



Parameters	Ratings	Units
Blocking Voltage	600	V <sub>P</sub>
Load Current	130	mA
Max On-resistance	35	Ω

### Features

- 5000V<sub>rms</sub> Input/Output Isolation
- Small 6-Pin Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable

### Applications

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

### Description

The PLA194 is a single-pole, normally open (1-Form-A) solid state relay that uses optically coupled relay technology to provide an enhanced 5000V<sub>rms</sub> isolation barrier between the input and the output of the relay.

These efficient MOSFET switches use Clare's patented OptoMOS architecture. The optically coupled output is controlled by a highly efficient GaAIAs infrared LED.

### Approvals

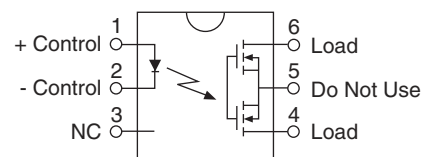
- UL-Recognized Component: File Number E76270
- CSA Certified Component: Certificate 1117539
- Certified to EN/IEC 60950-1:  
TUV Certificate B 10 05 49410 006

### Ordering Information

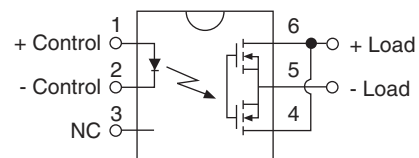
Part #	Description
PLA194	6-Pin DIP (50/Tube)
PLA194S	6-Pin Surface Mount (50/Tube)
PLA194STR	6-Pin Surface Mount (1000/Reel)

### Pin Configuration

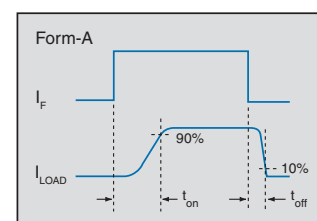
AC/DC Configuration



DC-Only Configuration



Switching Characteristics of Normally Open Devices



### Absolute Maximum Ratings @ 25°C

Parameter	Min	Max	Units
Blocking Voltage	-	600	V <sub>P</sub>
Reverse Input Voltage	-	5	V
Input Control Current	-	50	mA
Peak (10ms)	-	1	A
Input Power Dissipation <sup>1</sup>	-	150	mW
Total Package Dissipation <sup>2</sup>	-	800	mW
ESD Rating, Human Body Model	8	-	kV
Isolation Voltage, Input to Output	5000	-	V <sub>rms</sub>
Operational Temperature	-40	85	°C
Storage Temperature	-40	125	°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 conditions beyond those indicated in the operational sections of this data sheet is not implied.*

### Electrical Characteristics @ 25°C

Parameters	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics</b>						
Load Current <sup>1</sup>						
Continuous, AC/DC Configuration	-	I <sub>L</sub>	-	-	130	mA
Continuous, DC-Only Configuration	-		-	-	200	
Peak	t=10ms	I <sub>LPK</sub>	-	-	400	
On-Resistance <sup>2</sup>						
AC/DC Configuration	I <sub>L</sub> =130mA	R <sub>ON</sub>	-	26	35	Ω
DC-Only Configuration	I <sub>L</sub> =200mA		-	-	18	
Off-State Leakage Current	V <sub>L</sub> =600V <sub>P</sub>	I <sub>LEAK</sub>	-	-	1	μA
Switching Speeds						
Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	t <sub>on</sub>	-	0.85	3	ms
Turn-Off		t <sub>off</sub>	-	0.46	2	
Output Capacitance	V <sub>L</sub> =50V, f=1MHz	C <sub>OUT</sub>	-	5	-	pF
<b>Input Characteristics</b>						
Input Control Current <sup>3</sup>	I <sub>L</sub> =130mA	I <sub>F</sub>	-	0.44	2	mA
Input Dropout Current	-	I <sub>F</sub>	0.1	-	-	mA
Input Voltage Drop	I <sub>F</sub> =5mA	V <sub>F</sub>	0.9	1.2	1.4	V
Reverse Input Current	V <sub>R</sub> =5V	I <sub>R</sub>	-	-	10	μA
<b>Common Characteristics</b>						
Input to Output Capacitance	-	C <sub>I/O</sub>	-	3	-	pF

