

A CLARE HI-REL PRODUCT

Parameter	Rating	Units
Load Voltage	800	V _p
Load Current	100	mA
Maximum On-Resistance	50	Ω
Input Control Current	2	mA

Features

- Operational Temperature Range: -40°C to +105°C
- 800V_p Blocking Voltage
- 5000V_{rms} Input/Output Isolation
- Electrical Tests at Room Temperature and at 85°C
- 100% Burn-In
JESD22-A108 / MIL-STD-883 Method 1015
- 100% Post Burn-In Electrical Test
- Small 6-Pin Surface Mount Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Flammability Rating UL 94 V-0

Applications

- Instrumentation
 - Multiplexers
 - Data Acquisition
 - Electronic Switching
 - I/O Subsystems
 - Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Automotive High-Voltage Circuitry
- Aerospace
- Industrial Controls

Description

Clare's Hi-Rel PLA171PH is a single-pole, normally open (1-Form-A) Solid State Relay that uses optically coupled MOSFET technology to provide enhanced input-to-output isolation of 5000V_{rms}. The efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS[®] architecture.

Control of the optically-coupled output is by the input GaAIAs infrared LED. The PLA171PH is designed to replace electromechanical relays and offers the superior reliability associated with Clare's Hi-Rel Solid State devices. This device provides bounce-free switching in a compact surface mount package.

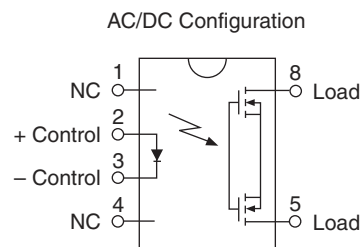
Approvals

- UL Certified Component: File # E76270
- EN/IEC 60950 Certified Component:
TUV Certificate B 09 07 49410 004
- Meets Requirements of:
AEC-Q101 "Temperature Grade 2" - Pending

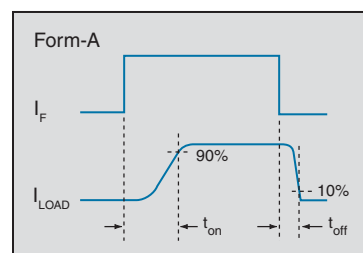
Ordering Information

Part #	Description
PLA171PH	6-Lead Surface Mount (50/Tube)
PLA171PHTR	6-Lead Surface Mount, Tape & Reel (1000/Reel)

Pin Configuration



Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings (@ 25°C Unless otherwise noted)

Parameter	Ratings	Units
Blocking Voltage (-40°C to +105°C)	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 (60 Seconds)	5000	V _{rms}
Operational Temperature	-40 to +105	°C
Storage Temperature	-40 to +125	°C

