# PAA140
## Dual Pole OptoMOS® Relays


| | PAA140 | Units |
|---|---|---|
| Load Voltage | 400 | V |
| Load Current | 250 | mA |
| Max $R_{ON}$ | 8 | Ω |

## Description
The PAA140 is a 400V, 250mA, 8Ω, dual 1-Form-A relay. This high performance leader provides a high peak load voltage handling capability combined with a very low resistance for specialized applications.

## Features
- Small 8-Pin SOIC and DIP Packages
- Low Drive Power Requirements (TTL/CMOS Compatible)
- No Moving Parts
- High Reliability
- Arc-Free With No Snubbing Circuits
- 3750$V_{rms}$ Input/Output Isolation
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Tape & Reel Versions Available

## 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

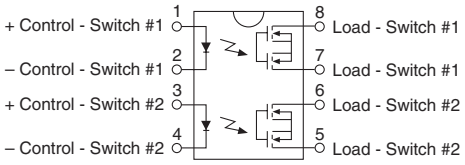
## Ordering Information

| Part # | Description |
|---|---|
| PAA140 | 8-Pin DIP (50/tube) |
| PAA140P | 8-Pin Flatpack (50/tube) |
| PAA140PTR | 8-Pin Flatpack (1000/Reel) |
| PAA140S | 8-Pin Surface Mount (50/tube) |
| PAA140STR | 8-Pin Surface Mount (1000/Reel) |

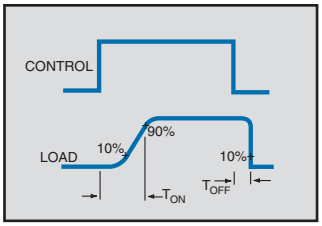
## Applications
- Telecommunications
  - Telecom Switching
  - Tip/Ring Circuits
  - Modem Switching (Laptop, Notebook, Pocket Size)
  - Hook Switch
  - Dial Pulsing
  - Ground Start
  - Ringing Injection
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
  - Meters (Watt-Hour, Water, Gas)
- Medical Equipment-Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

## Pin Configuration

**PAA140 Pinout**




**Switching Characteristics of Normally Open (Form A) Devices**



## Absolute Maximum Ratings

| Parameter | Ratings | Units |
|---|---|---|
| Blocking Voltage | 400 | V |
| 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 | 3750 | $V_{rms}$ |
| 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

Electrical absolute maximum ratings are at 25°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.*

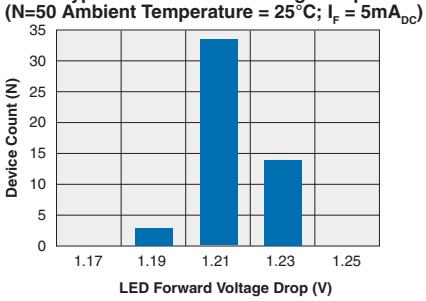
## Electrical Characteristics

| Parameter | Conditions | Symbol | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Output Characteristics @ 25°C** | | | | | | |
| Load Current*, Continuous | - | $I_L$ | - | - | 250 | mA |
| Peak Load Current | 10ms | $I_{LPK}$ | - | - | 500 | mA |
| On-Resistance | $I_L$=250mA | $R_{ON}$ | - | 6 | 8 | Ω |
| Off-State Leakage Current | $V_L$=400V | $I_{LEAK}$ | - | - | 1 | µA |
| Switching Speeds | | | | | | |
| Turn-On | $I_F$=5mA, $V_L$=10V | $T_{ON}$ | - | - | 3 | ms |
| Turn-Off | $I_F$=5mA, $V_L$=10V | $T_{OFF}$ | - | - | 1 | ms |
| **Input Characteristics @ 25°C** | | | | | | |
| Input Control Current | $I_L$=250mA | $I_F$ | 5 | - | - | 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 Current | $V_R$=5V | $I_R$ | - | - | 10 | µA |
| **Common Characteristics @ 25°C** | | | | | | |
| Capacitance Input to Output | - | $C_{I/O}$ | - | 3 | - | pF |

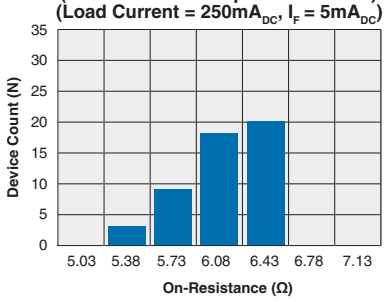
*NOTE: If both poles operate simultaneously load current must be derated so as not to exceed the package power dissipation value.

