



| Parameter | Rating | Units |
|------------------------|--------|--------------------|
| Load Voltage | 60 | V_P |
| Load Current | 1 | A_{rms} / A_{DC} |
| On-Resistance (max) | 0.6 | Ω |
| LED Current to Operate | 2 | mA |

Features

- 1A Load Current
- 0.6 Ω Max On-Resistance
- 2mA Control Current
- 3750V_{rms} Input/Output Isolation
- Low Drive Power Requirements (TTL/CMOS Compatible)
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Small 6-Pin Package
- Tape & Reel Version Available
- Flammability Rating UL 94 V-0

Applications

- Sensor Circuitry
- Instrumentation
- Multiplexers
- Data Acquisition
- Electronic Switching
- I/O Subsystems
- Meters (gas, oil, electric and water)
- Medical Equipment-Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

Description

LCB710 is a single-pole normally closed (1-Form-B) solid state relay that uses optically coupled technology to provide an enhanced 3750V_{rms} isolation barrier between the input and the output of the relay. The efficient MOSFET switches use IXYS Integrated Circuits Division's patented OptoMOS architecture. The optically coupled output is controlled by a highly efficient infrared LED.

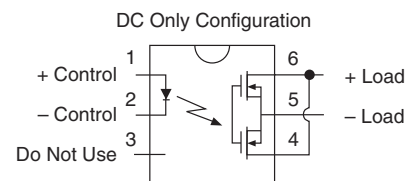
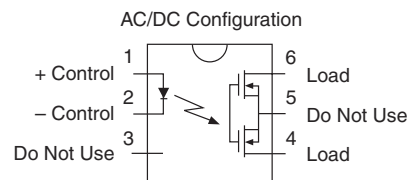
Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Pending
- EN/IEC 60950-1 Certified Component: Pending

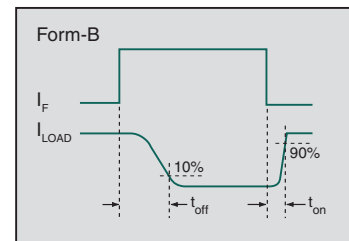
Ordering Information

| Part # | Description |
|-----------|----------------------------------|
| LCB710 | 6-Lead DIP (50/Tube) |
| LCB710S | 6-Lead Surface Mount (50/Tube) |
| LCB710STR | 6-Lead Surface Mount (1000/Reel) |

Pin Configuration



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25°C

| Parameter | Ratings | Units |
|--------------------------------------|-------------|------------------|
| Blocking Voltage | 60 | V _P |
| Reverse Input Voltage | 5 | V |
| Input Control Current | 50 | mA |
| Peak (10ms) | 1 | A |
| Input Power Dissipation ¹ | 100 | mW |
| Total Power Dissipation ² | 800 | mW |
| Isolation Voltage, Input to Output | 3750 | V _{rms} |
| ESD Rating, Human Body Model | 8 | kV |
| 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.

Typical values are characteristic of the device at the specified temperatures and are the result of engineering evaluations. They are provided for information purposes only and are not part of the manufacturing testing requirements.

