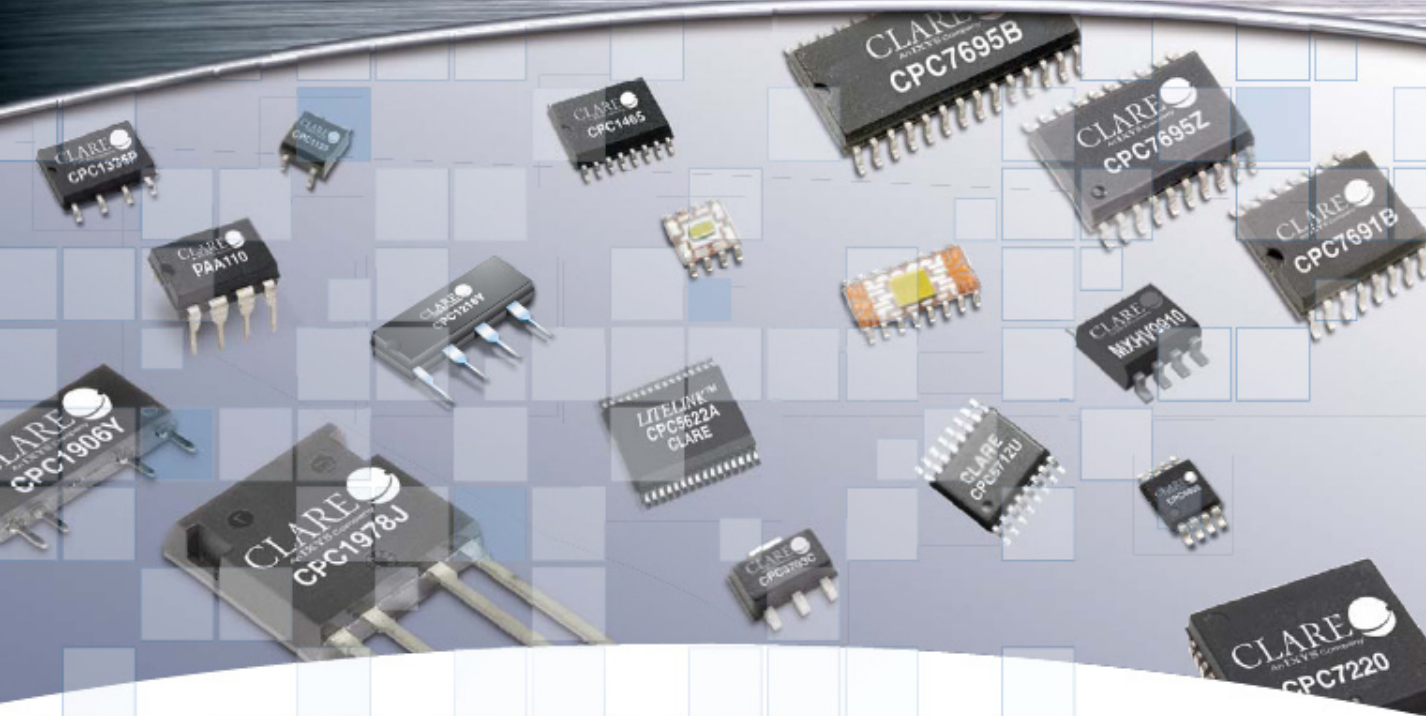




Clare 2009/2010

Product Catalog

Semiconductor Products

Complete data sheets are available
for downloading at Clare's website:
<http://www.clare.com>



Clare, a wholly owned subsidiary of IXYS Corporation, located 20 miles north of Boston, Massachusetts, USA, designs, manufactures, and markets a wide variety of 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 optically-isolated techniques for relays and signal processing offer high voltage isolation between the load side and the system controller.

Clare is a pioneer in the development of optically isolated **Solid State Relays (SSRs)**, and has become a leading supplier to the Telecommunications, Security, Utility Metering, and Industrial Control industries. Clare SSR solutions are rapidly replacing older electromechanical devices in many applications, thus improving safety and lowering costs, while minimizing equipment size and enhancing overall system performance.

Clare manufactures a broad range of **products for the Telecommunications industry that includes phone-line interface and monitoring devices, DC Termination devices for ADSL/VDSL and SHDSL/ISDN applications, and Central Office products**. Clare's newest entries into the Central Office market include two new Line Card Access Switch devices with the highest guaranteed transient immunity in the industry: 1500V/ μ s. These robust devices are just the start of an entire family of such devices that will make the designer's task much easier while reducing costs, minimizing time-to-market, and greatly improving product reliability.

Clare's **high-voltage and power expertise 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. In addition, Clare offers design services to the industry for custom development of high-voltage semiconductor devices: Bring your high-voltage semiconductor component design opportunities to Clare.

Clare offers **LED drivers for lighting and display applications**, and drivers for the newest electronic paper devices, such as those from E Ink. The new MXHV9910, answers the growing need in the illumination industry for a cost-effective, off-line, high-brightness LED driver. Clare's existing products and its new entries lead the way into these new and rapidly growing markets.

With the recent introduction of xDSL DC termination ICs, new power SSRs, innovative high-voltage analog switches, and electroluminescent display driver products, Clare has firmly established itself as a major supplier in the **Telecommunication, Consumer, Security, Power, Lighting, Industrial, Medical, and Display markets**.

With a steady eye to the future, Clare continues to **develop industry-leading products** that offer higher levels of integration and electrical performance for manufacturers in all these markets and others.

Our Product Catalog contains summary product information. Adobe® Acrobat® formatted versions of the complete data sheets are available for downloading on our web site. To download go to www.clare.com and select a product.



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CPC1004N	7	CPC1709	13	CPC3703	18	CPC7594xA	23	ITC137	26	LCA182	7	M-959	29
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CPC1035N	6	CPC1906	12	CPC5620	24	CYG2000	27	LAA126L	8	LCB126	9	MX860	32
CPC1106N	9	CPC1908	12	CPC5621	24	CYG2001	27	LAA127	8	LCB127	9	MX8771	16
CPC1117N	9	CPC1909	12	CPC5622	24	CYG2010	27	LAA127L	8	LCB716	9	MX877	16
CPC1130N	9	CPC1916	12	CPC5710	25	CYG2011	27	LAA710	8	LCC110	10	MX878	16
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CPC1302	21	CPC1965Y	14	CPC7582xA	★	CYG2218	27	LBB110	10	LDA203	21	OAA160	8
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CPC1330	6	CPC1973Y	12	CPC7583xA	23	CYG2911	★	LBB127	10	LDA212	21	PAA110L	8
CPC1335	6	CPC1976	14	CPC7583xB	★	FDA215	15	LCA100	6	LDA213	21	PAA132	8
CPC1390	6	CPC1977	12	CPC7583xC	★	IAA110	11	LCA100L	6	LIA100	20	PAA140	8
CPC1393	6	CPC1978	12	CPC7583xD	★	IAA170	11	LCA110	6	LIA101	20	PAA140L	8
CPC1394	6	CPC1979	12	CPC7591xA	23	IAB110	11	LCA110L	6	LIA120	20	PAA150	8
CPC1465	28	CPC1981Y	12	CPC7591xB	23	IAD110	11	LCA120	7	LIA130	20	PAA190	8
CPC1466	28	CPC1983	12	CPC7592xA	23	IAD170	11	LCA120L	7	LOC110	20	PAA191	8
CPC1510	6	CPC1986	12	CPC7592xB	23	IBB110	11	LCA125	7	LOC111	20	PAA193	8
CPC1560	6	CPC1988	12	CPC7592xC	23	ITC100	26	LCA125L	7	LOC112	20	PBA150	10
CPC1580	15	CPC2014N	8	CPC7593xA	23	ITC107	26	LCA126	7	LOC117	20	PBB150	10
CPC1590	15	CPC2017N	8	CPC7593xB	23	ITC117	26	LCA127	7	LOC210	20	PD1201	14

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-108 Current Limited Solid State Relays
- AN-145 Advantages of Solid State Relays Over Electromechanical Relays (English, Espanol, Deutsch, Francais)

Power Products

- AN-201 Using the CPC1580 Isolated Gate Driver IC

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-140 Understanding LITELINK
- AN-146 Guidelines for Effective LITELINK Designs
- AN-150 Ground-Start Supervision Circuit Using Clare's IAA110
- AN-155 Understanding LITELINK Display Feature Signal Routing and Applications
- 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-132 M-980 - Clare Components in Private Pay Stations
- AN-138 M-980 - Call Progress Tone Detector Applications
- AN-142 M-949 - Loop Current Sensing and Ring Chatter

Solid State Relays / Semiconductor Relays

The **OptoMOS** line of Solid State Relays uses discrete semiconductor components and the patented OptoMOS architecture to deliver fast, reliable, bounce-free switching in a compact design. From one of the world's smallest single pole, high-voltage, 4-pin relays to multi-pole and multifunction devices, OptoMOS products are an ideal solid state replacement for larger reed and electromechanical relays. Compared to older electromagnetic technologies, Clare OptoMOS relays offer significantly lower drive current, small 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.

The small single pole 4-pin SOP relays combine state-of-the-art, double-molded, vertical-construction packaging with high performance to give you a reliable product with 20% savings in board space compared to other 4-pin products.

