CLARE
An IXYS Company

Semiconductor

Product Catalog

Clare Overview

Clare is a wholly owned subsidiary of IXYS Corporation, and is conveniently located close to Boston, Massachusetts, USA. Clare designs, manufactures, and markets a wide variety of semiconductor devices, and is a major designer and manufacturer of optically isolated electronic products. Clare manufactures one of the industry's broadest lines of Solid State Relays (SSR), featuring galvanic input-to-output electrical isolation from $1500V_{rms}$ up to $5000V_{rms}$; a wide selection of optocouplers and linear optocouplers; and optically isolated AC Power Switches.

Clare SSR products are rapidly replacing electromechanical relays in many applications, making it a leading supplier to the Telecommunications, Medical, Security, Utility Metering, and Industrial Control industries. Replacing electromechanical relays with smaller, more-reliable optically isolated SSRs improves safety and lowers costs, while minimizing equipment size and enhancing overall system performance. With no moving parts, no coils, and no contacts, Solid State Relays are ideally suited for use in flammable surroundings, and in environments with high electrical and magnetic noise.

For the Telecommunications Industry, Clare manufactures a broad range of products that includes phone-line interface and monitoring devices, DC Termination devices for xDSL and ISDN applications, and Central Office products. Clare's newest entries into the Central Office market include several new Line Card Access Switch devices with high transient immunity: 1500V/μs. These robust devices have led to the development of monolithic high voltage switching ICs, powered from 3.3V digital supplies, that interface to industrial controls, instrumentation, automatic test equipment, and medical applications (see the new CPC7514).

Clare's expertise in high-voltage and power devices supports a growing line of standard devices. Power SSRs, SCR-based AC power switches, Field Effect transistors (FET), and IGBT and MOSFET gate drivers, both optically isolated and standard, round out a broad offering in the power market. The high-speed IXD_600 series of low-side IGBT and MOSFET gate drivers, with gate-drive currents of up to 30A, have rapidly become one of Clare's most successful power products.

In the display market, Clare offers drivers for LED lighting. The new CPC9909 answers the growing need in the illumination industry for a cost-effective, off-line, high-brightness LED driver. Clare also manufactures a line of display drivers for electronic paper devices.

Clare Hi-Reliability Program

Building on 20 years of experience supplying Hi-Rel parts to the aerospace industry, Clare now offers a line of high-reliability Solid State Relays and Optocouplers.

- Full Product Traceability
- Extremely Low PPM Failure Rates
- Guaranteed Operation from -40ºC to +85ºC, and up to 105ºC Upon Request
- 100% Burn-In (HTRB) 48 Hours Minimum
- 100% Post Burn-In Electrical Tests at Room Temperature and at 85ºC
- Thermal Cycle (By Sample or 100% for 20 Cycles)

Any Clare Solid State Relay (SSR) or Optocoupler offered in this catalog can be provided as a Hi-Rel device based on extensive additional environmental stressing and screening performed on standard commercial parts. Please see **www.clare.com/Products/HiRelProgram.htm** for full details.

Clare Custom, High-Voltage Semiconductor Design Services

Clare offers design services to the industry for the custom development of high-voltage semiconductor devices. Clare's wafer fabrication facility features a 600V BCDMOS process on a bonded-wafer, silicon-on-insulator, trench-isolated technology for IC development. Monolithic silicon with high-voltage vertical DMOSFETs along with CMOS logic and bipolar transistors from Clare address many applications requiring a high voltage interface. In addition, Clare's techniques for optical isolation for relays and signal processing offer high voltage isolation between the load side and the system controller.

Bring your high-voltage semiconductor component design challenges to Clare.

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Solid State Relays

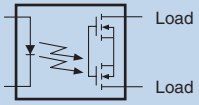
The OptoMOS® line of Solid State Relays (SSR) uses discrete semiconductor components and Clare's patented OptoMOS architecture to provide fast, reliable, bounce-free switching in a compact design. From one of the world's smallest single pole, high voltage, 4-pin relays to multi-pole and multifunction devices, OptoMOS products are an ideal replacement for larger reed and electromechanical relays. Compared to older electromagnetic technologies, Clare OptoMOS relays offer significantly lower drive current, smaller package size, no susceptibility to magnetic interference, and solid state reliability. All of these are key requirements for the design of today's complex low-power, multichannel products.

Clare SSRs are provided in three main types: Unidirectional (UNI), Bidirectional (BI), and Bidirectional Plus (BI+). A UNI relay conducts load current in only one direction, a BI relay conducts load current in both directions, and a BI+ relay has a provision for connecting the output MOSFETs in such a way that the relay in UNI configuration conducts significantly more load current than when it is wired in BI configuration (see the diagram on this page). The accompanying tables reference these three types for all devices listed.

These three main types are available in a variety of configurations: normally open (1-Form-A), normally closed (1-Form-B), dual 1-Form-A, dual 1-Form-B, 1-Form-A and 1-Form-B in the same package, 1-Form-A and 1-Form-B voltage-controlled relays, 2-Form-A, and 1-Form-C.

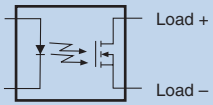
Drawings of all the available packages are shown below. For exact physical dimensions of any package, download the data sheet for the product that you are interested in from Clare's web site page, a link to which is referenced in the note at the bottom of the page. The packages are referred to by number in the accompanying tables.

Bidirectional



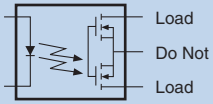
Polarity Independent

Unidirectional

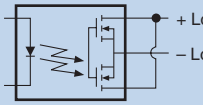


Polarity Dependent

Bidirectional Plus



BI Configuration
Polarity Independent



UNI Configuration
Polarity Dependent

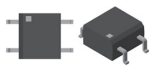
Features:

- Low Drive Current
- High Reliability
- No EMI/RFI Generation
- Arc-Free with No Snubbing Circuits
- AC or DC Switching
- Current Limiting (Available)
- FCC Compatible
- Low Off-State Leakage

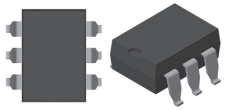
Applications:

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

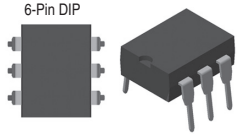
10 4-Pin SOP



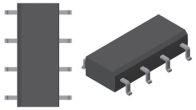
12 6-Pin Surface Mount



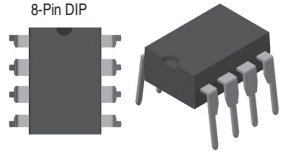
14 6-Pin DIP



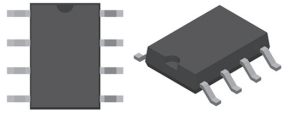
17 8-Pin SOP



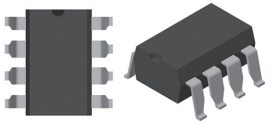
20 8-Pin DIP



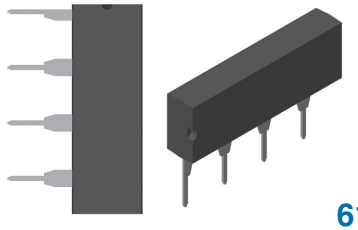
21 8-Pin Flatpack



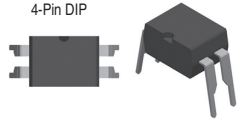
22 8-Pin Surface Mount



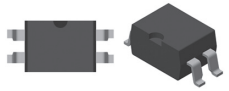
41 4-Pin SIP (8-Pin Body)



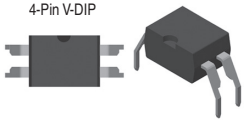
42 4-Pin DIP



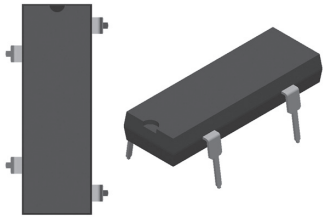
43 4-Pin Surface Mount



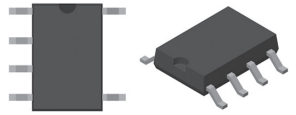
44 4-Pin V-DIP



61 4-Pin DIP (14-Pin Body)



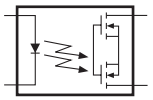
62 6-Pin Flatpack (8-Pin Body)



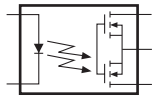
For ordering information, go to **www.clare.com/Products/ProdList.htm**

1-Form-A Relays: Single-Pole, Normally Open

BI



BI+



	Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type	Features and Comments
NEW!	CPC1006N	BI	60	75	10	0.5	10 / 10	1500	1	10	Low I_F, EN50130-4
	CPC1008N	BI	100	150	8	2	2 / 0.5	1500	1	10	
	CPC1009N	BI	100	150	8	2	2 / 0.5	1500	0.025	10	Very Low Off-State I_{LEAK} = 25nA
	CPC1014N	BI	60	400	2	2	2 / 1	1500	1	10	EN50130-4
	CPC1016N	BI	100	100	16	2	2 / 0.5	1500	1	10	
	CPC1017N	BI	60	100	16	1	10 / 10	1500	1	10	Low I_F, EN50130-4
	CPC1018N	BI	60	600	0.8	1	3 / 2	1500	1	10	Low I_F, EN50130-4
	CPC1019N	BI	60	750	0.6	2	3 / 3	1500	1	10	
	CPC1020N	BI	30	1200	0.25	2	3 / 3	1500	1	10	High Load Current, Very Low On-Resistance
	CPC1025N	BI	400	120	30	2	2 / 1	1500	1	10	
	CPC1030N	BI	350	120	30	2	2 / 1	1500	1	10	
	CPC1035N	BI	350	100	35	2	2 / 1	1500	1	10	
	CPC1225N	BI	400	120	30	2	2 / 1	1500	1	10	EN/IEC 60950-1 Supplemental Isolation Voltage (0.4mm Distance Through Isolation)
	CPC1230N	BI	350	120	30	2	2 / 1	1500	1	10	EN/IEC 60950-1 Supplemental Isolation Voltage (0.4mm Distance Through Isolation)
	CPC1317	BI	70	150	16	1	2.5 / 2.5	3750	1	21	EN50130-4 (Installation Class 3), Transient Voltage Suppression (TVS)
	CPC1330	BI	350	120	30	2	2 / 1	5000	1	42, 43	Enhanced Isolation Voltage
	CPC1335	BI	350	100	35	1	10 / 10	3750	1	21	Low I_F, EN50130-4 (Installation Class 3), Transient Voltage Suppression (TVS)
	CPC1390	BI	400	140	22	2	1 / 0.5	5000	1	42, 43, 44	Enhanced Isolation Voltage
	CPC1393	BI	600	90	50	2	5 / 5	5000	1	42, 43, 44	Enhanced Isolation Voltage
	CPC1394	BI	600	120	35	2	5 / 3	5000	1	42, 43, 44	Enhanced Isolation Voltage
	CPC1510	BI+	250	200	15	5	2 / 2	3750	1	12, 14	Active Current Limiting, Thermal Shutdown
	CPC1560	BI+	60	300	5.6	1.1	0.1 / 0.4	3750	1	20, 22	Enhanced Turn-On Switching Speed, Active Current Limiting, Thermal Shutdown
	LCA100	BI+	350	120	25	5	5 / 5	3750	1	12, 14	
	LCA100L	BI+	350	120	25	5	5 / 5	3750	1	12, 14	Current Limiting
	LCA110	BI+	350	120	35	2	3 / 3	3750	1	12, 14	
	LCA110L	BI+	350	120	35	2	3 / 3	3750	1	12, 14	Current Limiting
	LCA120	BI+	250	170	20	5	3 / 3	3750	1	12, 14	
	LCA120L	BI+	250	150	20	5	3 / 3	3750	1	12, 14	Current Limiting
	LCA125	BI+	300	170	16	5	5 / 5	3750	1	12, 14	
	LCA125L	BI+	300	170	20	5	5 / 5	3750	1	12, 14	Current Limiting
	LCA126	BI+	250	170	15	5	5 / 5	3750	1	12, 14	
	LCA127	BI+	250	200	10	5	5 / 5	3750	1	12, 14	

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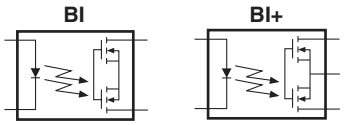
1-Form-A Relays: Single-Pole, Normally Open (Continued)

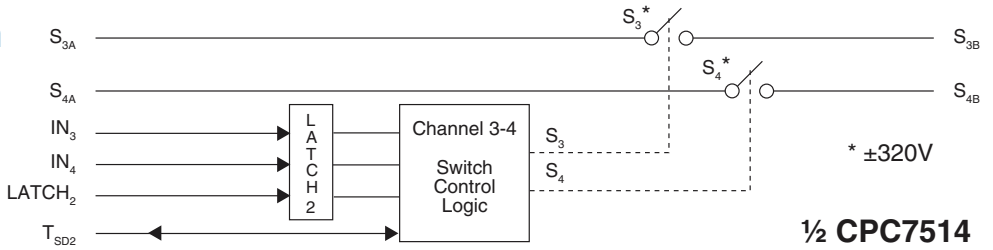


	Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type	Features and Comments
	LCA127L	BI+	250	170	15	5	5 / 5	3750	1	12, 14	Current Limiting
	LCA129	BI+	250	170	20	2	8 / 8	3750	1	12, 14	
	LCA182	BI+	350	120	35	0.25	3 / 3	3750	1	12, 14	Very Low I_F
NEW!	LCA701	BI+	100	1500	0.3	2	5 / 0.5	3750	1	12, 14	High Load Current
	LCA710	BI+	60	1000	0.5	10	2.5 / 0.25	3750	1	12, 14	High Load Current
	LCA712	BI+	60	1000	0.5	10	2.5 / 0.35	3750	0.01	12, 14	High Load Current, Low I_{LEAK}
	LCA715	BI+	60	2200	0.15	5	2.5 / 0.25	3750	1	12, 14	High Load Current
	LCA717	BI+	30	2000	0.15	2	3 / 3	3750	1	12, 14	High Load Current
	OMA160	BI+	250	50	100	10	0.125 / 0.125	3750	0.025	12, 14	Low I_{LEAK} , Fast Switching Times
	PLA110	BI+	400	150	22	5	1 / 0.5	3750	1	12, 14	
	PLA110L	BI+	400	150	25	5	1 / 0.25	3750	1	12, 14	Current Limiting
	PLA132	BI+	60	600	1	2	5 / 2	3750	1	12, 14	
	PLA134	BI+	100	350	3	5	5 / 5	3750	1	12, 14	
	PLA140	BI+	400	250	8	5	3 / 1	3750	1	12, 14	
	PLA140L	BI+	400	200	13	5	5 / 3	3750	1	12, 14	Current Limiting
	PLA143	BI+	600	100	50	2	5 / 5	4000	1	12, 14	Enhanced Isolation Voltage
	PLA150	BI+	250	250	7	5	2.5 / 0.5	3750	1	12, 14	
	PLA160	BI+	300	50	100	10	0.05 / 0.05	3750	0.025	12, 14	Low I_{LEAK} , Fast Switching Times
	PLA170	BI+	800	100	50	5	5 / 5	3750	1	12, 14	
NEW!	PLA171	BI	800	100	50	2	5 / 5	5000	1	62	Enhanced Isolation Voltage (7mm Output Pin Separation)
	PLA190	BI+	400	150	22	5	1 / 0.5	5000	1	12, 14	Enhanced Isolation Voltage
	PLA191	BI+	400	250	8	5	3 / 1	5000	1	12, 14	Enhanced Isolation Voltage
	PLA192	BI+	600	150	22	5	5 / 5	5000	1	12, 14	Enhanced Isolation Voltage
	PLA193	BI+	600	100	50	5	5 / 5	5000	10	12, 14	Enhanced Isolation Voltage
NEW!	PLA194	BI+	600	130	35	2	3 / 2	5000	1	12, 14	Enhanced Isolation Voltage
	XCA170	BI+	350	100	50	5	5 / 5	3750	1	12, 14	

1-Form-A Relays: Quad Single-Pole, Normally Open

NEW!

See Page 30 for full details. The CPC7514 Quad High Voltage Isolated Analog Switch Array provides the switching functionality of four independent 1-Form-A relays in a single small economical package. Designed to provide flexible single-ended or differential access to high voltage networks, up to 320V, the CPC7514 is configured as two sets of matched-pair switches. The CPC7514 is self-biasing, and requires no external power supply. Shown to the right is one 2-switch channel.



