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 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

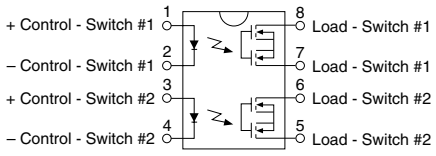
Ordering Information

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)

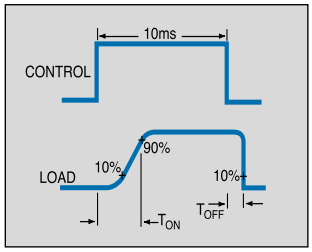
Pin Configuration

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[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.

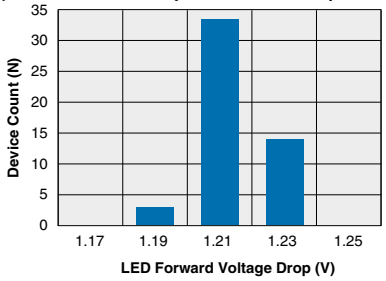
Electrical Characteristics

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

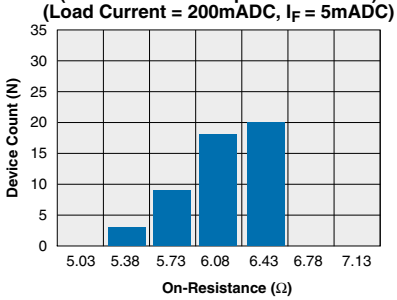
*NOTE: If both poles operate simultaneously load current must be derated so as not to exceed the package power dissipation value.

PERFORMANCE DATA*

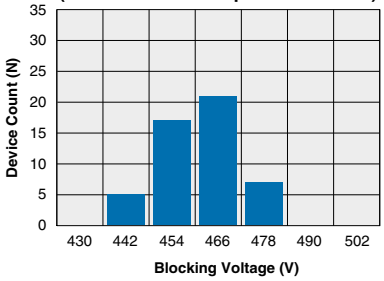
PAA140L
Typical LED Forward Voltage Drop
(N=50 Ambient Temperature = 25°C; I_F = 5mADC)



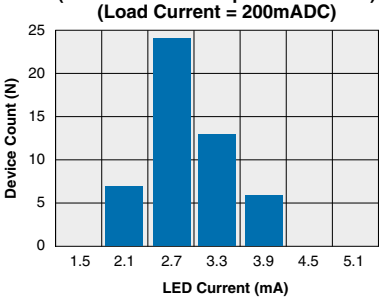
PAA140L
Typical On-Resistance Distribution
(N=50 Ambient Temperature = 25°C)
(Load Current = 200mADC, I_F = 5mADC)



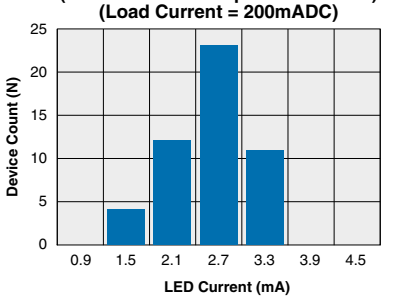
PAA140L
Typical Blocking Voltage Distribution
(N=50 Ambient Temperature = 25°C)



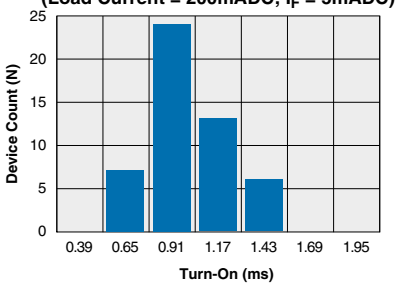
PAA140L
Typical I_F for Switch Operation
(N=50 Ambient Temperature = 25°C)
(Load Current = 200mADC)



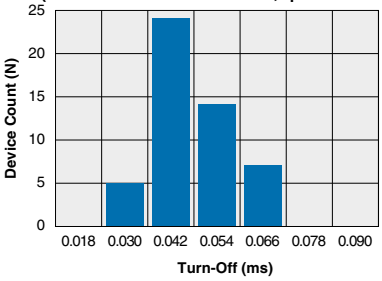
PAA140L
Typical I_F for Switch Dropout
(N=50 Ambient Temperature = 25°C)
(Load Current = 200mADC)



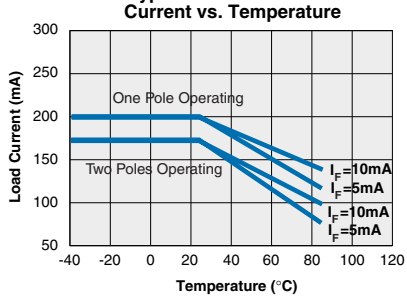
PAA140L
Typical Turn-On Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 200mADC; I_F = 5mADC)



