IXYS
INTEGRATED CIRCUITS DIVISION



LCC110
1-Form-C OptoMOS® Relay

Parameters	Ratings	Units
Blocking Voltage	350	V_P
Load Current	120	mA_{rms} / mA_{DC}
On-Resistance (max)	35	Ω

Featurges
- 3750V_{rms} Input/Output Isolation
- 1-Form-C Solid State Relay
- Low Drive Power Requirements (TTL/CMOS Compatible)
- High Reliability
- Arc-Free With No Snubbing Circuits
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Small 8-pin Packages
- Machine Insertable, Wave Solderable
- Surface Mount Tape & Reel Versions Available

Applications
- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - Hook Switch
  - Dial Pulsing
  - Ground Start
  - Ringing Injection
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

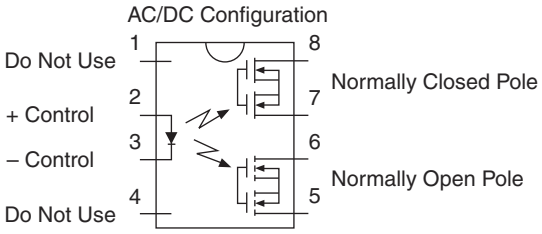
Description
LCC110P is a 350V, 120mA, 35Ω, 1-Form-C relay. This device is ideal for applications where a signal needs to be switched between two different lines. The small 8-lead package makes it an ideal space-saving replacement for a 1-Form-C electromechanical relay (EMR).

Approvals
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component: TUV Certificate B 09 07 49410 004

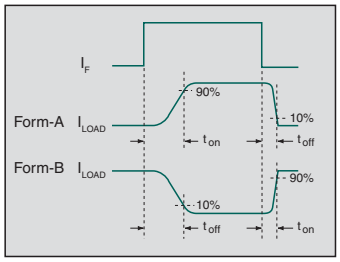
Ordering Information

Part #	Description
LCC110	8-Pin DIP (50/Tube)
LCC110P	8-Pin Flatpack (50/Tube)
LCC110PTR	8-Pin Flatpack Tape & Reel (1000/Reel)
LCC110S	8-Pin Surface Mount (50/Tube)
LCC110STR	8-Pin Surfact Mount Tape & Reel (1000/Reel)

Pin Configuration



Switching Characteristics for a 1-Form-C Device



Absolute Maximum Ratings @ 25ºC

Parameter	Min	Max	Unit
Blocking Voltage	-	350	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
Isolation Voltage, Input to Output	3750	-	V_{rms}
Operating Temperature	-40	+85	ºC
Storage Temperature	-40	+125	ºC

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

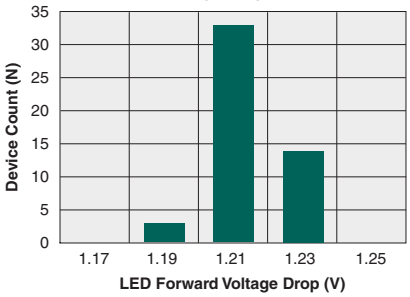
Electrical Characteristics @ 25ºC

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
Continuous, AC/DC Configuration	-	I_L	-	-	120	mA_{rms} / mA_{DC}
Peak	t=10ms	I_{LPK}	-	-	±350	mA_P
On-Resistance, AC/DC Configuration	I_L=120mA	R_{ON}	-	23	35	Ω
Off-State Leakage Current	V_L=350V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=8mA, V_L=10V	t_{on}	-	-	4	ms
Turn-Off		t_{off}	-	-	4	
Output Capacitance	V_L=50V, f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics						
Input Control Current to Activate	I_L=120mA	I_F	-	-	8	mA
Input Control Current to Deactivate	-	I_F	0.4	0.7	-	mA
Input Voltage Drop	I_F=8mA	V_F	0.9	1.2	1.4	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics						
Capacitance, Input to Output	-	$C_{I/O}$	-	3	-	pF

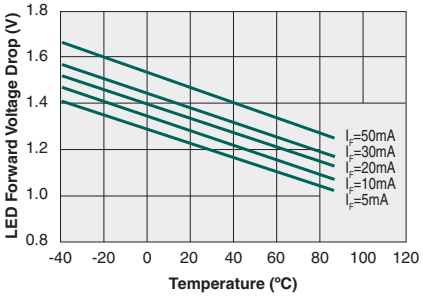
Note: If both poles operate simultaneously, then load current must be derated in order not to exceed package power dissipation value.