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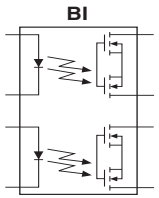
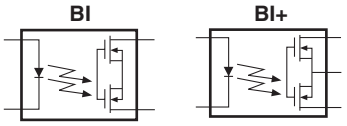


1-Form-A Relays: Dual Single-Pole, Normally Open

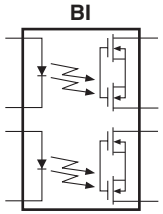
	Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type	Features and Comments
NEW!	CPC2014N	BI	60	400	2	2	2 / 1	1500	1	17	EN50130-4
NEW!	CPC2017N	BI	60	120	16	1	3 / 3	1500	1	17	Low I_F , EN50130-4
	LAA100	BI	350	120	25	5	5 / 5	3750	1	20, 21, 22	
	LAA100L	BI	350	120	25	5	5 / 5	3750	1	20, 21, 22	Current Limiting
	LAA108	BI	100	300	8	2	3 / 3	3750	1	20, 21, 22	
	LAA110	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	
	LAA110L	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	Current Limiting
	LAA120	BI	250	170	20	5	5 / 5	3750	1	20, 21, 22	
	LAA120L	BI	250	170	20	5	5 / 5	3750	1	20, 21, 22	Current Limiting
	LAA125	BI	350	170	16	5	5 / 5	3750	1	20, 21, 22	
	LAA125L	BI	350	150	18	5	5 / 5	3750	1	20, 21, 22	Current Limiting
	LAA126	BI	250	170	15	5	5 / 5	3750	1	20, 22	
	LAA126L	BI	250	170	20	5	5 / 5	3750	1	20, 22	Current Limiting
	LAA127	BI	250	200	10	5	5 / 5	3750	1	20, 21, 22	
	LAA127L	BI	250	170	10	5	5 / 5	3750	1	20, 21, 22	Current Limiting
	LAA710	BI	60	1000	0.5	10	2 / 0.25	3750	1	20, 21, 22	
	OAA160	BI	250	50	100	10	0.125 / 0.125	3750	0.025	20, 21, 22	Very Low I_{LEAK} , Fast Switching Times
	PAA110	BI	400	150	22	5	1 / 0.25	3750	1	20, 21, 22	
	PAA110L	BI	400	150	25	5	1 / 0.5	3750	1	20, 21, 22	Current Limiting
NEW!	PAA127	BI	280	200	10	3	0.5 / 0.5	3750	0.025	20, 21, 22	Very Low I_{LEAK} , Fast Switching Times
	PAA132	BI	60	600	1	2	5 / 2	3750	1	20, 22	
	PAA140	BI	400	250	8	5	3 / 1	3750	1	20, 21, 22	
	PAA140L	BI	400	200	13	5	5 / 3	3750	1	20, 21, 22	Current Limiting
	PAA150	BI	250	250	7	5	2.5 / 0.5	3750	1	20, 21, 22	
	PAA190	BI	400	150	22	5	1 / 0.5	5000	1	20, 21, 22	Enhanced Isolation Voltage
	PAA191	BI	400	250	8	5	3 / 1	5000	1	20, 21, 22	Enhanced Isolation Voltage
	PAA193	BI	600	100	50	5	5 / 5	5000	10	20, 21, 22	Enhanced Isolation Voltage
	XAA117	BI	60	150	16	1	5 / 5	3750	1	20, 21, 22	Low I_F
	XAA170	BI	350	100	50	5	5 / 5	3750	1	20, 21, 22	

For ordering information, go to **www.clare.com/Products/ProdList.htm**

1-Form-B Relays: Single-Pole, Normally Closed



	Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type	Features and Comments
NEW!	CPC1106N	BI	60	75	10	0.5	10 / 10	1500	1	10	Low I_F , EN50130-4
	CPC1117N	BI	60	150	16	1	1 / 2	1500	1	10	Low I_F , EN50130-4
	CPC1130N	BI	350	120	30	2	2 / 2	1500	5	10	
	CPC1135N	BI	350	120	35	2	2 / 2	1500	5	10	
	CPC1150N	BI	350	120	50	2	1 / 2	1500	5	10	
	CPC1231N	BI	350	120	30	2	2 / 2	1500	5	10	EN/IEC 60950-1 Supplemental Isolation Voltage (0.4mm Distance Through Isolation)
NEW!	CPC1333	BI	350	130	30	2	2 / 3	5000	1	42, 43	Enhanced Isolation Voltage
	LCB110	BI+	350	120	35	5	3 / 3	3750	1	12, 14	
	LCB111	BI+	350	120	35	2	5 / 5	3750	1	12, 14	
	LCB120	BI+	250	170	20	5	5 / 5	3750	1	12, 14	
	LCB126	BI+	250	170	15	5	5 / 5	3750	1	12, 14	
	LCB127	BI+	250	200	10	5	5 / 5	3750	1	12, 14	
	LCB710	BI+	60	1000	0.6	2	3 / 3	3750	1	12, 14	High Load Current
	LCB716	BI+	60	500	2	2	3 / 3	3750	1	12, 14	
	PLB150	BI+	250	250	7	5	1 / 2.5	3750	1	12, 14	
NEW!	PLB190	BI+	400	130	25	2	1 / 2.5	5000	1	12, 14	Enhanced Isolation Voltage
	XCB170	BI+	350	100	50	5	5 / 5	3750	1	12, 14	

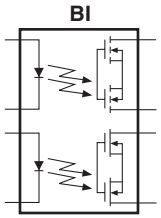


1-Form-B Relays: Dual Single-Pole, Normally Closed

Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type	Features and Comments
LBB110	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	
LBB120	BI	250	170	20	5	5 / 5	3750	1	20, 21, 22	
LBB126	BI	250	170	15	5	5 / 5	3750	1	20, 22	
LBB127	BI	250	200	10	5	5 / 5	3750	1	20, 21, 22	
PBB150	BI	250	250	7	5	2.5 / 2.5	3750	1	20, 21, 22	
XBB170	BI	350	100	50	5	5 / 5	3750	1	20, 21, 22	

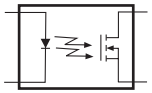
For ordering information, go to **www.clare.com/Products/ProdList.htm**

1-Form-A & 1-Form-B Relays: Combination Form-A & Form-B



	Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type	Features and Comments
NEW!	CPC2317N	BI	60	120	16	1	3 / 3	1500	1	17	Low I_F
NEW!	CPC2330N	BI	350	120	30	2	3 / 3	1500	1	17	
	LBA110	BI	350	120	35	2	3 / 3	3750	1	20, 21, 22	
	LBA110L	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	Current Limiting
	LBA120	BI	250	170	20	5	5 / 5	3750	1	20, 21, 22	
	LBA120L	BI	250	170	20	5	5 / 5	3750	1	20, 21, 22	Current Limiting
	LBA126	BI	250	170	15	5	5 / 5	3750	1	20, 21, 22	
	LBA126L	BI	250	150	20	5	5 / 5	3750	1	20, 21, 22	Current Limiting
	LBA127	BI	250	200	10	5	5 / 5	3750	1	20, 21, 22	
	LBA127L	BI	250	150	15	5	5 / 5	3750	1	20, 22	Current Limiting
NEW!	LBA710	BI	60	1000	0.6	2	5 / 5	3750	1	20, 22	High Load Current
	LBA716	BI	60	1000	0.4	2	5 / 5	3750	1	20, 22	High Load Current
	PBA150	BI	250	250	7	5	2.5 / 2.5	3750	1	20, 22	
	XBA170	BI	350	100	50	2	5 / 5	3750	1	20, 21, 22	

1-Form-A Relays: Single-Pole, Normally Open, Unidirectional (DC-Only)

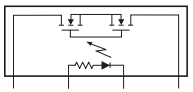


Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Voltage (V)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage μA)	Package Type	Features and Comments
CPC1002N	UNI	60	700	0.55	2	5 / 2	1500	1	10	EN50130-4
CPC1004N	UNI	100	300	4	2	3 / 1	1500	1	10	Extended Operating Temperature Range: -40°C to +110°C

For ordering information, go to **www.clare.com/Products/ProdList.htm**

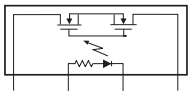
1-Form-A Relays: Single-Pole, Normally Open, Voltage-Controlled

BI

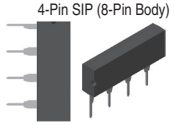


	Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Voltage (V)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type	Features and Comments
NEW!	CPC1215	BI	400	500	6	5V - 12V	5 / 3	3750	1	61	Direct drop-in reed relay replacement
	CPC1217	BI	60	200	16	5V - 12V	5 / 5	2500	1	41	EN50130-4, Direct drop-in reed relay replacement
	CPC1218	BI	60	600	1.1	5V - 12V	5 / 5	2500	1	41	EN50130-4, Direct drop-in reed relay replacement

BI

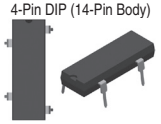


41



4-Pin SIP (8-Pin Body)

61

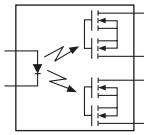


4-Pin DIP (14-Pin Body)

1-Form-B Relays: Single-Pole, Normally Closed, Voltage-Controlled

Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Voltage (V)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type	Features and Comments
CPC1219	BI	60	200	16	5V - 12V	5 / 5	2500	1	41	EN50130-4, Direct drop-in reed relay replacement

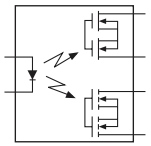
BI



2-Form-A Relays: Common Input, Dual-Pole, Normally Open

Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type	Features and Comments
LCA210	BI	350	85	35	8	3 / 3	3750	1	20, 22	
LCA210L	BI	350	100	35	8	4 / 4	3750	1	20, 22	Current Limiting
LCA211	BI	350	85	35	8	1 / 1.2	3750	1	20, 22	
LCA220	BI	250	120	20	10	5 / 5	3750	1	20, 22	

BI



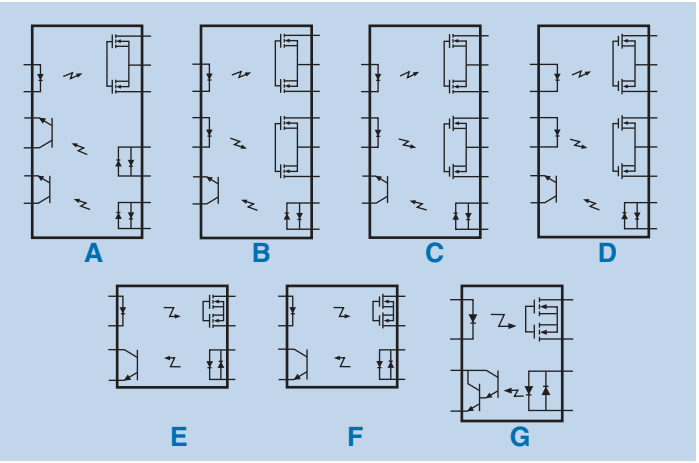
1-Form-C Relays: Common Input

Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type	Features and Comments
LCC110	BI	350	120	35	8	4 / 4	3750	1	20, 21, 22	
LCC120	BI	250	170	20	10	5 / 5	3750	1	20, 22	

For ordering information, go to **www.clare.com/Products/ProdList.htm**

Multifunction Products

The OptoMOS line of Multifunction products combines optically isolated discrete component functions into a single package. These products mix and match solid state relays, optocouplers, and Darlington transistors to create highly functional circuits in a single, small package. Multifunction devices allow designers to consolidate circuit functions into a single device, freeing up valuable board space and reducing component count.



Features:

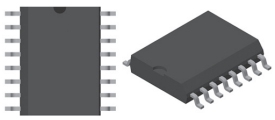
- 3750V_{rms} Input to Output Isolation
- Multiple Functionality in a Single Package
- Current Limiting (Part Numbers with "L" Suffix)
- Machine Insertable, Wave Solderable
- TTL and CMOS Compatible

Applications:

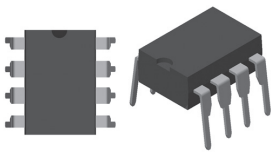
- Telecommunication / Datacommunication
- Instrumentation
- I/O Subsystems / Electronic Switching
- Medical Equipment (Patient / Equipment Isolation)
- Security
- Aerospace
- Industrial Controls

		Relay Characteristics				Optocoupler Characteristics						
Part Number	Style	Blocking Voltage (V_P)	Current Handling (mA)	On Resistance (Ω)	Input Control Current (mA)	Breakdown Voltage (V)	Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control Current (mA)	Isolation Voltage (V_{rms})	Package Type	Features and Comments
IAA110	B	350	100	35	5	20	33	0.5	6	3750	4	Two 1-Form-A Relays, One Optocoupler
IAA170	B	350	100	50	5	20	33	0.5	6	3750	4	Two 1-Form-A Relays, One Optocoupler
IAB110	C	350	100	35	5	20	33	0.5	6	3750	4	One 1-Form-A Relay, One 1-Form-B Relay, One Optocoupler
IAD110	A	350	100	35	5	20	33	0.5	6	3750	4	One 1-Form-A Relay, Two Optocouplers
IAD170	A	350	100	50	5	20	33	0.5	6	3750	4	One 1-Form-A Relay, Two Optocouplers
IBB110	D	350	100	35	5	20	33	0.5	6	3750	4	Two 1-Form-B Relays, One Optocoupler
TS117	E	350	120	35	2	20	33	0.5	6	3750	20, 21, 22	One 1-Form-A Relay, One Optocoupler
TS117L	E	350	120	35	2	20	33	0.5	6	3750	20, 21, 22	One Current-Limiting 1-Form-A Relay, One Optocoupler
TS118	F	350	120	35	5	20	33	0.5	6	3750	20, 21, 22	One 1-Form-B Relay, One Optocoupler
TS120	G	350	120	35	5	20	300	0.8	2	3750	20, 21, 22	One 1-Form-A Relay, One Darlington Optocoupler
TS120L	G	350	120	35	5	20	300	0.8	2	3750	20, 21, 22	One Current-Limiting 1-Form-A Relay, One Darlington Optocoupler
TS122	E	350	170	20	5	20	33	0.5	6	3750	20, 21, 22	One 1-Form-A Relay, One Optocoupler
TS190	E	350	150	22	5	20	33	0.5	6	3750	20, 21, 22	One 1-Form-A Relay, One Optocoupler
TS190L	E	350	150	25	5	20	33	0.5	6	3750	20, 21, 22	One Current-Limiting 1-Form-A Relay, One Optocoupler
XS170	E	350	100	50	2	20	33	0.5	6	3750	20, 21, 22	One 1-Form-A Relay, One Optocoupler

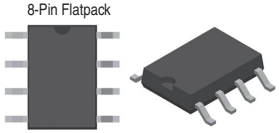
4 16-Pin Low-Profile SOIC



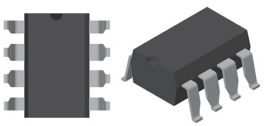
20 8-Pin DIP



21 8-Pin Flatpack



22 8-Pin Surface Mount



For ordering information, go to **www.clare.com/Products/ProdList.htm**

Telecom Multifunction Products

The OptoMOS line of Multifunction Products combines optically isolated discrete component functions into a single package. These products mix and match solid state relays, optocouplers, bridge rectifiers, Darlington transistors, and Zener diodes to create highly functional circuits in a single, small package. Multifunction devices allow designers to consolidate circuit functions into a single device, freeing up valuable board space and reducing component count. Designed specifically for the telecommunications industry, the Integrated Telecom Circuit (ITC) series is well suited for voice telephony and modem applications, providing most of the major functions required when designing DAA (Data Access Arrangement) or voice (FXO) line interface circuits. Available in a 16-pin SOIC package.

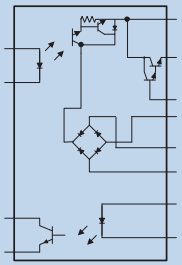
Features:

- 3750V_{rms} Input to Output Isolation
- Multiple Functionality in a Single Package
- Current Limiting (Part Numbers with "L" Suffix)
- Machine Insertable, Wave Solderable
- TTL and CMOS Compatible

Applications:

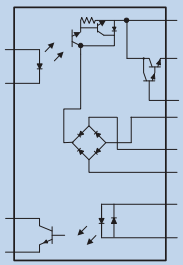
- Telecommunication / Datacommunication
- Instrumentation
- I/O Subsystems
- Electronic Switching
- Medical Equipment (Patient / Equipment Isolation)
- Security
- Aerospace
- Industrial Controls

With Half-Wave Ringing Detect



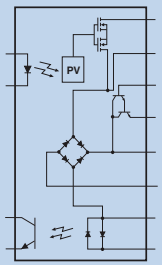
ITC100

With Full-Wave Ringing Detect



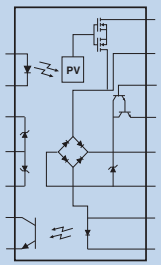
ITC107

No Zener Protection Bidirectional Opto-Input



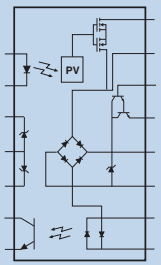
ITC117(L)

Zener Protection Unidirectional Opto-Input



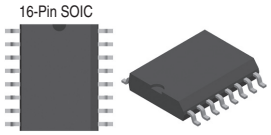
ITC135

Zener Protection Bidirectional Opto-Input



ITC137

16-Pin SOIC



	Relay Parameters				Optocoupler Parameters						
Part Number	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Breakdown Voltage (V)	Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control Current (mA)	Isolation Voltage (V_{rms})	Package Type	Features
ITC117	350	120	15	5	20	33	0.5	6	3750	16-Pin SOIC	Full-Wave Ringing Detect
ITC117L	350	120	20	5	20	33	0.5	6	3750	16-Pin SOIC	Full-Wave Ringing Detect, Current Limiting
ITC135	350	120	15	5	20	33	0.5	6	3750	16-Pin SOIC	Half-Wave Ringing Detect
ITC137	350	120	15	5	20	33	0.5	6	3750	16-Pin SOIC	Full-Wave Ringing Detect

	Photo-Darlington Parameters			Bridge Parameters		Optocoupler Parameters						
Part Number	Blocking Voltage (V_P)	Saturation Voltage (V)	Input Control Current (mA)	Reverse Voltage (V)	Forward Voltage (V)	Breakdown Voltage (V)	Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control Current (mA)	Isolation Voltage (V_{rms})	Package Type	Features
ITC100	350	1.2	5	350	1.1	20	33	0.5	6	3750	16-Pin SOIC	Half-Wave Ringing Detect
ITC107	350	1.2	5	350	1.1	20	33	0.5	6	3750	16-Pin SOIC	Full-Wave Ringing Detect

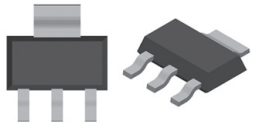
For ordering information, go to **www.clare.com/Products/ProdList.htm**

Discrete Components

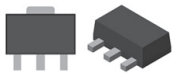
N-Channel Depletion Mode FETs

Clare's N-channel depletion mode Field Effect Transistors (FETs) utilize a proprietary third generation vertical DMOS process. The third generation process realizes world class, high-voltage MOSFET performance in an economical silicon gate process. The vertical DMOS process yields a robust device for low-power applications with high input impedance. These highly reliable FET devices have been used extensively in Clare's solid state relays for industrial and telecommunications applications.

SOT-223



SOT-89



The normally-on MOSFETs are well suited for low cost, pre-regulator applications that are tolerant of high voltage drop and power dissipation between the power source and the output regulator stage. The pre-regulator is particularly effective as an inexpensive solution for filtering AC line voltage variations in non-isolated DC power supplies as compared to switch-mode power supplies or step-down transformers.

	Part Number	BV_{DSX} (V)	$R_{DS(on)}$ Max (Ω)	$V_{GS(off)}$ Min (V)	$V_{GS(off)}$ Max (V)	I_{DSS} @ V_{GS} = 0V Min (mA)	I_D @ V_{GS} = -0.57V Min (mA)	Package Type	Features & Comments
NEW!	CPC3701	60	1	-1.6	-3.9	600	-	SOT-223	
	CPC3703	250	4	-1.6	-3.9	300	-	SOT-89	
	CPC3710	250	10	-1.6	-3.9	220	-	SOT-89	
	CPC3714	350	14	-1.6	-3.9	240	-	SOT-89	
	CPC3720	350	22	-1.6	-3.9	130	-	SOT-89	
	CPC3730	350	30	-1.6	-3.9	140	-	SOT-89	
NEW!	CPC3760	600	44	-0.8	-2.9	100	-	SOT-223	Please call Clare Customer Service for more information
NEW!	CPC3780	800	60	-0.8	-2.9	50	-	SOT-223	Please call Clare Customer Service for more information
	CPC5602	350	14	-2	-3.6	-	130	SOT-223	Designed for Use with LITELINK Designs
	CPC5603	415	14	-2	-3.6	-	130	SOT-223	Designed for Use with LITELINK Designs

Diode Bridges

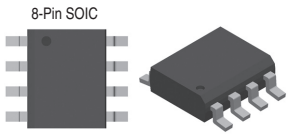
The CPC7556N integrated diode bridge offers protection from high voltage transients by means of an adjustable voltage clamp. The clamp performs two actions, first to limit the voltage across the diode bridge rectified outputs to a value determined by external resistors and the gate voltage, and second to fully discharge the V+ to V– outputs when the gate's trigger threshold is exceeded during the voltage limiting function. The rectified outputs are discharged as a result of the voltage fold-back function of the OVP device. Voltage fold-back of the OVP circuit will continue until the current through the protector falls below the hold current threshold.

