



CLARE

PAA140L Dual Pole OptoMOS® Relays



	PAA140L	Units
Load Voltage	400	V
Load Current	200	mA
Max R _{ON}	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_{RMS} 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 GaAIAs 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

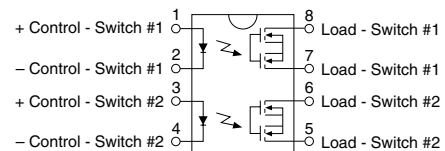
Ordering Information

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)

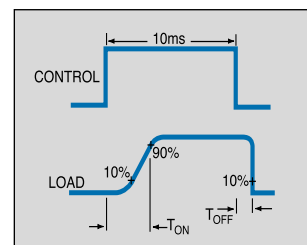
Pin Configuration

PAA140L Pinout

AC/DC Configuration



Switching Characteristics of Normally Open (Form A) Devices





PAA140L

Absolute Maximum Ratings (@ 25° C)

Parameter	Min	Typ	Max	Units
Input Power Dissipation	-	-	150 ¹	mW
Input Control Current	-	-	50	mA
Peak (10ms)	-	-	1	A
Reverse Input Voltage	-	-	5	V
Blocking Voltage	-	-	400	V
Total Power Dissipation	-	-	800 ²	mW
Isolation Voltage Input to Output	3750	-	-	V _{RMS}
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

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 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.

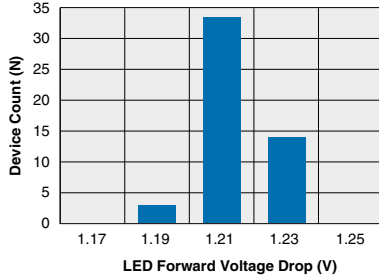
Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current* (Continuous) AC/DC Configuration	-	I _L	-	-	200	mA
Peak Load Current	10ms	I _{LPK}	-	-	500	mA
On-Resistance AC/DC Configuration	I _L =200mA	R _{ON}	-	10	13	Ω
Off-State Leakage Current	V _L =400V	I _{LEAK}	-	-	1	μA
Switching Speeds						
Turn-On	I _F =5mA, V _L =10V	T _{ON}	-	-	5.0	ms
Turn-Off	I _F =5mA, V _L =10V	T _{OFF}	-	-	3.0	ms
Load Current Limit	I _F =5mA	I _{CL}	240	-	380	mA
Output Capacitance	50V; f=1MHz	C _{OUT}	-	65	-	pF
Capacitance Input to Output	-	-	-	3	-	pF
Input Characteristics @ 25°C						
Input Control Current	I _L = 200mA	I _F	5	-	50	mA
Input Dropout Current	-	I _F	0.4	0.7	-	mA
Input Voltage Drop	I _F = 5mA	V _F	0.9	1.2	1.4	V
Reverse Input Voltage	-	V _R	-	-	5	V
Reverse Input Current	V _R =5V	I _R	-	-	10	μA
Input to Output Capacitance	-	C _{I/O}	-	3	-	pF

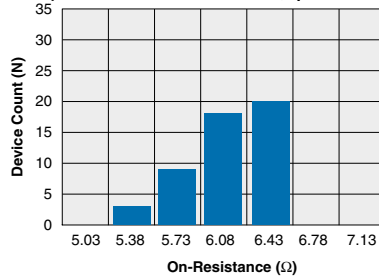
*NOTE: If both poles operate simultaneously load current must be derated so as not to exceed the package power dissipation value.

PERFORMANCE DATA*

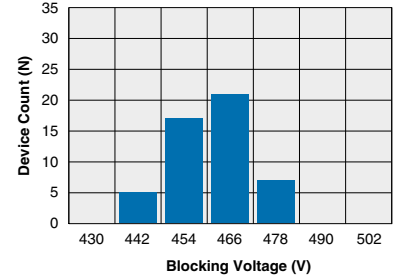
PAA140L
Typical LED Forward Voltage Drop
(N=50 Ambient Temperature = 25°C; I_F = 5mADC)



