INTEGRATED CIRCUITS DIVISION

LBA710
Dual Single-Pole OptoMOS® Relay Normally Open & Normally Closed

Parameter	Rating	Units
Blocking Voltage	60	V
Load Current	1	A_{rms} / A_{DC}
On-Resistance (max)	0.6	Ω
LED Current to Operate	2	mA

Features
- Low On-Resistance (0.6Ω)
- Low Control Current (2mA)
- 3750V_{rms} Input/Output Isolation
- 100% Solid State
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Surface Mount Versions
- Small 8-Pin Package
- Tape & Reel available

Applications
- Telecommunications
- 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

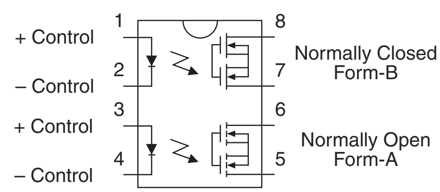
Description
LBA710 is a 60V, 1A, 0.6Ω dual Solid State Relay integrating independent single-pole normally open (1-Form-A) and single-pole normally closed (1-Form-B) relays into a single package. It features a superior combination of low on-resistance and 1A load current handling capability.

Approvals
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component: TUV Certificate B 09 07 49410 004

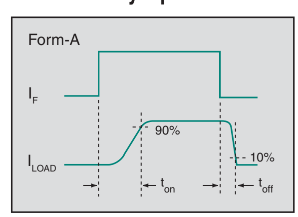
Ordering Information

Part #	Description
LBA710	8-Pin DIP (50/Tube)
LBA710S	8-Pin Surface Mount (50/Tube)
LBA710STR	8-Pin Surface Mount (1000/Reel)

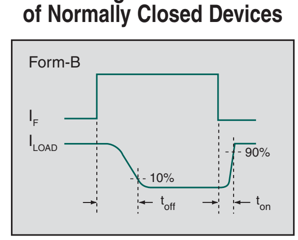
Pin Configuration



Switching Characteristics of Normally Open Devices



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Blocking Voltage	60	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}
ESD Rating, Human Body Model	8	kV
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.

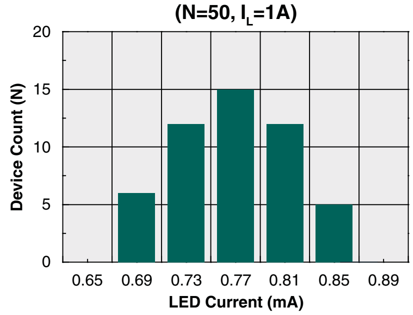
Electrical Characteristics @ 25°C

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics: Form-A (Normally Open)						
Load Current						
Continuous	I_F=2mA	I_L	-	-	1	A_{rms} / A_{DC}
Peak	I_F=2mA, t ≤ 10ms	I_{LPK}	-	-	±5	A_P
On-Resistance	I_F=2mA, I_L=1A	R_{ON}	-	0.21	0.6	Ω
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	0.7	5	ms
Turn-Off		t_{off}	-	0.09	5	
Off-State Leakage Current	I_F=0mA, V_L=60V	I_{LEAK}	-	-	1	µA
Output Capacitance	I_F=0mA, V_L=50V, f=1MHz	C_{OUT}	-	44	-	pF
Output Characteristics: Form-B (Normally Closed)						
Load Current						
Continuous	I_F=0mA	I_L	-	-	1	A_{rms} / A_{DC}
Peak	I_F=0mA, t ≤ 10ms	I_{LPK}	-	-	±5	A_P
On-Resistance	I_F=0mA, I_L=1A	R_{ON}	-	0.39	0.6	Ω
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	0.63	5	ms
Turn-Off		t_{off}	-	1.5	5	
Off-State Leakage Current	I_F=2mA, V_L=60V	I_{LEAK}	-	-	1	µA
Output Capacitance	I_F=2mA, V_L=50V, f=1MHz	C_{OUT}	-	125	-	pF
Input Characteristics: Form-A and Form-B						
Input Control Current to Activate	I_L=1A	I_F	-	-	2	mA
Input Control Current to Deactivate	-	I_F	0.1	-	-	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: Form-A and Form-B						
Capacitance, Input to Output	-	$C_{I/O}$	-	3	-	pF