Features:

- Low drive current
- High reliability
- No EMI/RFI generation
- Arc-free with no snubbing circuits
- Machine insertable, wave solderable
- AC/DC switching
- Current limiting (available)
- FCC compatible
- Low off-state leakage

Applications:

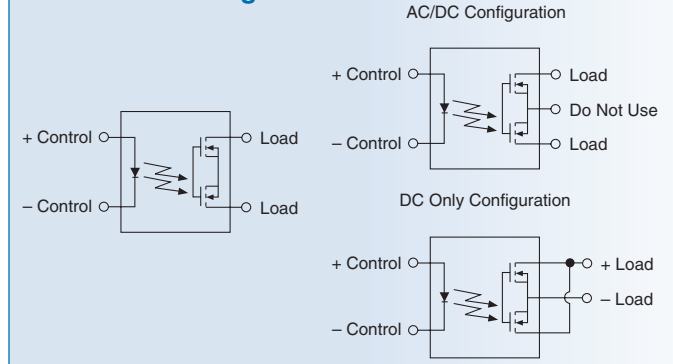
- Telecommunications/Datacommunications
- Instrumentation
- Multiplexers
- Data acquisition/Electronic switching
- I/O subsystems
- Meters (watt-hour, water, gas)
- Medical equipment (patient/equipment isolation)
- Security
- Aerospace
- Industrial controls

Single Pole Normally Open: 1-Form-A

Operational temperature range of -40° to 85°C



Block Diagrams



Part Number	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Current (mA)	Switching Speeds t _{ON} /t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package ¹ Type	Features
NEW! CPC1006N	60	75	10	0.5	10 / 10	1500	4-Pin SMT	EN50130-4 Compliant, Low Input Control Current
CPC1008N	100	150	8	2	2 / 0.5	1500	4-Pin SMT	
CPC1009N	100	150	8	2	2 / 0.5	1500	4-Pin SMT	Low Off-State Leakage Current of 20nA
CPC1014N	60	400	2	2	2 / 1	1500	4-Pin SMT	For use in systems complying with EN50130-4
CPC1016N	100	100	16	2	2 / 0.5	1500	4-Pin SMT	
CPC1017N	60	100	16	1	10 / 10	1500	4-Pin SMT	
CPC1018N	60	600	0.8	1	3 / 2	1500	4-Pin SMT	
CPC1019N	60	750	0.6	2	3 / 3	1500	4-Pin SMT	
CPC1020N	30	1200	0.25	2	3 / 3	1500	4-Pin SMT	
CPC1025N	400	120	30	2	2 / 1	1500	4-Pin SMT	
CPC1030N	350	120	30	2	2 / 1	1500	4-Pin SMT	
CPC1035N	350	100	35	2	2 / 1	1500	4-Pin SMT	
CPC1225N	400	120	30	2	2 / 1	1500	4-Pin SMT	Supplementary Isolation
CPC1230N	350	120	30	2	2 / 1	1500	4-Pin SMT	Supplementary Isolation
CPC1317	70	150	16	1	2.5 / 2.5	3750	8-Pin SMT	Bidirectional TVS Protection
CPC1330	350	120	30	2	2 / 1	5000	4-Pin SMT, TH	Enhanced Isolation Voltage
CPC1335	350	100	35	1	10 / 10	3750	8-Pin SMT	Bidirectional TVS Protection
CPC1390	400	140	22	2	1 / 0.5	5000	4-Pin SMT, TH	Enhanced Isolation Voltage
CPC1393	600	90	50	2	5 / 5	5000	4-Pin SMT, TH	Enhanced Isolation Voltage
CPC1394	600	120	35	2	5 / 3	5000	4-Pin SMT, TH	Enhanced Isolation Voltage
CPC1510	250	200	15	5	2 / 2	3750	6-Pin SMT, TH	Active Current Limit + Thermal Shutdown
CPC1560	60	300	5.6	1.1	0.1 / 0.4	3750	8-Pin SMT, TH	Active Current Limit + Thermal Shutdown
LCA100	350	120	25	5	5 / 5	3750	6-Pin SMT, TH	
LCA100L	350	120	25	5	5 / 5	3750	6-Pin SMT, TH	Current Limit

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

Single Pole Normally Open: 1-Form-A Continued

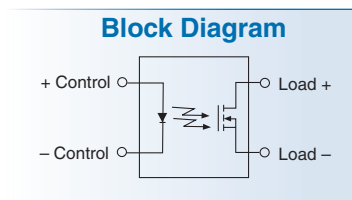
Operational temperature range of -40° to 85°C

Part Number	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Current (mA)	Switching Speeds t _{ON} / t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package ¹ Type	Features
LCA110	350	120	35	2	3 / 3	3750	6-Pin SMT, TH	
LCA110L	350	120	35	2	3 / 3	3750	6-Pin SMT, TH	Current Limit
LCA120	250	170	20	5	3 / 3	3750	6-Pin SMT, TH	
LCA120L	250	150	20	5	3/3	3750	6-Pin SMT, TH	Current Limit
LCA125	350	170	16	5	5 / 5	3750	6-Pin SMT, TH	
LCA125L	350	170	20	5	5 / 5	3750	6-Pin SMT, TH	Current Limit
LCA126	250	170	15	5	5 / 5	3750	6-Pin SMT, TH	
LCA127	250	200	10	5	5 / 5	3750	6-Pin SMT, TH	
LCA127L	250	170	15	5	5 / 5	3750	6-Pin SMT, TH	Current Limit
LCA129	250	170	20	2	8 / 8	3750	6-Pin SMT, TH	
LCA182	350	120	35	0.25	3 / 3	3750	6-Pin SMT, TH	Ultra Low Input Control Current
LCA710	60	1000	0.5	10	2.5 / 0.25	3750	6-Pin SMT, TH	
LCA712	60	1000	0.5	10	2.5 / 0.35	3750	6-Pin SMT, TH	Low Off-State Leakage 10nA
LCA715	60	1800	0.25	10	2.5 / 0.25	3750	6-Pin SMT, TH	High Load Current
LCA717	30	2000	0.15	2	3 / 3	3750	6-Pin SMT, TH	High Load Current
OMA160	250	50	100	10	0.125 / 0.125	3750	6-Pin SMT, TH	Low Off-State Leakage 25nA
PLA110	400	150	22	5	1 / 0.5	3750	6-Pin SMT, TH	
PLA110L	400	150	25	5	1 / 0.25	3750	6-Pin SMT, TH	Current Limit
PLA132	60	600	1	2	5 / 2	3750	6-Pin SMT, TH	
PLA134	100	350	3	5	5 / 5	3750	6-Pin SMT, TH	
PLA140	400	250	8	5	3 / 1	3750	6-Pin SMT, TH	
PLA140L	400	200	13	5	5 / 3	3750	6-Pin SMT, TH	Current Limit
PLA143	600	100	50	2	5 / 5	4000	6-Pin SMT, TH	
PLA150	250	250	7	5	2.5 / 0.5	3750	6-Pin SMT, TH	
PLA160	300	50	100	10	0.05 / 0.05	3750	6-Pin SMT, TH	EN/IEC 60950 Certification
PLA170	800	100	50	5	5 / 5	3750	6-Pin SMT, TH	
PLA190	400	150	22	5	1 / 0.5	5000	6-Pin SMT, TH	Enhanced Isolation Voltage
PLA191	400	250	8	5	3 / 1	5000	6-Pin SMT, TH	Enhanced Isolation Voltage
PLA192	600	150	22	5	5 / 5	5000	6-Pin SMT, TH	Enhanced Isolation Voltage
PLA193	600	100	50	5	5 / 5	5000	6-Pin SMT, TH	Enhanced Isolation Voltage
XCA170	350	100	50	5	5 / 5	3750	6-Pin SMT, TH	

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

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

Operational temperature range of -40° to 85°C



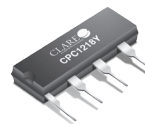
Part Number	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Current (mA)	Switching Speeds t _{ON} / t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package ¹ Type	Features
CPC1002N	60	700	0.55	2	5 / 2	1500	4-Pin SMT	
CPC1004N	100	300	4	2	3 / 1	1500	4-Pin SMT	Operational Temperature to +110°C

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

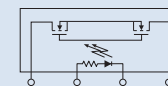
To download datasheets or to find your nearest sales representative, visit www.clare.com

Single Pole Normally Open: Voltage Controlled Single Pole Normally Closed: Voltage Controlled

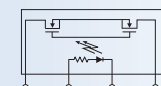
Operational temperature range of -40° to 85°C



Block Diagrams



1-Form-A



1-Form-B

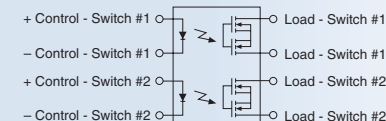
Part Number	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Voltage (V)	Switching Speeds t _{ON} /t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package Type	Features
NEW! CPC1217	60	200	16	5-12	5 / 5	2500	4-Pin SIP	1-Form-A
CPC1218	60	600	1.1	5-12	5 / 5	2500	4-Pin SIP	1-Form-A
NEW! CPC1219	60	200	16	5-12	5 / 5	2500	4-Pin SIP	1-Form-B

