LCB110
Single Pole OptoMOS® Relay

Parameter	Ratings	Units
Blocking Voltage	350	V_P
Load Current	120	mA
Max On-resistance	35	Ω

Features
- Small 6-Pin Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- 3750V_{rms} Input/Output Isolation
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Surface Mount Tape & Reel Version 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
The LCB110 is a 1-Form-B (normally closed) relay which uses optically coupled MOSFET technology to provide 3750V_{rms} of input to output isolation. The efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS® architecture. A highly efficient GaAlAs infrared LED controls the optically coupled output. The LCB110 has low on-resistance and is well suited for most applications requiring a normally closed relay.

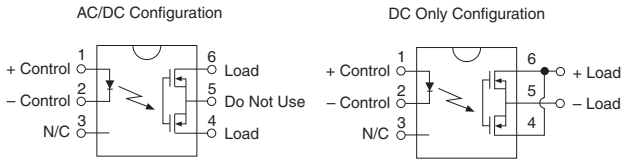
Approvals
- UL Recognized Component: File # E76270
- CSA Certified Component: Certificate # 1175739
- EN/IEC 60950-1 Compliant

Ordering Information

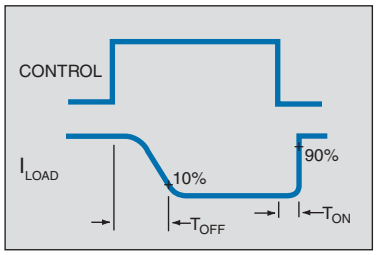
Part #	Description
LCB110	6-Pin DIP (50/Tube)
LCB110S	6-Pin Surface Mount (50/Tube)
LCB110STR	6-Pin Surface Mount (1000/Reel)

* For other packaging options consult factory.

Pin Configuration



Switching Characteristics of Normally Closed (Form B) Devices



Absolute Maximum Ratings

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

[1] Derate Linearly 3.33 mw / °C
[1] Derate Linearly 6.67 mw / °C

Electrical absolute maximum ratings are at 25°C

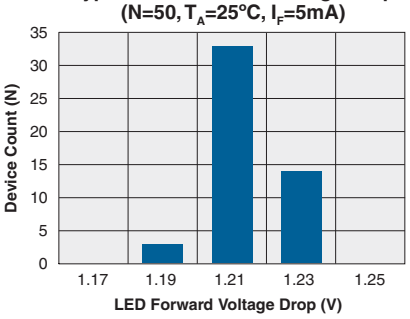
Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

Electrical Characteristics

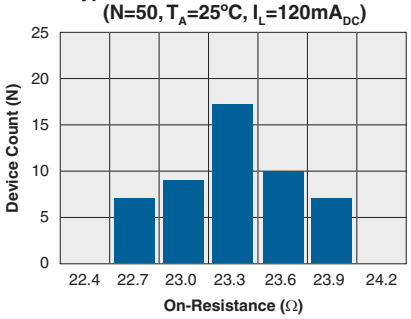
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current Continuous						
AC/DC Configuration	-	I_L	-	-	120	mA
DC Configuration					200	
Peak Load Current	t=10ms	I_L	-	-	350	mA
On-Resistance						
AC/DC Configuration	I_L=120mA	R_{ON}	-	23	35	Ω
DC Configuration	I_L=200mA		-	7	10	
Off-State Leakage Current	I_F=5mA, V_L=350V_P	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	t_{ON}	-	0.38	3	ms
Turn-Off		t_{OFF}	-	0.93	3	
Output Capacitance	I_F=5mA, 50V, f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics @ 25°C						
Input Control Current	I_L=120mA	I_F	-	-	5	mA
Input Dropout Current	-	I_F	0.4	0.7	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.4	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics @ 25°C						
Input to Output Capacitance	-	$C_{I/O}$	-	3	-	pF

PERFORMANCE DATA*

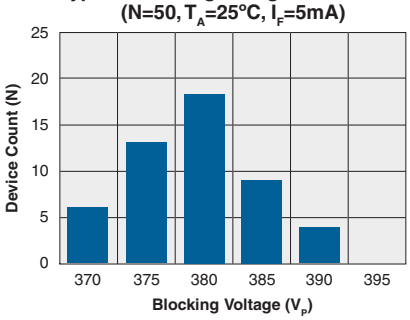
LCB110
Typical LED Forward Voltage Drop
(N=50, T_A=25°C, I_F=5mA)



