



Parameter	Rating	Units
Blocking Voltage	100	V _p
Load Current	±1.5	A
Maximum On-Resistance	0.3	Ω
Input Control Current	2	mA

Features

- 100V_p Blocking Voltage
- Operational Temperature Range: -40°C to +85°C
- 3750V_{rms} Input/Output Isolation
- Small 6-Pin Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Surface Mount and Tape & Reel Version Available

Applications

- Instrumentation
 - Multiplexers
 - Data Acquisition
 - Electronic Switching
 - I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

Description

Clare's LCA701 is a 100V, 1.5A, 0.3Ω, normally open (1-Form-A) solid state relay that uses optically coupled MOSFET technology to provide 3750V_{rms} of input-to-output isolation.

The relay outputs are constructed with efficient MOSFET switches and photovoltaic die that use Clare's patented OptoMOS architecture while the input, a highly efficient GaAlAs infrared LED, provides the optically coupled control.

The LCA701 is designed to replace electromechanical relays, and offers the superior reliability associated with solid state devices.

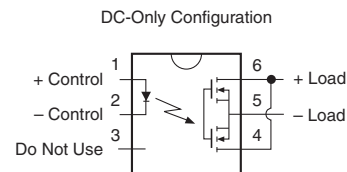
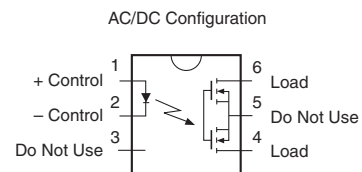
Approvals

- UL Recognized Component: File # E76270
- CSA Certified Component: Certificate 1175739
- EN 60950-1: 2006 Certified Component: TUV Certificate B 10 05 49410 006

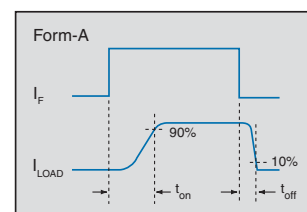
Ordering Information

Part #	Description
LCA701	6 Pin DIP (50/Tube)
LCA701S	6 Pin Surface Mount (50/Tube)
LCA701STR	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	100	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
ESD Rating, Human Body Model	8	kV
Isolation Voltage, Input to Output (60 Seconds)	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, Continuous						
AC/DC Configuration ¹	-	I _L	-	-	±1.5	A
DC-Only Configuration					2.5	
Peak Load Current	t=10ms	I _{LPK}	-	-	5	A
On-Resistance ²						
AC/DC Configuration	I _F =5mA, I _L =1.5A	R _{ON}	-	0.2	0.3	Ω
DC-Only Configuration	I _F =5mA, I _L =2.5A		-	0.06	0.09	
Off-State Leakage Current	V _L =100V _P	I _{LEAK}	-	-	1	μA
Switching Speeds						
Turn-On	I _F =5mA, V _L =10V	t _{on}	-	1.95	4	ms
Turn-Off		t _{off}	-	0.45	1	
Output Capacitance	V _L =0V, f=1MHz	-	-	200	-	pF
Input Characteristics						
Input Control Current ³	I _L =1A	I _F	-	0.14	2	mA
Input Dropout Current	-	I _F	0.1	-	-	mA
Input Voltage Drop	I _F =10mA	V _F	0.9	1.2	1.4	V
Reverse Input Current	V _R =5V	I _R	-	-	10	μA
Common Characteristics						
Input to Output Capacitance	-	C _{I/O}	-	3	-	pF

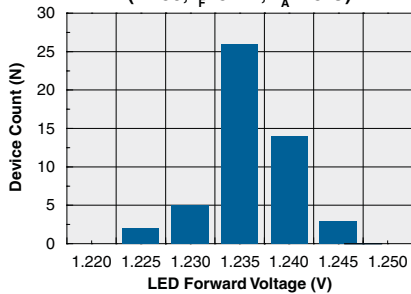
¹ Load current derates linearly from 1.5A @ 25°C to 0.75A @ 85°C.

² Measurement taken within one second of turn-on time.