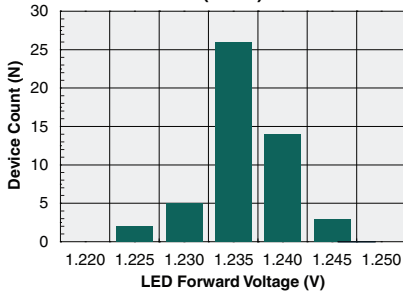
Electrical Characteristics @ 25°C

| Parameter | Conditions | Symbol | Min | Typ | Max | Units |
|-------------------------------------|--------------------------------------------------|-------------------|-----------------------------------------|------|-----|------------------------------------|
| Output Characteristics | | | | | | |
| Load Current | | | | | | |
| AC/DC Configuration, Continuous | I _F =0mA | I _L | - | - | 1 | A _{rms} / A _{DC} |
| DC Configuration, Continuous | | | - | - | 2 | A _{DC} |
| Peak | I _F =0mA, t ≤ 10ms | I _{LPK} | - | - | ±5 | A _P |
| On-Resistance ¹ | | | | | | |
| AC/DC Configuration | I _F =0mA, I _L =1A | R _{ON} | - | 0.39 | 0.6 | Ω |
| DC Configuration | | | I _F =0mA, I _L =2A | - | 0.1 | |
| Switching Speeds | | | | | | |
| Turn-On | I _F =5mA, V _L =10V | t _{on} | - | 0.63 | 3 | ms |
| Turn-Off | | t _{off} | - | 1.5 | 3 | |
| Off-State Leakage Current | I _F =2mA, V _L =60V | I _{LEAK} | - | - | 1 | μA |
| Output Capacitance | I _F =2mA, V _L =50V, f=1MHz | C _{OUT} | - | 125 | - | pF |
| Input Characteristics | | | | | | |
| Input Control Current to Activate | I _L =1A | I _F | - | 0.22 | 2 | mA |
| Input Control Current to Deactivate | - | I _F | 0.1 | 0.21 | - | mA |
| Input Voltage Drop | I _F =5mA | V _F | 0.9 | 1.2 | 1.5 | V |
| Reverse Input Current | V _R =5V | I _R | - | - | 10 | μA |
| Common Characteristics | | | | | | |
| Capacitance, Input to Output | V _{IO} =0mA, f=1MHz | C _{IO} | - | 3 | - | pF |

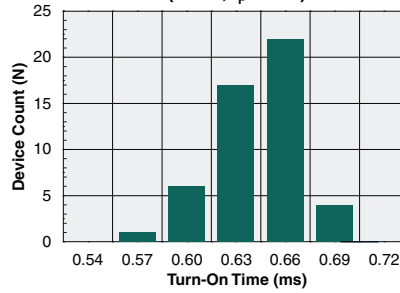
¹ Measurement taken within 1 second of on-time.

PERFORMANCE DATA *

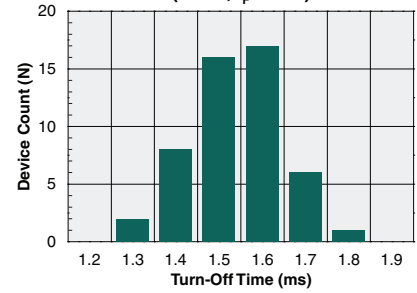
Typical LED Forward Voltage Drop (N=50)



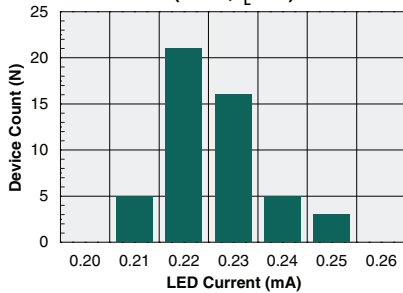
Typical Turn-On Time (N=50, I_F=5mA)



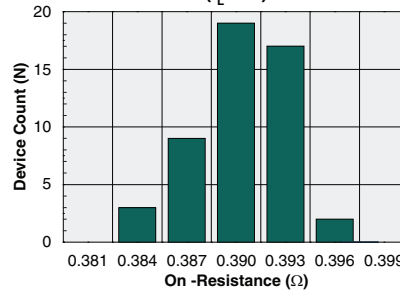
Typical Turn-Off Time (N=50, I_F=5mA)



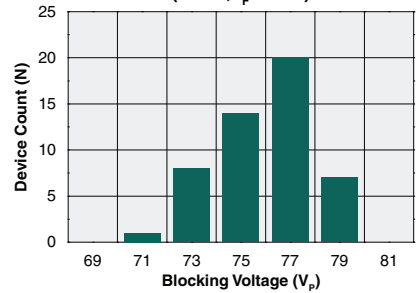
Typical I_F for Switch Operation (N=50, I_L=1A)



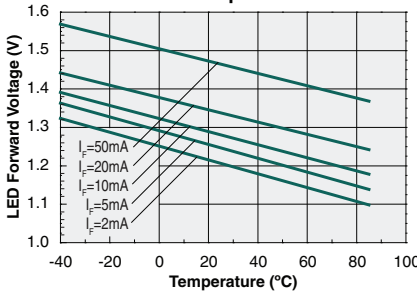
Typical On-Resistance Distribution (I_L=1A)



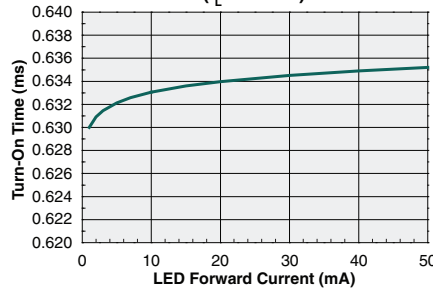
Typical Blocking Voltage Distribution (N=50, I_F=2mA)