The CPC7557N is an integrated diode bridge built on Clare's High Voltage SOI technology. Very small in size, this integrated diode bridge device offers a space saving method for inclusion of a highly reliable, monolithic, full-wave bridge rectifier into today's miniature circuit designs.

Features:
- Monolithic Construction
- Surface Mount Package

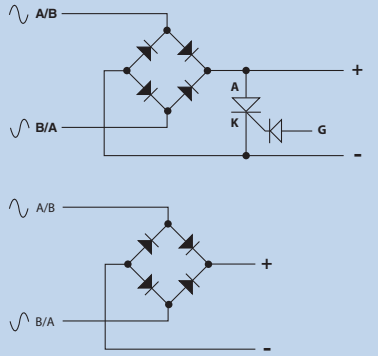
Applications:
- Telecommunications Protection Clamp
- High Voltage Multiplexer / Switch
- High Voltage ESD Clamp

8-Pin SOIC



CPC7556

CPC7557



	Part Number	Reverse Voltage (V)	Forward Current (mA_{rms})	Diode V_F Drop (V)	Thyristor Current (mA)	Reverse Leakage I_{LEAK} (μA)
NEW!	CPC7556	100	240	0.95	120	1
NEW!	CPC7557	100	240	0.95	-	1

For ordering information, go to **www.clare.com/Products/ProdList.htm**

Power Relays

Clare and IXYS have joined forces to bring OptoMOS technology, reliability, and compact size to the Power SIP, i4-PAC™ and ISOPLUS™-264 series of power solid state relays. Development of these products was founded on the blending of Clare's traditional strengths in the design and manufacture of photovoltaic integrated circuits (ICs), leadframe design, and multi-chip packaging with IXYS' expertise in power MOSFETs, power packages, and substrate technology.

Clare Power Relays are now offered in three package types, all of which offer 2500V_{rms} of input to output isolation: the Power SIP, the i4-PAC, and the ISOPLUS-264. The Power SIP package offers pin-to-pin compatibility with other solid state relays providing an easy upgrade path for existing designs, and compatibility for new designs. The i4-PAC and the ISOPLUS-264 packages feature a unique assembly process whereby the silicon is soft soldered onto a Direct Copper Bond (DCB) substrate rather than traditional bonding onto an epoxy encapsulated copper frame. This structure allows for a substantially lower junction-to-case thermal impedance when compared to conventionally assembled power relays. The i4-PAC thermal resistance is 0.35°C/W while the ISOPLUS-264 has an even lower thermal impedance of 0.30°C/W.

Clare Power SSRs are provided in two types: Unidirectional (UNI) and Bidirectional (BI). The polarity independent BI relay conducts load current in both directions, while the polarity dependent UNI relay conducts load current in only one direction. The accompanying tables reference these two types for all devices listed.

On the back of these packages, the electrically non-conductive surface of the DCB ceramic substrate provides 2500V_{rms} of isolation to the package's electrically conductive power switching and control leads. The combination of an electrically isolated, non-conductive exterior and low thermal impedance makes the new i4-PAC and ISOPLUS-264 power relays an ideal solution for power applications preferring a non-biased heat sink with superior thermal management properties.

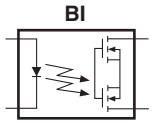
Features:

- Handles Loads up to 32A
- Voltage Ratings up to 1000V_P
- Low On-Resistance
- Electrically Non-Conductive Thermal Pad for Heat Sink Applications
- Industry Standard 4-Pin SIP Package
- Low Input Control Current
- Low Thermal Impedances:
  - 0.30°C/W - ISOPLUS-264
  - 0.35°C/W - i4-PAC
  - 1.50°C/W - Power SIP

Applications:

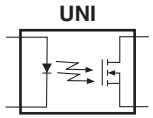
- Robotics
- Medical Equipment
- Railroad / Traffic Controls
- Consumer Appliances
- Industrial Control
- Test and Measurement Equipment

1-Form-A Power Relays: Single-Pole, Bidirectional



	Part Number	Relay Type	Blocking Voltage (V_P)	Load Current Free Air (A_{rms})	Load Current T_C=25°C (A_{rms})	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type
	CPC1906Y	BI	60	2	-	0.3	10	10 / 5	2500	1	Power SIP
	CPC1908J	BI	60	3.5	15	0.3	10	20 / 5	2500	1	i4-PAC
	CPC1909J	BI	60	6.5	15	0.1	10	25 / 10	2500	1	ISOPLUS-264
	CPC1916Y	BI	100	2.5	-	0.34	10	5 / 3	2500	1	Power SIP
	CPC1918J	BI	100	5.25	15	0.1	10	25 / 10	2500	1	ISOPLUS-264
	CPC1926Y	BI	250	0.7	-	1.4	10	10 / 10	2500	1	Power SIP
	CPC1927J	BI	250	2.7	15	0.2	10	25 / 10	2500	1	ISOPLUS-264
	CPC1967J	BI	400	1.35	13.15	0.85	10	20 / 5	2500	1	i4-PAC
	CPC1973Y	BI	400	0.35	-	5	10	5 / 3	2500	1	Power SIP
	CPC1977J	BI	600	1.25	12.25	1	10	20 / 5	2500	1	i4-PAC
	CPC1978J	BI	800	0.75	7.25	2.3	10	20 / 5	2500	1	i4-PAC
	CPC1979J	BI	600	1.4	14.5	0.75	10	25 / 5	2500	1	ISOPLUS-264
	CPC1981Y	BI	1000	0.18	-	18	10	10 / 5	2500	1	Power SIP
NEW!	CPC1983Y	BI	600	0.5	-	6	5	5 / 2	2500	1	Power SIP
NEW!	CPC1983YE	BI	600	0.5	-	6	5	5 / 2	4000	1	Power SIP
	CPC1986J	BI	1000	0.65	6.5	3	10	20 / 5	2500	1	i4-PAC
	CPC1988J	BI	1000	0.9	9.4	2.5	10	20 / 5	2500	1	ISOPLUS-264

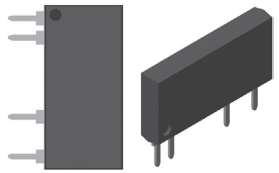
1-Form-A Power Relays: Single-Pole, Unidirectional



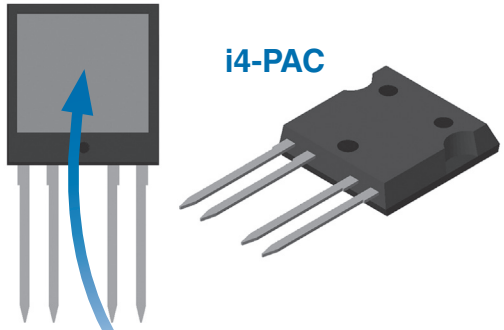
	Part Number	Relay Type	Blocking Voltage (V_P)	Load Current Free Air (A)	Load Current T_C=25°C (A)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type
NEW!	CPC1706Y	UNI	60	4	-	0.09	5	5 / 2	2500	1	Power SIP
	CPC1708J	UNI	60	4	24	0.08	10	20 / 5	2500	1	i4-PAC
	CPC1709J	UNI	60	9	32	0.05	10	20 / 5	2500	1	ISOPLUS-264
	CPC1718J	UNI	100	6.75	32	0.075	10	20 / 5	2500	1	ISOPLUS-264
	CPC1726Y	UNI	250	1	-	0.75	10	5 / 2	2500	1	Power SIP
	CPC1727J	UNI	250	3.4	20	0.09	10	20 / 5	2500	1	ISOPLUS-264
	CPC1777J	UNI	600	1.5	15	0.5	10	20 / 5	2500	1	i4-PAC
	CPC1779J	UNI	600	1.65	15	0.4	10	20 / 5	2500	1	ISOPLUS-264
	CPC1786J	UNI	1000	0.65	6.9	2	10	20 / 5	2500	1	i4-PAC
	CPC1788J	UNI	1000	1	10.3	1.25	10	20 / 5	2500	1	ISOPLUS-264

CLARE
An IXYS Company

Power SIP

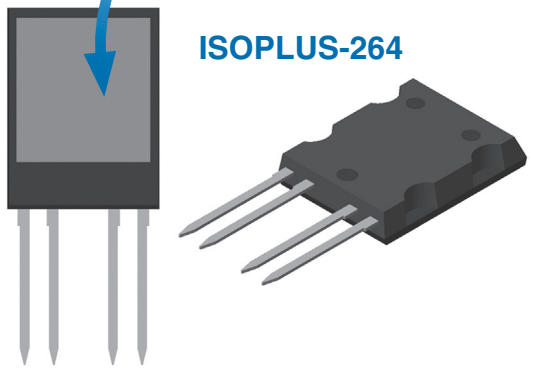


i4-PAC



Electrically Isolated Thermal Pad

ISOPLUS-264



For ordering information, go to **www.clare.com/Products/ProdList.htm**

Optically Isolated AC Power Switches

Optically Isolated AC Power Switches: I_{LOAD} ≤1A

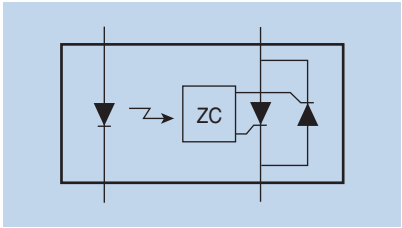
The OptoMOS line of power products uses dual power-SCR outputs to produce an alternative to optocoupler and Triac circuits. These AC Power Switches provide a blocking voltage of up to $800V_P$. In addition, tightly controlled zero-cross circuitry ensures switching of AC loads while minimizing the generation of transients. The input and output circuits are optically coupled to provide $3750V_{rms}$ of isolation and noise immunity between control and load circuits. Long life and environmental integrity make these power switches ideal for controlling a variety of AC circuits in industrial environments where electromagnetic interference would disrupt the operation of electromechanical relays.

Features:

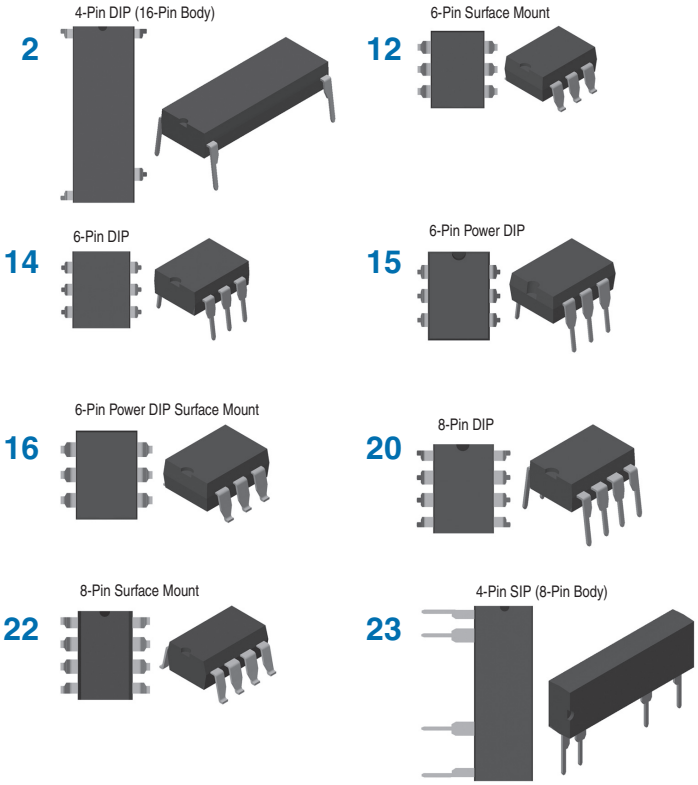
- Load Current up to $1A_{rms}$
- Blocking Voltage up to $800V_P$
- 5mA Sensitivity
- Zero-Crossing Turn-On
- DC Control, AC Switching
- Optically Isolated
- TTL and CMOS Compatible
- Low EMI and RFI Generation
- High Noise Immunity
- VDE Compatible
- Machine Insertable, Wave Solderable
- Switching Speed < 0.5 Cycle

Applications:

- Programmable Controls
- Process Control
- Power Control Panels
- Remote Switching
- Gas Pump Electronics
- Contactors
- Large Relay Control Circuits
- Solenoids
- Motor Controls
- Heater Controls



Part Number	Blocking Voltage (V_P)	Load Current (A_{rms})	Input Control Current (mA)	Operating Frequency min / max (Hz)	Isolation Voltage (V_{rms})	Package Type
CPC1943	400	0.5	5	20 - 500	3750	15, 16
CPC1945G	400	1	5	20 - 400	3750	2
CPC1945Y	400	1	5	20 - 400	3750	23
CPC1961	600	0.25	5	20 - 500	3750	20, 22
CPC1963	600	0.5	5	20 - 500	3750	15, 16
CPC1965G	600	1	5	20 - 400	3750	2
CPC1965Y	600	1	5	20 - 400	3750	23
CPC1972	800	0.25	5	20 - 500	3750	12, 14
PD1201	400	1	5	20 - 500	3750	2
PD2401	500	1	5	20 - 500	3750	2
PD2601	600	1	5	20 - 500	3750	2
PM1204	400	0.5	5	20 - 500	3750	15, 16
PM1205	500	0.5	5	20 - 500	3750	15, 16
PM1206	600	0.5	5	20 - 500	3750	15, 16
PS1201	400	1	5	20 - 500	3750	23
PS2401	500	1	5	20 - 500	3750	23
PS2601	600	1	5	20 - 500	3750	23



For ordering information, go to **www.clare.com/Products/ProdList.htm**

Optically Isolated AC Power Switches: I_{LOAD} >1A

Clare introduces new solid-state AC Power Switches that are capable of handling very high load currents. With blocking voltages up to $800V_P$ and tightly controlled zero-cross circuitry (ensuring switching of AC loads while minimizing the generation of transients), these robust AC Power Switches enable simpler power switching designs.

Optically coupled input and output circuits provide up to $3750V_{rms}$ of isolation and noise immunity between control and load circuits. These arc-free, heavy-duty AC power switches are ideal for controlling a variety of AC circuits in industrial environments where electromagnetic interference would disrupt the operation of electromechanical relays or where explosive atmospheres exist.

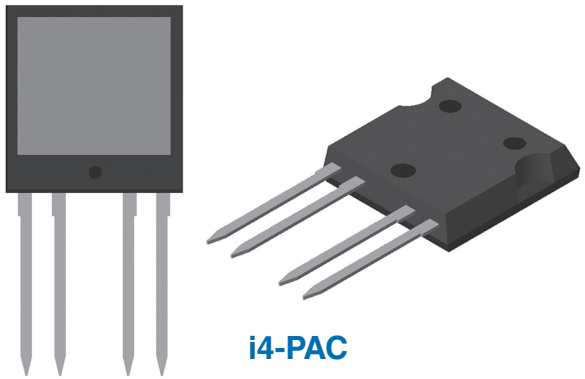
Features:

- Load Current up to $50A_{rms}$
- Blocking Voltage up to $800V_P$
- 5mA Sensitivity
- Zero-Crossing Turn-On
- DC Control, AC Switching
- Optically Isolated I/O
- TTL and CMOS Compatible
- Low EMI and RFI Generation
- High Noise Immunity
- VDE Compatible
- Machine Insertable, Wave Solderable
- Switching Speed < 0.5 Cycle

Applications:

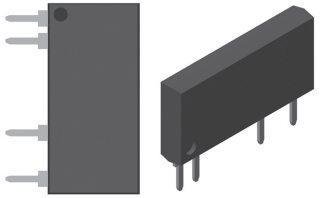
- Programmable Controls
- Process Control
- Power Control Panels
- Remote Switching
- Gas Pump Electronics
- Contactors
- Large Relay Control Circuits
- Solenoids
- Motor Controls
- Heater Controls

4-Pin i4-PAC

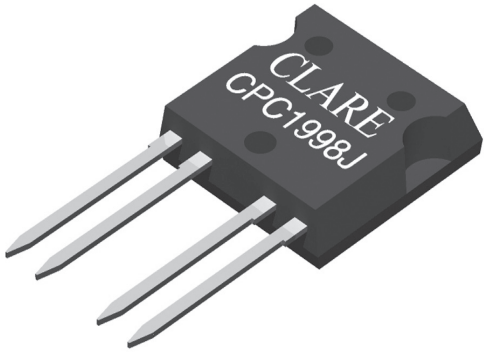


i4-PAC

4-Pin Power SIP (8-Pin Body)



Power SIP



	Part Number	Blocking Voltage (V_P)	Load Current: No Heat Sink (A_{rms})	Load Current: With 5°C/W Heat Sink (A_{rms})	Load Current: T_C=25°C (A_{rms})	Input Control Current (mA)	Operating Frequency min / max (Hz)	Isolation Voltage (V_{rms})	Package Type
NEW!	CPC1966	600	3	-	-	5	20 - 500	3750	Power SIP
	CPC1976	600	2	-	-	5	20 - 500	3750	Power SIP
NEW!	CPC1998	800	5	20	50	5	20 - 500	2500	i4-PAC

For ordering information, go to **www.clare.com/Products/ProdList.htm**

Optocouplers

Single & Dual Optocouplers

Single and dual OptoMOS optocouplers provide an optically isolated means of current detection or control of switching circuits. Devices offer a single or dual anti-parallel LED input stage for unidirectional or bidirectional signal control to the optically coupled output. The output can be either a single transistor or, for greater gain, a Darlington transistor. These optocouplers are ideal for use in circuits where electrical isolation of control circuitry or voltage detection is crucial.

