



Parameter	Rating	Units
Blocking Voltage	100	$V_P$
Load Current	1.5	$A_{rms} / A_{DC}$
On-Resistance (max)	0.3	$\Omega$
Input Control Current	2	mA

### Features

- 100V<sub>P</sub> Blocking Voltage
- Operational Temperature Range: -40°C to +85°C
- 3750V<sub>rms</sub> Input/Output Isolation
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Small 6-Pin Package
- 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

IXYS Integrated Circuits Division's LCA701 is a 100V, 1.5A, 0.3 $\Omega$ , 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 optically coupled outputs, which use the patented OptoMOS architecture, are controlled by a highly efficient GaAIAs infrared LED.

LCA701 is designed to replace electromechanical relays, and offers fast, reliable, bounce-free operation, as well as the superior reliability associated with solid state devices.

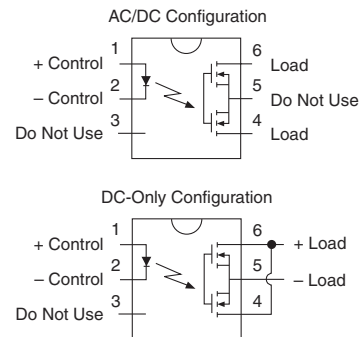
### Approvals

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

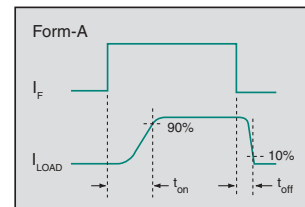
### Ordering Information

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 <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
ESD Rating, Human Body Model	8	kV
Isolation Voltage, Input to Output (60 Seconds)	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	Typ	Max	Units
<b>Output Characteristics</b>						
Load Current, Continuous						
AC/DC Configuration <sup>1</sup>	-	I <sub>L</sub>	-	-	1.5	A <sub>rms</sub> / A <sub>DC</sub>
DC-Only Configuration					2.5	A <sub>DC</sub>
Peak Load Current	t=10ms	I <sub>LPK</sub>	-	-	±5	A <sub>p</sub>
On-Resistance <sup>2</sup>						
AC/DC Configuration	I <sub>F</sub> =5mA, I <sub>L</sub> =1.5A	R <sub>ON</sub>	-	0.2	0.3	Ω
DC-Only Configuration	I <sub>F</sub> =5mA, I <sub>L</sub> =2.5A		-	0.06	0.09	
Off-State Leakage Current	V <sub>L</sub> =100V <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>	-	1.95	4	ms
Turn-Off		t <sub>off</sub>	-	0.45	1	
Output Capacitance	V <sub>L</sub> =0V, f=1MHz	-	-	200	-	pF
<b>Input Characteristics</b>						
Input Control Current to Activate <sup>3</sup>	I <sub>L</sub> =1A	I <sub>F</sub>	-	0.14	2	mA
Input Control Current to Deactivate	-	I <sub>F</sub>	0.1	-	-	mA
Input Voltage Drop	I <sub>F</sub> =10mA	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

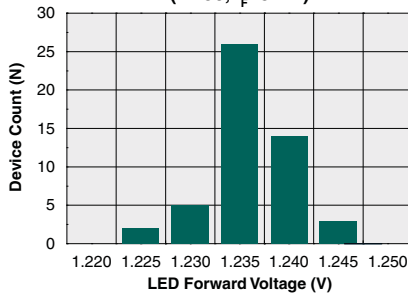
<sup>1</sup> Load current derates linearly from 1.5A @ 25°C to 0.75A @ 85°C.

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

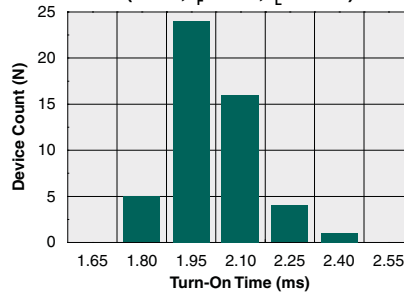
<sup>3</sup> For applications requiring high temperature operation (T<sub>A</sub> > 60°C) a LED current of 5mA is recommended.

