



Parameter	Rating	Units
Load Voltage	600	V _P
Load Current	100	mA
Max R _{ON}	50	Ω

Features

- 5000V_{rms} Input/Output Isolation
- Small 8-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
- Surface Mount Tape & Reel Version Available

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 PAA193 is a dual normally open (1-Form-A) solid state relay that uses optically coupled relay technology to provide an enhanced 5000V_{rms} input to output isolation barrier. The efficient MOSFET switches use Clare's patented OptoMOS architecture. Highly efficient GaAIAs infrared LEDs provide the optically coupled control.

Dual OptoMOS relays provide a more compact design solution than discrete single-pole relays in a variety of applications. The dual relays save board space by incorporating two relays in a single 8-pin package.

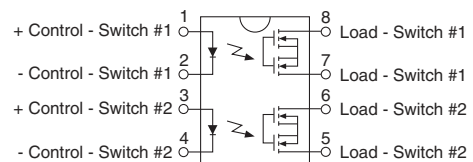
Approvals

- UL Recognized Component: File E76270
- CSA Certified Component: Certificate 1175739
- EN/IEC 60950-1 Certified Component:
TUV Certificate B 09 07 49410 004

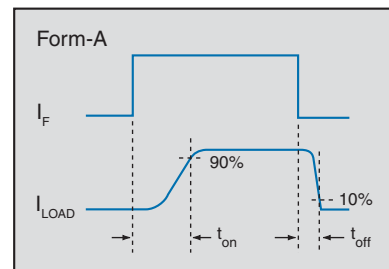
Ordering Information

Part #	Description
PAA193	8-Lead DIP (50/tube)
PAA193S	8-Lead Surface Mount (50/tube)
PAA193STR	8-Lead Surface Mount (1000/Reel)

Pin Configuration



Switching Characteristics of Normally Open Devices



Absolute Maximum Ratings @ 25°C

Parameter	Ratings	Units
Blocking Voltage	600	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	5000	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

