



# LBA127L Dual Single-Pole, Combination OptoMOS® Relay

Parameter	Ratings	Units
Blocking Voltage	250	V <sub>P</sub>
Load Current	150	mA
Max R <sub>ON</sub>	15	Ω

# **Features**

- Current Limited 1-Form-A Relay
- 3750V<sub>rms</sub> Input/Output Isolation
- Low Drive Power Requirements (TTL/CMOS Compatible)
- High Reliability
- Arc-Free With No Snubbing Circuits
- FCC Compatible
- VDE 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
  - Meters (Watt-Hour, Water, Gas)
- Medical Equipment-Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

### Description

LBA127L comprises two independent 250V, 150mA,  $15\Omega$  solid state relays: one current-limited, single-pole, normally open (1-Form-A), relay and one single-pole, normally closed (1-Form-B) relay.

The relay outputs are constructed with efficient MOSFET switches and photovoltaic die that use Clare's patented OptoMOS architecture, while the inputs, highly efficient GaAIAs infrared LEDs, provide the optically coupled control.

LBA127L is designed to provide an ideal solution where a complementary Form-A/Form-B relay pair is required in a space-saving single package.

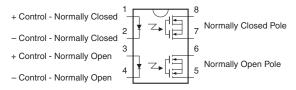
# **Approvals**

- 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**

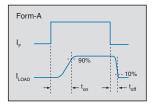
Part #	Description
LBA127L	8-Pin DIP (50/Tube)
LBA127LS	8-Pin Surface Mount (50/Tube)
LBA127LSTR	8-Pin Surface Mount (1,000/Reel)

# **Pin Configuration**

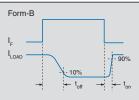


#### Switching Characteristics of Normally Open (Form A) Devices

#### Switching Characteristics of Normally Closed (Form B) Devices



(Form B) Devices





DS-LBA127L-R07



## Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Blocking Voltage	250	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	А
Input Power Dissipation <sup>1</sup>	150	mW
Total Power Dissipation <sup>2</sup>	800	mW
Isolation Voltage, Input to Output	3750	V <sub>rms</sub>
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°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.

<sup>1</sup> Derate linearly 1.33 mW / °C <sup>2</sup> Derate linearly 6.67 mW / °C

### **Electrical Characteristics @ 25°C**

Parameter	Conditions	Symbol	Min	Тур	Max	Units
Output Characteristics						
Load Current						
Continuous 1	-	I <sub>L</sub>	-	-	150	mA
Peak (Form-B Only)	t = 10ms	I <sub>LPK</sub>	-	-	400	
Load Current Limiting (Form-A Only)	I <sub>F</sub> =5mA, V <sub>L</sub> =8V	I <sub>CL</sub>	190	200	280	
On-Resistance <sup>2</sup>	I <sub>L</sub> =150mA	R <sub>on</sub>	-	6.8	15	Ω
Off-State Leakage Current	V <sub>L</sub> =250V <sub>P</sub>	I <sub>LEAK</sub>	-	-	1	μΑ
Switching Speeds						
Turn-On	L_EmA_\/_10\/	t <sub>on</sub>	-	-	5	
Turn-Off	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	t <sub>off</sub>	-	-	5	ms
Output Capacitance	V <sub>L</sub> =50V, f=1MHz	C <sub>OUT</sub>	-	110	-	pF
Input Characteristics						
Input Control Current	I <sub>L</sub> =150mA	I <sub>F</sub>	-	-	5	mA
Input Dropout Current	-	-	0.4	0.7	-	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.2	1.4	V
Reverse Input Current	V <sub>R</sub> =5V	I <sub>R</sub>	-	-	10	μА
Common Characteristics		I				
Input to Output Capacitance	-	C <sub>I/O</sub>	-	3	-	pF

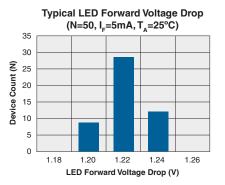
<sup>1</sup> If both poles operate the load current must be derated so as not to exceed the package power dissipation value.

<sup>2</sup> Measurement taken within 1 second of on-time.

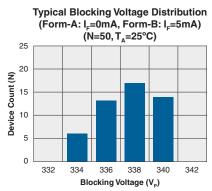


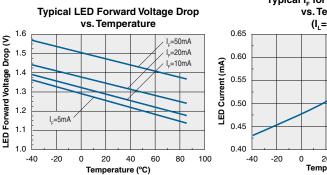
# LBA127L

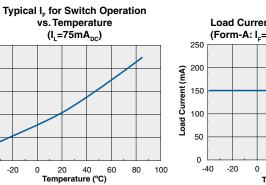
### **COMMON PERFORMANCE DATA\***

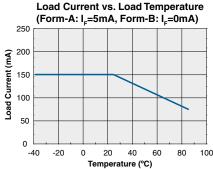




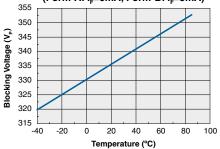








#### Typical Blocking Voltage vs. Temperature (Form-A: I<sub>F</sub>=0mA, Form-B: I<sub>F</sub>=5mA)

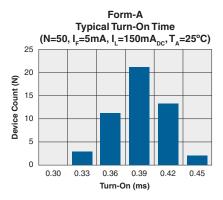


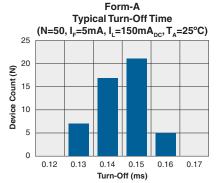
\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