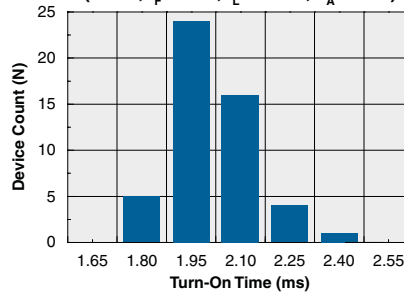
³ For applications requiring high temperature operation (T_A > 60°C) a LED current of 5mA is recommended.

Performance Data*

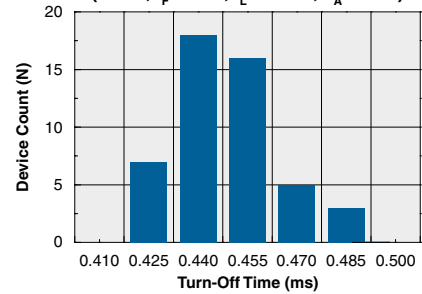
Typical LED Forward Voltage Drop
(N=50, $I_F=5\text{mA}$, $T_A=25^\circ\text{C}$)



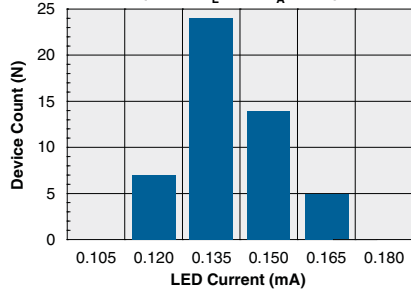
Typical Turn-On Time
(N=50, $I_F=5\text{mA}$, $I_L=75\text{mA}$, $T_A=25^\circ\text{C}$)



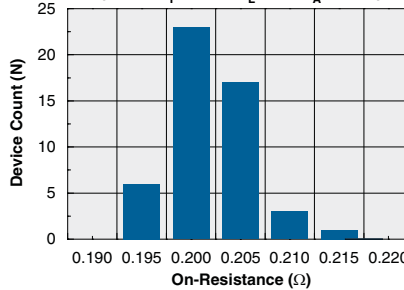
Typical Turn-Off Time
(N=50, $I_F=5\text{mA}$, $I_L=75\text{mA}$, $T_A=25^\circ\text{C}$)



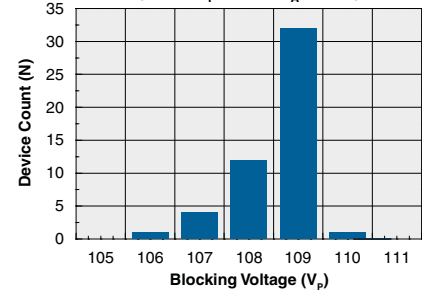
Typical I_F for Switch Operation
(N=50, $I_L=1\text{A}$, $T_A=25^\circ\text{C}$)



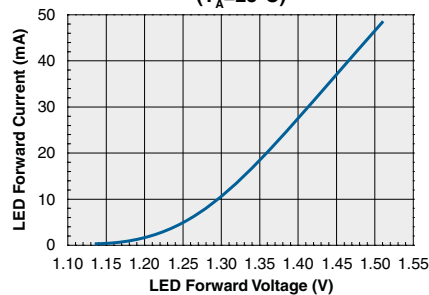
Typical On-Resistance Distribution
(N=50, $I_F=2\text{mA}$, $I_L=1\text{A}$, $T_A=25^\circ\text{C}$)



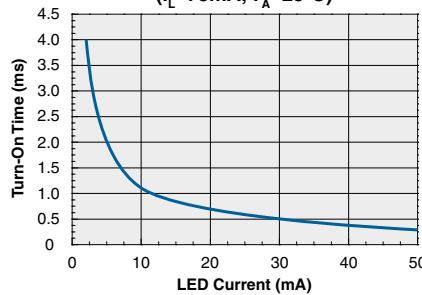
Typical Blocking Voltage Distribution
(N=50, $I_F=0\text{mA}$, $T_A=25^\circ\text{C}$)