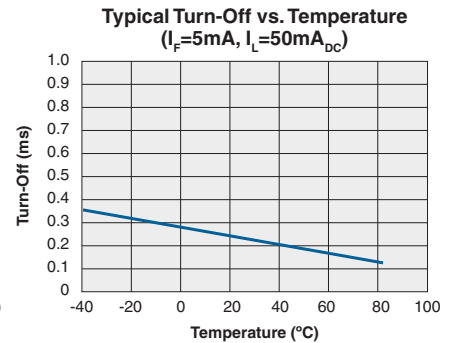
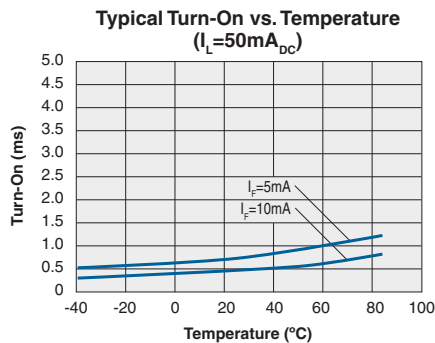
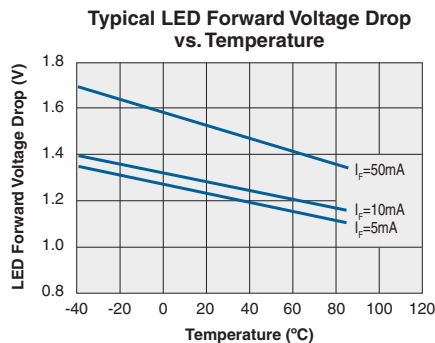
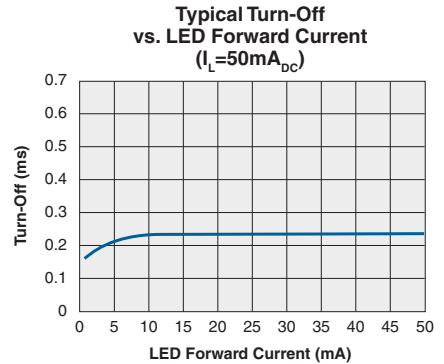
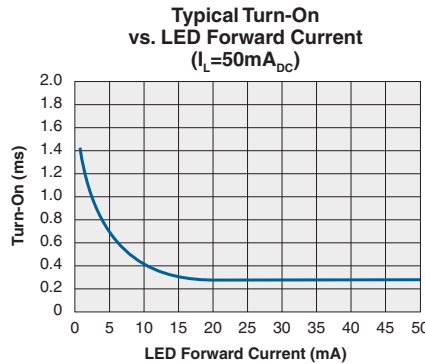
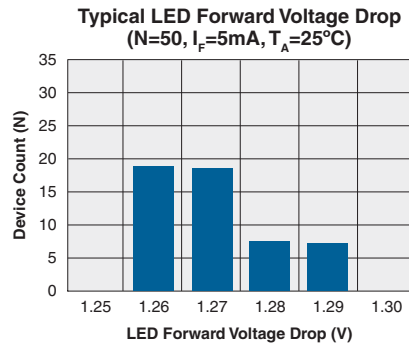
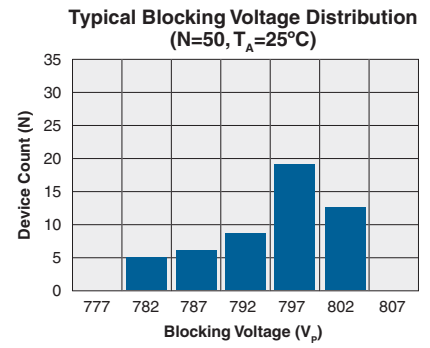
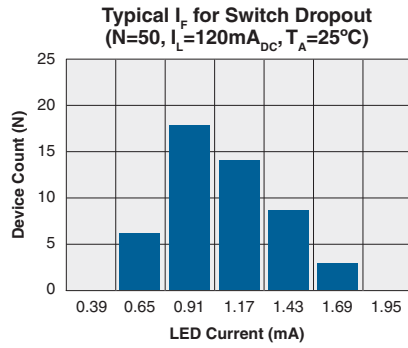
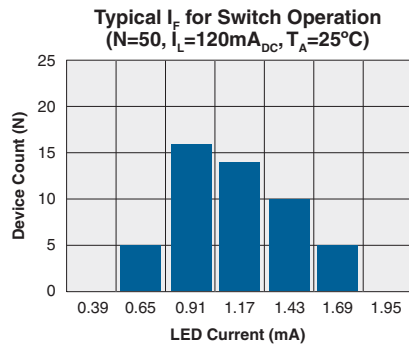
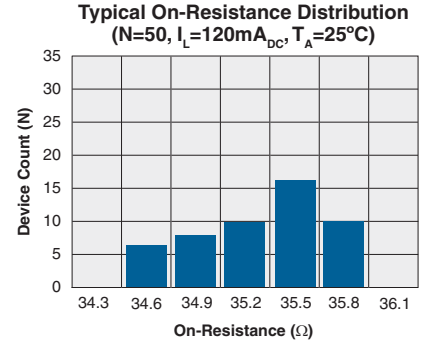
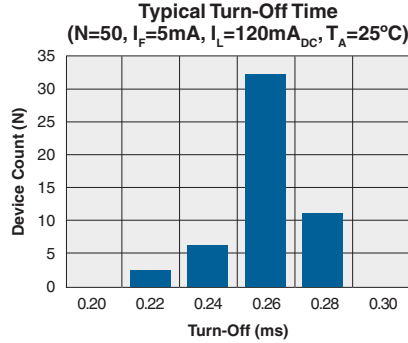
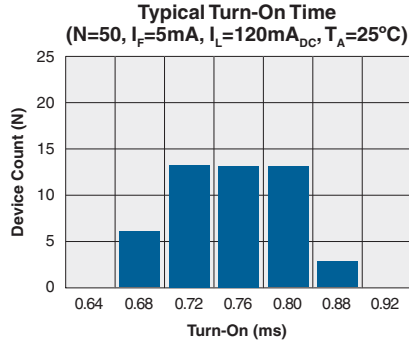
Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

