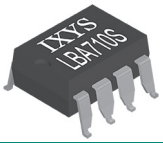
Not For New Designs

IXYS
INTEGRATED CIRCUITS DIVISION



LBA710
60V, 1A Dual Single-Pole Relays: 1-Form-A (NO) & 1-Form-B (NC)

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
- No EMI/RFI Generation
- Surface Mount Version
- Small 8-Pin Package
- Tape & Reel available

Applications
- Security
- Instrumentation
- Multiplexers
- Data Acquisition
- Electronic Switching
- I/O Subsystems
- Medical Equipment-Patient/Equipment Isolation
- Industrial Controls

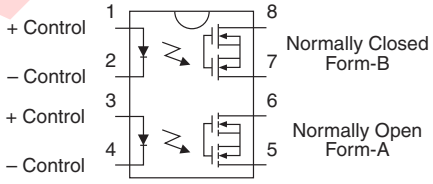
Description
LBA710 is a 60V, 1A, 0.6Ω dual Solid State Relay integrating independent single-pole normally open (1-Form-A) and single-pole normally closed (1-Form-B) relays into a single package. It features a superior combination of low on-resistance and 1A load current handling capability.

Approvals
- UL Recognized Component: File # E76270
- CSA Certified Component: Certificate # 1175739
- TUV EN 62368-1: Certificate # B 082667 0008

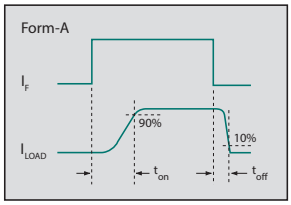
Ordering Information

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

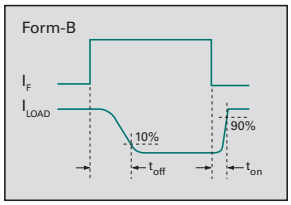
Pin Configuration



Switching Characteristics of Normally Open Devices



Switching Characteristics of Normally Closed Devices



NFND

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, Ambient	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 1.33 mW / °C

[2] Derate output power linearly 6.67 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 @ 25°C

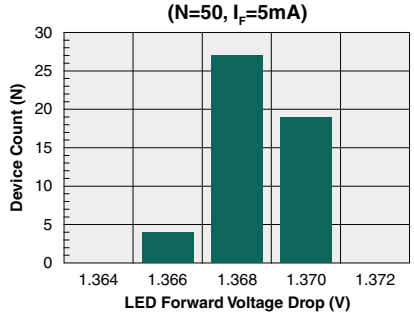
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics: Form-A (Normally Open)						
Blocking Voltage	I_L=1µA	V_{DRM}	60	-	-	V_P
Load Current						
Continuous	I_F=2mA	I_L	-	-	1	A_{rms} / A_{DC}
Peak	I_F=2mA, t ≤ 10ms	I_{LPK}	-	-	±5	A_P
On-Resistance	I_F=2mA, I_L=1A	R_{ON}	-	0.21	0.6	Ω
Switching Speeds						
Turn-On Output (Activate)	I_F=5mA, V_L=10V	t_{on}	-	0.7	5	ms
Turn-Off Output (Deactivate)		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)						
Blocking Voltage	I_F=2mA, I_L=1µA	V_{DRM}	60	-	-	V_P
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 Output (Deactivate)	I_F=5mA, V_L=10V	t_{on}	-	0.63	5	ms
Turn-Off Output (Activate)		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	1.36	1.5	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics: Form-A and Form-B						
Capacitance, Input to Output	V_{IO}=0V, f=1MHz	C_{IO}	-	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.

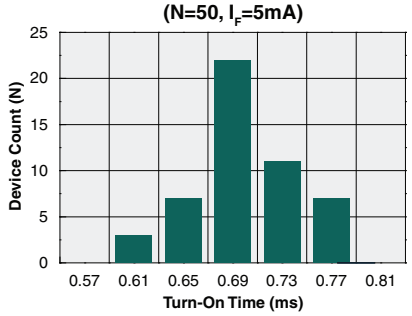
NFND

Form-A PERFORMANCE DATA*

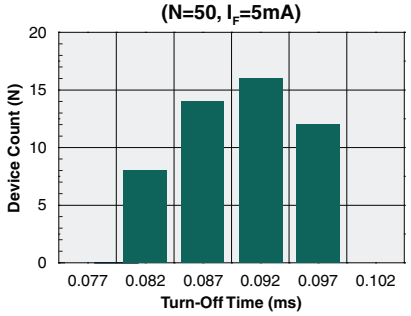
Form-A
Typical LED Forward Voltage Drop
(N=50, I_F=5mA)