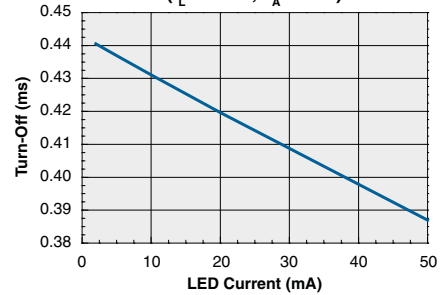
LED Forward Voltage vs. LED Forward Current
($T_A=25^\circ\text{C}$)



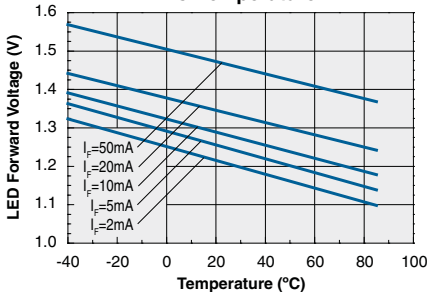
Typical Turn-On Time vs. LED Forward Current
($I_L=75\text{mA}$, $T_A=25^\circ\text{C}$)



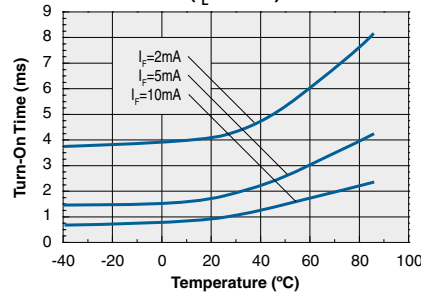
Typical Turn-Off Time vs. LED Forward Current
($I_L=75\text{mA}$, $T_A=25^\circ\text{C}$)



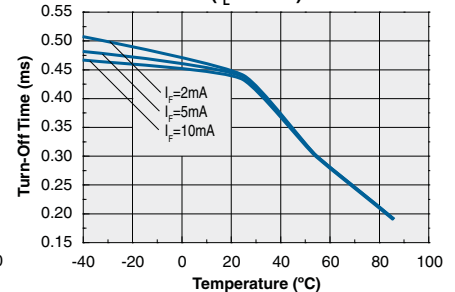
Typical LED Forward Voltage Drop vs. Temperature



Typical Turn-On Time vs. Temperature
($I_L=75\text{mA}$)