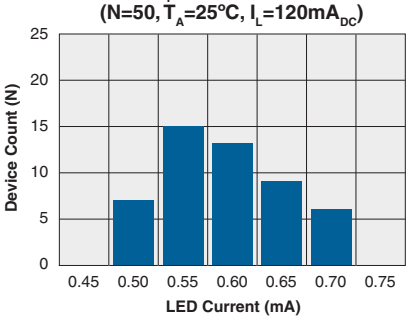
LCB110
Typical On-Resistance Distribution
(N=50, T_A=25°C, I_L=120mA$_{DC}$)



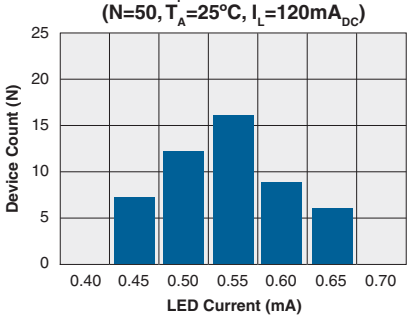
LCB110
Typical Blocking Voltage Distribution
(N=50, T_A=25°C, I_F=5mA)



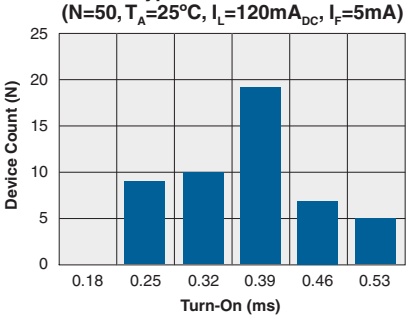
LCB110
Typical I_F for Switch Operation
(N=50, T_A=25°C, I_L=120mA$_{DC}$)



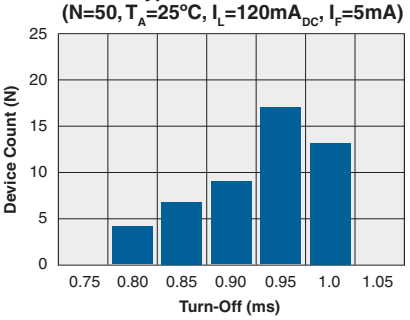
LCB110
Typical I_F for Switch Dropout
(N=50, T_A=25°C, I_L=120mA$_{DC}$)



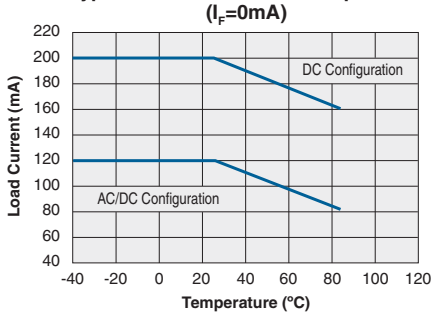
LCB110
Typical Turn-On Time
(N=50, T_A=25°C, I_L=120mA$_{DC}$, I_F=5mA)



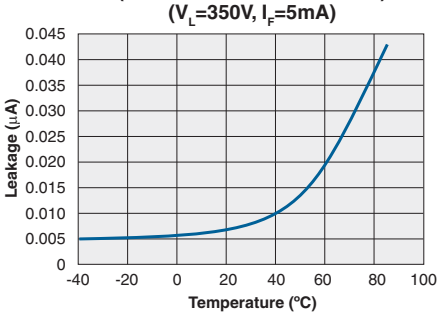
LCB110
Typical Turn-Off Time
(N=50, T_A=25°C, I_L=120mA$_{DC}$, I_F=5mA)



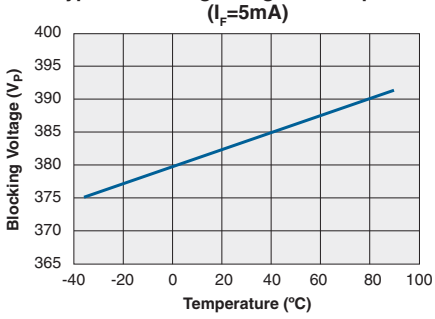
LCB110
Typical Load Current vs. Temperature
(I_F=0mA)



