IXYS
INTEGRATED CIRCUITS DIVISION

XBA170
Dual Single-Pole, Normally Open OptoMOS® Relay

Parameter	Rating	Units
Load Voltage	350	V
Load Current	100	mA_{rms} / mA_{DC}
On-Resistance (max)	50	Ω
Input Control Current	5	mA

Features
- 3750V_{rms} Input/Output Isolation
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- VDE Compatible
- FCC Compatible
- No EMI/RFI Generation
- Small 8-Pin Package
- Machine Insertable, Wave Solderable
- Surface Mount & 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
- Utility Meters (gas, oil, electric and water)
- Medical Equipment-Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

Description
XBA170 comprises two independent 350V, 100mA, 50Ω solid state relays: one single-pole, normally open (1-Form-A) relay and one single-pole, normally closed (1-Form-B) relay.

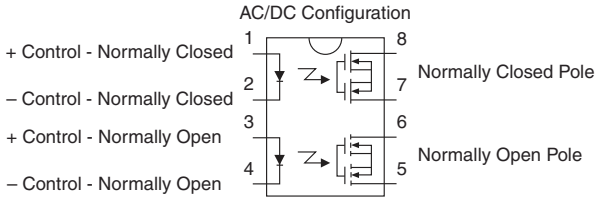
Featuring low on-resistance combined with enhanced peak load current handling capabilities, XBA170 is designed to provide an ideal solution where a complementary Form-A/Form-B relay pair is required.

Approvals
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Compliant

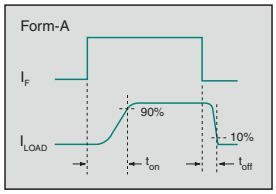
Ordering Information

Part #	Description
XBA170	8-Pin DIP (50/Tube)
XBA170P	8-Pin Flatpack (50/Tube)
XBA170PTR	8-Pin Flatpack (1000/Reel)
XBA170S	8-Pin Surface Mount (50/Tube)
XBA170STR	8-Pin Surface Mount (1000/Reel)

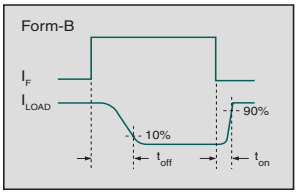
Pin Configuration



Switching Characteristics of Normally Open Devices



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25ºC

Parameter	Ratings	Units
Blocking Voltage	350	V_P
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation [1]	150	mW
Total Power Dissipation [2]	800	mW
Isolation Voltage, Input to Output	3750	V_{rms}
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 1.33 mW / ºC
[2] Derate linearly 6.67 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.

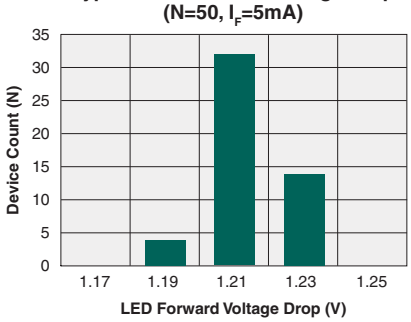
Electrical Characteristics @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
AC/DC Configuration, Continuous	-	I_L	-	-	100	mA_{rms} / mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	±350	mA_P
On-Resistance, AC/DC Configuration	I_L=100mA	R_{ON}	-	33	50	Ω
Off-State Leakage Current	V_L=350V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	-	5	ms
Turn-Off		t_{off}	-	-	5	
Output Capacitance	V_L=50V, f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics						
Input Control Current to Activate	I_L=100mA	I_F	-	-	2	mA
Input Control Current to Deactivate	-	I_F	0.4	0.7	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics						
Capacitance, Input to Output	-	$C_{I/O}$	-	3	-	pF

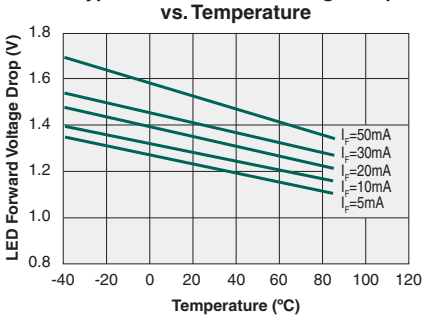
*NOTE: If both poles operate simultaneously, then the load current must be derated in order not to exceed the package power dissipation value.

