

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.



PAA140P
Clare

Clare

Clare

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

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	Standard Package ¹	Optional Packaging ¹	
									1-Form-A 1-Form-B	2-Form-A 2-Form-B
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	

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

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

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

CPC1002N	60	700	0.55	1500	2	1	5/2	4 Pin DIP	1
CPC1004N	100	300	4	1500	2	1	3/1	4 Pin SOP	

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

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

CPC1217	60	200	16	2500	5 - 12	1	5/5	4 Pin SIP	
CPC1218	60	600	1.1	2500	5 - 12	1	5/5	4 Pin SIP	

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

Single Pole Normally Closed: 1-Form-B

CPC1117N	60	150	16	1500	1	1	1/2	4 Pin SOP	
CPC1130N	350	120	30	1500	2	5	2/2	4 Pin SOP	
CPC1135N	350	120	35	1500	1	5	2/2	4 Pin SOP	
CPC1150N	350	120	50	1500	2	5	1/2	4 Pin SOP	
CPC1231N	350	120	30	1500	2	5	2/2	4 Pin SOP	
LCB110	350	120	35	3750	5	1	3/3	6 Pin DIP	1



	LCA710	Units
Blocking Voltage	60	V _P
Load Current	1	A
Max R _{ON}	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_{rms} 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

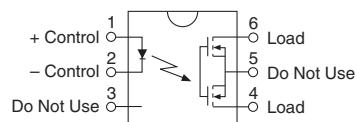
Ordering Information

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

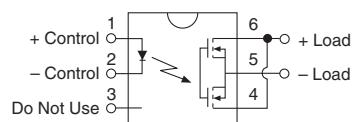
LCA710 Pinout

AC/DC Configuration

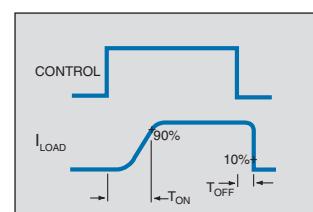


LCA710 Pinout

DC Only Configuration



Switching Characteristics of Normally Open (Form A) Devices



Absolute Maximum Ratings (@ 25°C)

Parameter	Ratings	Units
Blocking Voltage	60	V _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/°C² 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
Output Characteristics @ 25°C						
Load Current						
AC/DC Configuration	Continuous	I _L	-	-	1.0	A
DC Configuration					1.8	
Peak Load Current	10ms	I _{LPK}	-	-	5.0	A
On-Resistance						
AC/DC Configuration	I _L =1A	R _{ON}	-	0.3	0.5	Ω
DC Configuration				0.1	0.15	
Off-State Leakage Current	V _L =60V	I _{LEAK}	-	-	1	μA
Switching Speeds						
Turn-On	I _F =10mA, V _L =10V	T _{ON}	-	-	2.5	ms
Turn-Off	I _F =10mA, V _L =10V	T _{OFF}			0.25	
Output Capacitance	0V; f=1MHz	-	-	105	-	pF
Input Characteristics @ 25°C						
Input Control Current	I _L =1A	I _F	-	-	10	mA
Input Dropout Current	-	I _F	0.4	0.7	-	mA
Input Voltage Drop	I _F =10mA	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 _{IO}	-	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.

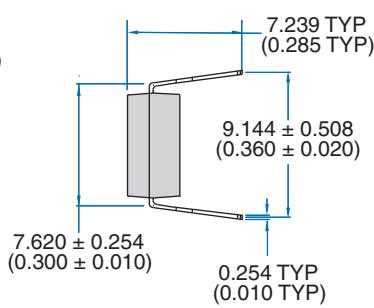
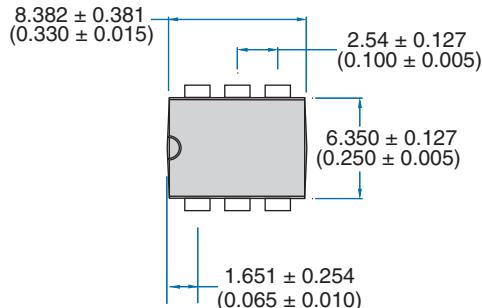
Washing

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

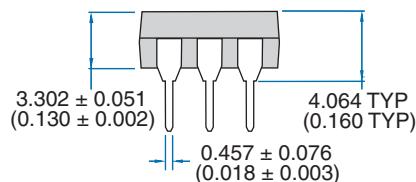
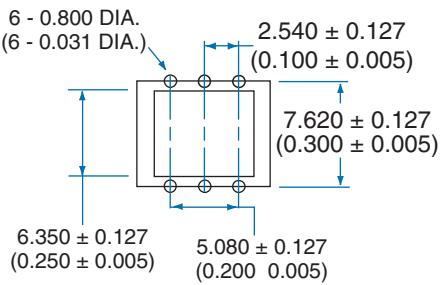