PERFORMANCE DATA @25°C (Unless Otherwise Noted)\*

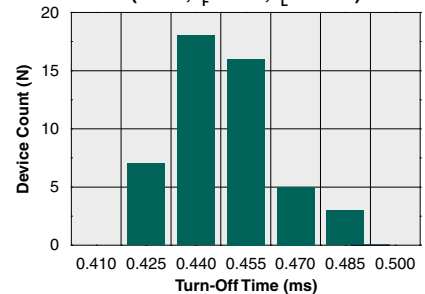
Typical LED Forward Voltage Drop  
(N=50,  $I_F=5\text{mA}$ )



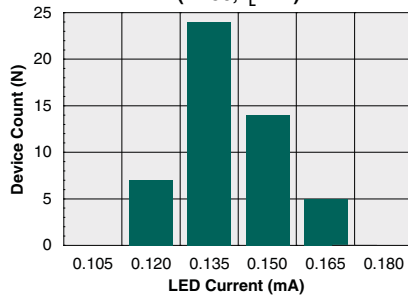
Typical Turn-On Time  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=75\text{mA}$ )



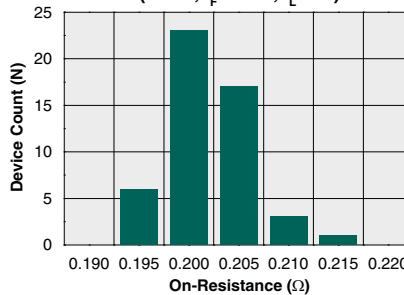
Typical Turn-Off Time  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=75\text{mA}$ )



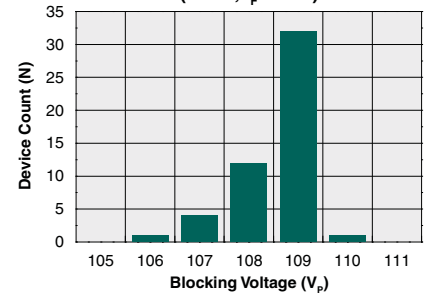
Typical  $I_F$  for Switch Operation  
(N=50,  $I_L=1\text{A}$ )



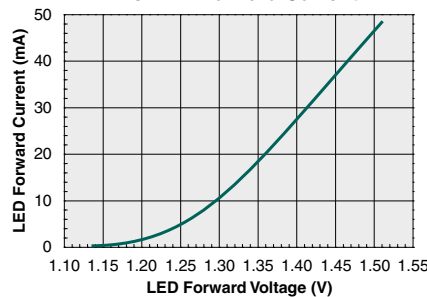
Typical On-Resistance Distribution  
(N=50,  $I_F=2\text{mA}$ ,  $I_L=1\text{A}$ )



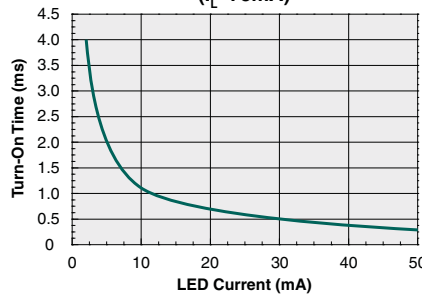
Typical Blocking Voltage Distribution  
(N=50,  $I_F=0\text{mA}$ )



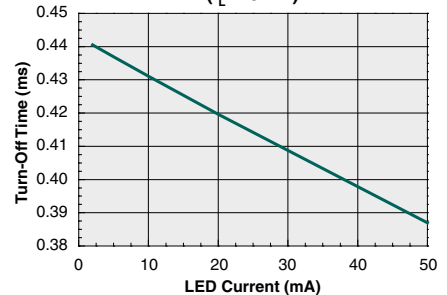
LED Forward Voltage vs. LED Forward Current