FORM-A / FORM-B PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

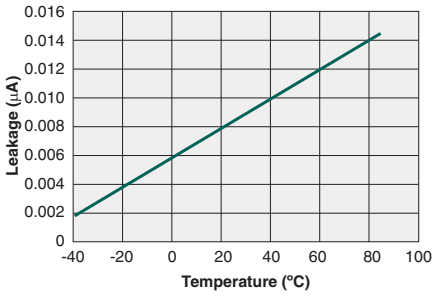
Typical LED Forward Voltage Drop
(N=50, I_F=5mA)



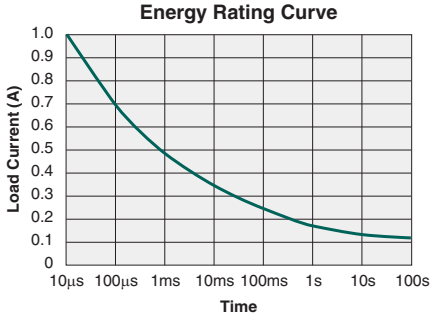
Typical LED Forward Voltage Drop
vs. Temperature



Typical Leakage vs. Temperature
Measured across Pins 5&6 or 7&8

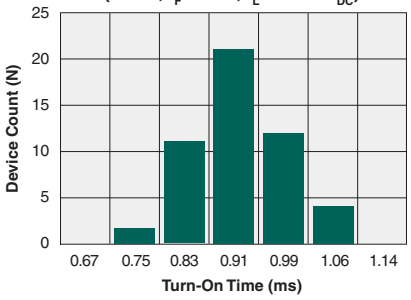


Energy Rating Curve

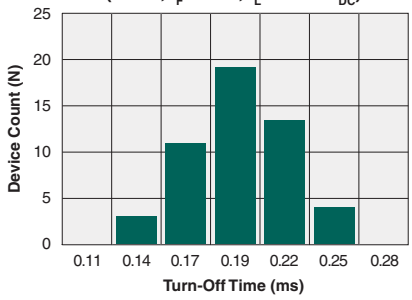


FORM-A RELAY PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

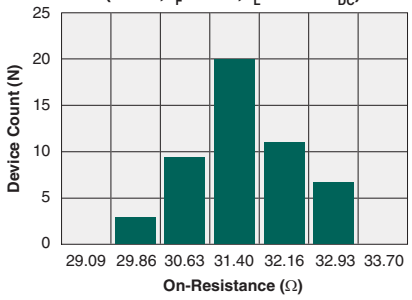
FormA
Typical Turn-On Time
(N=50, I_F=5mA, I_L=100mA$_{DC}$)



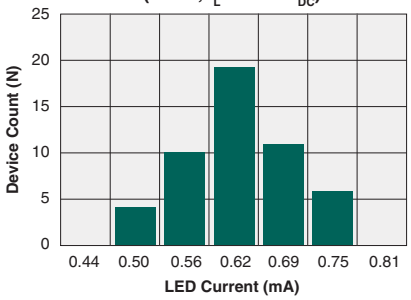
FormA
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=100mA$_{DC}$)



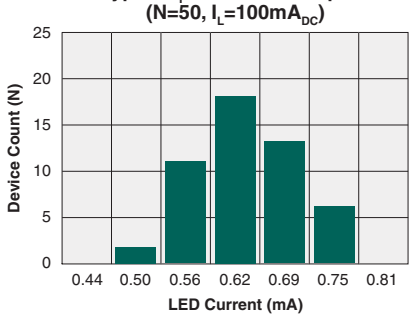
FormA
Typical On-Resistance Distribution
(N=50, I_F=5mA, I_L=100mA$_{DC}$)



