



Parameter	Ratings	Units
Blocking Voltage	250	V _P
Load Current	170	mA
Max On-resistance	20	Ω

Features

- 3750V_{rms} Input/Output Isolation
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Surface Mount Tape & Reel Version Available
- Arc-Free With No Snubbing Circuits
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Small 6-Pin Package
- Machine Insertable, Wave Solderable

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 LCB120 is a single-pole, normally closed (1-Form-B) relay that 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 LCB120 has low on-resistance, and is well suited for most applications requiring a normally closed relay.

Approvals

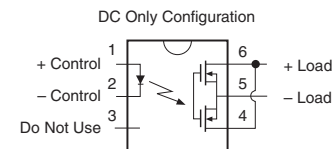
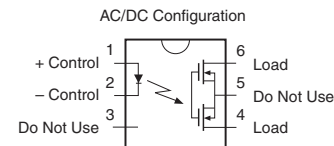
- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component:
TUV Certificate B 09 07 49410 006

Ordering Information

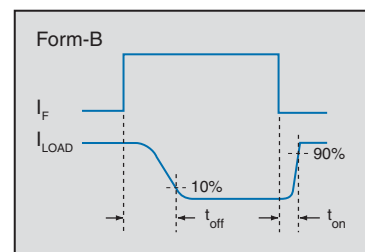
Part #	Description
LCB120	6-Pin DIP (50/Tube)
LCB120S	6-Pin Surface Mount (50/Tube)
LCB120STR	6-Pin Surface Mount (1000/Reel)

* For other packaging options consult factory.

Pin Configuration



Switching Characteristics of Normally Closed Devices



Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Blocking Voltage	250	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 1.33 mW / °C

² Derate linearly 6.67 mW / °C

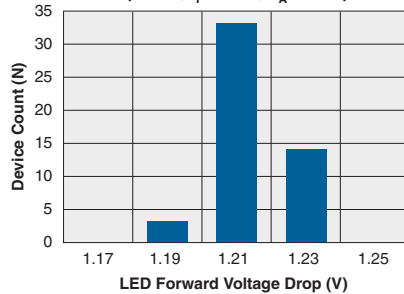
Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

Electrical Characteristics @ 25°C

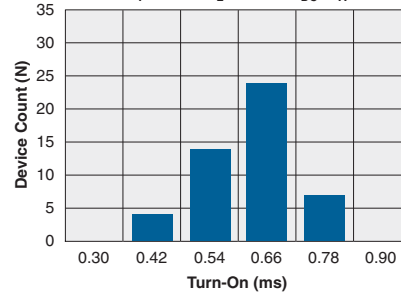
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current: Continuous						
AC/DC Configuration	-	I _L	-	-	170	mA
DC Configuration	-	I _L	-	-	300	mA
Peak Load Current	t=10ms	I _L	-	-	400	mA
On-Resistance						
AC/DC Configuration	I _L =170mA	R _{ON}	-	11	20	Ω
DC Configuration	I _L =300mA	R _{ON}	-	5	6	Ω
Off-State Leakage Current	I _F =5mA, V _L =250V _P	I _{LEAK}	-	-	1	μA
Switching Speeds						
Turn-On	I _F =5mA, V _L =10V	t _{on}	-	0.65	5	ms
Turn-Off	I _F =5mA, V _L =10V	t _{off}	-	1.30	5	ms
Output Capacitance	V _L =50V, f=1MHz, I _F =50mA	C _{OUT}	-	50	-	pF
Input Characteristics						
Input Control Current	I _L =170mA	I _F	-	-	5	mA
Input Dropout Current	-	I _F	0.4	-	-	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						
Input to Output Capacitance	-	C _{IO}	-	3	-	pF

PERFORMANCE DATA*

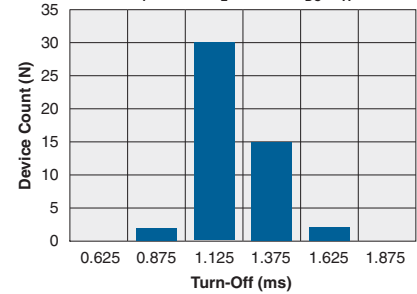
Typical LED Forward Voltage Drop
(N=50, $I_F=5\text{mA}$, $T_A=25^\circ\text{C}$)