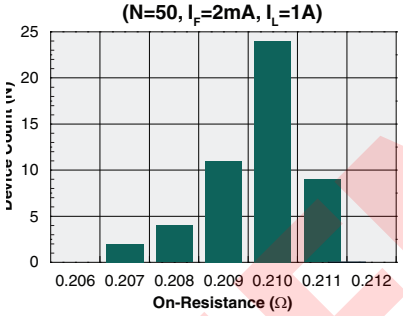
Form-A
Typical Turn-On Time
(N=50, I_F=5mA)



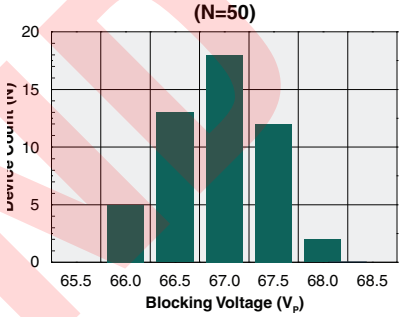
Form-A
Typical Turn-Off Time
(N=50, I_F=5mA)



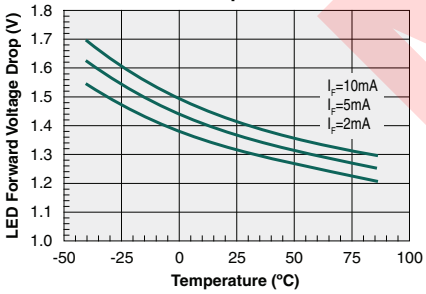
Form-A
Typical On-Resistance Distribution
(N=50, I_F=2mA, I_L=1A)



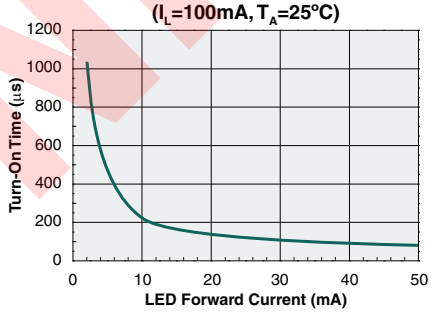
Form-A
Typical Blocking Voltage Distribution
(N=50)



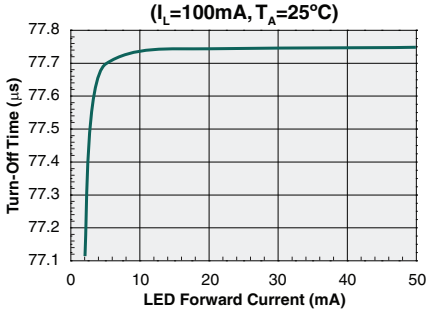
Typical LED Forward Voltage Drop
vs. Temperature



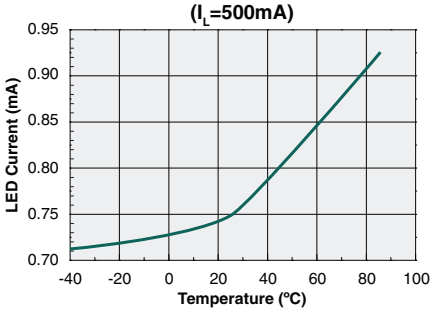
Form-A
Typical Turn-On
vs. LED Forward Current
(I_L=100mA, T_A=25°C)



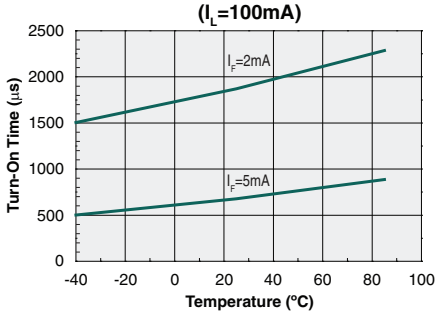
Form-A
Typical Turn-Off
vs. LED Forward Current
(I_L=100mA, T_A=25°C)



