



Parameter	Rating	Units
Load Voltage	350	V _P
Load Current	120	mA
Input Control Current	2	mA
Max On-resistance	35	Ω

Features

- Low Input Control Current: 2mA
- 3750V_{rms} Input/Output Isolation
- Small 6-Pin Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- High Reliability
- Arc-Free With No Snubbing Circuits
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Tape & Reel, Surface Mount 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

LCB111 is a 350V, 120mA, 35Ω, normally closed (1-Form-B) solid state relay featuring high sensitivity. It uses optically coupled relay technology to provide a 3750V_{rms} isolation barrier between the input and the output of the relay.

The efficient MOSFET switches use Clare's patented OptoMOS architecture. The optically coupled output is controlled by a highly efficient GaAlAs infrared LED.

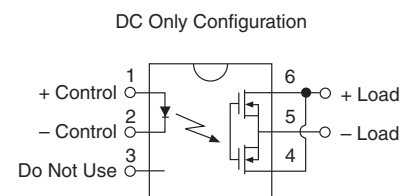
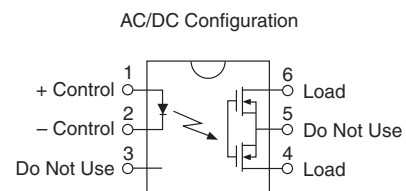
Approvals

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

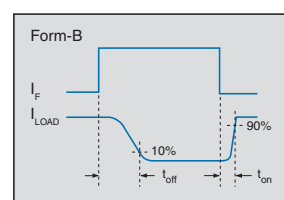
Ordering Information

Part #	Description
LCB111	6-Pin DIP (50/Tube)
LCB111S	6-Pin Surface Mount (50/Tube)
LCB111STR	6-Pin Surface Mount (1000/Reel)

Pin Configuration



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Blocking Voltage	350	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 @ 25°C

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
AC/DC Configuration, Continuous	-	I _L	-	-	120	mA
DC Configuration, Continuous	-		-	-	200	
Peak	10ms	I _{LPK}	-	-	350	mA
On-Resistance						
AC/DC Configuration	I _L =120mA	R _{ON}	-	23	35	Ω
DC Configuration	I _L =200mA		-	7	10	
Off-State Leakage Current	V _L =350V _P	I _{LEAK}	-	-	1	μA
Switching Speeds						
Turn-On	I _F =2mA, V _L =10V	t _{on}	-	2	5	ms
Turn-Off		t _{off}	-	2	5	
Output Capacitance	V _L =50V, f=1MHz	C _{OUT}	-	25	-	pF
Input Characteristics						
Input Control Current	I _L =120mA	I _F	-	1	2	mA
Input Dropout Current	-	I _F	0.4	0.7	-	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						
Capacitance, Input to Output	-	C _{I/O}	-	3	-	pF

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
LCB111 / LCB111S	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
LCB111 / LCB111S	250°C for 30 seconds

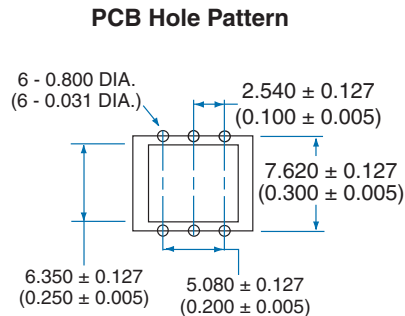
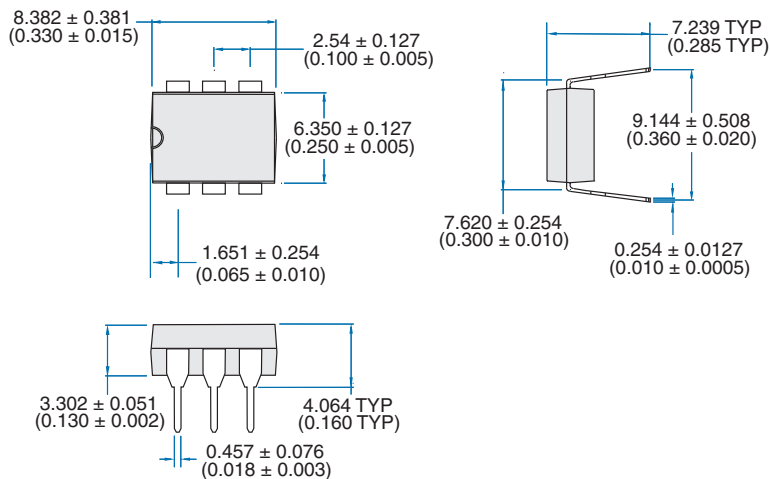
Board Wash

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 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.



