



|                     | PLA140L | Units |
|---------------------|---------|-------|
| Load Voltage        | 400     | V     |
| Load Current        | 200     | mA    |
| Max R <sub>ON</sub> | 13      | Ω     |

### Features

- Small 6 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
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Current Limiting, Surface Mount and Tape & Reel Versions 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
- Automotive

### Description

PLA140L is a 1-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 PLA140L 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

- UL Recognized: File Number E76270
- CSA Certified: File Number LR 43639-10
- BSI Certified to:
  - BS EN 60950:1992 (BS7002:1992)  
Certificate #: 7344
  - BS EN 41003:1993  
Certificate #: 7344

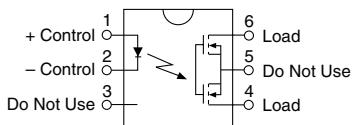
### Ordering Information

| Part #     | Description                     |
|------------|---------------------------------|
| PLA140L    | 6 Pin DIP (50/Tube)             |
| PLA140LS   | 6 Pin Surface Mount (50/Tube)   |
| PLA140LSTR | 6 Pin Surface Mount (1000/Reel) |

### Pin Configuration

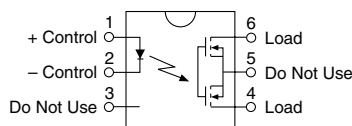
#### PLA140L Pinout

AC/DC Configuration

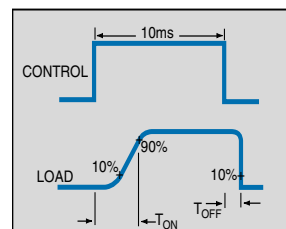


#### PLA140L Pinout

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                |
| Total Power Dissipation                    | -    | -   | 800 <sup>2</sup> | mW               |
| Isolation Voltage<br>Input to Output       | 3750 | -   | -                | V <sub>RMS</sub> |
| Operational Temperature                    | -40  | -   | +85              | °C               |
| Storage Temperature                        | -40  | -   | +125             | °C               |
| Soldering Temperature<br>DIP Package       | -    | -   | +260             | °C               |
| Surface Mount Package<br>(10 Seconds Max.) | -    | -   | +220             | °C               |

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

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

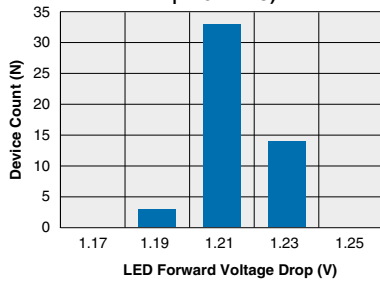
*Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to the absolute maximum ratings for an extended period may degrade the device and effect its reliability.*

