

Parameter	Ratings	Units
Blocking Voltage	60	$V_P$
Load Current	2.2	$A_{rms} / A_{DC}$
On-Resistance (max)	0.15	$\Omega$

### Features

- 3750V<sub>rms</sub> Input/Output Isolation
- Low Drive Power Requirements
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Small 6-Pin Package
- Flammability Rating UL 94 V-0
- Surface Mount and Tape & Reel Versions 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

The LCA715 is a 60V single-pole, normally open (1-Form-A) Solid State Relay. It uses optically coupled MOSFET technology to provide 3750V<sub>rms</sub> of input to output isolation, and features an ultra-low on-resistance for high-current operation.

Its optically coupled outputs, which use the patented OptoMOS architecture, are controlled by a highly efficient infrared LED.

Offering the superior reliability associated with semiconductor devices, the LCA715 can be used to replace mechanical relays. Because it has no moving parts, it can offer faster, bounce-free switching in a more compact surface mount or thru-hole package.

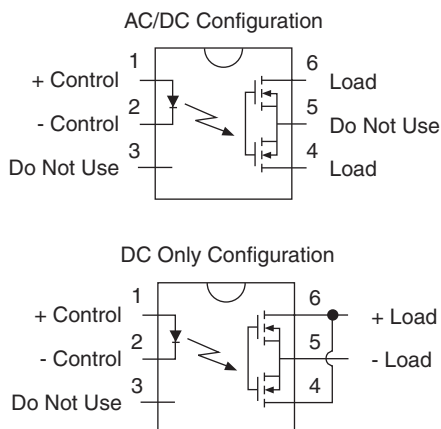
### Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1172007
- EN/IEC 60950-1 Certified Component:  
Certificate available on our website

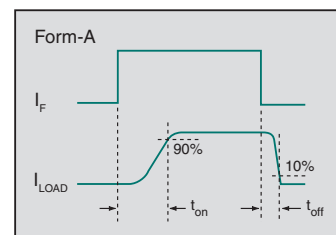
### Ordering Information

Part #	Description
LCA715	6 Pin DIP (50/Tube)
LCA715S	6 Pin Surface Mount (50/Tube)
LCA715STR	6 Pin Surface Mount (1000/Reel)

### Pin Configuration



### Switching Characteristics of Normally Open Devices



**Absolute Maximum Ratings @ 25°C**

Parameter	Ratings	Units
Blocking Voltage	60	V <sub>p</sub>
Reverse Input Voltage	5	V
Input Control Current Peak (10ms)	50	mA
	1	A
Input Power Dissipation	70	mW
Total Power Dissipation <sup>1</sup>	800	mW
ESD, Human Body Model	8	kV
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.

Typical values are characteristic of the device at +25°C, and are the result of engineering evaluations. They are provided for information purposes only, and are not part of the manufacturing testing requirements.

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

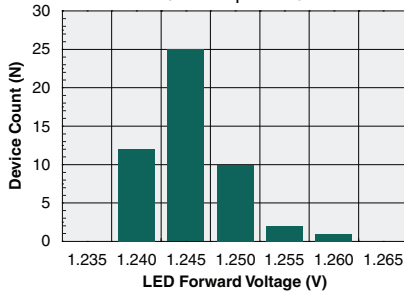
**Electrical Characteristics @ 25°C**

Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics</b>						
Load Current Continuous, AC/DC Configuration Continuous, DC Configuration Peak	Continuous, Free Air	I <sub>L</sub>	-	-	2.2	A <sub>rms</sub> / A <sub>DC</sub>
			-	-	4	A <sub>DC</sub>
	t <sub>≤</sub> 10ms	I <sub>LPK</sub>	-	-	±10	A <sub>p</sub>
On-Resistance <sup>1</sup> AC/DC Configuration DC Configuration	I <sub>F</sub> =5mA, I <sub>L</sub> =1A	R <sub>ON</sub>	-	0.12	0.15	Ω
			-	0.038	0.05	
Off-State Leakage Current	I <sub>F</sub> =0mA, V <sub>L</sub> =60V <sub>p</sub>	I <sub>LEAK</sub>	-	-	1	μA
<b>Switching Speeds</b>						
Turn-On Turn-Off	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	t <sub>on</sub>	-	0.7	2.5	ms
		t <sub>off</sub>	-	0.115	0.25	ms
Output Capacitance	I <sub>F</sub> =0mA, f=1MHz	C <sub>OUT</sub>	-	110	200	pF
	V <sub>L</sub> =10V		-	60	-	
	V <sub>L</sub> =50V		-	-	-	
<b>Input Characteristics</b>						
Input Control Current to Activate	I <sub>L</sub> =1A	I <sub>F</sub>	-	0.9	5	mA
Input Control Current to Deactivate	-	I <sub>F</sub>	0.4	-	-	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.2	1.5	V
Reverse Input Current	V <sub>R</sub> =5V	I <sub>R</sub>	-	-	10	μA
<b>Common Characteristics</b>						
Input to Output Capacitance	V <sub>IO</sub> =0V, f=1MHz	C <sub>IO</sub>	-	3	-	pF