Dual Independent Single Pole Normally Open: Dual 1-Form-A

Operational temperature range of -40° to 85°C



Block Diagram



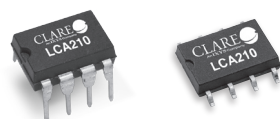
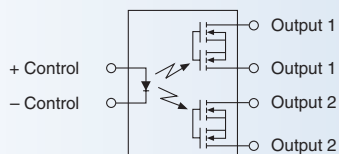
Part Number	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Current (mA)	Switching Speeds t _{ON} /t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package ¹ Type	Features
NEW! CPC2014N	60	400	2	2	2 / 1	1500	8-Pin SMT	Low Input Control Current
NEW! CPC2017N	60	120	16	1	3 / 3	1500	8-Pin SMT	Very Low Input Control Current
LAA100	350	120	25	5	5 / 5	3750	8-Pin SMT, TH	
LAA100L	350	120	25	5	5 / 5	3750	8-Pin SMT, TH	Current Limit
NEW! LAA108	100	300	8	2	3 / 3	3750	8-Pin SMT, TH	Low Input Control Current
LAA110	350	120	35	5	3 / 3	3750	8-Pin SMT, TH	
LAA110L	350	120	35	5	3 / 3	3750	8-Pin SMT, TH	Current Limit
LAA120	250	170	20	5	5 / 5	3750	8-Pin SMT, TH	
LAA120L	250	150	25	5	5 / 5	3750	8-Pin SMT, TH	Current Limit
LAA125	350	170	16	5	5 / 5	3750	8-Pin SMT, TH	
LAA125L	350	150	18	5	5 / 5	3750	8-Pin SMT, TH	Current Limit
LAA126	250	170	15	5	5 / 5	3750	8-Pin SMT, TH	
LAA126L	250	170	20	5	5 / 5	3750	8-Pin SMT, TH	Current Limit
LAA127	250	200	10	5	5 / 5	3750	8-Pin SMT, TH	
LAA127L	250	170	10	5	5 / 5	3750	8-Pin SMT, TH	Current Limit
LAA710	60	1000	0.5	10	2.5 / 0.25	3750	8-Pin SMT, TH	
OAA160	250	50	100	3	0.125 / 0.125	3750	8-Pin SMT, TH	Low Off-State Leakage 25nA
PAA110	400	150	22	5	1 / 0.25	3750	8-Pin SMT, TH	
PAA110L	400	150	25	5	1 / 0.5	3750	8-Pin SMT, TH	Current Limit
PAA132	60	600	1	2	5 / 2	3750	8-Pin SMT, TH	Low Input Control Current
PAA140	400	250	8	5	3 / 1	3750	8-Pin SMT, TH	
PAA140L	400	200	13	5	5 / 3	3750	8-Pin SMT, TH	Current Limit
PAA150	250	250	7	5	2.5 / 0.5	3750	8-Pin SMT, TH	
PAA190	400	150	22	5	1 / 0.5	5000	8-Pin SMT, TH	Enhanced Isolation Voltage
PAA191	400	250	8	5	3 / 1	5000	8-Pin SMT, TH	Enhanced Isolation Voltage
PAA193	600	100	50	5	5 / 5	5000	8-Pin SMT, TH	Enhanced Isolation Voltage
NEW! XAA117	60	150	16	1	5 / 5	3750	8-Pin SMT, TH	Very Low Input Control Current
XAA170	350	100	50	5	5 / 5	3750	8-Pin SMT, TH	

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

Common Input Double Pole Normally Open: 2-Form-A

Operational temperature range of -40° to 85°C

Block Diagram

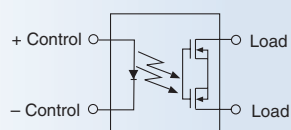


Part Number	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Current (mA)	Switching Speeds t _{ON} /t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package ¹ Type	Features
LCA210	350	85	35	8	3 / 3	3750	8-Pin SMT, TH	
LCA210L	350	100	35	8	4 / 4	3750	8-Pin SMT, TH	Current Limit
LCA211	350	85	35	8	1 / 1.2	3750	8-Pin SMT, TH	
LCA220	250	120	20	10	5 / 5	3750	8-Pin SMT, TH	

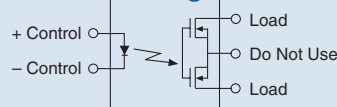
¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

Single Pole Normally Closed: 1-Form-B

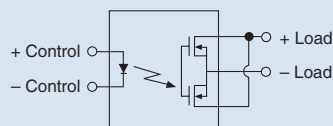
Operational temperature range of -40° to 85°C



Block Diagrams



DC Only Configuration



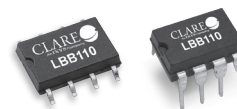
Part Number	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Current (mA)	Switching Speeds t _{ON} /t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package ¹ Type	Features
NEW! CPC1106N	60	75	10	0.5	10 / 10	1500	4-Pin SMT	EN50130-4 Compliant
CPC1117N	60	150	16	1	1 / 2	1500	4-Pin SMT	
CPC1130N	350	120	30	2	2 / 2	1500	4-Pin SMT	
CPC1135N	350	120	35	2	2 / 2	1500	4-Pin SMT	
CPC1150N	350	120	50	2	1 / 2	1500	4-Pin SMT	
CPC1231N	350	120	30	2	2 / 2	1500	4-Pin SMT	Supplementary Isolation
LCB110	350	120	35	5	3 / 3	3750	6-Pin SMT, TH	
LCB111	350	120	35	2	5 / 5	3750	6-Pin SMT, TH	
LCB120	250	170	20	5	5 / 5	3750	6-Pin SMT, TH	
LCB126	250	170	15	5	5 / 5	3750	6-Pin SMT, TH	
LCB127	250	200	10	5	5 / 5	3750	6-Pin SMT, TH	
LCB716	60	500	2	2	3 / 3	3750	6-Pin SMT, TH	
PLB150	250	250	7	5	1 / 2.5	3750	6-Pin SMT, TH	
NEW! PLB190	400	130	25	2	1 / 2.5	5000	6-Pin SMT, TH	Enhanced Isolation Voltage
XCB170	350	100	50	5	5 / 5	3750	6-Pin SMT, TH	

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

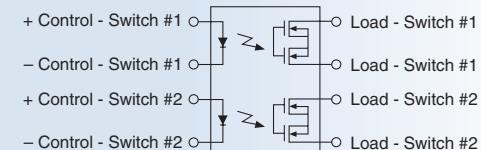
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Dual Independent Single Pole Normally Closed: 1-Form-B

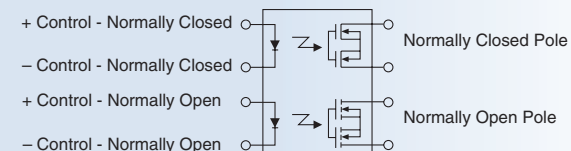
Operational temperature range of -40° to 85°C



Part Number	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Current (mA)	Switching Speeds t _{ON} /t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package ¹ Type
LBB110	350	120	35	5	3 / 3	3750	8-Pin SMT, TH
LBB120	250	170	20	5	5 / 5	3750	8-Pin SMT, TH
LBB126	250	170	15	5	5 / 5	3750	8-Pin SMT, TH
LBB127	250	200	10	5	5 / 5	3750	8-Pin SMT, TH
PBB150	250	250	7	5	2.5 / 2.5	3750	8-Pin SMT, TH
XBB170	350	100	50	5	5 / 5	3750	8-Pin SMT, TH

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.**Block Diagram****Dual Pole Combination: Form-A & Form-B**

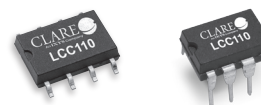
Operational temperature range of -40° to 85°C

**Block Diagram**

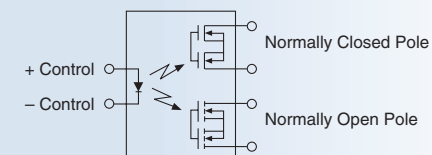
Part Number	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Current (mA)	Switching Speeds t _{ON} /t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package ¹ Type	Features
CPC2317N	60	120	16	1	3 / 3	1500	8-Pin SOIC	
LBA110	350	120	35	2	3 / 3	3750	8-Pin SMT, TH	
LBA110L	350	120	35	5	3 / 3	3750	8-Pin SMT, TH	Current Limit
LBA120	250	170	20	5	5 / 5	3750	8-Pin SMT, TH	
LBA120L	250	150	25	5	5 / 5	3750	8-Pin SMT, TH	Current Limit
LBA126	250	170	15	5	5 / 5	3750	8-Pin SMT, TH	
LBA126L	250	150	20	5	5 / 5	3750	8-Pin SMT, TH	Current Limit
LBA127	250	200	10	5	5 / 5	3750	8-Pin SMT, TH	
LBA127L	250	150	15	5	5 / 5	3750	8-Pin SMT, TH	Current Limit
LBA716	60	1000	0.4	2	5 / 5	3750	8-Pin SMT, TH	Low On-Resistance
PBA150	250	250	7	5	2.5 / 2.5	3750	8-Pin SMT, TH	
XBA170	350	100	50	5	5 / 5	3750	8-Pin SMT, TH	

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.**Common Input: 1-Form-C**

Operational temperature range of -40° to 85°C



Part Number	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Current (mA)	Switching Speeds t _{ON} /t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package ¹ Type
LCC110	350	120	35	8	4 / 4	3750	8-Pin SMT, TH
LCC120	250	170	20	10	5 / 5	3750	8-Pin SMT, TH

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.**Block Diagram**

Multifunction Products

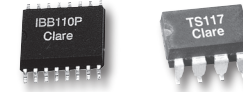
The OptoMOS line of Multifunction products combines optically isolated discrete component functions into a single package. These products mix and match solid state relays, optocouplers, and Darlington transistors to create highly functional circuits in a single, small package. Multifunction devices allow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

