LBA716

Dual Single-Pole OptoMOS® Relays Normally Open & Normally Closed

Parameter	Rating	Units
Load Voltage	60	V
Load Current	1	A
Max On-resistance	0.4	Ω

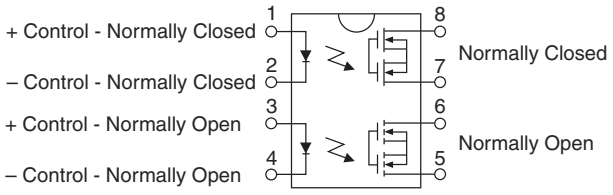
Features

- 3750V_{rms} Input/Output Isolation
- Small 8-Pin Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Surface Mount Version
- 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

Pin Configuration



Description

LBA716 is a 60V, 1A, 0.4Ω dual Solid State Relay integrating independent normally open (1-Form-A) and normally closed (1-Form-B) relays into a single package. It features a superior combination of low on-resistance and enhanced peak load current (5A max.) handling capability.

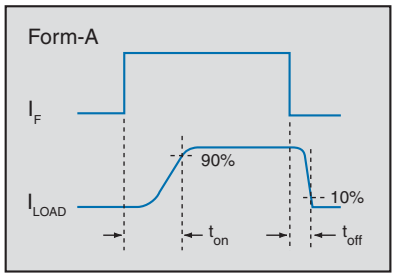
Approvals

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

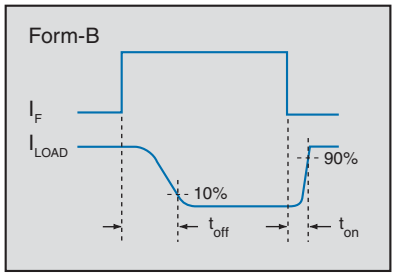
Ordering Information

Part #	Description
LBA716	8-Pin DIP (50/Tube)
LBA716S	8-Pin Surface Mount (50/Tube)
LBA716STR	8-Pin Surface Mount (1000/Reel)

Switching Characteristics of Normally Open Devices



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25ºC

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}
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate Linearly 1.33 mW/°C

[2] Derate 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.

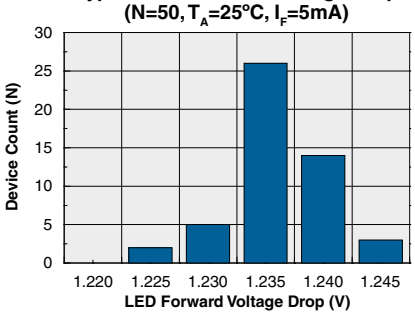
Electrical Characteristics @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Characteristics: Form-A (Normally Open)						
Load Current						
Continuous	-	I_L	-	-	1	A
Peak	t ≤ 10ms	I_{LPK}	-	-	5	
On-resistance	I_L=1A	R_{ON}	-	0.21	0.4	Ω
Off-State Leakage Current	V_L=60V	I_{LEAK}	-	-	1	µA
Output Capacitance	50V, f=1MHz	C_{OUT}	-	105	-	pF
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{ON}	-	0.7	5	ms
Turn-Off		t_{OFF}	-	0.09	5	
Input Control Current	I_L=1A	I_F	-	-	2	mA
Input Dropout Current	-	I_F	0.1	-	-	mA
Characteristics: Form-B (Normally Closed)						
Load Current						
Continuous	-	I_L	-	-	0.5	A
Peak	t ≤ 10ms	I_{LPK}	-	-	1.2	
On-resistance	I_L=0.5A	R_{ON}	-	1.63	2	Ω
Off-State Leakage Current	V_L=60V, I_F=5mA	I_{LEAK}	-	-	1	µA
Output Capacitance	I_F=5mA, 50V, f=1MHz	C_{OUT}	-	280	-	pF
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{ON}	-	0.58	5	ms
Turn-Off		t_{OFF}	-	0.76	5	
Input Control Current	-	I_F	-	-	2	mA
Input Dropout Current	I_L=0.5A	I_F	0.1	-	-	mA
Common Characteristics: Form-A and Form-B						
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
Capacitance, Input to Output	-	$C_{I/O}$	-	3	-	pF

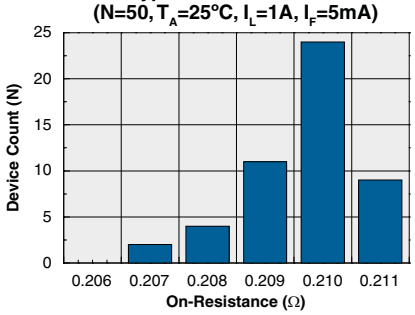
*NOTE: If both poles operate simultaneously load current must be derated so as not to exceed the package power dissipation value.