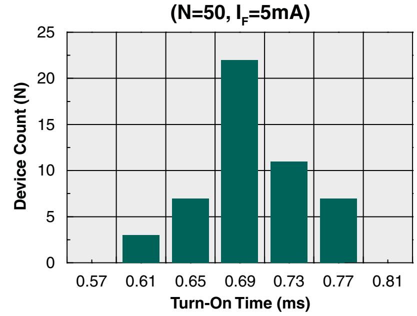
*NOTE: If both poles operate simultaneously, then load current must be derated so as not to exceed the package total power dissipation value.

Form-A RELAY PERFORMANCE DATA @25°C (Unless Otherwise Noted)*

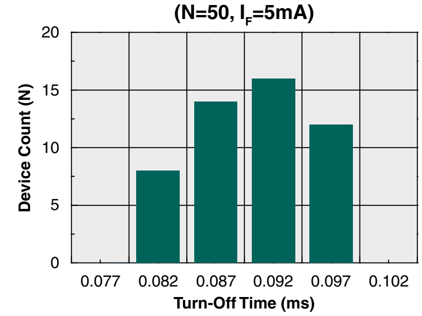
Form-A
Typical LED Current to Operate
(N=50, I_L=1A)



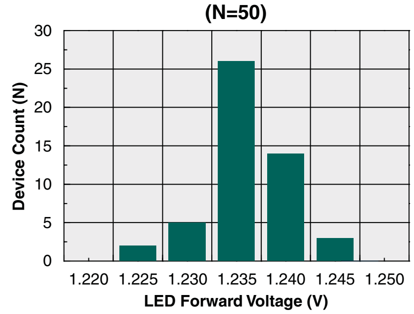
Form-A
Typical Turn-On Time
(N=50, I_F=5mA)



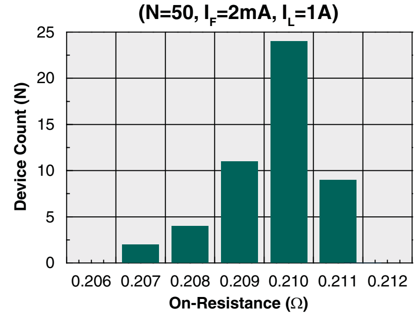
Form-A
Typical Turn-Off Time
(N=50, I_F=5mA)



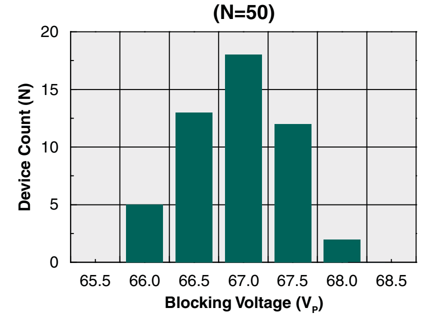
Form-A
Typical LED Forward Voltage Drop
(N=50)



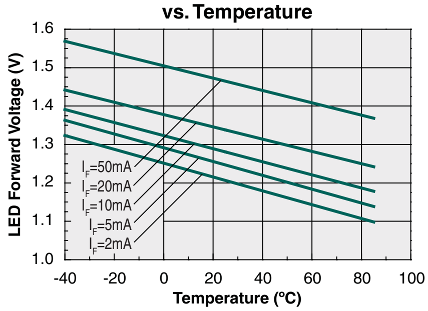
Form-A
Typical On-Resistance Distribution
(N=50, I_F=2mA, I_L=1A)