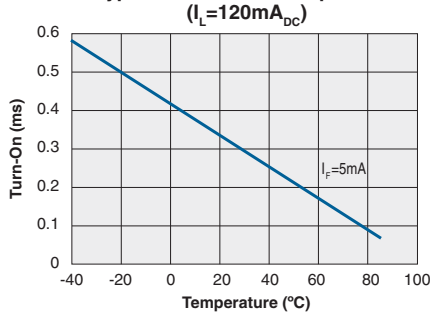
LCB110
Typical Leakage vs. Temperature
(Measured Across Pins 4&6)
(V_L=350V, I_F=5mA)



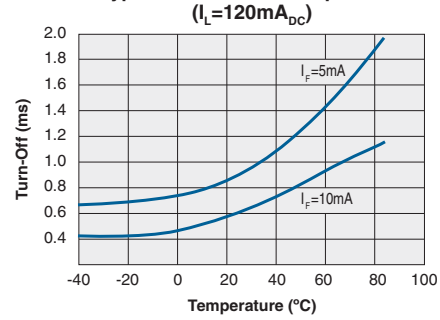
LCB110
Typical Blocking Voltage vs. Temperature
(I_F=5mA)



LCB110
Typical Turn-On vs. Temperature
(I_L=120mA$_{DC}$)



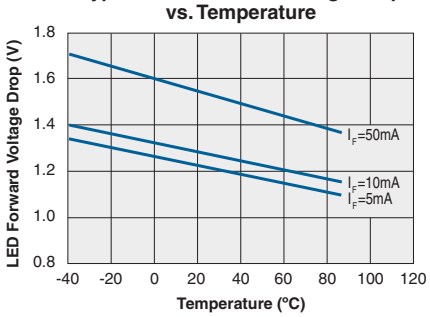
LCB110
Typical Turn-Off vs. Temperature
(I_L=120mA$_{DC}$)



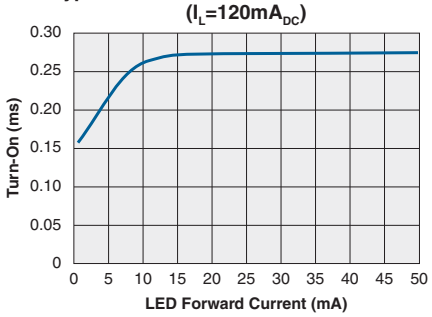
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

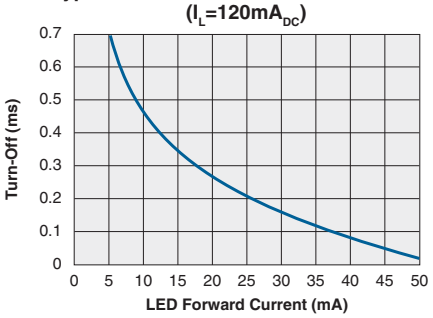
LCB110
Typical LED Forward Voltage Drop vs. Temperature



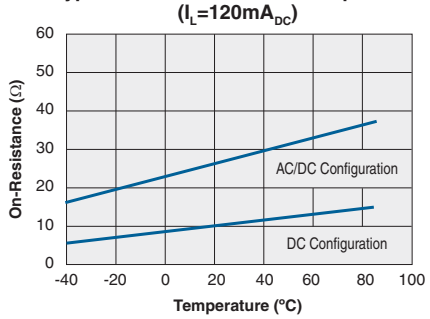
LCB110
Typical Turn-On vs. LED Forward Current (I_L=120mA$_{DC}$)



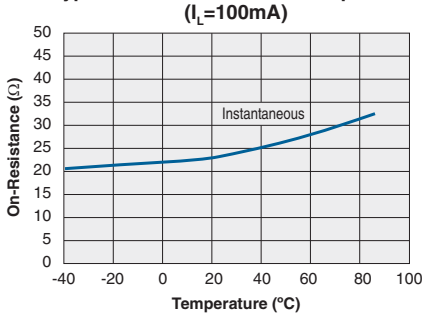
LCB110
Typical Turn-Off vs. LED Forward Current (I_L=120mA$_{DC}$)