PERFORMANCE DATA*

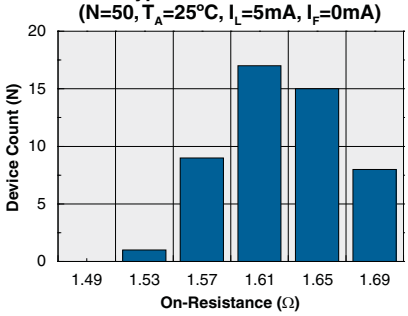
1-Form-A & 1-Form-B Relays
Typical LED Forward Voltage Drop
(N=50, T_A=25°C, I_F=5mA)



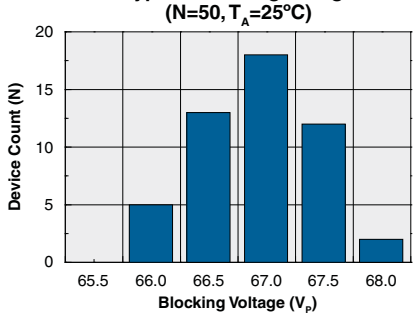
1-Form-A Relay
Typical On-Resistance
(N=50, T_A=25°C, I_L=1A, I_F=5mA)



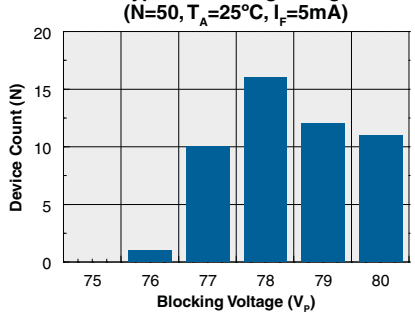
1-Form-B Relay
Typical On-Resistance
(N=50, T_A=25°C, I_L=5mA, I_F=0mA)



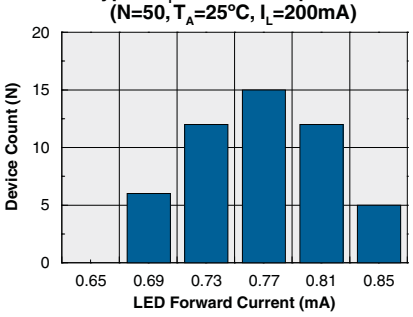
1-Form-A Relay
Typical Blocking Voltage
(N=50, T_A=25°C)



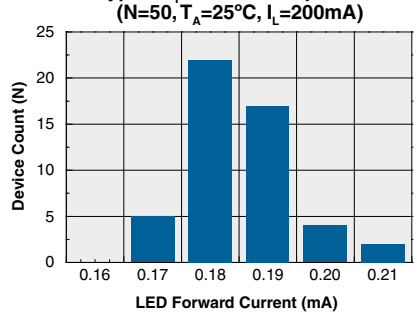
1-Form-B Relay
Typical Blocking Voltage
(N=50, T_A=25°C, I_F=5mA)



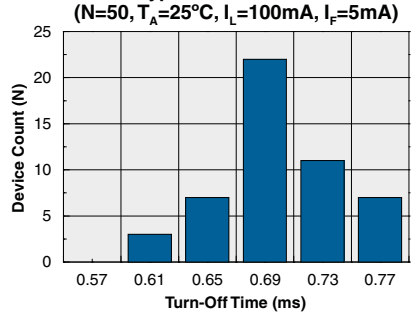
1-Form-A Relay
Typical I_F for Switch Operation
(N=50, T_A=25°C, I_L=200mA)



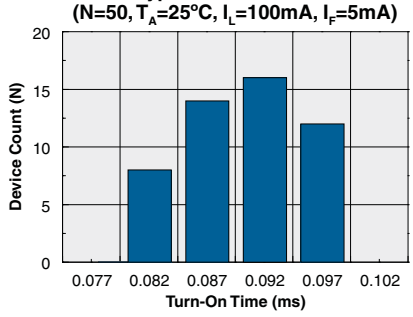
1-Form-B Relay
Typical I_F for Switch Operation
(N=50, T_A=25°C, I_L=200mA)



