IXYS
INTEGRATED CIRCUITS DIVISION

LCB716
Single-Pole, Normally Closed OptoMOS® Relay

Parameter	Rating	Units
Load Voltage	60	V_P
Load Current	500	mA_{rms} / mA_{DC}
On-Resistance (max)	2	Ω

Features

- 3750V_{rms} 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
- Tape & Reel, Surface Mount Version Available

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

LCB716 is a single-pole, normally closed (1-Form-B) solid state relay that uses optically coupled relay technology to provide an enhanced 3750V_{rms} isolation barrier between the input and the output of the relay. The efficient MOSFET output switch uses IXYS Integrated Circuits' patented OptoMOS architecture. The optically coupled output is controlled by a highly efficient infrared LED.

Approvals

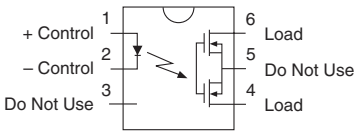
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component: Certificate available on our website

Ordering Information

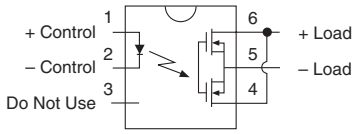
Part #	Description
LCB716	6-Pin DIP (50/Tube)
LCB716S	6-Pin Surface Mount (50/Tube)
LCB716STR	6-Pin Surface Mount (1000/Reel)

Pin Configuration

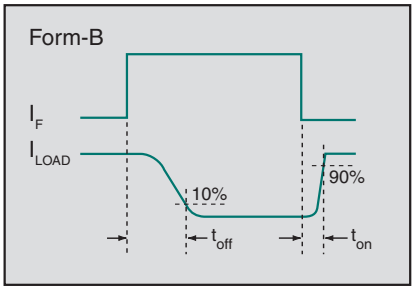
AC/DC Configuration



DC-Only Configuration



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25ºC

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}
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 1.33 mW / ºC
[2] Derate linearly 6.67 mW / ºC

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.

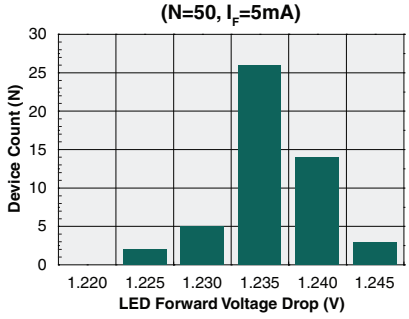
Typical values are characteristic of the device at +25°C, and are the result of engineering evaluations. They are provided for information purposes only, and are not part of the manufacturing testing requirements.

Electrical Characteristics @ 25ºC

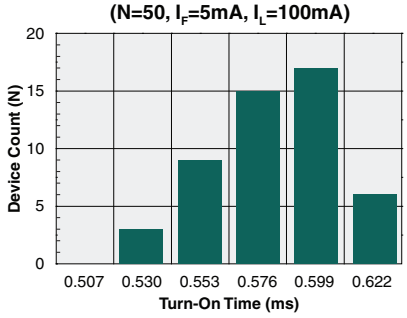
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
AC/DC Configuration, Continuous	-	I_L	-	-	500	mA_{rms} / mA_{DC}
DC Configuration, Continuous	-		-	-	1000	mA_{DC}
Peak	t ≤ 10ms	I_{LPK}	-	-	±1.2	A_P
On-Resistance						
AC/DC Configuration	I_L=500mA	R_{ON}	-	1.63	2	Ω
DC Configuration	I_L=1000mA		-	0.4	0.5	
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}	-	280	-	pF
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{on}	-	0.58	3	ms
Turn-Off		t_{off}	-	0.76	3	
Input Characteristics						
Input Control Current to Activate	I_L=500mA	I_F	-	-	2	mA
Input Control Current to Deactivate	-	I_F	0.1	-	-	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}=0V, f=1MHz	C_{IO}	-	3	-	pF

PERFORMANCE DATA*

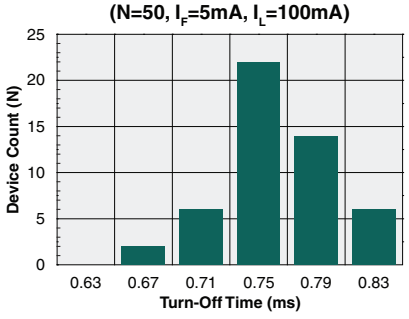
Typical LED Forward Voltage Drop
(N=50, I_F=5mA)



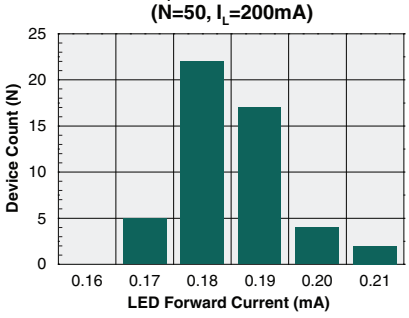
Typical Turn-On Time
(N=50, I_F=5mA, I_L=100mA)