Features:

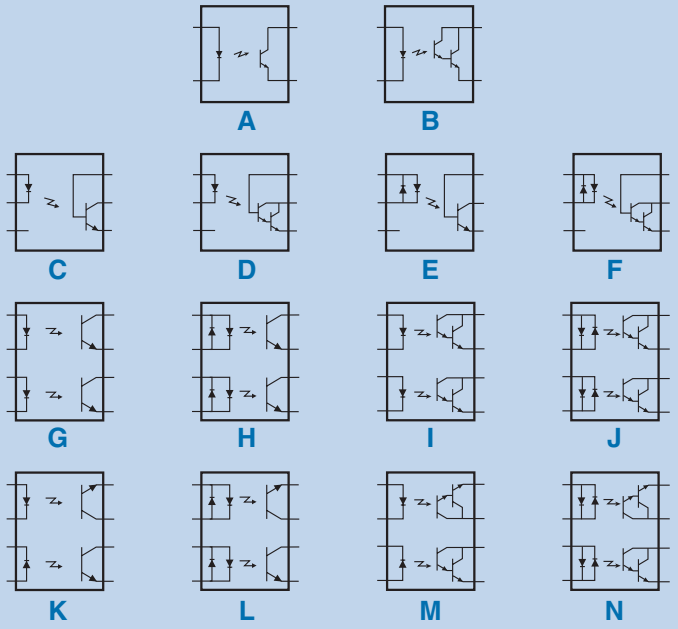
- AC and DC Compatible Inputs
- 1500V_{rms}, 3750V_{rms}, 5000V_{rms} I/O Isolation
- Machine Insertable, Wave Solderable

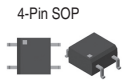
Applications:

- Voltage Detection
- Tip/Ring Circuits
- Modem Switching (Laptops, Notebooks, PDAs)
- Loop Detection
- Ringing Detection
- Current Sensing
- Telecom Switching

Part Number	Minimum Breakdown Voltage (V_P)	Nominal Current Transfer Ratio (%)	Maximum Saturation Voltage (V)	Maximum Input Control Current (mA)	Minimum Isolation Voltage (V_{rms})	Package Type	Configuration
CPC1001N	30	330	0.3	0.2	1500	10	A
CPC1301	350	5500	1.2	1	5000	42, 43	B
CPC1302	350	5500	1.2	1	3750	20, 22	I
CPC1303	30	1000	0.5	0.2	5000	42, 43	A
LDA100	30	300	0.5	1	3750	12, 14	E
LDA101	30	300	0.5	1	3750	12, 14	C
LDA102	30	350	0.5	1	3750	12, 14	C
LDA110	30	8500	1	1	3750	12, 14	F
LDA111	30	8500	1	1	3750	12, 14	D
LDA200	30	300	0.5	1	3750	20, 22	L
LDA201	30	300	0.5	1	3750	20, 22	K
LDA202	30	300	0.5	1	3750	20, 22	H
LDA203	30	300	0.5	1	3750	20, 22	G
LDA210	30	8500	1	1	3750	20, 22	N
LDA211	30	8500	1	1	3750	20, 22	M
LDA212	30	8500	1	1	3750	20, 22	J
LDA213	30	8500	1	1	3750	20, 22	I

Configurations





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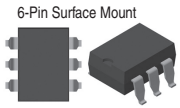

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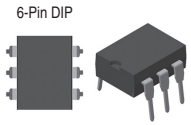

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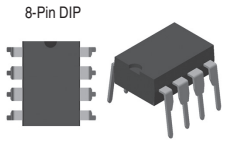

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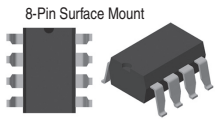

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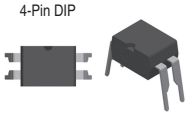

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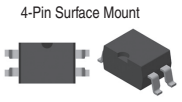

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For ordering information, go to **www.clare.com/Products/ProdList.htm**

Linear Optocouplers

OptoMOS Linear Optocouplers feature an infrared LED optically coupled to a pair of photodiodes. One feedback (input) photodiode is used to generate a feedback signal that provides a servomechanism to the LED drive current thus compensating for the LED's nonlinear time and temperature characteristics. The output photodiode provides an isolated output signal that is linear with respect to the servo LED current.

Features:

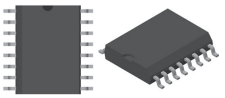
- Couples Analog & Digital Signals
- 3750V_{rms} Input / Output Isolation
- Wide Bandwidth (>200kHz)
- High Gain Stability
- Low Input / Output Capacitance
- Low Power Consumption
- 0.01% Servo Linearity
- THD 87dB Typical
- VDE Compatible
- Machine Insertable, Wave Solderable

Applications:

- Modem Transformer Replacement with No Insertion Loss
- Digital Telephone Isolation
- Power Supply Feedback Voltage / Current
- Medical Sensor Interfacing
- Isolation of Process Control Transducers

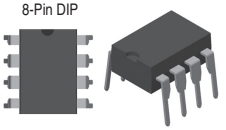
16-Pin SOIC

4



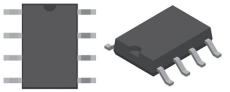
8-Pin DIP

20



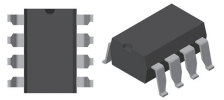
8-Pin Flatpack

21



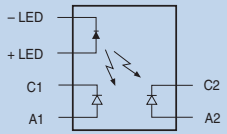
8-Pin Surface Mount

22

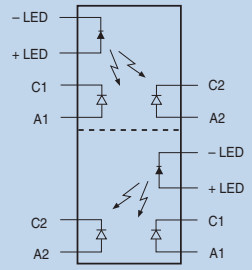


Part Number	Servo Gain K1 (Min / Max)	Forward Gain K2 (Min / Max)	Transfer Gain K3 (Min / Max)	Input Control Current (mA)	Isolation Voltage (V_{rms})	Package Type
LOC110	0.004 / 0.03	0.004 / 0.03	0.668 / 1.179	2 - 10	3750	20, 21, 22
LOC111	0.008 / 0.03	0.006 / 0.03	0.733 / 1.072	2 - 10	3750	20, 21, 22
LOC112	0.004 / 0.03	0.004 / 0.03	0.733 / 1.072	2 - 10	3750	20, 21, 22
LOC117	0.008 / 0.03	0.006 / 0.03	0.887 / 1.072	2 - 10	3750	20, 21, 22
LOC210	0.004 / 0.03	0.004 / 0.03	0.733 / 1.072	2 - 10	3750	4
LOC211	0.008 / 0.03	0.006 / 0.03	0.733 / 1.072	2 - 10	3750	4

LOC11x



LOC21x



Optically Isolated Error Amplifiers

Optically Isolated Linear Error Amplifiers combine Clare's optical technology with an industry standard 431-type precision programmable shunt regulator to provide linear isolated feedback for power supply designs. The LIA120 features matched photodiodes for linear high-gain response with excellent temperature stability for a total gain error of less than 2dB.

These devices are well suited for isolated high-gain feedback amplifiers that require excellent linearity and low temperature variation such as power supply feedback stages, modem and audio transformer replacements, industrial control signals, and sensor feedback. Available in 8-pin DIP or 8-pin surface mount packages.

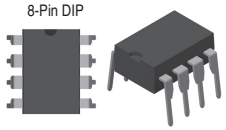
Features:

- 70dB Linearity Typical
- Optocoupler, Precision Reference, and Error Amplifier in a Single Package
- Low Voltage Operation: 2.7V

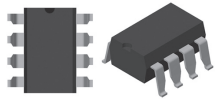
Applications:

- Power Supply Feedback
- Telecom Central Office Supply
- Telecom Bricks
- Modem Transformer Replacement

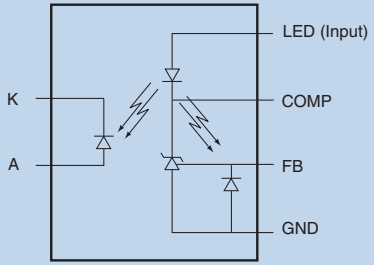
8-Pin DIP



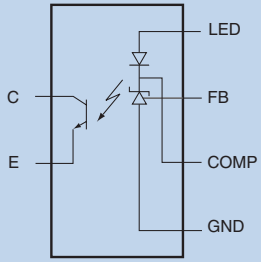
8-Pin Surface Mount



LIA120



LIA130



Part Number	Reference Voltage (V)	V_{REF} Tolerance (%)	CTR K1 (%)	CTR K2 (%)	CTR Matching K3 (%)	Linearity (dB)	Isolation Voltage (V_{rms})	Package Type
LIA120	1.24V	1	1 - 3	1 - 3	85 - 115	70	3750	8-Pin DIP, 8-Pin Surface Mount
LIA130	1.24V	1	-	-	-	-	3750	8-Pin DIP, 8-Pin Surface Mount

For ordering information, go to **www.clare.com/Products/ProdList.htm**

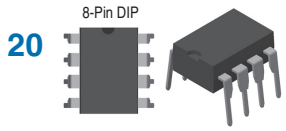
Gate Drivers

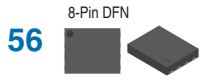
Clare's line of ultra-fast, high current MOSFET and IGBT gate drivers are optimized for high efficiency performance in motor drive and power conversion applications. With output current ratings of 2A to 30A, they are designed to switch the largest MOSFETs and IGBTs with minimum switching times and at frequencies up to 10MHz. Depending on the output current rating, these gate drivers are offered in DFN, SOIC, Power SOIC, DIP, TO-220, and TO-263 packages.

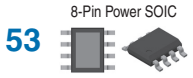
The 30A IXD_630 features an undervoltage lockout (UVLO) that keeps the output LOW until a sufficient level of V_{CC} is present.

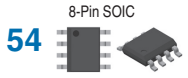
IXD_600 Series Low-Side Gate Drivers - NEW!

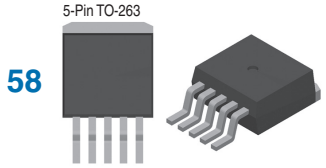
Part Number	Output Type	I_{PEAK} T_C=25°C (A_P)	Output Resistance (Ω)	Logic Configuration	Enable Function	Undervoltage Lockout (V)	Package Type
IXDF602	DUAL	2	4	F			20, 53, 54, 56
IXDI602	DUAL	2	4	D			20, 53, 54, 56
IXDN602	DUAL	2	4	E			20, 53, 54, 56
IXDD604	DUAL	4	2.5	G	•		20, 53, 54, 56
IXDF604	DUAL	4	2.5	F			20, 53, 54
IXDI604	DUAL	4	2.5	D			20, 53, 54
IXDN604	DUAL	4	2.5	E			20, 53, 54
IXDD609	SINGLE	9	1	A	•		20, 53, 54, 56, 57, 58
IXDI609	SINGLE	9	1	B			20, 53, 54, 57, 58
IXDN609	SINGLE	9	1	C			20, 53, 54, 57, 58
IXDD614	SINGLE	14	0.8	A	•		20, 53, 57, 58
IXDI614	SINGLE	14	0.8	B			20, 53, 57, 58
IXDN614	SINGLE	14	0.8	C			20, 53, 57, 58
IXDD630	SINGLE	30	0.4	A	•	$V_{CC} \leq 12.5V$	57, 58
IXDD630M	SINGLE	30	0.4	A	•	$V_{CC} \leq 9V$	57, 58
IXDI630	SINGLE	30	0.4	B		$V_{CC} \leq 12.5V$	57, 58
IXDI630M	SINGLE	30	0.4	B		$V_{CC} \leq 9V$	57, 58
IXDN630	SINGLE	30	0.4	C		$V_{CC} \leq 12.5V$	57, 58
IXDN630M	SINGLE	30	0.4	C		$V_{CC} \leq 9V$	57, 58

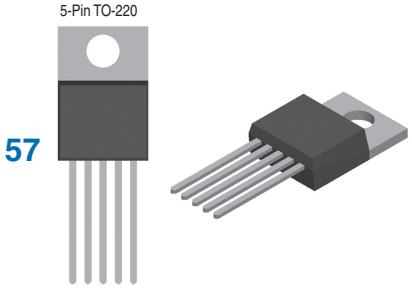










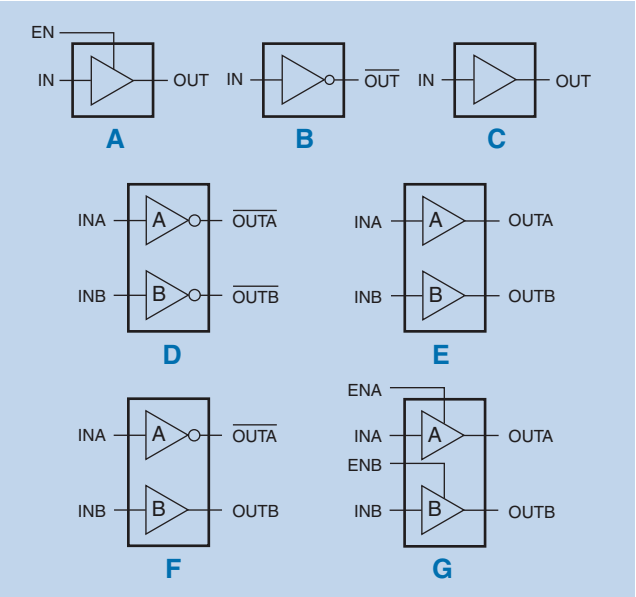


Features:

- 2A to 30A Peak Source/Sink Drive Current
- Wide Operating Voltage Range: 4.5V to 35V
- -40°C to +125°C Extended Operating Temperature Range
- Logic Input Withstands Negative Swing of up to 5V
- Matched Rise and Fall Times
- Low Propagation Delay Time
- Low 10μA Supply Current
- Low Output Impedance

Applications:

- Efficient Power MOSFET and IGBT Switching
- Switch Mode Power Supplies
- Motor Controls
- DC to DC Converters
- Class-D Switching Amplifiers
- Pulse Transformer Driver



For ordering information, go to **www.clare.com/Products/ProdList.htm**

IX2127 600V High-Side MOSFET and IGBT Driver

The IX2127 is a high-voltage, high-speed power MOSFET and IGBT driver. The device's high-voltage level-shift technique enables it to operate at up to 600V. Clare's proprietary common-mode design techniques provide stable operation in high dV/dt noise environments.

The IX2127 detects an over-current condition in the driven MOSFET or IGBT device, and shuts down drive to that device. An open-drain output, FAULT, indicates that an over-current shutdown has occurred. The gate driver output typically can source 250mA and sink 500mA, which is suitable for fluorescent lamp ballast, motor control, SMPS, and other converter drive topologies. Available in 8-pin DIP and 8-pin SOIC packages.

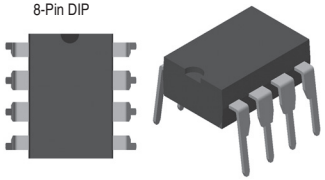
Features:

- Floating Channel Designed for Bootstrap Operation up to 600V
- Tolerant to Negative Transient Voltages; dV/dt Immune
- Undervoltage Lockout
- 3.3V, 5V, and 12V Input Logic Compatible
- Open-Drain FAULT Indicator Pin Shows Over-Current Shutdown
- Output in Phase with the Input

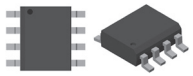
Applications:

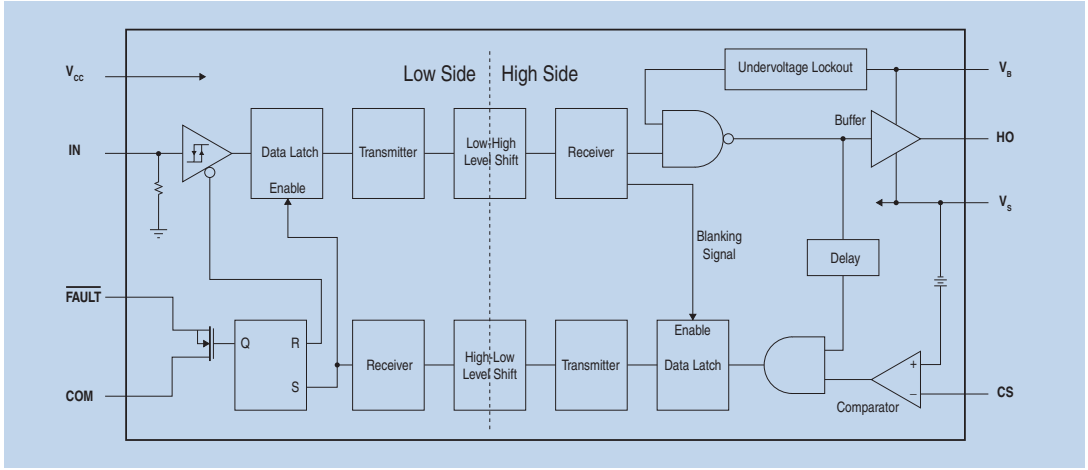
- High Speed Gate Driver
- Motor Drive Inverter
- Automotive

8-Pin DIP



8-Pin SOIC





MX6895 -550V Full Bridge Gate Driver

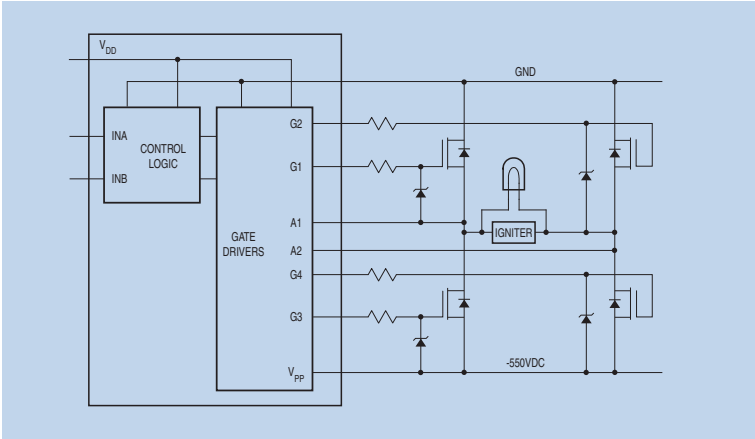
Built on Clare's high voltage integrated circuit (HVIC) technology, the MX6895 combines high-side and low-side N-channel power MOSFET drivers in a full bridge configuration. The circuit is optimally configured to be used as a commutator for High Intensity Discharge (HID) lamps. This device is provided in a 16-pin SOIC package.

Features:

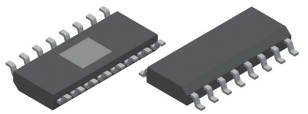
- Internal High Voltage Level Shift Function
- Negative 550V Lamp Supply Voltage
- 3V to 12V CMOS Logic Compatible
- 8V to 12V Input Supply Voltage
- No External Bootstrap Capacitors Needed

Applications:

- Commutator for High Intensity Discharge Lamps
- Vehicle Xenon Head Lamps
- Outdoor/Street Lighting
- Multimedia Projectors
- Retail Accent Lighting
- Warehouse Lighting



16-Pin Power SOIC

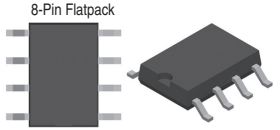


For ordering information, go to **www.clare.com/Products/ProdList.htm**

Optically Isolated Gate Drivers

The CPC1580 and CPC1590 are high speed, optically isolated Gate Driver ICs. On-chip circuitry charges an external capacitor from the load voltage which eliminates the need for an external IC power supply. These Gate Drivers are ideal for low duty cycle switching applications. Both devices are provided in Clare's 8-pin flatpack package.