MECHANICAL DIMENSIONS

6-Pin DIP Thru-Hole Package

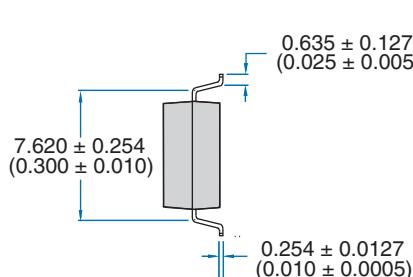
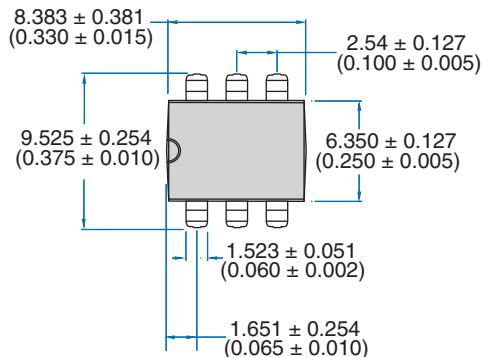


PC Board Pattern

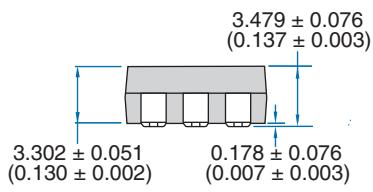
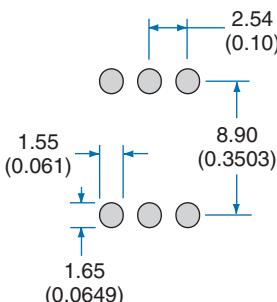


Dimensions
mm
(inches)

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

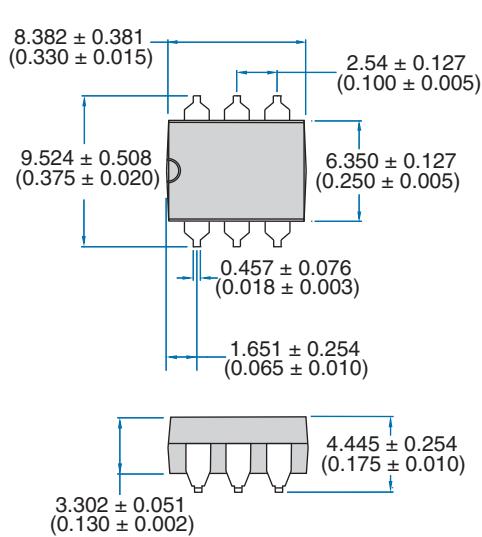


Recommended PCB Land Pattern

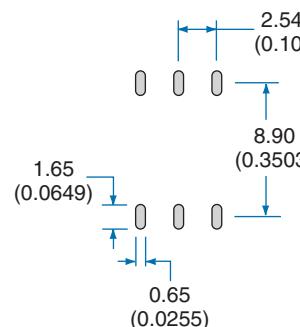


Dimensions
mm
(inches)

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

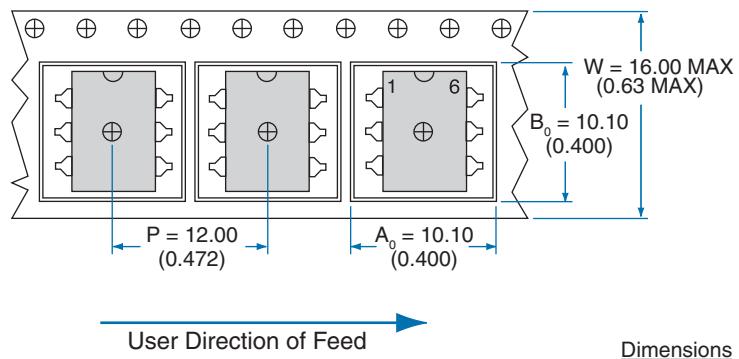
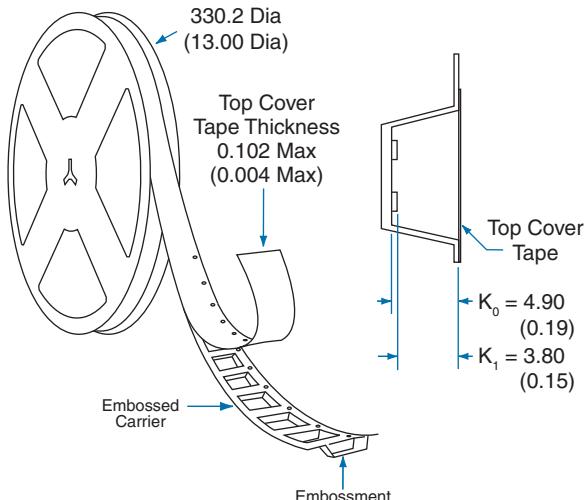


Recommended PCB Land Pattern



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