



	PAA140L	Units
Load Voltage	400	V
Load Current	200	mA
Max R <sub>ON</sub>	13	Ω

### Features

- Small 8 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
- Current Limiting

### 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

PAA140L is a 2-Form-A solid state 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. The optically-coupled input is controlled by a highly efficient GaAlAs infrared LED. The PAA140L also contains a built in load current limiting feature. This combined with a low on resistance and very high load current handling capabilities makes it suitable for a variety of high performance switching applications.

### Approvals

These products comply with the requirements of:

- UL 1577 (UL recognized file #E76270)
- CSA #14 (CSA certified file #LR43639)
- EN 60950
- IEC 950
- AS/NZS 3260

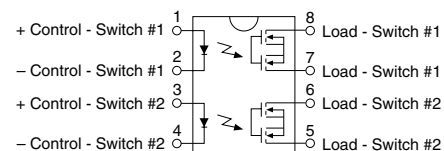
### Ordering Information

Part #	Description
PAA140L	8 Pin DIP (50/Tube)
PAA140PL	8 Pin Flatpack (50/Tube)
PAA140PLTR	8 Pin Flatpack (1000/Reel)
PAA140LS	8 Pin Surface Mount (50/Tube)
PAA140LSTR	8 Pin Surface Mount (1000/Reel)

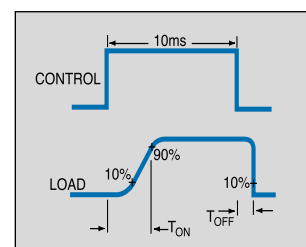
### Pin Configuration

#### PAA140L Pinout

AC/DC Configuration



### Switching Characteristics of Normally Open (Form A) 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
Blocking Voltage	-	-	400	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
Flatpack/Surface Mount Package (10 Seconds Max.)	-	-	+220	°C

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

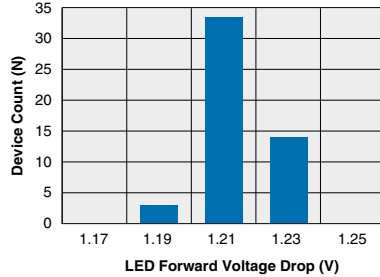
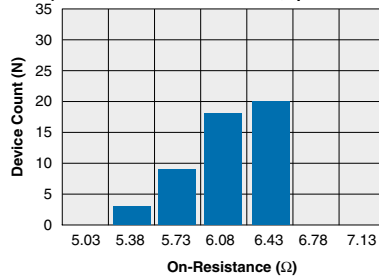
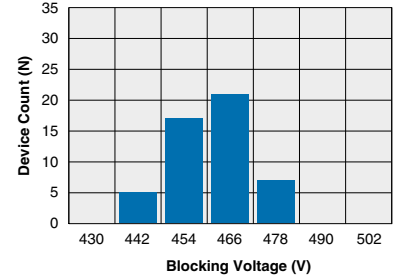
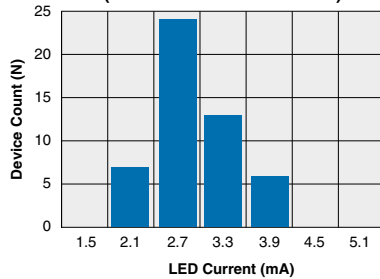
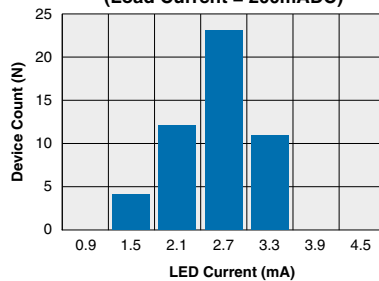
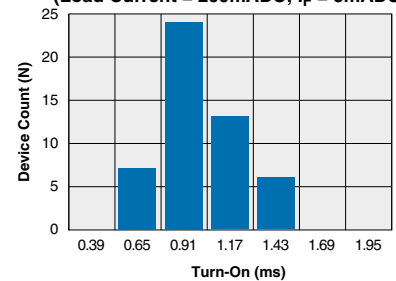
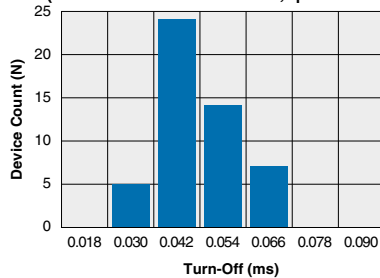
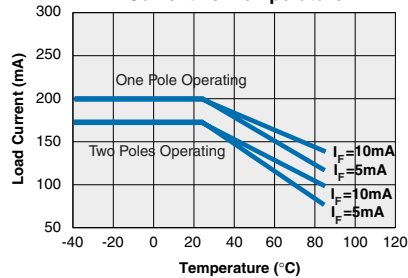
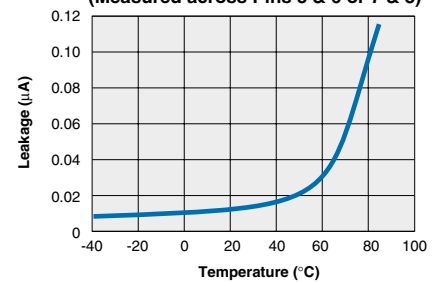
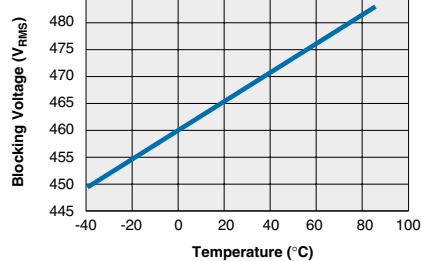
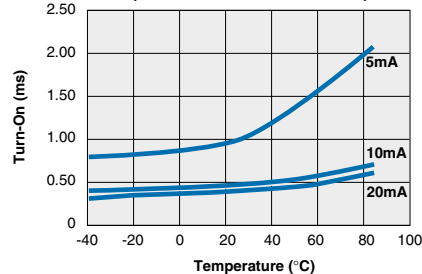
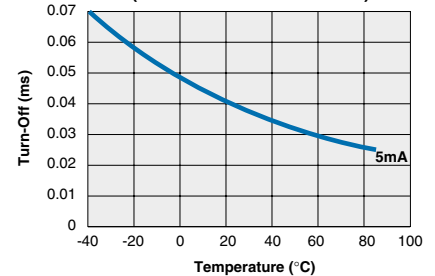
<sup>2</sup> Derate Linearly 6.67 mw/°C