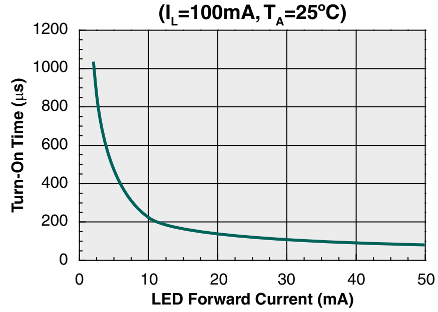
Form-A
Typical Blocking Voltage Distribution
(N=50)



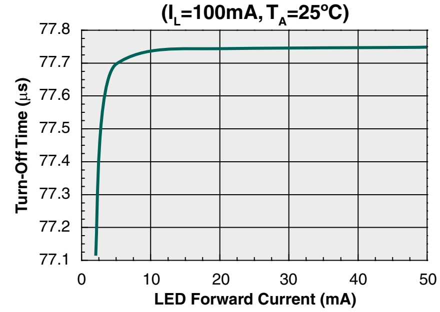
Form-A
Typical LED Forward Voltage Drop
vs. Temperature



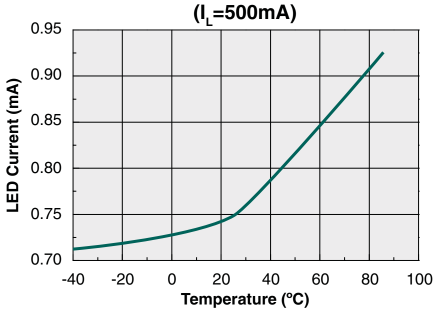
Form-A
Typical Turn-On
vs. LED Forward Current
(I_L=100mA, T_A=25°C)



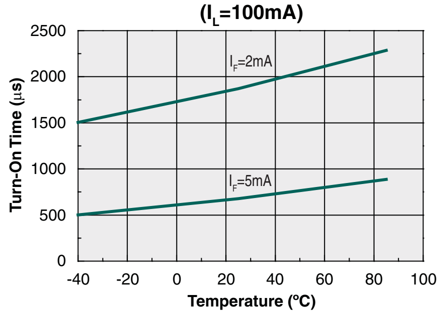
Form-A
Typical Turn-Off
vs. LED Forward Current
(I_L=100mA, T_A=25°C)



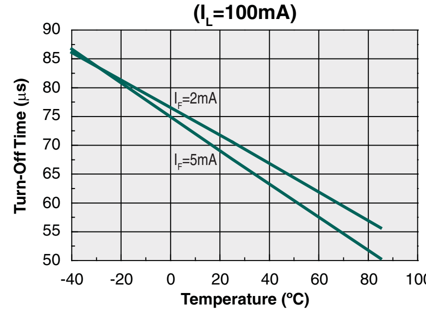
Form-A
Typical I_F for Switch Operation
vs. Temperature
(I_L=500mA)



Form-A
Typical Turn-On Time
vs. Temperature
(I_L=100mA)



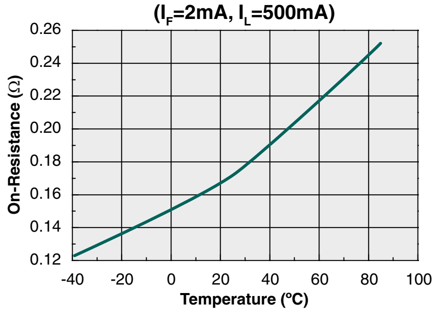
Form-A
Typical Turn-Off Time
vs. Temperature
(I_L=100mA)



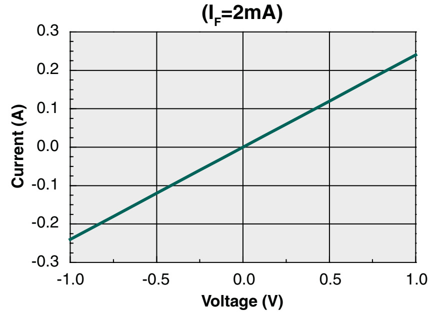
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