Features:

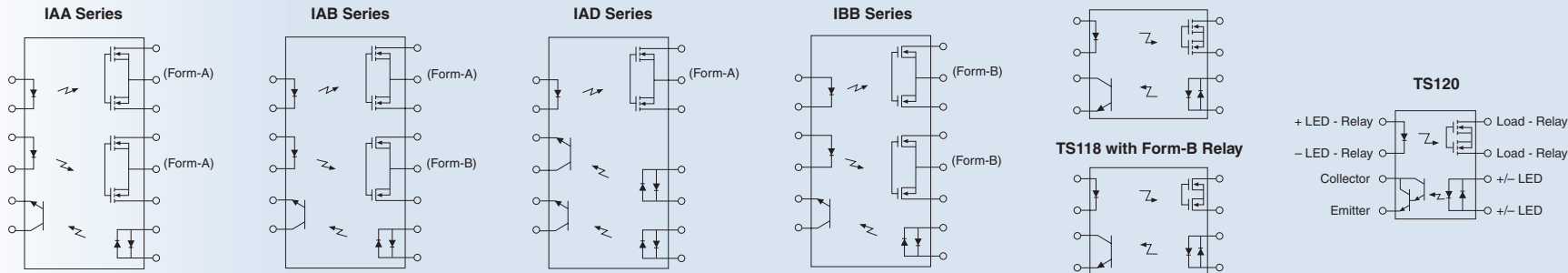
- 3750V_{rms} input to output isolation
- Multiple functionality in a single package
- Current limiting (part numbers with L suffix)
- Machine insertable, wave solderable
- TTL and CMOS compatible

Applications:

- Telecommunication/Datacommunication
- Instrumentation
- I/O subsystems
- Electronic switching
- Medical equipment (patient/equipment isolation)
- Security
- Aerospace
- Industrial controls



Block Diagrams



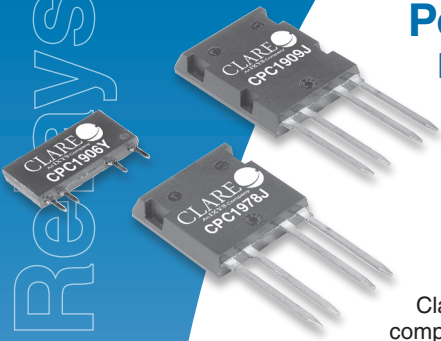
Combination SSR & Optocoupler Products (IAX, IBX, TS, XS)

Operational temperature range of -40° to 85°C

Part Number	Blocking Voltage (V _p)	Current Handling (mA)	On-Resistance (Ohms)	Input Control Current (mA)	Breakdown Voltage (V)	Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control Current (mA)	Isolation Voltage (V _{rms})	Package ¹ Type	Features
IAA110	350	100	35	5	20	33	0.5	6	3750	16-Pin SMT	
IAA170	350	100	50	5	20	33	0.5	6	3750	16-Pin SMT	
IAB110	350	100	35	5	20	33	0.5	6	3750	16-Pin SMT	
IAD110	350	100	35	5	20	33	0.5	6	3750	16-Pin SMT	
IAD170	350	100	50	5	20	33	0.5	6	3750	16-Pin SMT	
IBB110	350	100	50	5	20	33	0.5	6	3750	16-Pin SMT	
TS117	350	120	35	2	20	33	0.5	6	3750	8-Pin SMT, TH	
TS117L	350	120	35	2	20	33	0.5	6	3750	8-Pin SMT, TH	Current Limit
TS118	350	120	35	5	20	33	0.5	6	3750	8-Pin SMT, TH	Form-B
TS120	350	120	35	5	20	300	0.8	2	3750	8-Pin SMT, TH	
TS120L	350	120	35	5	20	300	0.8	2	3750	8-Pin SMT, TH	Current Limit
TS122	250	170	20	5	20	33	0.5	6	3750	8-Pin SMT, TH	
TS190	400	150	22	5	20	33	0.5	6	3750	8-Pin SMT, TH	
TS190L	400	150	25	5	20	33	0.5	6	3750	8-Pin SMT, TH	Current Limit
XS170	350	100	50	2	20	33	0.5	6	3750	8-Pin SMT, TH	

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

To download datasheets or to find your nearest sales representative, visit www.clare.com



Power Solid State Relays

Power SIP, ISOPLUS™-264 and i4-PAC™ Relays

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

The optically coupled MOSFET technology provides 2500V_{rms} of input to output isolation. Similar to Clare's solid state relays, the optically coupled output is controlled by a GaAlAs infrared LED.

Clare Power Relays are now offered in three package types: 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 impedance of 0.30°C/W.

Although exposed 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
- Non-conductive thermal pad for heat sink applications
- Industry standard 4-Pin SIP package

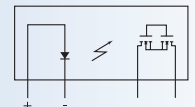
- Low input control current
- Low thermal impedances:
0.30°C/W - ISOPLUS-264
0.35°C/W - i4-PAC
1.5°C/W - Power SIP

Applications:

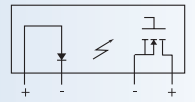
- Motor controls
- Robotics
- Medical equipment
- Railroad/traffic controls
- Consumer appliances
- Industrial control
- Test and measurement equipment

Block Diagrams

AC/DC



DC Only



Specifications for: AC/DC Single Pole Power SIP, ISOPLUS-264 and i4-PAC Relays

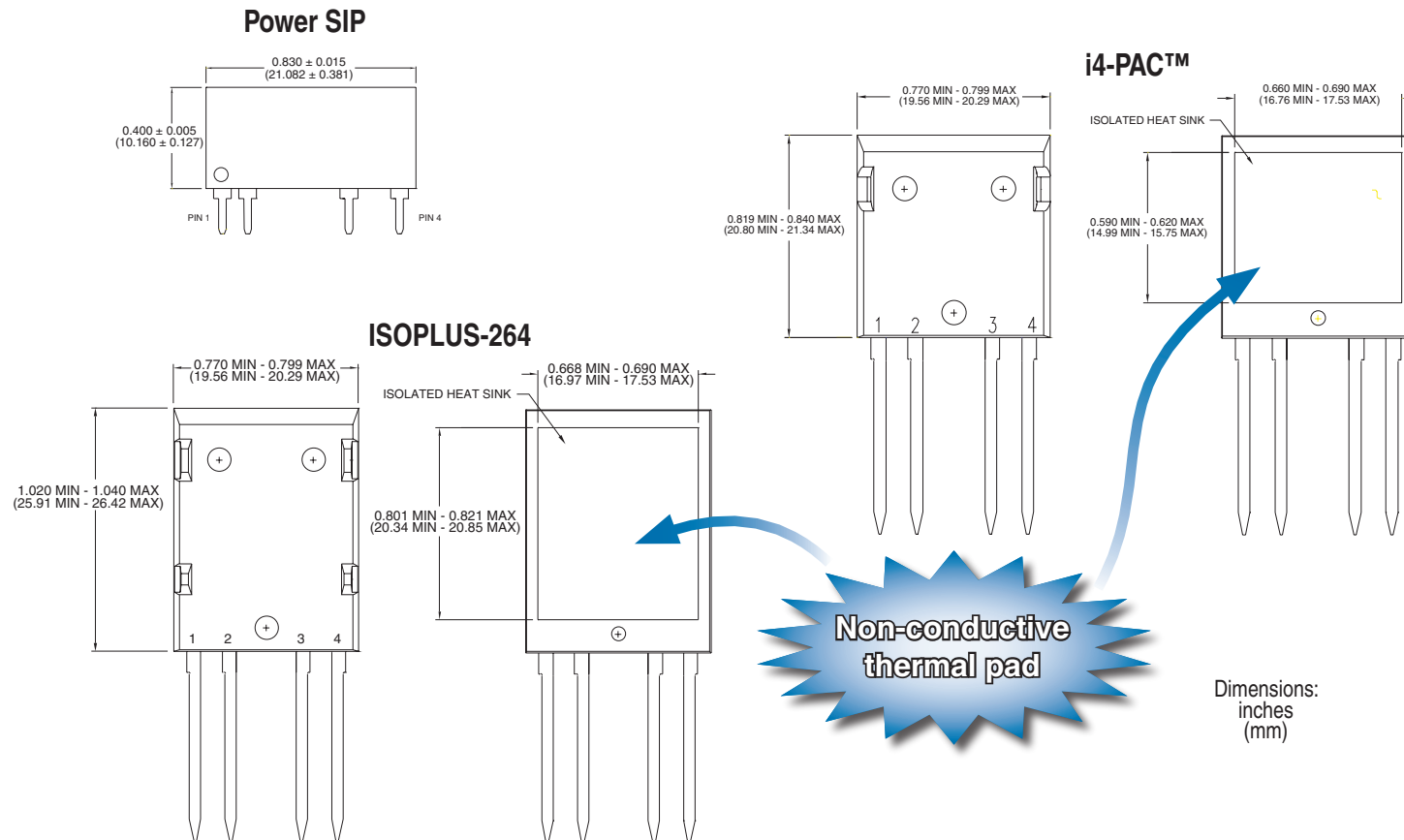
Part Number	Blocking Voltage (V _p)	Load Current No Heat Sink (A _{rms})	Load Current T _c =25°C (A _{rms})	On Resistance (Ohms)	Input Control Current (mA)	Switching Speeds t _{ON} /t _{OFF} (ms)	Isolation Voltage (V _{rms})	Package
CPC1906	60	2	-	0.3	10	10 / 5	2500	Power SIP
CPC1908	60	3.5	15	0.3	10	20 / 5	2500	i4-PAC
CPC1909	60	6.5	15	0.1	10	25 / 10	2500	ISOPLUS-264
CPC1916	100	2.5	-	0.34	10	5 / 3	2500	Power SIP
CPC1918	100	5.25	15	0.1	10	25 / 10	2500	ISOPLUS-264
CPC1926	250	0.7	-	1.4	10	10 / 10	2500	Power SIP
CPC1927	250	2.7	15	0.2	10	25 / 10	2500	ISOPLUS-264
CPC1967	400	1.35	13.15	0.85	10	20 / 5	2500	i4-PAC
CPC1973	400	0.35	-	5.0	10	5 / 3	2500	Power SIP
CPC1977	600	1.25	12.25	1.0	10	20 / 5	2500	i4-PAC
CPC1978	800	0.75	7.25	2.3	10	20 / 5	2500	i4-PAC
CPC1979	600	1.4	14.5	0.75	10	25 / 5	2500	ISOPLUS-264
CPC1981	1000	0.18	-	18.0	10	10 / 5	2500	Power SIP
NEW! CPC1983	600	0.5	-	6	5	5 / 2	2500	Power SIP
CPC1986	1000	0.65	6.5	3.0	10	20 / 5	2500	i4-PAC
CPC1988	1000	0.9	9.4	2.5	10	20 / 5	2500	ISOPLUS-264

