

## 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**  
**1-Form-B**

**2-Form-A**  
**2-Form-B**

**1-Form-2A**  
**1-Form-C**  
**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 <sup>1</sup>	Optional Packaging <sup>1</sup> Surface Mount "S" Suffix	Optional Packaging <sup>1</sup> Flat Pack "P" Suffix
<b>Single Pole Normally Open: 1-Form-A</b>										
<a href="#">CPC1008N</a>	100	150	8	1500	2	1	2/0.5	4 Pin SOP		
<a href="#">CPC1016N</a>	100	100	16	1500	2	1	2/0.5	4 Pin SOP		
<a href="#">CPC1017N</a>	60	100	16	1500	1	1	10/10	4 Pin SOP		
<a href="#">CPC1018N</a>	60	600	0.8	1500	1	1	3/2	4 Pin SOP		
<a href="#">CPC1025N</a>	400	120	30	1500	2	1	2/1	4 Pin SOP		
<a href="#">CPC1030N</a>	350	120	30	1500	2	1	2/1	4 Pin SOP		
<a href="#">CPC1035N</a>	350	100	35	1500	2	1	2/1	4 Pin SOP		
<a href="#">CPC1225N</a>	400	120	30	1500	2	1	2/1	4 Pin SOP		
<a href="#">CPC1230N</a>	350	120	30	1500	2	1	2/1	4 Pin SOP		
<a href="#">CPC1330</a>	350	120	30	5000	2	1	2/1	4 Pin DIP		
<a href="#">CPC1390</a>	400	140	22	5000	2	1	1/0.5	4 Pin DIP		
<a href="#">CPC1393</a>	600	90	50	5000	2	1	5/5	4 Pin DIP		
<a href="#">CPC1510</a>	250	200	15	3750	5	1	2/2	6 Pin DIP	1	
<a href="#">LCA100</a>	350	120	25	3750	5	1	5/5	6 Pin DIP	1	
<a href="#">LCA100L*</a>	350	120	25	3750	5	1	5/5	6 Pin DIP	1	
<a href="#">LCA110</a>	350	120	35	3750	2	1	3/3	6 Pin DIP	1	
<a href="#">LCA110L*</a>	350	120	35	3750	2	1	3/3	6 Pin DIP	1	
<a href="#">LCA120</a>	250	170	20	3750	5	1	5/5	6 Pin DIP	1	
<a href="#">LCA120L*</a>	250	150	20	3750	5	1	3/3	6 Pin DIP	1	
<a href="#">LCA125</a>	350	170	16	3750	5	1	5/5	6 Pin DIP	1	
<a href="#">LCA125L*</a>	350	170	20	3750	5	1	5/5	6 Pin DIP	1	
<a href="#">LCA126</a>	250	170	15	3750	5	1	5/5	6 Pin DIP	1	

<a href="#">LCA127</a>	250	200	10	3750	5	1	5/5	6 Pin DIP	1
<a href="#">LCA127L*</a>	250	170	15	3750	5	1	5/5	6 Pin DIP	1
<a href="#">LCA129</a>	250	170	20	3750	2	1	8/8	6 Pin DIP	1
<a href="#">LCA710</a>	60	1000	0.5	3750	10	1	2.5/0.25	6 Pin DIP	1
<a href="#">LCA712</a>	60	1000	0.5	3750	10	0.01	2.5/0.25	6 Pin DIP	1
<a href="#">LCA715</a>	60	1800	0.25	3750	10	1	2.5/0.25	6 Pin DIP	1
<a href="#">LCA182</a>	350	120	35	3750	0.25	1	3/3	6 Pin DIP	1
<a href="#">OMA160</a>	250	50	100	3750	10	0.025	0.125/0.125	6 Pin DIP	1
<a href="#">PLA110</a>	400	150	22	3750	5	1	1/0.25	6 Pin DIP	1
<a href="#">PLA110L*</a>	400	150	25	3750	5	1	1/0.25	6 Pin DIP	1
<a href="#">PLA132</a>	50	600	1	3750	5	1	5/2	6 Pin DIP	1
<a href="#">PLA134</a>	100	350	3	3750	5	1	5/5	6 Pin DIP	1
<a href="#">PLA140</a>	400	250	8	3750	5	1	3/1	6 Pin DIP	1
<a href="#">PLA140L*</a>	400	170	13	3750	5	1	5/3	6 Pin DIP	1
<a href="#">PLA143</a>	600	100	50	4000	2	1	5/5	6 Pin DIP	1
<a href="#">PLA150</a>	250	250	7	3750	5	1	2.5/0.5	6 Pin DIP	1
<a href="#">PLA160</a>	300	50	100	3750	10	0.025	0.05/0.05	6 Pin DIP	1
<a href="#">PLA170</a>	800	100	50	3750	5	1	5/5	6 Pin DIP	1
<a href="#">PLA190</a>	400	150	22	5000	5	1	1/0.25	6 Pin DIP	1
<a href="#">PLA191</a>	400	250	8	5000	5	1	1.5/0.25	6 Pin DIP	1
<a href="#">PLA192</a>	600	150	22	5000	5	1	5/5	6 Pin DIP	1
<a href="#">PLA193</a>	600	100	50	5000	5	1	5/5	6 Pin DIP	1
<a href="#">XCA170</a>	350	100	50	3750	5	1	5/5	6 Pin DIP	1

