



# CLARE

# XCB170 Single Pole OptoMOS® Relays



	XCB170	Units
Load Voltage	350	V
Load Current	100	mA
Max R <sub>ON</sub>	50	Ω

### Features

- Small 6 Pin DIP Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- 3750V<sub>RMS</sub> Input/Output Isolation
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Surface Mount and Tape & Reel Versions Available

### Applications

- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - Hookswitch
  - Dial Pulsing
  - Ground Start
  - Ringer 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 XCB170 is a 1-Form-B relay which uses optically coupled MOSFET technology to provide 3750V 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 input. The device is available in small 6-pin dual in line package in standard through hole and surface mount lead bend.

### Approvals

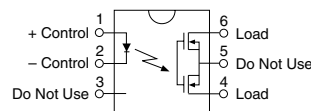
- UL Recognized: File Number E76270
- CSA Certified: File Number LR 43639-10
- BSI Certified to:
  - BS EN 60950:1992 (BS7002:1992) Certificate #: 7344
  - BS EN 41003:1993 Certificate #: 7344

### Ordering Information

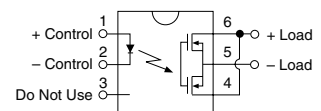
Part #	Description
XCB170	6 Pin DIP (50/Tube)
XCB170S	6 Pin Surface Mount (50/Tube)
XCB170STR	6 Pin Surface Mount (1000/Reel)

### Pin Configuration

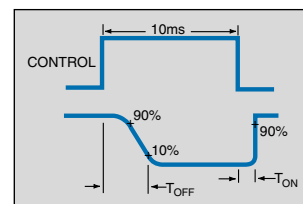
**XCB170 Pinout**  
AC/DC Configuration



**XCB170 Pinout**  
DC Only Configuration



### Switching Characteristics of Normally Closed (Form B) Devices



**Absolute Maximum Ratings (@ 25° C)**

Parameter	Min	Typ	Max	Units
Input Power Dissipation	-	-	150 <sup>1</sup>	mW
Input Control Current	-	-	50	mA
Peak (10ms)	-	-	1	A
Reverse Input Voltage	-	-	5	V
Total Power Dissipation	-	-	800 <sup>2</sup>	mW
Isolation Voltage Input to Output	3750	-	-	V <sub>RMS</sub>
Operational Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C
Soldering Temperature DIP Package	-	-	+260	°C
Surface Mount Package (10 Seconds Max.)	-	-	+220	°C

<sup>1</sup> Derate Linearly 1.33 mw/°C

<sup>2</sup> Derate Linearly 6.67 mw/°C

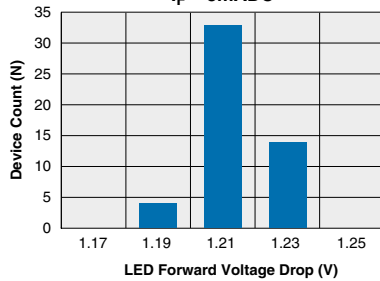
*Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to the absolute maximum ratings for an extended period may degrade the device and effect its reliability.*