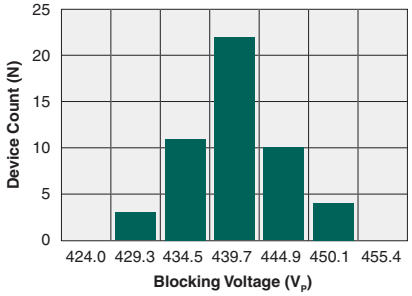
FormA
Typical I_F for Switch Operation
(N=50, I_L=100mA$_{DC}$)



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



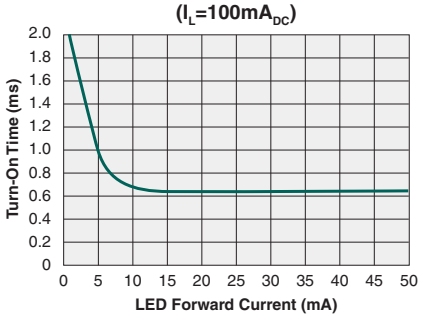
FormA
Typical Blocking Voltage Distribution
(N=50)



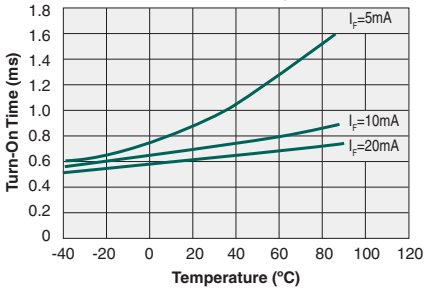
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

FORM-A RELAY PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

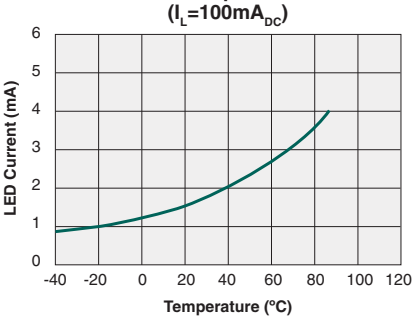
FormA
Typical Turn-On Time
vs. LED Forward Current
(I_L=100mA$_{DC}$)



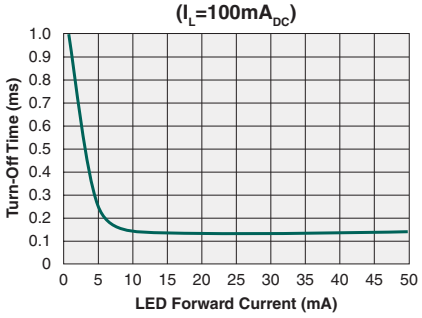
FormA
Typical Turn-On Time
vs. Temperature
(I_L=100mA$_{DC}$)



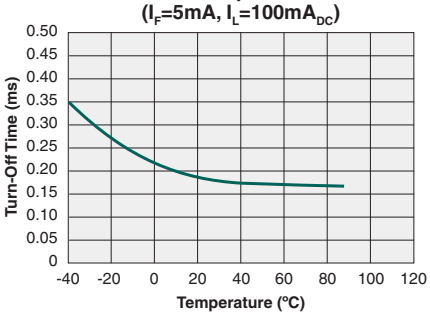
FormA
Typical I_F for Switch Operation
vs. Temperature
(I_L=100mA$_{DC}$)



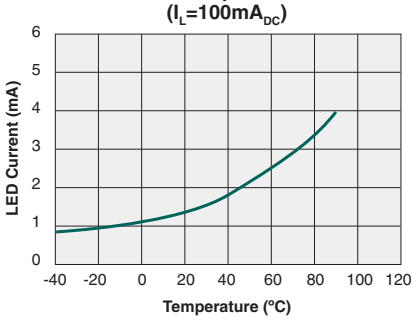
FormA
Typical Turn-Off Time
vs. LED Forward Current
(I_L=100mA$_{DC}$)



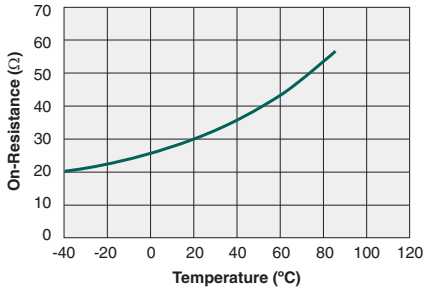
FormA
Typical Turn-Off Time
vs. Temperature
(I_F=5mA, I_L=100mA$_{DC}$)