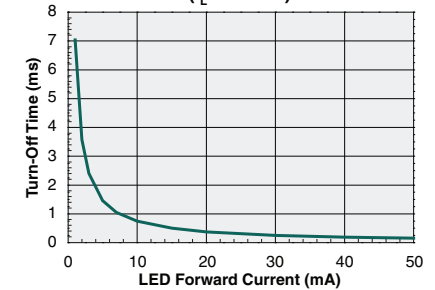
LED Forward Voltage vs. Temperature



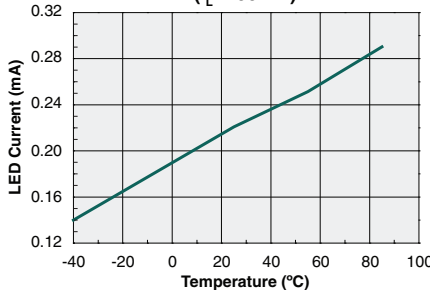
Typical Turn-On Time vs. LED Forward Current (I_L=100mA)



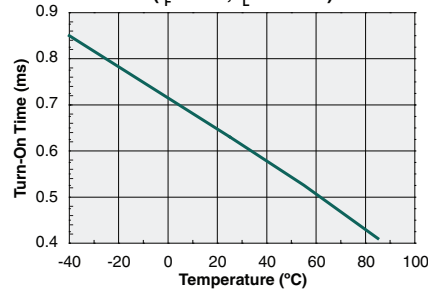
Typical Turn-Off Time vs. LED Forward Current (I_L=100mA)



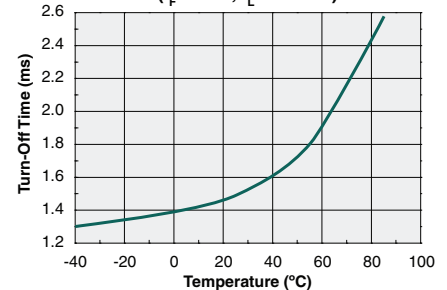
Typical I_F for Switch Operation vs. Temperature (I_L=100mA)



Typical Turn-On Time vs. Temperature (I_F=5mA, I_L=100mA)



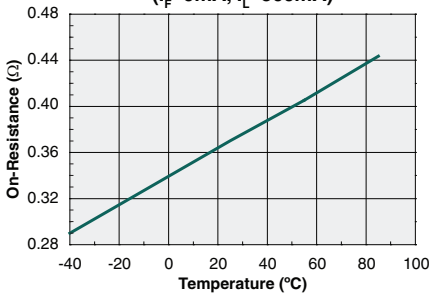
Typical Turn-Off Time vs. Temperature (I_F=5mA, I_L=100mA)



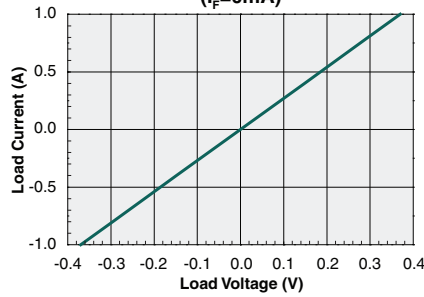
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

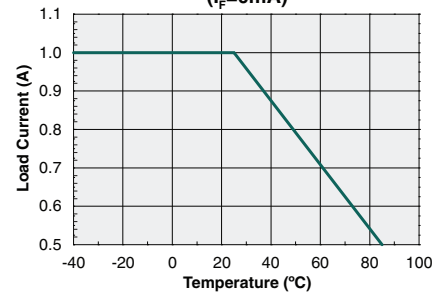
**Typical On-Resistance vs. Temperature
AC/DC Configuration**
($I_F=0mA, I_L=500mA$)



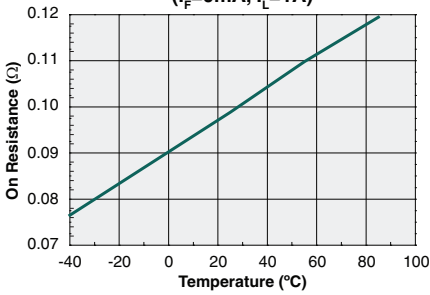
**Typical Load Current vs. Load Voltage
AC/DC Configuration**
($I_F=0mA$)



