LAA110
Dual Single Pole OptoMOS® Relay

Parameter	Ratings	Units
Blocking Voltage	350	V_P
Load Current	120	mA
Max R_{ON}	35	Ω

Features
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Arc-Free With No Snubbing Circuits
- 3750V_{rms} Input/Output Isolation
- FCC Compatible
- VDE Compatible
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Surface Mount Tape & Reel Packages Available

Applications
- 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

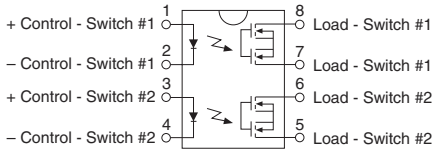
Description
LAA110 is a Dual 1-Form-A Solid State Relay that has two independently controlled optically coupled MOSFET switches. The MOSFET switches and photovoltaic die use Clare's patented OptoMOS® architecture to provide 3750 V_{rms} of input to output isolation. The optically coupled output is controlled by a highly efficient GaAlAs infrared LED. This dual pole OptoMOS relay provides a more compact design solution than discrete single-pole relays in a variety of applications and saves board space by incorporating both switches in a single 8-Pin package.

Approvals
- UL Recognized: File Number E76270
- CSA Certified: File Number LR 43639-10
- EN/IEC 60950-1:2001 Compliant

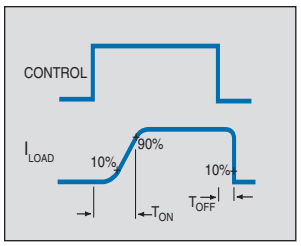
Ordering Information

Part #	Description
LAA110	8-Pin DIP (50/Tube)
LAA110S	8-Pin Surface Mount (50/Tube)
LAA110STR	8-Pin Surface Mount (1,000/Reel)
LAA110P	8-Pin Flat Pack (50/Tube)
LAA110PTR	8-Pin Flat Pack (1,000/Reel)

Pin Configuration



Switching Characteristics of Normally Open (Form A) Devices



Absolute Maximum Ratings

Parameter	Ratings	Units
Blocking Voltage	350	V_P
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.

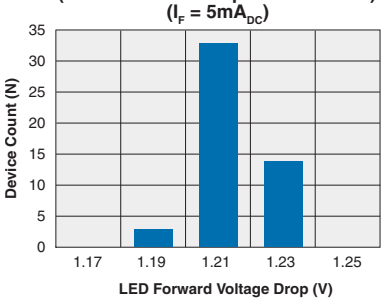
Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics @ 25°C						
Load Current, Continuous [1]	-	I_L	-	-	120	mA
Peak Load Current	t=10ms	I_{LPK}	-	-	350	mA
On-Resistance	I_L=120mA	R_{ON}	-	25	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
Input Characteristics @ 25°C						
Input Control Current	I_L=120mA	I_F	-	-	5	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 Current	V_R=5V	I_R	-	-	10	µA
Common Characteristics @ 25°C						
Input to Output Capacitance	-	$C_{I/O}$	-	3	-	pF

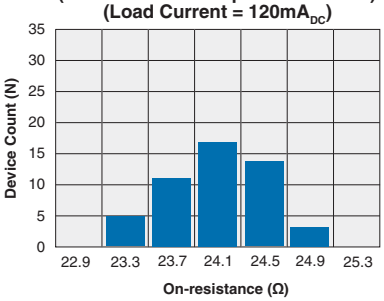
[1] If both poles operate the load current must be derated so as not to exceed the package power dissipation value.

PERFORMANCE DATA*

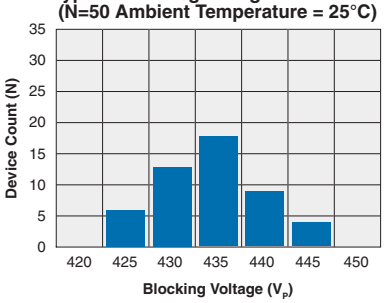
LAA110
Typical LED Forward Voltage Drop
(N=50 Ambient Temperature = 25°C)
(I_F = 5mA$_{DC}$)