**Electrical Characteristics**

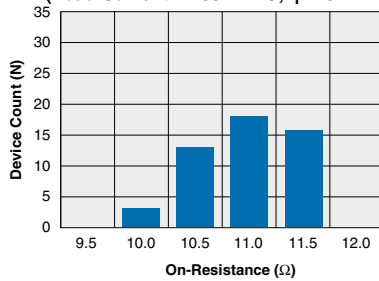
| Parameter                            | Conditions                               | Symbol            | Min  | Typ | Max | Units            |
|--------------------------------------|--|-------------------|------|-----|-----|------------------|
| <b>Output Characteristics @ 25°C</b> |  |                   |      |     |     |                  |
| Load Voltage (Peak)                  | -  | V <sub>L</sub>    | -    | -   | 400 | V                |
| Load Current (Continuous)            | -  | I <sub>L</sub>    | -    | -   | 200 | mA               |
| AC/DC Configuration                  | -  | I <sub>L</sub>    | -    | -   | 350 | mA               |
| DC Configuration                     | -  | I <sub>L</sub>    | -    | -   | 350 | mA               |
| Peak Load Current                    | 10ms                                     | I <sub>L</sub>    | -    | -   | 500 | mA               |
| On-Resistance                        | -  | R <sub>ON</sub>   | -    | -   | -   | Ω                |
| AC/DC Configuration                  | I <sub>L</sub> =200mA                    | R <sub>ON</sub>   | -    | 10  | 13  | Ω                |
| DC Configuration                     | I <sub>L</sub> =350mA                    | R <sub>ON</sub>   | -    | 3   | 4   | 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   | ms               |
| Turn-Off                             | I <sub>F</sub> =5mA, V <sub>L</sub> =10V | T <sub>OFF</sub>  | -    | -   | 3   | ms               |
| Load current limit                   | I <sub>F</sub> =5mA, T=25°C              | I <sub>CL</sub>   | 240  | -   | 380 | mA               |
| Output Capacitance                   | 50V; f=1MHz                              | C <sub>OUT</sub>  | -    | 65  | -   | 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               |
| <b>Common Characteristics @ 25°C</b> |  |                   |      |     |     |                  |
| Input to Output Capacitance          | -  | C <sub>I/O</sub>  | -    | 3   | -   | pF               |
| Input to Output Isolation            | -  | V <sub>I/O</sub>  | 3750 | -   | -   | V <sub>RMS</sub> |

PERFORMANCE DATA\*

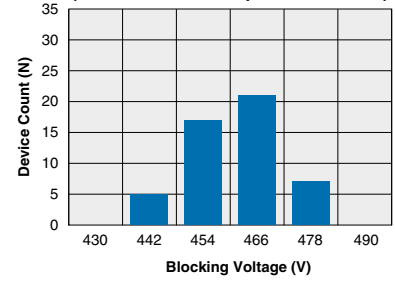
**PLA140L**  
Typical LED Forward Voltage Drop  
(N=50 Ambient Temperature = 25°C;  
I<sub>F</sub> = 5mADC)



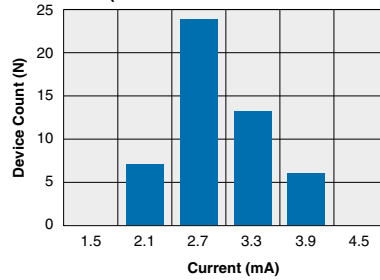
**PLA140L**  
Typical On-Resistance Distribution  
(N=50 Ambient Temperature = 25°C)  
(Load Current = 200mADC; I<sub>F</sub> = 5mADC)



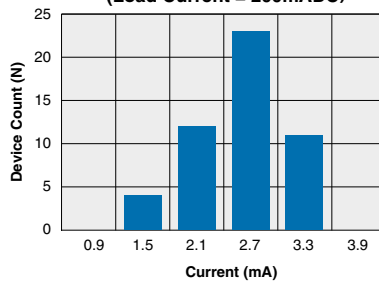
**PLA140L**  
Typical Blocking Voltage Distribution  
(N=50 Ambient Temperature = 25°C)



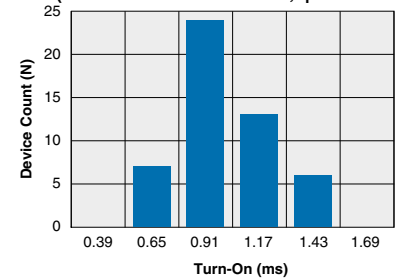
**PLA140L**  
Typical I<sub>F</sub> for Switch Operation  
(N=50 Ambient Temperature = 25°C)  
(Load Current = 200mADC)



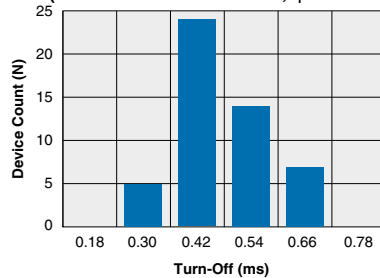
**PLA140L**  
Typical I<sub>F</sub> for Switch Dropout  
(N=50 Ambient Temperature = 25°C)  
(Load Current = 200mADC)