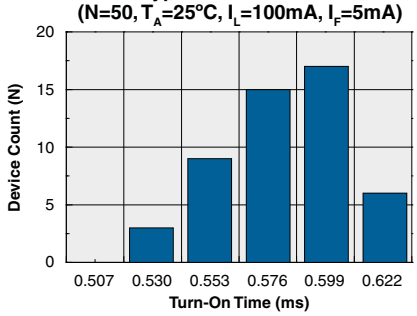
1-Form-A Relay
Typical Turn-On Time
(N=50, T_A=25°C, I_L=100mA, I_F=5mA)



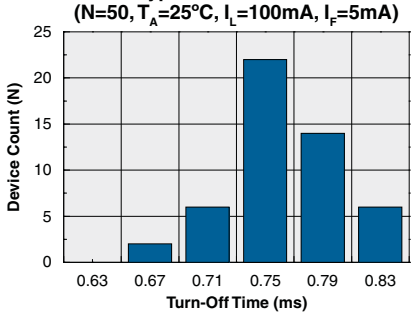
1-Form-A Relay
Typical Turn-Off Time
(N=50, T_A=25°C, I_L=100mA, I_F=5mA)



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



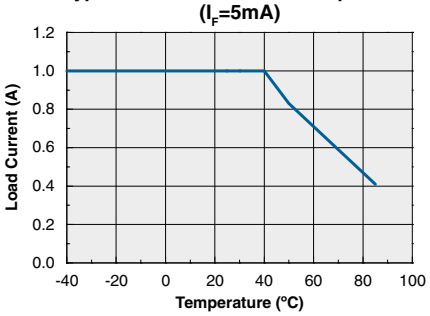
1-Form-B Relay
Typical Turn-Off Time
(N=50, T_A=25°C, I_L=100mA, I_F=5mA)



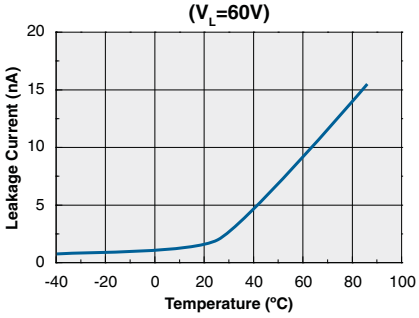
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

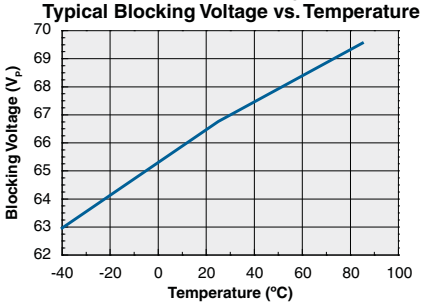
Form-A Relay
Typical Load Current vs. Temperature
(I_F=5mA)



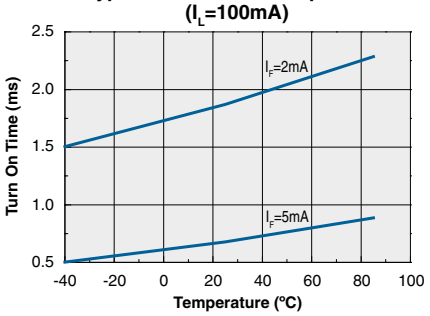
1-Form-A Relay
Typical Leakage vs. Temperature
Measured Across Pins 5 & 6
(V_L=60V)



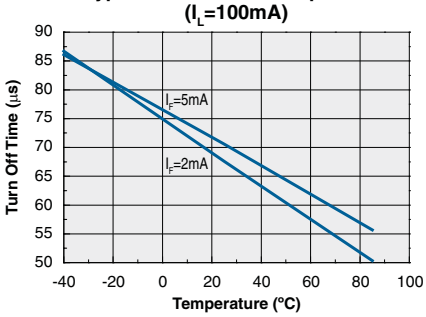
1-Form-A Relay
Typical Blocking Voltage vs. Temperature



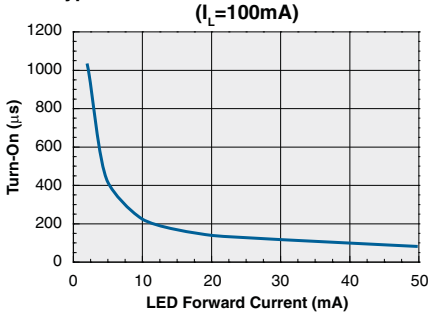
1-Form-A Relay
Typical Turn-On vs. Temperature
(I_L=100mA)



