



# CLARE

# PLA110L Single Pole OptoMOS® Relays



	PLA110L	Units
Load Voltage	400	V
Load Current	150	mA
Max R <sub>ON</sub>	25	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
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Current Limiting, Surface Mount and Tape & Reel Versions Available

### 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

PLA110L is a 1-Form-A solid state relay which uses optically coupled MOSFET technology to provide 3750V of input to output isolation. The efficient current limited 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 PLA110L can be used to replace mechanical relays and offers the superior reliability associated with semiconductor devices. Because they have no moving parts, they can offer faster, bounce-free switching in a more compact surface mount or through hole package.

### Approvals

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

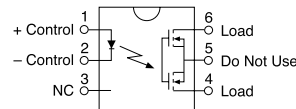
### Ordering Information

Part #	Description
PLA110L	6 Pin Dip (50/Tube)
PLA110LS	6 Pin Surface Mount (50/Tube)
PLA110LSTR	6 Pin Surface Mount (1000/Reel)

### Pin Configuration

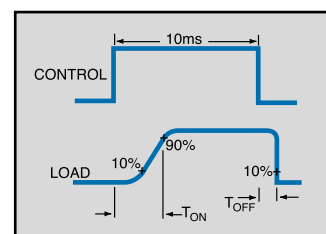
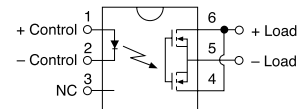
#### PLA110L Pinout

AC/DC Configuration



#### PLA110L Pinout

DC Only Configuration



**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 Input to Output	3750	-	-	V <sub>RMS</sub>
Operational Temperature	-40	-	+85	°C
Storage Temperature	-40	-	+125	°C
Soldering Temperature DIP Package	-	-	+260	°C
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

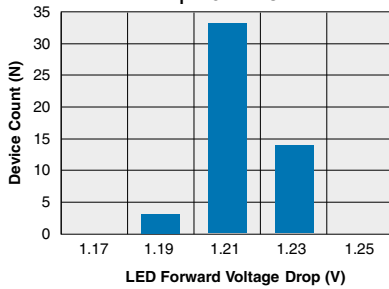
Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to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

**Electrical Characteristics**

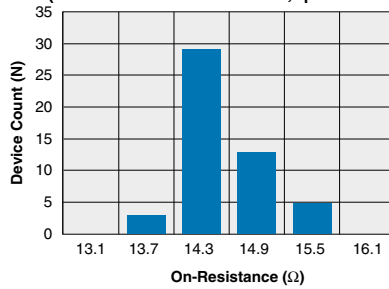
Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics @ 25°C</b>						
Load Voltage (Peak)	-	V <sub>L</sub>	-	-	400	V
Load Current (Continuous)	-	I <sub>L</sub>	-	-	150	mA
AC/DC Configuration	-	I <sub>L</sub>	-	-	250	mA
DC Configuration	-	I <sub>L</sub>	-	-	-	mA
Peak Load Current	10ms	I <sub>L</sub>	-	-	-	mA
On-Resistance	-	R <sub>ON</sub>	-	-	25	Ω
AC/DC Configuration	I <sub>L</sub> =150mA	R <sub>ON</sub>	-	-	9	Ω
DC Configuration	I <sub>L</sub> =250mA	R <sub>ON</sub>	-	-	-	μA
Off-State Leakage Current	V <sub>L</sub> =400V	I <sub>LEAK</sub>	-	-	-	μA
Switching Speeds	-	-	-	-	-	-
Turn-On	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	T <sub>ON</sub>	-	-	1	ms
Turn-Off	I <sub>F</sub> =5mA, V <sub>L</sub> =10V	T <sub>OFF</sub>	-	-	0.25	ms
Output Capacitance	50V; f=1MHz	C <sub>OUT</sub>	-	25	-	pF
Load Current Limiting	-	I <sub>CL</sub>	190	235	280	mA
<b>Input Characteristics @ 25°C</b>						
Input Control Current	I <sub>L</sub> =150mA	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\*

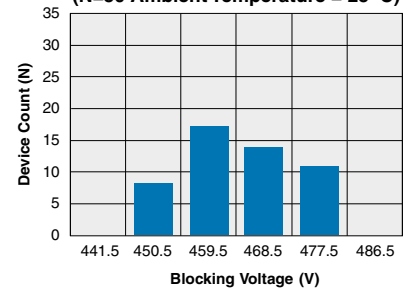
**PLA110L**  
Typical LED Forward Voltage Drop  
(N=50 Ambient Temperature = 25 °C)  
 $I_F = 5\text{mADC}$



