



Parameter	Ratings	Units
Blocking Voltage	350	V <sub>p</sub>
Load Current	120	mA
Max R <sub>ON</sub>	35	Ω

### Features

- Built-in Current Limiting
- 3750V<sub>rms</sub> Input/Output Isolation
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Small 6-Pin Package
- Flammability Classification Rating: V-0
- 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

The LCA110L is a normally open (1-Form-A) solid state relay that uses optically coupled MOSFET technology to provide 3750V<sub>rms</sub> of input to output isolation. Its efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS architecture. A highly efficient, optically coupled GaAIAs infrared LED controls the output.

Use the LCA110L to replace mechanical relays, and gain the superior reliability associated with semiconductor devices, which, because they have no moving parts, can offer faster, bounce-free switching in a more compact surface mount or through-hole package.

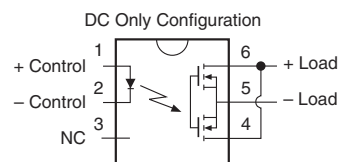
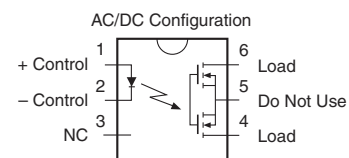
### Approvals

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

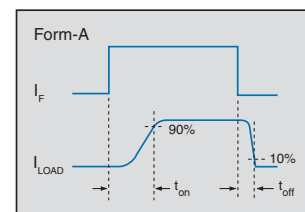
### Ordering Information

Part #	Description
LCA110L	6 Pin DIP (50/Tube)
LCA110LS	6 Pin Surface Mount (50/Tube)
LCA110LSTR	6 Pin Surface Mount (1000/Reel)

### Pin Configuration



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



**Absolute Maximum Ratings @ 25°C**

Parameter	Ratings	Units
Blocking Voltage	350	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
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

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

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

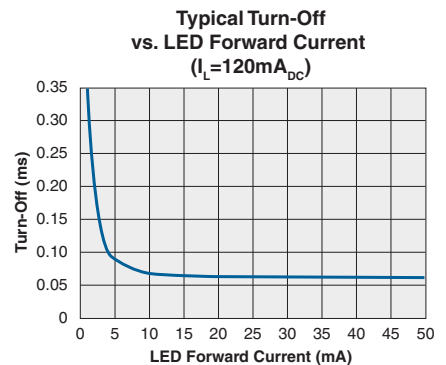
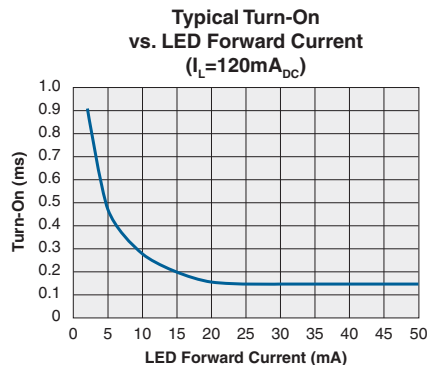
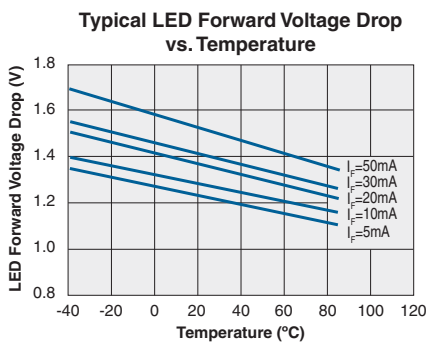
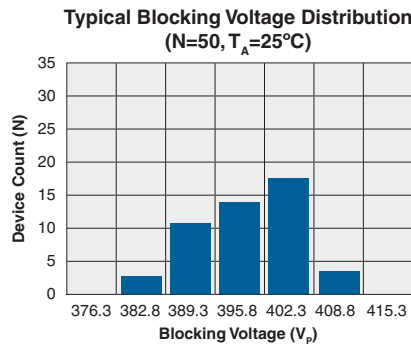
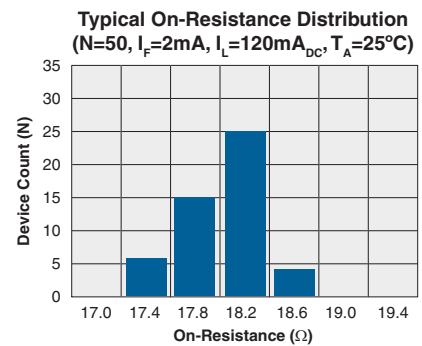
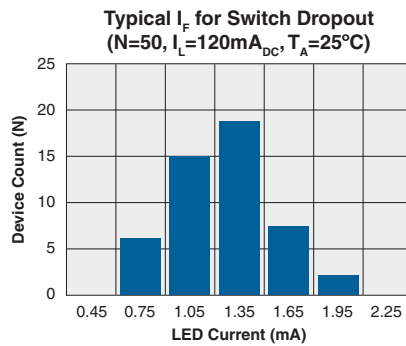
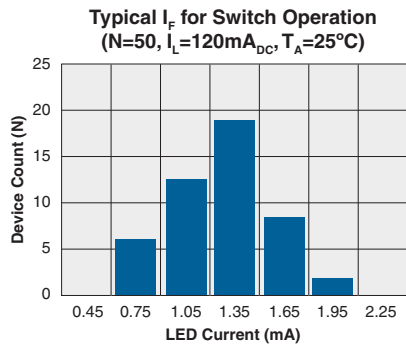
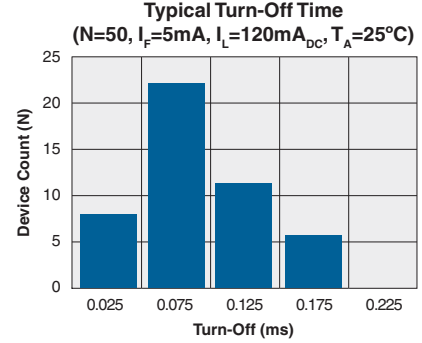
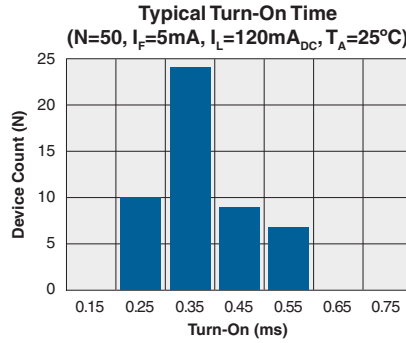
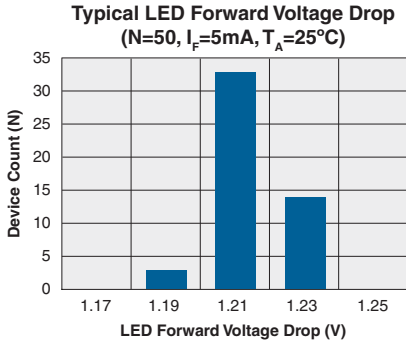
*Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.*