*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**

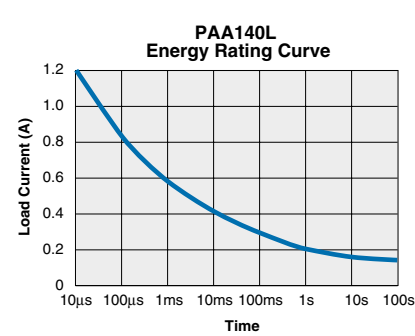
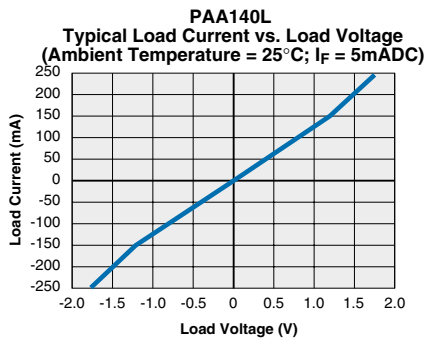
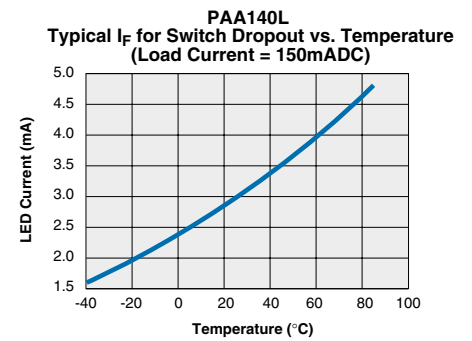
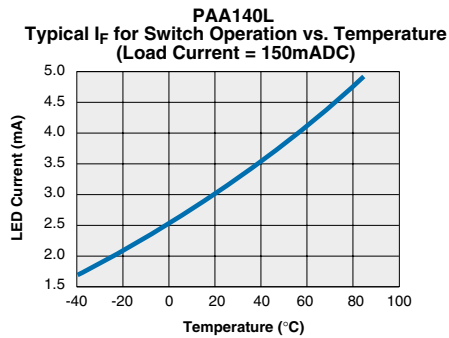
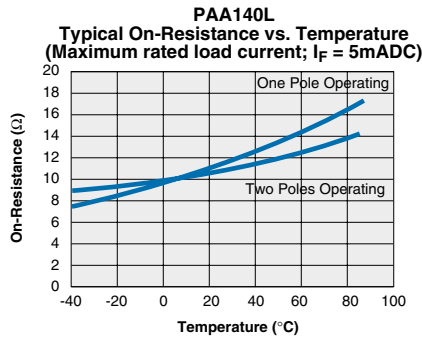
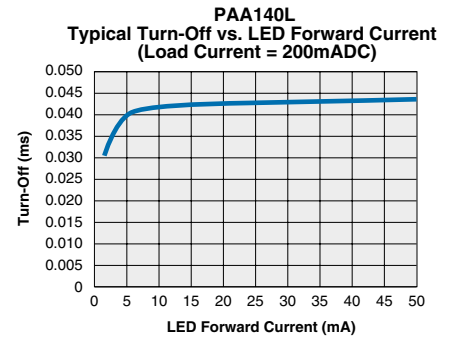
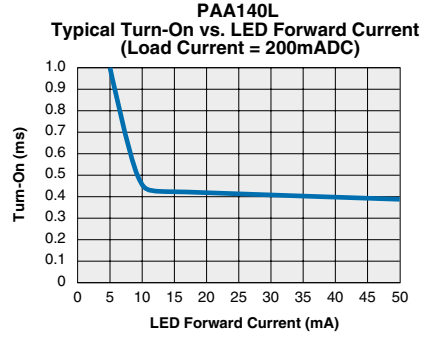
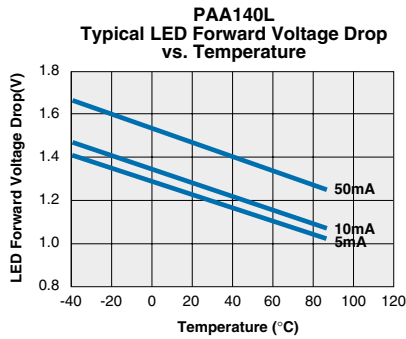
Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics @ 25°C</b>						
Load Current* (Continuous) AC/DC Configuration	-	I <sub>L</sub>	-	-	200	mA
Peak Load Current	10ms	I <sub>LPK</sub>	-	-	500	mA
On-Resistance AC/DC Configuration	I <sub>L</sub> =200mA	R <sub>ON</sub>	-	10	13	Ω
Off-State Leakage Current	V <sub>L</sub> =400V	I <sub>LEAK</sub>	-	-	1	μA
Switching Speeds						
Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	T <sub>ON</sub>	-	-	5.0	ms
Turn-Off	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	T <sub>OFF</sub>	-	-	3.0	ms
Load Current Limit	I <sub>F</sub> =5mA	I <sub>CL</sub>	240	-	380	mA
Output Capacitance	50V; f=1MHz	C <sub>OUT</sub>	-	65	-	pF
Capacitance Input to Output	-	-	-	3	-	pF
<b>Input Characteristics @ 25°C</b>						
Input Control Current	I <sub>L</sub> = 200mA	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

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

**PERFORMANCE DATA\***
**PAA140L**  
**Typical LED Forward Voltage Drop**  
 (N=50 Ambient Temperature = 25°C; I<sub>F</sub> = 5mADC)

**PAA140L**  
**Typical On-Resistance Distribution**  
 (N=50 Ambient Temperature = 25°C)  
 (Load Current = 200mADC, I<sub>F</sub> = 5mADC)

**PAA140L**  
**Typical Blocking Voltage Distribution**  
 (N=50 Ambient Temperature = 25°C)

**PAA140L**  
**Typical I<sub>F</sub> for Switch Operation**  
 (N=50 Ambient Temperature = 25°C)  
 (Load Current = 200mADC)

**PAA140L**  
**Typical I<sub>F</sub> for Switch Dropout**  
 (N=50 Ambient Temperature = 25°C)  
 (Load Current = 200mADC)

**PAA140L**  
**Typical Turn-On Time**  
 (N=50 Ambient Temperature = 25°C)  
 (Load Current = 200mADC; I<sub>F</sub> = 5mADC)