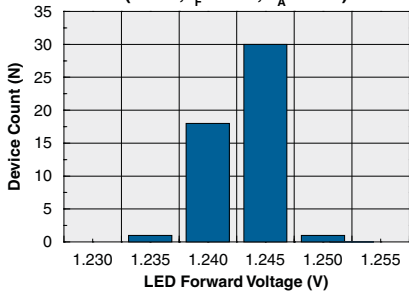
<sup>1</sup> Load current derates linearly from 130mA @ 25°C to 65mA @ 85°C.

<sup>2</sup> Measurement taken within 1 second of on-time.

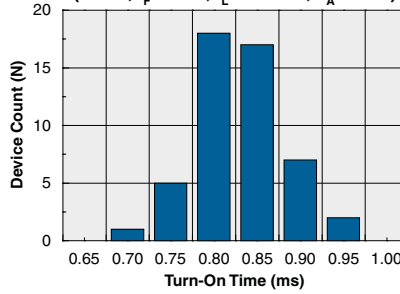
<sup>3</sup> For applications requiring high temperature operation (greater than 60°C), a LED drive current of 3mA is recommended.

**PERFORMANCE DATA \***

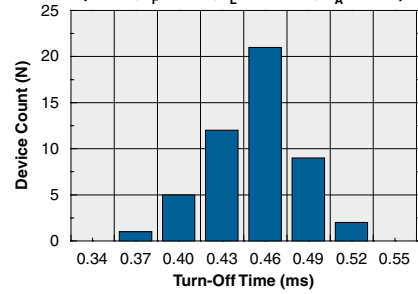
**Typical LED Forward Voltage Drop**  
(N=50,  $I_F=5\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



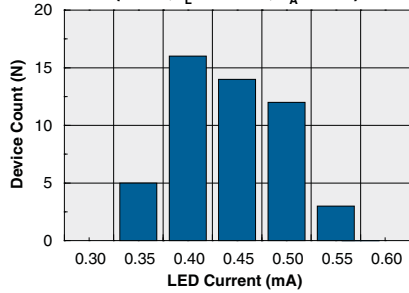
**Typical Turn-On Time**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=130\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



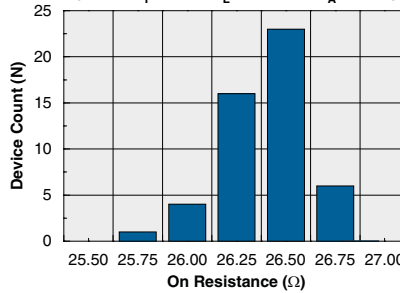
**Typical Turn-Off Time**  
(N=50,  $I_F=5\text{mA}$ ,  $I_L=130\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



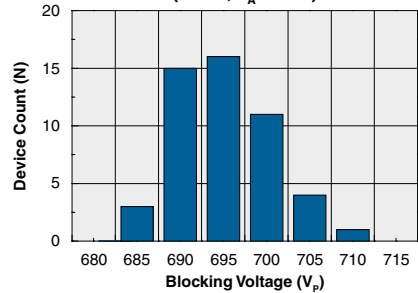
**Typical  $I_F$  for Switch Operation**  
(N=50,  $I_L=130\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



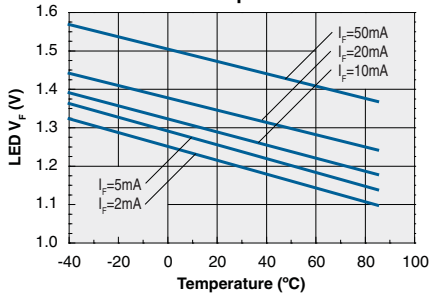
**Typical On-Resistance Distribution**  
(N=50,  $I_F=2\text{mA}$ ,  $I_L=130\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