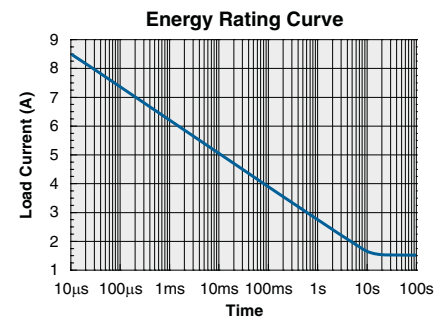
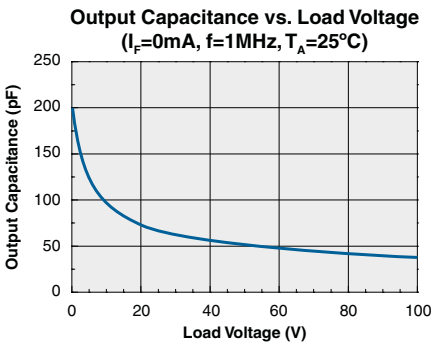
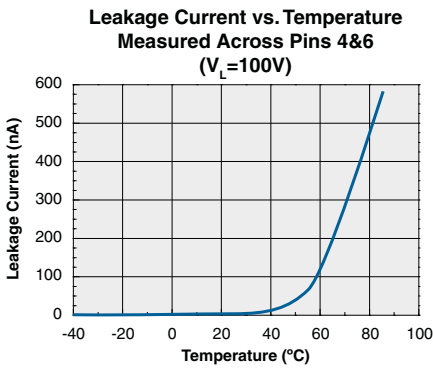
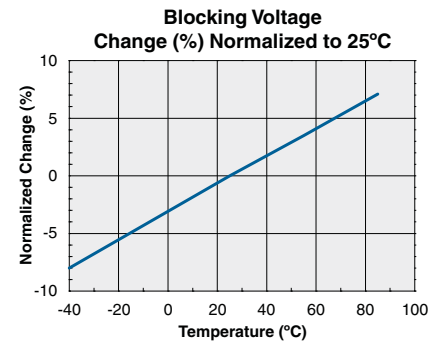
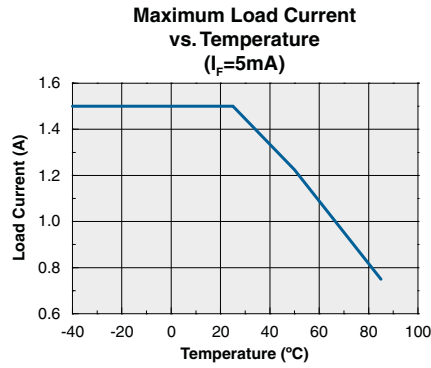
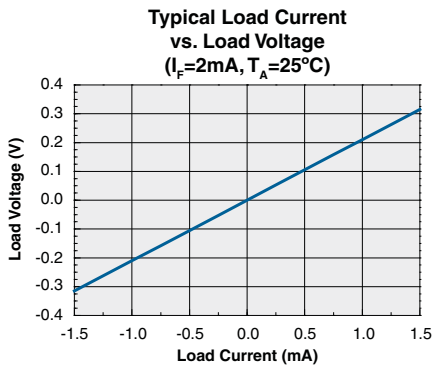
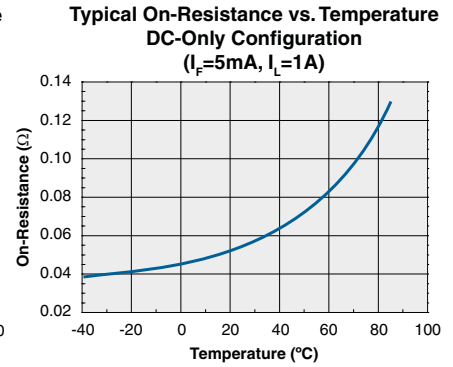
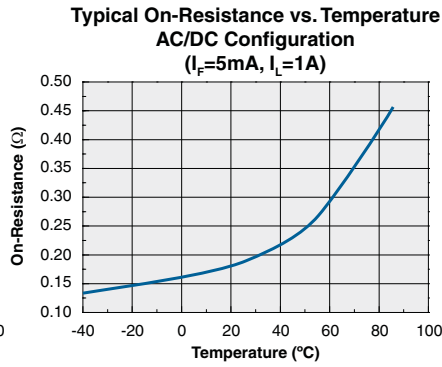
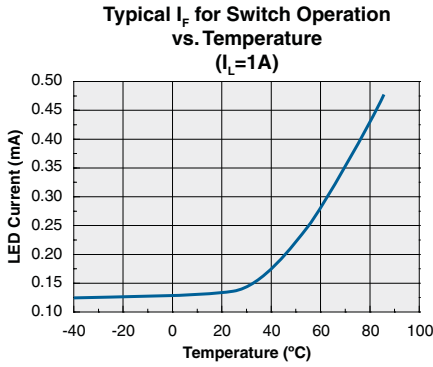


Typical Turn-Off Time vs. Temperature
($I_L=75\text{mA}$)



*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*



*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.

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
LCA701 / LCA701S	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
LCA701 / LCA701S	250°C for 30 seconds

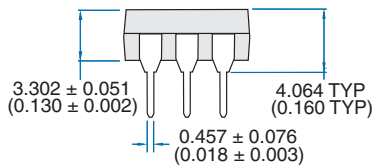
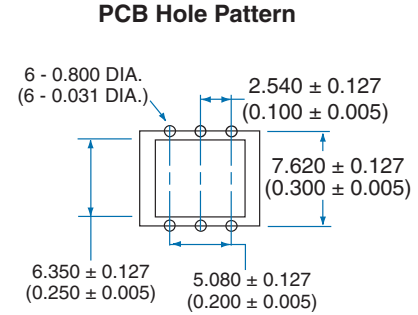
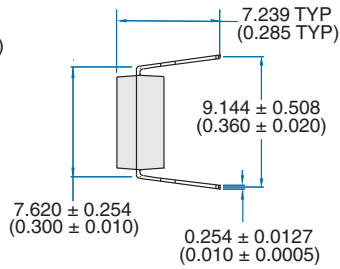
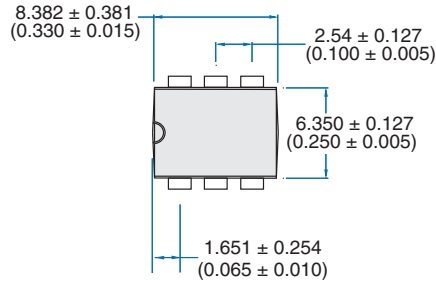
Board Wash