COMMON PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

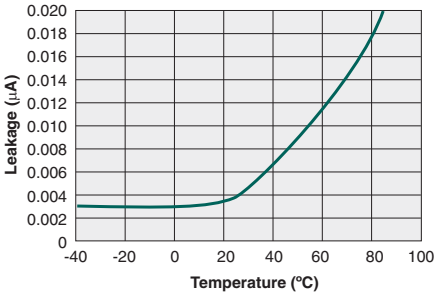
Typical LED Forward Voltage Drop (N=50)



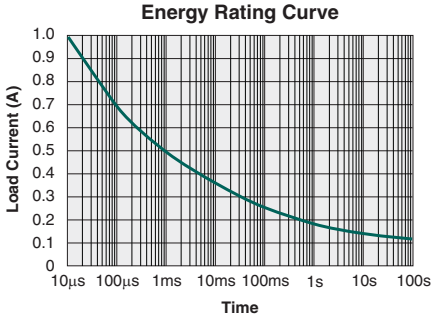
Typical LED Forward Voltage Drop vs. Temperature



Typical Leakage vs. Temperature Measured across Pins 5&6 or 7&8

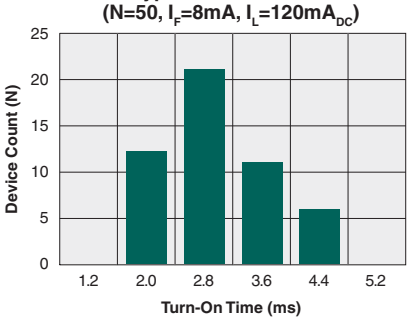


Energy Rating Curve

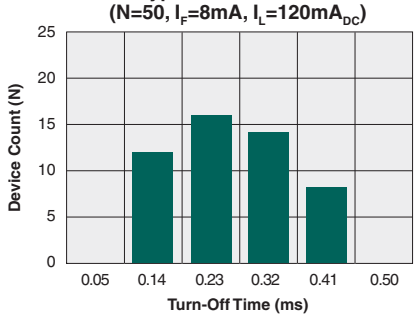


FORM-A RELAY PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

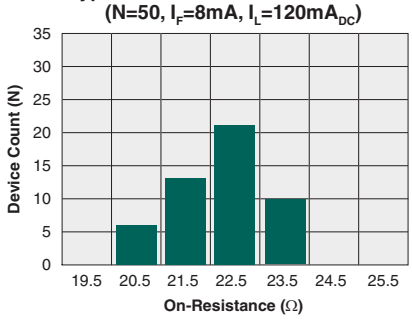
Form-A
Typical Turn-On Time
(N=50, I_F=8mA, I_L=120mA$_{DC}$)



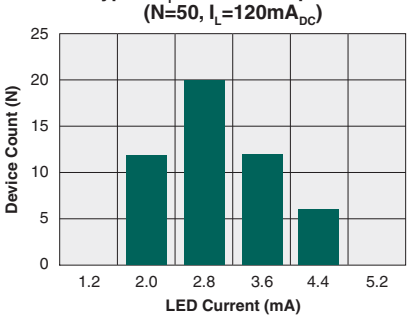
Form-A
Typical Turn-Off Time
(N=50, I_F=8mA, I_L=120mA$_{DC}$)