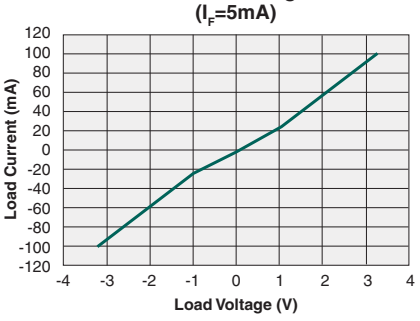
FormA
Typical I_F for Switch Dropout
vs. Temperature
(I_L=100mA$_{DC}$)



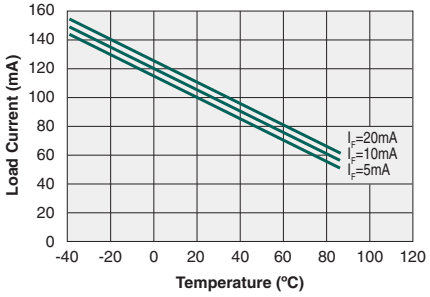
FormA
Typical On-Resistance
vs. Temperature
(I_F=5mA, I_L=100mA$_{DC}$)



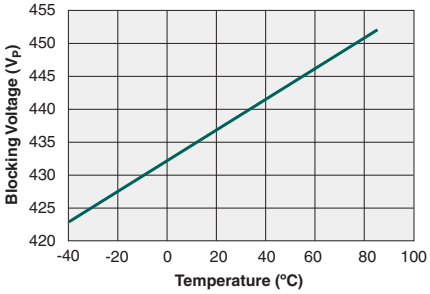
FormA
Typical Load Current
vs. Load Voltage
(I_F=5mA)



Form A
Maximum Load Current
vs. Temperature



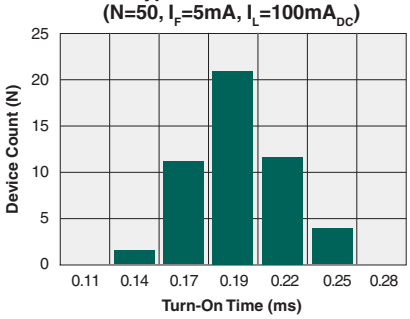
FormA
Typical Blocking Voltage
vs. Temperature



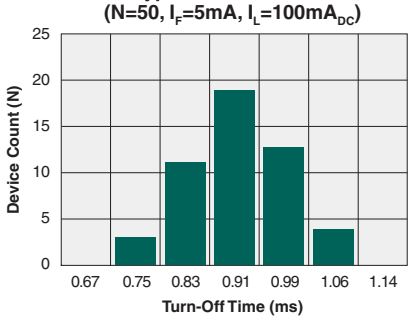
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

FORM-B RELAY PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

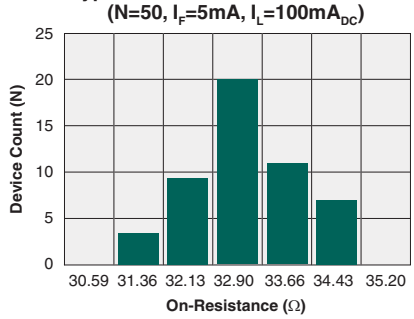
FormB
Typical Turn-On Time
(N=50, I_F=5mA, I_L=100mA$_{DC}$)



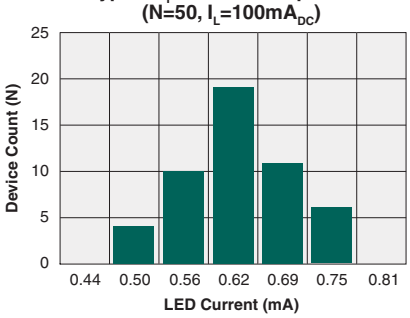
FormB
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=100mA$_{DC}$)