¹ Derate linearly 3.33 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

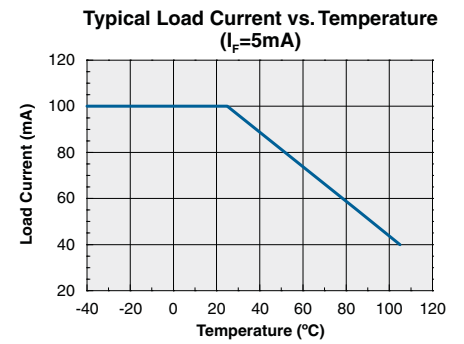
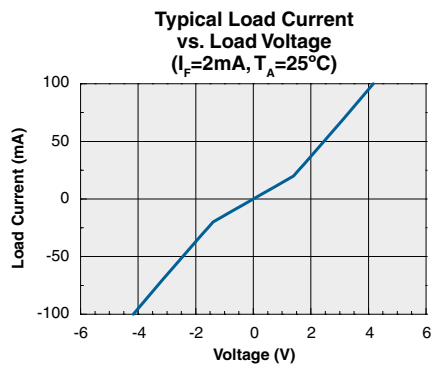
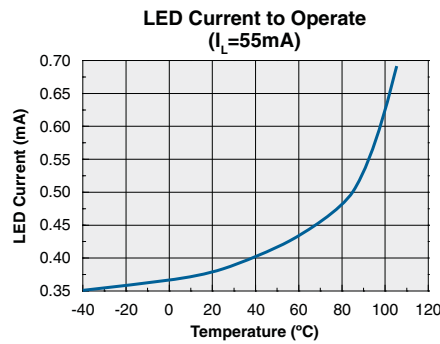
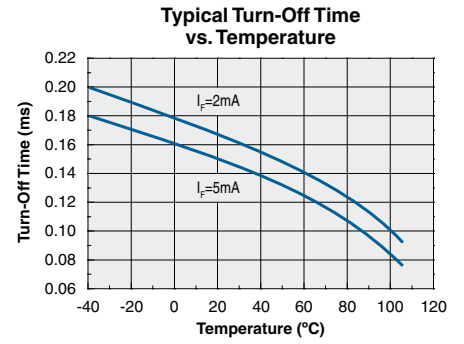
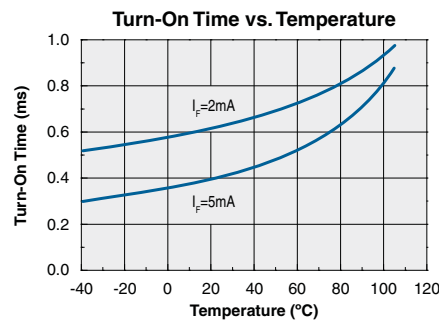
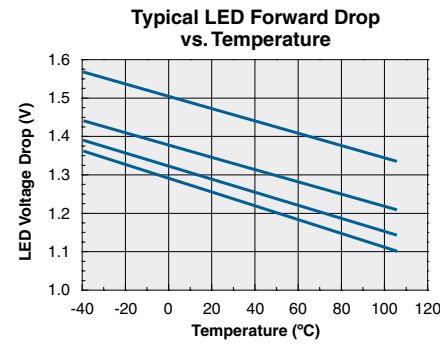
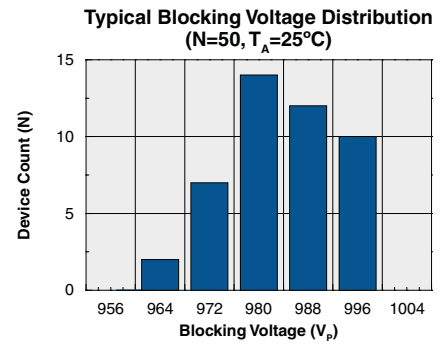
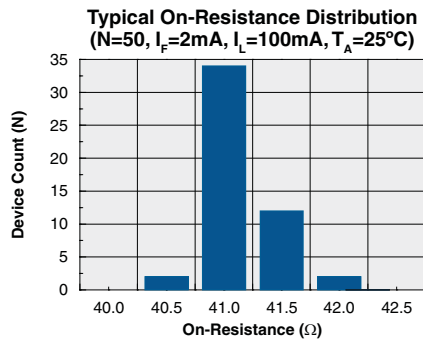
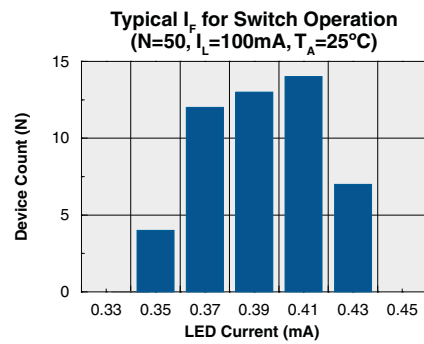
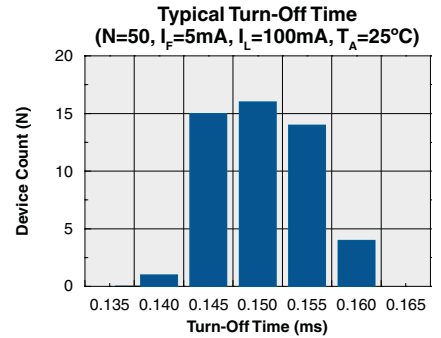
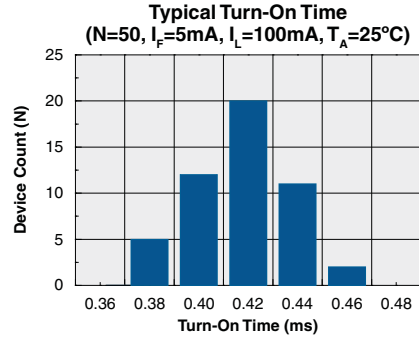
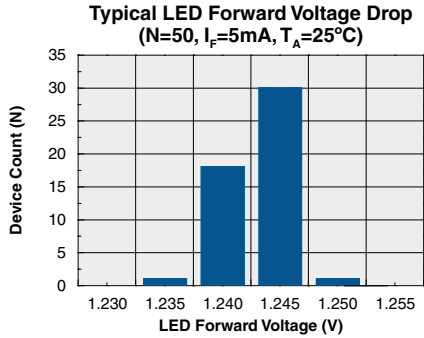
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current	I _F =2mA	I _L	-	-	100	mA
Peak	I _F =2mA, t=10ms	I _{LPK}	-	-	350	
On-Resistance ²	I _F =2mA, I _L =100mA	R _{ON}	-	40	50	Ω
	I _F =5mA, I _L =1mA		-	70	85	
Off-State Leakage Current	V _L =800V _P	I _{LEAK}	-	-	1	μA
Switching Speeds	I _F =5mA, V _L =10V	t _{on}	-	0.42	5	ms
		t _{off}	-	0.15	5	
Output Capacitance	I _F =0mA, V _L =50V, f=1MHz	C _{OUT}	-	11	-	pF
Output Characteristics @ 105°C						
On-Resistance ²	I _F =5mA, I _L =30mA	R _{ON}	-	75	110	Ω
	I _F =5mA, I _L =1mA		-	115	140	
Off-State Leakage Current	V _L =800V _P	I _{LEAK}	-	-	5	μA
Input Characteristics @ 25°C						
Input Control Current ³	I _L =100mA	I _F	-	0.39	2	mA
Input Dropout Current	-	I _F	0.1	-	-	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 _{IO}	-	3	-	pF