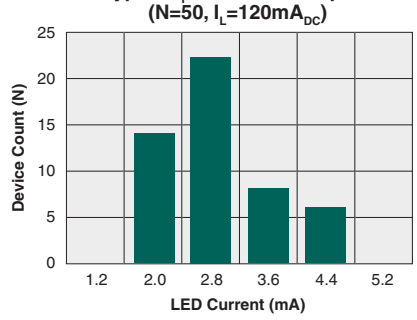
Form-A
Typical On-Resistance Distribution
(N=50, I_F=8mA, I_L=120mA$_{DC}$)



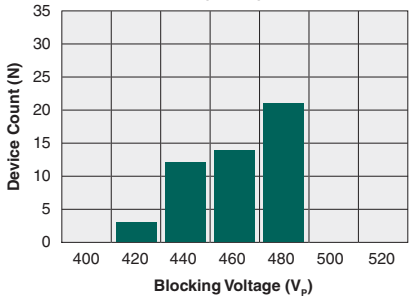
Form-A
Typical I_F for Switch Operation
(N=50, I_L=120mA$_{DC}$)



Form-A
Typical I_F for Switch Dropout
(N=50, I_L=120mA$_{DC}$)



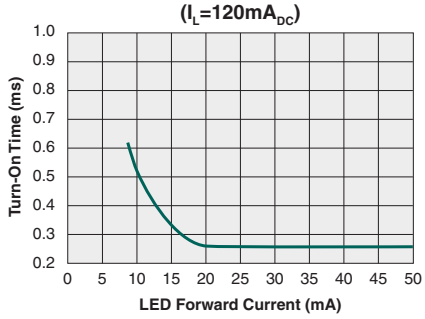
Form-A
Typical Blocking Voltage Distribution
(N=50)



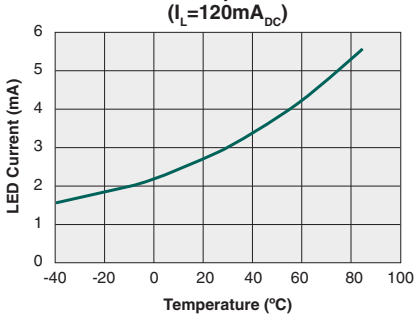
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

FORM-A RELAY PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

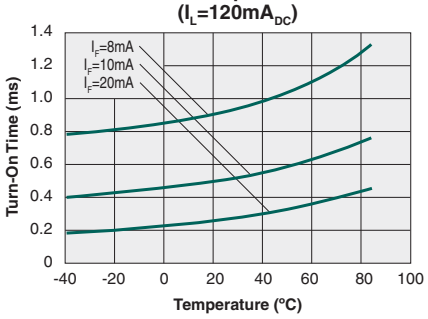
Form-A
Typical Turn-On Time
vs. LED Forward Current
(I_L=120mA$_{DC}$)



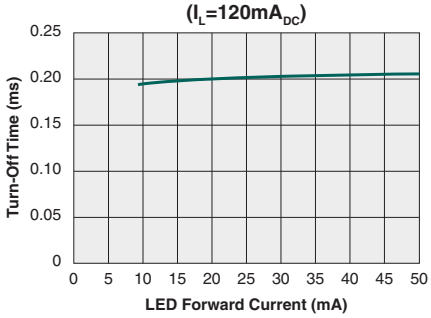
Form-A
Typical I_F for Switch Operation
vs. Temperature
(I_L=120mA$_{DC}$)



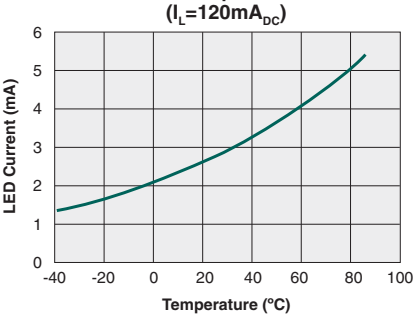
Form-A
Typical Turn-On Time
vs. Temperature
(I_L=120mA$_{DC}$)



