PLA170
Single Pole OptoMOS® Relay

	PLA170	Units
Load Voltage	800	V_P
Load Current		
AC/DC Configuration	100	mA
DC Configuration	180	mA
Max R_{ON}		
AC/DC Configuration	50	Ω
DC Configuration	14	Ω

Features

- 100% Solid State
- Small 6 Pin Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- 3750V_{rms} Input/Output Isolation
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- 800V blocking

Applications

- 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 PLA170 is a 1-Form-A Solid State Relay which uses optically coupled MOSFET technology to provide enhanced input-to-output isolation of 3750V_{rms}. The efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS® architecture.

The optically-coupled output is controlled by a GaAlAs infrared LED. The PLA170 is designed to replace electromechanical relays and offers the superior reliability associated with Solid State devices. This device provides bounce-free switching in a more compact surface mount or through hole package.

Approvals

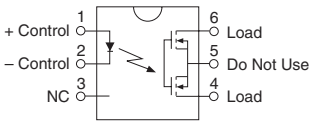
- UL Recognized File: E76270
- CSA Certified File: LR 43639-10
- Certified to:
  - EN 60950
  - EN 41003

Ordering Information

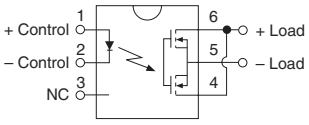
Part #	Description
PLA170	6 Pin DIP (50/tube)
PLA170S	6 Pin Surface Mount (50/tube)
PLA170STR	6 Pin Surface Mount (1000/Reel)

Pin Configuration

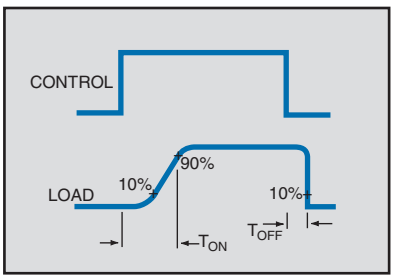
PLA170 Pinout
AC/DC Configuration



PLA170 Pinout
DC Only Configuration



Switching Characteristics of Normally Open (Form A) Devices



Absolute Maximum Ratings (@ 25˚ C)

Parameter	Ratings	Units
Blocking Voltage	800	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 / 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.

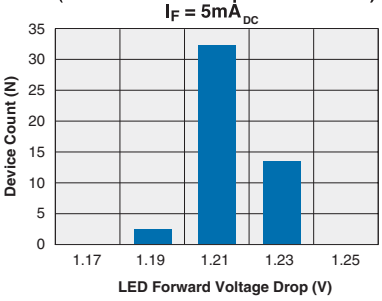
Electrical Characteristcs

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current						
AC/DC Configuration [1]	Continuous	I_L	-	-	100	mA
DC Configuration					180	
Peak Load Current	10ms	I_{LPK}	-	-	350	mA
On-Resistance [2]						
AC/DC Configuration	I_L= Load Current	R_{ON}	-	-	50	Ω
DC Configuration			-	-	14	
Off-State Leakage Current	V_L=800V	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On	I_F=5mA, V_L=10V	T_{ON}	-	-	5	ms
Turn-Off	I_F =5mA, V_L=10V	T_{OFF}	-	-	5	ms
Output Capacitance	50V; f=1MHz	C_{OUT}	-	50	-	pF
Input Characteristics @ 25°C						
Input Control Current [3]	I_L=Load Current	I_F	5	-	-	mA
Input Dropout Current	-	I_F	0.3	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
Input to Output Isolation	60 Hz, 60 seconds	$V_{I/O}$	3750	-	-	V_{rms}

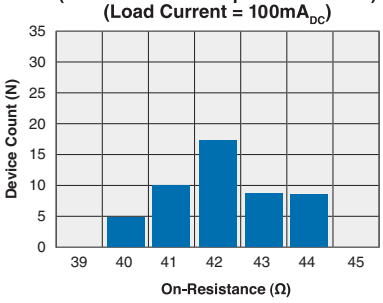
[1] Load derates linearly from 100mA @ 25ºC to 90mA @80ºC.
[2] Measurement taken within 1 second of on time.
[3] For applications requiring high temperature operation (greater than 60ºC) an LED drive current of 10mA is recommended.