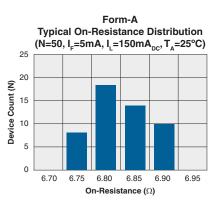


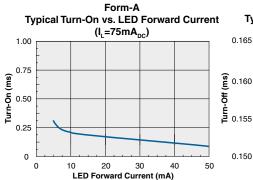
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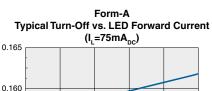


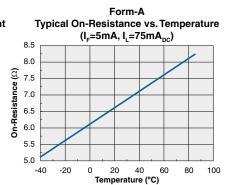


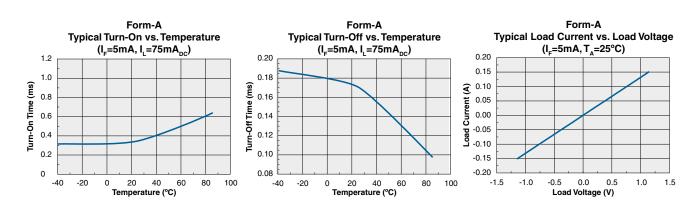












20

10

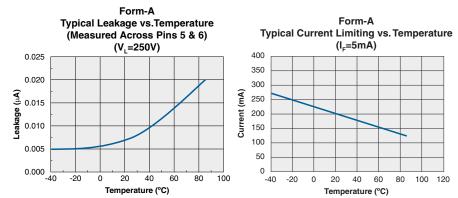
30

LED Forward Current (mA)

40

50

0



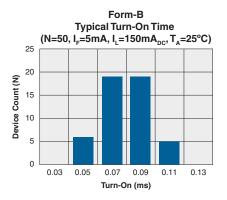
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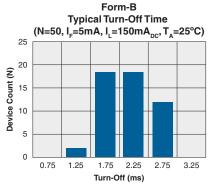
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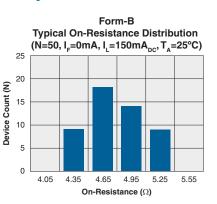


# LBA127L

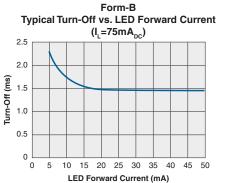
### **PERFORMANCE DATA for 1-Form-B Relay\***

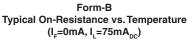


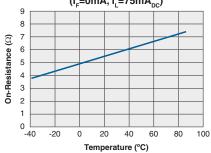


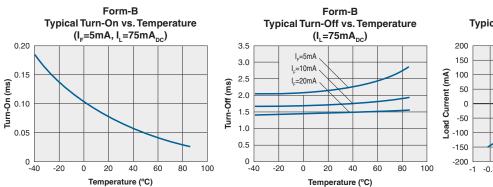


Form-B Typical Turn-On vs. LED Forward Current  $(I_{L}=75mA_{DC})$ 78.5 78.0 (ST) 77.5 **UO-ULI** 77.0 76.5 76.0 0 5 10 15 20 25 30 35 40 45 50 LED Forward Current (mA)



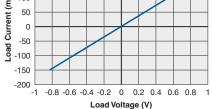






Typical Load Current vs. Load Voltage (I<sub>F</sub>=0mA, T<sub>A</sub>=25°C)

Form-B



Typical Leakage vs. Temperature Measured Across Pins 7&8 **Energy Rating Curve** (I\_=5mA) 0.06 1.2 0.05 1.0 Load Current (A) 0.8 Leakage (µA) 0.04 0.6 0.03 0.4 0.02 0.01 0.2 0 0 10μs 100μs 1ms 10ms 100ms 1s 10s 100s -20 80 100 -40 20 40 60 0 Temperature (°C) Time

\*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.

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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 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	
LBA127L / LBA127LS	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
LBA127L / LBA127LS	250°C for 30 seconds

#### **Board Wash**

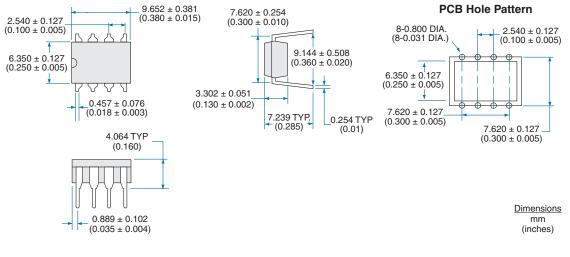
Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake may be necessary if a wash is used after solder reflow processes. Chlorine-based or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.



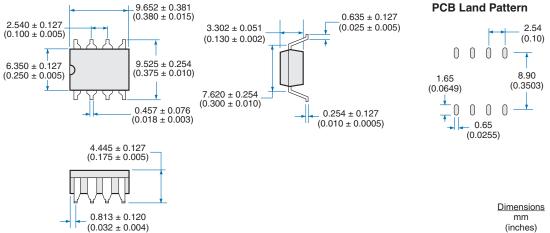


## **MECHANICAL DIMENSIONS**

### **LBA127L**



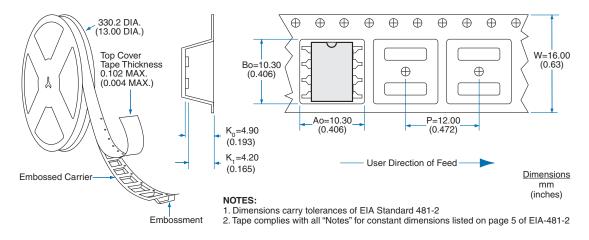
### LBA127LS





### **MECHANICAL DIMENSIONS**

### LBA127LS Tape & Reel



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