LAA110L
Dual Pole OptoMOS® Relays

	LAA110L	Units
Blocking Voltage	350	V
Load Current	120	mA
Max R_{ON}	35	Ω

Features
- Small 8 Pin DIP Package
- Current Limit
- 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

Applications
- 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
LAA110L is a Dual 1 Form-A solid state relay that has two independently controlled optically coupled MOSFETs with an additional current limiting circuit. The efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS architecture to provide 3750 V_{RMS} of input to output isolation. The optically coupled inputs are controlled by highly efficient GaAlAs infrared LEDs. Dual pole OptoMOS relays provide a more compact design solution than discrete single pole relays in a variety of applications. The dual pole relays save board space by incorporating both relays in a single 8-pin package.

Approvals
- UL Recognized: File Number E76270
- CSA Certified: File Number LR 43639-10
- Certified to:
  - EN 60950
  - EN 41003
  - IEC950
  - AS/NZS3260

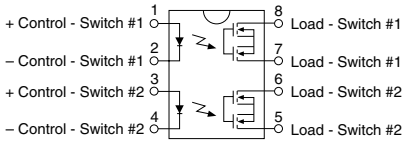
Ordering Information

Part #	Description
LAA110L	8 Pin DIP (50/Tube)
LAA110PL	8 Pin Flatpack (50/Tube)
LAA110PLTR	8 Pin Flatpack (1000/Reel)
LAA110LS	8 Pin Surface Mount (50/Tube)
LAA110LSTR	8 Pin Surface Mount (1000/Reel)

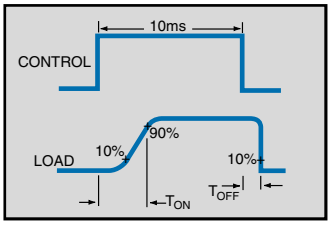
Pin Configuration

LAA110L Pinout

AC/DC Configuration



Switching Charcteristics 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
Blocking Voltage DC or AC peak	-	-	350	V
Reverse Input Voltage	-	-	5	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 (10 Seconds Max.) DIP Package	-	-	+260	°C
Flatpack/Surface Mount Package	-	-	+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.

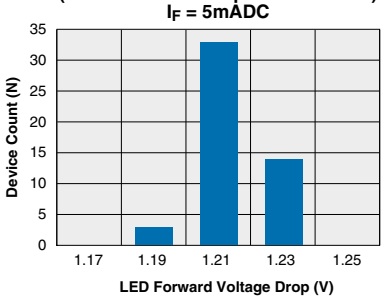
Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current (Continuous)*	-	I_L	-	-	120	mA
Peak Load Current	10ms max	I_{LPK}	-	-	350	mA
On-Resistance	I_L=120mA	R_{ON}	-	30	35	Ω
Off-State Leakage Current	V_L=350V	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}	-	-	3	ms
Output Capacitance	50V; f=1MHz	C_{OUT}	-	25	-	pF
Load Current Limiting	-	I_{CL}	130	170	210	mA
Input Characteristics @ 25°C						
Input Control Current	I_L=120mA	I_F	5	-	50	mA
Input Dropout Current	-	-	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

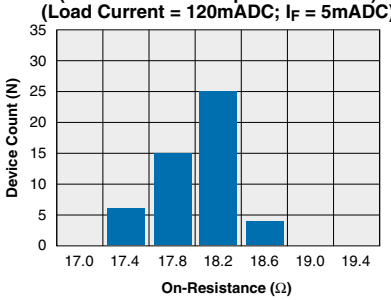
*Note: If both poles operate load current must be derated so as not to exceed the package power dissipation valve.