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

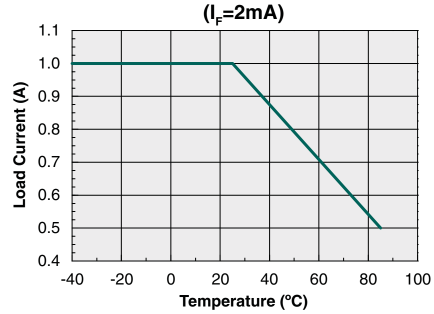
Form-A
Typical On-Resistance
vs. Temperature
(I_F=2mA, I_L=500mA)



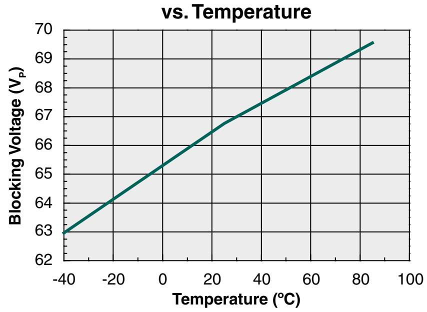
Typical Load Current
vs. Load Voltage
(I_F=2mA)



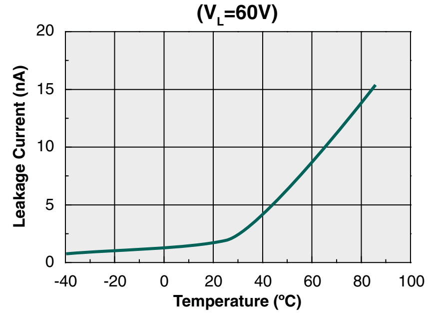
Form-A
Maximum Load Current
vs. Temperature
(I_F=2mA)



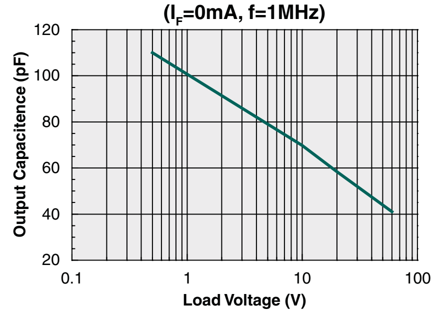
Form-A
Typical Blocking Voltage
vs. Temperature



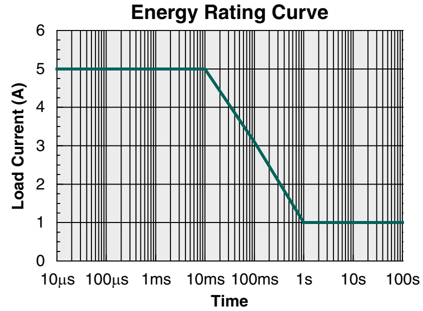
Form-A
Typical Leakage vs. Temperature
Measured Across Pins 5&6
(V_L=60V)



Form-A
Output Capacitance
vs. Load Voltage
(I_F=0mA, f=1MHz)



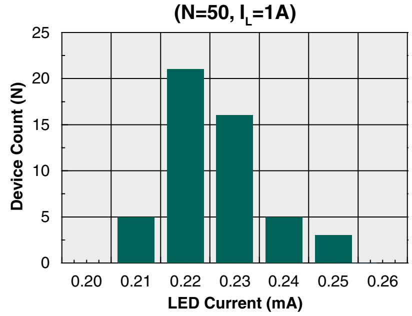
Form-A
Energy Rating Curve



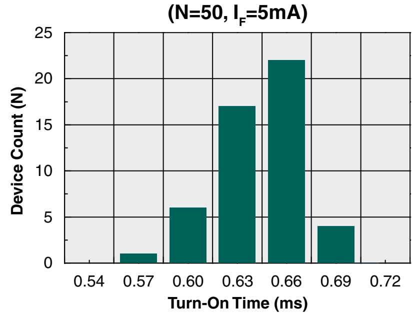
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