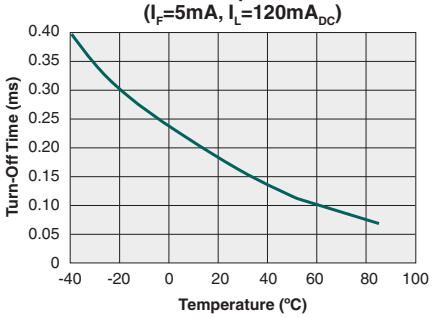
Form-A
Typical Turn-Off Time
vs. LED Forward Current
(I_L=120mA$_{DC}$)



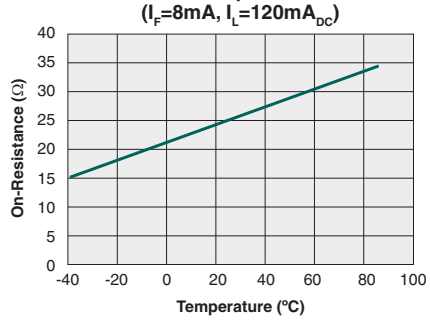
Form-A
Typical I_F for Switch Dropout
vs. Temperature
(I_L=120mA$_{DC}$)



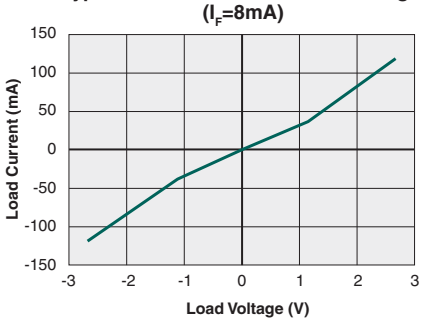
Form-A
Typical Turn-Off Time
vs. Temperature
(I_F=5mA, I_L=120mA$_{DC}$)



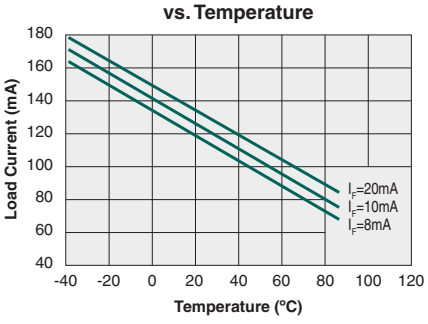
Form-A
Typical On-Resistance
vs. Temperature
(I_F=8mA, I_L=120mA$_{DC}$)



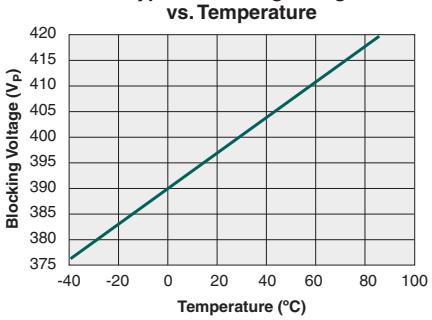
Form-A
Typical Load Current vs. Load Voltage
(I_F=8mA)



Form-A
Maximum Load Current
vs. Temperature



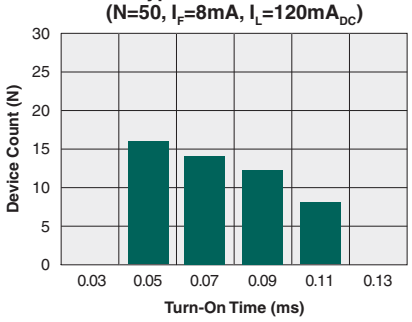
Form-A
Typical Blocking Voltage
vs. Temperature



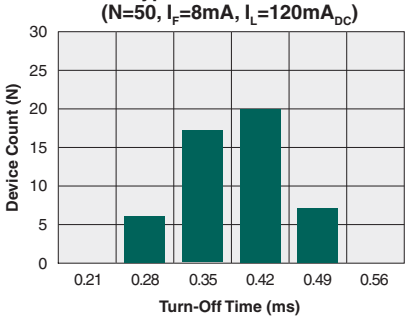
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