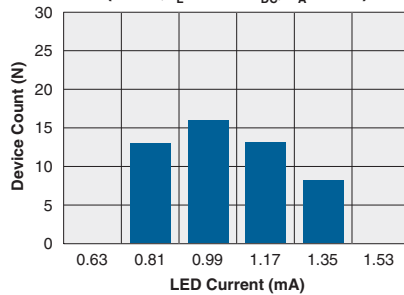
Typical Turn-On Time
(N=50, $I_F=5\text{mA}$, $I_L=170\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



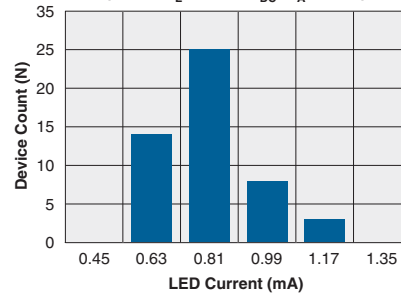
Typical Turn-Off Time
(N=50, $I_F=5\text{mA}$, $I_L=170\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



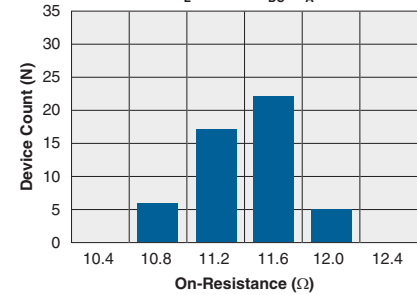
Typical I_F for Switch Operation
(N=50, $I_L=170\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



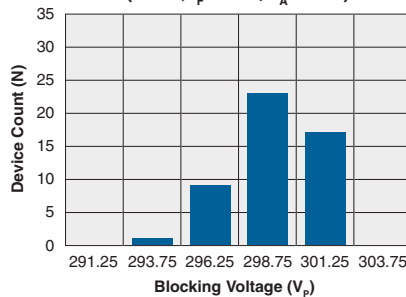
Typical I_F for Switch Dropout
(N=50, $I_L=170\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



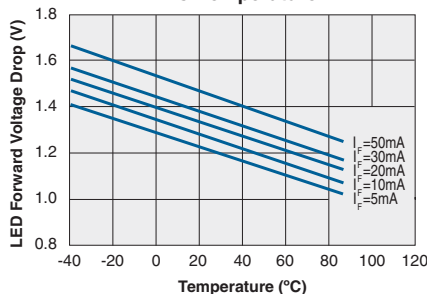
Typical On-Resistance Distribution
(N=50, $I_L=170\text{mA}_{DC}$, $T_A=25^\circ\text{C}$)



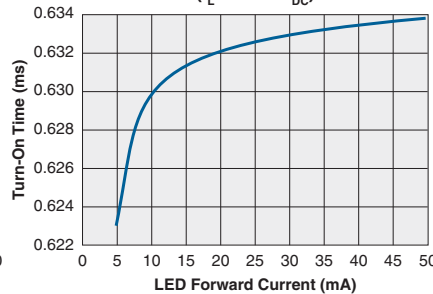
Typical Blocking Voltage Distribution
(N=50, $I_F=5\text{mA}$, $T_A=25^\circ\text{C}$)



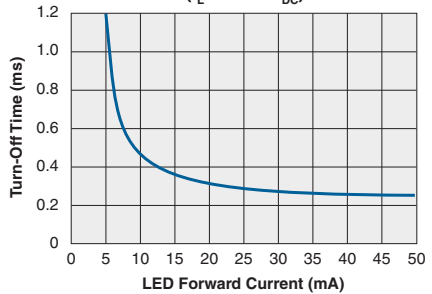
Typical LED Forward Voltage Drop vs. Temperature