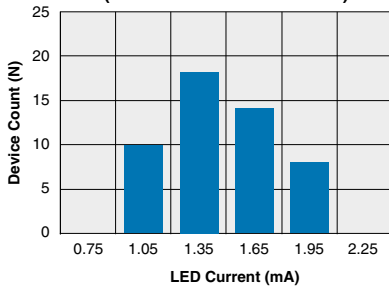
**PLA110L**  
Typical On-Resistance Distribution  
(N=50 Ambient Temperature = 25 °C)  
(Load Current = 150mADC;  $I_F = 5\text{mADC}$ )



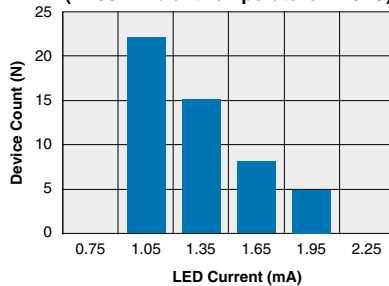
**PLA110L**  
Typical Blocking Voltage Distribution  
(N=50 Ambient Temperature = 25 °C)



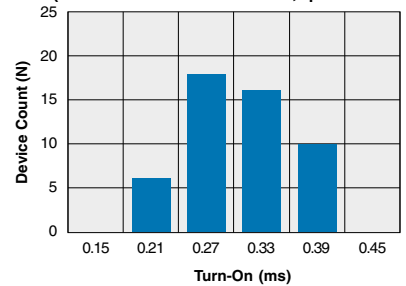
**PLA110L**  
Typical  $I_F$  for Switch Operation  
(N=50 Ambient Temperature = 25 °C)  
(Load Current = 150mADC)



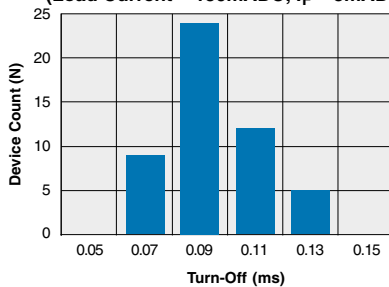
**PLA110L**  
Typical  $I_F$  for Switch Dropout  
(N=50 Ambient Temperature = 25 °C)



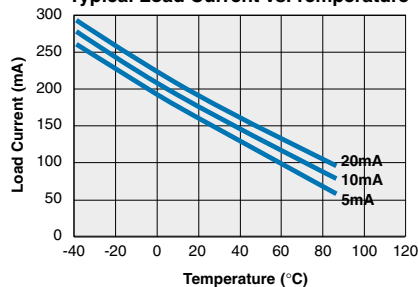
**PLA110L**  
Typical Turn-On Time  
(N=50 Ambient Temperature = 25 °C)  
(Load Current = 150mADC;  $I_F = 5\text{mADC}$ )



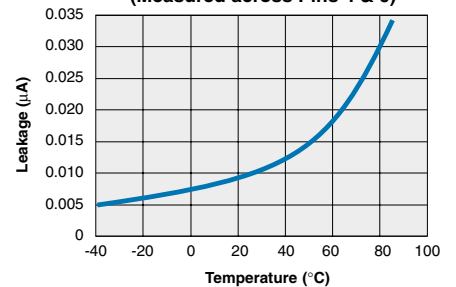
**PLA110L**  
Typical Turn-Off Time  
(N=50 Ambient Temperature = 25 °C)  
(Load Current = 150mADC;  $I_F = 5\text{mADC}$ )



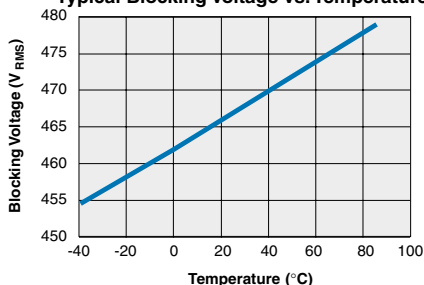
**PLA110L**  
Typical Load Current vs. Temperature



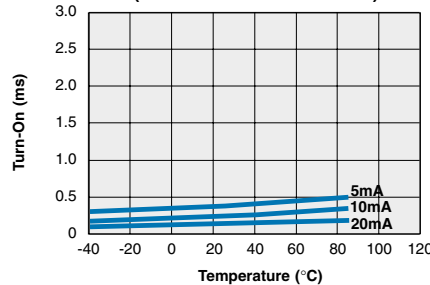
**PLA110L**  
Typical Leakage vs. Temperature  
(Measured across Pins 4 & 6)