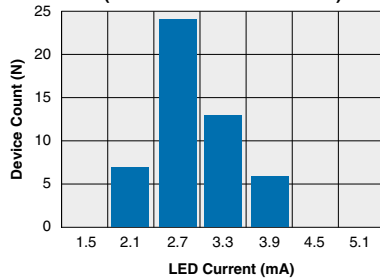
PAA140L
Typical On-Resistance Distribution
(N=50 Ambient Temperature = 25°C)
(Load Current = 200mADC, I_F = 5mADC)



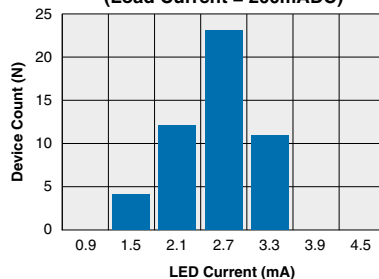
PAA140L
Typical Blocking Voltage Distribution
(N=50 Ambient Temperature = 25°C)



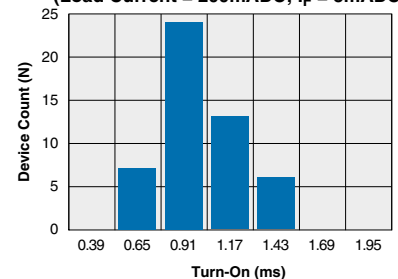
PAA140L
Typical I_F for Switch Operation
(N=50 Ambient Temperature = 25°C)
(Load Current = 200mADC)



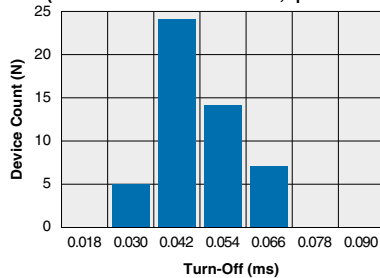
PAA140L
Typical I_F for Switch Dropout
(N=50 Ambient Temperature = 25°C)
(Load Current = 200mADC)



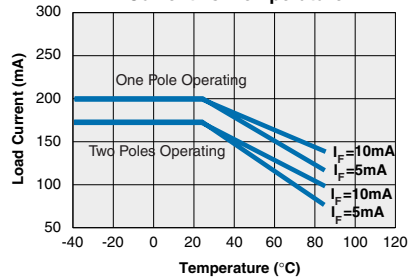
PAA140L
Typical Turn-On Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 200mADC; I_F = 5mADC)



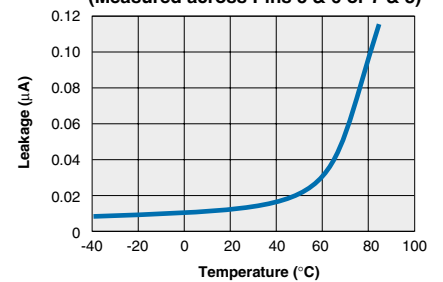
PAA140L
Typical Turn-Off Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 200mADC; I_F = 5mADC)



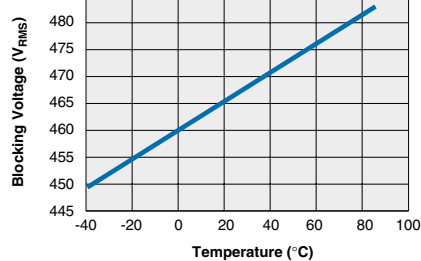
PAA140L
Typical Maximum Load Current vs. Temperature



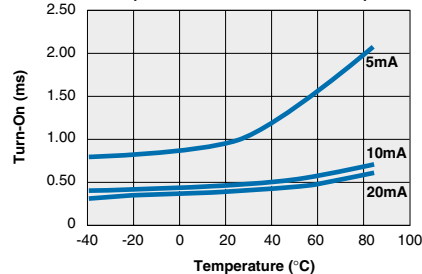
PAA140L
Typical Leakage vs. Temperature
(Measured across Pins 5 & 6 or 7 & 8)



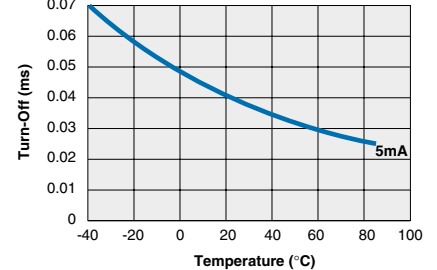
PAA140L
Typical Blocking Voltage vs. Temperature