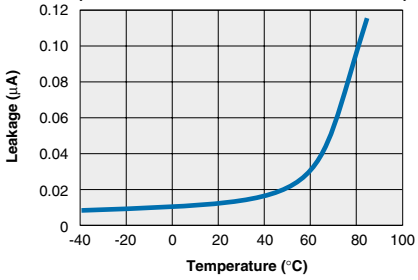
PAA140L
Typical Turn-Off Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 200mADC; I_F = 5mADC)



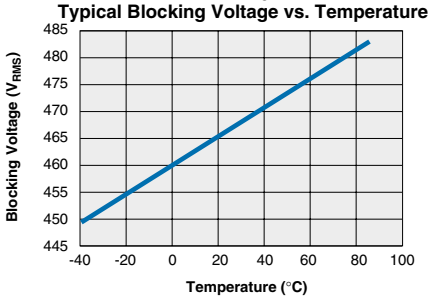
PAA140L
Typical Maximum Load
Current vs. Temperature



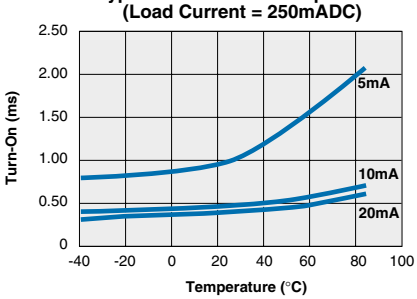
PAA140L
Typical Leakage vs. Temperature
(Measured across Pins 5 & 6 or 7 & 8)



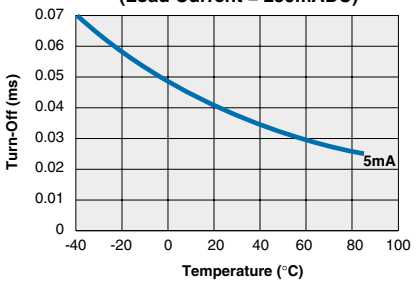
PAA140L
Typical Blocking Voltage vs. Temperature



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



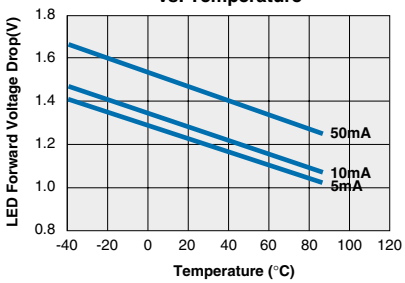
PAA140L
Typical Turn-Off vs. Temperature
(Load Current = 250mADC)



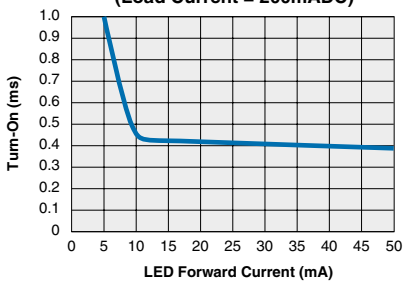
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

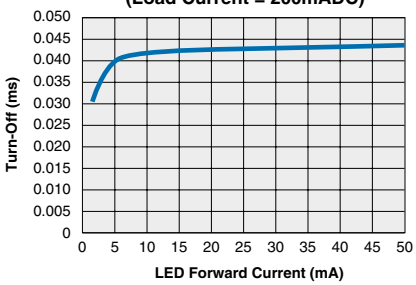
PAA140L
Typical LED Forward Voltage Drop vs. Temperature



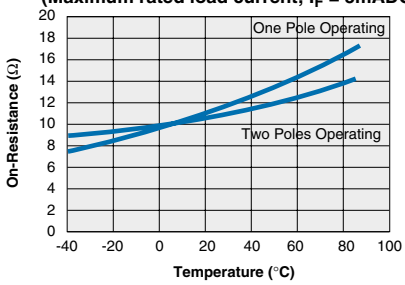
PAA140L
Typical Turn-On vs. LED Forward Current (Load Current = 200mADC)



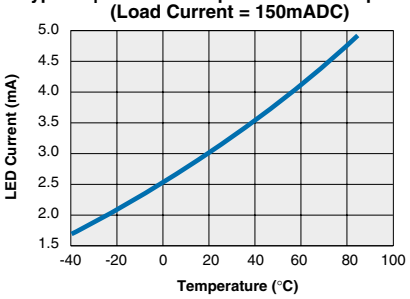
PAA140L
Typical Turn-Off vs. LED Forward Current (Load Current = 200mADC)



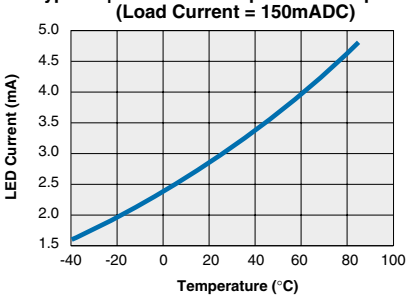
PAA140L
Typical On-Resistance vs. Temperature (Maximum rated load current; I_F = 5mADC)