**Electrical Characteristics @ 25°C**

Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics</b>						
Load Current, Continuous						
AC/DC Configuration	-	I <sub>L</sub>	-	-	120	mA
DC Configuration	-	I <sub>L</sub>	-	-	200	
Load Current Limiting, AC/DC Configuration	I <sub>F</sub> =2mA, V <sub>L</sub> =8V	I <sub>CL</sub>	130	170	210	mA
On-Resistance <sup>1</sup>						
AC/DC Configuration	I <sub>L</sub> =120mA	R <sub>ON</sub>	-	19	35	Ω
DC Configuration	I <sub>L</sub> =200mA			7	10	
Off-State Leakage Current	V <sub>L</sub> =350V <sub>P</sub>	I <sub>LEAK</sub>	-	-	1	μA
Switching Speeds						
Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	t <sub>on</sub>	-	-	3	ms
Turn-Off		t <sub>off</sub>	-	-	3	
Output Capacitance	V <sub>L</sub> =50V, f=1MHz	C <sub>OUT</sub>	-	25	-	pF
<b>Input Characteristics</b>						
Input Control Current	I <sub>L</sub> =120mA	I <sub>F</sub>	-	1.1	2	mA
Input Dropout Current	-	I <sub>F</sub>	0.4	1.0	-	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	μA
<b>Common Characteristics</b>						
Input to Output Capacitance	-	C <sub>I/O</sub>	-	3	-	pF