Electrical Characteristics @ 25°C

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current						
Continuous *	-	I _L	-	-	100	mA
Peak	t=10ms	I _{LPK}	-	-	350	
On-Resistance	I _L =100mA	R _{ON}	-	-	50	Ω
Off-State Leakage Current	V _L =600V _p	I _{LEAK}	-	-	10	μA
Switching Speeds						
Turn-On	I _F =5mA, V _L =10V	t _{on}	-	-	5	ms
Turn-Off		t _{off}	-	-	5	
Output Capacitance	V _L =50V, f=1MHz	C _{OUT}	-	50	-	pF
Input Characteristics						
Input Control Current	I _L =100mA	I _F	-	-	5	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						
Capacitance, Input to Output	-	C _{I/O}	-	3	-	pF

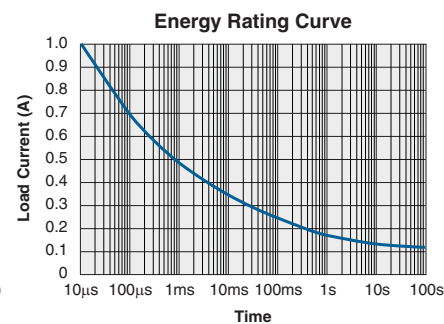
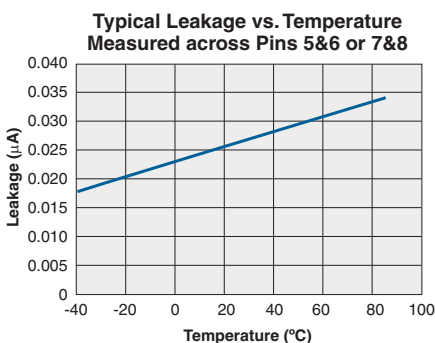
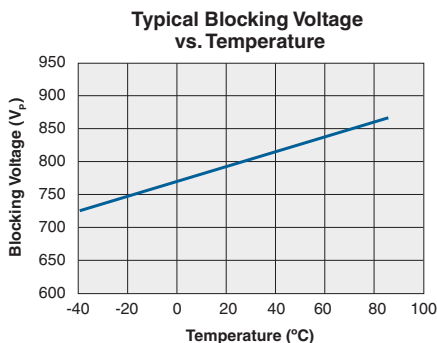
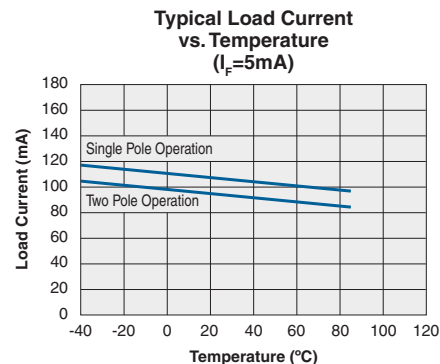
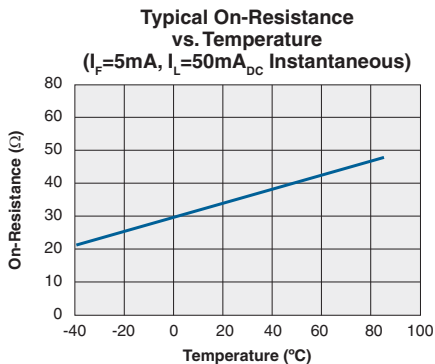
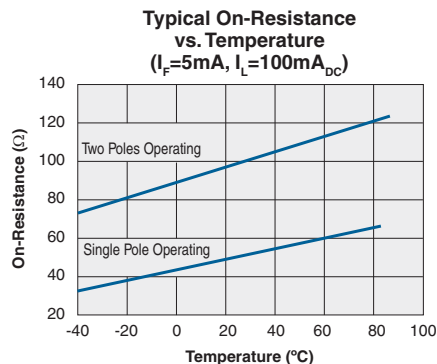
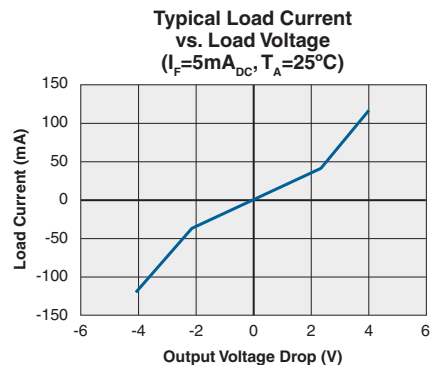
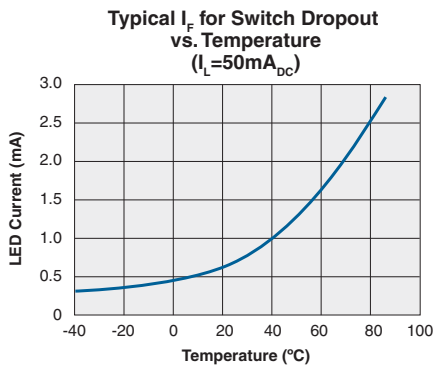
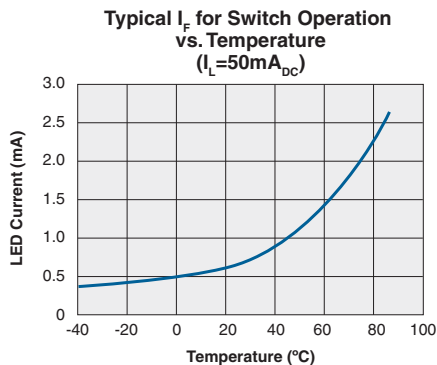
*NOTE: If both poles operate simultaneously, then load current must be derated so as not to exceed the package power dissipation value.