FORM-B RELAY PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

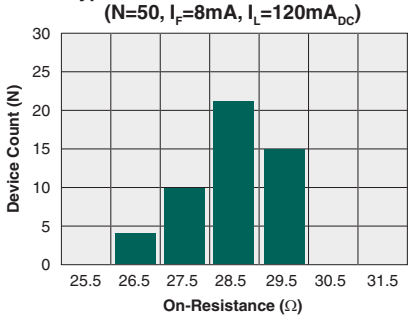
Form-B Typical Turn-On Time (N=50, I_F=8mA, I_L=120mA$_{DC}$)



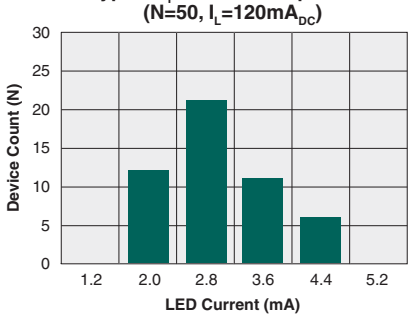
Form-B Typical Turn-Off Time (N=50, I_F=8mA, I_L=120mA$_{DC}$)



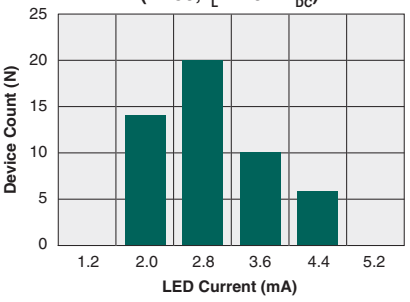
Form-B Typical On-Resistance Distribution (N=50, I_F=8mA, I_L=120mA$_{DC}$)



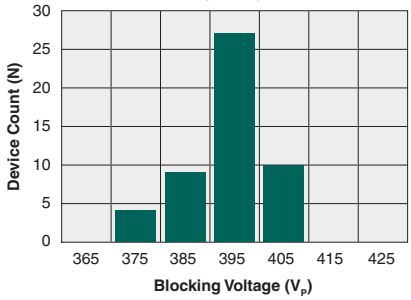
Form-B Typical I_F for Switch Operation (N=50, I_L=120mA$_{DC}$)



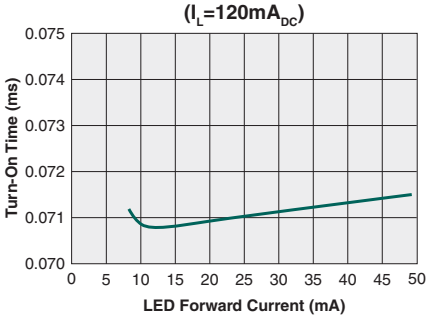
Form-B Typical I_F for Switch Dropout (N=50, I_L=120mA$_{DC}$)



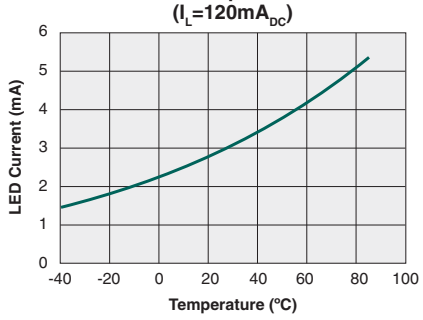
Form-B Typical Blocking Voltage Distribution (N=50)



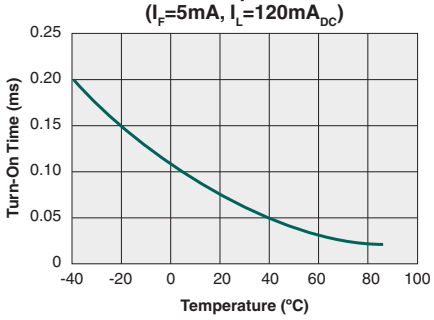
Form-B Typical Turn-On Time vs. LED Forward Current (I_L=120mA$_{DC}$)