8-Pin Flatpack



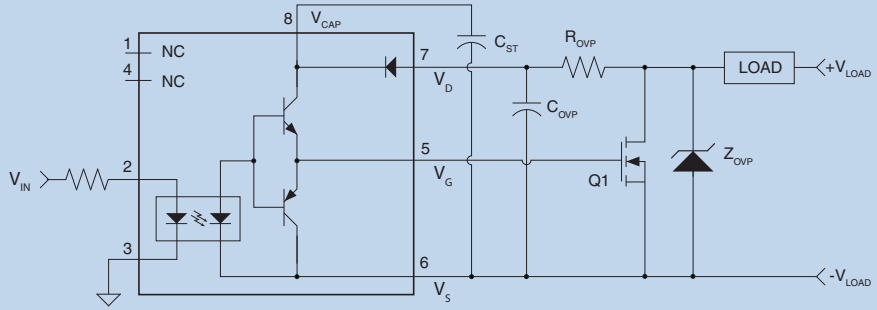
Features:

- No External IC Power Supply
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Load Voltages up to 200V
- Fast Switching Times - On: 20 μsec / Off: 400 μsec

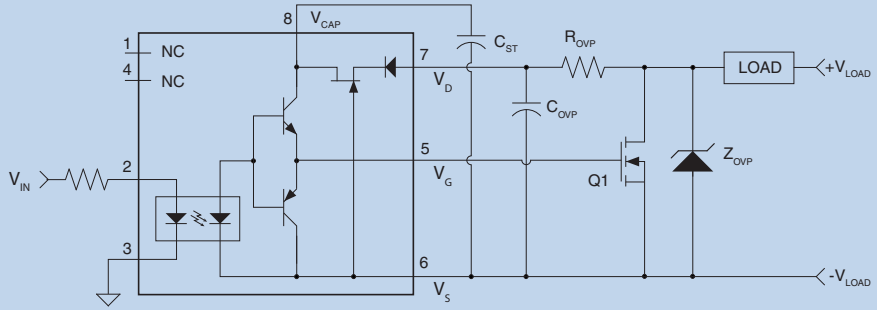
Applications:

- Instrumentation
- Multiplexers
- I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment (Patient/Equipment Isolation)
- Security
- Aerospace
- Industrial Controls

CPC1580



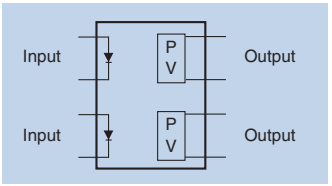
CPC1590



Part Number	Input Control Current (mA)	Gate Voltage @ I_F=5mA (V_G)	Blocking Voltage (V_P)	Regulated Capacitor Voltage ($V_{CAP-MAX}$)	Nominal Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})
CPC1580	5	7 - 12	65	V_{DS} - 0.2	0.04 / 0.4	3750
CPC1590	5	7 - 12	200	16	0.04 / 0.4	3750

Optically Isolated Dual MOSFET Gate Driver

The FDA215 is a Dual Optically Isolated Photodiode Array. The light-activated array produces an open-circuit voltage of up to 8V. This device is suited for use in discrete solid state relay designs. The FDA215 is provided in either an 8-pin DIP package or in an 8-pin surface-mount package.



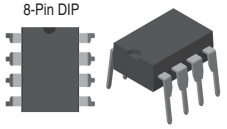
Features:

- Isolated 5V Photovoltaic Output
- Floating Outputs for Parallel or Series Configuration

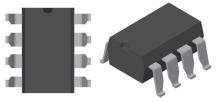
Applications:

- MOSFET Driver
- Isolated Floating Power Source

8-Pin DIP



8-Pin Surface Mount



Part Number	Input Control Current (mA)	Nominal Open-Circuit Voltage V_{OC} (V)	Nominal Short-Circuit Current I_{SC} (μA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Package Type
FDA215	5	5.5	2.5	5 / 5	3750	8-Pin DIP, 8-Pin Surface Mount

For ordering information, go to **www.clare.com/Products/ProdList.htm**

High Voltage Analog Switches

Clare's high-voltage analog switches are low charge injection 8 & 16-channel, high-voltage analog switch integrated circuits for use in applications requiring high voltage switching. Control of the high voltage switching is via low voltage, TTL logic level compatible inputs for direct connectivity to the system controller. Switch manipulation is managed by serial to parallel shift registers whose outputs are buffered and stored by a transparent latch. Level shifters buffer the latch outputs, and operate the high voltage switches. Construction of the switches using Clare's reliable BCDMOS process technology on SOI (Silicon On Insulator) enables the switches to be organized as solid state switches with direct gate drive.

Features:

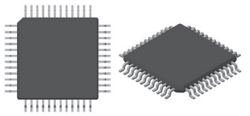
- Flexible High Voltage Supplies up to V_{PP}-V_{NN}=200V
- Output Switch On-Resistance Typically 20Ω
- Low Charge Injection, Low Capacitance Analog Switches
- Very Low Quiescent Current: 30nA Typical
- -58dB Off-Isolation at 5MHz
- Internal Bleed Resistors: CPC7232 & CPC7701

Applications:

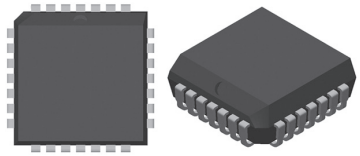
- Piezoelectric Transducer Drivers
- Ultrasound Imaging
- Printers
- Industrial Controls and Measurement

	Part Number	Number of Channels	Channel On-Resistance (Ω)	Bleed Resistors (kΩ)	Clock Frequency (MHz)	Turn-On Time (µs)	Turn-Off Time (µs)	Package Type
	CPC7220	8	20	-	5	5	5	50, 51
	CPC7232	8	21	20 - 50	5	5	5	50, 51
NEW!	CPC7601	16	20	-	8	5	5	50
NEW!	CPC7701	16	21	20 - 50	8	5	5	50

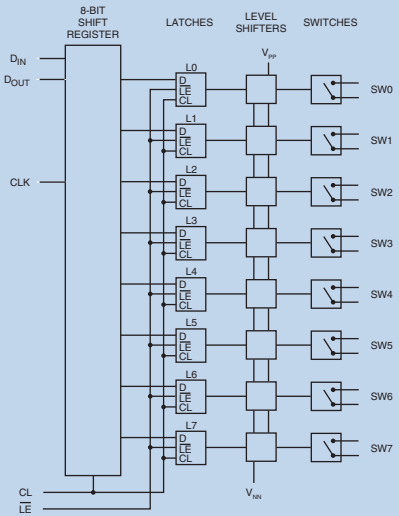
50 48-Pin LQFP



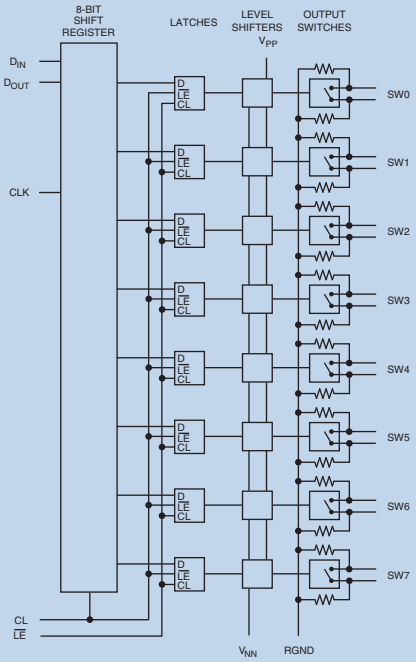
51 28-Pin PLCC



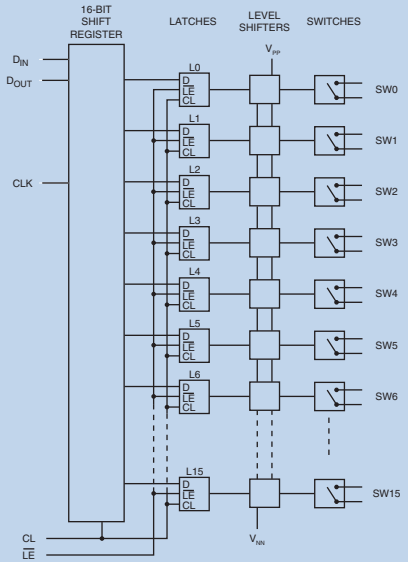
CPC7220



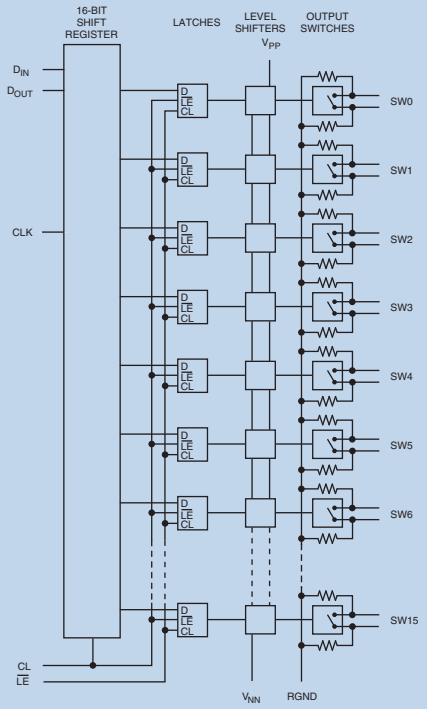
CPC7232



CPC7601



CPC7701



For ordering information, go to **www.clare.com/Products/ProdList.htm**

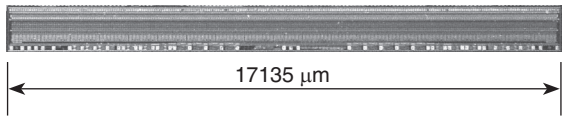
Display Products

MXEI2300 300-Output ePaper Gate Driver

MXEI2300 is a 300 bit serial shift register, level translator, and high voltage buffered driver. MXEI2300 is an excellent choice for driving the displays of eBooks and eReaders, mobile phones and other portable hand-held devices, smart cards, and other electronic display devices. MXEI2300 output switching modes are: one pulse, continuous two pulse, jumping two pulse, or no pulse pattern. MXEI2300 can be cascaded up to a maximum of four devices. MXEI2300 is available as gold bumped die in wafer form or waffle pack.

Features:

- CMOS Technology
- Drives Segment or Active Matrix Displays
- 16V to 47V Output Drive (V_{DD} to V_{EE})
- Selectable Output Shift Direction and Polarity

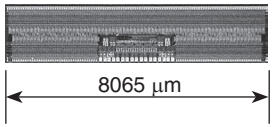


MXEI2240 240-Output ePaper Gate Driver

MXEI2240 is a 240 bit serial shift register, level translator, and high voltage buffered driver. MXEI2240 is an excellent choice for driving the displays of eBooks and eReaders, mobile phones and other portable hand-held devices, smart cards, and other electronic display devices. MXEI2240 output switching modes are: one pulse, continuous two pulse, jumping two pulse, or no pulse pattern. MXEI2240 can be cascaded up to a maximum of four devices. MXEI2240 is available as gold bumped die in wafer form or waffle pack.

Features:

- CMOS Technology
- Drives Segment or Active Matrix Displays
- 16V to 57V Output Drive (V_{DD} to V_{EE})
- Selectable Output Shift Direction and Polarity

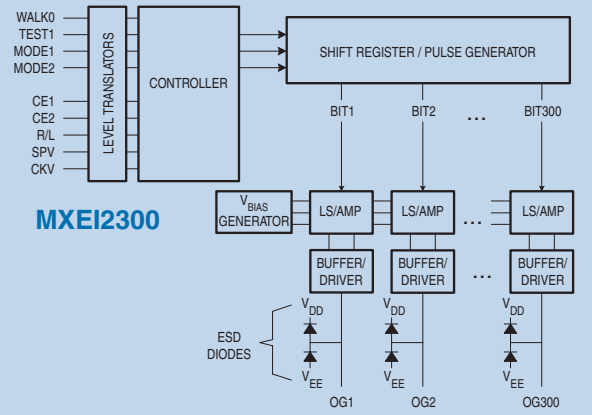


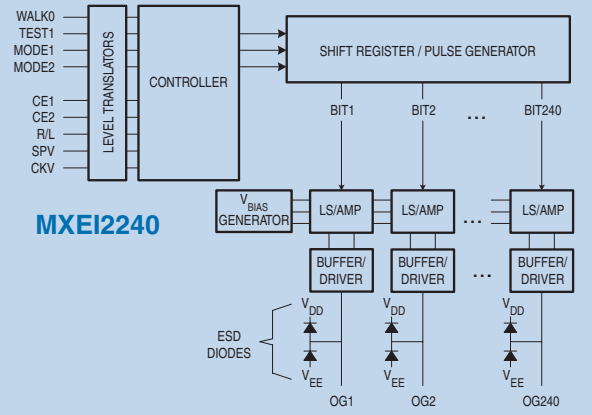
MXEI1480 ±15V ePaper Source Driver

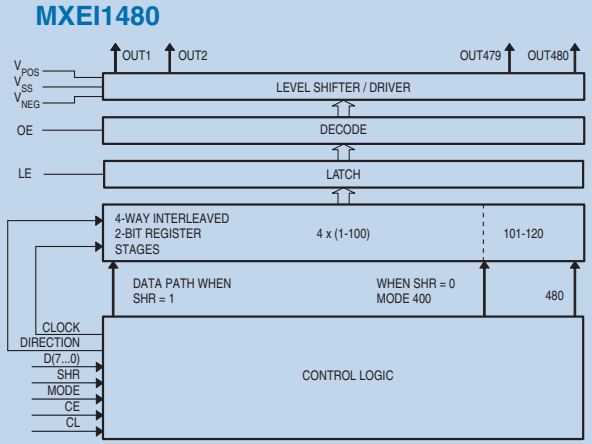
Clare's MXEI1480 is a selectable 400 or 480 bit long, 2-bit wide, serial-input, parallel-output digital shift register with level conversion on each parallel output, which convert the 2 digital bits into V_{POS}, V_{SS}, or V_{NEG} analog output voltages. An 8-bit input bus simultaneously inputs 4 groups of 2 bits each. MXEI1480 is available as gold-bumped die in waffle pack and gold-bumped die in wafer form.

Features:

- CMOS Technology
- ±15V Output Driver Supply Voltage
- Drives Segment or Active Matrix Displays
- 4-Level Gray Scale
- 25MHz Clock Frequency
- Bidirectional Data Transfer
- Selectable Register Length
- 2.7V to 5.5V Logic Supply Voltage
- Cascadable







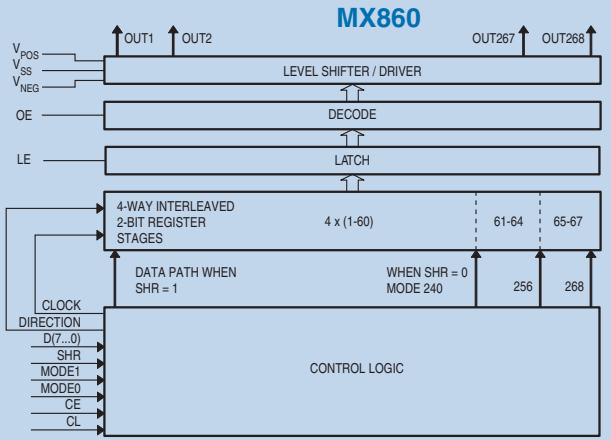
For ordering information, go to **www.clare.com/Products/ProdList.htm**

MX860 ±15V ePaper Source Driver

Clare's MX860 is a selectable 240, 256, or 268 bit long 2-bit wide serial-input, parallel-output digital shift register with level conversion on each parallel output, which convert the 2 digital bits into V_{POS}, V_{SS}, or V_{NEG} analog output voltages. An 8-bit input bus simultaneously inputs 4 groups of 2 bits each. MX860 is available as gold-bumped die in waffle pack and gold-bumped die in wafer form.

Features:

- CMOS Technology
- ±15V Output Driver Supply Voltage
- Drives Segment or Active Matrix Displays
- 4-Level Gray Scale
- 25MHz Clock Frequency
- Bidirectional Data Transfer
- Selectable Register Length
- 2.7V to 5.5V Logic Supply Voltage
- Cascadable



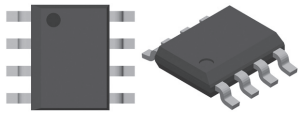
CPC9909 High Efficiency, High Brightness Off-Line LED Driver

The CPC9909 is a low-cost, high-efficiency, off-line, high-brightness (HB) LED driver manufactured using Clare's high voltage BCDMOS on SOI process. It has an internal regulator that allows it to operate from $8V_{DC}$ to $550V_{DC}$. This wide input operating voltage range enables the driver to be used in a broad range of HB LED applications.

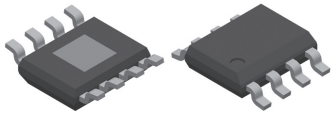
Features:

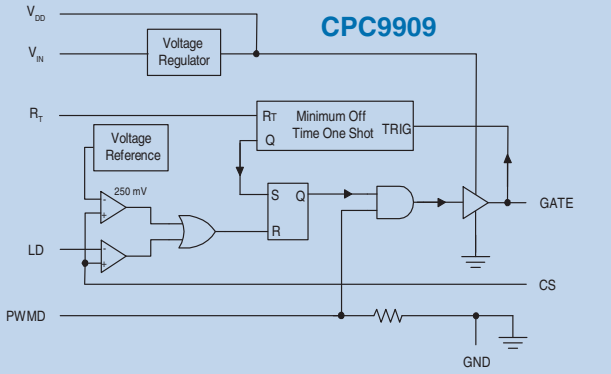
- 8V to 550V Input Voltage Range
- >90% Efficiency
- Stable Operation at >50% Duty Cycle
- Drives Multiple LEDs in Series/Parallel
- Regulated LED Current
- Linear or PWM Brightness Control Inputs
- Resistor-Programmable Minimum Off-Time
- Buck or Boost Configuration
- Available in 8-Pin SOIC and Power SOIC Packages

8-Pin SOIC



8-Pin Power SOIC





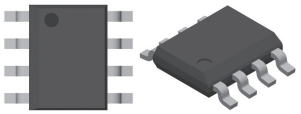
MXHV9910 High Voltage, Off-Line LED Driver

The MXHV9910 features a fixed-frequency, peak-current control method, which provides an ideal solution for driving multiple LEDs in series and in parallel. Internal circuitry allows it to operate from a universal AC line, or from $8V_{DC}$ to $450V_{DC}$. This highly versatile input operating voltage enables this IC to be used in a broad range of HB LED applications. In addition, LED dimming can be implemented by applying a small DC voltage to the LD pin, or by applying a low-frequency digital PWM signal to the PWMD pin. Applications include flat-panel display RGB backlighting, signage, decorative LED lighting, and DC & AC/DC LED driver applications.