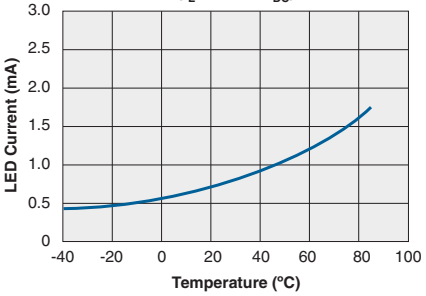
LCB110
Typical On-Resistance vs. Temperature (I_L=120mA$_{DC}$)



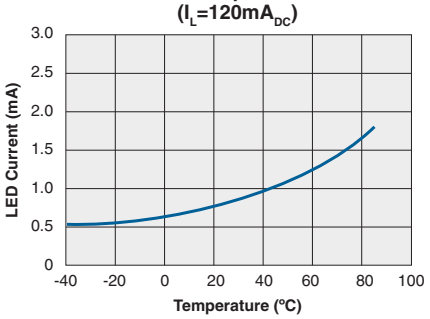
LCB110
Typical On-Resistance vs. Temperature (I_L=100mA)



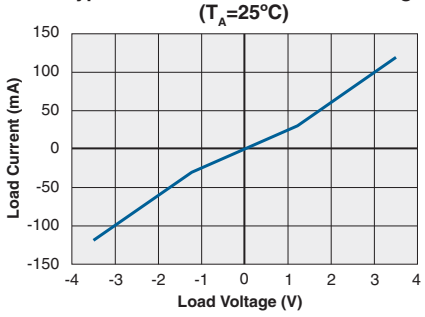
LCB110
Typical I_F for Switch Dropout vs. Temperature (I_L=120mA$_{DC}$)



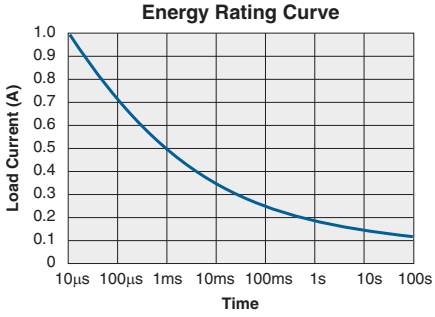
LCB110
Typical I_F for Switch Operation vs. Temperature (I_L=120mA$_{DC}$)



LCB110
Typical Load Current vs. Load Voltage (T_A=25°C)



LCB110
Energy Rating Curve



*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

Soldering

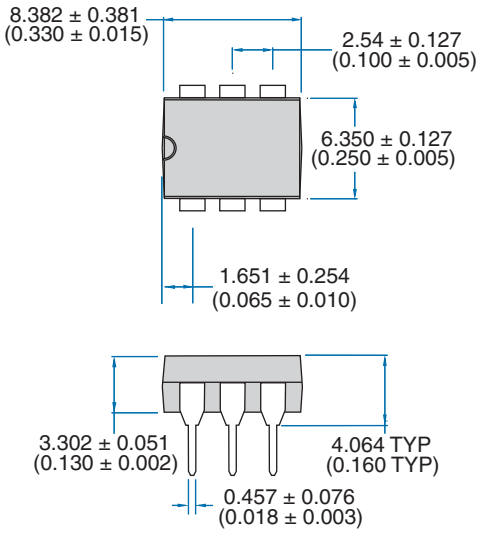
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Washing

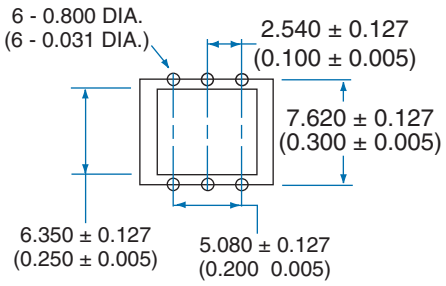
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