PERFORMANCE DATA*

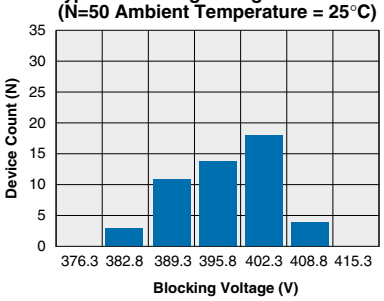
LAA110L
Typical LED Forward Voltage Drop
(N=50 Ambient Temperature = 25°C)
I_F = 5mADC



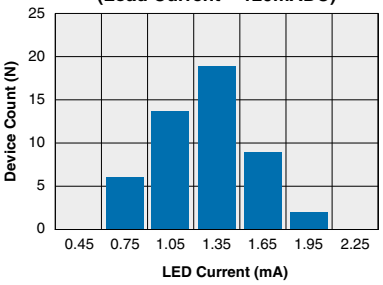
LAA110L
Typical On-Resistance Distribution
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mADC; I_F = 5mADC)



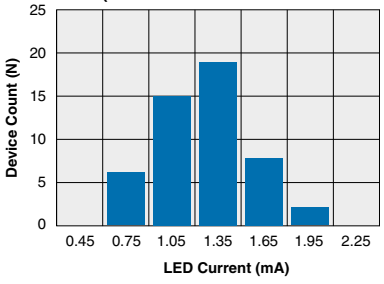
LAA110L
Typical Blocking Voltage Distribution
(N=50 Ambient Temperature = 25°C)



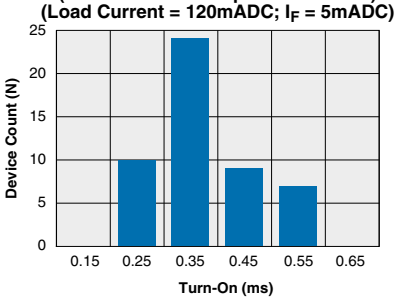
LAA110L
Typical I_F for Switch Operation
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mADC)



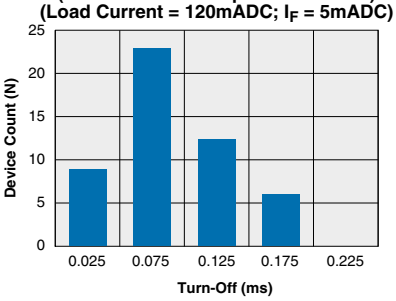
LAA110L
Typical I_F for Switch Dropout
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mADC)



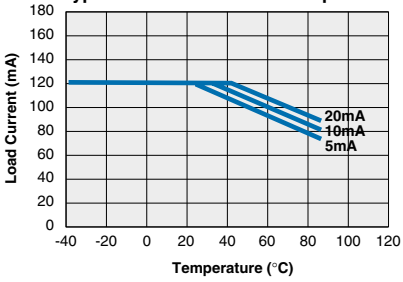
LAA110L
Typical Turn-On Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mADC; I_F = 5mADC)



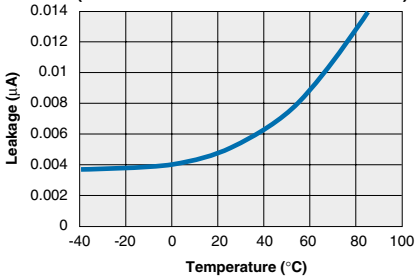
LAA110L
Typical Turn-Off Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mADC; I_F = 5mADC)



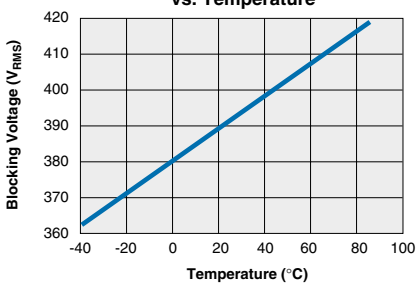
LAA110L
Typical Load Current vs. Temperature



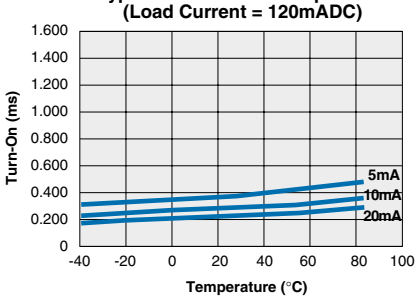
LAA110L
Typical Leakage vs. Temperature
(Measured across Pins 5 & 6 or 7 & 8)