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 *



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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
PAA193 / PAA193S	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
PAA193 / PAA193S	250°C for 30 seconds

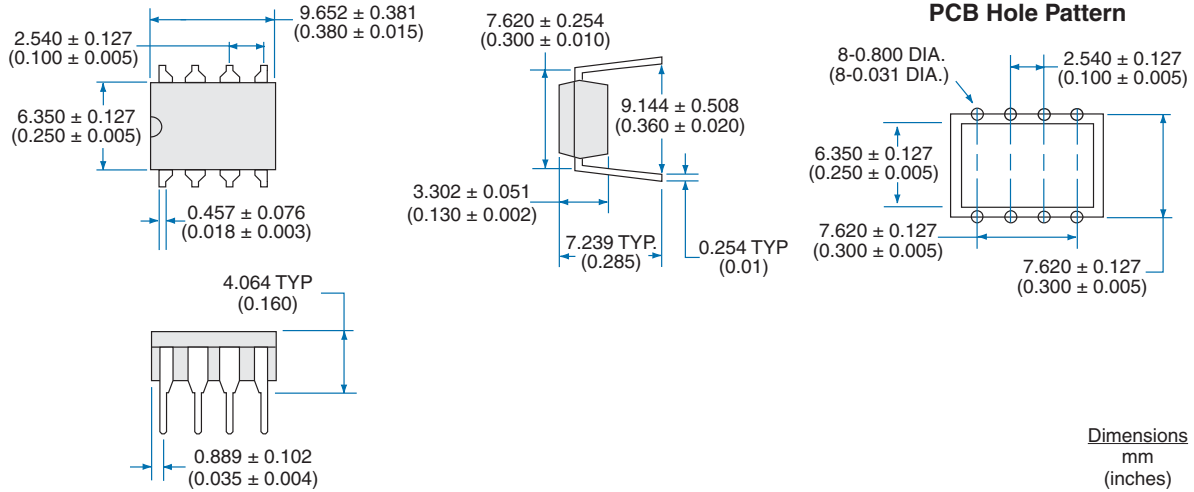
Board Wash

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.