**Electrical Characteristics**

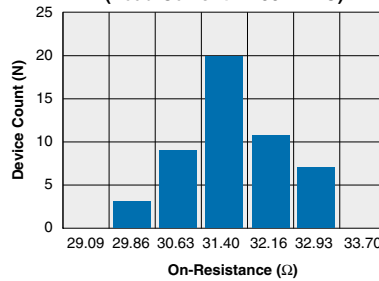
Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics @ 25°C</b>						
Load Voltage (Peak)	-	V <sub>L</sub>	-	-	350	V
Load Current (Continuous) AC/DC Configuration	-	I <sub>L</sub>	-	-	100	mA
DC Configuration	-	I <sub>L</sub>	-	-	180	mA
Peak Load Current	10ms	I <sub>LPK</sub>	-	-	350	mA
On-Resistance AC/DC Configuration	I <sub>L</sub> =120mA	R <sub>ON</sub>	-	31	50	Ω
DC Configuration	I <sub>L</sub> =200mA	R <sub>ON</sub>	-	10	15	Ω
Off-State Leakage Current	V <sub>L</sub> =350V	I <sub>LEAK</sub>	-	-	1	μA
Switching Speeds Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	T <sub>ON</sub>	-	-	5	ms
Turn-Off	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	T <sub>OFF</sub>	-	-	5	ms
Output Capacitance	50V; f=1MHz	C <sub>OUT</sub>	-	25	-	pF
Capacitance Input to Output	-	-	-	3	-	pF
<b>Input Characteristics @ 25°C</b>						
Input Control Current	I <sub>L</sub> =120mA	I <sub>F</sub>	5	-	50	mA
Input Dropout Current	-	I <sub>F</sub>	0.4	0.7	-	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.2	1.4	V
Reverse Input Voltage	-	V <sub>R</sub>	-	-	5	V
Reverse Input Current	V <sub>R</sub> =5V	I <sub>R</sub>	-	-	10	μA
Input to Output Capacitance	-	C <sub>I/O</sub>	-	3	-	pF

**PERFORMANCE DATA\***

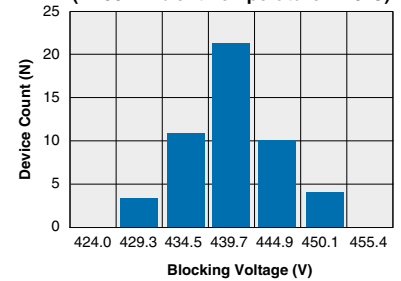
**XCB170**  
**Typical LED Forward Voltage Drop**  
 (N=50 Ambient Temperature = 25°C)  
 $I_F = 5\text{mADC}$



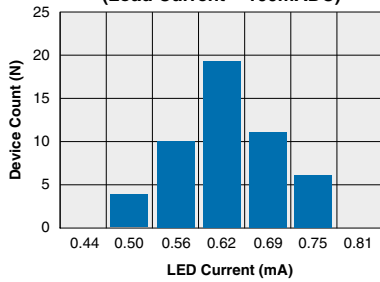
**XCB170**  
**Typical On-Resistance Distribution**  
 (N=50 Ambient Temperature = 25°C)  
 (Load Current = 100mADC)



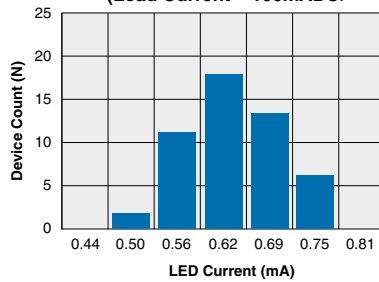
**XCB170**  
**Typical Blocking Voltage Distribution**  
 (N=50 Ambient Temperature = 25°C)



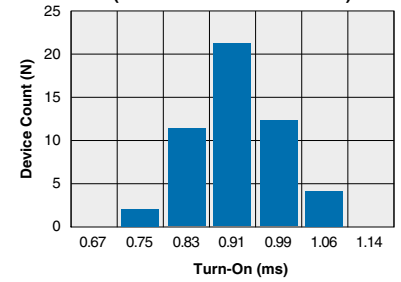
**XCB170**  
**Typical  $I_F$  for Switch Operation**  
 (N=50 Ambient Temperature = 25°C)  
 (Load Current = 100mADC)



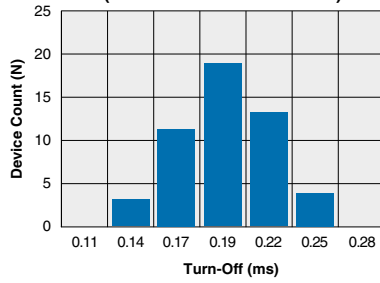
**XCB170**  
**Typical  $I_F$  for Switch Dropout**  
 (N=50 Ambient Temperature = 25°C)  
 (Load Current = 100mADC)