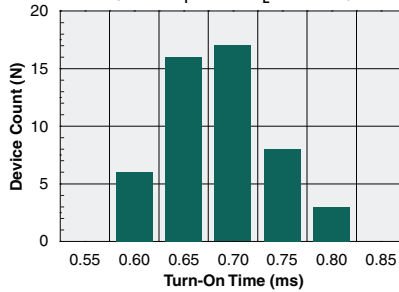
<sup>1</sup> Measurement taken within 1 second of on-time.

**PERFORMANCE DATA\***

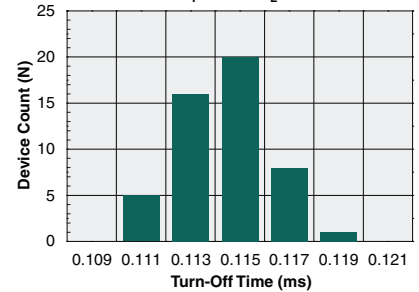
**Typical LED Forward Voltage Drop**  
(N=50,  $I_F=5\text{mA}$ )



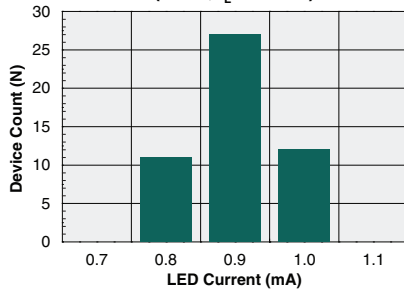
**Typical Turn-On Time Distribution**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=100\text{mA}$ )



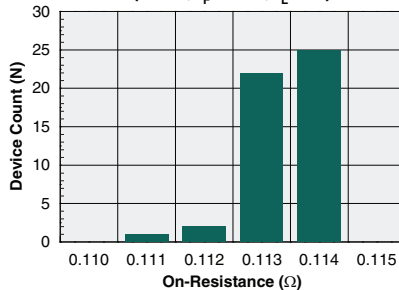
**Typical Turn-Off Time Distribution**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=100\text{mA}$ )



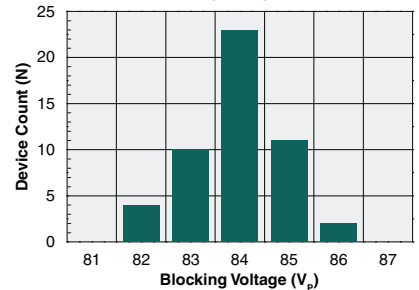
**Typical  $I_F$  for Switch Operation**  
(N=50,  $I_L=100\text{mA}$ )



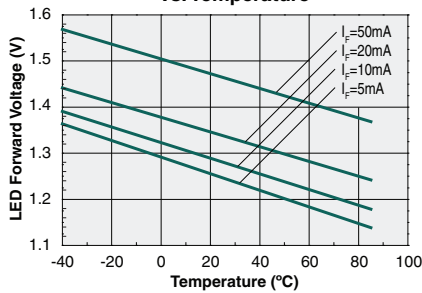
**Typical On-Resistance Distribution**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=1\text{A}$ )



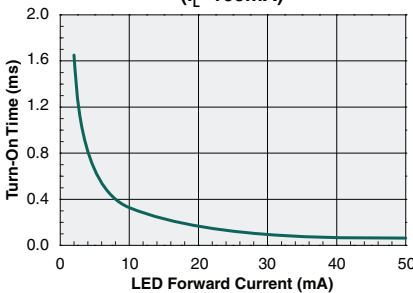
**Typical Blocking Voltage Distribution**  
(N=50)