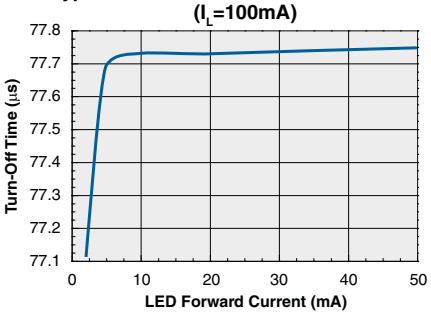
1-Form-A Relay
Typical Turn-Off vs. Temperature
(I_L=100mA)



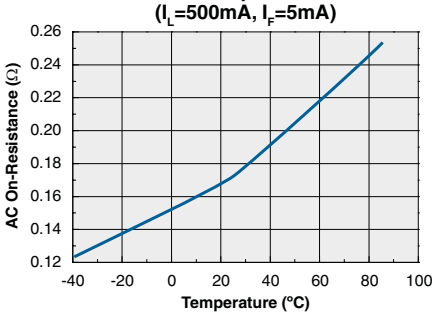
1-Form-A Relay
Typical Turn-On vs. LED Forward Current
(I_L=100mA)



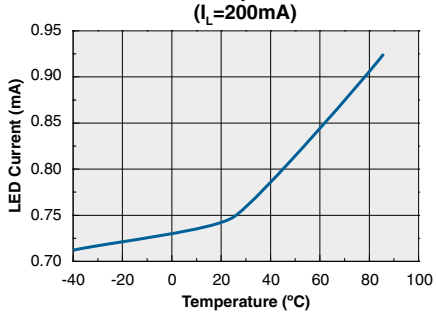
1-Form-A Relay
Typical Turn-Off vs. LED Forward Current
(I_L=100mA)



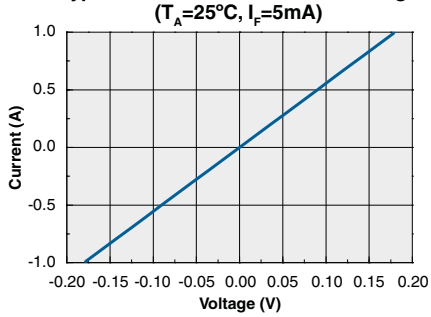
1-Form-A Relay
Typical On-Resistance (AC)
vs. Temperature
(I_L=500mA, I_F=5mA)



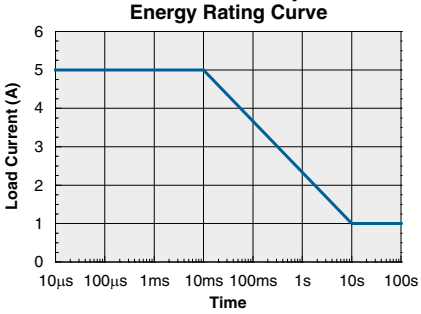
1-Form-A Relay
Typical I_F for Switch Operation
vs. Temperature
(I_L=200mA)



1-Form-A Relay
Typical Load Current vs. Load Voltage
(T_A=25°C, I_F=5mA)



1-Form-A Relay
Energy Rating Curve



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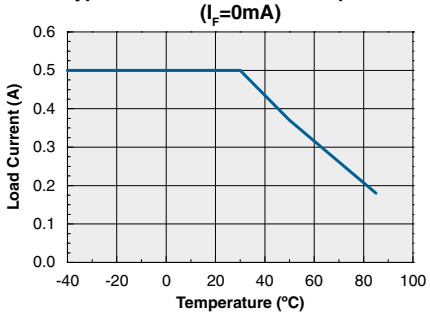
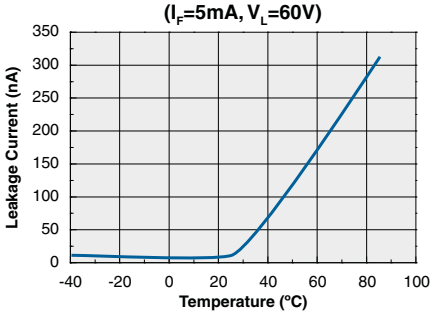
PERFORMANCE DATA*

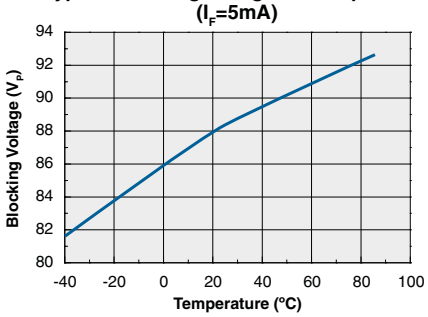
Form-B Relay
Typical Load Current vs. Temperature
(I_F=0mA)