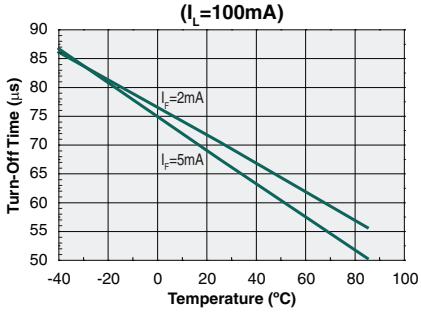
Form-A
Typical I_F for Switch Operation
vs. Temperature
(I_L=500mA)



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



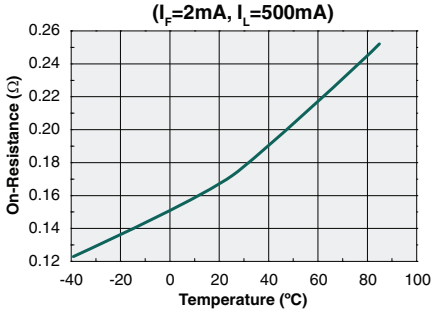
Form-A
Typical Turn-Off Time
vs. Temperature
(I_L=100mA)



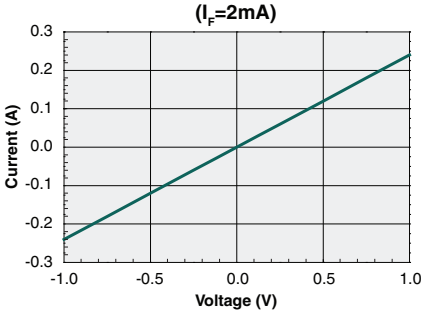
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.

Form-A PERFORMANCE DATA (continued)*

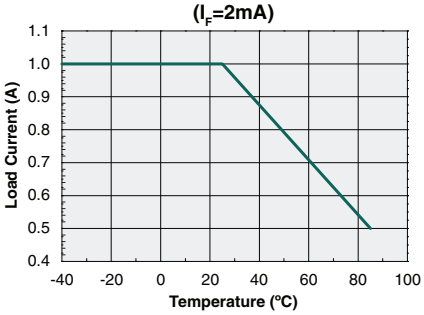
Form-A
Typical On-Resistance
vs. Temperature
(I_F=2mA, I_L=500mA)



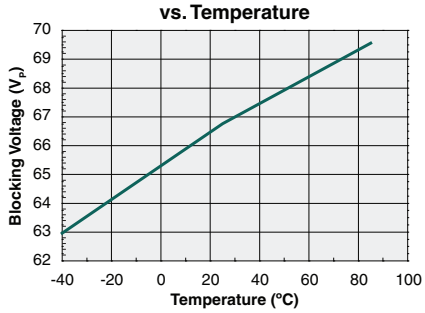
Typical Load Current
vs. Load Voltage
(I_F=2mA)



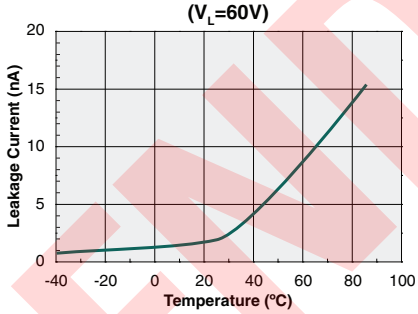
Form-A
Maximum Load Current
vs. Temperature
(I_F=2mA)



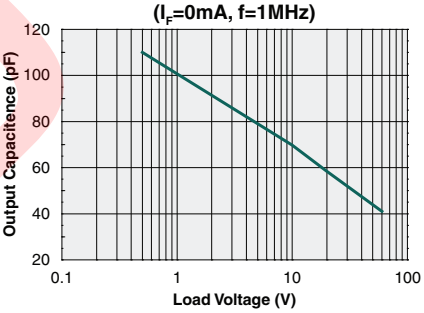
Form-A
Typical Blocking Voltage
vs. Temperature



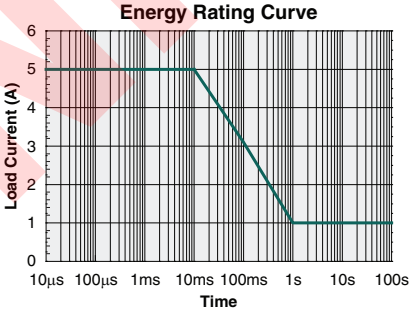
Form-A
Typical Leakage vs. Temperature
Measured Across Pins 5&6
(V_L=60V)