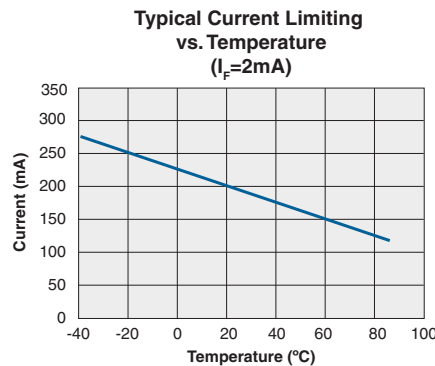
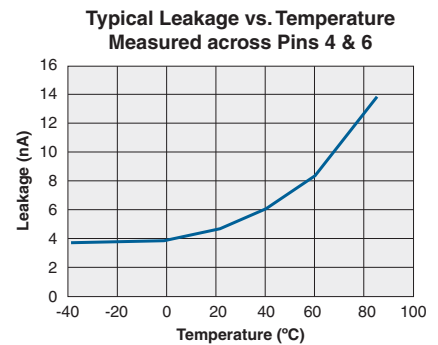
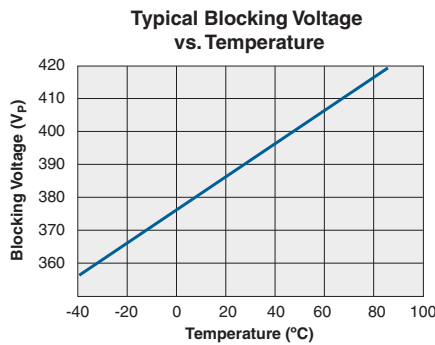
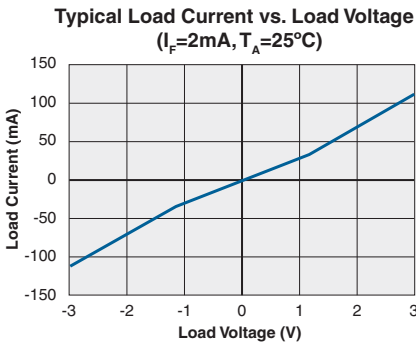
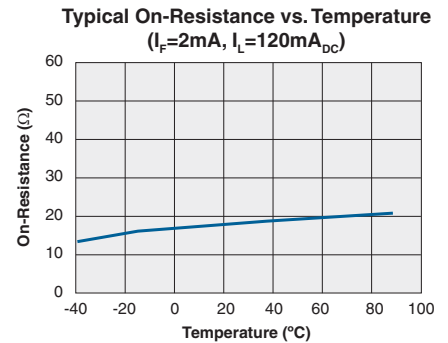
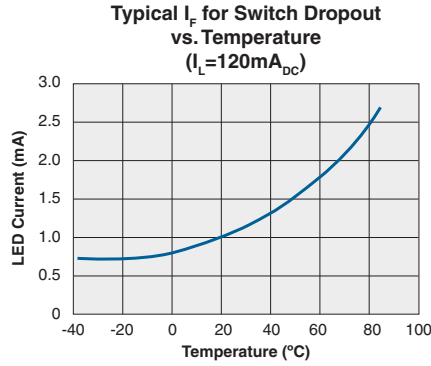
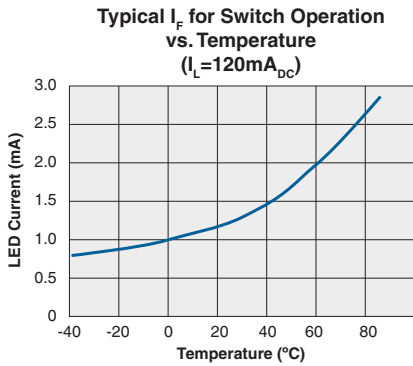
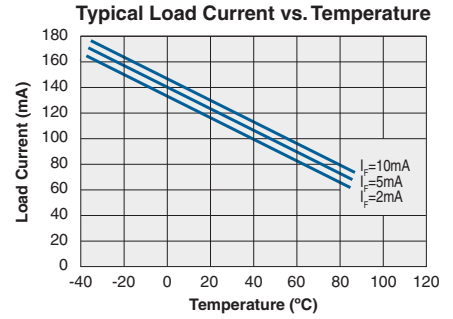
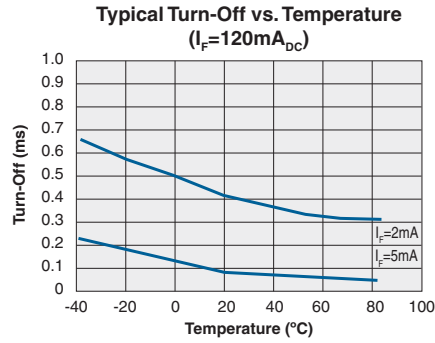
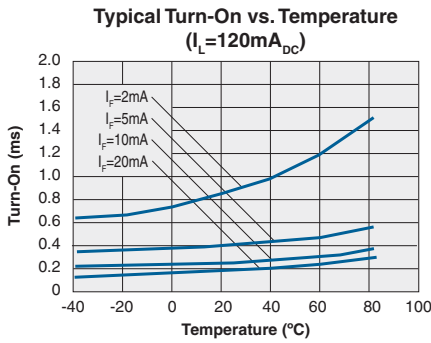
<sup>1</sup> Measurement taken within 1 second of on-time.