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 <sup>1</sup>	Optional Packaging <sup>1</sup>	
									Surface Mount "S" Suffix	Flat Pack "P" Suffix

#### Single Pole Normally Open: 1-Form-A DC ONLY

<a href="#">CPC1002N</a>	60	700	0.55	1500	2	1	5/2	4 Pin DIP	1
<a href="#">CPC1004N</a>	100	300	4	1500	2	1	3/1	4 Pin SOP	

Product Part Number	Load Voltage (V)	Current Handling (mA)	On Resistance (Ohms)	Isolation Voltage (Vrms)	Input Control Voltage (V)	Off State Leakage (uA)	Switching Speeds TON/TOFF (ms)	Standard Package <sup>1</sup>	Optional Packaging <sup>1</sup>	
									Surface Mount "S" Suffix	Flat Pack "P" Suffix

#### Single Pole Normally Open: 1-Form-A Voltage-Controlled

<a href="#">CPC1217</a>	60	200	16	2500	5 - 12	1	5/5	4 Pin SIP	
<a href="#">CPC1218</a>	60	600	1.1	2500	5 - 12	1	5/5	4 Pin SIP	

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 <sup>1</sup>	Optional Packaging <sup>1</sup>	
									Surface Mount "S" Suffix	Flat Pack "P" Suffix

#### Single Pole Normally Closed: 1-Form-B

<a href="#">CPC1117N</a>	60	150	16	1500	1	1	1/2	4 Pin SOP	
<a href="#">CPC1130N</a>	350	120	30	1500	2	5	2/2	4 Pin SOP	
<a href="#">CPC1135N</a>	350	120	35	1500	1	5	2/2	4 Pin SOP	
<a href="#">CPC1150N</a>	350	120	50	1500	2	5	1/2	4 Pin SOP	
<a href="#">CPC1231N</a>	350	120	30	1500	2	5	2/2	4 Pin SOP	
<a href="#">LCB110</a>	350	120	35	3750	5	1	3/3	6 Pin DIP	1



	LCA710	Units
Blocking Voltage	60	V <sub>p</sub>
Load Current	1	A
Max R <sub>ON</sub>	0.5	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
- 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

### Description

LCA710 is a 60V, 1A, 0.5Ω 1-Form-A relay. It features a high peak load current capability of up to 1 Amp.

### Approvals

- UL Recognized: File Number E76270
- CSA Certified: File Number LR 43639-10
- Certified to:
  - EN 60950
  - EN 41003

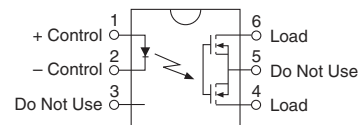
### Ordering Information

Part #	Description
LCA710	6 Pin DIP (50/Tube)
LCA710R	6 Pin Low-Profile Surface Mount (50/Tube)
LCA710RTR	6 Pin Low-Profile Surface Mount (1000/Reel)
LCA710S	6 Pin Surface Mount (50/Tube)
LCA710STR	6 Pin Surface Mount (1000/Reel)

### Pin Configuration

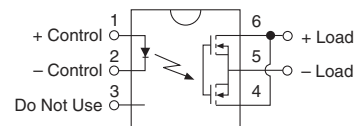
#### LCA710 Pinout

AC/DC Configuration

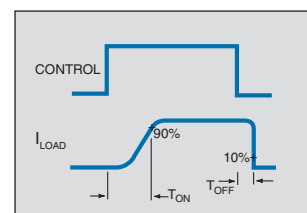


#### LCA710 Pinout

DC Only Configuration



### Switching Characteristics of Normally Open (Form A) Devices



### Absolute Maximum Ratings (@ 25°C)

Parameter	Ratings	Units
Blocking Voltage	60	V <sub>P</sub>
Reverse Input Voltage	5	V
Input Control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation <sup>1</sup>	150	mW
Total Power Dissipation <sup>2</sup>	800	mW
Isolation Voltage Input to Output	3750	V <sub>rms</sub>
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°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 conditions beyond those indicated in the operational sections of this data sheet is not implied.*