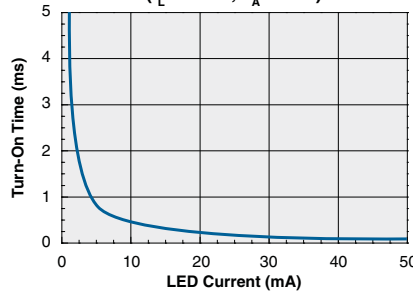
**Typical Blocking Voltage Distribution**  
(N=50,  $T_A=25^\circ\text{C}$ )



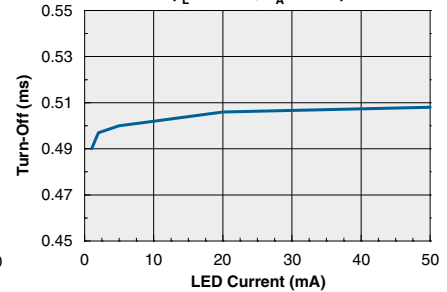
**Typical LED Forward Voltage Drop vs. Temperature**



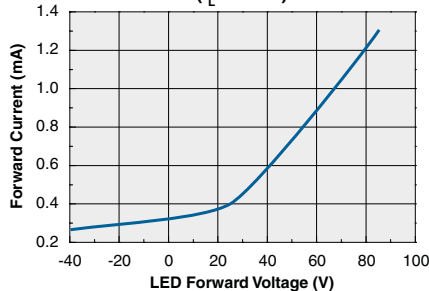
**Typical Turn-On vs. LED Forward Current**  
( $I_L=70\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



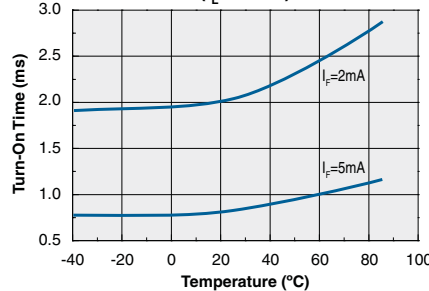
**Typical Turn-Off vs. LED Forward Current**  
( $I_L=70\text{mA}$ ,  $T_A=25^\circ\text{C}$ )



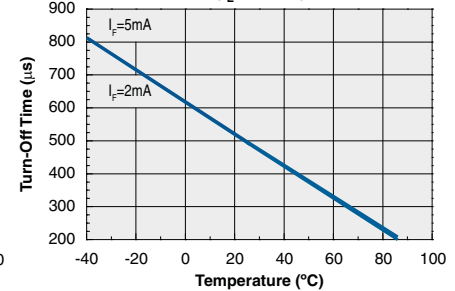
**Typical  $I_F$  for Switch Operation vs. Temperature**  
( $I_L=70\text{mA}$ )



**Typical Turn-On vs. Temperature**  
( $I_L=70\text{mA}$ )



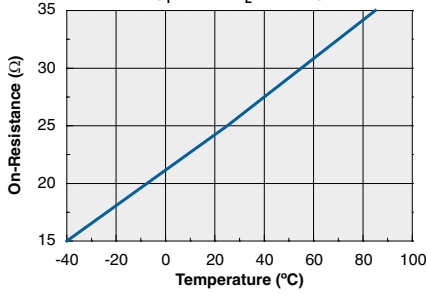
**Typical Turn-Off vs. Temperature**  
( $I_L=70\text{mA}$ )



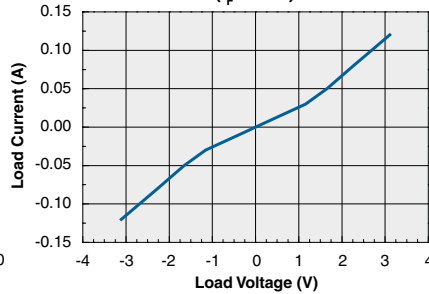
\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