PERFORMANCE DATA*

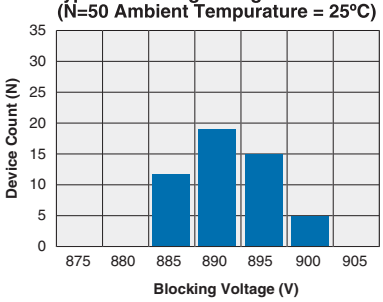
PLA170
Typical LED Forward Voltage Drop
(N=50 Ambient Temperature = 25°C)
I_F = 5mA$_{DC}$



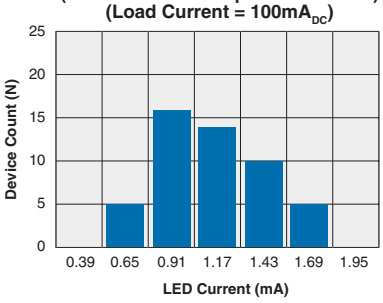
PLA170
Typical On-Resistance Distribution
(N=50 Ambient Tempurature = 25°C)
(Load Current = 100mA$_{DC}$)



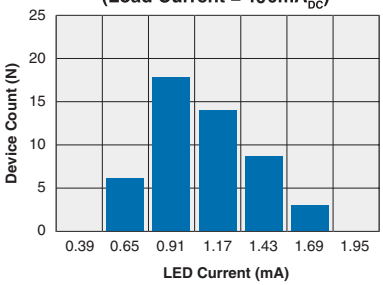
PLA170
Typical Blocking Voltage Distribution
(N=50 Ambient Tempurature = 25°C)



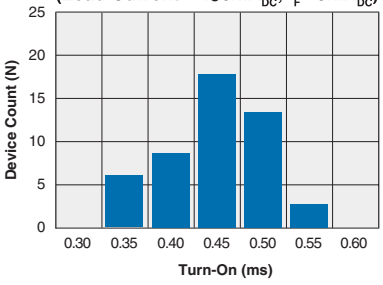
PLA170
Typical I_F for Switch Operation
(N=50 Ambient Tempurature = 25°C)
(Load Current = 100mA$_{DC}$)



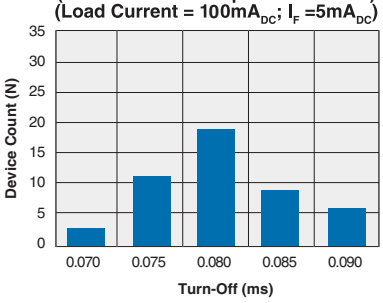
PLA170
Typical I_F for Switch Dropout
(N=50 Ambient Tempurature = 25°C)
(Load Current = 100mA$_{DC}$)



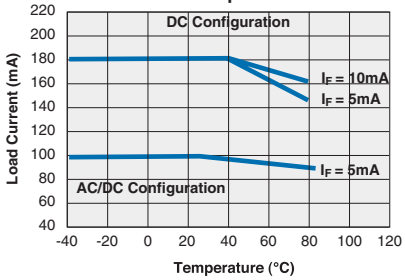
PLA170
Typical Turn-On Time
(N=50 Ambient Tempurature = 25°C)
(Load Current = 100mA$_{DC}$; I_F =5mA$_{DC}$)



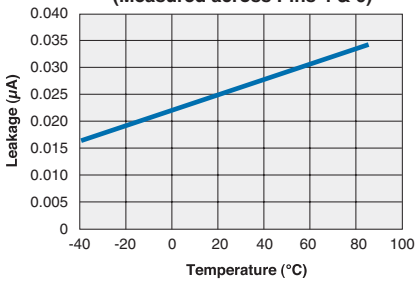
PLA170
Typical Turn-Off Time
(N=50 Ambient Tempurature = 25°C)
(Load Current = 100mA$_{DC}$; I_F =5mA$_{DC}$)



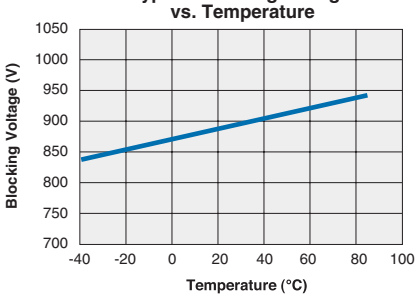
PLA170
Typical Maximum Load Current
vs. Temperature



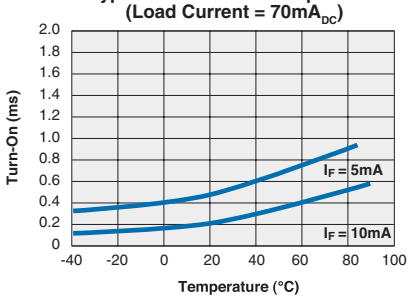
PLA170
Typical Leakage vs. Temperature
(Measured across Pins 4 & 6)