To download datasheets or to find your nearest sales representative, visit www.clare.com

Specifications for: DC-only Single Pole Relays

Part Number	Blocking Voltage	Load Current		On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Package
	(V _p)	No Heat Sink (A)	T _c =25°C (A)	(Ohms)	(mA)	t _{ON} /t _{OFF} (ms)	(V _{rms})	
NEW! CPC1706	60	4	-	0.09	5	5 / 2	2500	Power SIP
CPC1708	60	4	24	0.08	10	20 / 5	2500	i4-PAC
CPC1709	60	9	32	0.05	10	20 / 5	2500	ISOPLUS-264
CPC1718	100	6.75	32	0.075	10	20 / 5	2500	ISOPLUS-264
CPC1726	250	1	-	0.75	10	5 / 2	2500	Power SIP
CPC1727	250	3.4	20	0.09	10	20 / 5	2500	ISOPLUS-264
CPC1777	600	1.5	15	0.5	10	20 / 5	2500	i4-PAC
CPC1779	600	1.65	15	0.4	10	20 / 5	2500	ISOPLUS-264
CPC1786	1000	0.65	6.9	2	10	20 / 5	2500	i4-PAC
CPC1788	1000	1	10.3	1.25	10	20 / 5	2500	ISOPLUS-264

Package Dimensions:



Optically Isolated AC Power Switches

The **OptoMOS line** of power products uses dual power SCR outputs to produce an alternative to optocoupler and Triac circuits. These AC Power Switches are robust enough to provide a blocking voltage of up to $800V_p$. In addition, tightly controlled zero-cross circuitry ensures switching of AC loads without 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 to control a variety of AC circuits in industrial environments where electromagnetic interference would disrupt the operation of electromechanical relays.

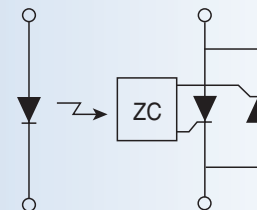
Features:

- Load current up to $2A_{rms}$
- Blocking voltage up to $800V_p$
- 5mA sensitivity
- Zero-crossing detection
- 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

Block Diagram



A



B



C



D



E



F



G

Operational temperature range of -40° to $85^{\circ}C$

Part Number	Blocking Voltage (V_p)	Load Current (A_{rms})	Input Control Current (mA)	Operating Frequency min/max (Hz)	Isolation Voltage (V_{rms})	Package Code	Features
CPC1943	400	0.5	5	20 / 500	3750	D, E	
CPC1945G	400	1	5	20 / 400	3750	C	
CPC1945Y	400	1	5	20 / 400	3750	A	
CPC1961	600	0.25	5	20 / 500	3750	F, G	Dual
CPC1963	600	0.5	5	20 / 500	3750	D, E	
CPC1965G	600	1	5	20 / 400	3750	C	
CPC1965Y	600	1	5	20 / 400	3750	A	
CPC1972	800	0.25	5	20 / 500	3750	D, E	
CPC1976Y	600	2	5	20 / 500	3750	B	
PD1201	400	1	5	20 / 500	3750	C	
PD2401	500	1	5	20 / 500	3750	C	
PD2601	600	1	5	20 / 500	3750	C	
PM1204	400	0.5	5	20 / 500	3750	D, E	
PM1205	500	0.5	5	20 / 500	3750	D, E	
PM1206	600	0.5	5	20 / 500	3750	D, E	
PS1201	400	1	5	20 / 500	3750	A	
PS2401	500	1	5	20 / 500	3750	A	
PS2601	600	1	5	20 / 500	3750	A	

Optically Isolated Gate Drivers

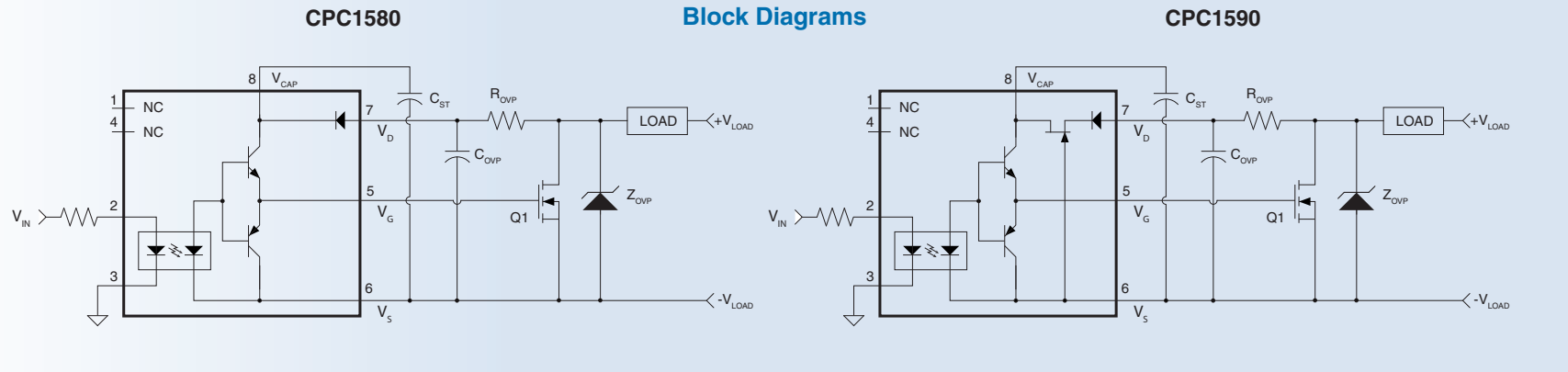
The CPC1580 and CPC1590 are high speed, Optically Isolated Gate Driver ICs. On-chip circuitry charges an external capacitor from the load voltage which eliminates the need for an external IC power supply. The Driver IC is ideal for low duty cycle switching applications.

Features:

- Low drive power requirements (TTL/CMOS Compatible)
- Fast switching t_{ON}/t_{OFF} 20/400 μ sec
- Load Voltages up to 200V
- No external IC power supply

Applications:

- Instrumentation
- Multiplexers
- Electronic switching
- I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment (patient/equipment isolation)
- Security
- Aerospace
- Industrial controls



Operational temperature range of -40° to 85°C

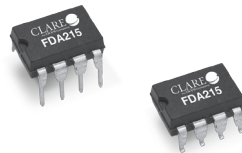
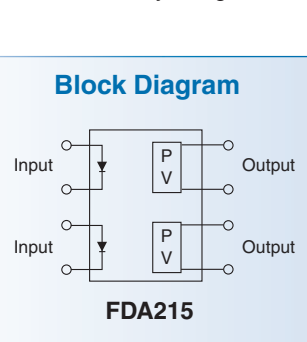
Part Number	Input Control Current (mA)	Gate Voltage @ $I_F = 5\text{mA}$ (V_G)	Blocking Voltage (V_D)	Regulated Capacitor Voltage ($V_{CAP-MAX}$)	Nominal Switching Speeds ¹ t_{ON}/t_{OFF} (ms)	Isolation Voltage (V_{rms})	Package ² Type
CPC1580	5	7.5 to 12	65	$V_{DS}-0.2$	0.04 / 0.4	3750	8-Pin SMT
CPC1590	5	7.5 to 12	200	16	0.04 / 0.4	3750	8-Pin SMT

¹ With $I_F=5\text{mA}$.

² For Package Type, SMT indicates Surface Mount Technology.

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 8 Volts. This device is suited for use in discrete solid state relay designs.



Features:

- Isolated 5V photovoltaic output
- May be configured for AC and DC switching
- Floating outputs for parallel or series configuration

Applications:

- MOSFET Driver
- Programmable control
- Process control
- Instrumentation

Operational temperature range of -40° to 85°C

Part Number	Input Control Current I_F (mA)	Open Circuit Voltage (V_{OC})	Nominal Short Circuit Current I_{SC} (μ A)	Switching Speeds t_{ON}/t_{OFF} (ms)	Isolation Voltage (V_{rms})	Package ¹ Type
FDA215	5	5.5	2.5	5 / 5	3750	8-Pin SMT, TH

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

Load/Relay Drivers

MX877, MX878, MX879: 8-Channel, 60V Relay/Load Drivers 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 QFN-28 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.