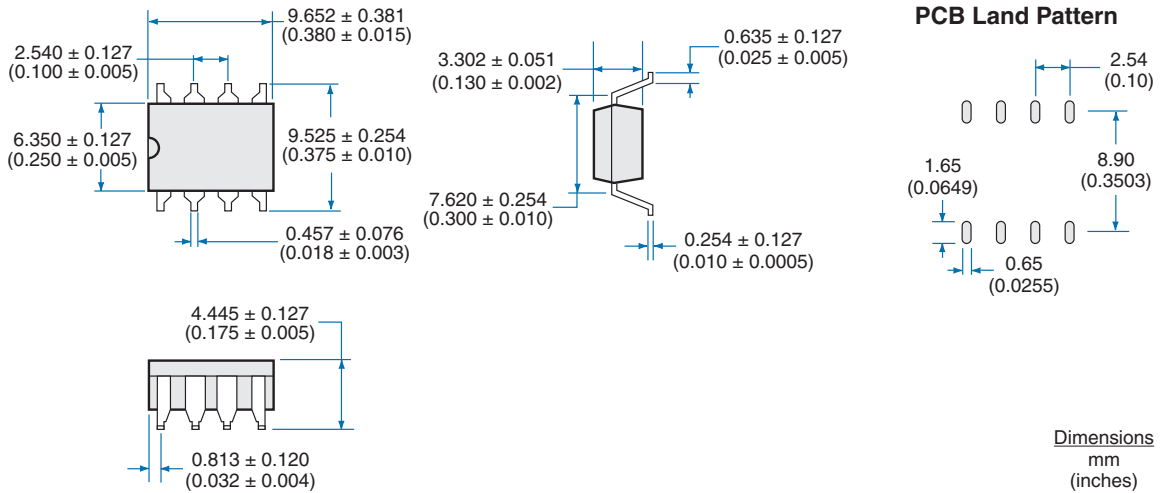


MECHANICAL DIMENSIONS

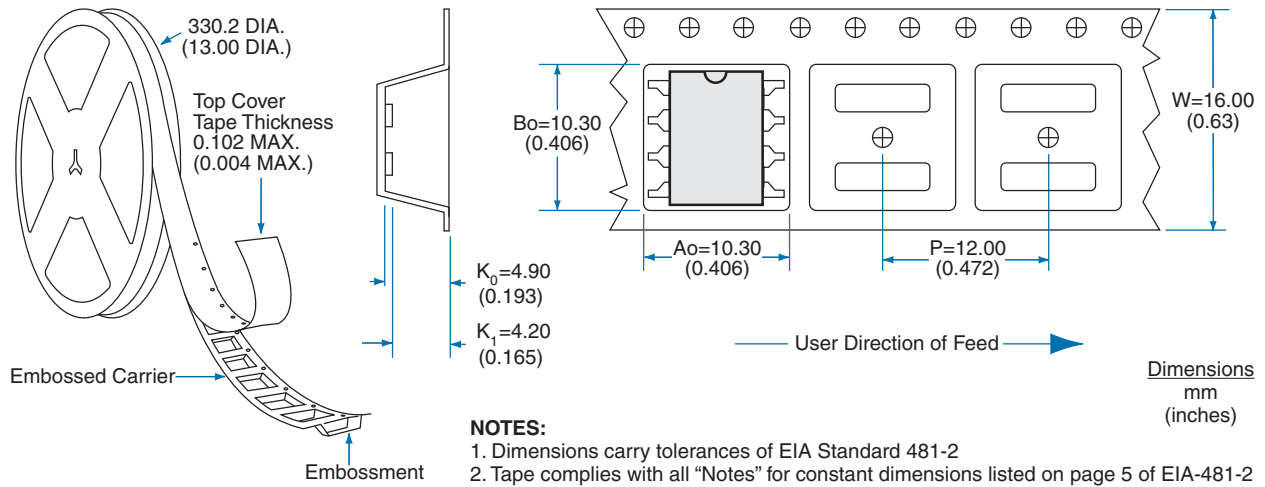
PAA193



PAA193S



PAA193S Tape & Reel



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Specification: DS-PAA193-R02
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