Typical Turn-On Time vs. LED Forward Current
($I_L=170\text{mA}_{DC}$)

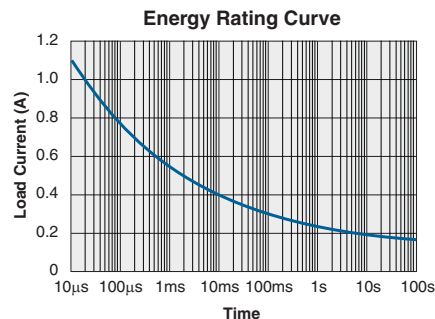
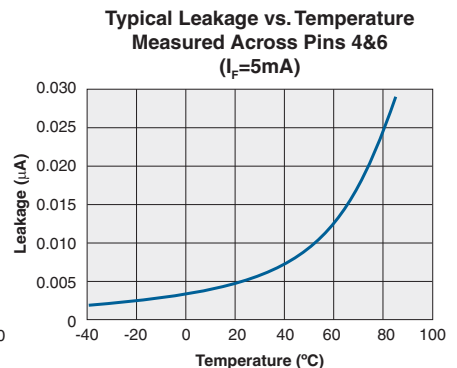
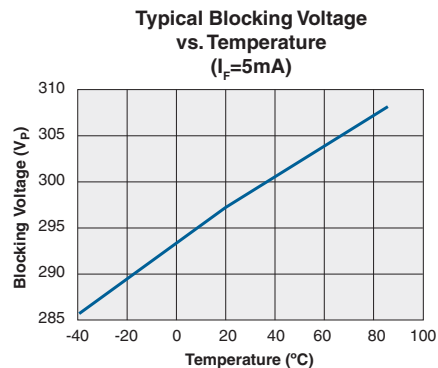
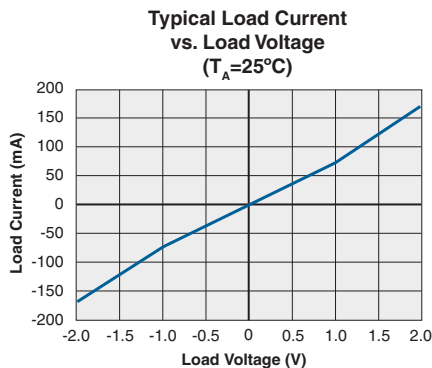
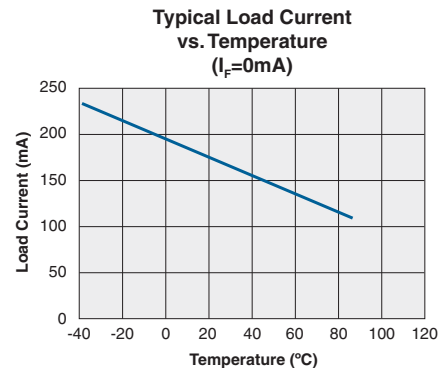
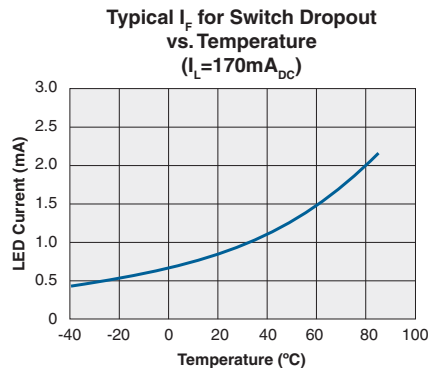
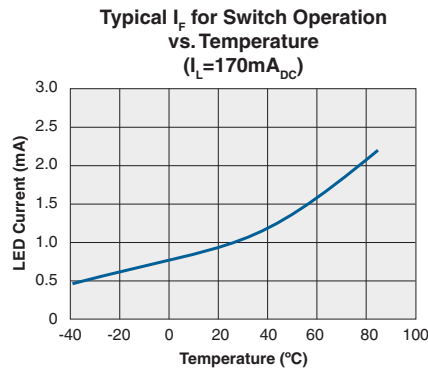
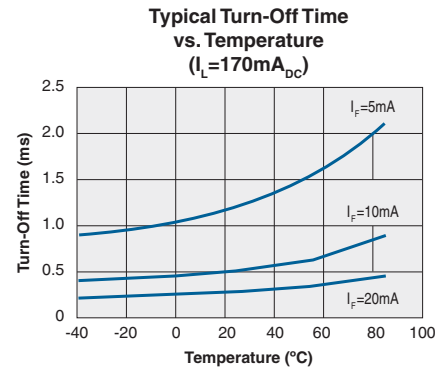
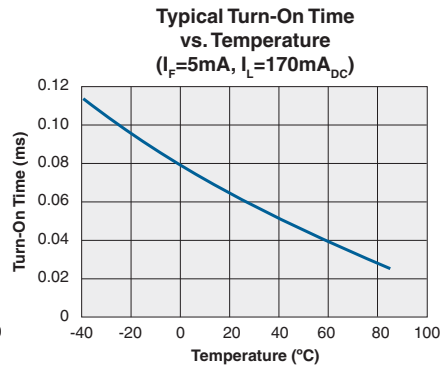
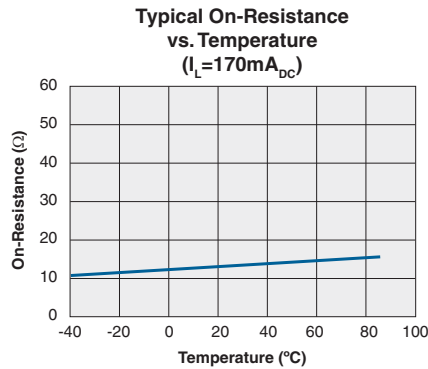