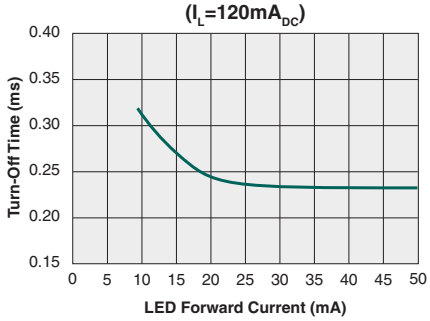
Form-B Typical I_F for Switch Operation vs. Temperature (I_L=120mA$_{DC}$)



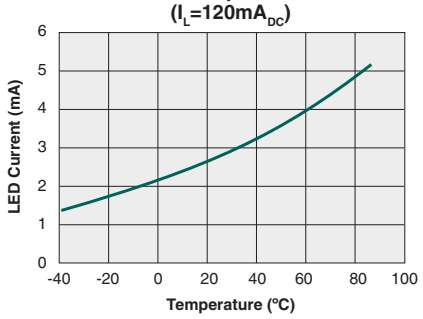
Form-B Typical Turn-On Time vs. Temperature (I_F=5mA, I_L=120mA$_{DC}$)



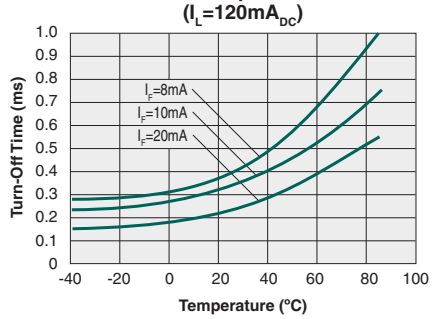
Form-B Typical Turn-Off Time vs. LED Forward Current (I_L=120mA$_{DC}$)



Form-B Typical I_F for Switch Dropout vs. Temperature (I_L=120mA$_{DC}$)



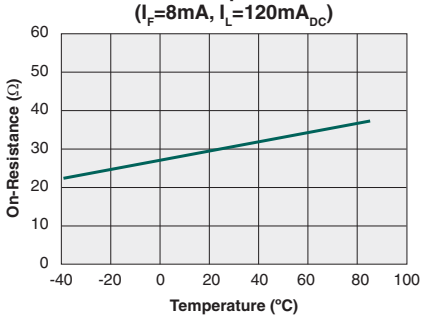
Form-B Typical Turn-Off Time vs. Temperature (I_L=120mA$_{DC}$)



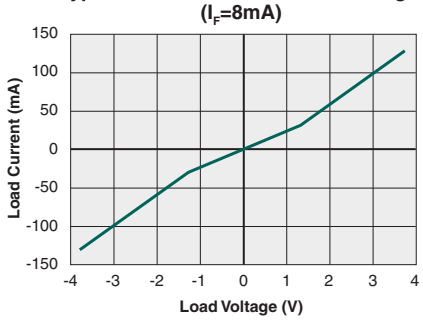
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

FORM-B RELAY PERFORMANCE DATA @25ºC (Unless Otherwise Noted)*

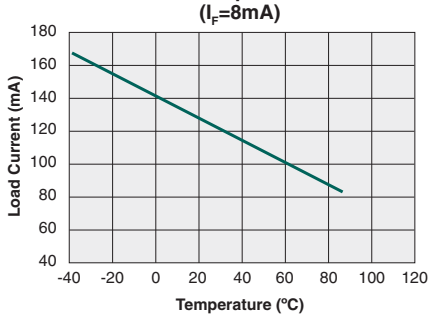
Form-B
Typical On-Resistance
vs. Temperature
(I_F=8mA, I_L=120mA$_{DC}$)



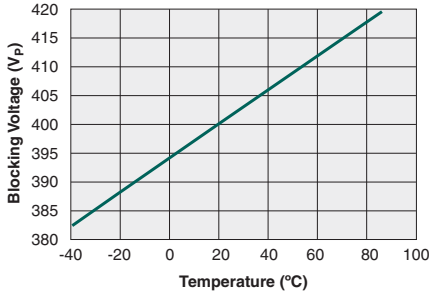
Form-B
Typical Load Current vs. Load Voltage
(I_F=8mA)



Form-B
Maximum Load Current
vs. Temperature
(I_F=8mA)



Form-B
Typical Blocking Voltage
vs. Temperature



*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 ingression. 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
LCC110 / LCC110S / LCC110P	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.