MX878, with open-drain pulldown output configuration, can drive up to 60 volts at 200mA. Outputs can be paralleled for increased drive current up to a device total of 1000mA sink.

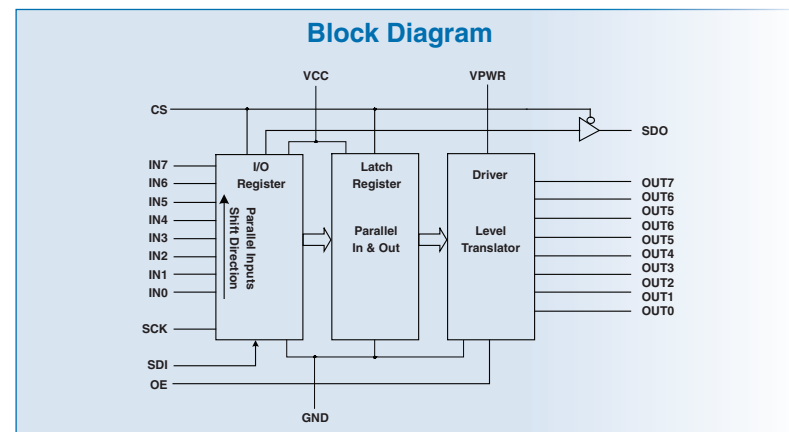
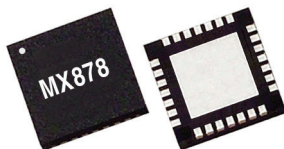
MX879, with open-drain pullup output configuration, can drive up to 60 volts at 120mA. Outputs can be paralleled for increased drive current up to a device total of 600mA source.

Features:

- 6V to 60V driver supply range
- 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

Applications:

- White goods
- Automatic test equipment (ATE)
- Industrial equipment
- Automotive relay control



MX8771 16-Channel, 60V Driver with Push-Pull Outputs & I2C Interface

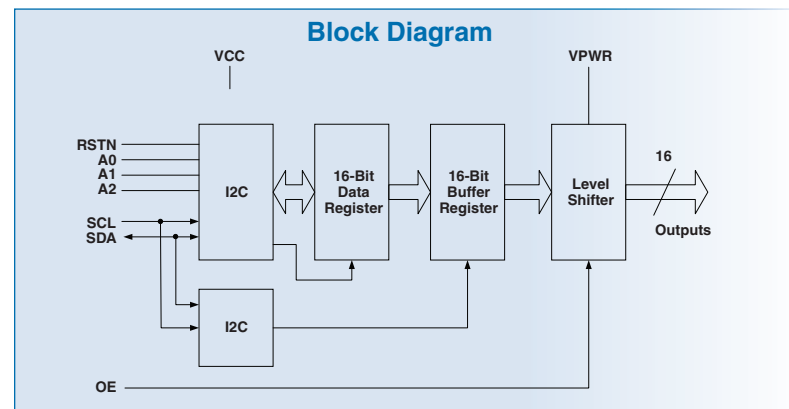
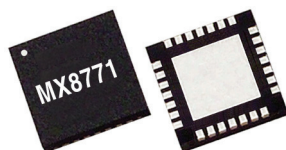
MX8771 is a 16-channel, high-voltage switch with I2C serial input control. The device connects directly to a microprocessor through a standard I2C interface. The push-pull outputs can drive up to 15mA at up to 60V, and can be paralleled for increased drive current up to a device total of 240mA sink or source.

Features:

- 16 push-pull outputs
- 6V to 60V driver supply range
- 1.65V to 5.5V logic supply range
- I2C Interface
- Synchronous update across multiple packages
- Outputs can be paralleled

Applications:

- White goods
- Automatic test equipment (ATE)
- Industrial equipment

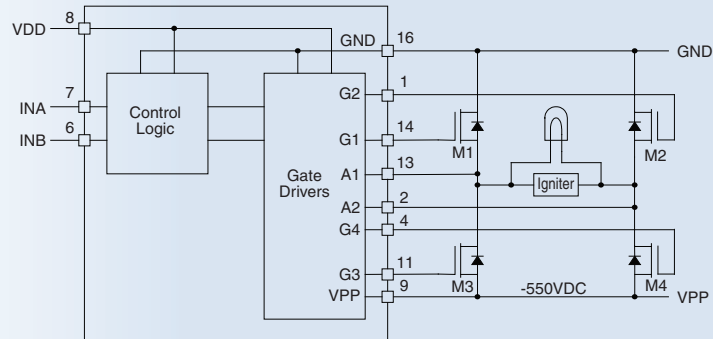


IGBT/MOSFET Drivers & N-Channel Depletion Mode FETs

MX6895 -550V Full-Bridge Gate Driver

The MX6895 features Clare's high voltage integrated circuit (HVIC) technology integrating high- and low-side N-channel power MOSFET drivers in a full-bridge configuration. The circuit is intended as a commutator for High Intensity Discharge (HID) lamps such as those used in vehicle headlamps, outdoor street lighting, multimedia projectors, retail accent lighting, and warehouse lighting.

Block Diagram



Features:

- Full-bridge gate driver
- Internal high-voltage level shift function
- Negative 550V lamp supply voltage
- 3V to 12V CMOS logic compatible
- External dead-time control
- 8V to 12V input supply voltage
- No external bootstrap capacitors

Applications:

- Commutator for high intensity:
- Discharge lamps
 - Vehicle headlamps
 - Outdoor/street lighting
 - Multimedia projectors
 - Retail accent lighting
 - Warehouse lighting



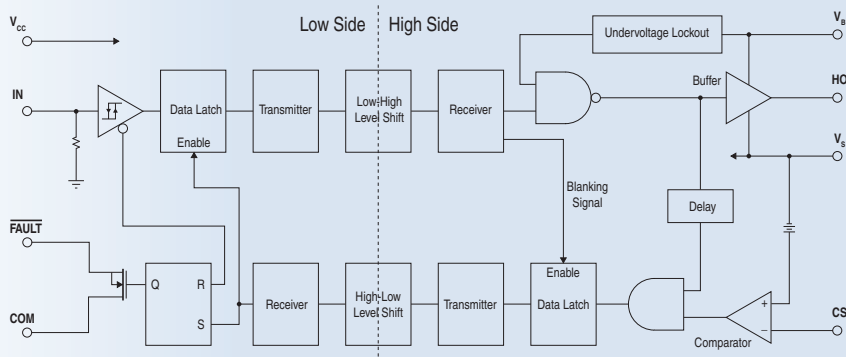
NEW! IX2127 High Voltage MOSFET and IGBT Driver

The IX2127 is a high-voltage, high-speed power MOSFET and IGBT driver. The high-voltage level-shift technique enables this device 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, the $\overline{\text{FAULT}}$ output, 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.

Block Diagram



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 $\overline{\text{FAULT}}$ indicator pin shows over-current shutdown
- Output in phase with the input

Applications:

- High-speed gate driver
- Motor drive inverter
- Automotive



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 high 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.

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.



N-Channel Depletion Mode FETs

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)	Package
CPC3703	250	4	-1.6	-3.9	300	SOT89
CPC3710	250	10	-1.6	-3.9	220	SOT89
CPC3714	350	14	-1.6	-3.9	240	SOT89
CPC3720	350	22	-1.6	-3.9	130	SOT89
CPC3730	350	30	-1.6	-3.9	140	SOT89

LITELINK N-Channel Depletion Mode FETs

Part Number	BV_{DSX} (V)	$R_{DS(ON)}$ Max (Ω)	$V_{GS(off)}$ Min (V)	$V_{GS(off)}$ Max (V)	I_D @ $V_{GS} = -0.57V$ Min (mA)	Package
CPC5602	350	14	-2.0	-3.6	130	SOT223
CPC5603	415	14	-2.0	-3.6	130	SOT223

Solar Cell Products

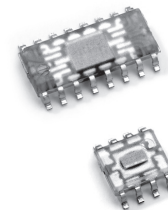
The Clare Solar Cell is a revolutionary new product offering that addresses the diverse needs and applications of the growing low power solar energy market. This technology development is based on Clare's strength in photovoltaic silicon processing and IC packaging. The Solar Cell product family offers open circuit voltage levels of 4V and 8V when activated by natural or artificial light. These voltage levels correlate to common circuit board power supply voltages making the solar cell ideal for battery charging applications and trickle-charge power sources. Standard JEDEC SOIC package styles make these Solar Cell products ideal for prototype and high volume production usage.