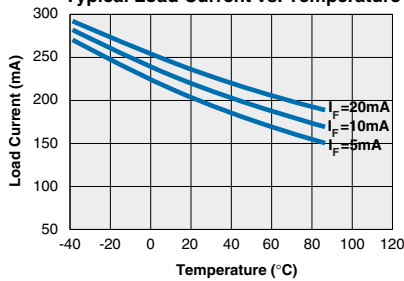
**PLA140L**  
Typical Turn-On Time  
(N=50 Ambient Temperature = 25°C)  
(Load Current = 200mADC; I<sub>F</sub> = 5mADC)



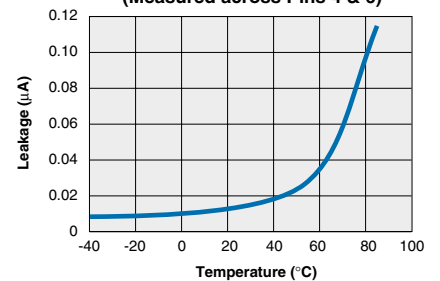
**PLA140L**  
Typical Turn-Off Time  
(N=50 Ambient Temperature = 25°C)  
(Load Current = 200mADC; I<sub>F</sub> = 5mADC)



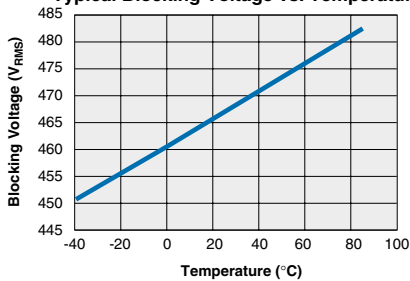
**PLA140L**  
Typical Load Current vs. Temperature



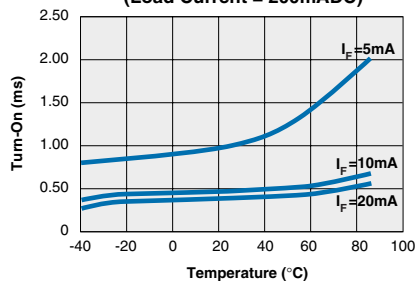
**PLA140L**  
Typical Leakage vs. Temperature  
(Measured across Pins 4 & 6)



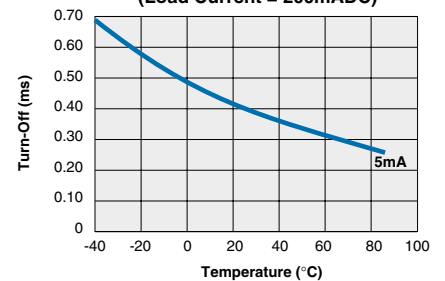
**PLA140L**  
Typical Blocking Voltage vs. Temperature