Form-B RELAY PERFORMANCE DATA @25°C (Unless Otherwise Noted)*

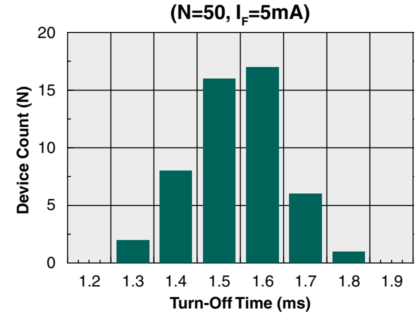
Form-B
Typical LED Current to Operate
($N=50$, $I_L=1A$)



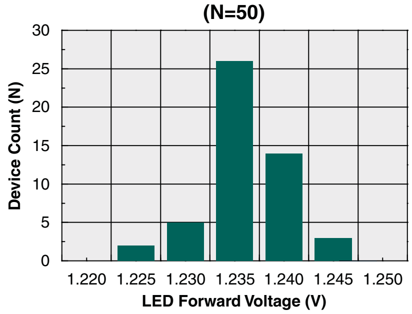
Form-B
Typical Turn-On Time
($N=50$, $I_F=5mA$)



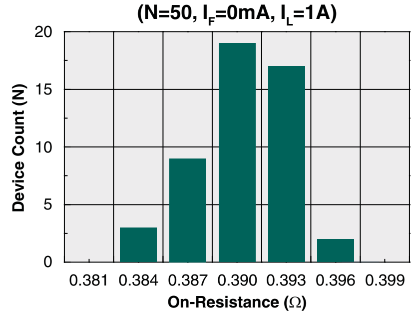
Form-B
Typical Turn-Off Time
($N=50$, $I_F=5mA$)



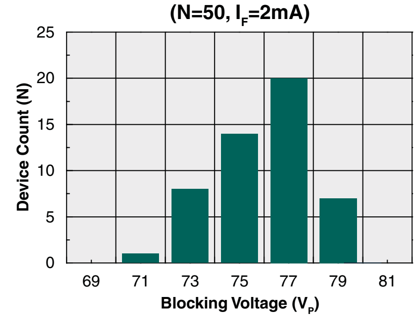
Form-B
Typical LED Forward Voltage Drop
($N=50$)



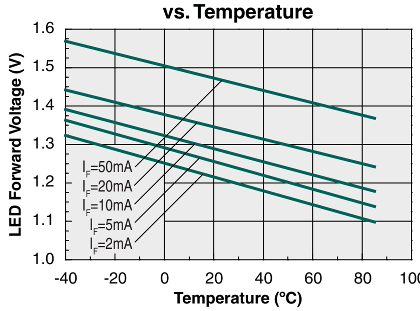
Form-B
Typical On-Resistance Distribution
($N=50$, $I_F=0mA$, $I_L=1A$)



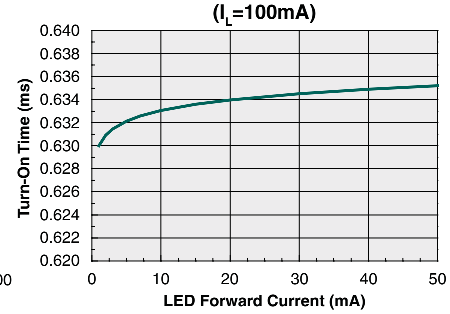
Form-B
Typical Blocking Voltage Distribution
($N=50$, $I_F=2mA$)