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

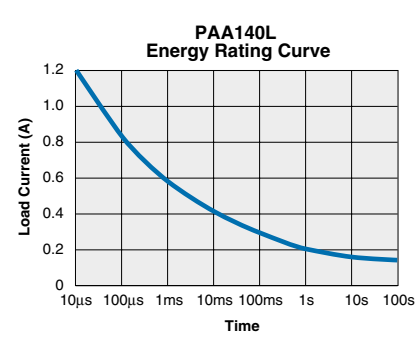
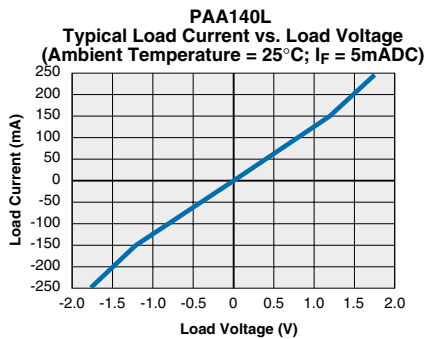
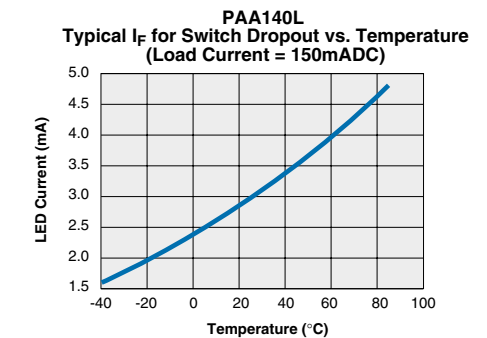
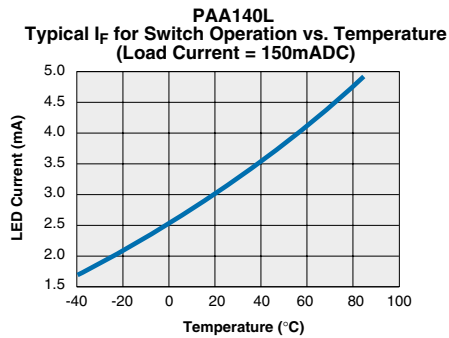
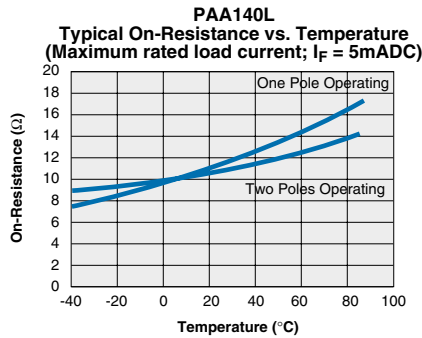
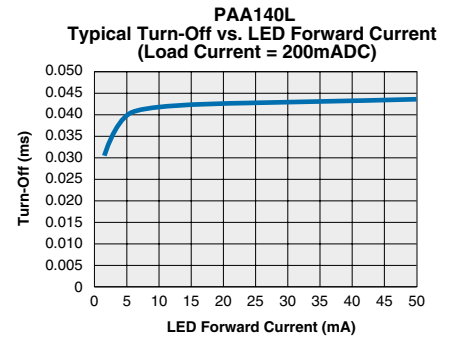
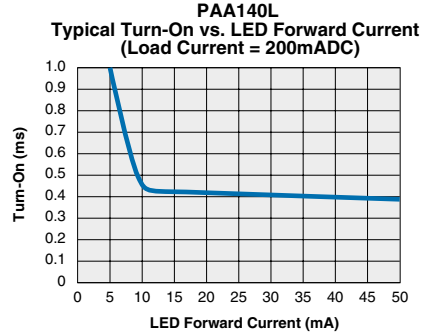
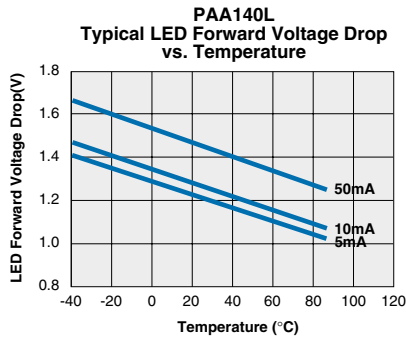


PAA140L
Typical Turn-Off vs. Temperature
(Load Current = 250mADC)



*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.