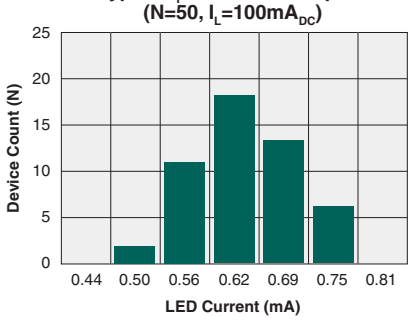
FormB
Typical On-Resistance Distribution
(N=50, I_F=5mA, I_L=100mA$_{DC}$)



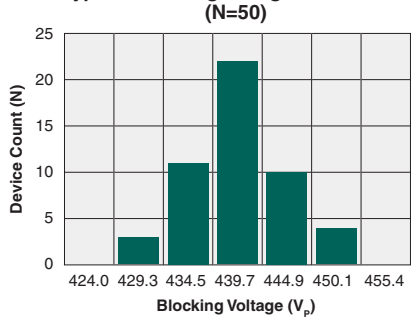
FormB
Typical I_F for Switch Operation
(N=50, I_L=100mA$_{DC}$)



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



FormB
Typical Blocking Voltage Distribution
(N=50)



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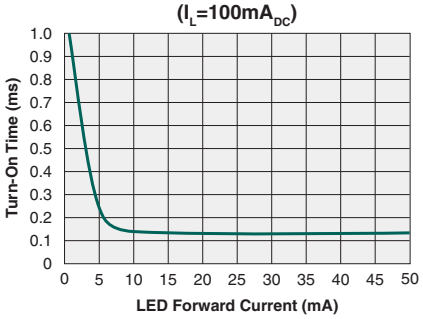
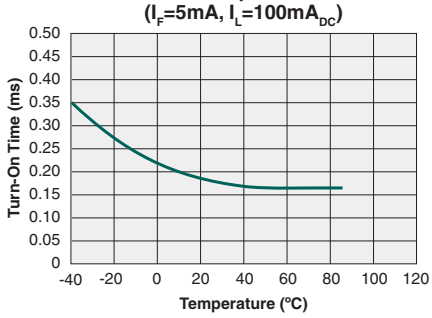
FORM-B RELAY PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

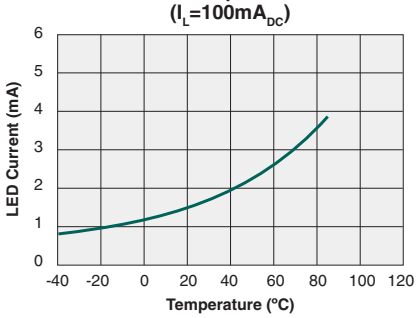
FormB
Typical Turn-On Time
vs. LED Forward Current
(I_L=100mA$_{DC}$)



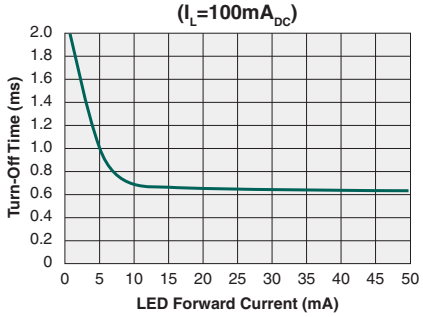
FormB
Typical Turn-On Time
vs. Temperature
(I_F=5mA, I_L=100mA$_{DC}$)



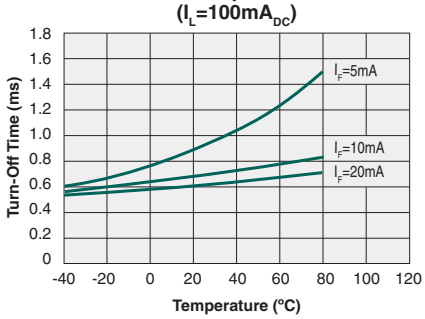
FormB
Typical I_F for Switch Operation
vs. Temperature
(I_L=100mA$_{DC}$)



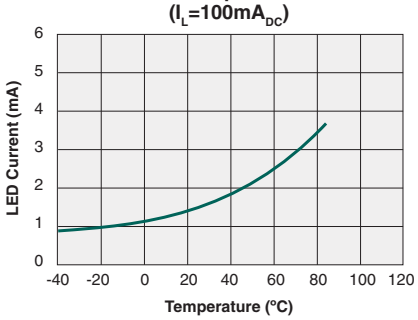
FormB
Typical Turn-Off Time
vs. LED Forward Current
(I_L=100mA$_{DC}$)