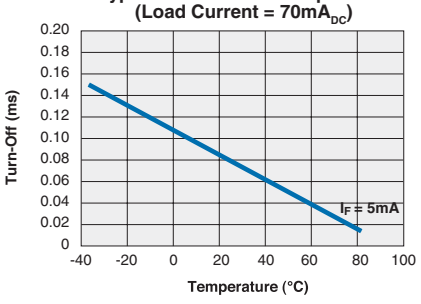
PLA170
Typical Blocking Voltage
vs. Temperature



PLA170
Typical Turn-On vs. Temperature
(Load Current = 70mA$_{DC}$)



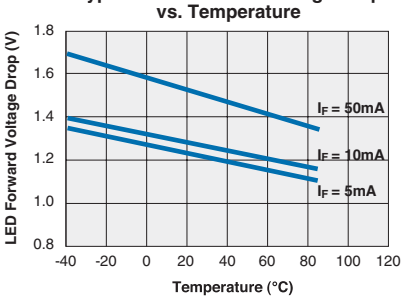
PLA170
Typical Turn-Off vs. Temperature
(Load Current = 70mA$_{DC}$)



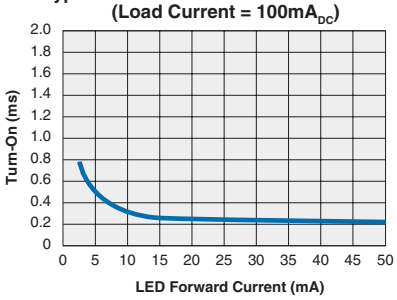
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

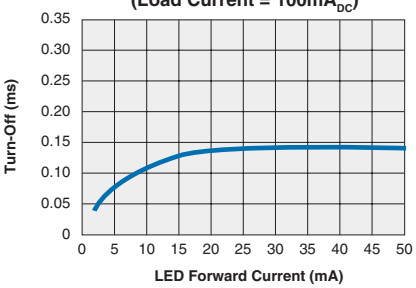
PLA170
Typical LED Forward Voltage Drop vs. Temperature



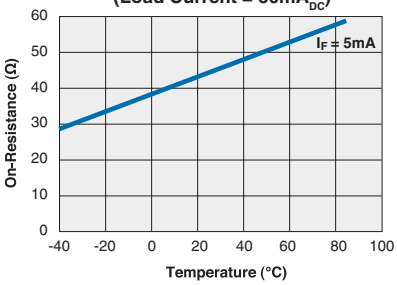
PLA170
Typical Turn-On vs. LED Forward Current (Load Current = 100mA$_{DC}$)



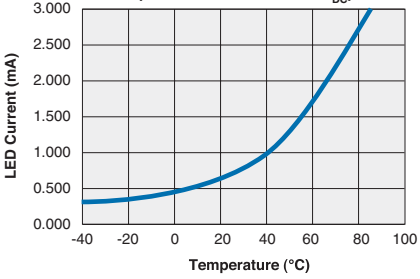
PLA170
Typical Turn-Off vs. LED Forward Current (Load Current = 100mA$_{DC}$)



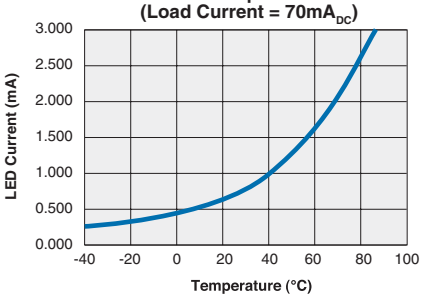
PLA170
Typical On-Resistance vs. Temperature (Load Current = 50mA$_{DC}$)



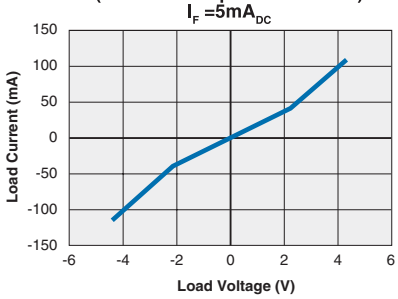
PLA170
Typical I_F for Switch Operation vs. Temperature (Load Current = 70mA$_{DC}$)