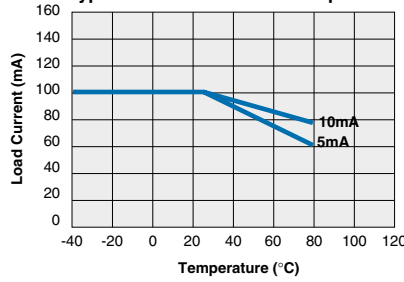
**XCB170**  
**Typical Turn-Off Time**  
 (N=50 Ambient Temperature = 25°C)  
 (Load Current = 100mADC)



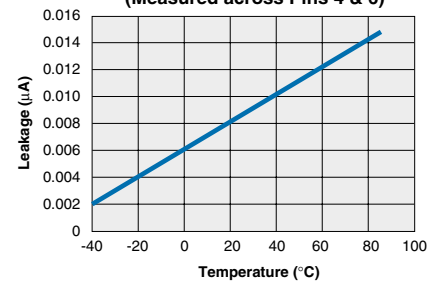
**XCB170**  
**Typical Turn-On Time**  
 (N=50 Ambient Temperature = 25°C)  
 (Load Current = 100mADC)



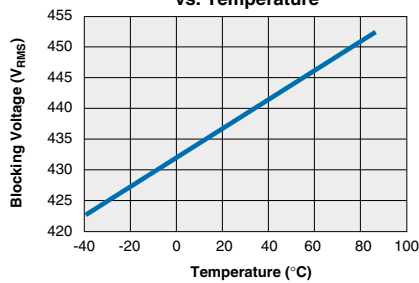
**XCB170**  
**Typical Load Current vs. Temperature**



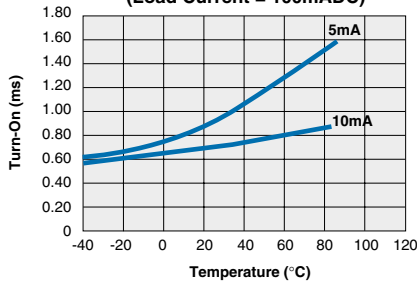
**XCB170**  
**Typical Leakage vs. Temperature**  
 (Measured across Pins 4 & 6)



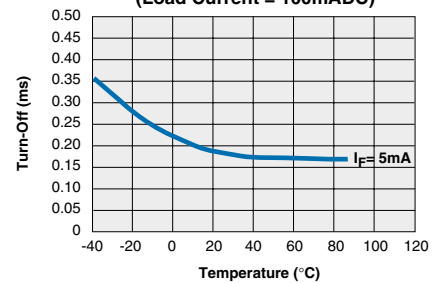
**XCB170**  
**Typical Blocking Voltage vs. Temperature**