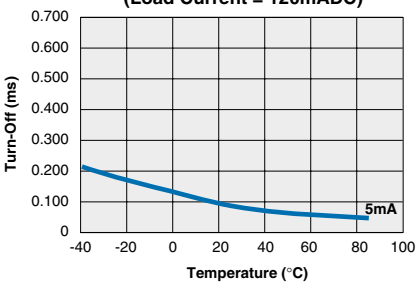
LAA110L
Typical Blocking Voltage
vs. Temperature



LAA110L
Typical Turn-On vs. Temperature
(Load Current = 120mADC)



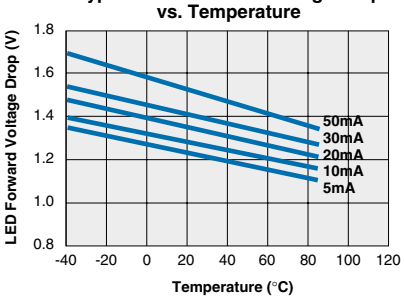
LAA110L
Typical Turn-Off vs. Temperature
(Load Current = 120mADC)



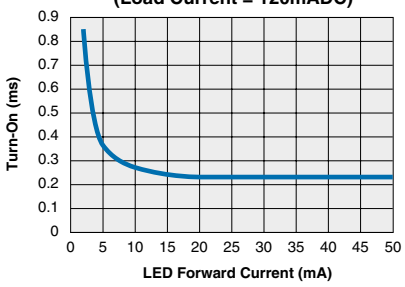
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

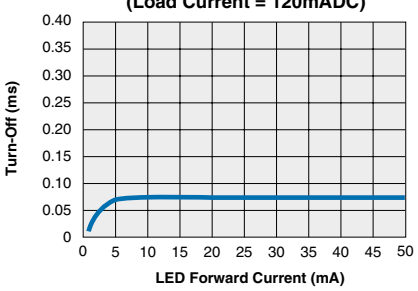
LAA110L
Typical LED Forward Voltage Drop vs. Temperature



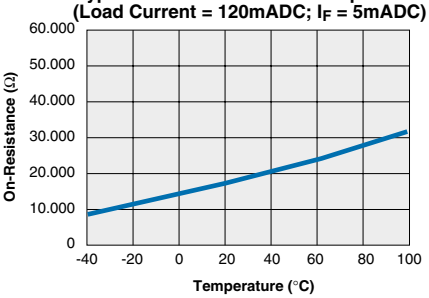
LAA110L
Typical Turn-On vs. LED Forward Current (Load Current = 120mADC)



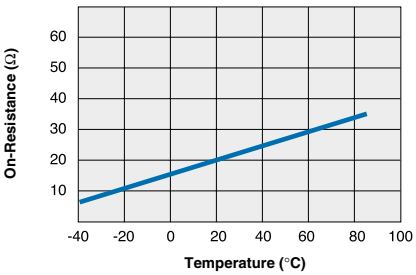
LAA110L
Typical Turn-Off vs. LED Forward Current (Load Current = 120mADC)



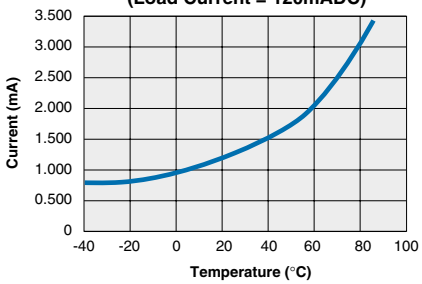
LAA110L
Typical On-Resistance vs. Temperature (Load Current = 120mADC; I_F = 5mADC)



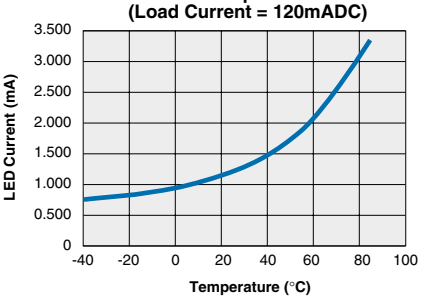
LAA110L
Typical On-Resistance vs. Temperature (Load current = 50mADC Instantaneous) (I_F = 5mADC)