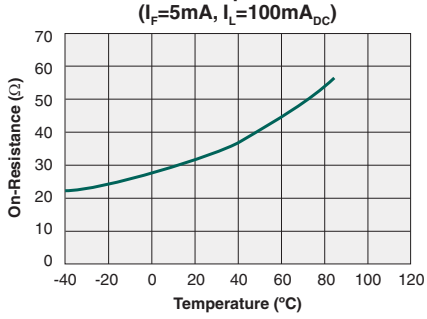
FormB
Typical Turn-Off Time
vs. Temperature
(I_L=100mA$_{DC}$)



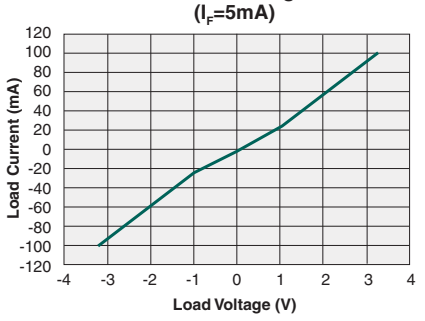
FormB
Typical I_F for Switch Dropout
vs. Temperature
(I_L=100mA$_{DC}$)



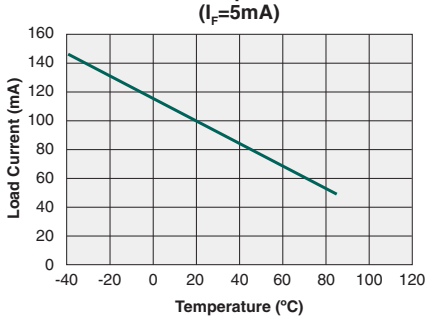
FormB
Typical On-Resistance
vs. Temperature
(I_F=5mA, I_L=100mA$_{DC}$)



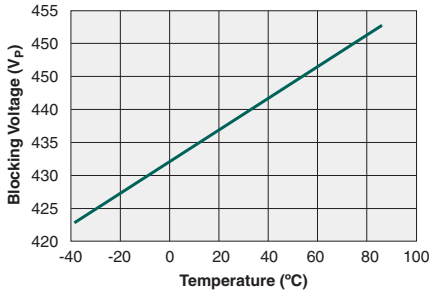
FormB
Typical Load Current
vs. Load Voltage
(I_F=5mA)



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



FormB
Typical Blocking Voltage
vs. Temperature



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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
XBA170 / XBA170S / XBA170P	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.

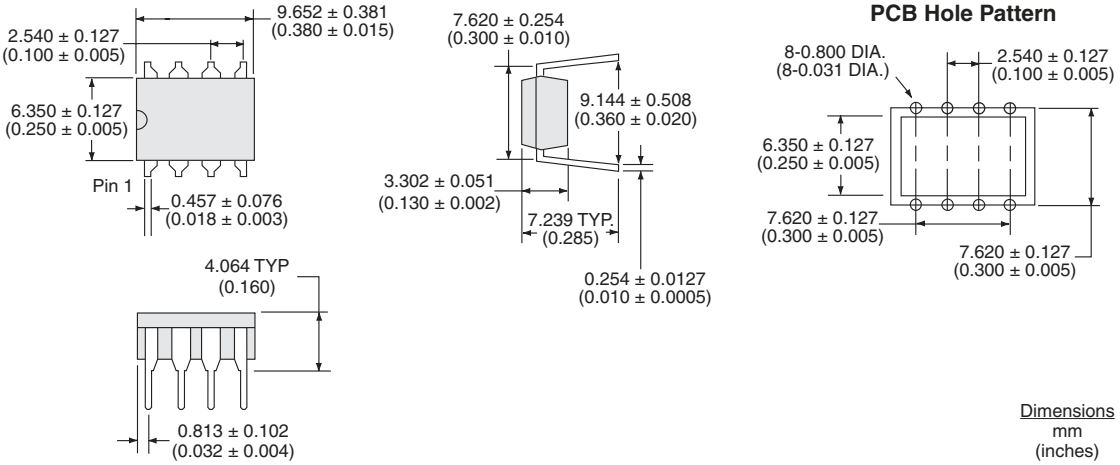
Device	Maximum Temperature x Time
XBA170 / XBA170S	250°C for 30 seconds
XBA170P	260°C for 30 seconds

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.