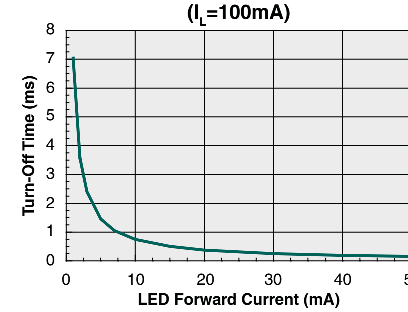
Form-B
Typical LED Forward Voltage Drop
vs. Temperature



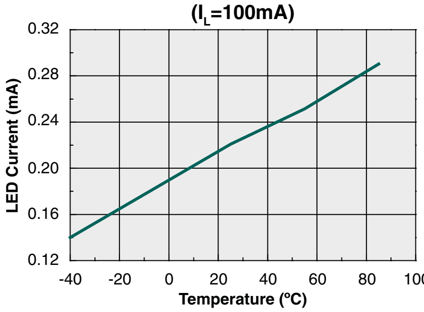
Form-B
Typical Turn-On Time
vs. LED Forward Current
($I_L=100mA$)



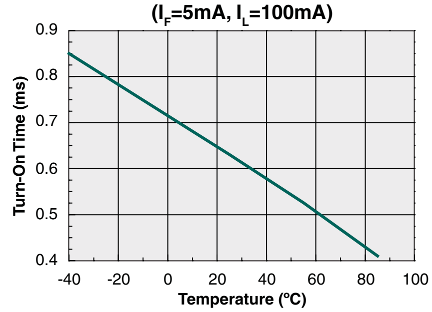
Form-B
Typical Turn-Off Time
vs. LED Forward Current
($I_L=100mA$)



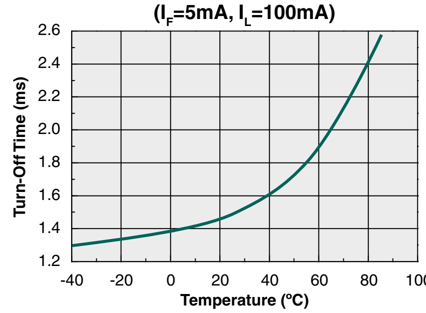
Form-B
Typical I_F for Switch Operation
vs. Temperature
($I_L=100mA$)



Form-B
Typical Turn-On Time
vs. Temperature
($I_F=5mA$, $I_L=100mA$)



Form-B
Typical Turn-Off Time
vs. Temperature
($I_F=5mA$, $I_L=100mA$)



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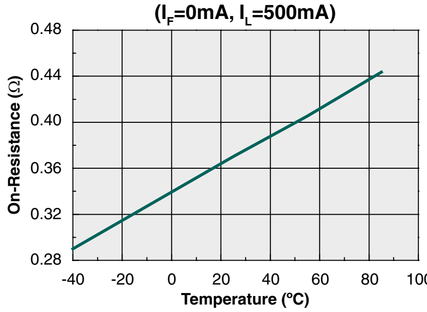
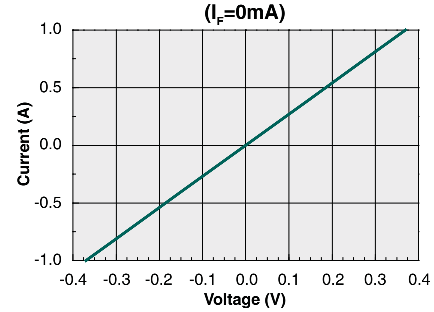
Form-B RELAY PERFORMANCE DATA @25°C (Unless Otherwise Noted)*

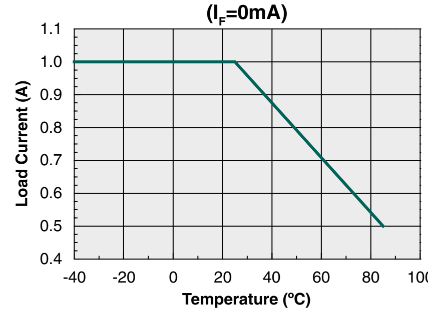
Form-B
Typical On-Resistance
vs. Temperature
(I_F=0mA, I_L=500mA)