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



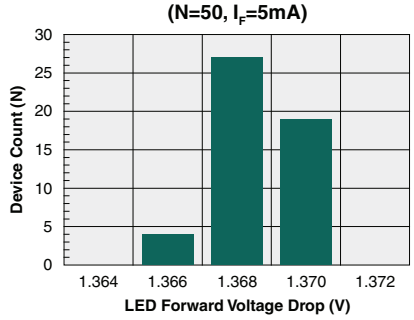
Form-A
Energy Rating Curve



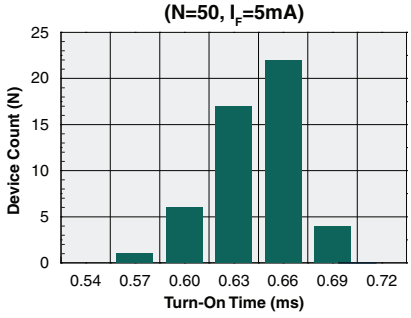
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.

Form-B PERFORMANCE DATA*

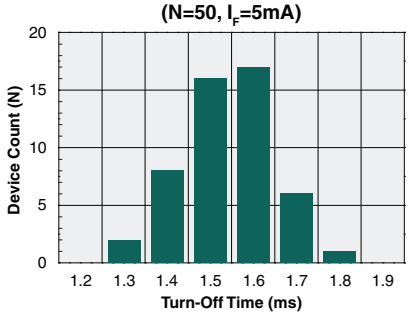
Form-B
Typical LED Forward Voltage Drop
(N=50, I_F=5mA)



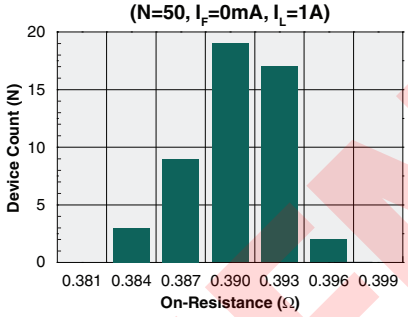
Form-B
Typical Turn-On Time
(N=50, I_F=5mA)



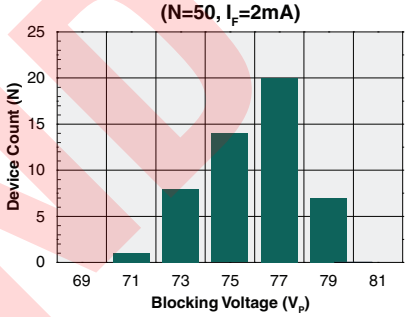
Form-B
Typical Turn-Off Time
(N=50, I_F=5mA)



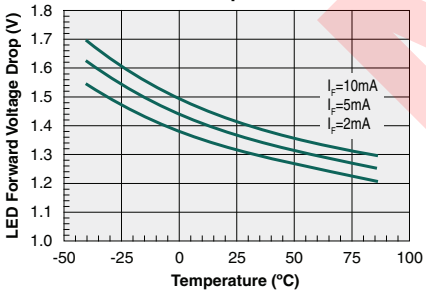
Form-B
Typical On-Resistance Distribution
(N=50, I_F=0mA, I_L=1A)



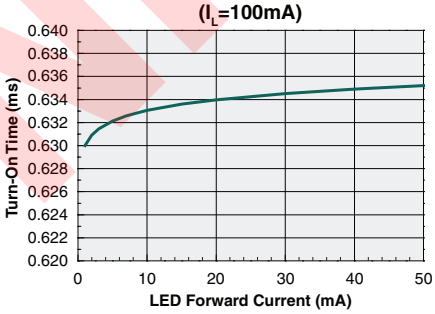
Form-B
Typical Blocking Voltage Distribution
(N=50, I_F=2mA)



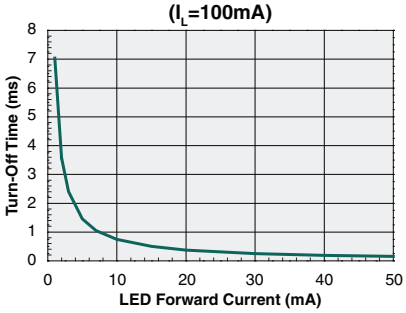
Typical LED Forward Voltage Drop
vs. Temperature