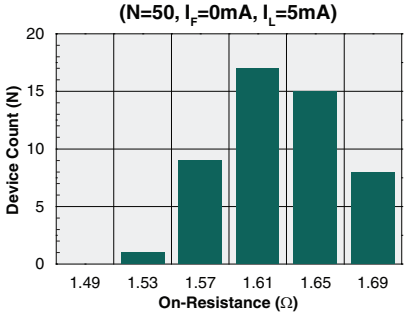
Typical Turn-Off Time
(N=50, I_F=5mA, I_L=100mA)



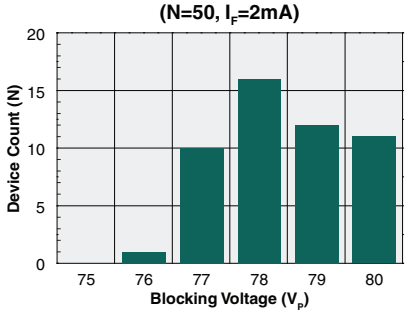
Typical I_F for Switch Operation
(N=50, I_L=200mA)



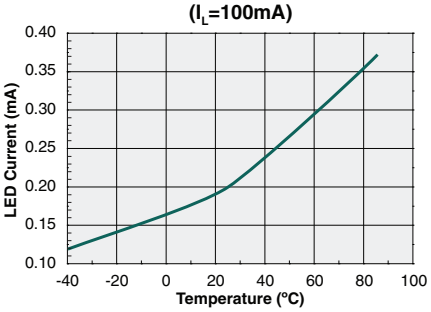
Typical On-Resistance
(N=50, I_F=0mA, I_L=5mA)



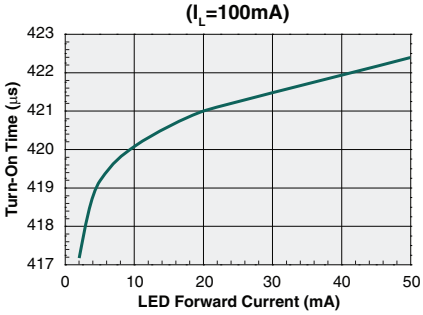
Typical Blocking Voltage
(N=50, I_F=2mA)



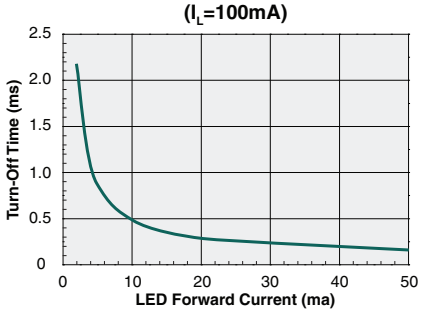
Typical I_F for Switch Operation
vs. Temperature
(I_L=100mA)



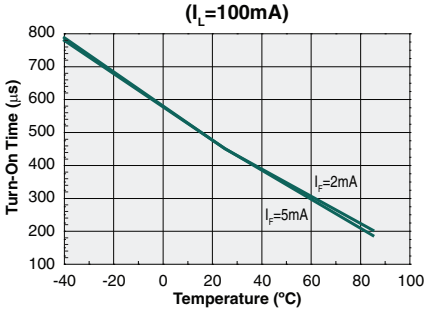
Typical Turn-On Time
vs. LED Forward Current
(I_L=100mA)



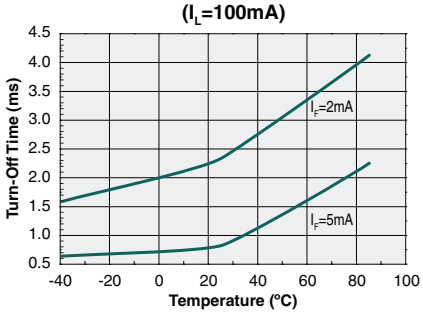
Typical Turn-Off Time
vs. LED Forward Current
(I_L=100mA)



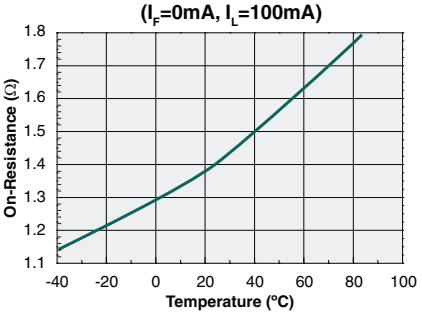
Typical Turn-On Time
vs. Temperature
(I_L=100mA)