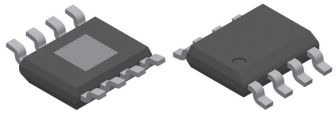
Features:

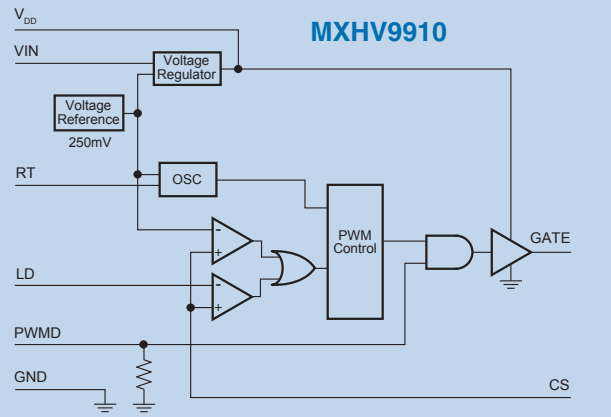
- 8V to 450V Input Voltage Range
- >90% Efficiency
- Drives Multiple LEDs in Series/Parallel Combinations
- Regulated LED Drive Current
- Linear or PWM Brightness Control Inputs
- Resistor-Programmable Oscillator Frequency
- Available in 8-Pin SOIC and Power SOIC Packages

8-Pin SOIC



8-Pin Power SOIC





For ordering information, go to **www.clare.com/Products/ProdList.htm**

Telecommunications Products

Line Card Access Switches - LCAS

The LCAS product family consists of monolithic ICs that contain high-voltage switches for tip and ring line break, power ringing, line test access, test in access, and ringing generator testing. They provide the necessary functions to replace all 2-Form-C electromechanical relays found on both traditional voice and integrated voice and data (IVD) line cards found in Central Office, Digital Loop Carriers, and Channel Banks. LCAS ICs enable low-power, high-density line cards.

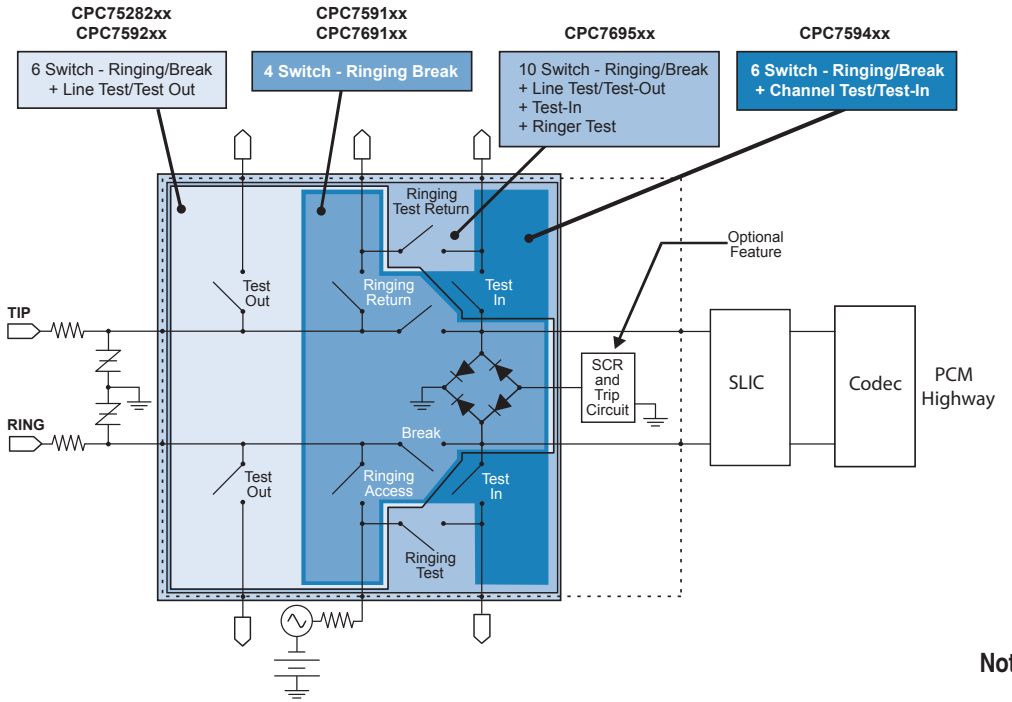
New features include: (1) TTL compatible inputs, (2) Smart logic for safe power up and hot plug state control, and (3) Increased dV/dt immunity.

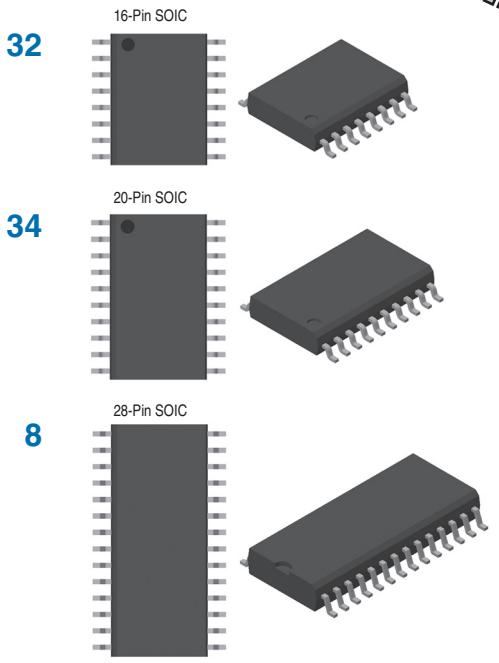
Features:

- Small Surface Mount SOIC or DFN Packages
- Monolithic IC Reliability
- Low, Matched On-Resistance
- Built-in Zero-Cross Switching
- Impulse Noise Reduction
- Current Limiting, Thermal Shutdown, and SLIC Protection
- Robust Power Cross and Lightning Surge Performance
- Ultra-Low Power Consumption of <10.5mW

Applications:

- VOIP Gateways
- Central Offices (CO)
- Digital Loop Carriers (DLC)
- Digitally Added Main Line (DAML)
- Hybrid Fiber Coax (HFC)
- Fiber in the Loop (FITL)
- Pair Gain Systems
- Channel Banks
- PBX Systems





Note: Packages refer to devices in the table on the next page.

For ordering information, go to **www.clare.com/Products/ProdList.htm**

LCAS Devices

Part Number	Minimum 1500V/µs dV/dt	Switch Pairs: # Switches	Break	Ringing	Test Out	Test In	Ringing Test	Zero-Cross Switching	Protection Features: Current Limit	Diode Bridge	Protection SCR	Minimum Hold Current (mA)	Logic States	Package Type
CPC7691BA	•	4	•	•				•	•	•	•	110	3	32
CPC7691BB	•	4	•	•				•	•	•			3	32
CPC7695xA	•	10	•	•	•	•	•	•	•	•	•	110	7	8, 34
CPC7695xB	•	10	•	•	•	•	•	•	•	•			7	8, 34
CPC7695xC	•	10	•	•	•	•	•	•	•	•	•	110	8	8, 34
CPC7591BA		4	•	•				•	•	•	•	110	3	32
CPC7591BB		4	•	•				•	•	•			3	32
CPC7592BA		6	•	•	•			•	•	•	•	60	4	32
CPC7592BB		6	•	•	•			•	•	•			4	32
CPC7592BC		6	•	•	•			•	•	•	•	110	5	32
CPC7594xA		6	•	•		•		•	•	•	•	110	4	32
CPC7594xB		6	•	•		•		•	•	•			4	32
CPC7594xC		6	•	•		•		•	•	•	•	110	4	32

Dual LCAS: 6-Pole CPC75282

The CPC75282 Dual Line Card Access Switch (LCAS), a member of Clare's next generation Line Card Access Switch family, is a monolithic solid state device that provides the switching functionality of four 2-Form-C relays in a single, small, economical package.

The CPC75282 Dual LCAS device is designed to provide ringing and test access to the telephone loop in Central Office, Digitally Added Main Line, Private Branch Exchange, Digital Loop Carrier, and Hybrid Fiber Coax/Fiber-In-The-Loop analog line card applications. Test access switches provide access to the telephone loop for line (drop) test or message waiting in the PBX application. Available in a 44-pin TQFP package.

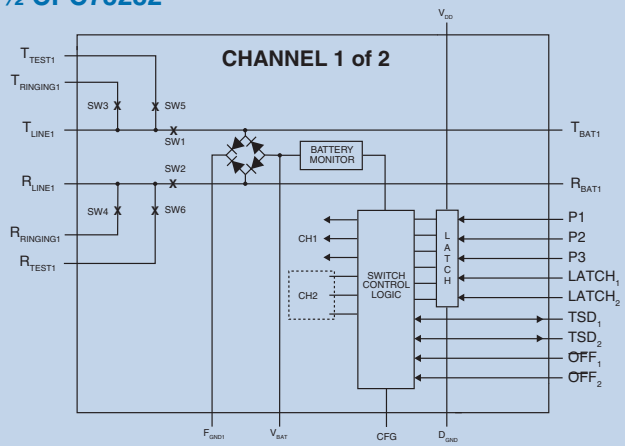
Features:

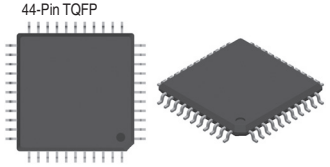
- Improved Switch dV/dt Immunity of 1500V/µs
- Smart Logic for Power-Up/Hot-Plug State Control
- Low, Matched R_{ON}
- Eliminates the Need for Zero-Cross Switching
- Flexible Switch Timing to Transition from Ringing Mode to Talk Mode
- Tertiary Protection Consisting of Integrated Current Limiting, Voltage Clamping, and Thermal Shutdown for SLIC Protection
- 5V Operation with Very Low Power Consumption
- Intelligent Battery Monitor
- Latched Logic-Level Inputs, No External Drive Circuitry Required

Applications:

- VoIP Gateways
- Central Office (CO)
- Digital Loop Carrier (DLC)
- PBX Systems
- Digitally Added Main Line (DAML)
- Hybrid Fiber Coax (HFC)
- Fiber In The Loop (FITL)
- Pair Gain System
- Channel Banks

½ CPC75282





For ordering information, go to **www.clare.com/Products/ProdList.htm**

LCAS for Ringing SLIC: CPC7508

The CPC7508 is a member of Clare's next generation Line Card Access Switch family. Used with ringing SLICs, it provides the necessary functions to replace the two 2-Form-C electromechanical test relays used in contemporary Fiber To The Home (FTTH) and Optical Network Unit (ONU) deployments as well as Voice over IP (VoIP) telephony terminals. Solid state switches provide the mechanism for tip and ring line break, drop test, and channel test while requiring only a single +12V supply for operation. Interface compatibility with 3.3V or 5V logic for switch state control is provided by the TTL logic-level inputs. The CPC7508 is designed for fiber access units where EMR's are used for test access and line monitoring functions but solid-state switches are desired due to reduced operating noise, lower power consumption and longer lifetimes. Available in a 16-pin SOIC package.

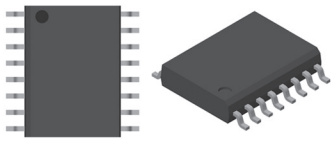
Features:

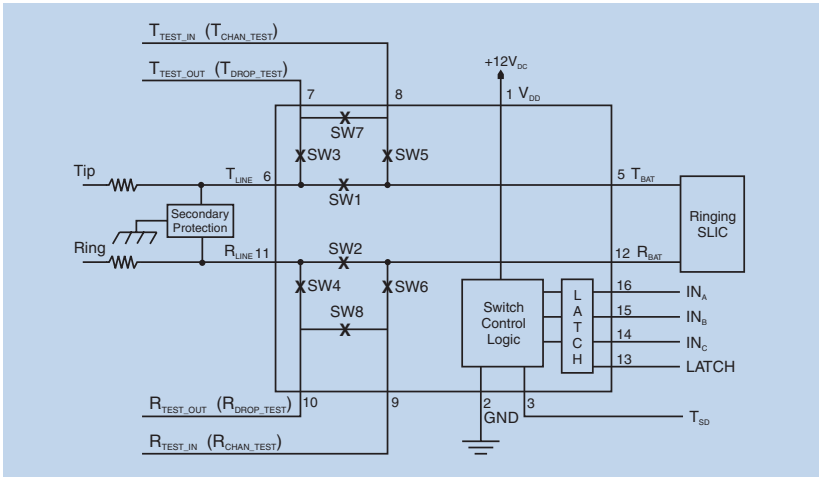
- TTL Logic-Level Inputs for 3.3V Logic Interfaces
- Smart Logic for Power-Up / Hot Plug State Control
- Monolithic IC Reliability
- Low, Matched R_{ON}
- Clean, Bounce-Free Switching
- Tertiary Protection Consisting of Integrated Current Limiting and Thermal Shutdown for SLIC Protection

Applications:

- Fiber to the Home (FTTH)
- Fiber in the Loop (FITL)
- VoIP Gateways
- PBX Systems
- Digitally Added Main Line (DAML)
- Hybrid Fiber Coax (HFC)

16-Pin SOIC





Quad High Voltage Isolated Analog Switch Array: CPC7514 (NEW!)

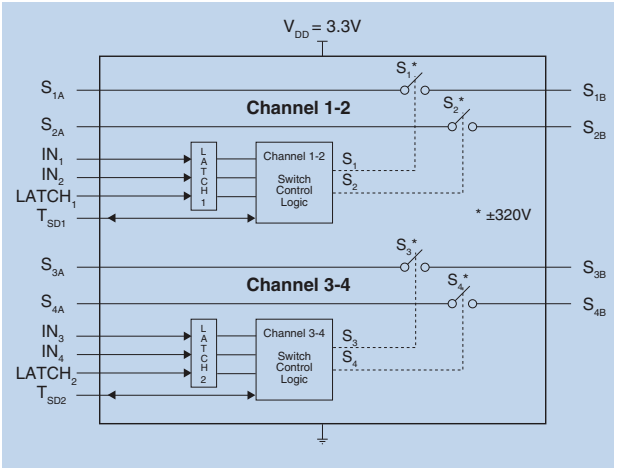
The CPC7514 Quad High Voltage (HV) isolated Analog Switch Array builds upon Clare's Line Card Access Switch (LCAS) design and fabrication expertise for telecom and non-telecom applications. This monolithic solid state device provides the switching functionality of four normally open (1-Form-A) relays in one small economical package. Designed to provide flexible single-ended or differential access to high voltage networks, the CPC7514 High Voltage Array (HVA) is configured as two sets of matched, paired switches for improved differential performance. Additionally, sensitive differential applications will benefit from the matched pairs excellent pair-to-pair isolation. The self-biasing switches do not require external high-voltage supplies for proper operation. Independent switch current limiting and switch-pair thermal shutdown features provide enhanced protection for devices connected to high voltage networks up to +320V.

Features:

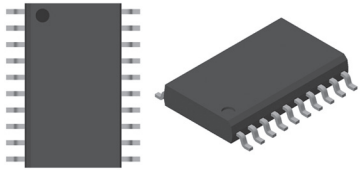
- Low, Matched R_{ON}
- Switch Voltage up to 320V
- 320V Logic Input to Switch Output Isolation
- 110dB Switch-to-Switch Isolation at 5kHz
- Flexible Switch Configurations
- Smart Logic for Power-Up / Hot-Plug State Control
- 3.3V Operation with Very Low Power Consumption
- Switch Current Limiting Protects Against Fault Conditions
- Thermal Shutdown Protects Against Fault Conditions
- Latched TTL Logic-Level Inputs
- Clean, Bounce-Free Switching
- Monolithic IC Reliability

Applications:

- Instrumentation
- Industrial Controls and Monitoring
  - Automatic Test Equipment (ATE)
  - Battery Charging Circuits
- Telephony
  - VoIP Gateways
  - Central Office (CO) and Remote Terminal (RT)
    - Concentrators
  - PBX Systems
  - Optical Network Terminals (ONT) and Optical Network Units (ONU)
  - Hybrid Fiber Coax (HFC)



20-Pin SOIC



For ordering information, go to **www.clare.com/Products/ProdList.htm**

LITELINK™ Silicon DAA, Phone Line Interface

The LITELINK phone line interface is the industry's only single package silicon Data Access Arrangement, featuring a 32-pin, small outline, low profile, surface mount package. It is ideal for both voice and data (V.22bis to V.90/V.92) and applications in particularly dense circuit environments. The internal optical isolation barrier eliminates high-cost transformer or capacitive isolation circuits. This solution saves cost relative to competitive circuits through reduced passive component count and smaller printed circuit board space.

The 3kV$_{rms}$ internal isolation barrier exceeds all worldwide regulatory requirements. The optical isolation barrier yields low distortion performance necessary for high speed communications. In addition, the LITELINK application circuit is capable of surviving 6kV (10µsec x 700µsec) lightning surge waveforms making it the most robust silicon DAA on the market.

LITELINK offers the lowest operational phone line quiescent current. The device easily interfaces to commonly available standard single-ended or differential voice and modem codecs on the market. Contact Clare for information on codec reference designs that offer programmable AC termination impedance for global applications. LITELINK complies with international PSTN agency requirements.

The newest device is the CPC5622, which is part of the LITELINK III product family. It offers continuous Caller-ID (CID) signal buffering which is ideal for telephony applications in countries where CID information is present before the ringing signal. The CPC5622 also offers both full-wave and half-wave ringing signal detection allowing the designer to choose the appropriate interface to the codec/DSP block.