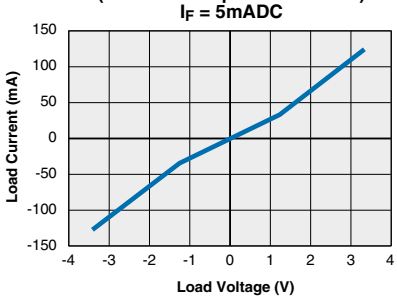
LAA110L
Typical I_F for Switch Operation vs. Temperature (Load Current = 120mADC)



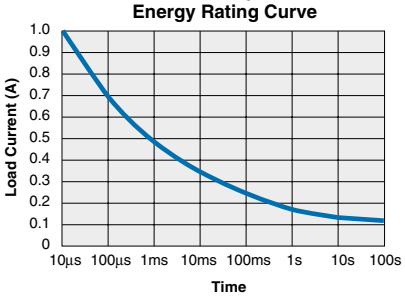
LAA110L
Typical I_F for Switch Dropout vs. Temperature (Load Current = 120mADC)



LAA110L
Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C) I_F = 5mADC



LAA110L
Energy Rating Curve



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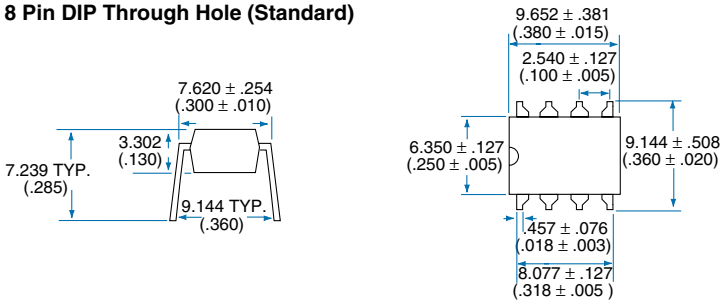
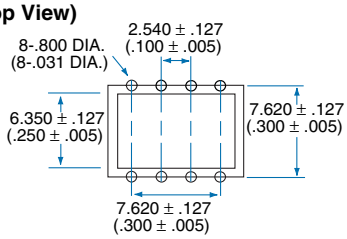
MECHANICAL DIMENSIONS

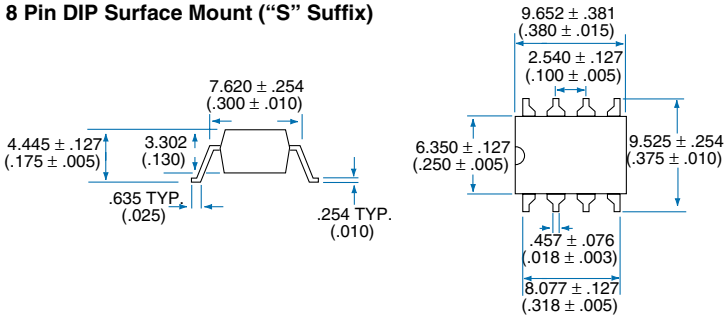
8 Pin DIP Through Hole (Standard)



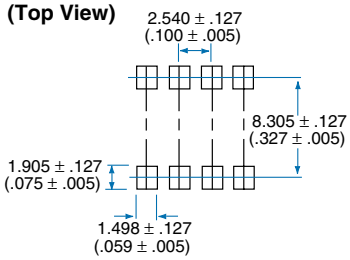
PC Board Pattern (Top View)



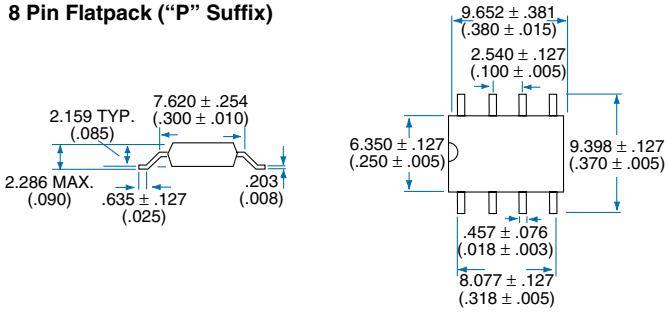
8 Pin DIP Surface Mount ("S" Suffix)