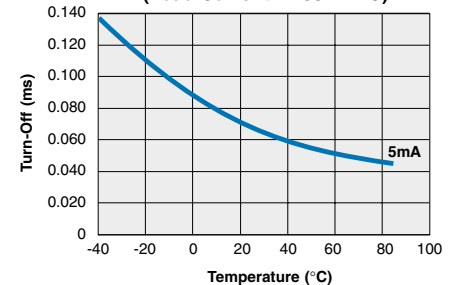
**PLA110L**  
Typical Blocking Voltage vs. Temperature



**PLA110L**  
Typical Turn-On vs. Temperature  
(Load Current = 150mADC)

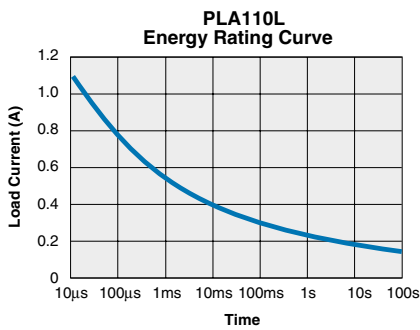
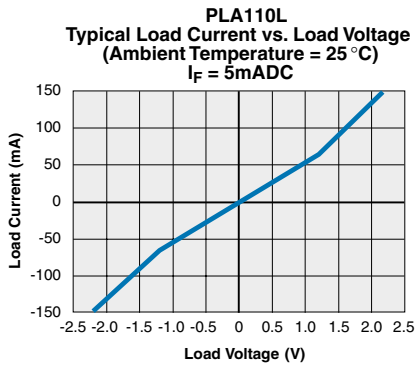
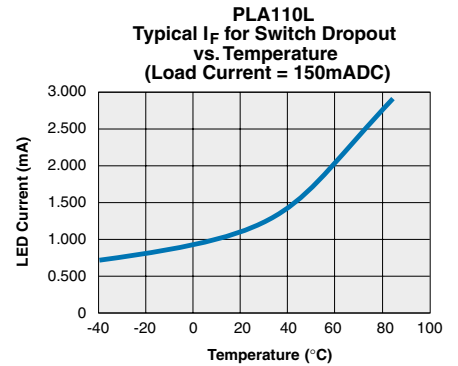
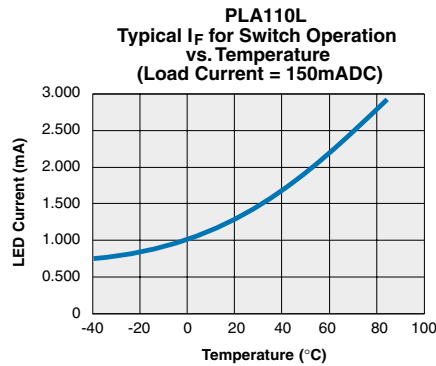
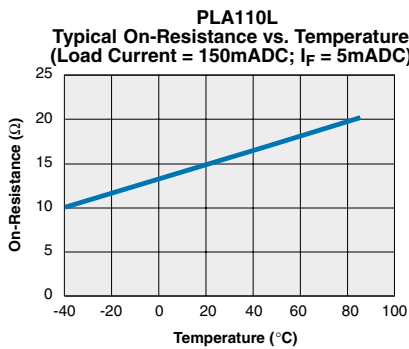
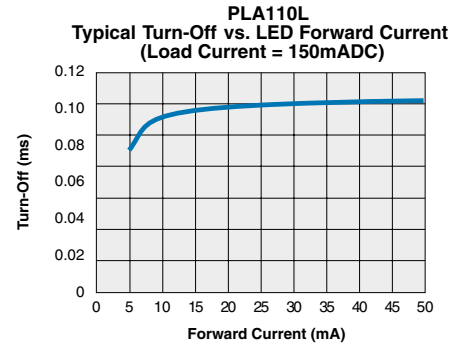
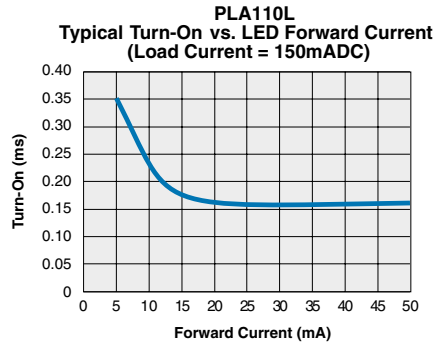
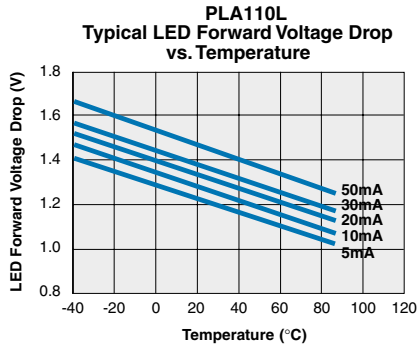


**PLA110L**  
Typical Turn-Off vs. Temperature  
(Load Current = 150mADC)



\*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.