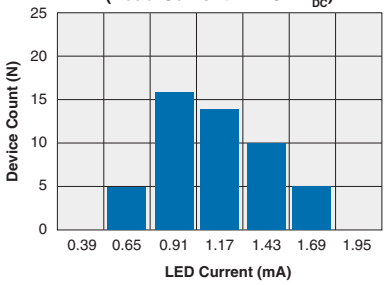
LAA110
Typical On-resistance Distribution
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mA$_{DC}$)



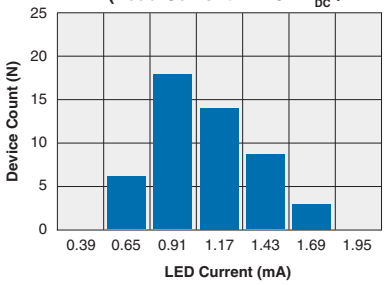
LAA110
Typical Blocking Voltage Distribution
(N=50 Ambient Temperature = 25°C)



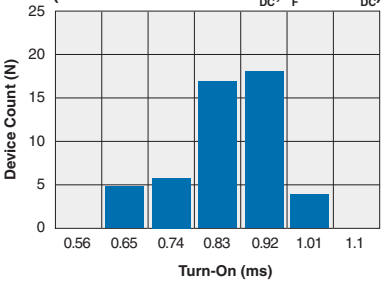
LAA110
Typical I_F for Switch Operation
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mA$_{DC}$)



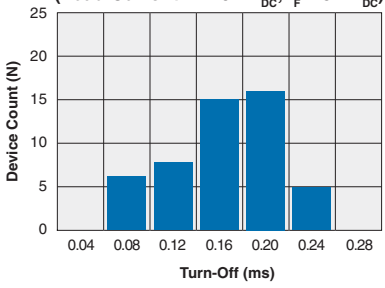
LAA110
Typical I_F for Switch Dropout
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mA$_{DC}$)



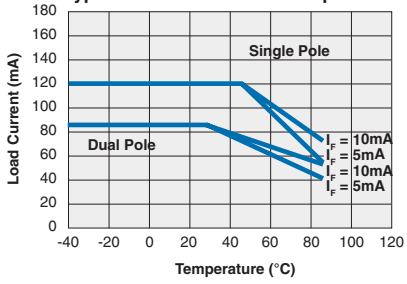
LAA110
Typical Turn-On Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mA$_{DC}$; I_F = 5mA$_{DC}$)



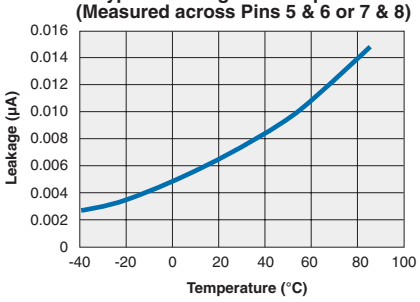
LAA110
Typical Turn-Off Time
(N=50 Ambient Temperature = 25°C)
(Load Current = 120mA$_{DC}$; I_F = 5mA$_{DC}$)



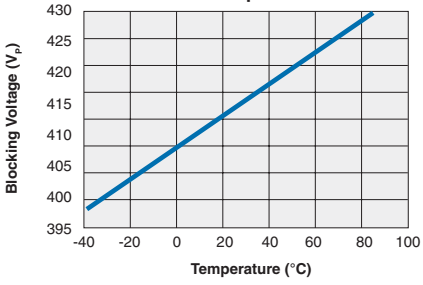
LAA110
Typical Load Current vs. Temperature



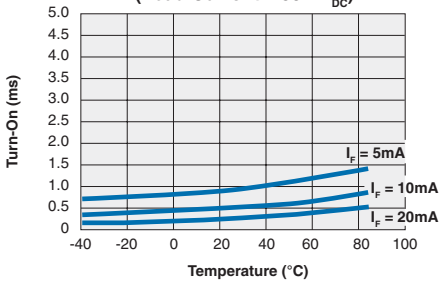
LAA110
Typical Leakage vs. Temperature
(Measured across Pins 5 & 6 or 7 & 8)