### Electrical Characteristics

Parameter	Conditions	Symbol	Min	Typ	Max	Units
<b>Output Characteristics @ 25°C</b>						
Load Current						
AC/DC Configuration	Continuous	I <sub>L</sub>	-	-	1.0	A
DC Configuration					1.8	
Peak Load Current	10ms	I <sub>LPK</sub>	-	-	5.0	A
On-Resistance						
AC/DC Configuration	I <sub>L</sub> =1A	R <sub>ON</sub>	-	0.3	0.5	Ω
DC Configuration	I <sub>L</sub> =1.8A			0.1	0.15	
Off-State Leakage Current	V <sub>L</sub> =60V	I <sub>LEAK</sub>	-	-	1	μA
Switching Speeds						
Turn-On	I <sub>F</sub> =10mA, V <sub>L</sub> =10V	T <sub>ON</sub>	-	-	2.5	ms
Turn-Off	I <sub>F</sub> =10mA, V <sub>L</sub> =10V	T <sub>OFF</sub>			0.25	
Output Capacitance	0V; f=1MHz	-	-	105	-	pF
<b>Input Characteristics @ 25°C</b>						
Input Control Current	I <sub>L</sub> =1A	I <sub>F</sub>	-	-	10	mA
Input Dropout Current	-	I <sub>F</sub>	0.4	0.7	-	mA
Input Voltage Drop	I <sub>F</sub> =10mA	V <sub>F</sub>	0.9	1.2	1.4	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