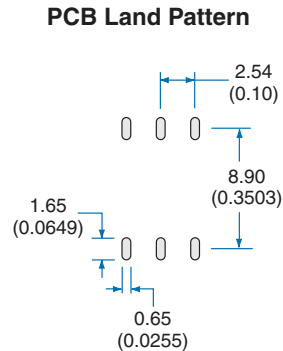
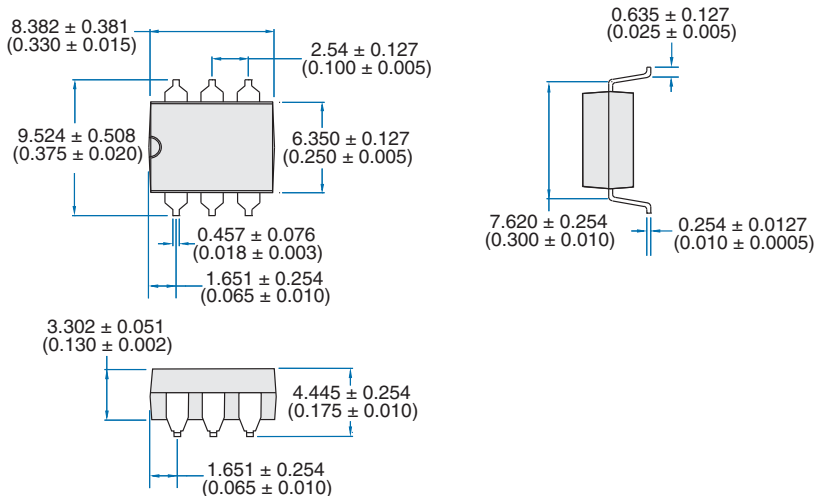
MECHANICAL DIMENSIONS

LCB111



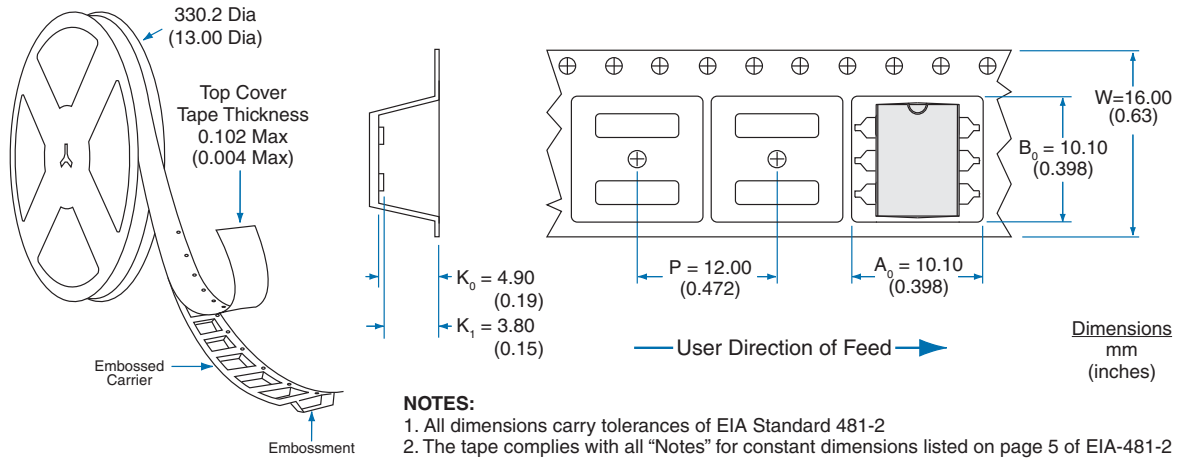
Dimensions
mm
(inches)

LCB111S



Dimensions
mm
(inches)

LCB111S Tape & Reel



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

Clare, Inc. makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication and reserves the right to make changes to specifications and product descriptions at any time without notice. Neither circuit patent licenses nor indemnity are expressed or implied. Except as set forth in Clare's Standard Terms and Conditions of Sale, Clare, Inc. assumes no liability whatsoever, and disclaims any express or implied warranty, relating to its products including, but not limited to, the implied warranty of merchantability, fitness for a particular purpose, or infringement of any intellectual property right.

The products described in this document are not designed, intended, authorized or warranted for use as components in systems intended for surgical implant into the body, or in other applications intended to support or sustain life, or where malfunction of Clare's product may result in direct physical harm, injury, or death to a person or severe property or environmental damage. Clare, Inc. reserves the right to discontinue or make changes to its products at any time without notice.