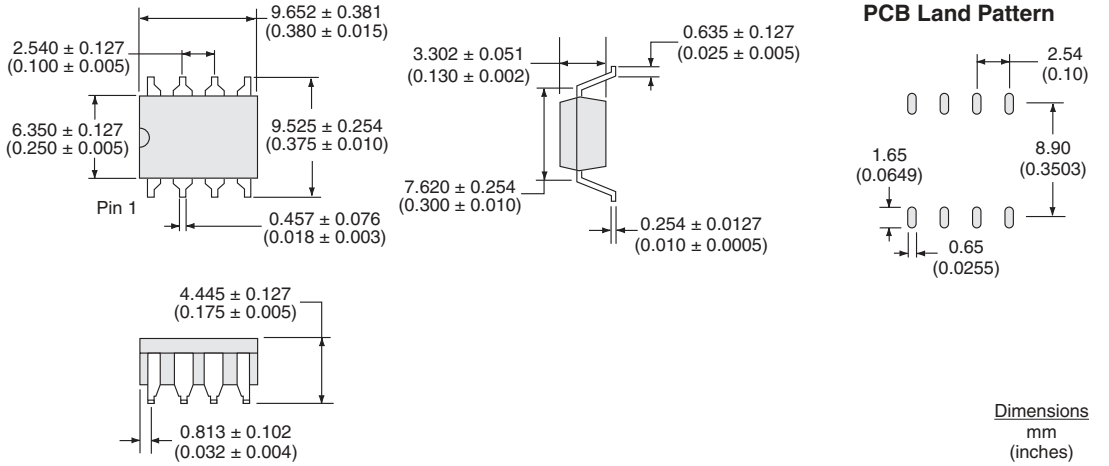
Mechanical Dimensions

XBA170



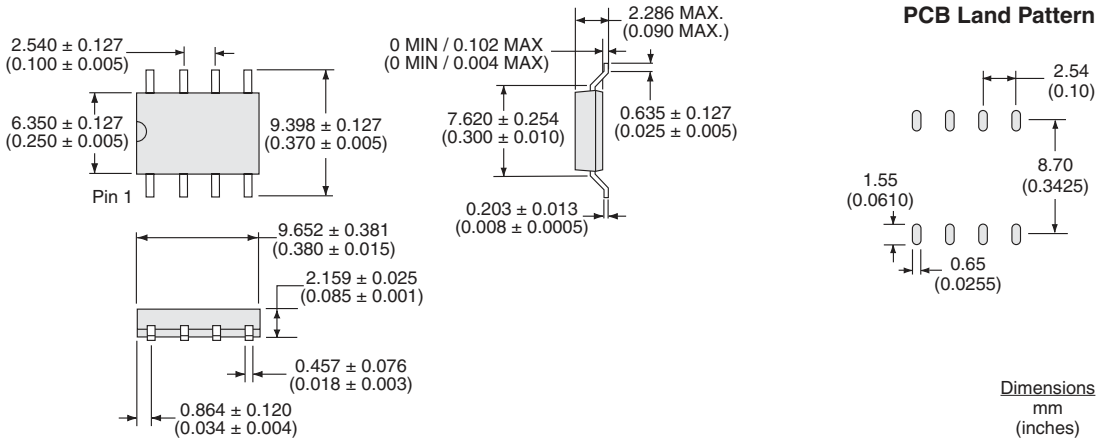
Dimensions
mm
(inches)