## PERFORMANCE DATA*

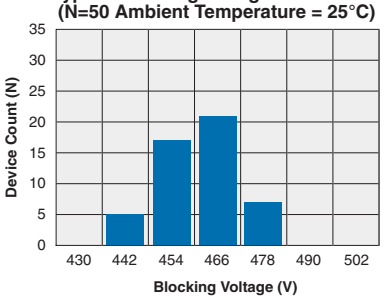
**PAA140**
**Typical LED Forward Voltage Drop**
**(N=50 Ambient Temperature = 25°C; $I_F$ = 5mA$_{DC}$)**



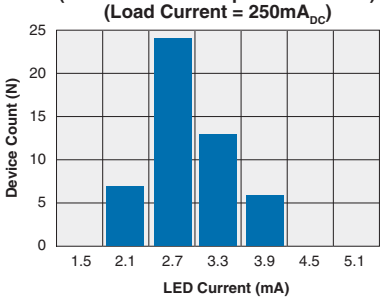

**PAA140**
**Typical On-Resistance Distribution**
**(N=50 Ambient Temperature = 25°C)**
**(Load Current = 250mA$_{DC}$, $I_F$ = 5mA$_{DC}$)**



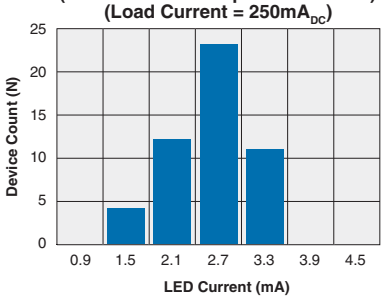

**PAA140**
**Typical Blocking Voltage Distribution**
**(N=50 Ambient Temperature = 25°C)**



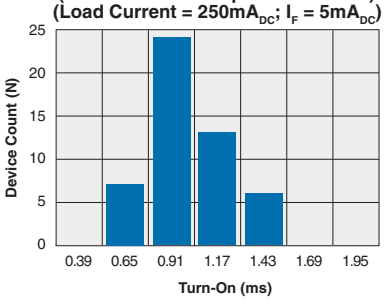

**PAA140**
**Typical $I_F$ for Switch Operation**
**(N=50 Ambient Temperature = 25°C)**
**(Load Current = 250mA$_{DC}$)**



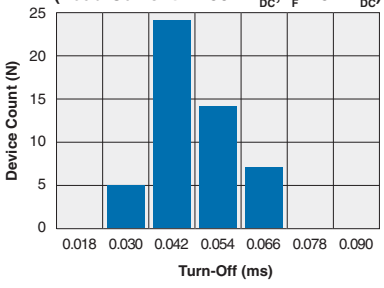

**PAA140**
**Typical $I_F$ for Switch Dropout**
**(N=50 Ambient Temperature = 25°C)**
**(Load Current = 250mA$_{DC}$)**



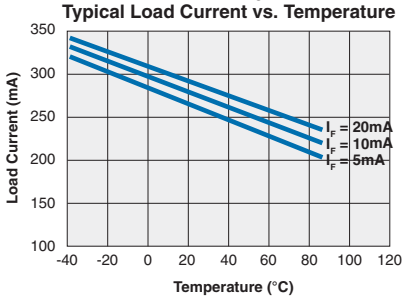

**PAA140**
**Typical Turn-On Time**
**(N=50 Ambient Temperature = 25°C)**
**(Load Current = 250mA$_{DC}$; $I_F$ = 5mA$_{DC}$)**



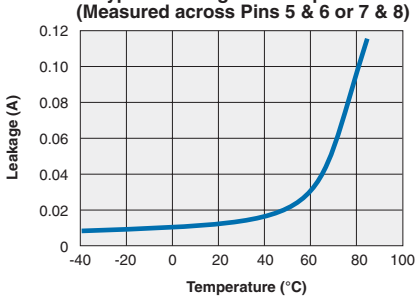

**PAA140**
**Typical Turn-Off Time**
**(N=50 Ambient Temperature = 25°C)**
**(Load Current = 250mA$_{DC}$; $I_F$ = 5mA$_{DC}$)**