¹ Load derates linearly from 100mA @ 25°C to 40mA @ 105°C.

² Measurement taken within 1 second of on-time.

³ For applications requiring high temperature operation (greater than 60°C) an LED drive current of 5mA is recommended.

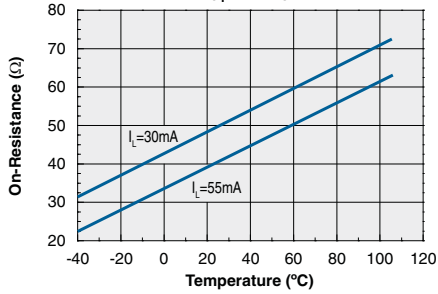
PERFORMANCE DATA*



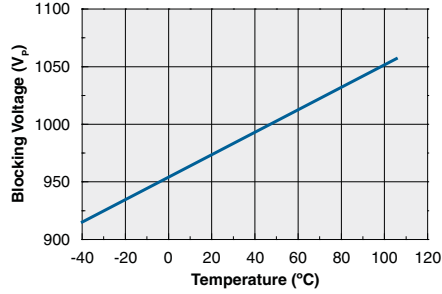
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

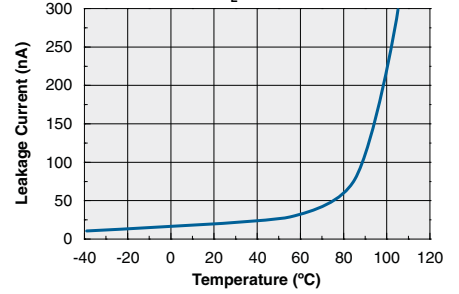
Typical On-Resistance vs. Temperature
($I_F=5mA$)



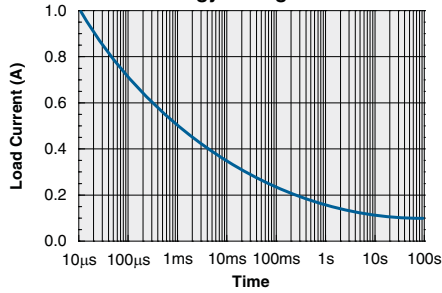
Typical Blocking Voltage vs. Temperature



