CLARE
An IXYS Company

Optically Isolated Solid State Relays

The OptoMOS® line of solid state relays uses discrete semiconductor components and the patented OptoMOS architecture to deliver fast, reliable, bounce-free switching in a compact design. From the world's smallest single-pole, 4-pin relay to multi-pole and multi-function devices, OptoMOS products are an ideal solid state replacement for larger reed and electro-mechanical relays. Compared to these old electromagnetic technologies, the Clare OptoMOS relays offer significantly lower drive current, small package size, no susceptibility to magnetic interaction and solid-state reliability. All of these are key requirements for the design of today's complex low-power, multi-channel products.

The small 4-pin SOP relays combine our state-of-the-art, double-molded, vertical-construction packaging with high performance to give you a reliable product with 20% savings in board space compared to other 4-pin products. The dual pole OptoMOS relays combine two independent relays into a single 8-pin package paving the way for designers to condense more functionality into a single component. And, the common input OptoMOS relays provide a design alternative where two independent outputs are driven by the same input signal.

Features:
- Low drive current
- High reliability
- Optically isolated I/O
- No EMI/RFI generation
- Arc-free with no snubbing circuits
- Machine insertable/ wave solderable
- AC/DC switching
- Current limiting (part numbers ending with L)
- FCC compatible

Applications:
- Telecommunications/ Datacommunications
- Instrumentation
  - Multiplexers
  - Data acquisition
  - Electronic switching
  - I/O subsystems
  - Meters (watt-hour, water, gas)
- Medical equipment (patient/equipment isolation)
- Security
- Aerospace

Application Notes

Optically Isolated Solid State Relays

Operational temperature range of -40° to 85° C

1-Form-A | 2-Form-A | 1-Form-2A | 1-Form-C
1-Form-B | 2-Form-B | Combination Form A & B

Product Part Number	Load Voltage (V)	Current Handling (mA)	On Resistance (Ohms)	Isolation Voltage (Vrms)	Input Control Current (mA)	Off State Leakage (uA)	Switching Speeds TON/TOFF (ms)	Standard Package [1]	Optional Packaging [1] Surface Mount "S" Suffix	Flat Pack "P" Suffix
Single Pole Normally Open: 1-Form-A										
CPC1008N	100	150	8	1500	2	1	2/0.5	4 Pin SOP		
CPC1016N	100	100	16	1500	2	1	2/0.5	4 Pin SOP		
CPC1017N	60	100	16	1500	1	1	10/10	4 Pin SOP		
CPC1018N	60	600	0.8	1500	1	1	3/2	4 Pin SOP		
CPC1025N	400	120	30	1500	2	1	2/1	4 Pin SOP		
CPC1030N	350	120	30	1500	2	1	2/1	4 Pin SOP		
CPC1035N	350	100	35	1500	2	1	2/1	4 Pin SOP		
CPC1225N	400	120	30	1500	2	1	2/1	4 Pin SOP		
CPC1230N	350	120	30	1500	2	1	2/1	4 Pin SOP		
CPC1330	350	120	30	5000	2	1	2/1	4 Pin DIP		
CPC1390	400	140	22	5000	2	1	1/0.5	4 Pin DIP		
CPC1393	600	90	50	5000	2	1	5/5	4 Pin DIP		
CPC1510	250	200	15	3750	5	1	2/2	6 Pin DIP		1
LCA100	350	120	25	3750	5	1	5/5	6 Pin DIP		1
LCA100L*	350	120	25	3750	5	1	5/5	6 Pin DIP		1
LCA110	350	120	35	3750	2	1	3/3	6 Pin DIP		1
LCA110L*	350	120	35	3750	2	1	3/3	6 Pin DIP		1
LCA120	250	170	20	3750	5	1	5/5	6 Pin DIP		1
LCA120L*	250	150	20	3750	5	1	3/3	6 Pin DIP		1
LCA125	350	170	16	3750	5	1	5/5	6 Pin DIP		1
LCA125L*	350	170	20	3750	5	1	5/5	6 Pin DIP		1
LCA126	250	170	15	3750	5	1	5/5	6 Pin DIP		1

LCA110
Single Pole OptoMOS® Relays

Parameter	Rating	Units
Blocking Voltage	350	V_P
Load Current	120	mA
Max On-resistance	35	Ω

Features
- 100% Solid State
- Small 6-Pin Package
- Low Drive Power Requirements (TTL/CMOS Compatible)
- High Reliability
- Arc-Free With No Snubbing Circuits
- $3750V_{rms}$ Input/Output Isolation
- No EMI/RFI Generation
- Machine Insertable, Wave Solderable
- Surface Mount Tape & Reel Version Available
- Flammability classification rating of V-0

Applications
- Instrumentation
  - Multiplexers
  - Data Acquisition
  - Electronic Switching
  - I/O Subsystems
  - Meters (Watt-Hour, Water, Gas)
- Medical Equipment—Patient/Equipment Isolation
- Security
- Aerospace
- Industrial Controls

Description
The LCA110 is a 1-Form-A Solid State Relay which uses optically coupled MOSFET technology to provide $3750V_{rms}$ of input to output isolation. The efficient MOSFET switches and photovoltaic die use Clare's patented OptoMOS® architecture. The optically coupled output is controlled by a highly efficient GaAIAs infrared LED. The LCA110 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 though hole package.