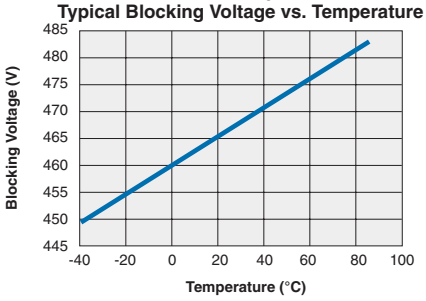

**PAA140**
**Typical Load Current vs. Temperature**



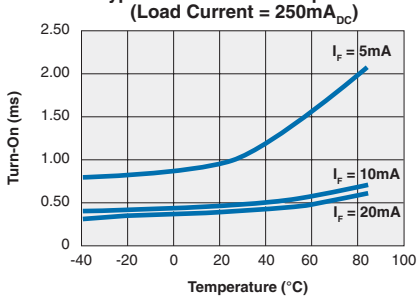

**PAA140**
**Typical Leakage vs. Temperature**
**(Measured across Pins 5 & 6 or 7 & 8)**



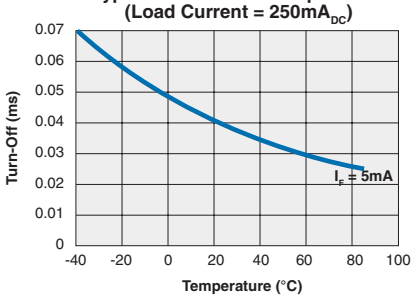

**PAA140**
**Typical Blocking Voltage vs. Temperature**




**PAA140**
**Typical Turn-On vs. Temperature**
**(Load Current = 250mA$_{DC}$)**



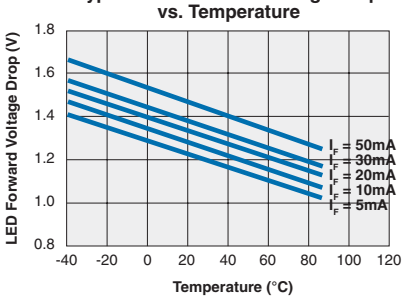

**PAA140**
**Typical Turn-Off vs. Temperature**
**(Load Current = 250mA$_{DC}$)**



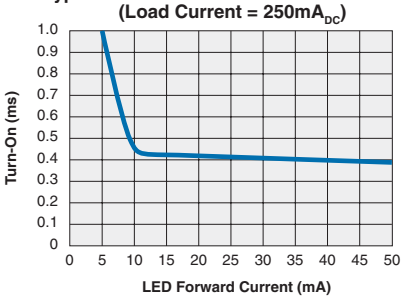

*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

## PERFORMANCE DATA*

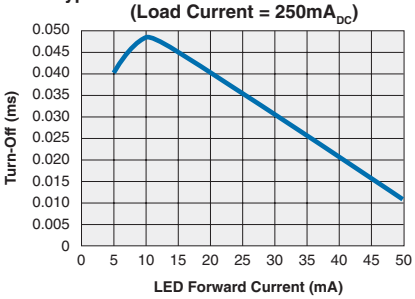
**PAA140**
**Typical LED Forward Voltage Drop vs. Temperature**