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



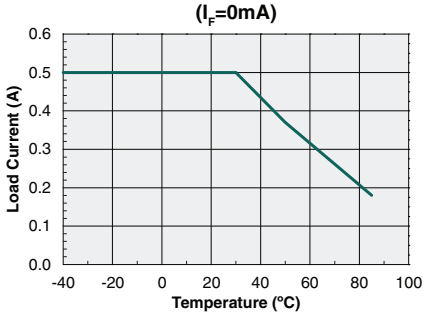
Typical On-Resistance
vs. Temperature
(I_F=0mA, I_L=100mA)



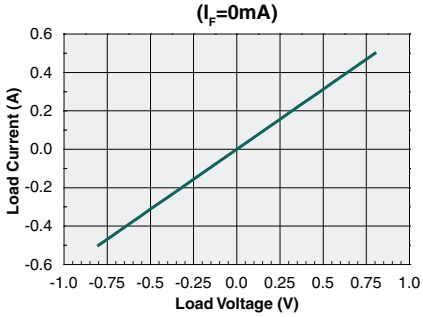
*Unless otherwise noted, data presented in these graphs is typical of device operation at 25°C.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

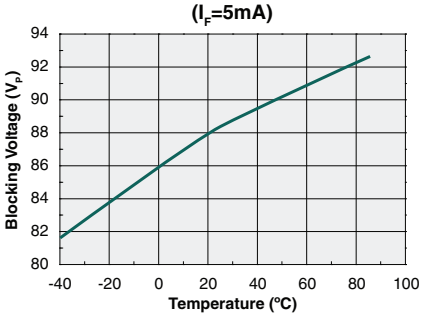
Maximum Load Current vs. Temperature (I_F=0mA)



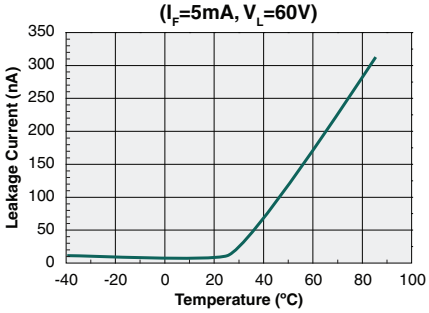
Typical Load Voltage vs. Load Current (I_F=0mA)



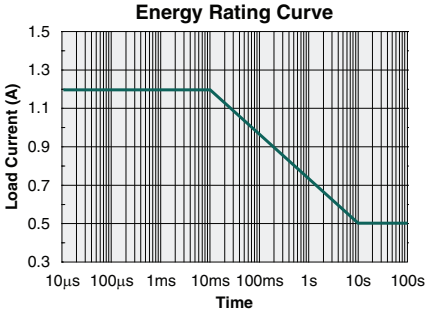
Typical Blocking Voltage vs. Temperature (I_F=5mA)



Typical Leakage vs.Temperature Measured Across Pins 4&6 (I_F=5mA, V_L=60V)



1-Form-B Relay Energy Rating Curve



*Unless otherwise noted, data presented in these graphs is typical of device operation at 25ºC.
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 ingression. 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
LCB716 / LCB716S	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.

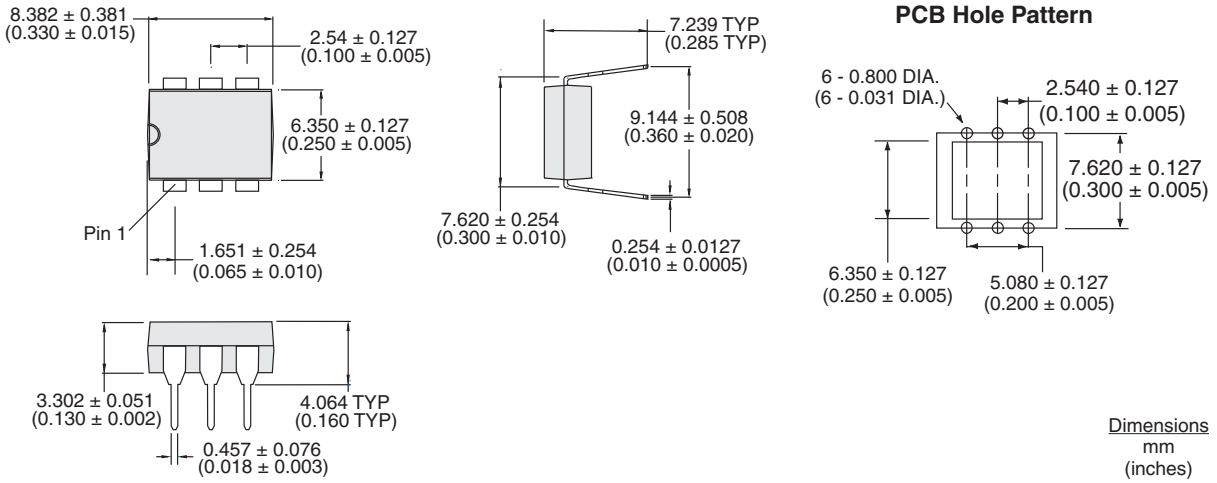
Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
LCB716	250°C	30 seconds	1
LCB716S	250°C	30 seconds	3

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.