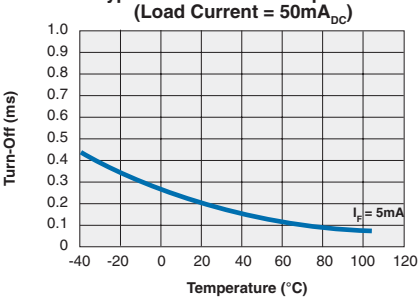
LAA110
Typical Blocking Voltage
vs. Temperature



LAA110
Typical Turn-On vs. Temperature
(Load Current = 50mA$_{DC}$)



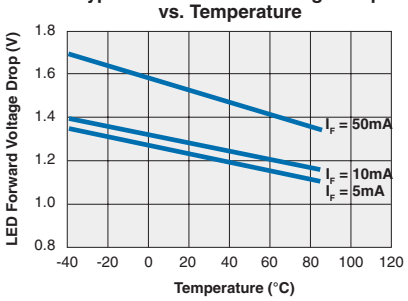
LAA110
Typical Turn-Off vs. Temperature
(Load Current = 50mA$_{DC}$)



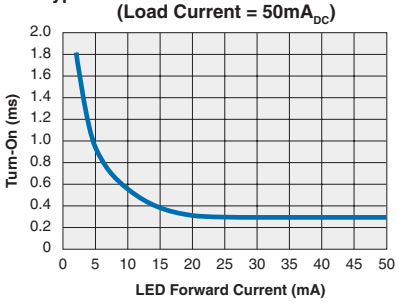
*The Performance data shown in the graphs above is typical of device performance. For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

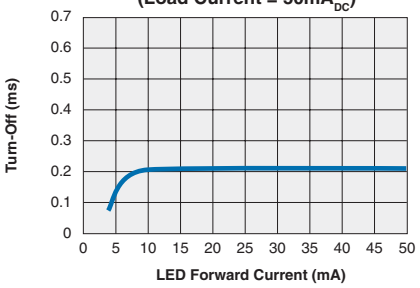
LAA110
Typical LED Forward Voltage Drop vs. Temperature



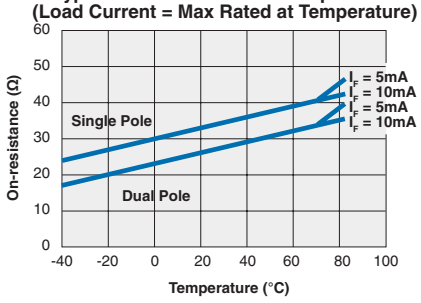
LAA110
Typical Turn-On vs. LED Forward Current (Load Current = 50mA$_{DC}$)



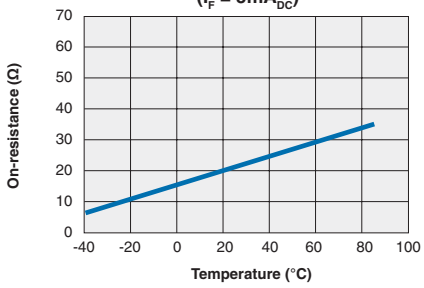
LAA110
Typical Turn-Off vs. LED Forward Current (Load Current = 50mA$_{DC}$)



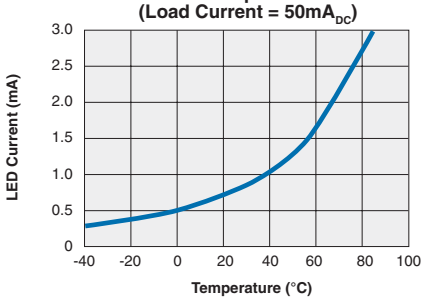
LAA110
Typical On-resistance vs. Temperature (Load Current = Max Rated at Temperature)



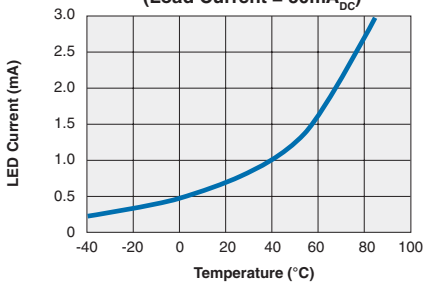
LAA110
Typical On-resistance vs. Temperature (Load current = 50mA$_{DC}$ Instantaneous) (I_F = 5mA$_{DC}$)