XBA170S



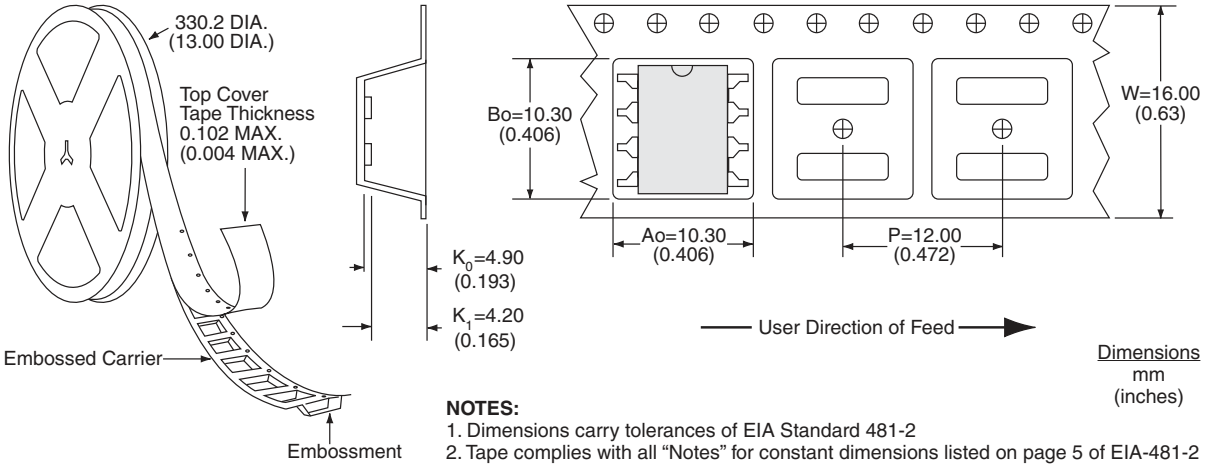
Dimensions
mm
(inches)

XBA170P



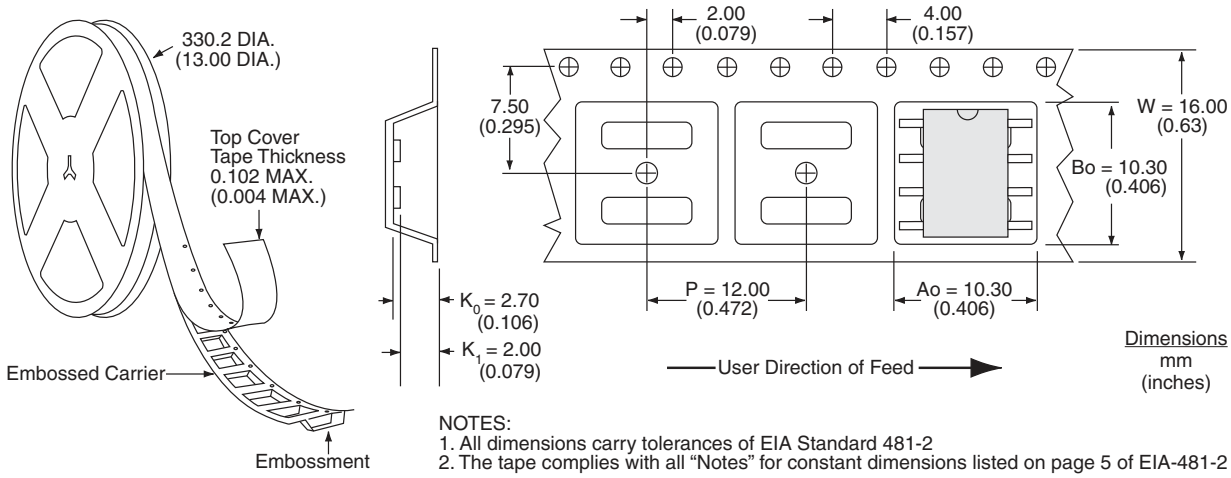
Dimensions
mm
(inches)

XBA170STR Tape & Reel



NOTES:
1. Dimensions carry tolerances of EIA Standard 481-2
2. Tape complies with all "Notes" for constant dimensions listed on page 5 of EIA-481-2

XBA170PTR 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

For additional information please visit our website at: www.ixysic.com

Specification: DS-XBA170-R04

12/22/2012