Typical Turn-Off Time vs. LED Forward Current
($I_L=170\text{mA}_{DC}$)



*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*



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Manufacturing Information

Moisture Sensitivity



All plastic encapsulated semiconductor packages are susceptible to moisture ingress. Clare 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
LCB120 / LCB120S	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
LCB120 / LCB120S	250°C for 30 seconds

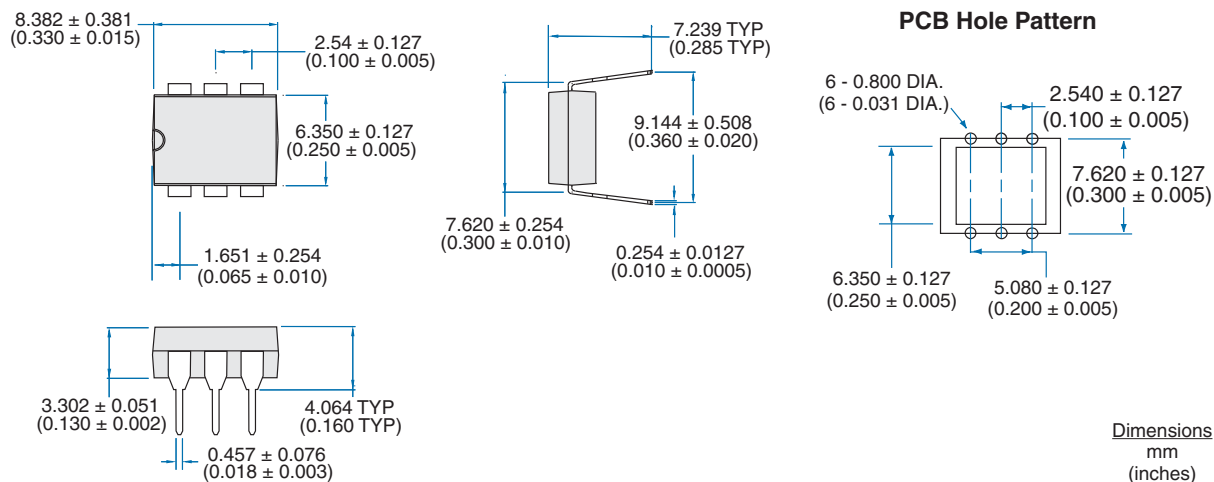
Board Wash

Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare 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.