**PLA140L**  
Typical Turn-On vs. Temperature  
(Load Current = 200mADC)

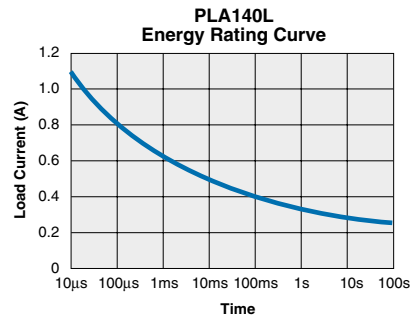
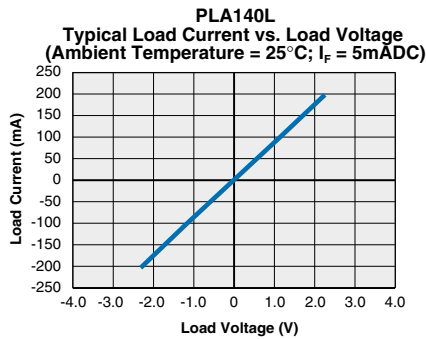
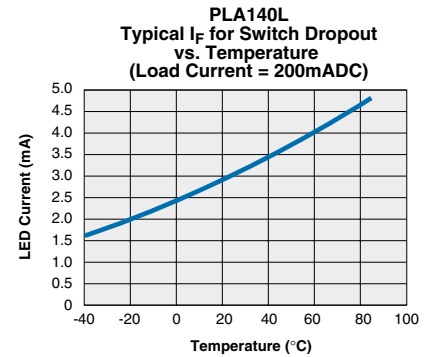
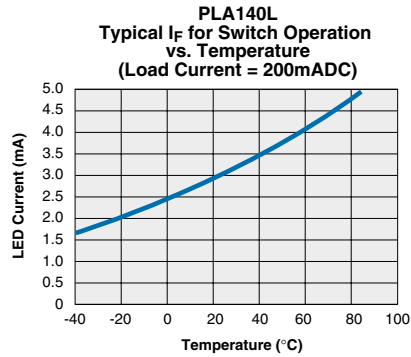
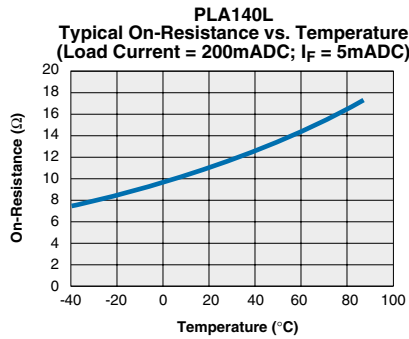
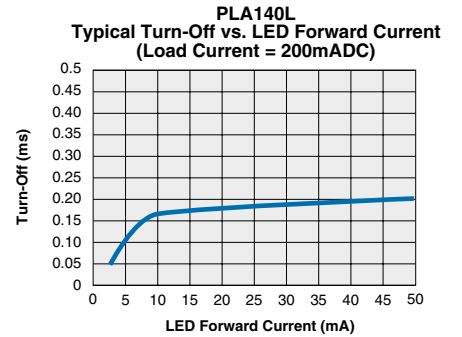
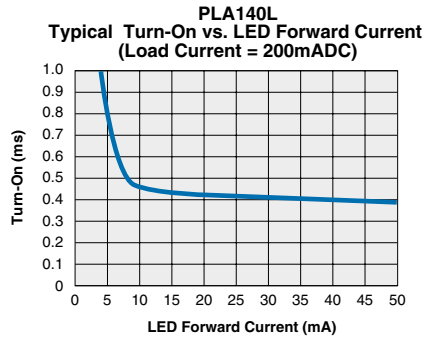
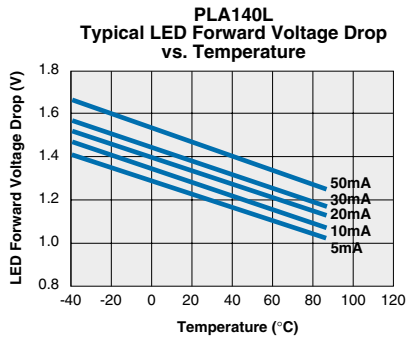


**PLA140L**  
Typical Turn-Off vs. Temperature  
(Load Current = 200mADC)



\* 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.