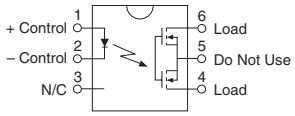
Approvals
- UL Recognized: File Number E76270
- CSA Certified: File Number LR 43639-10
- EN/IEC 60950-1:2001 Compliant

Ordering Information

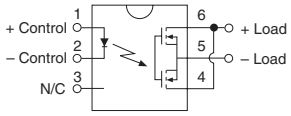
Part Number	Description
LCA110	6-Pin DIP (50/Tube)
LCA110S	6-Pin Surface Mount (50/Tube)
LCA110STR	6-Pin Surface Mount (1,000/Reel)

Pin Configuration

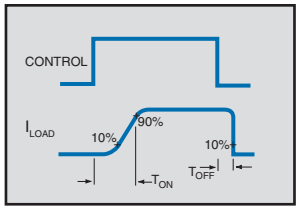
AC/DC Configuration



DC Only Configuration



Switching Characteristics of Normally Open (Form A) Devices



RoHS 2002/95/EC

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)						
AC/DC Configuration	-	I_L	-	-	120	mA
DC Configuration			-	-	200	
Peak Load Current	t=10ms	I_{LPK}	-	-	350	mA
On-resistance						
AC/DC Configuration	I_L=120mA	R_{ON}	-	23	35	Ω
DC Configuration	I_L=200mA		-	7	10	
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		T_{OFF}				
Output Capacitance	50V; f=1MHz	C_{OUT}	-	25	-	pF
Input Characteristics @ 25°C						
Input Control Current	I_L=120mA	I_F	-	-	2	mA
Input Dropout Current	-	I_F	0.4	-	-	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

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.

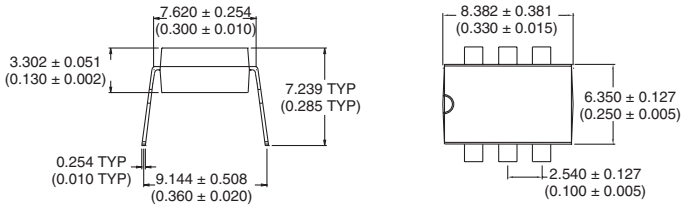
Recommended soldering processes are limited to 260ºC component body temperature for 10 seconds.

Washing

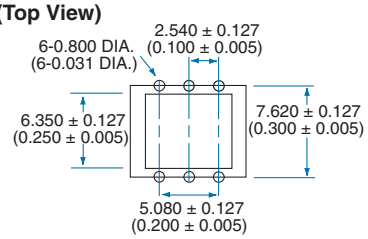
Clare does not recommend ultrasonic cleaning or the use of chlorinated solvents.

MECHANICAL DIMENSIONS

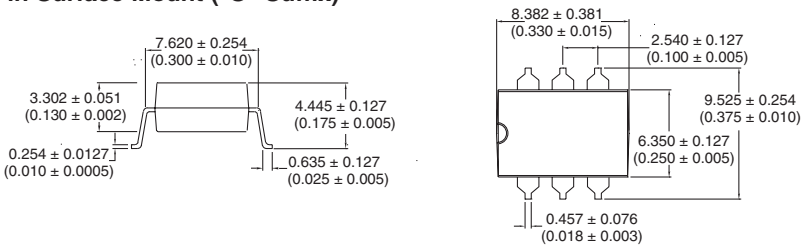
6-Pin DIP Through Hole (Standard)



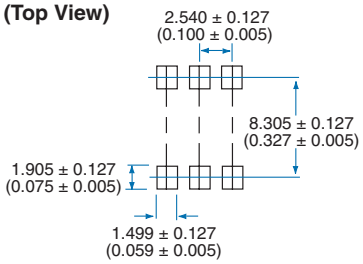
PC Board Pattern (Top View)



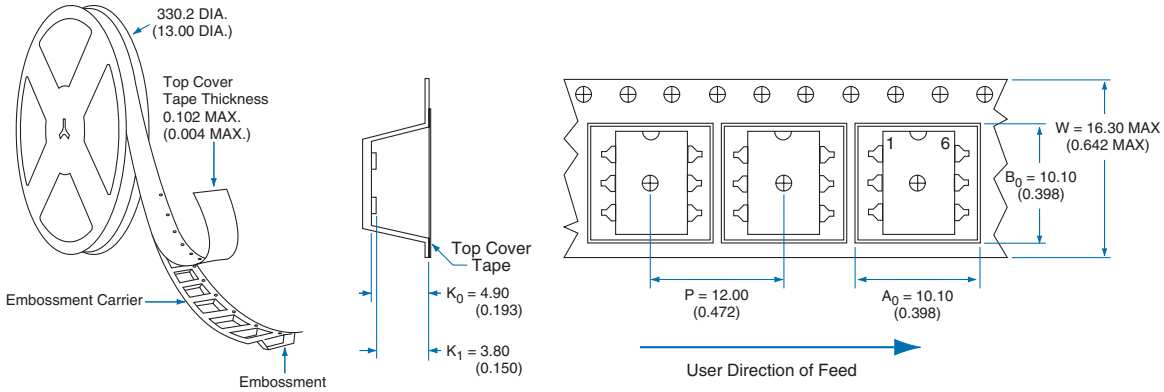
6-Pin Surface Mount ("S" Suffix)



PC Board Pattern (Top View)



Tape and Reel Packaging for Surface Mount Package



Dimensions:
mm
(inches)