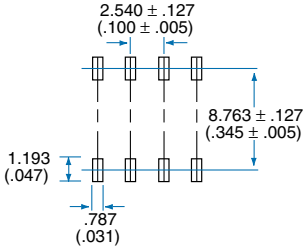
PC Board Pattern (Top View)



8 Pin Flatpack ("P" Suffix)



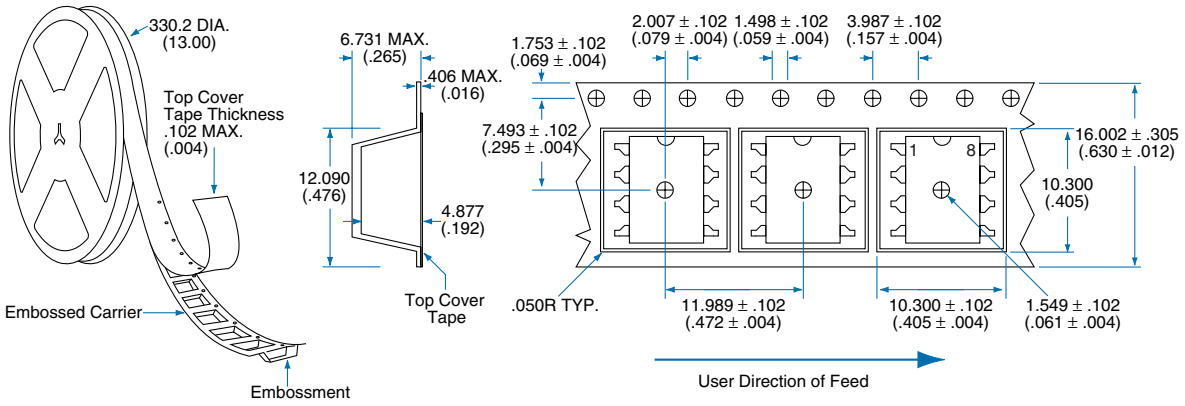
PC Board Pattern (Top View)



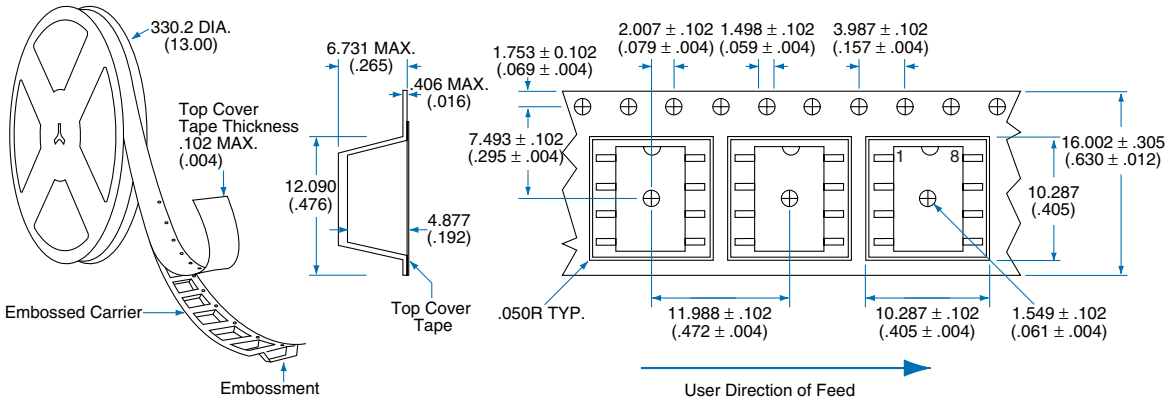
Dimensions
mm
(inches)

MECHANICAL DIMENSIONS

Tape and Reel Packaging for 8 Pin Surface Mount Package



Tape and Reel Packaging for 8 Pin Flatpack Package



Dimensions
mm
(inches)

CLARE

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

Specification: DS-LAA110L-R7.0

6/5/02