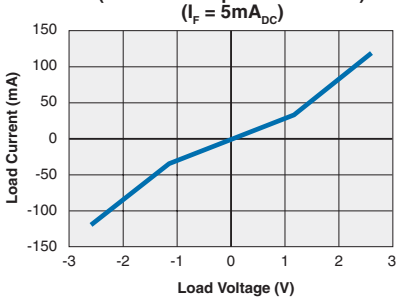
LAA110
Typical I_F for Switch Operation vs. Temperature (Load Current = 50mA$_{DC}$)



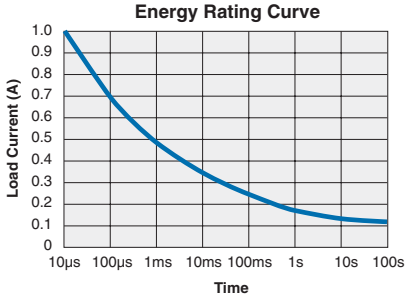
LAA110
Typical I_F for Switch Dropout vs. Temperature (Load Current = 50mA$_{DC}$)



LAA110
Typical Load Current vs. Load Voltage (Ambient Temperature = 25°C) (I_F = 5mA$_{DC}$)



LAA110
Energy Rating Curve



*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.

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.

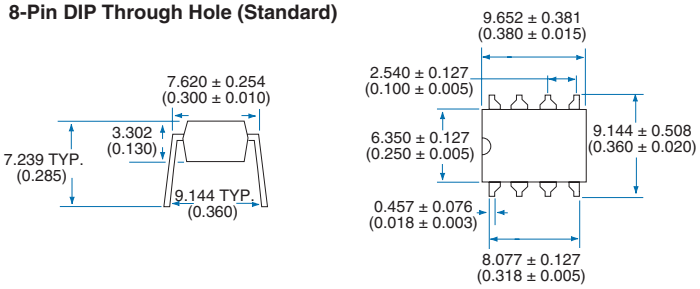
Recommended soldering processes are limited to 260ºC component body temperature for 10 seconds.

Washing

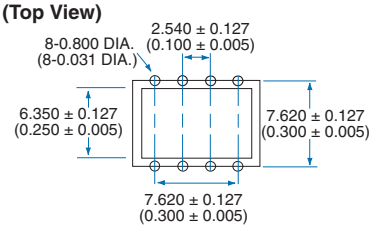
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

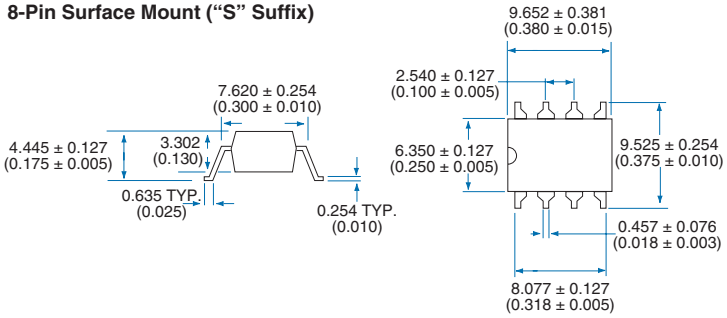
8-Pin DIP Through Hole (Standard)



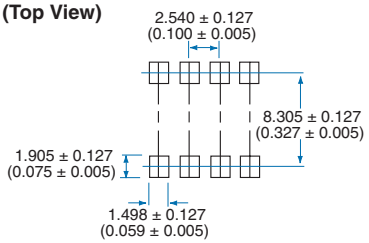
PC Board Pattern
(Top View)



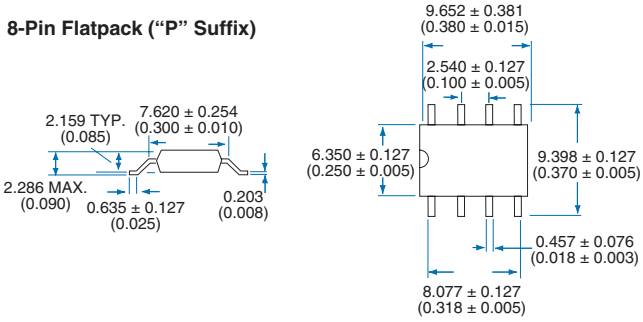
8-Pin Surface Mount ("S" Suffix)