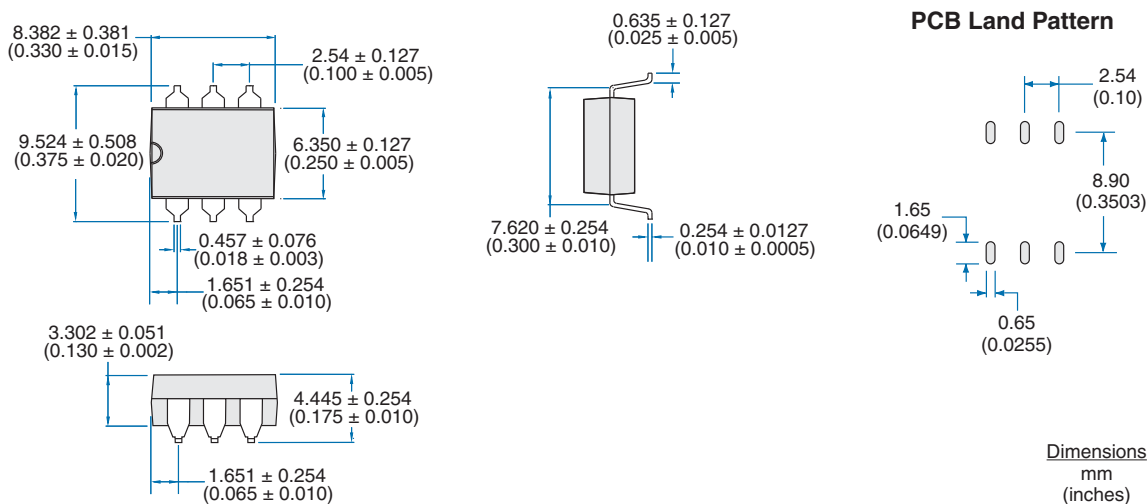


MECHANICAL DIMENSIONS

LCB120

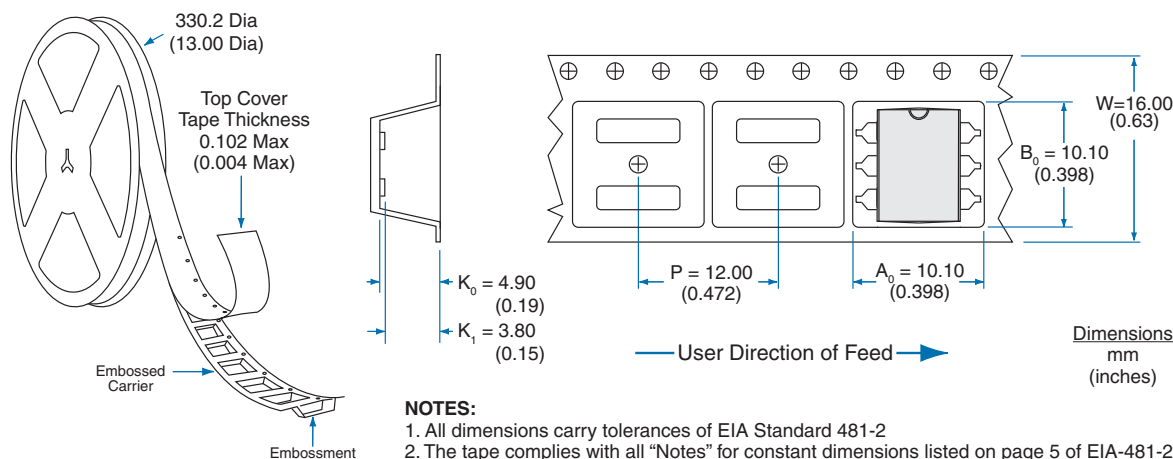


LCB120S



MECHANICAL DIMENSIONS (Cont.)

LCB120S Tape & Reel



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