Features:

- Select from multiple voltage and current outputs
 - 4V & 8V output
 - 25 μ A - 100 μ A current output
- Provides true wireless power
- Triggers with natural sunlight or artificial light
- Semiconductor miniature size and reliability

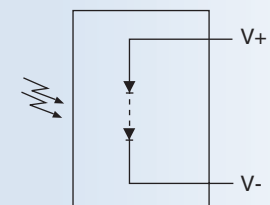
Applications:

- Portable electronics
- Solar battery chargers
- Battery operated equipment
- Consumer electronics
- Wireless sensors and detection
- Sunlight / light / flame detection
- Remote installation



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

Block Diagram

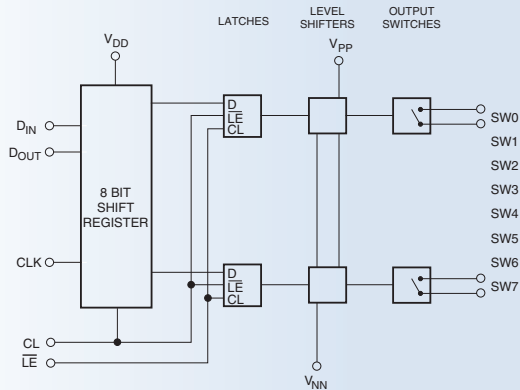


High-Voltage Products

The high-voltage process technology used on these devices is Clare's reliable BCDMOS on SOI (Silicon On Insulator). This process offers unique performance features such as multiple 300 Volt open drain FET devices and 200 Volt bidirectional analog switch cells with 1-Amp peak current capability.

CPC7220 High-Voltage 8-Channel Analog Switch

Block Diagram



The CPC7220 is a low charge injection, 8-channel, high-voltage analog switch integrated circuit (IC). The CPC7220 is capable of switching large load voltages, and has a flexible load voltage range, e.g. V_{PP}/V_{NN} : +40V/-160V or +100V/-100V. Switch manipulation is managed by an 8-bit serial-to-parallel shift register whose outputs are buffered and stored by an 8-bit transparent latch. Level shifters buffer the latch outputs and operate the high-voltage switches.



Features:

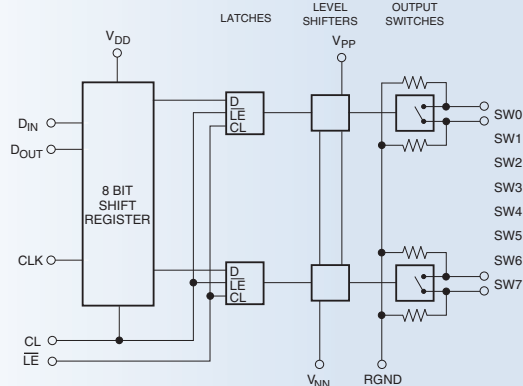
- DC to 10MHz analog signal frequency
- 200 Volts peak-to-peak output switches
- Low quiescent power dissipation (< 1μA typical)
- Output on-resistance typically 26Ω
- TTL inputs and outputs for 3.3V interface
- 28-Pin PLCC Package; 48-Pin LQFP Package

Applications:

- Ultrasound imaging
- Printers
- Industrial controls and measurement

NEW! CPC7232 High-Voltage 8-Channel Analog Switch with Bleeder Resistors

Block Diagram



The CPC7232 is a low charge injection, 8-channel, high-voltage analog switch integrated circuit (IC). The CPC7232 incorporates bleeder resistors on all switch outputs. The device is capable of switching large load voltages, and has a flexible load voltage range, e.g. V_{PP}/V_{NN} : +40V/-160V or +100V/-100V. Switch manipulation is managed by an 8-bit serial-to-parallel shift register whose outputs are buffered and stored by an 8-bit transparent latch. Level shifters buffer the latch outputs and operate the high-voltage switches.



Features:

- DC to 10MHz analog signal frequency
- 200 Volts peak-to-peak output switches
- Output bleeder resistors
- Low quiescent power dissipation (< 1μA typical)
- Output on-resistance typically 26Ω
- TTL inputs and outputs for 3.3V interface
- 28-Pin PLCC Package; 48-Pin LQFP Package

Applications:

- Ultrasound imaging
- Printers
- Industrial controls and measurement

Linear Optocouplers and Isolation Amplifiers

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

OptoMOS Linear Isolation Amplifiers integrate a linear optocoupler with two independent LF356 op-amps in a single 16-pin package. These amplifiers can couple both AC and DC signals in either unipolar or bipolar modes, while providing 3750V_{rms} of input/output isolation. Using a servo control loop to compensate for the nonlinear time and temperature characteristics of the LED, these amplifiers distinguish themselves among conventional optocouplers by significantly improving linearity and stability.

Features:

- Couples analog and 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
- Machine insertable, wave solderable
- VDE compatible

Applications:

- Modem transformer replacement with no insertion loss
- Digital telephone isolation
- Power supply feedback voltage/current
- Medical sensor interfacing
- Isolation of process control transducers

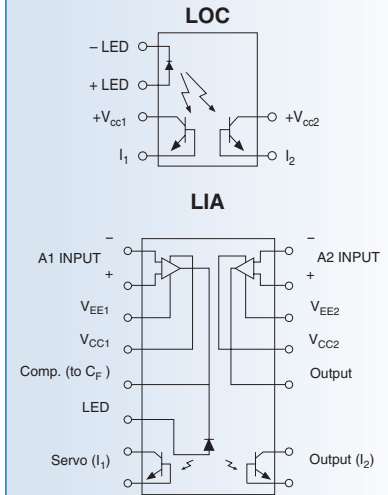
Operational temperature range of -40° to 85°C



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 ¹ Type
LOC110	0.004 / 0.03	0.004 / 0.03	0.668 / 1.179	2-10	3750	8-Pin SMT, TH
LOC111	0.008 / 0.03	0.006 / 0.03	0.733 / 1.072	2-10	3750	8-Pin SMT, TH
LOC112	0.004 / 0.03	0.004 / 0.03	0.733 / 1.072	2-10	3750	8-Pin SMT, TH
NEW! LOC117	0.008 / 0.03	0.006 / 0.03	0.887 / 1.072	2-10	3750	8-Pin SMT, TH
LOC210	0.004 / 0.03	0.004 / 0.03	0.733 / 1.072	2-10	3750	16-Pin SMT
LOC211	0.008 / 0.03	0.006 / 0.03	0.733 / 1.072	2-10	3750	16-Pin SMT
LIA100	0.004 / 0.03	0.004 / 0.03	0.55 / 1.42	2-10	3750	16-Pin SMT, TH
LIA101	0.004 / 0.03	0.004 / 0.03	0.550 / 1.072	2-10	3750	16-Pin SMT, TH

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

Block Diagrams



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 exhibiting excellent temperature stability for a total gain error of less than 2dB.

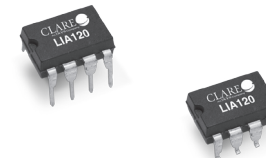
These devices are well suited for isolated high-gain feedback amplifiers that require excellent linearity and low temperature variation such as power supply feedback stages, modem and audio transformer replacements, industrial control signals, and sensor feedback.

Features:

- Fully Matched IC
- 70dB Linearity (typ.)
- Optocoupler, precision reference, and error amplifier in single package
- Low voltage operation 2.7V

Applications:

- Power supply feedback
- Telecom central office supply
- Telecom bricks
- Modem transformer replacement



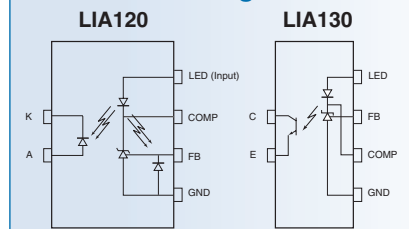
Operational temperature range of -40° to 85°C

Part Number	Reference Voltage	V _{REF} Tolerance ²	CTR K1	CTR K2	CTR Matching K3	Linearity	Isolation Voltage (V _{rms})	Package ¹ Type
LIA120	1.24 V	1%	1 to 3%	1 to 3%	85 to 115%	70dB	3750	8-Pin SMT, TH
LIA130	1.24 V	1%	-	-	-	-	3750	8-Pin SMT, TH

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

² At T_A = 25°C.

Block Diagrams



Single and Dual Optocouplers

Single and dual OptoMOS products 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 phototransistor output. The phototransistor output can be either a single transistor or, for greater gain, a Darlington transistor.

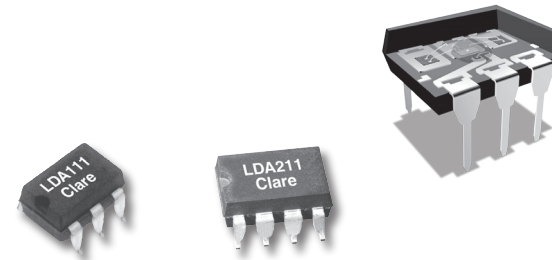
These optocouplers allow for either AC or DC input circuits, and are ideal for telecom, industrial control, and instrumentation circuits where electrical isolation of control circuitry is crucial.