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.



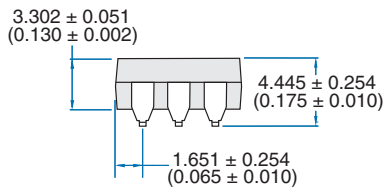
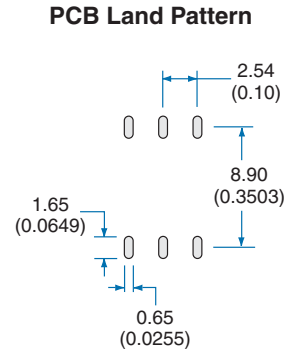
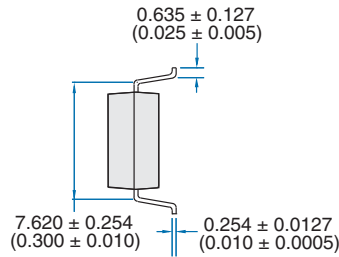
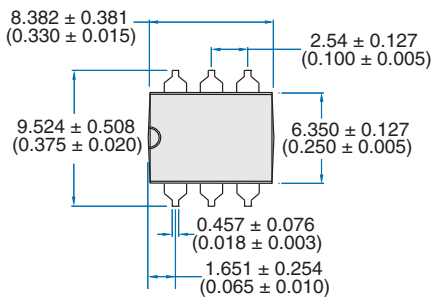
MECHANICAL DIMENSIONS

LCA701



Dimensions
mm
(inches)

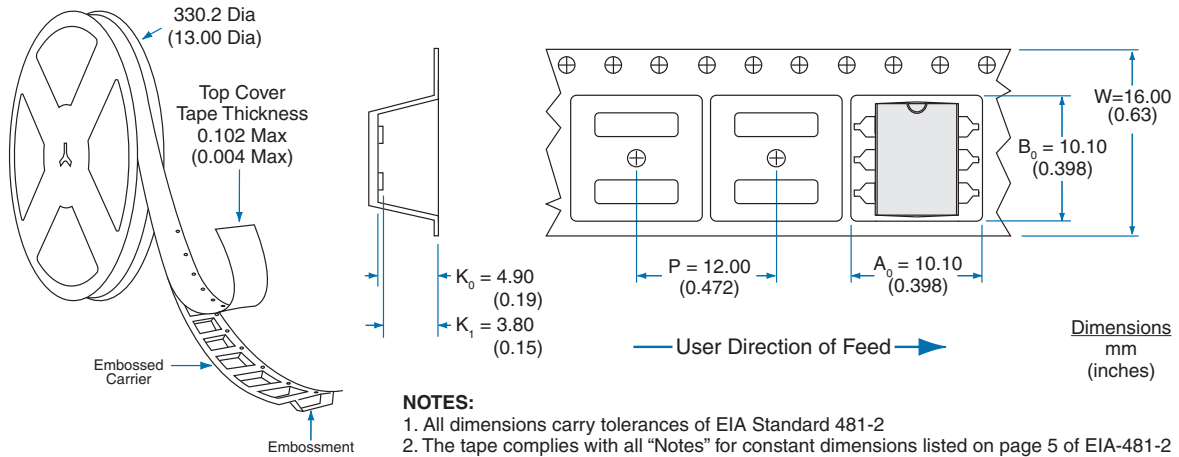
LCA701S



Dimensions
mm
(inches)

MECHANICAL DIMENSIONS (Cont.)

LCA701S 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.