Typical Leakage Current vs. Temperature
($V_L=800V$)



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

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
PLA171PH	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
PLA171PH	260°C for 30 seconds

Board Wash

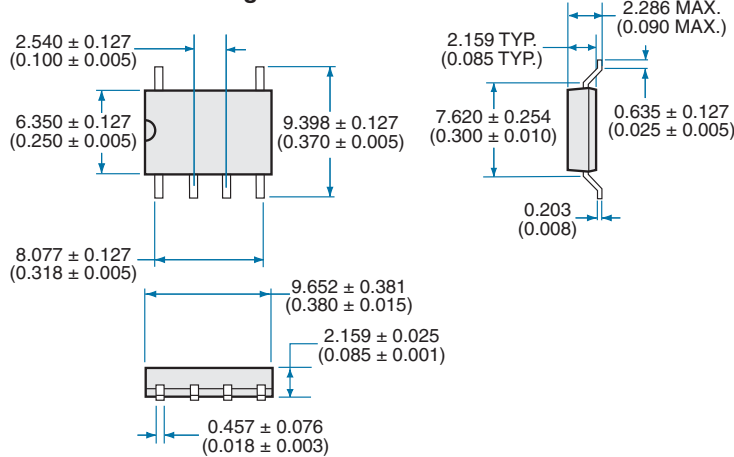
Clare recommends the use of no-clean flux formulations. However, board washing to remove flux residue is acceptable. Since Clare employs the use of silicone coating as an optical waveguide in many of its optically isolated products, the use of a short drying bake could be necessary if a wash is used 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.



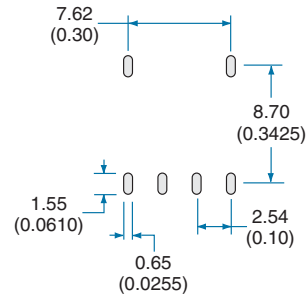
MECHANICAL DIMENSIONS

PLA171PH

Surface Mount Package



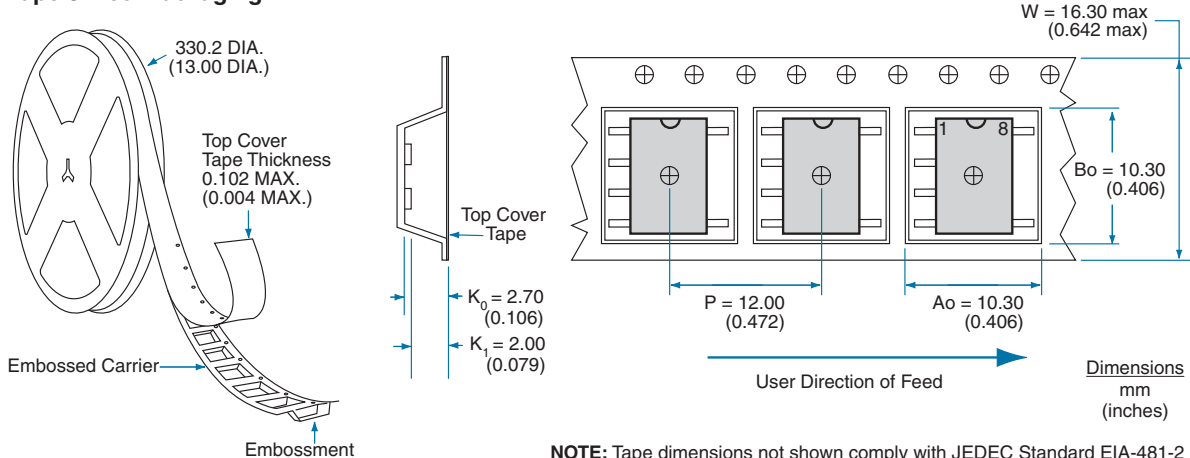
Recommended PCB Land Pattern



Dimensions
mm
(inches)

PLA171PH Tape & Reel

Tape & Reel Packaging



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

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-PLA171PH-R02
©Copyright 2010, Clare, Inc.
OptoMOS® is a registered trademark of Clare, Inc.
All rights reserved. Printed in USA.
8/10/2010