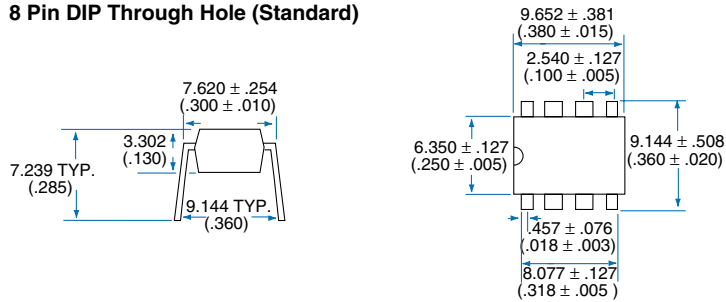
PERFORMANCE DATA*



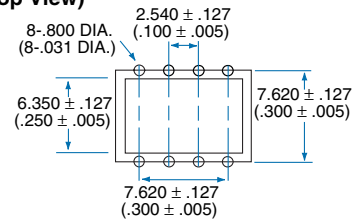
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

MECHANICAL DIMENSIONS

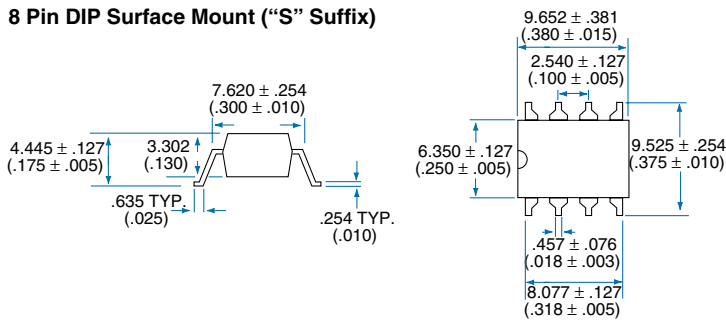
8 Pin DIP Through Hole (Standard)



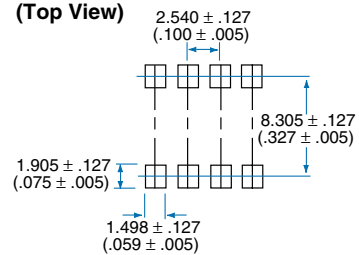
PC Board Pattern (Top View)



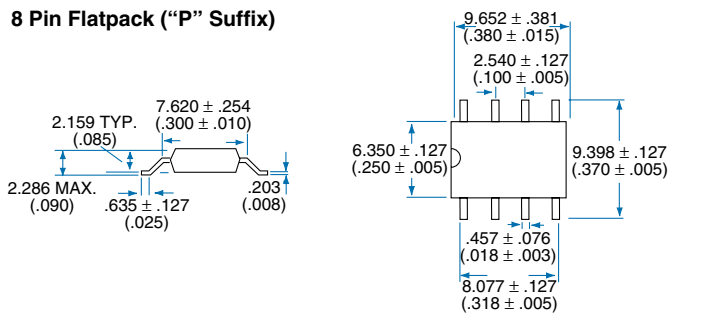
8 Pin DIP Surface Mount ("S" Suffix)



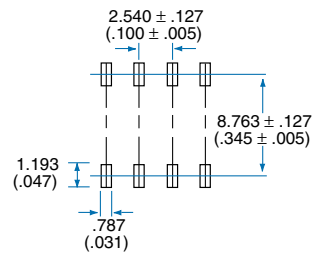
PC Board Pattern (Top View)



8 Pin Flatpack ("P" Suffix)



PC Board Pattern (Top View)



Dimensions
 mm
 (inches)



CLARE

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-PAA140L-R1.0
©Copyright 2002, Clare, Inc.
OptoMOS® is a registered trademark of Clare, Inc.
All rights reserved. Printed in USA.
8/23/02