6-Pin DIP Thru-Hole Package

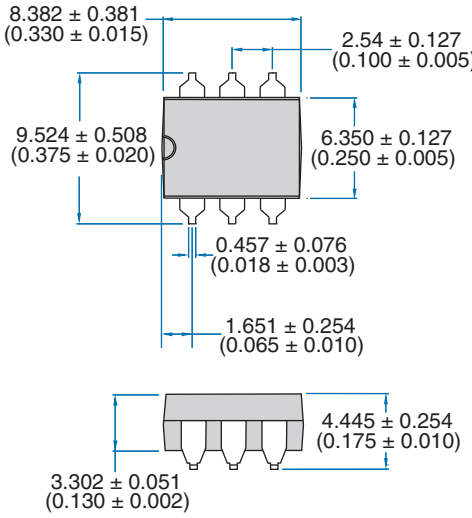


PC Board Pattern

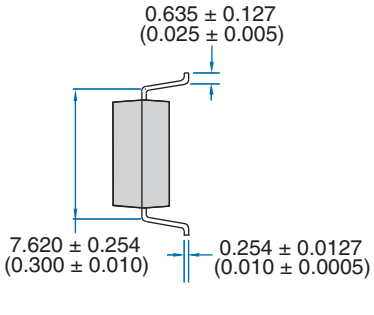


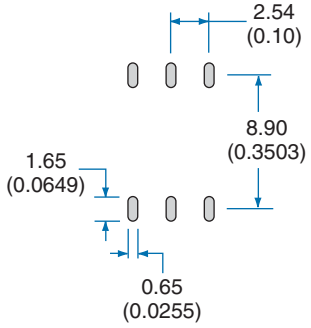
Dimensions
mm
(inches)

6-Pin Surface Mount Package (”S” Suffix)



Recommended PCB Land Pattern

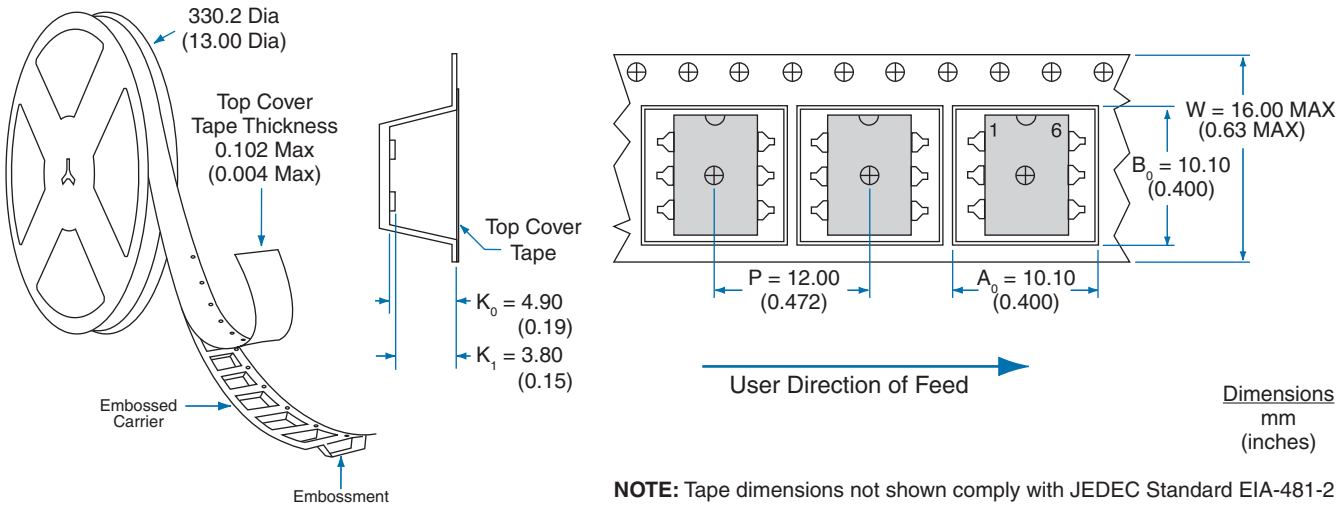




Dimensions
mm
(inches)

MECHANICAL DIMENSIONS (Cont.)

Tape and Reel Packaging for 6-Pin "S" Suffix Parts



NOTE: Tape dimensions not shown comply with JEDEC Standard EIA-481-2

Specification: DS-LCB110-R07

7/23/08