**XCB170**  
**Typical Turn-Off vs. Temperature**  
 (Load Current = 100mADC)



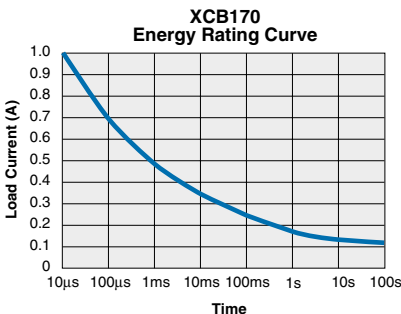
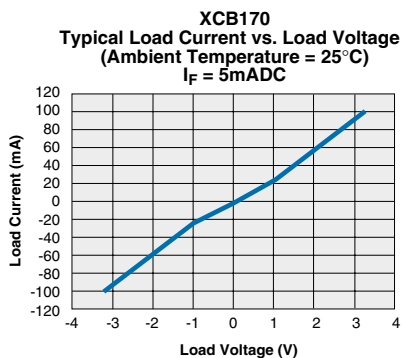
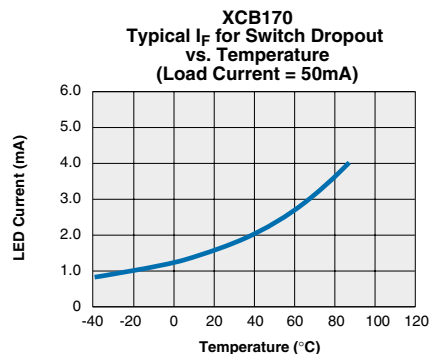
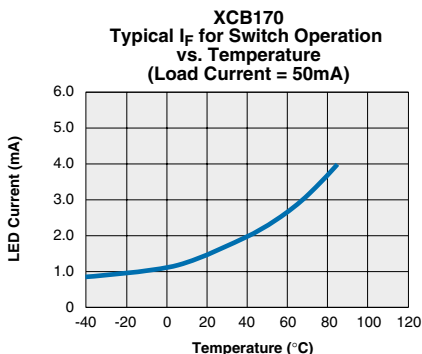
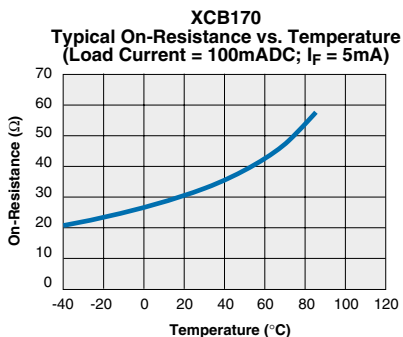
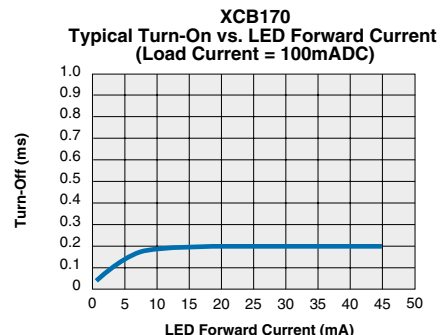
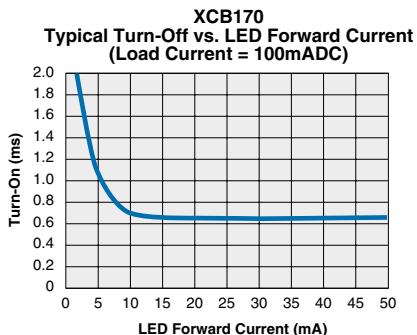
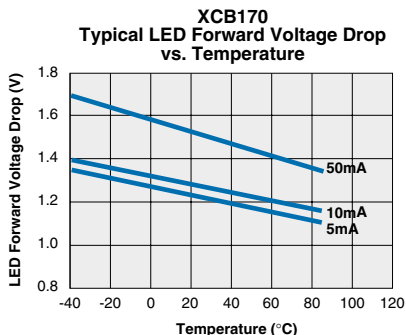
**XCB170**  
**Typical Turn-On vs. Temperature**  
 (Load Current = 100mADC)