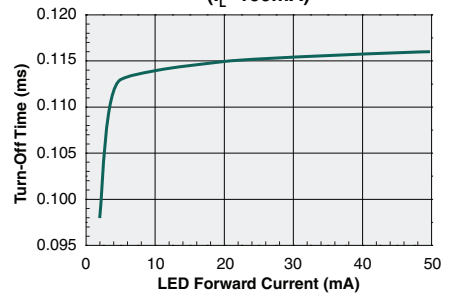
**Typical LED Forward Voltage vs. Temperature**



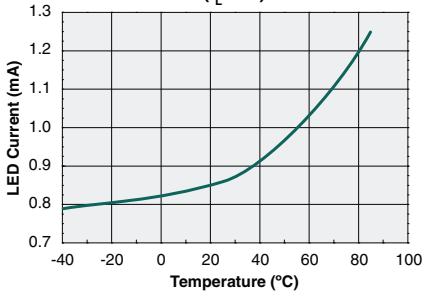
**Typical Turn-On Time vs. LED Forward Current**  
( $I_L=100\text{mA}$ )



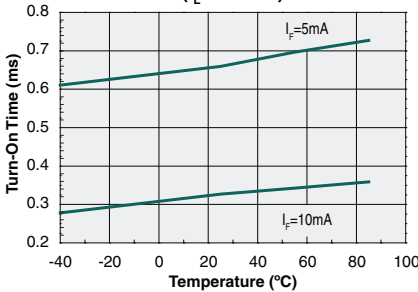
**Typical Turn-Off Time vs. LED Forward Current**  
( $I_L=100\text{mA}$ )



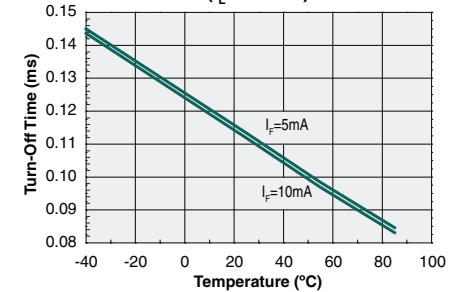
**LED Current to Operate vs. Temperature**  
( $I_L=1\text{A}$ )