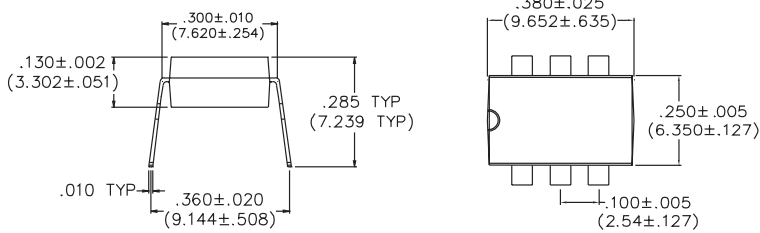
PERFORMANCE DATA\*



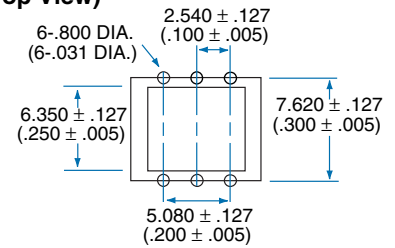
\* The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

MECHANICAL DIMENSIONS

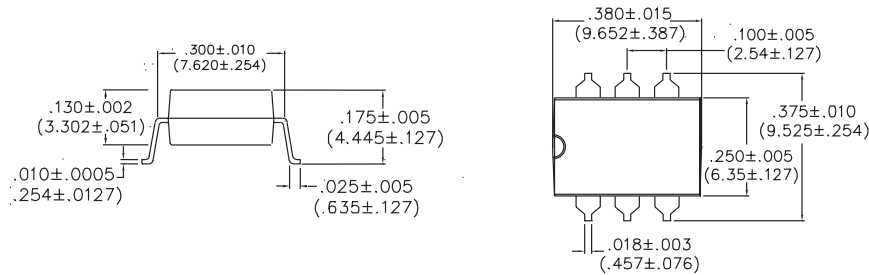
6Pin DIP Through Hole (Standard)



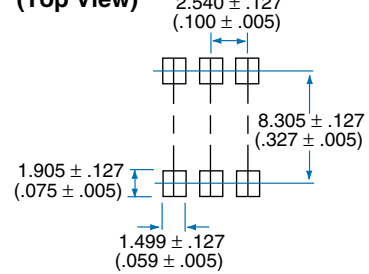
PC Board Pattern (Top View)



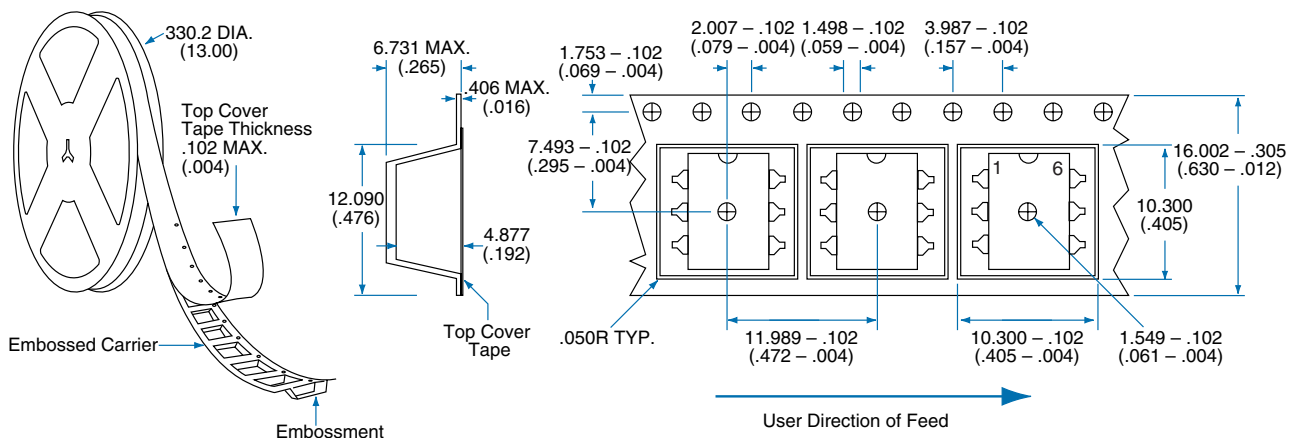
6Pin DIP Surface Mount ("S" Suffix)



PC Board Pattern (Top View)



Tape and Reel Packaging for 6 Pin Power DIP Surface Mount Package



Dimensions  
mm  
(inches)



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