**PAA140L**  
**Typical Turn-Off Time**  
 (N=50 Ambient Temperature = 25°C)  
 (Load Current = 200mADC; I<sub>F</sub> = 5mADC)

**PAA140L**  
**Typical Maximum Load Current vs. Temperature**

**PAA140L**  
**Typical Leakage vs. Temperature**  
 (Measured across Pins 5 & 6 or 7 & 8)

**PAA140L**  
**Typical Blocking Voltage vs. Temperature**

**PAA140L**  
**Typical Turn-On vs. Temperature**  
 (Load Current = 250mADC)

**PAA140L**  
**Typical Turn-Off vs. Temperature**  
 (Load Current = 250mADC)


\*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.

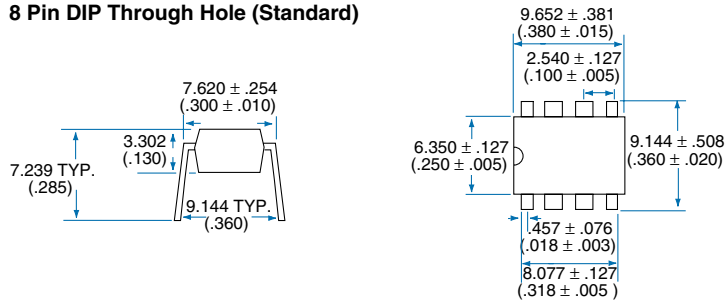
PERFORMANCE DATA\*



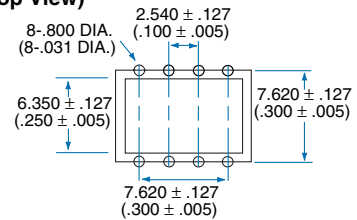
\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

MECHANICAL DIMENSIONS

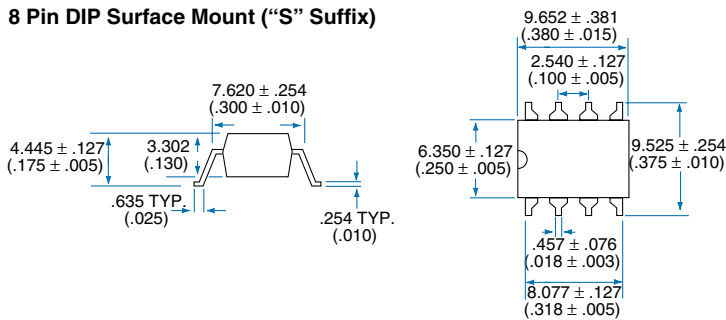
8 Pin DIP Through Hole (Standard)



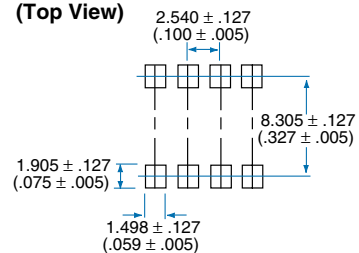
PC Board Pattern (Top View)



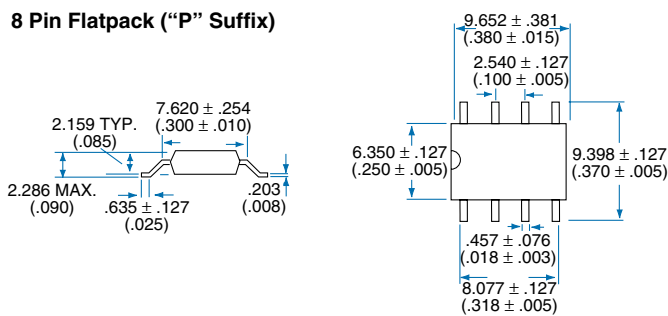
8 Pin DIP Surface Mount ("S" Suffix)



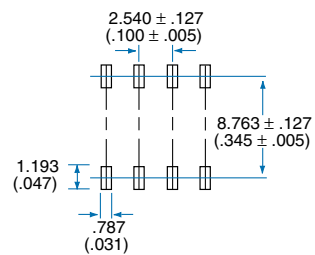
PC Board Pattern (Top View)



8 Pin Flatpack ("P" Suffix)



PC Board Pattern (Top View)



Dimensions  
 mm  
 (inches)



# CLARE

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