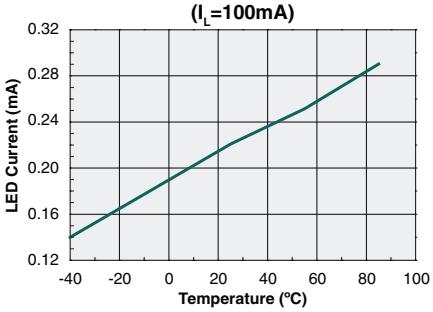
Form-B
Typical Turn-On Time
vs. LED Forward Current
(I_L=100mA)



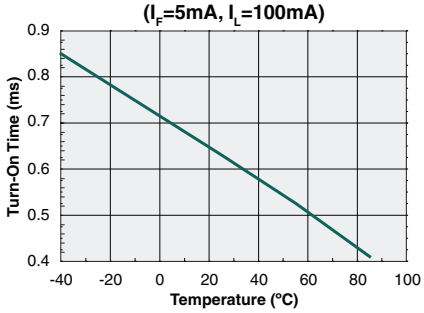
Form-B
Typical Turn-Off Time
vs. LED Forward Current
(I_L=100mA)



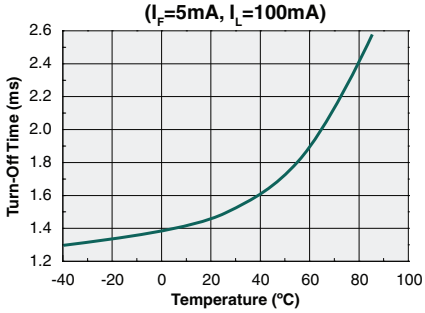
Form-B
Typical I_F for Switch Operation
vs. Temperature
(I_L=100mA)



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



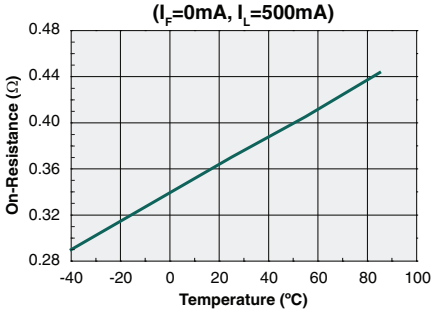
Form-B
Typical Turn-Off Time
vs. Temperature
(I_F=5mA, I_L=100mA)



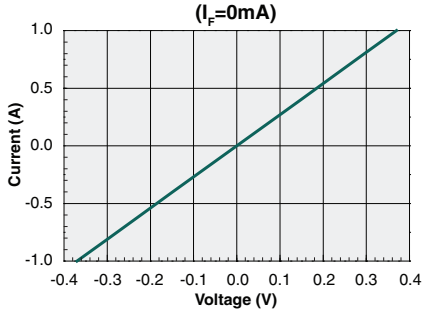
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.

Form-B PERFORMANCE DATA (continued)*

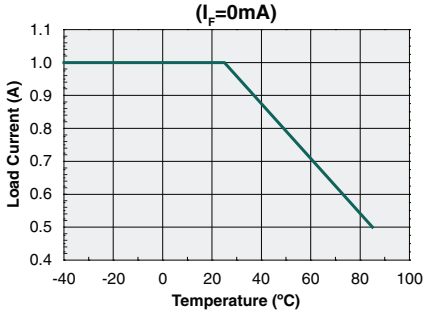
Form-B
Typical On-Resistance
vs. Temperature
(I_F=0mA, I_L=500mA)



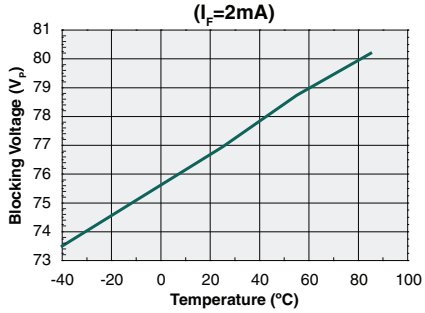
Form-B
Typical Load Current
vs. Load Voltage
(I_F=0mA)



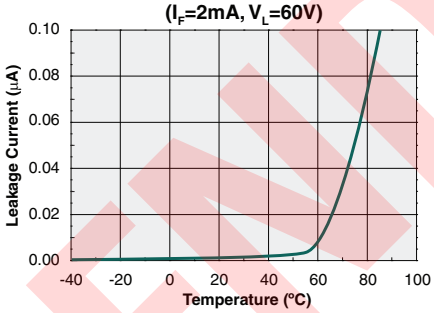
Form-B
Maximum Load Current
vs. Temperature
(I_F=0mA)