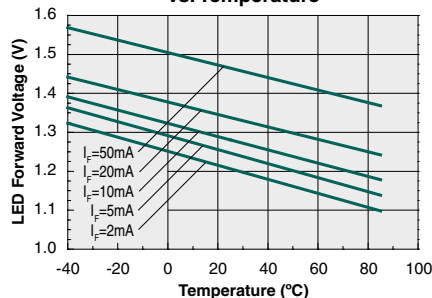
Typical Turn-On Time vs. LED Forward Current  
( $I_L=75\text{mA}$ )



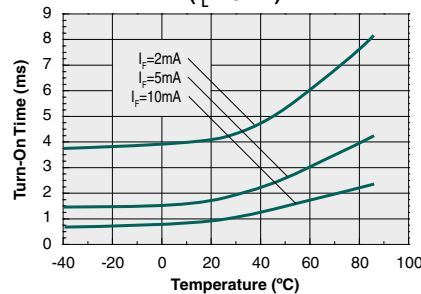
Typical Turn-Off Time vs. LED Forward Current  
( $I_L=75\text{mA}$ )



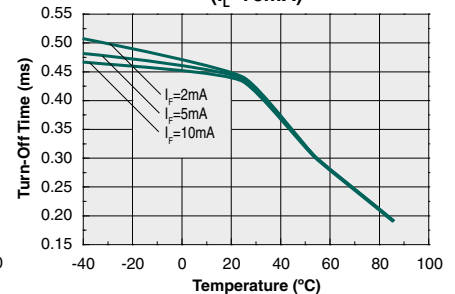
Typical LED Forward Voltage Drop vs. Temperature