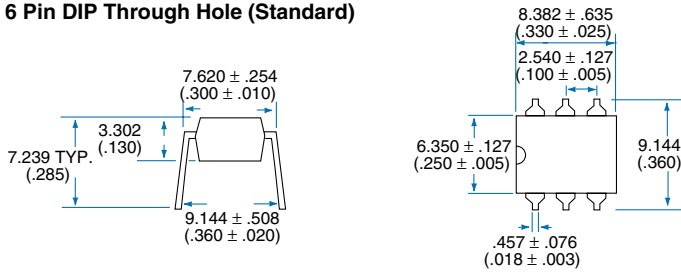
PERFORMANCE DATA\*



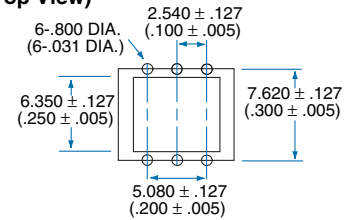
\*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

MECHANICAL DIMENSIONS

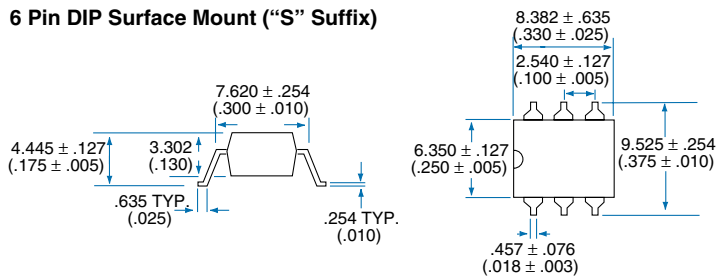
6 Pin DIP Through Hole (Standard)



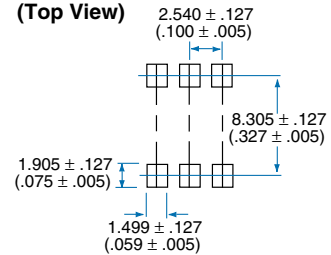
PC Board Pattern (Top View)



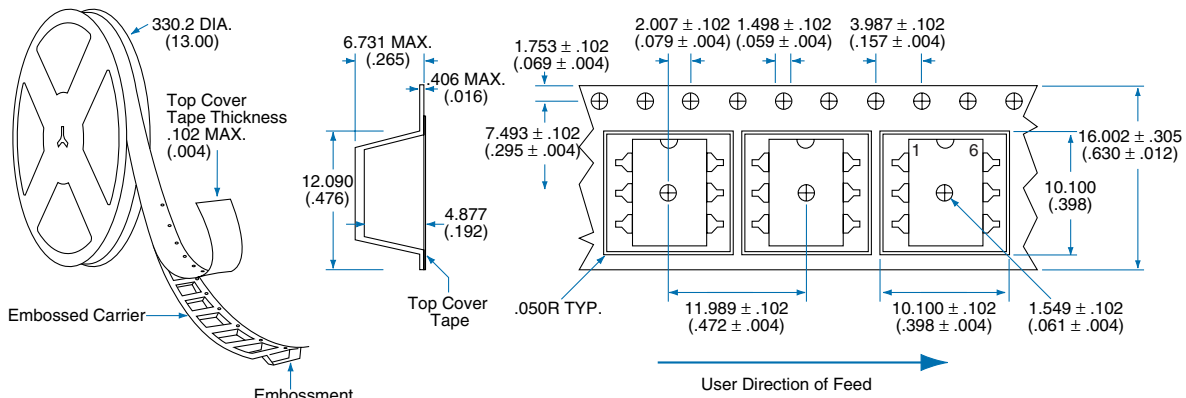
6 Pin DIP Surface Mount ("S" Suffix)



PC Board Pattern (Top View)



Tape and Reel Packaging for 6 Pin Surface Mount Package



Dimensions  
 mm  
 (inches)



# CLARE

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