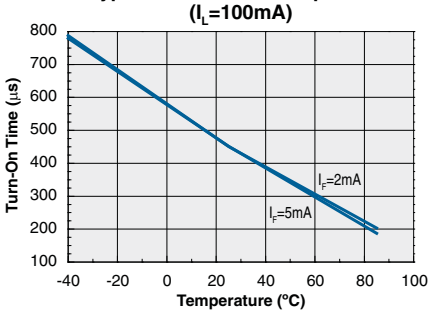
1-Form-B Relay
Typical Leakage vs.Temperature
Measured Across Pins 7&8
(I_F=5mA, V_L=60V)



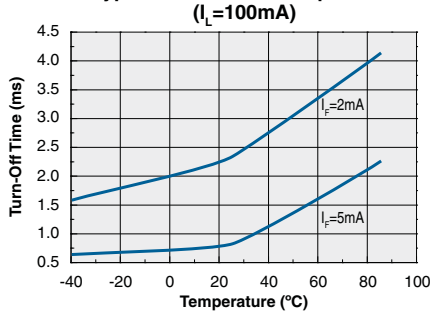
1-Form-B Relay
Typical Blocking Voltage vs. Temperature
(I_F=5mA)



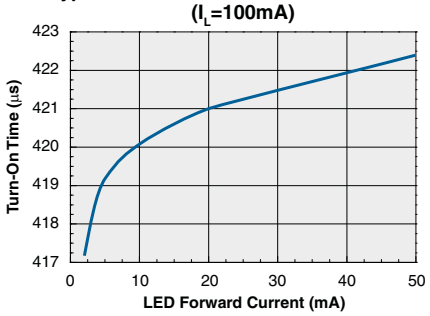
1-Form-B Relay
Typical Turn-On vs. Temperature
(I_L=100mA)



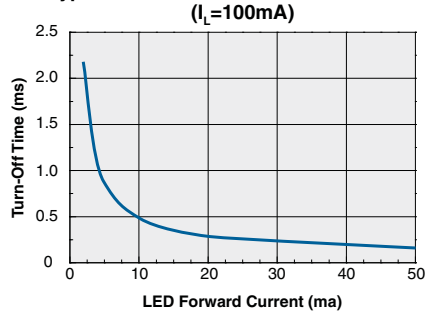
1-Form-B Relay
Typical Turn-Off vs. Temperature
(I_L=100mA)



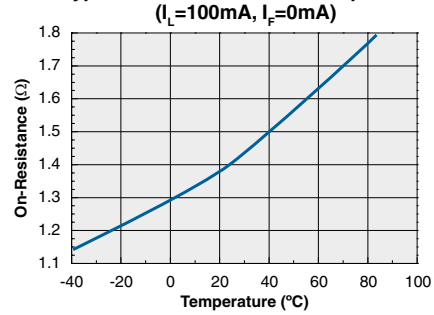
1-Form-B
Typical Turn-On vs. LED Forward Current
(I_L=100mA)



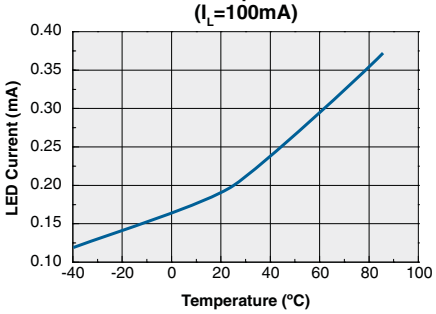
1-Form-B Relay
Typical Turn-Off vs. LED Forward Current
(I_L=100mA)



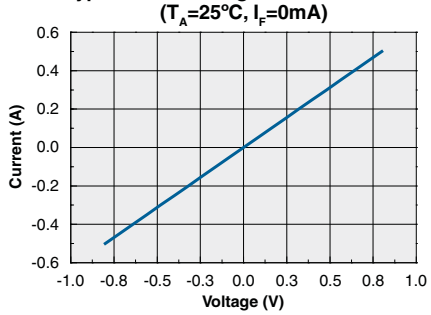
1-Form-B Relay
Typical On-Resistance vs. Temperature
(I_L=100mA, I_F=0mA)