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

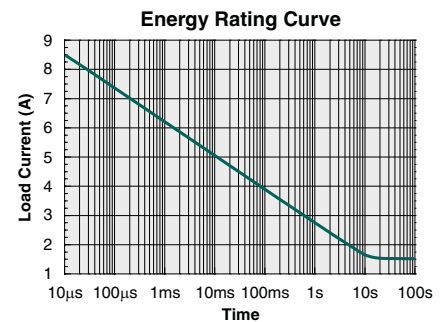
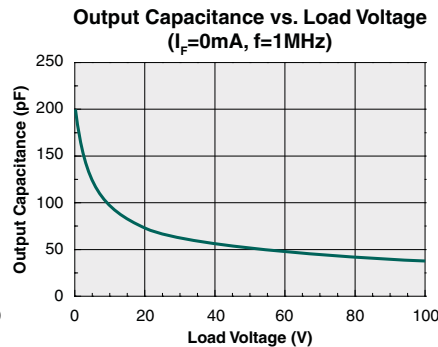
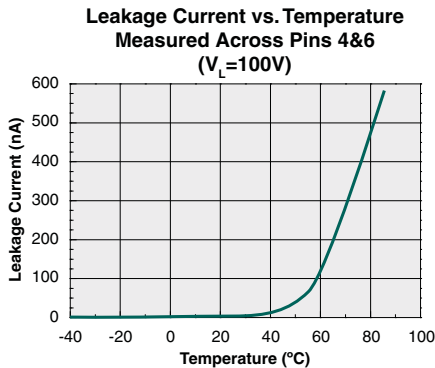
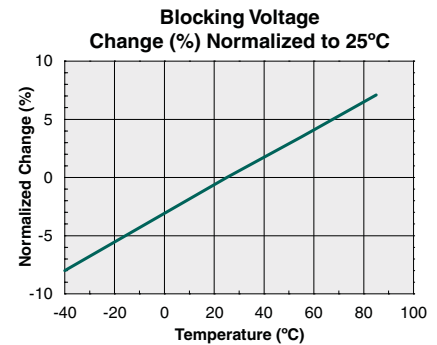
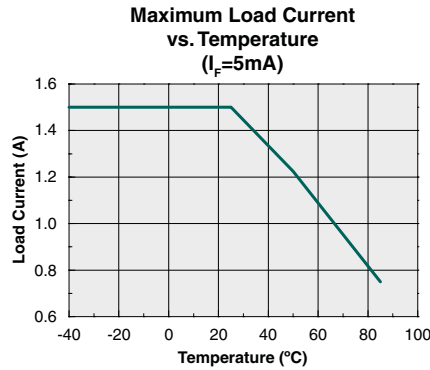
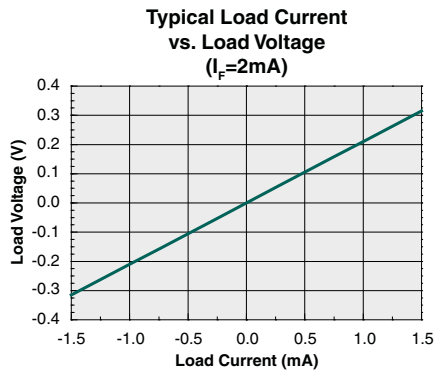
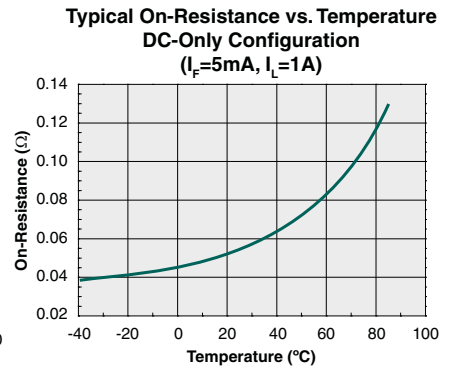
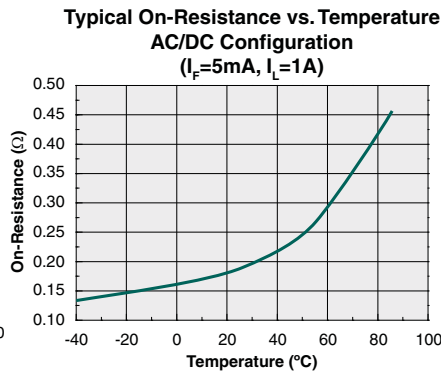
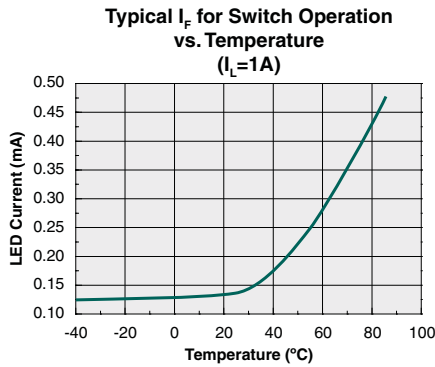


Typical Turn-Off Time vs. Temperature  
( $I_L=75\text{mA}$ )



\*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 @25°C (Unless Otherwise Noted)\*



\*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. IXYS Integrated Circuits Division 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

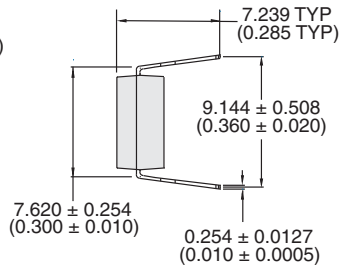
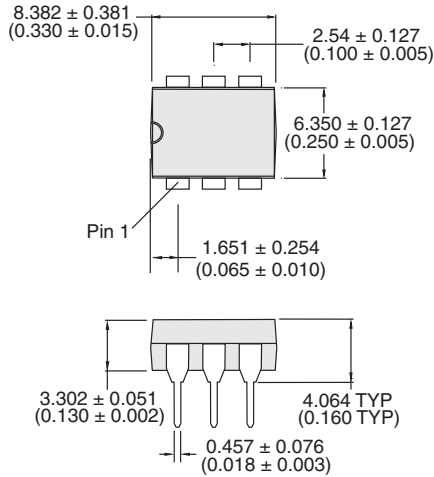
**Board Wash**