**PERFORMANCE DATA\***

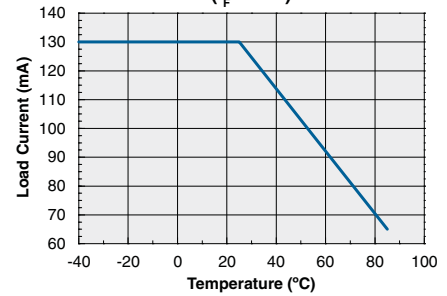
**Typical On-Resistance vs. Temperature**  
( $I_F=2\text{mA}$ ,  $I_L=70\text{mA}$ )



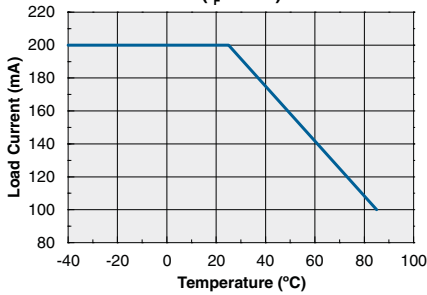
**Typical Load Current vs. Load Voltage**  
( $I_F=2\text{mA}$ )



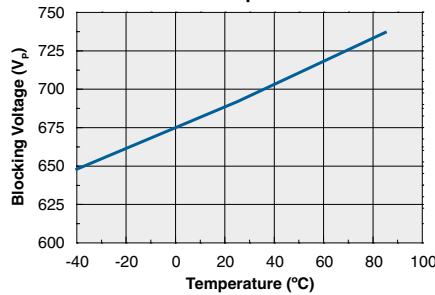
**Typical Load Current vs. Temperature**  
AC/DC Configuration  
( $I_F=2\text{mA}$ )



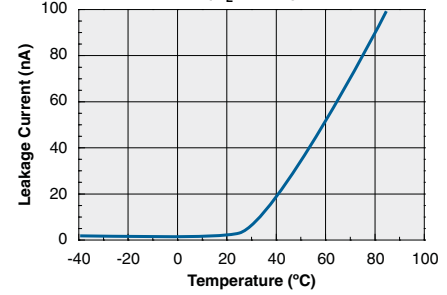
**Typical Load Current vs. Temperature**  
DC-Only Configuration  
( $I_F=2\text{mA}$ )



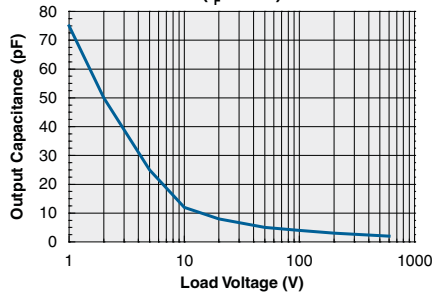
**Typical Blocking Voltage vs. Temperature**



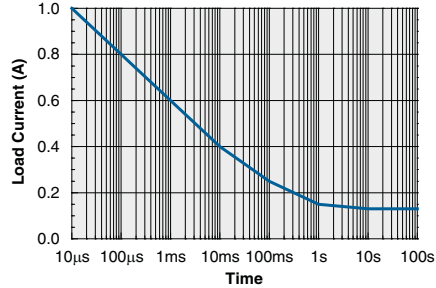
**Typical Leakage vs. Temperature**  
( $V_L=600\text{V}$ )



**Output Capacitance vs. Load Voltage**  
( $I_F=0\text{mA}$ )



**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
PLA194 / PLA194S	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
PLA194 / PLA194S	250°C for 30 seconds