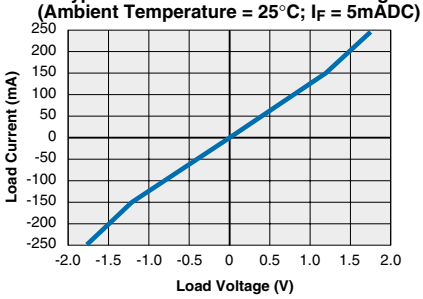
PAA140L
Typical I_F for Switch Operation vs. Temperature (Load Current = 150mADC)



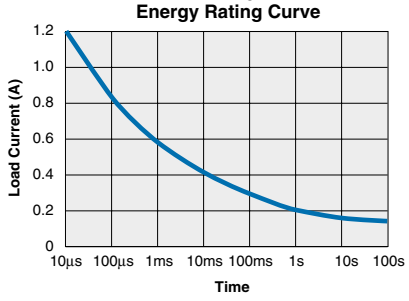
PAA140L
Typical I_F for Switch Dropout vs. Temperature (Load Current = 150mADC)



PAA140L
Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C; I_F = 5mADC)



PAA140L
Energy Rating Curve



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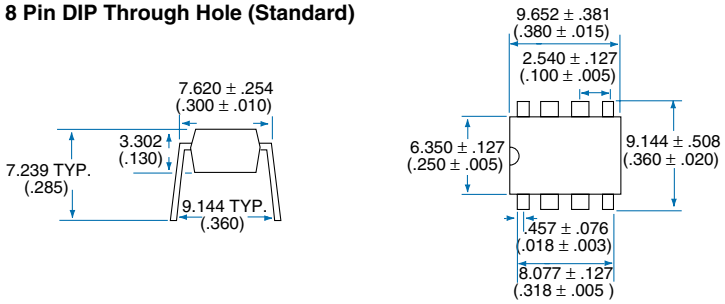
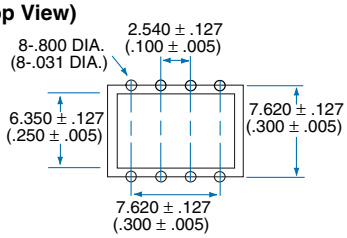
MECHANICAL DIMENSIONS

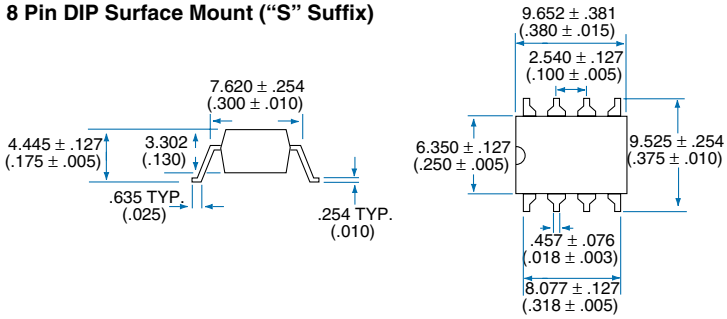
8 Pin DIP Through Hole (Standard)



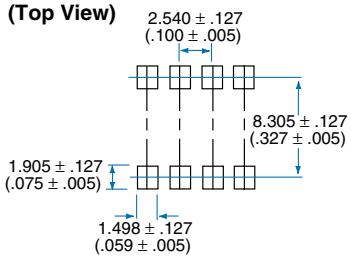
PC Board Pattern (Top View)



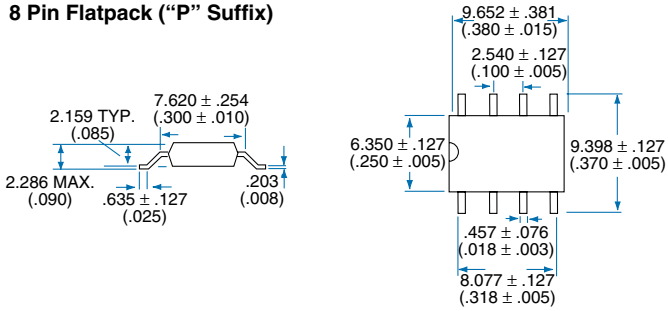
8 Pin DIP Surface Mount ("S" Suffix)



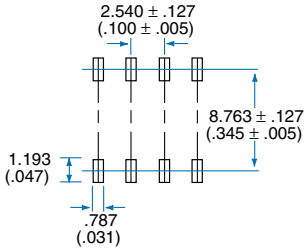
PC Board Pattern (Top View)



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

Specification: DS-PAA140L-R1.0

8/23/02