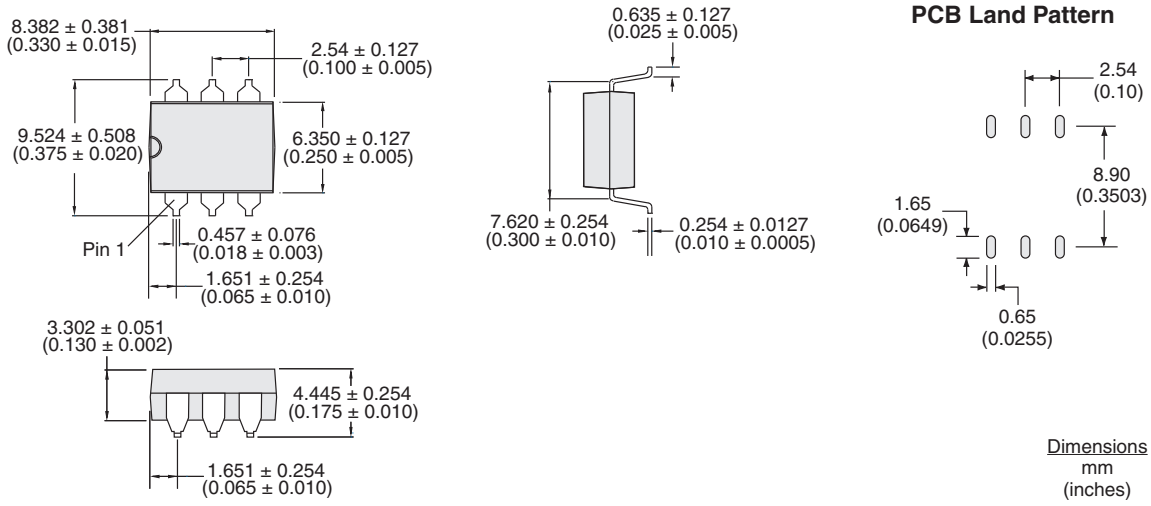
Mechanical Dimensions

LCB716



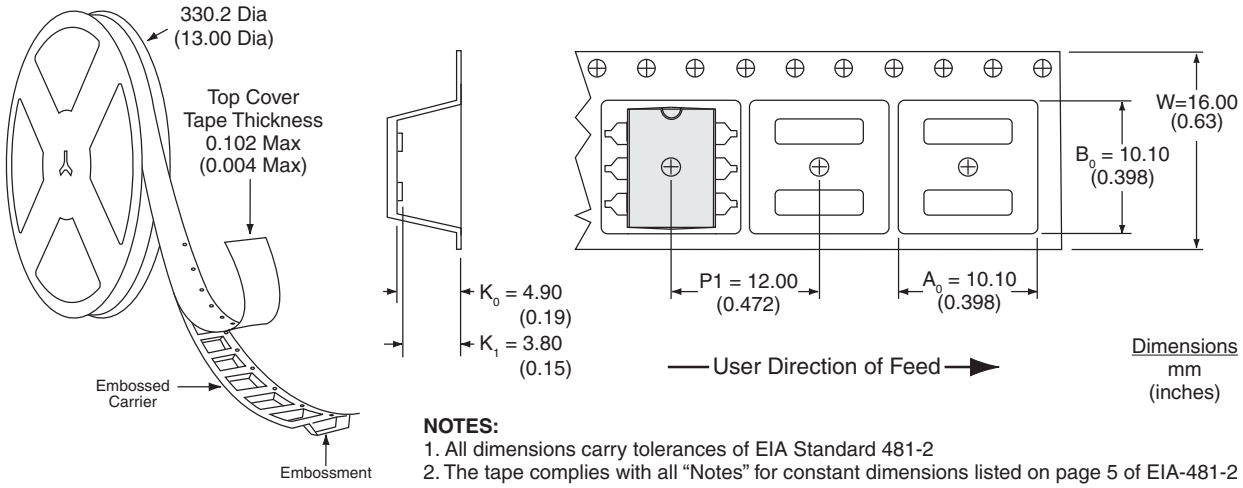
Dimensions
mm
(inches)

LCB716S



Dimensions
mm
(inches)

LCB716STR Tape & Reel



NOTES:
1. All dimensions carry tolerances of EIA Standard 481-2
2. The tape complies with all "Notes" for constant dimensions listed on page 5 of EIA-481-2

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

Specification: DS-LCB716-R04

6/26/2018