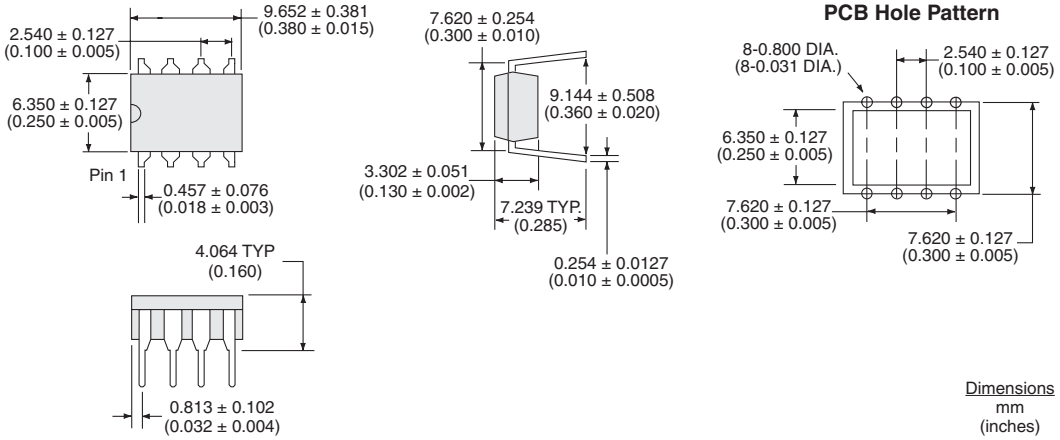
Device	Maximum Temperature x Time
LCC110 / LCC110S	250°C for 30 seconds
LCC110P	260°C for 30 seconds

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.