**Turn-On Time vs. Temperature**  
( $I_L=100\text{mA}$ )

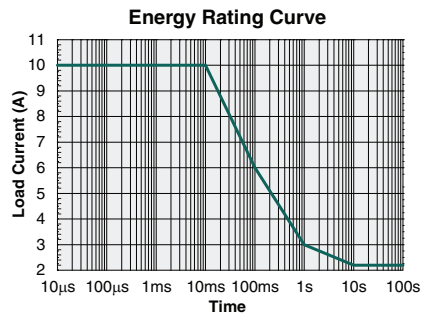
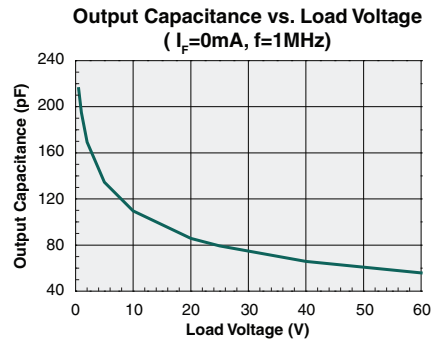
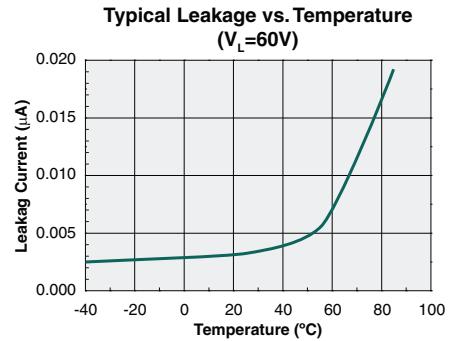
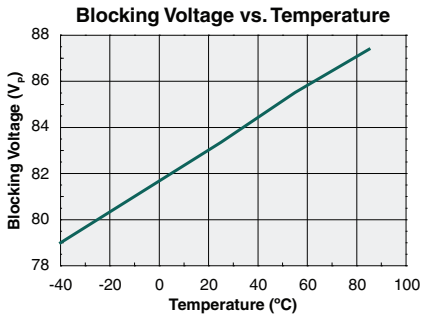
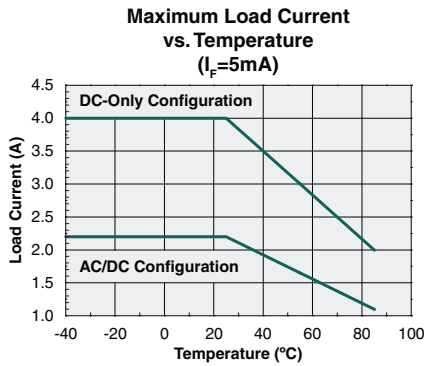
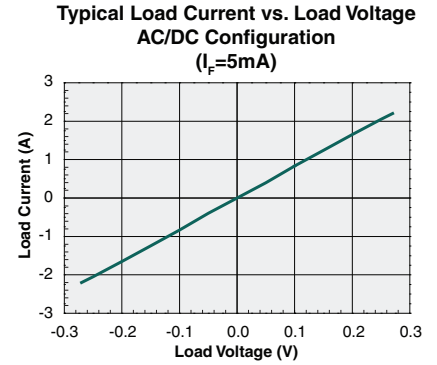
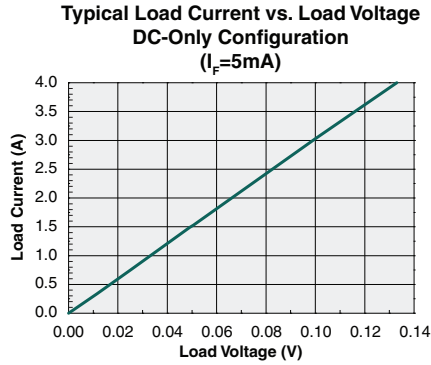
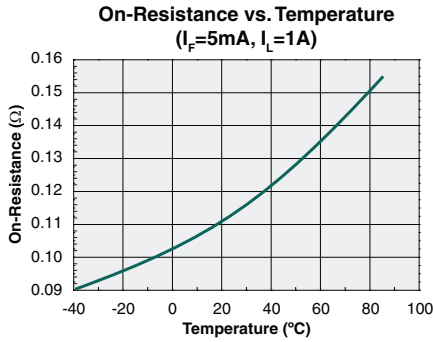


**Turn-Off Time vs. Temperature**  
( $I_L=100\text{mA}$ )



\*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C. For guaranteed parameters not indicated in the written specifications, please contact our application department.

**PERFORMANCE DATA\***



\*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.  
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 classifies 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) classification 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) Classification
LCA715 / LCA715S	MSL 1

### ESD Sensitivity



This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

### Soldering Profile

Provided in the table below is the Classification Temperature ( $T_C$ ) of this product and the maximum dwell time the body temperature of this device may be ( $T_C - 5$ )°C or greater. The classification temperature sets the Maximum Body Temperature allowed for this device during lead-free reflow processes. For through-hole devices, and any other processes, the guidelines of **J-STD-020** must be observed.

Device	Classification Temperature ( $T_C$ )	Dwell Time ( $t_p$ )	Max Reflow Cycles
LCA715	250°C	30 seconds	1
LCA715S	250°C	30 seconds	3

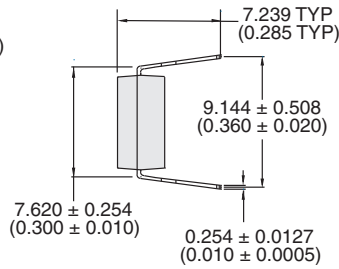
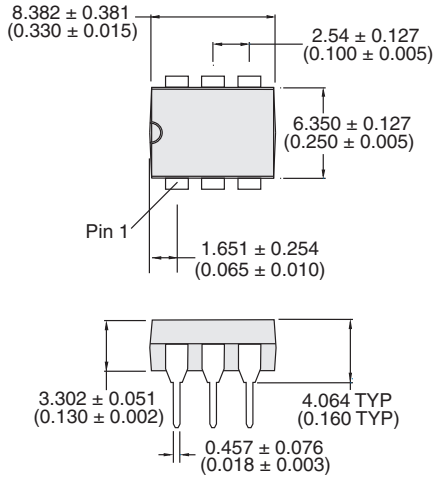
### Board Wash

IXYS Integrated Circuits recommends the use of no-clean flux formulations. Board washing to reduce or remove flux residue following the solder reflow process is acceptable provided proper precautions are taken to prevent damage to the device. These precautions include, but are not limited to: using a low pressure wash and providing a follow up bake cycle sufficient to remove any moisture trapped within the device due to the washing process. Due to the variability of the wash parameters used to clean the board, determination of the bake temperature and duration necessary to remove the moisture trapped within the package is the responsibility of the user (assembler). Cleaning or drying methods that employ ultrasonic energy may damage the device and should not be used. Additionally, the device must not be exposed to flux or solvents that are Chlorine- or Fluorine-based.