Features:

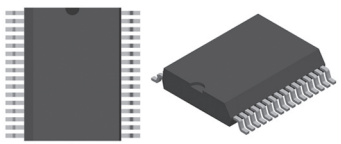
- Voice and Data Applications
- Modem DAA for Speeds up to V.92
- Half-Wave or Full-Wave Ringing Detection
- Worldwide Telephone Network Compatibility
- Caller-ID Reception
- Line Side Powered from Telephone Line
- 3.3V to 5V Power Supply
- Easy Interface with Modem ICs and Voice Codecs
- High Power Transmit Option for Voice Applications (>3dBm)
- Small 32-Pin SOIC Package

Applications:

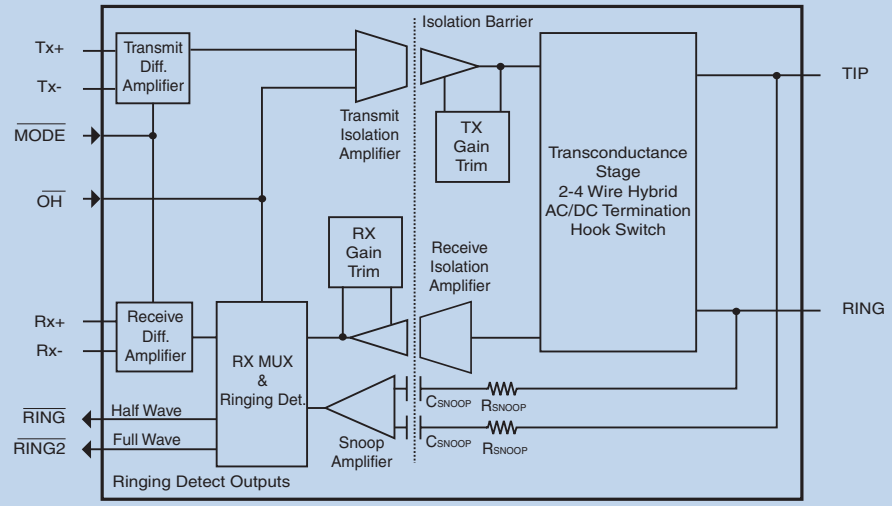
- Computer Telephony
- VoIP Gateways
- PBXs
- Satellite Set-Top Box
- V.92 Modems
- Fax Machines
- Voice Mail Systems
- Embedded Modems
- Vending Machines
- Automated Banking
- Remote Metering
- Surveillance
- Security Systems

Part Number	Family	Isolation Voltage (V_{rms})	Power Supply (V)	Caller ID	Ringing Detect
CPC5622	LITELINK III	3000	3.3 - 5	Continuous	Half-Wave & Full-Wave
CPC5621	LITELINK III	3000	3.3 - 5	Selectable	Full-Wave
CPC5620	LITELINK III	3000	3.3 - 5	Selectable	Half-Wave
CPC5601	Optional Optically Isolated Auxiliary Programmable Driver IC: Enables Host Equipment Control For LITELINK Silicon DAA Devices				
CPC5608	Low-Power Transistor Array (see page 38)				

32-Pin SOIC



CPC5622



For ordering information, go to **www.clare.com/Products/ProdList.htm**

Phone Line Monitor Devices

Clare's CPC5712 is a special-purpose "Phone Line Monitor with Detectors" integrated circuit that is used in various high-voltage telephony applications such as VoIP gateways and IP-PBXs. The device monitors the TIP/RING potential through a high-impedance divider (resistor isolation) to derive two resistor-programmable signal level detects, polarity information, and a scaled, linear representation of the phone line voltages.

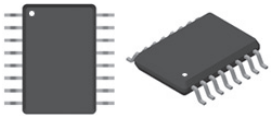
Clare's CPC5710N is a versatile building block for designing telephone line monitoring circuits. The device has two outputs: a scaled, linear representation of the input TIP/RING voltage, and a switchable, internally set comparator output. The comparator output provides a ringing detect signal, the level of which is set by the resistor values selected for the input network. A formula for selecting these input resistors is given in the CPC5710 Data Sheet that is available at Clare's web site. The Data Sheet also includes an application circuit that derives Line-in-Use (LIU) and line polarity information from the scaled output signal. This high-impedance, resistive-barrier application circuit is fully compliant to the EN60950 safety standard, and meets the ITU-T K.21 over-voltage and over-current specifications.

In use, the resistor divider and the high input impedance of both the CPC5710 and the CPC5712 make the circuits practically undetectable on the line.

CPC5712 Features:

- Two Independent, Programmable Level Detectors with Programmable Hysteresis
- Fixed-Level Polarity Detector with Hysteresis
- Differential Linear Output
- Excellent Common-Mode Rejection Ratio (CMRR)
- 16-Pin SOP Package
- Worldwide Telephone Network Compatibility
- Minimum External Components
- High Differential Input Impedance, Very Low Common-Mode Input Impedance
- Fixed Gain
- 3V to 5.5V Operation
- Low Power Consumption
- CMOS Logic-Level Output (TTL Compatible)

16-Pin SOP



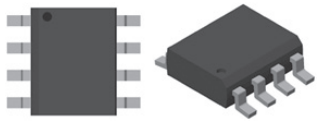
CPC5712 Applications:

- VoIP Gateways, IP-PBX, xDSL
- TIP/RING Monitoring: Polarity Detection for Caller ID, Enhanced 911, Line-in-Use, Battery Detection, PSTN Check
- Non-Telephony Voltage Level Detection Applications: Instrumentation and Industrial Control

CPC5710 Features:

- Differential or Single-Ended Linear Output
- Full-Wave Ringing Level Detector Comparator with Internal Threshold, Large Hysteresis, and TTL Logic-Level Output
- High Common-Mode Rejection Ratio (CMRR)
- 8-Pin SOIC Package
- Worldwide Telephone Network Compatibility
- High Differential Input Impedance, Very Low Common-Mode Input Impedance
- Fixed Gain
- 3V to 5.5V Operation
- CMOS Logic-Level Output (TTL Compatible)

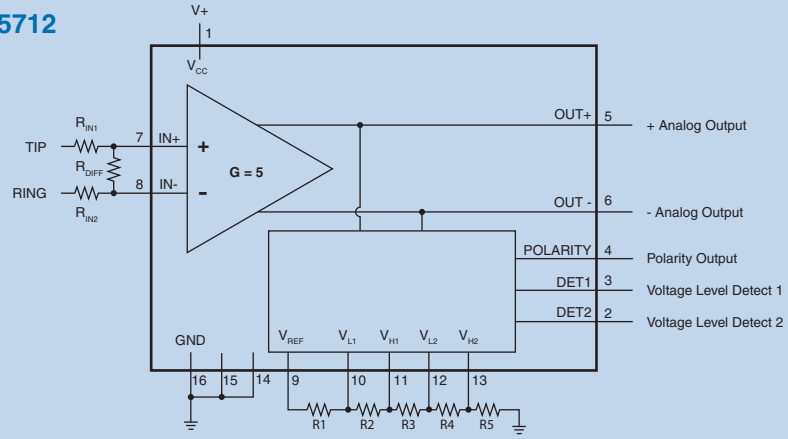
8-Pin SOIC



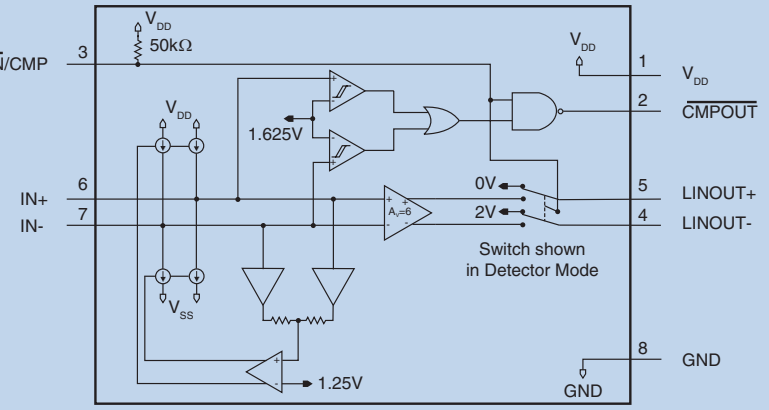
CPC5710 Applications:

- Display Feature (Caller ID) Signal Buffering
- Line-in-Use Detection (Another Phone-Off-Hook)
- Ringing Signal Detection
- Battery Presence Monitoring
- TIP/RING Voltage Monitoring
- Line Polarity

CPC5712



CPC5710



For ordering information, go to **www.clare.com/Products/ProdList.htm**

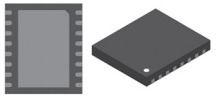
DC Termination IC: CPC1465 SHDSL/ISDN

The CPC1465 provides a polarity-insensitive DC termination for wetting (sealing) current on the CPE side conforming to ITU-T G.991.2 to eliminate corrosion on G.SHDSL/ISDN lines. The CPC1465 has excellent linearity (70dB typ.) to minimize harmonic distortion, and well-controlled turn-on and turn-off characteristics to minimize injecting impulse noise with in-band signal energy into the G.SHDSL channel. This DC termination IC, which interfaces with the tip/ring pair, is rated at 300V, and is able to handle power cross and lightning transients with appropriate protection. Manufactured in Clare's proven 320V Silicon-On-Insulator (SOI) process, the CPC1465 is packaged as a 16-pin SOIC or as a 16-pin DFN.

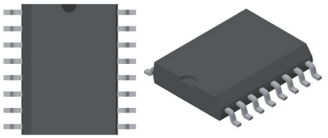
Features:

- Meets Wetting (Sealing) Current Requirements Per ITU-T G.991.2
- Integrated Bridge Rectifier for Polarity Correction
- Uses Inexpensive Optocoupler for DC Signaling
- Electronic Inductor, Breakover, and Latch Circuits
- Current Limiting and Excess Power Protection Circuits
- ANSI SHDSL and ISDN Compatible
- MLT and SARTS Compatible
- Excellent Linearity (70dB typ.)

16-Pin DFN



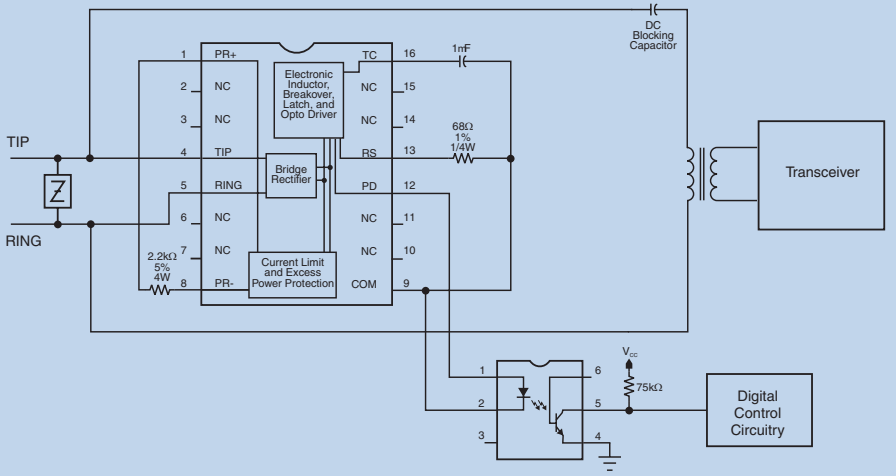
16-Pin SOIC



Applications:

- G.SHDSL
- ISDN
- Router and Bridge Customer Premises Equipment
- Leased Line Equipment
- T1/E1 Network Line Cards and Repeaters
- Network Termination 1 (NT1) Equipment
- Mechanized Loop Test (MLT) Networks
- Switched Access Remote Test System (SARTS) Networks

CPC1465 & Application Circuit



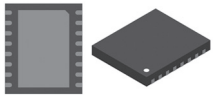
DC Termination IC: CPC1466 Broadband ADSL/VDSL

The CPC1466 is a DC Termination IC for broadband ADSL/VDSL applications. The high-voltage, monolithic device provides a path for DC wetting (sealing) current in customer premises equipment (CPE) to eliminate phone line corrosion on DSL twisted-pair copper lines without telephone voice services (i.e. broadband-only services).

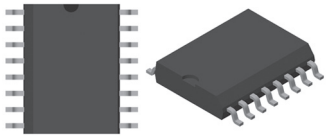
Features:

- Meets Wetting (Sealing) Current Requirements Per ITU-T G.992.3
- Integrated Bridge Rectifier for Polarity Correction
- Uses Inexpensive Optocoupler for DC Sealing Current Monitoring
- Electronic Inductor, Breakover, and Latch Circuits
- Current Limiting and Excess Power Protection Circuits
- ADSL/VDSL Compatible with Low-Pass Filter Network
- MLT and SARTS Compatible
- Compatible with Portable Test Sets
- Small 16-Pin SOIC and 16-Pin DFN Packages

16-Pin DFN



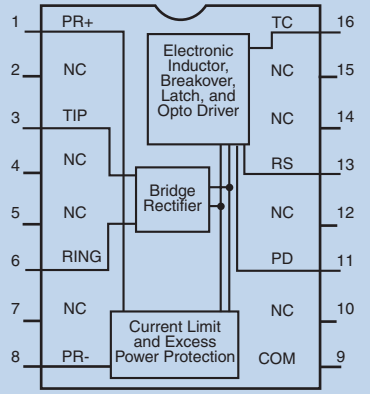
16-Pin SOIC



Applications:

- ADSL/VDSL Broadband Modems
- Router and Bridge Customer Premises Equipment
- Leased Line Equipment
- Mechanized Loop Test (MLT) Networks
- Switched Access Remote Test Systems (SARTS) Networks

CPC1466



For ordering information, go to **www.clare.com/Products/ProdList.htm**

Cybergate™ Data Access Arrangement (DAA) Modules

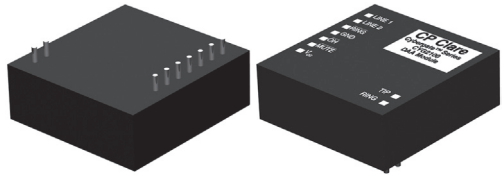
The Cybergate family is Clare's turnkey modular DAA solution. The V.34 family provides the circuitry required in a single, completely functional DAA circuit in a 1.07" x 1.07" x 0.4" plastic module. This plug-and-play design allows the user to choose the necessary options to minimize costs, and in turn maximize value. Standard features include surge protection, transient protection Zeners, ringing detection, hook switch circuitry, gyrator circuitry (impedance balancing), and a transformer. Caller-ID (CID) and loop current detection are also available as options.

Features:

- 28.8kbps (Except for CYG2911 at 9.6kbps)
- Optional Caller ID and Loop Current Sense
- Ringing Detection
- Low Power Hook Switch
- Surge Protection
- Low THD
- Gyrator Circuitry
- Meets Most Regulatory Agency Requirements

Applications:

- Modems
- Remote Data Acquisition
- Fax Machines
- Security / Metering
- Computer Telephony
- PBX
- Voice Mail Systems



Small Package Size!

1.07" x 1.07" x 0.4"

27.18mm x 27.18mm x 10.16mm

Part Number	Region	Hook Switch Resistance	DC Loop Current	Return Loss (Min)	Insertion Loss (Max)	Ringing Voltage Detection Range	Isolation Voltage	FEATURES				
								Ringing Detection				
					TX - Transmit (dB) RX - Receive (dB)			Full Wave	Half Wave	Caller ID	Loop Current Detect	2-4 Wire Conversion
		(Ω)	(mA)	(dB)		(V_{rms})	(V_{rms})					
CYG2000	N. America Asia	15	20-120	18	TX 7 RX 7	20-150	1000		•			
CYG2011	N. America Asia	15	20-120	18	TX 7 RX 7	20-150	1000	•			•	
CYG2020	N. America Asia	15	20-120	18	TX 7 RX 7	20-150	1000		•	•		
CYG2100	Europe	35	5-120	14	TX 7 RX 7	29-150	1500		•			
CYG2110	France	35	5-120	14	TX 7 RX 7	29-150	1500		•			
CYG2111	CTR-21	35	5-120	14	TX 7.5 RX 7.5	29-150	1500		•			
CYG2217	N. America Asia	15	20-120	39	TX 7 RX 1	20-150	1000		•			•
CYG2218	N. America Asia	15	20-120	39	TX 1 RX 1	20-150	1000		•			•
CYG2320	Australia	-	5-120	14	TX 7 RX 7	29 MIN	1500		•			

For ordering information, go to **www.clare.com/Products/ProdList.htm**

Call Progress Tone Detectors & Generators

Clare's Call Progress Detectors and Generators provide an inexpensive method of detecting and generating common call progress tones including busy tone, dial tone, call waiting tones, and others. The family includes both an inexpensive band detector and precise call tone detectors that detect individual tones. Detectors are available in both DIP and SOIC packages, and operate on a 3V to 5V supply. The call progress generator allows for a simple method of providing dial tone, busy tone, and other call progress tones in applications where a POTS interface is required such as VoIP or other network gateways.