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

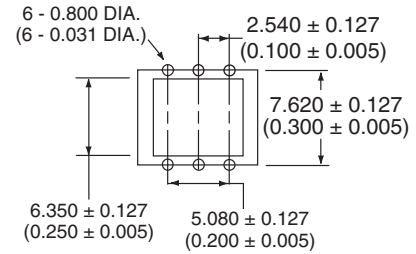


**MECHANICAL DIMENSIONS**

**LCA701**

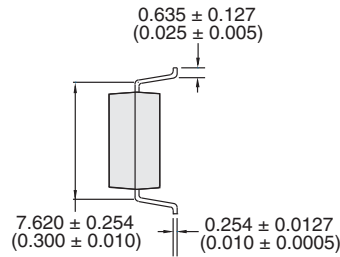
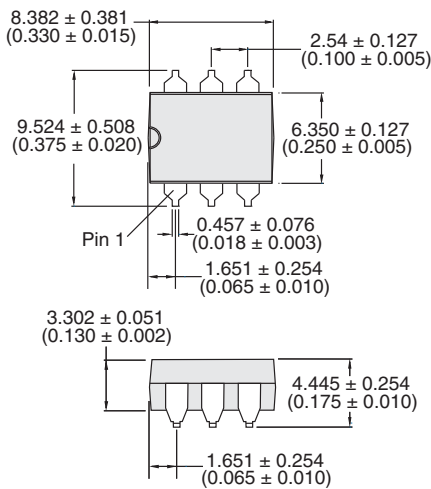


**PCB Hole Pattern**

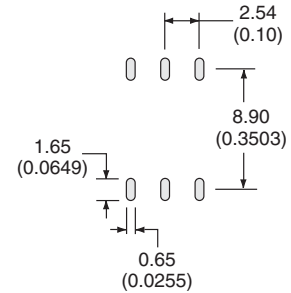


Dimensions  
mm  
(inches)

**LCA701S**

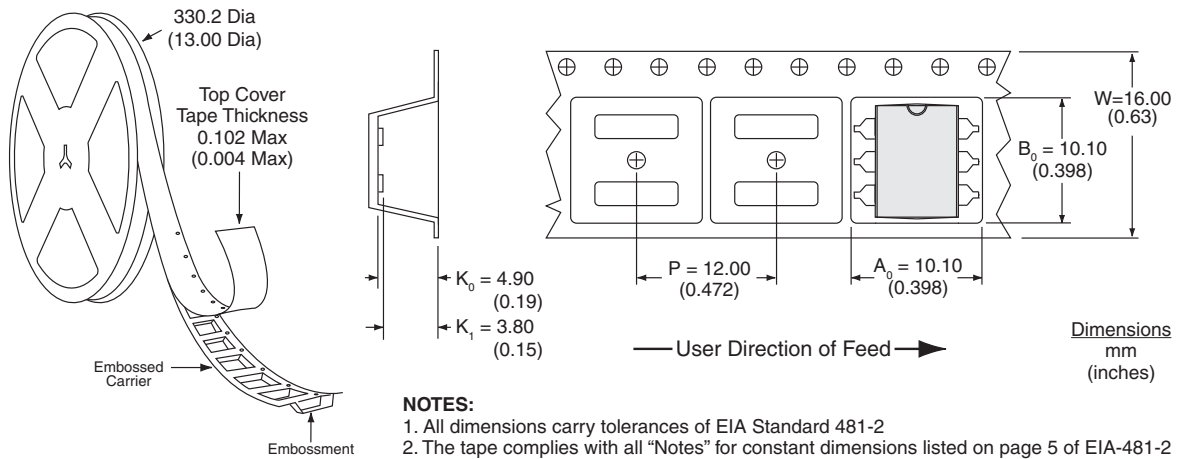


**PCB Land Pattern**



Dimensions  
mm  
(inches)

**LCA701STR Tape & Reel**



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

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