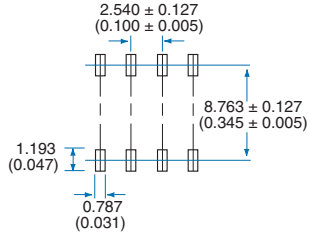
PC Board Pattern
(Top View)



8-Pin Flatpack ("P" Suffix)



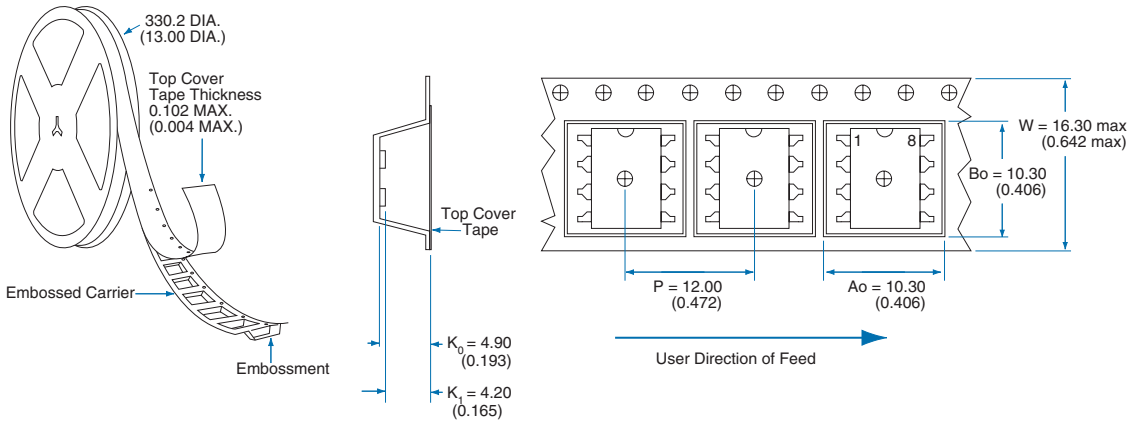
PC Board Pattern
(Top View)



Dimensions
mm
(inches)

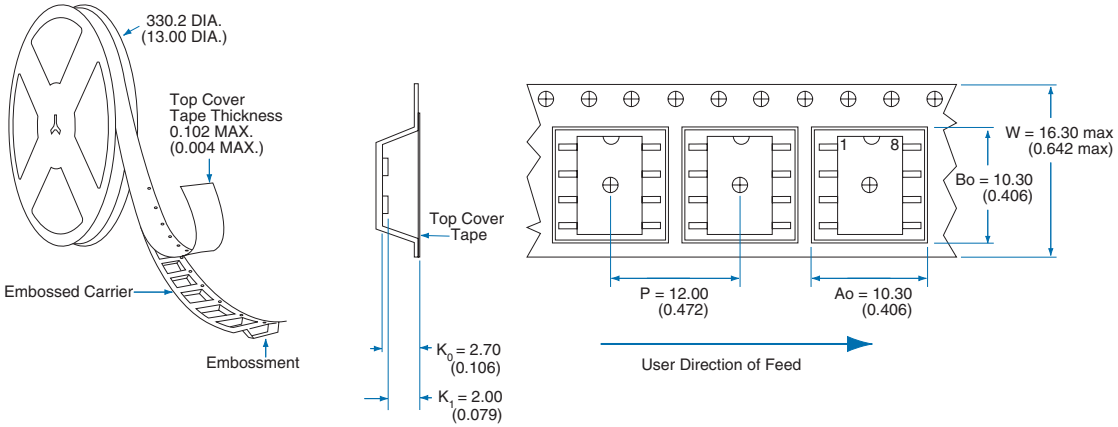
MECHANICAL DIMENSIONS

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)

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10/20/06