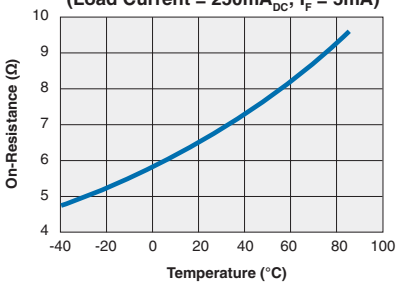

**PAA140**
**Typical Turn-On vs. LED Forward Current (Load Current = 250mA$_{DC}$)**



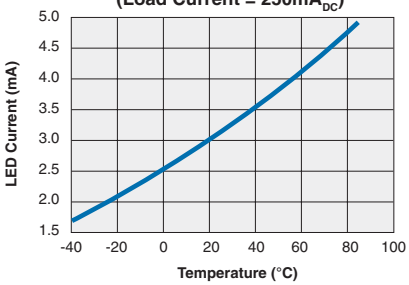

**PAA140**
**Typical Turn-Off vs. LED Forward Current (Load Current = 250mA$_{DC}$)**



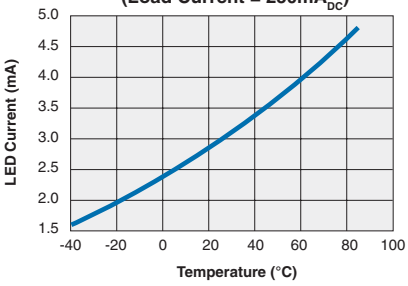

**PAA140**
**Typical On-Resistance vs. Temperature (Load Current = 250mA$_{DC}$; $I_F$ = 5mA)**



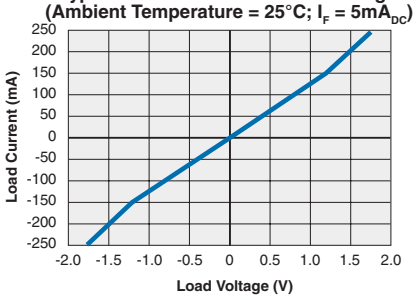

**PAA140**
**Typical $I_F$ for Switch Operation vs. Temperature (Load Current = 250mA$_{DC}$)**



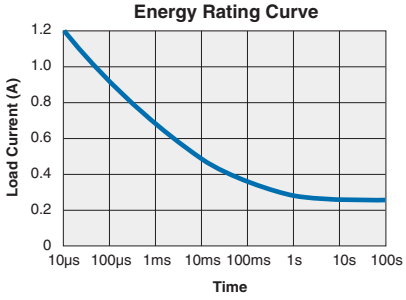

**PAA140**
**Typical $I_F$ for Switch Dropout vs. Temperature (Load Current = 250mA$_{DC}$)**




**PAA140**
**Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C; $I_F$ = 5mA$_{DC}$)**




**PAA140**
**Energy Rating Curve**

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## Manufacturing Information

### Soldering

For proper assembly, the component must be processed in accordance with the current revision of IPC/JEDEC standard J-STD-020. Failure to follow the recommended guidelines may cause permanent damage to the device resulting in impaired performance and/or a reduced lifetime expectancy.

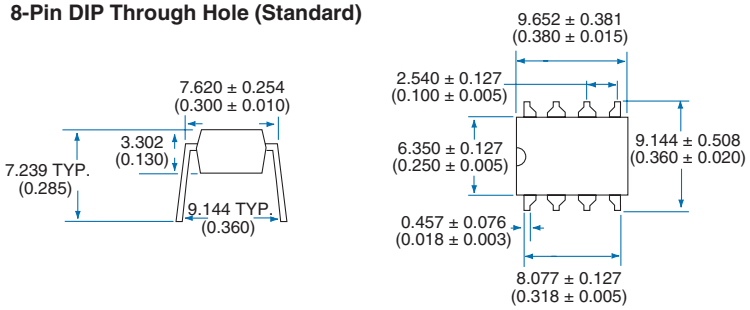
Recommended soldering processes are limited to 260ºC component body temperature for 10 seconds.

### Washing

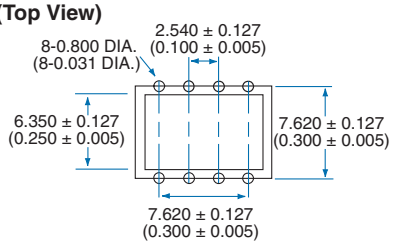
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