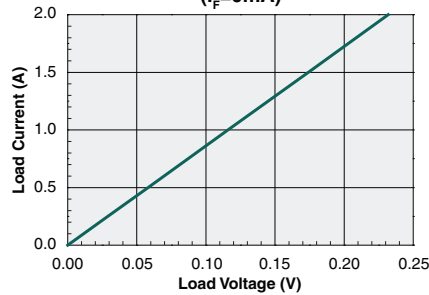
**Maximum Load Current vs. Temperature
AC/DC Configuration**
($I_F=0mA$)



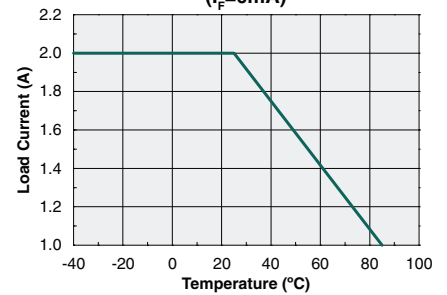
**Typical On-Resistance vs. Temperature
DC-Only Configuration**
($I_F=0mA, I_L=1A$)



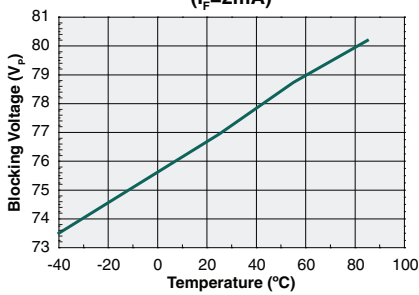
**Load Current vs. Load Voltage
DC-Only Configuration**
($I_F=0mA$)



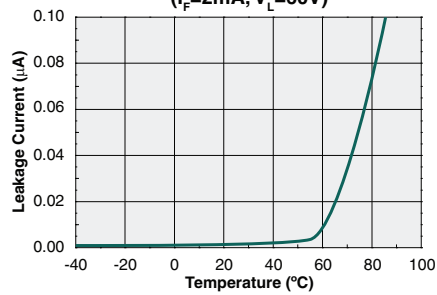
**Maximum Load Current vs. Temperature
DC-Only Configuration**
($I_F=0mA$)



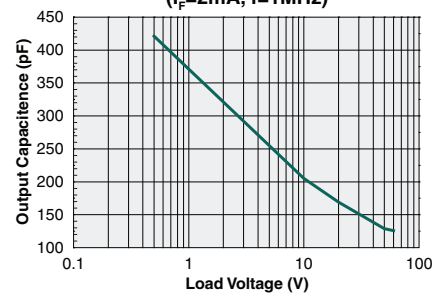
**Typical Blocking Voltage
vs. Temperature**
($I_F=2mA$)



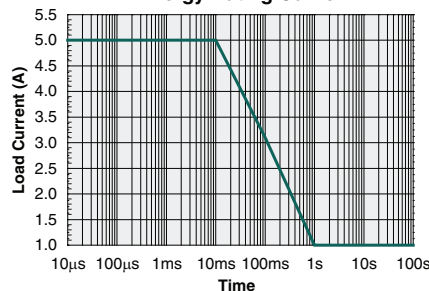
**Typical Leakage Current
vs. Temperature**
($I_F=2mA, V_L=60V$)



**Output Capacitance
vs. Load Voltage**
($I_F=2mA, f=1MHz$)



Energy Rating Curve



*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 Division 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 |
|------------------|-------------------------------------------------|
| LCB710 / LCB710S | 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 |
|------------------|--------------------------------------|----------------------|-------------------|
| LCB710 / LCB710S | 250°C | 30 seconds | 3 |