**PERFORMANCE DATA\***



\*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\***



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**Manufacturing Information**

**Moisture Sensitivity**



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. 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
LCA110L / LCA110LS	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
LCA110L / LCA110LS	250°C for 30 seconds

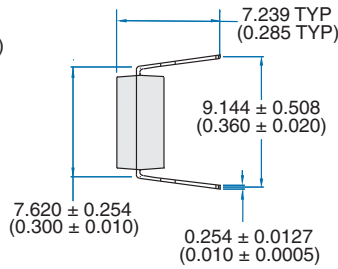
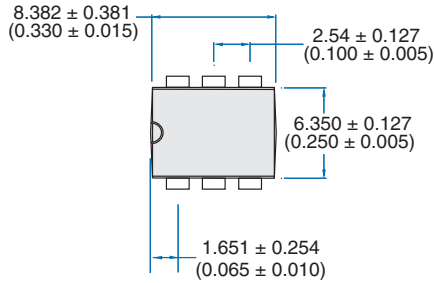
**Board Wash**

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.

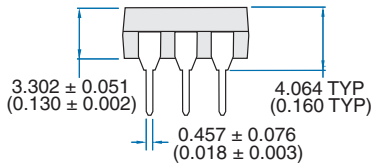
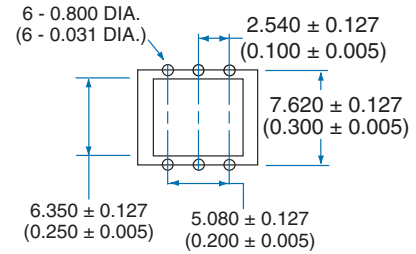


**MECHANICAL DIMENSIONS**

**LCA110L**

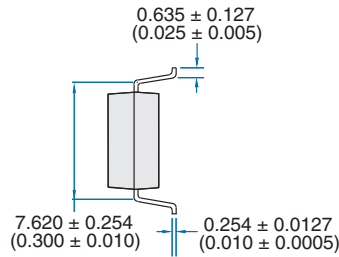
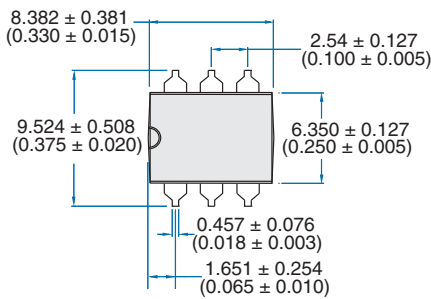


**PCB Hole Pattern**

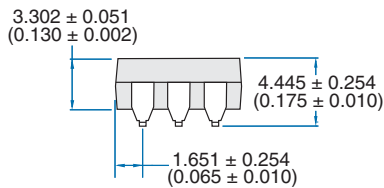
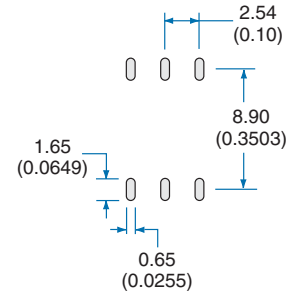


Dimensions  
mm  
(inches)

**LCA110LS**



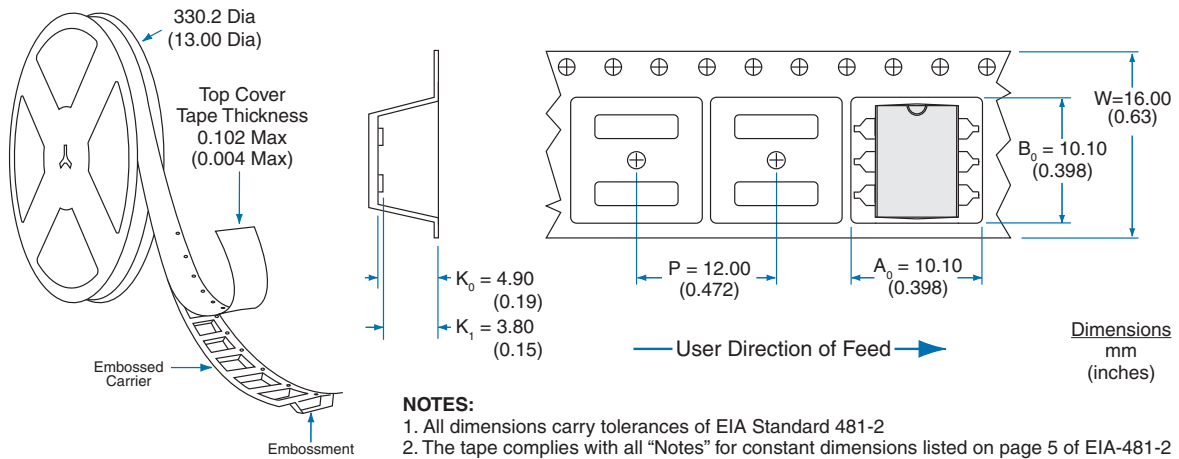
**PCB Land Pattern**



Dimensions  
mm  
(inches)

**MECHANICAL DIMENSIONS**

**LCA110LS Tape & Reel**



**For additional information please visit our website at: [www.clare.com](http://www.clare.com)**

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