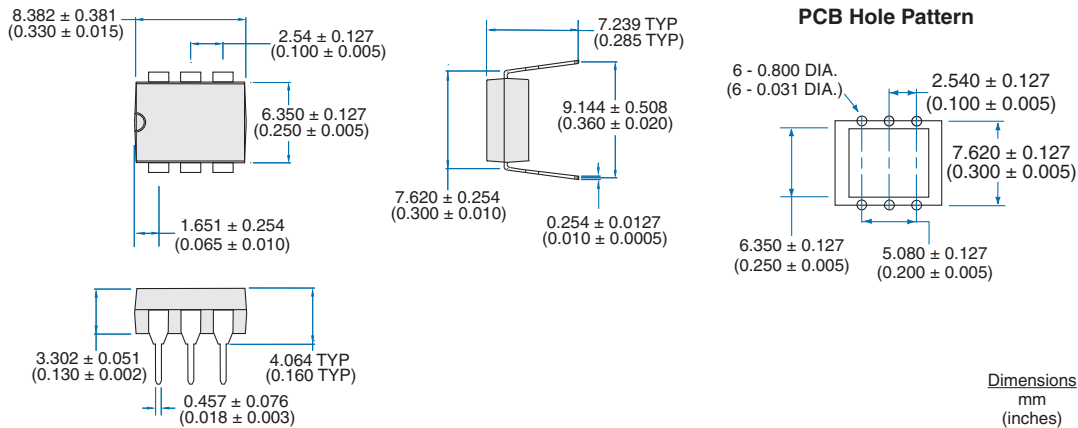
### Board Wash

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-based or Fluorine-based solvents or fluxes should not be used. Cleaning methods that employ ultrasonic energy should not be used.

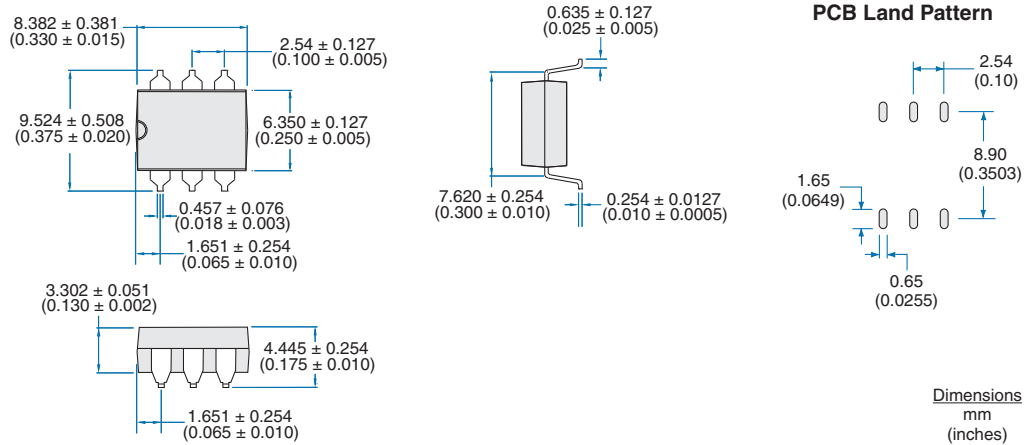


**Mechanical Dimensions**

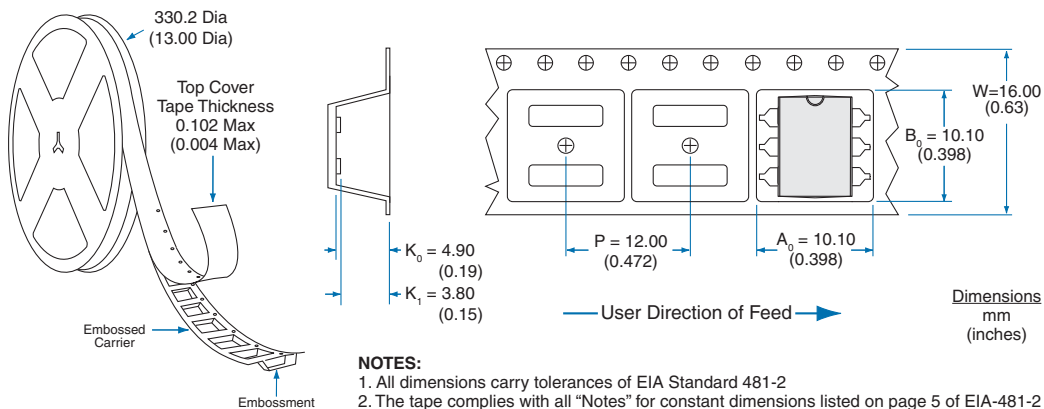
**PLA194**



**PLA194S**



**PLA194S Tape & Reel**



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