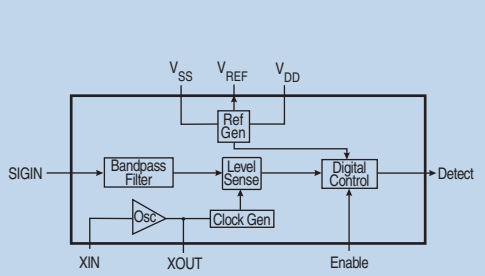
Features:

- Receive and Generate Common Call Progress Tones
- Detectors Operate with a Single 3-5 Volt Supply
- Linear Input (Detectors) and Output (Generator)
- Inexpensive Band Detector with Wide Dynamic Range (>38dB)
- Low Power Consumption
- Common Call Progress and SIT Detection
- Available in both DIP and SOIC packages

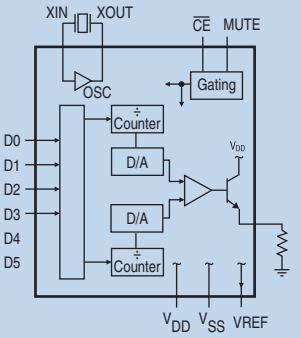
Applications:

- PBX Circuits
- Billing Systems
- Test Equipment
- Point-of-Sale Terminals
- Pay Telephones

M-980-02

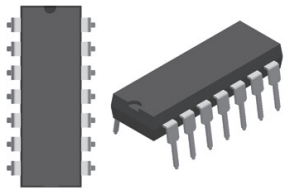


M-991

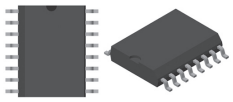


Part Number	Function (315 - 640Hz)	Detection Frequencies: Band (350 + 440Hz)	Dial Tone (440 + 480Hz)	Audible Ringing (480 + 620Hz)	Busy Tone	Package Types
M-980-02	Detector	•				102, 103
M-991	Generator		•	•	•	100, 102

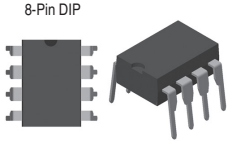
100 14-Pin DIP



102 16-Pin SOIC



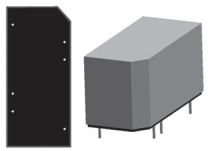
103 8-Pin DIP

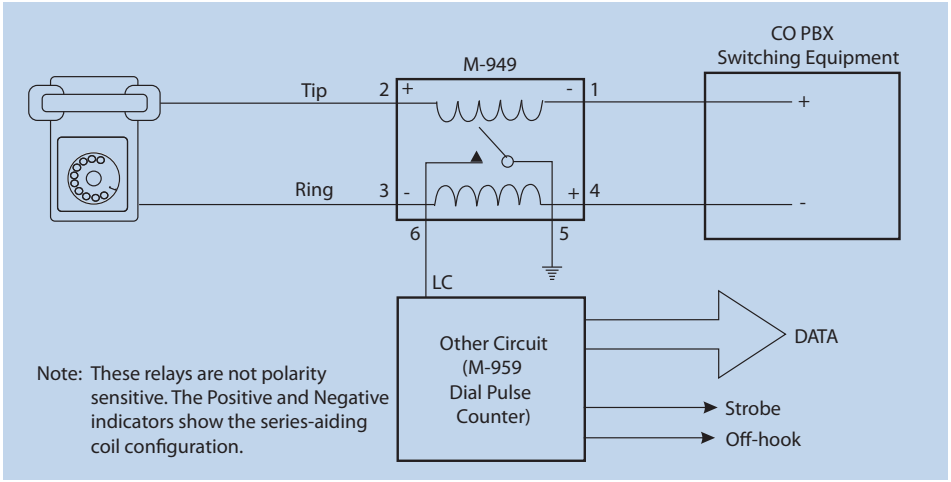


Line Sense Relay

M-949-11 Balanced Dual Coil Telephone Line Current Sensing Relay

- Senses Telephone Line Current From 15mA to 200mA
- Used by Control Circuitry for
  - On-Hook/Off-Hook Monitoring
  - Switch Hook Flash Detection
  - Rotary Dial Pulse
- Meets High Isolation Voltage Requirement of 4000V
- Meets UL and British Standard Specifications
- Includes 1-Form-A Relay Contact





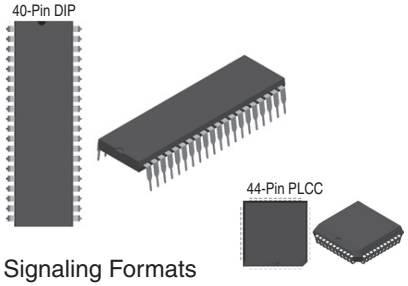
For ordering information, go to **www.clare.com/Products/ProdList.htm**

MF Trunk Signaling Device

Operating with a 20.48 MHz crystal, the M-986 is capable of providing a direct digital interface to an A-law encoded PCM digital input. Each channel can be connected to an analog source using a coder-decoder (codec) as shown in the block diagram. The M-986 can be configured by the customer to operate with the transmitter and receiver either coupled together or independently, enabling it to handle a compelled cycle automatically or via command from the host processor. A-law is used for coding/decoding. The M-986 is configured and controlled through an integral coprocessor port. M-986-2R2 provided in 40-pin DIP and 44-pin PLCC packages.

Features:

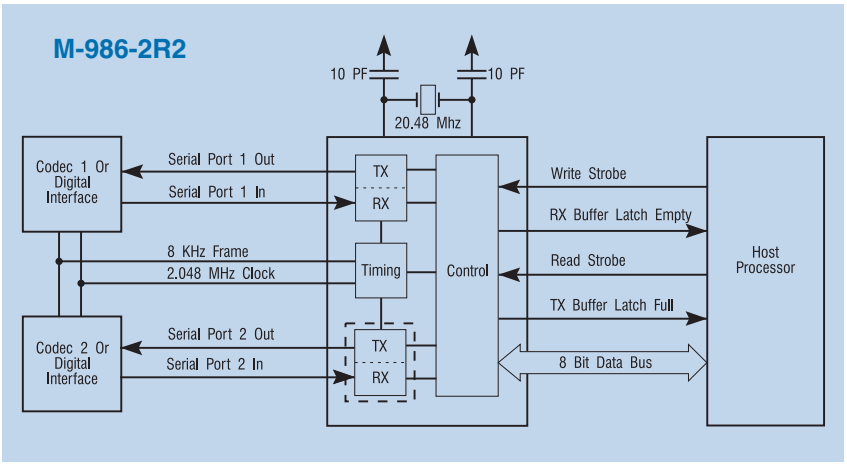
- Direct PCM interface to Chip
- Manual or Compelled Mode Operation for R2 Signaling
- 2.048 MHz Clocking
- Dual Channel
- Microprocessor Read/Write Interface



Application:

- Trunk Circuits Requiring MF Trunk Signaling in R1 or R2 Signaling Formats

Part Number	Function	CCITT R1	CCITT R2	A-law PCM	μ-law PCM	PCM (In/Out)
M-986-2R2	Transceiver		•	•		•
NEW! M-987-2A1K	Transceiver	•		•	•	•



Embedded Modem Module: CPC2400E

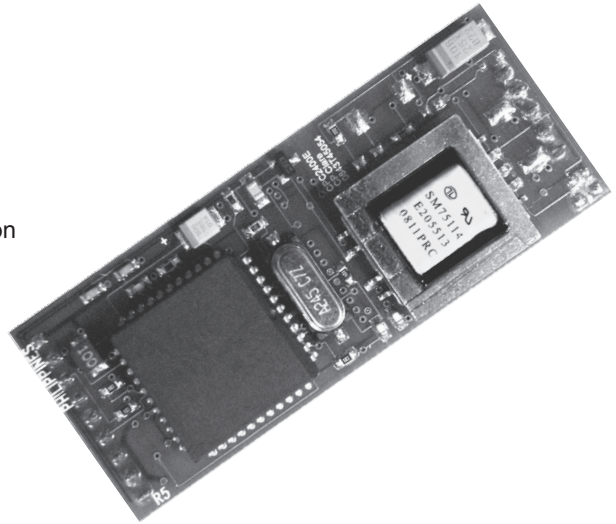
The Embedded Modem Module (EMM) combines a datapump and microcontroller with the Data Access Arrangement (DAA) to deliver an all-in-one solution for V.22bis modem transaction-oriented applications. This plug-and-play module provides a total solution complete with transferable FCC registration. It supports a standard serial V.24 TTL interface to the DTE equipment. The CPC2400E features a quick handshake time of 1.6 seconds. This offers a clear advantage for short connection sessions when compared to V.34 and V.90 modems which have a data handshake period greater than 10 seconds.

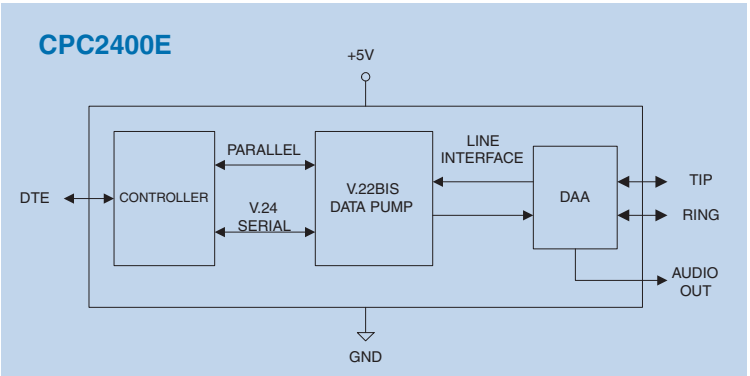
Features:

- Easy Integration and Installation
- Small Footprint of 1.00” x 2.50”
- Low Power Consumption
- 5V Power Supply Operation
- Supports V.22bis, V.22, V.23
- FCC Part 15B Compliant
- FCC Part 68 User Transferable Registration
- UL Approved

Applications:

- Point-of-Sale (POS)
- Gaming Equipment
- Utility Metering
- Lock Boxes
- Remote Monitoring
- Embedded Applications
- Medical Appliances





For ordering information, go to **www.clare.com/Products/ProdList.htm**

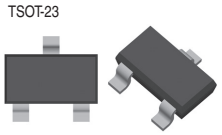
Other Semiconductor Products

Hall Effect Switches

The MX887D and MX887P integrated Hall-Effect switches target the requirements of low-power portable devices with battery operating voltages from 2.5V to 5.5V. On-chip power management circuitry reduces the effective average current to just 5µA at 3V supply voltage.

Both devices turn on when either a north or south magnetic pole is applied, and turn off when the magnetic field is removed. The MX887D switches between GND and high-impedance state, while the output of the MX887P switches between the supply voltage and GND.

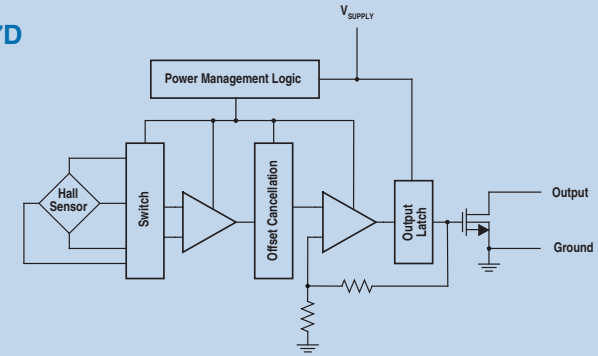
MX887D and MX887P are ideal reed relay replacements, especially in low-power portable device applications. Available in a TSOT-23 package.



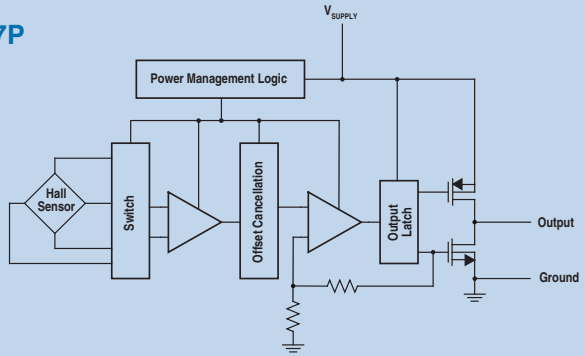
Applications:

- Handheld Portable Devices
- White Goods
- Automotive - Body Systems
- Security Systems
- High Reliability Reed Switch Replacement

MX887D



MX887P



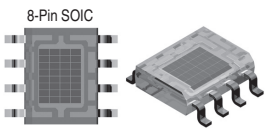
Solar Cells

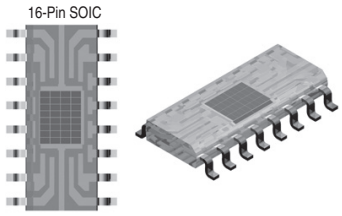
Clare's Solar Cells address the diverse needs of the growing number of micro-solar-power applications. Clare's SOI process, which also creates isolation trenches on the die, produces multiple solar cells on a single, monolithic piece of monocrystalline silicon. These isolated solar cells can then be interconnected to give a useful level of voltage from a small, SOIC package that can be easily installed in an automated process. Ideal for use in applications where high current is not needed, but voltages higher than those provided by single solar cells is required.

Part Number	Open-Circuit Voltage (V)	Short-Circuit Current (µA)	Package Type
CPC1822	4	50	8-Pin SOIC
CPC1824	4	100	16 Pin SOIC
CPC1831	8	25	8-Pin SOIC
CPC1832	8	50	16-Pin SOIC

Features:

- Provides True Wireless Power
- Triggers with Natural Sunlight or Artificial Light
- Semiconductor Miniature Size and Reliability





Applications:

- Solar Tracking
- µ-Power Wireless Sensors
- Portable Electronics
- Solar Battery Chargers
- Battery Operated Equipment
- Consumer Electronics
- Sunlight / Light / Flame Detection

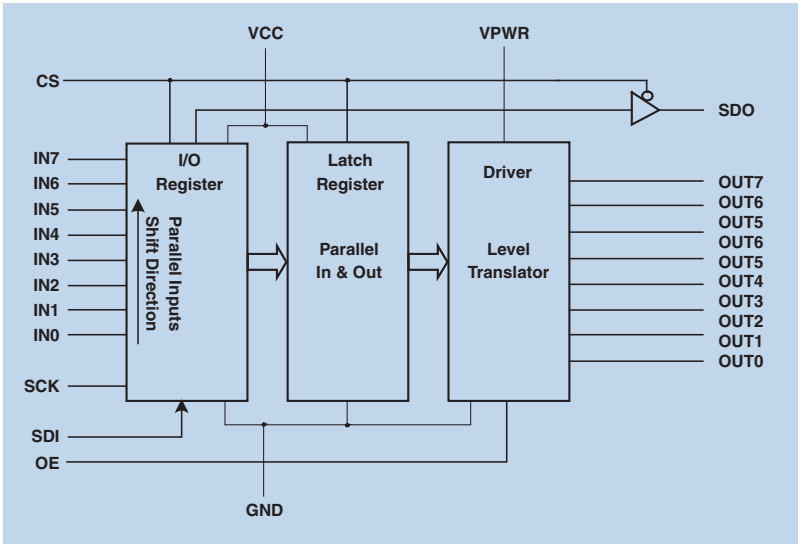
For ordering information, go to **www.clare.com/Products/ProdList.htm**

Load Drivers: MX877 & MX879 (8-Channel, 60V, with Serial Interface)

These devices are 8-channel, high-voltage switches with 8-bit parallel or serial input control. The 3-wire serial interface connects directly to a microprocessor using an industry standard protocol. These devices are designed to operate over a temperature range of -40°C to +85°C, and are available in a 28-pin QFN package.

MX877, with push-pull output configuration, can drive up to 60 volts at 80mA. Outputs can be paralleled for increased drive current up to a device total of 400mA sink or source.

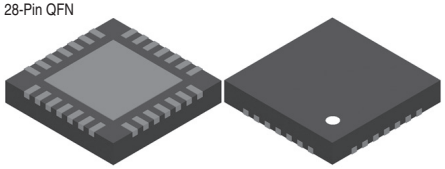
MX879, with open-drain pullup output configuration, can drive up to 60 volts at 120mA. Outputs can be paralleled for increased drive current up to a device total of 600mA source.



Features:
- 6V to 60V Drive Supply Voltage
- 2.7V to 5.5V Logic Supply Range
- 3-Wire Serial Interface Plus Chip Select
- Captures Serial and Parallel Input Data
- Outputs Can Be Paralleled
- Small 28-Pin QFN Package

Applications:
- White Goods
- Automatic Test Equipment (ATE)
- Industrial Equipment
- Automotive Relay Control

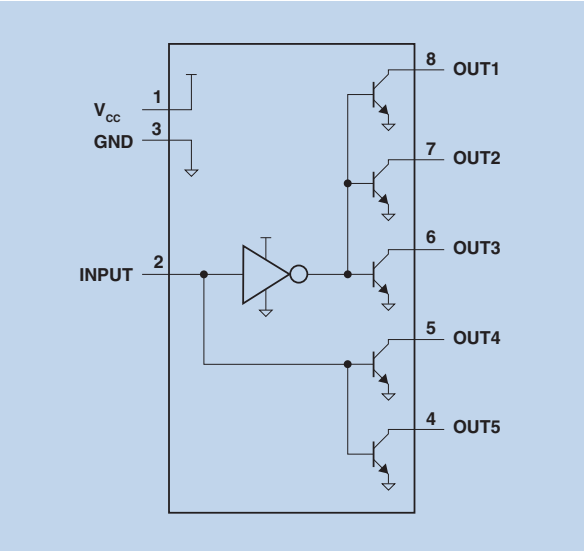
28-Pin QFN



Low Power Transistor Array: CPC5608

Clare's CPC5608 is a 5-channel, low-power transistor array IC with a simple 2-state logic control input. A logic-low input turns on switches OUT1, OUT2, and OUT3; a logic high turns on switches OUT4 and OUT5. Output transistors are capable of sinking 50mA in low output voltage (<7V) circuits. The IC features a low supply voltage range of 2.5V to 5.5V and no static supply bias current draw making it ideal for portable battery and on-hook telephone applications. In addition, output transistor leakage is a low 1µA maximum current.

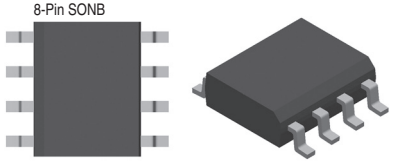
The device has a low input threshold. It can also be used with a standard optocoupler interface for isolation applications. The CPC5608 is used with the Clare LITELINK silicon DAA (CPC56xx) family for selecting programmable phone-line AC terminations for worldwide compliance. **Please call Clare Customer Service for more information.**



Features:
- No Static Current Draw from Power Supply (CMOS Control)
- Two-State Control
- Low-Voltage Operation (V_{CC} = 2.5V)
- Low Output Transistor Leakage
- 8-Pin, 150mil SONB Package

Applications:
- Portable Battery Equipment
- Telephony
- Instrumentation

8-Pin SONB



For ordering information, go to **www.clare.com/Products/ProdList.htm**

Application Notes

The following application notes can be downloaded from our web site at www.clare.com

General
- AN-131 Handling MOS Devices

Solid State Relays
- AN-145 Advantages of Solid State Relays Over Electromechanical Relays (English, Espanol, Deutsch, Francais)

High Voltage LED Drivers
- AN-300 MXHV9910 Design Considerations
- AN-301 CPC9909 Design Considerations

Gate Drivers
- AN-201 Using the CPC1580 Isolated Gate Driver IC
- AN-202 CPC1590 Application Technical Information

Optoisolators
- AN-107 LOCxx Series - Isolated Amplifier Design Principals
- AN-109 LOC110 - Variable Speed Motor Controller Design
- AN-111 Isolated 0-10V to 4-20mA Converter Application
- AN-118 Detecting Line Polarity Reversal

Multifunction Products
- AN-112 Ground-Start Supervision Circuit Using Clare's IAA110
- AN-114 ITC117P Integrated Telecom Circuit
- AN-151 FXO/DAA Design Using Clare OptoMOS Components

Line Interface Products
Line Card Access Switch
- AN-100 Design Surge and Power Fault Protection for Subscriber Line Interfaces
- AN-144 Impulse Noise Benefits of Line Card Access Switches
- AN-154 LCAS Longitudinal Balance Calculator Excel Spreadsheet for Line Card Applications

LITELINK Silicon DAA
- AN-102 Loop Current Detection for LITELINK
- AN-146 Guidelines for Effective LITELINK Designs
- AN-150 Ground-Start Supervision Circuit Using Clare's IAA110
- AN-157 Increased LITELINK Transmit Power
- AN-158 LITELINKIII Application Circuit Calculations

Tone Signaling Products
- AN-125 M-986 - Configuring the M-986 MF Trunk Signaling
- AN-128 M-980 - Algorithm for Call Progress Signal Detection
- AN-129 M-991 - Call Progress Tone Generator
- AN-130 Call Progress Tone Standards
- AN-138 M-980 - Call Progress Tone Detector Applications
- AN-142 M-949 - Loop Current Sensing and Ring Chatter

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Clare Product Catalog