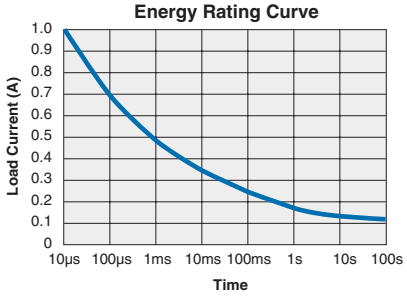
PLA170
Typical I_F for Switch Dropout vs. Temperature (Load Current = 70mA$_{DC}$)



PLA170
Typical Load Current vs. Load Voltage (Ambient Tempurature = 25°C)
I_F =5mA$_{DC}$



PLA170
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

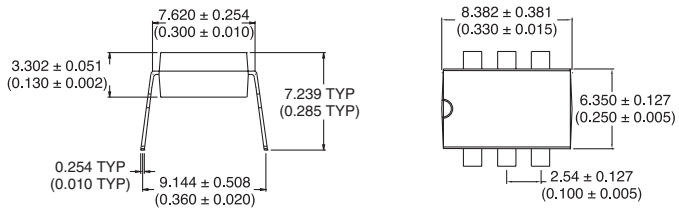
Soldering
For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

Recommended soldering processes are limited to 260ºC component body temperature for 10 seconds.

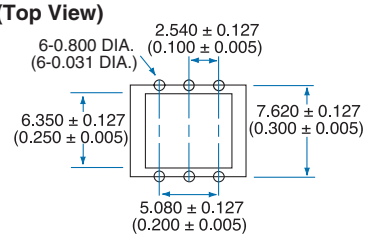
Washing
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

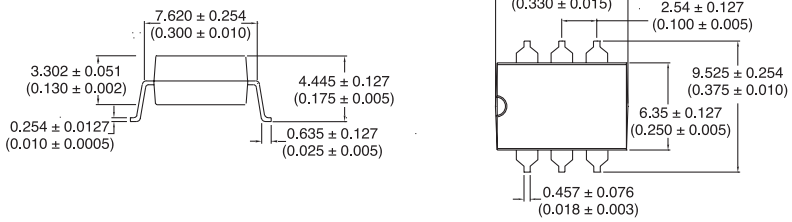
6 Pin DIP Through Hole (Standard)



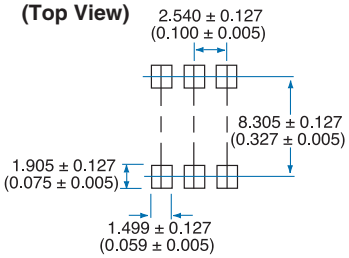
PC Board Pattern (Top View)



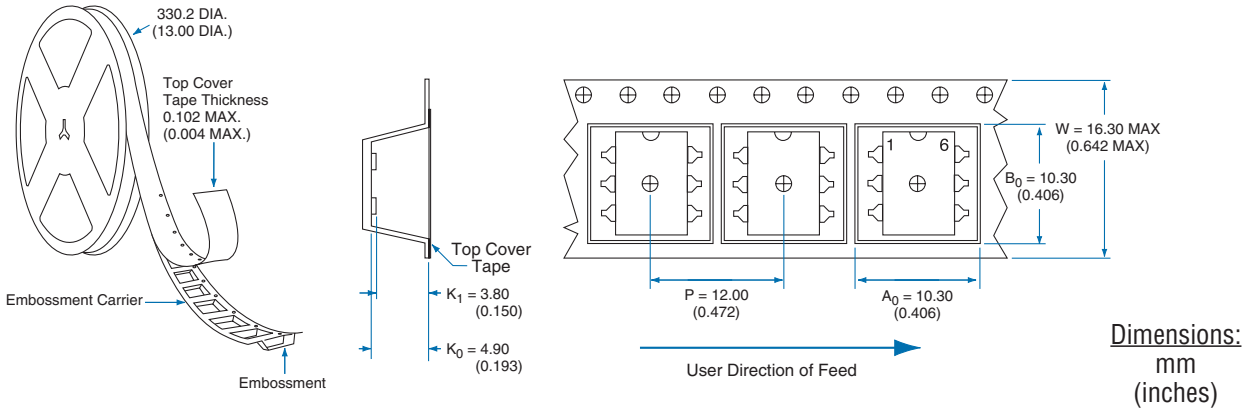
6 Pin Surface Mount ("S" Suffix)



PC Board Pattern (Top View)



Tape and Reel Packaging for 6 Pin Surface Mount Package



Dimensions:
mm
(inches)

For additional information please visit our website at: 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-PLA170-R02
©Copyright 2006, Clare, Inc.
OptoMOS® is a registered trademark of Clare, Inc.
All rights reserved. Printed in USA.
10/18/06