## MECHANICAL DIMENSIONS

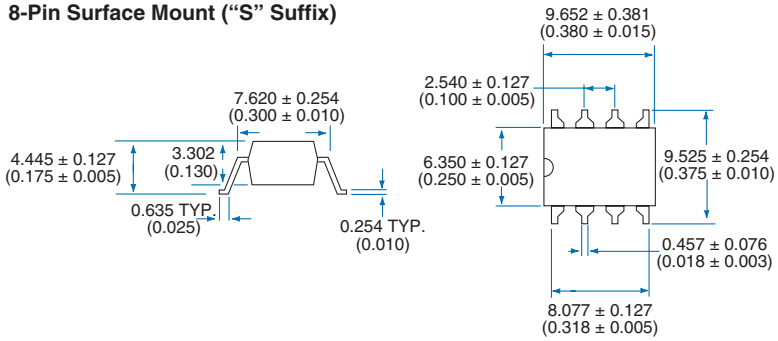
**8-Pin DIP Through Hole (Standard)**



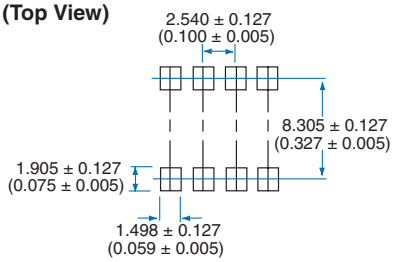

**PC Board Pattern (Top View)**



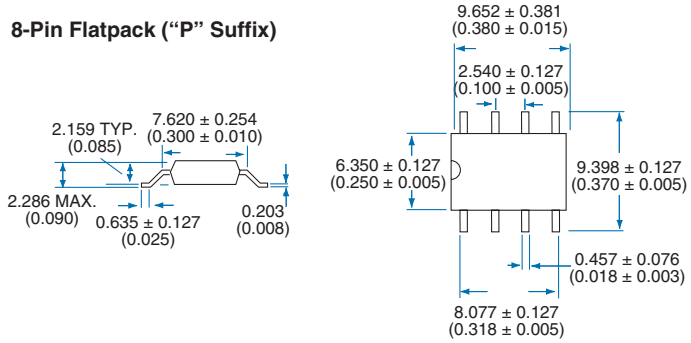

**8-Pin Surface Mount ("S" Suffix)**



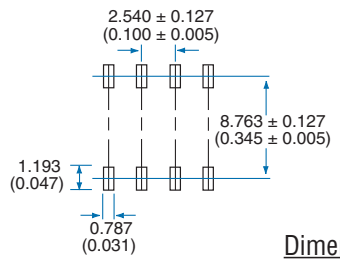

**PC Board Pattern (Top View)**




**8-Pin Flatpack ("P" Suffix)**



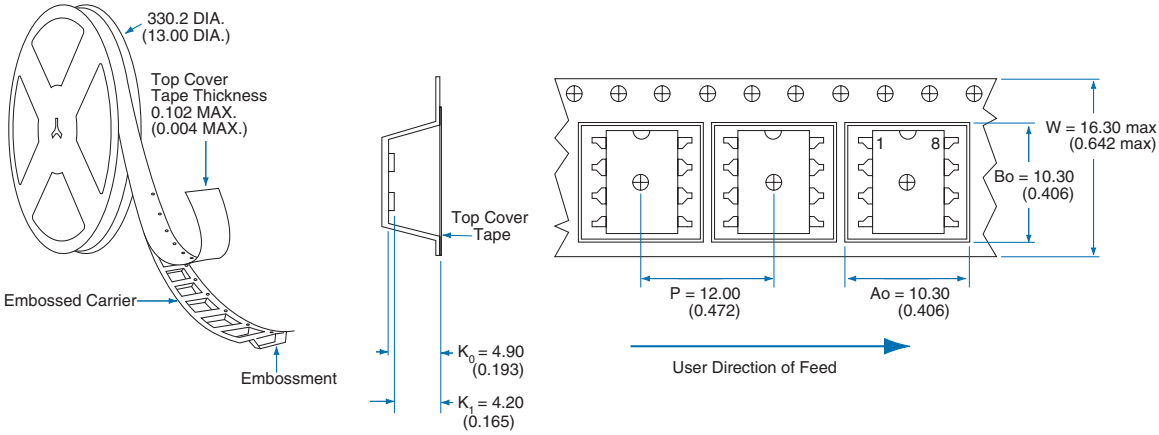

**PC Board Pattern (Top View)**




Dimensions:
mm
(inches)

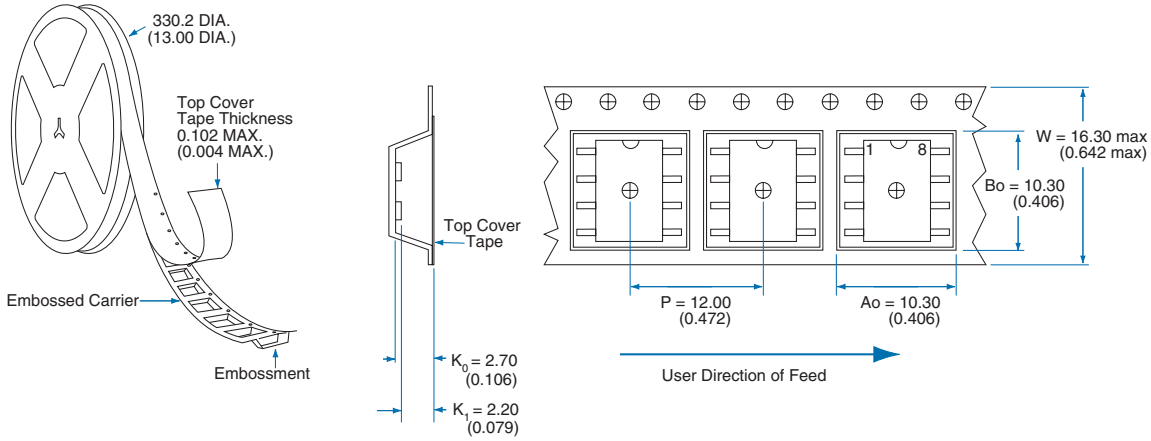
# MECHANICAL DIMENSIONS

**Tape and Reel Packaging for 8-Pin Surface Mount Package**




**NOTE:** Tape dimensions not shown, comply with JEDEC Standard EIA-481-2

**Tape and Reel Packaging for 8-Pin Flatpack Package**




**NOTE:** Tape dimensions not shown, comply with JEDEC Standard EIA-481-2

Dimensions:
mm
(inches)

## For additional information please visit our website at: www.clare.com



Specification: DS-PAA140-R07

10/18/06