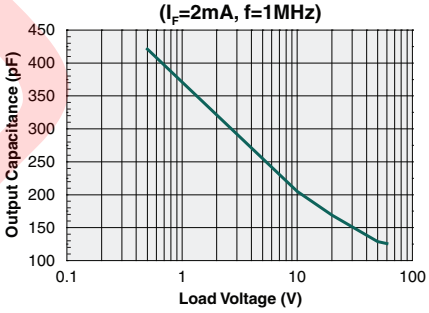
Form-B
Typical Blocking Voltage
vs. Temperature
(I_F=2mA)



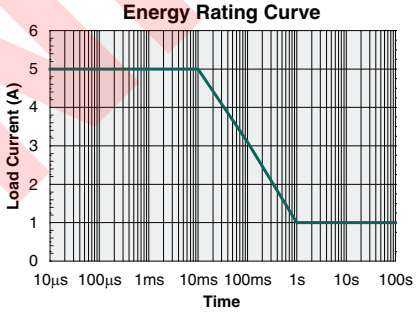
Form-B
Typical Leakage vs. Temperature
Measured Across Pins 7&8
(I_F=2mA, V_L=60V)



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



Form-B
Energy Rating Curve



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

Not For New Designs

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
LBA710S	MSL 1

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 total dwell time (t_P) in all reflow processes that the body temperature of these surface mount devices may be (T_C - 5)°C or greater. The device's body temperature must not exceed the Classification Temperature at any time during reflow soldering processes.

Device	Classification Temperature (T_c)	Dwell Time (t_P)	Max Reflow Cycles
LBA710S	250°C	30 seconds	3

For through-hole devices, the maximum pin temperature and maximum dwell time through all solder waves is provided in the table below. Dwell time is the interval beginning when the pins are initially immersed into the solder wave until they exit the solder wave. For multiple waves, the dwell time is from entering the first wave until exiting the last wave. During this time, pin temperatures must not exceed the maximum temperature given in the table below. Body temperature of the device must not exceed the limit shown in the table below at any time during the soldering process.

Device	Maximum Pin Temperature	Maximum Body Temperature	Maximum Dwell Time	Wave Cycles
LBA710	260°C	250°C	10 seconds*	1

*Total cumulative duration of all waves.

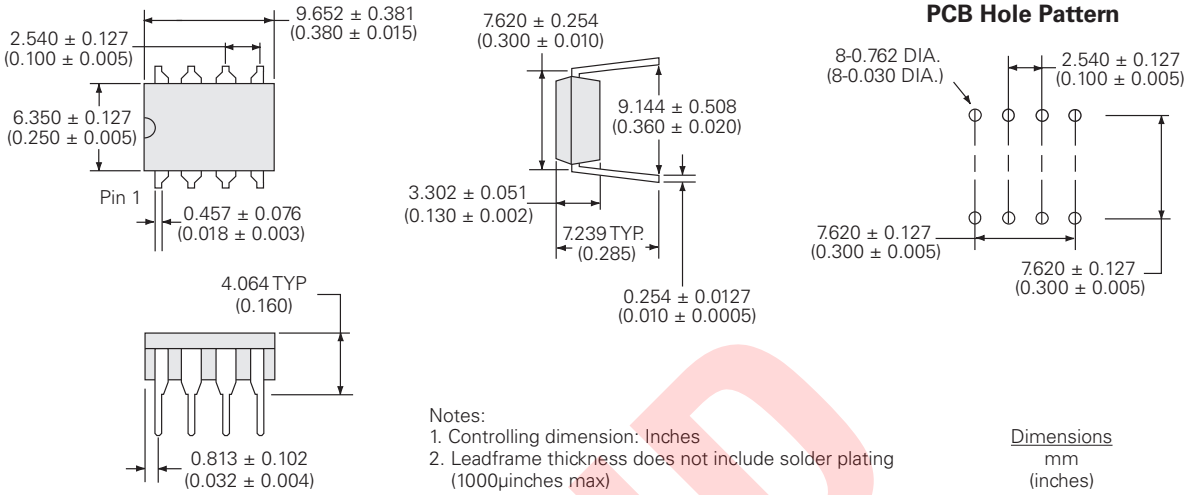
Board Wash

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.