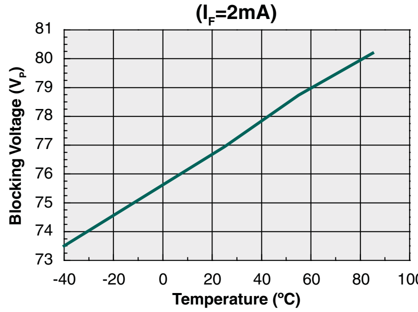
Form-B
Typical Load Current
vs. Load Voltage
(I_F=0mA)



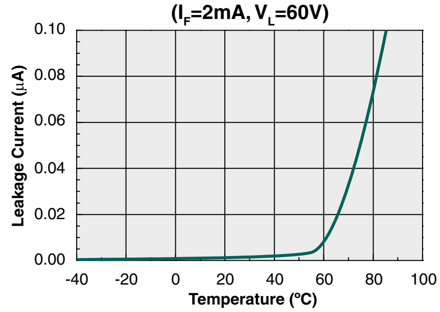
Form-B
Maximum Load Current
vs. Temperature
(I_F=0mA)



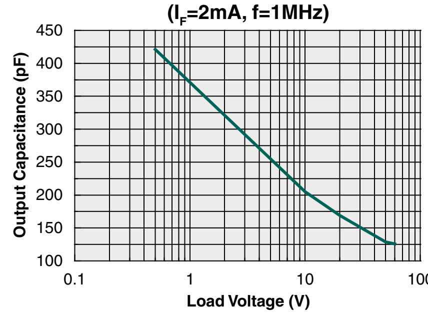
Form-B
Typical Blocking Voltage
vs. Temperature
(I_F=2mA)



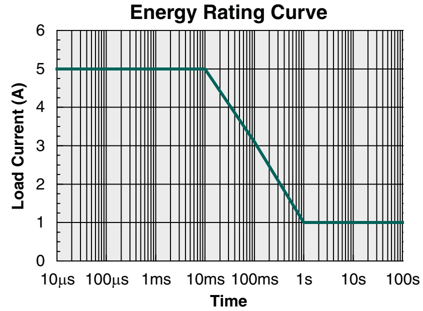
Form-B
Typical Leakage vs. Temperature
Measured Across Pins 7&8
(I_F=2mA, V_L=60V)



Form-B
Output Capacitance
vs. Load Voltage
(I_F=2mA, f=1MHz)



Form-B
Energy Rating Curve



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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
LBA710 / LBA710S	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
LBA710 / LBA710S	250°C for 30 seconds

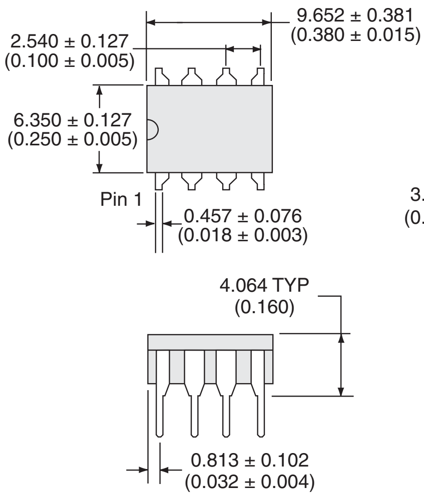
Board Wash

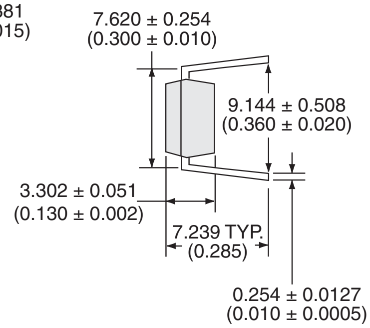
IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since IXYS Integrated Circuits Division employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a 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.