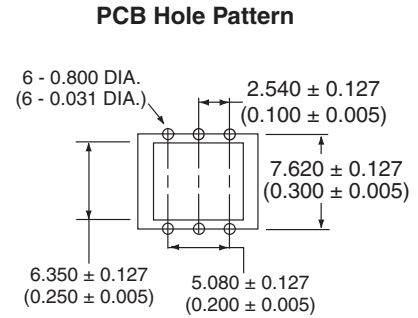
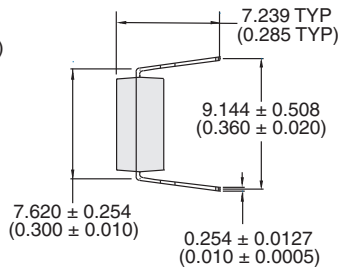
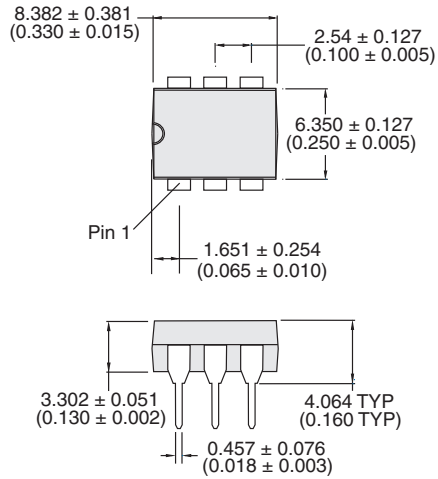
Board Wash

IXYS Integrated Circuits Division 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.



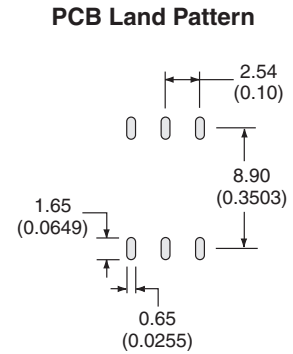
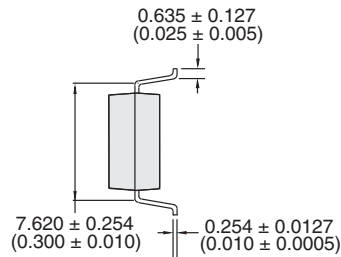
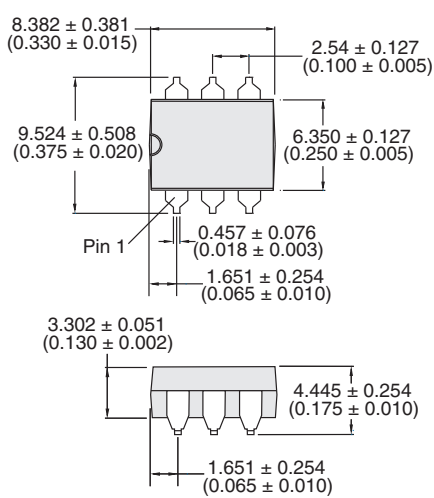
Mechanical Dimensions

LCB710



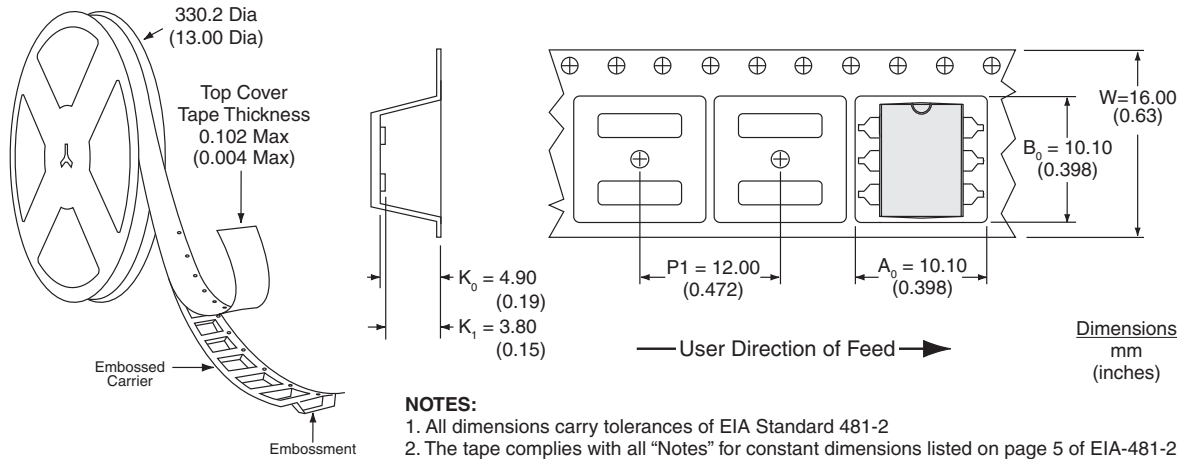
Dimensions
mm
(inches)

LCB710S



Dimensions
mm
(inches)

LCB710STR Tape & Reel



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