**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.

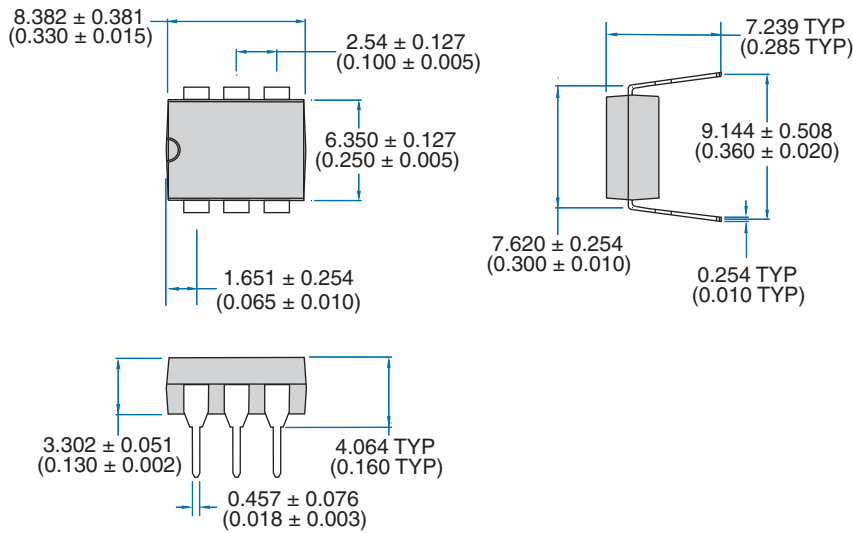
**Washing**

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

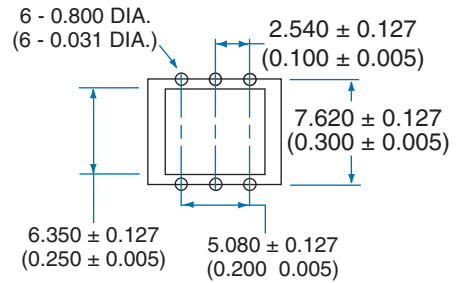


**MECHANICAL DIMENSIONS**

**6-Pin DIP Thru-Hole Package**

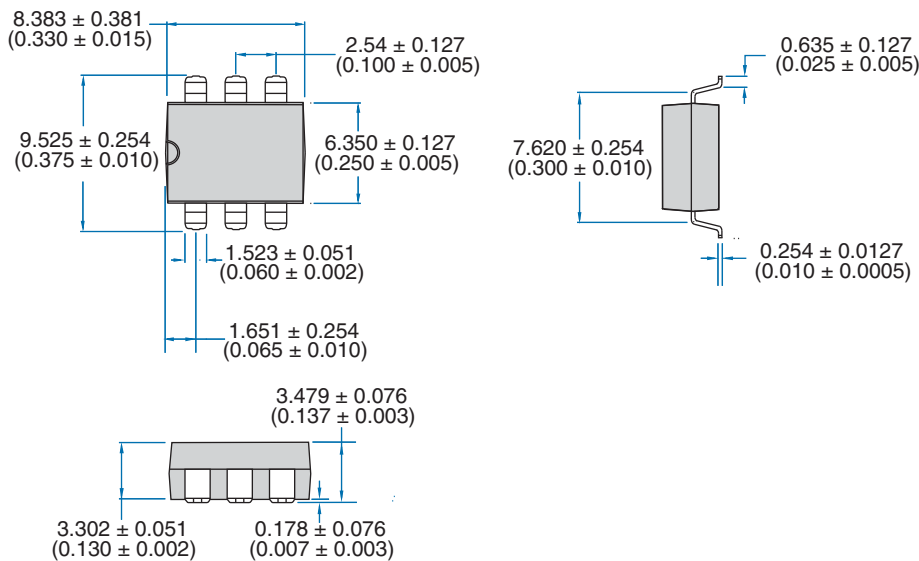


**PC Board Pattern**

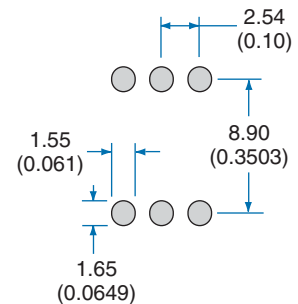


Dimensions  
mm  
(inches)

**6-Pin Surface Mount Low Profile Package ("R" Suffix)**

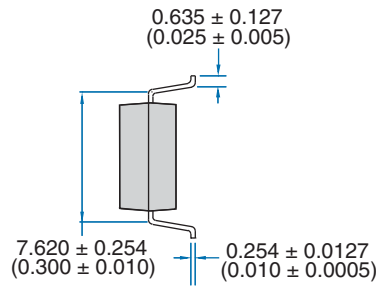
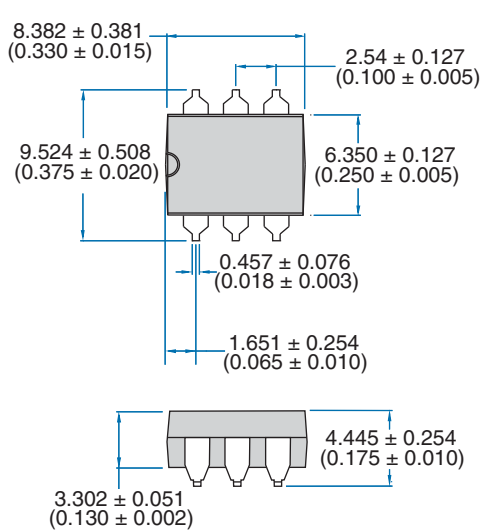


**Recommended PCB Land Pattern**

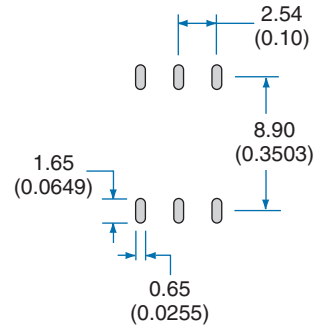


Dimensions  
mm  
(inches)

**6-Pin Surface Mount Package ("S" Suffix)**

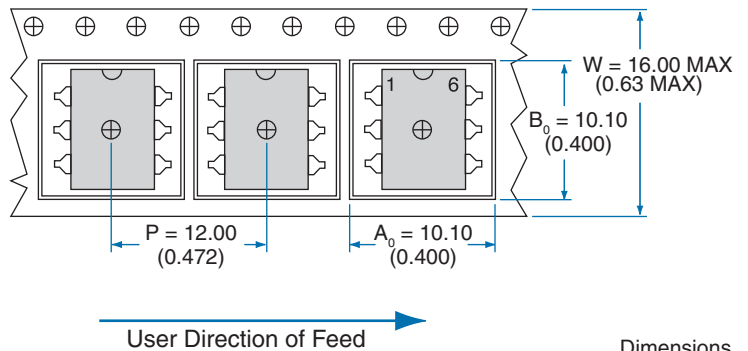
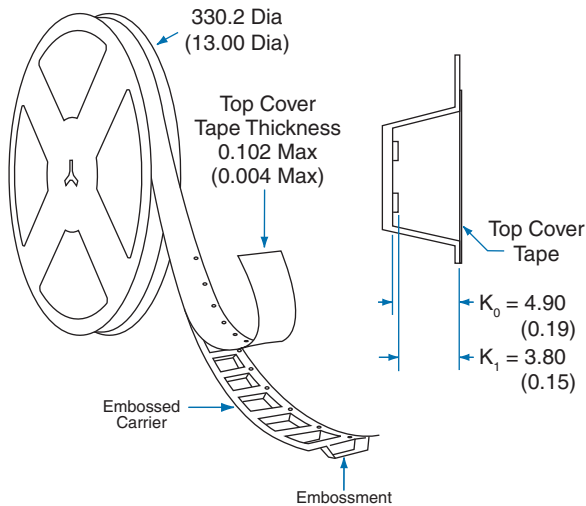


**Recommended PCB Land Pattern**



Dimensions  
mm  
(inches)

**Tape and Reel Packaging for 6-Pin "R" and "S" Suffix Parts**



Dimensions  
mm  
(inches)

**NOTE:** Tape dimensions not shown comply with JEDEC Standard EIA-481-2