Not For New Designs

Mechanical Dimensions

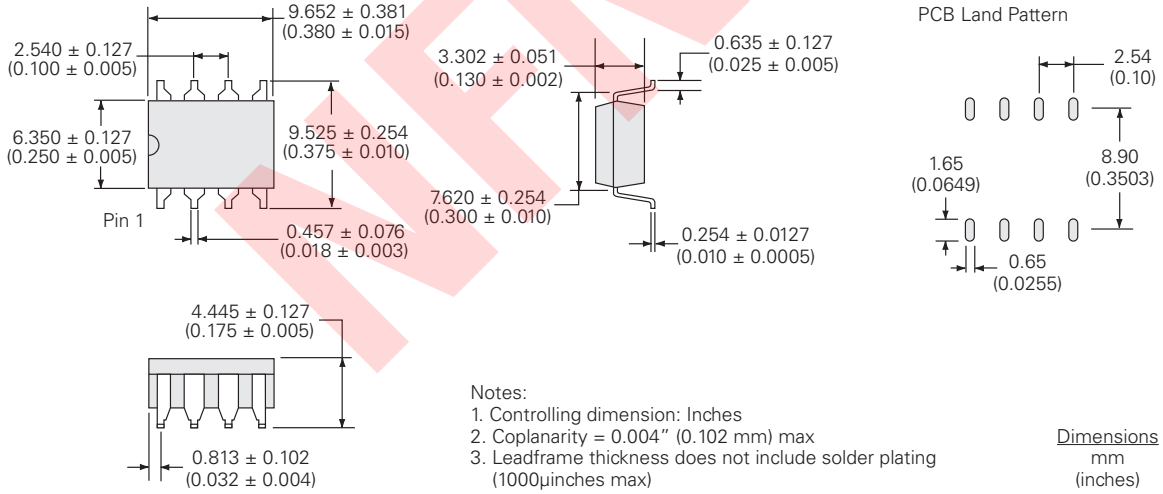
LBA710



Notes:
1. Controlling dimension: Inches
2. Leadframe thickness does not include solder plating (1000µinches max)

Dimensions
mm
(inches)

LBA710S

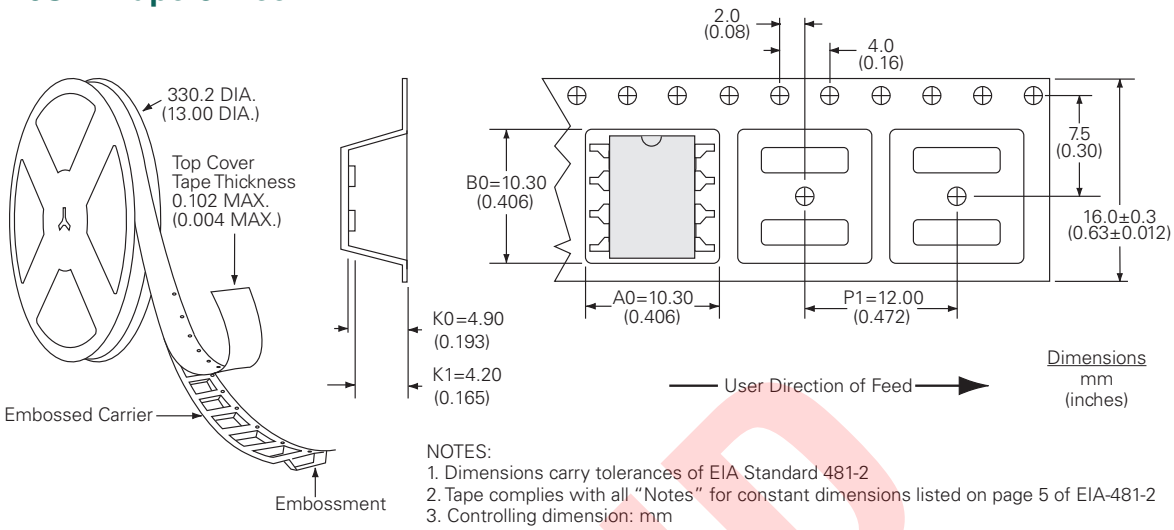


Notes:
1. Controlling dimension: Inches
2. Coplanarity = 0.004" (0.102 mm) max
3. Leadframe thickness does not include solder plating (1000µinches max)

Dimensions
mm
(inches)

NFND

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
3. Controlling dimension: mm

NFND

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

IXYS
A Littelfuse Technology

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11/18/2025