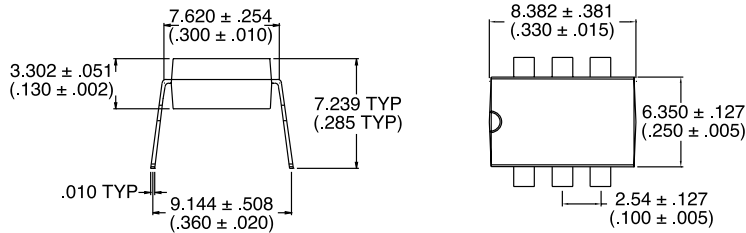
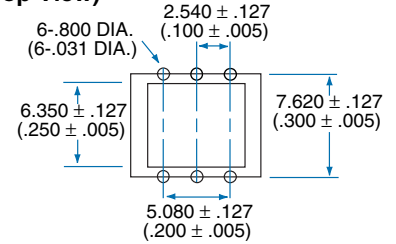
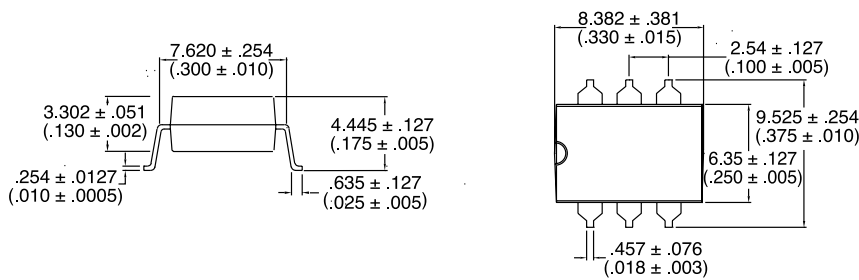
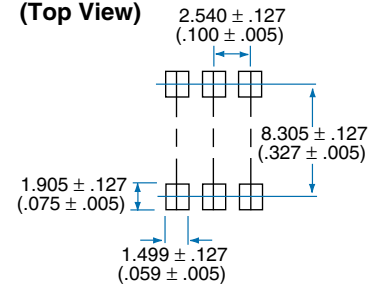
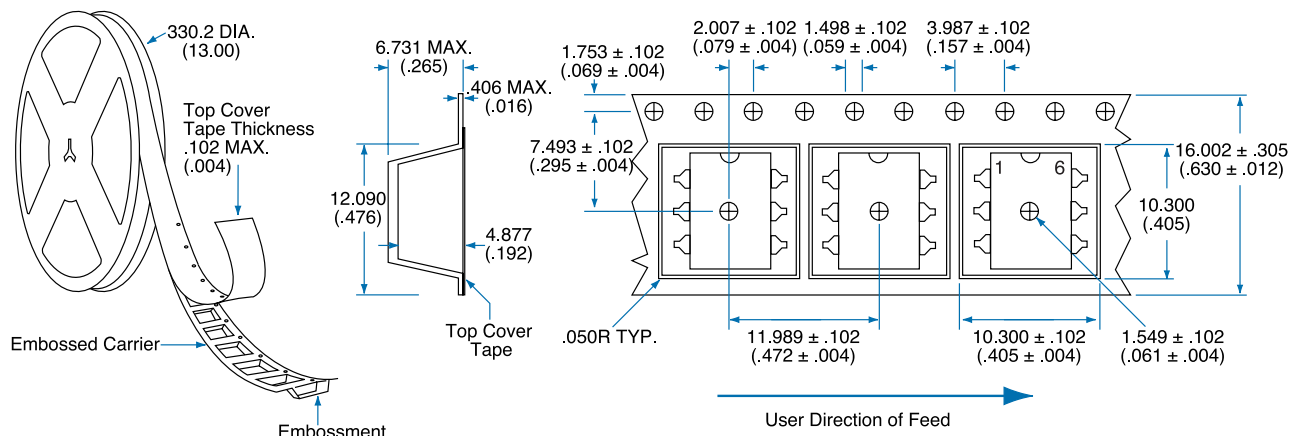
\* The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.



PERFORMANCE DATA\*



\* 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.

**MECHANICAL DIMENSIONS**
**6Pin DIP Through Hole (Standard)**

**PC Board Pattern (Top View)**

**6Pin DIP Surface Mount ("S" Suffix)**

**PC Board Pattern (Top View)**

**Tape and Reel Packaging for 6 Pin Power DIP Surface Mount Package**

 Dimensions  
 mm  
 (inches)



# CLARE

---

**For additional information please visit our website at: [www.clare.com](http://www.clare.com)**

*Clare, Inc. makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication and reserves the right to make changes to specifications and product descriptions at any time without notice. Neither circuit patent licenses nor indemnity are expressed or implied. Except as set forth in Clare's Standard Terms and Conditions of Sale, Clare, Inc. assumes no liability whatsoever, and disclaims any express or implied warranty, relating to its products including, but not limited to, the implied warranty of merchantability, fitness for a particular purpose, or infringement of any intellectual property right.*

*The products described in this document are not designed, intended, authorized or warranted for use as components in systems intended for surgical implant into the body, or in other applications intended to support or sustain life, or where malfunction of Clare's product may result in direct physical harm, injury, or death to a person or severe property or environmental damage. Clare, Inc. reserves the right to discontinue or make changes to its products at any time without notice.*

---

Specification: DS-XCB170-R2.0  
©Copyright 2001, Clare, Inc.  
OptoMOS® is a registered trademark of Clare, Inc.  
All rights reserved. Printed in USA.  
9/26/01