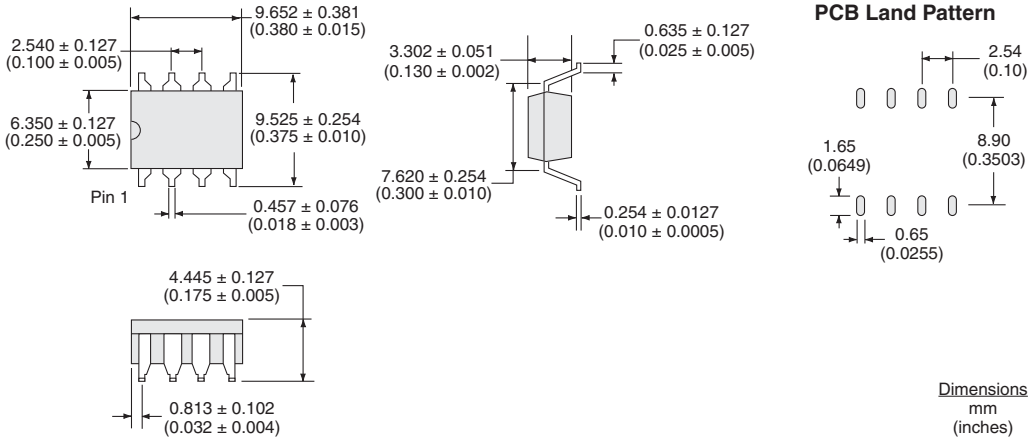
Mechanical Dimensions

LCC110



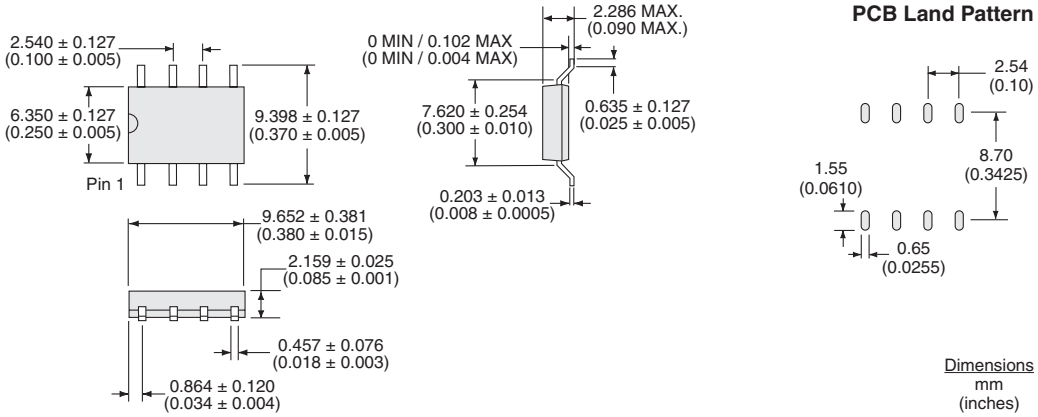
Dimensions
mm
(inches)

LCC110S



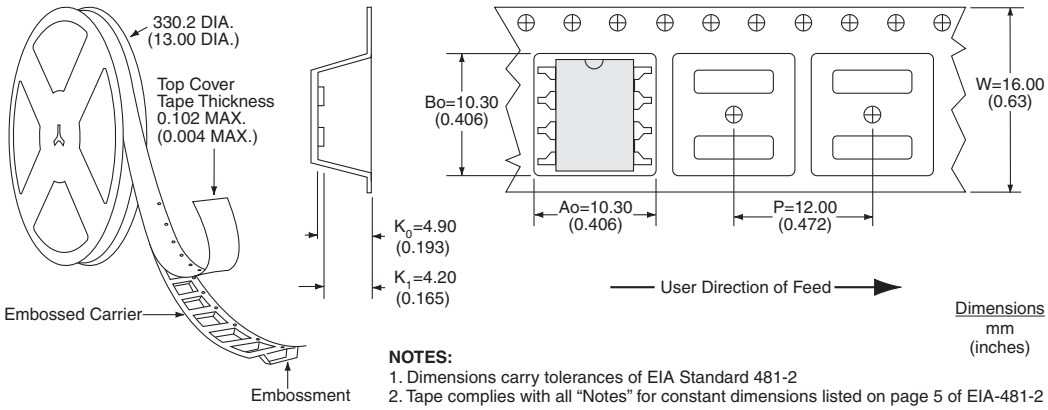
Dimensions
mm
(inches)

LCC110P



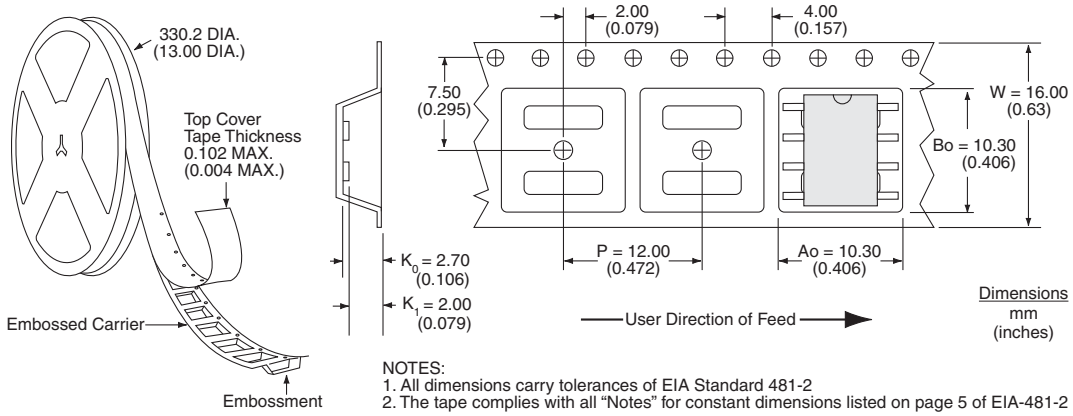
Dimensions
mm
(inches)

LCC110STR Tape & Reel



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

LCC110PTR 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

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