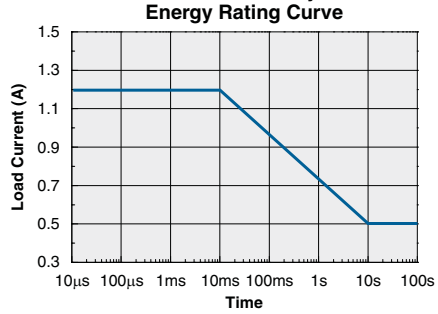
1-Form-B Relay
Typical I_F for Switch Operation
vs. Temperature
(I_L=100mA)



1-Form-B Relay
Typical Load Voltage vs. Load Current
(T_A=25°C, I_F=0mA)



1-Form-B Relay
Energy Rating Curve



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Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. Clare 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 is rated **Moisture Sensitivity Level 1 (MSL 1)**, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

ESD Sensitivity

This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

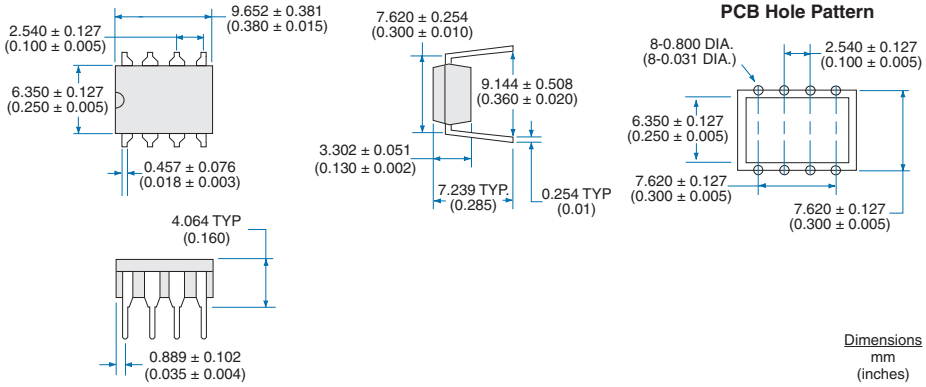
Reflow Profile

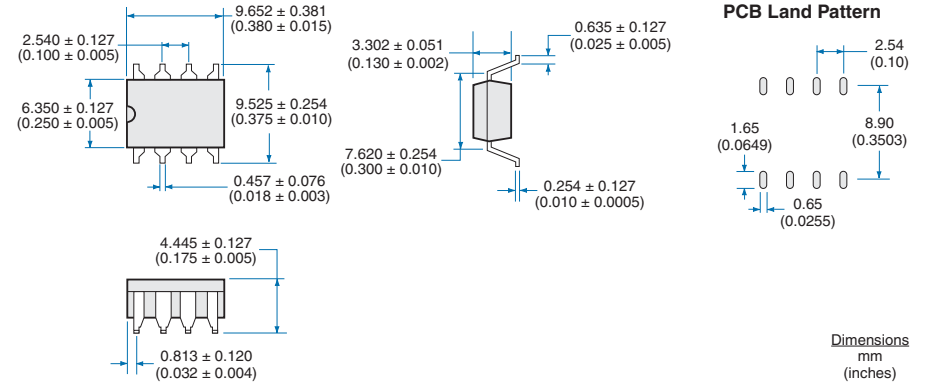
This product has a maximum body temperature rating of **250°C for a maximum of 30 seconds**. All other guidelines of **J-STD-020** must be observed.

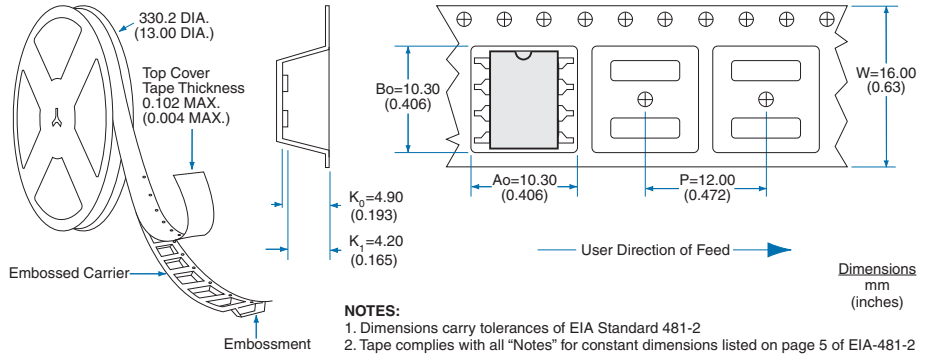
Board Wash

Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare 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







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

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

Specification: DS-LBA716-R02

6/7/2010