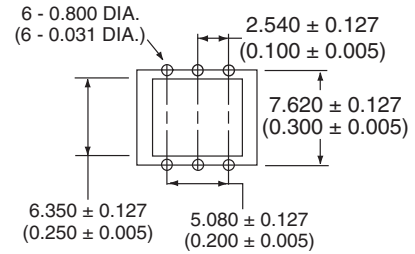


**MECHANICAL DIMENSIONS**

**LCA715**

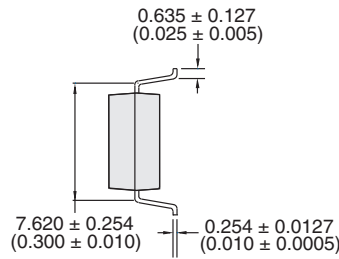
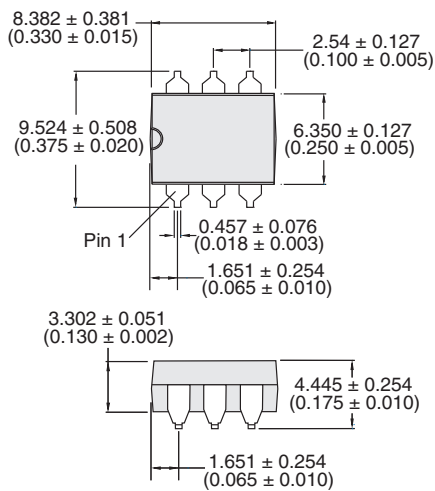


**PCB Hole Pattern**

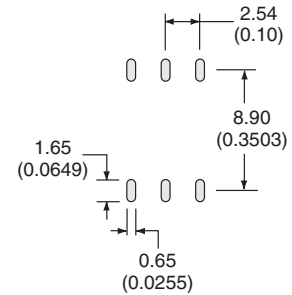


Dimensions  
mm  
(inches)

**LCA715S**

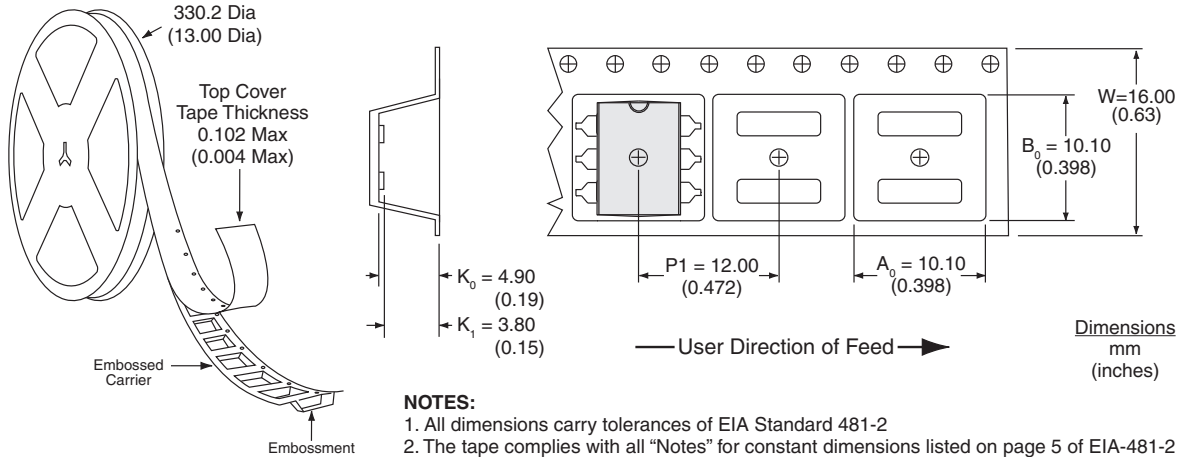


**PCB Land Pattern**



Dimensions  
mm  
(inches)

**LCA715STR Tape & Reel**



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

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