Pb RoHS e3

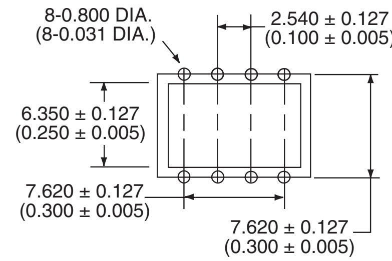
Mechanical Dimensions

LBA710



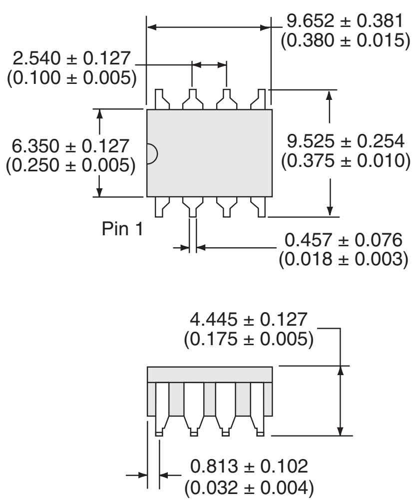


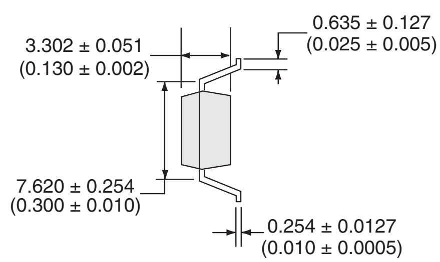
PCB Hole Pattern



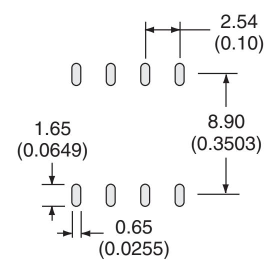
Dimensions
mm
(inches)

LBA710S



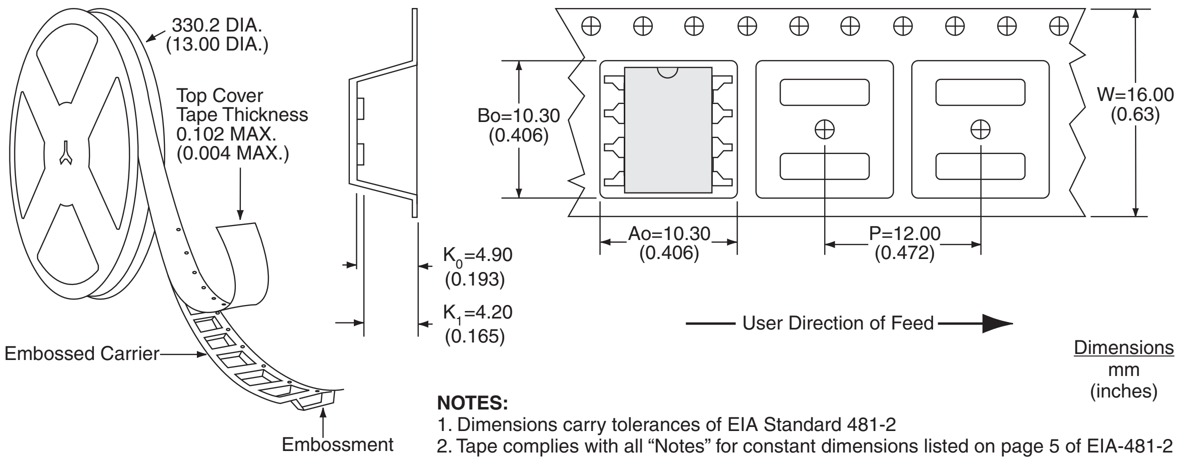


PCB Land Pattern



Dimensions
mm
(inches)

LBA710STR 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

Specification: DS-LBA710-R02

12/22/2012