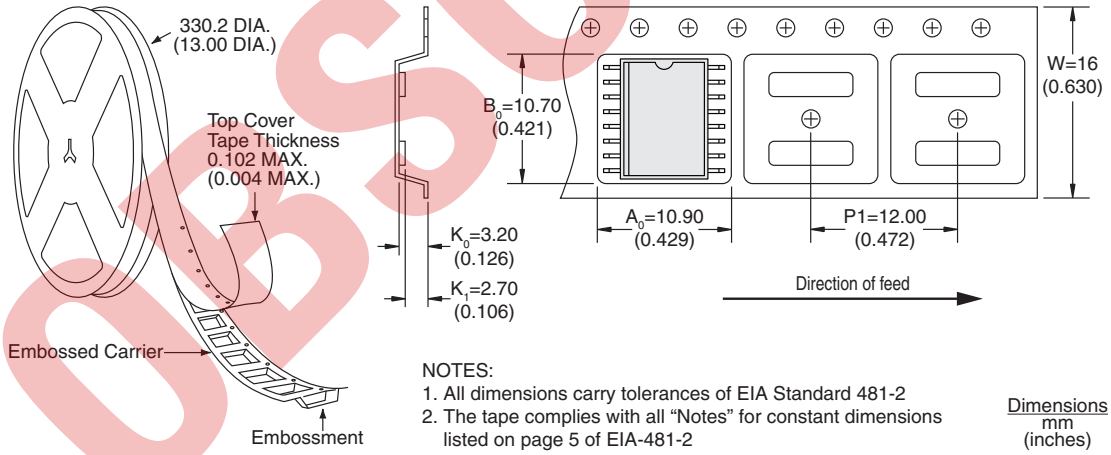
MECHANICAL DIMENSIONS

IBB110P



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

IBB110PTR 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

Specification: DS-IBB110P_R06.1

12/1/2021