Features:

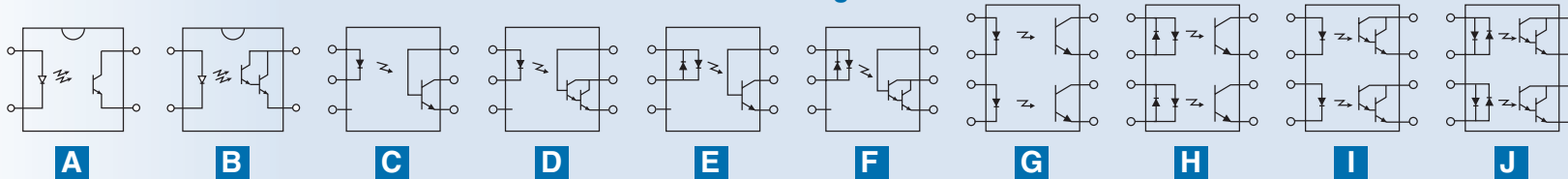
- AC and DC compatible inputs
- 1500V_{rms}, 3750V_{rms}, 5000V_{rms} I/O isolation
- Machine insertable, wave solderable

Applications:

- Telecom switching
- Tip/ring circuits
- Modem switching (laptops, notebooks, PDAs)
- Loop detection
- Ringing detection
- Current sensing



Block Diagrams



Operational temperature range of -40° to 85°C

Part Number	Breakdown Voltage (V _p)	Nominal Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control Current (mA)	Isolation Voltage (V _{rms})	Package ¹ Type	Configuration
NEW! CPC1001N	30	330	0.3	0.2	1500	4-Pin SMT	A
CPC1301	350	5500	1	1	5000	4-Pin SMT, TH	B
CPC1302	350	5500	1	1	3750	8-Pin SMT, TH	I
NEW! CPC1303	30	1000	0.5	0.2	5000	4-Pin SMT, TH	A
LDA100	30	300	0.5	1	3750	6-Pin SMT, TH	E
LDA101	30	300	0.5	1	3750	6-Pin SMT, TH	C
NEW! LDA102	30	350	0.5	1	3750	6-Pin SMT, TH	C
LDA110	30	8500	1	1	3750	6-Pin SMT, TH	F
LDA111	30	8500	1	1	3750	6-Pin SMT, TH	D
LDA200	30	300	0.5	1	3750	8-Pin SMT, TH	H
LDA201	30	300	0.5	1	3750	8-Pin SMT, TH	G
LDA202	30	300	0.5	1	3750	8-Pin SMT, TH	H
LDA203	30	300	0.5	1	3750	8-Pin SMT, TH	G
LDA210	30	8500	1	1	3750	8-Pin SMT, TH	J
LDA211	30	8500	1	1	3750	8-Pin SMT, TH	I
LDA212	30	8500	1	1	3750	8-Pin SMT, TH	J
LDA213	30	8500	1	1	3750	8-Pin SMT, TH	I

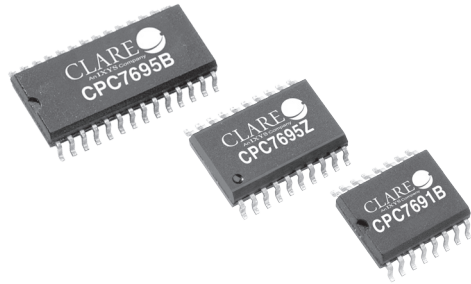
¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

To download datasheets or to find your nearest sales representative, visit www.clare.com

Line Card Access Switch (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.



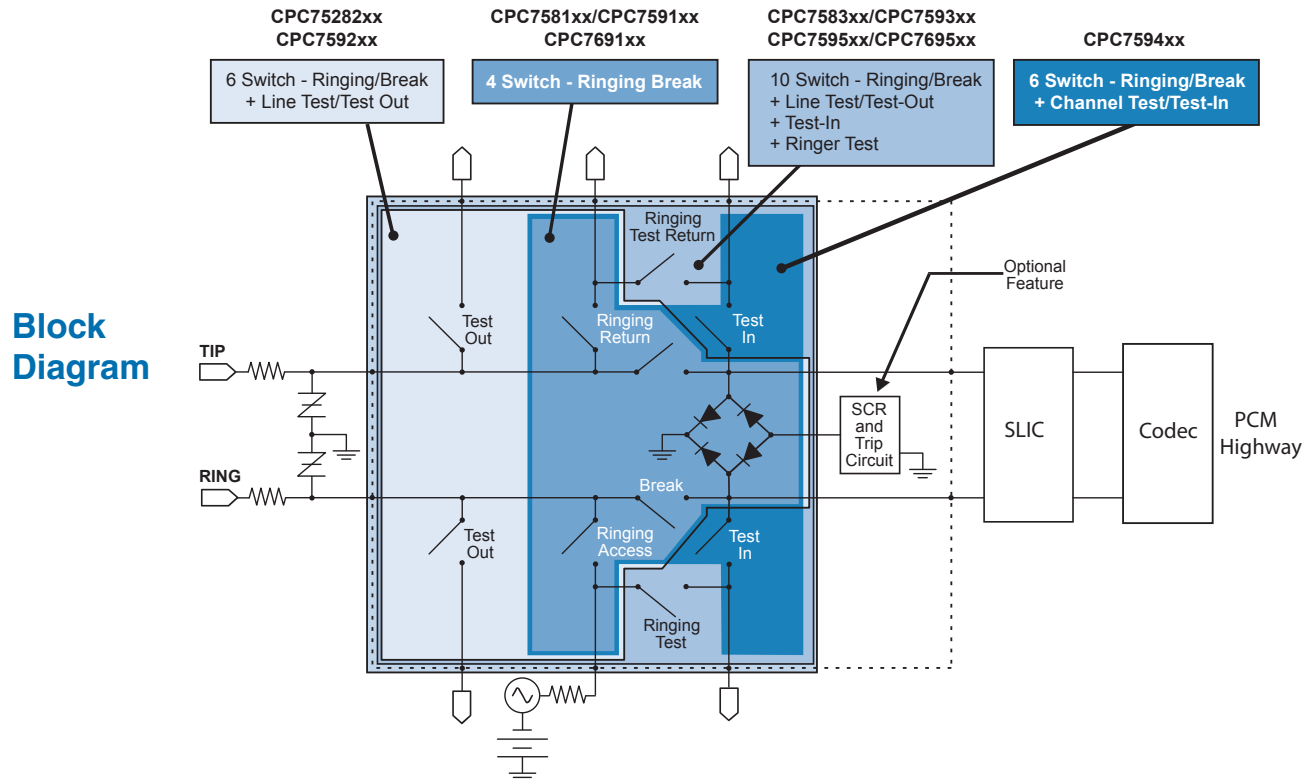
Features:

- 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
- Pin-to-pin compatibility to the Legerity 7581, 7582, and 7583 SOIC products

Applications:

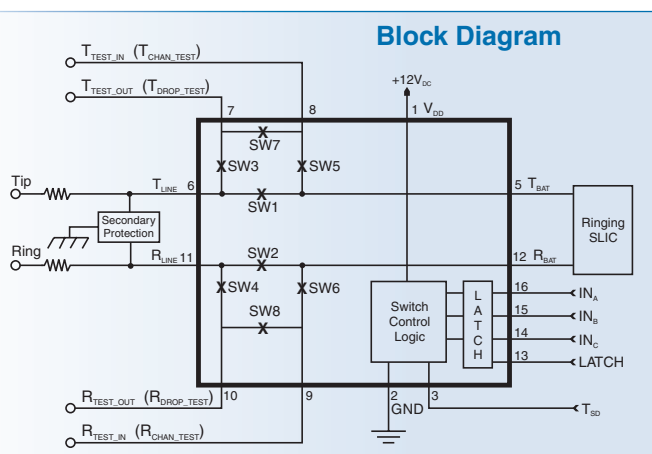
- VOIP gateways
- Central Offices (CO)
- Digital Loop Carriers (DLC)
- Digitally Added Main Line (DAML)
- Hybrid Fiber Coax (HFC)
- Fiber in the Loop (FITL)
- Pair Gain systems
- Channel banks
- PBX systems

1500V/ μ s Guaranteed Transient Sensitivity (dV/dt) - CPC75282, CPC7691, CPC7695!



Part Number	Minimum 1.5KV dV/dt	# Switches	Switch Pairs					Ringing Test	Protection Features				Logic States	Package Type
			Break	Ringing	Test Out	Test In			Zero-Cross Switching	Diode Bridge	Protection SCR	Hold Current (mA)		
NEW! CPC75282KA	yes	Dual 6	•	•	•				•	Full	•		6	44 TQFP
NEW! CPC7691xA	yes	4	•	•					•	Half	•	110	3	16 SOIC or 16 DFN
NEW! CPC7691xB	yes	4	•	•					•	Full	•		3	16 SOIC or 16 DFN
NEW! CPC7695xA	yes	10	•	•	•	•	•		•	Half	•	110	7	20 SOIC or 28 SOIC
NEW! CPC7695xB	yes	10	•	•	•	•	•		•	Full	•		7	20 SOIC or 28 SOIC
NEW! CPC7695xC	yes	10	•	•	•	•	•		•	Half	•	110	8	20 or 28 SOIC or 28 DFN
CPC7591xA		4	•	•					•	Half	•	110	3	16 SOIC or DFN
CPC7591xB		4	•	•					•	Full	•		3	16 SOIC
CPC7592xA		6	•	•	•				•	Half	•	60	4	16 SOIC
CPC7592xB		6	•	•	•				•	Full	•		4	16 SOIC
CPC7592xC		6	•	•	•				•	Half	•	110	5	16 SOIC
CPC7593xA		10	•	•	•	•	•		•	Half	•	110	7	20 or 28 SOIC
CPC7593xB		10	•	•	•	•	•		•	Full	•		7	20 or 28 SOIC
CPC7593xC		10	•	•	•	•	•		•	Half	•	110	8	20 or 28 SOIC or 28 DFN
CPC7594xA		6	•	•		•			•	Half	•	110	4	16 SOIC
CPC7595xA		10	•	•	•	•	•		•	Half	•	110	7	20 or 28 SOIC or 28 DFN
CPC7595xB		10	•	•	•	•	•		•	Full	•		7	20 or 28 SOIC or 28 DFN
CPC7595xC		10	•	•	•	•	•		•	Half	•	110	8	20 or 28 SOIC or 28 DFN
CPC7581xA		4	•	•					•	Half	•	60	3	16 SOIC
CPC7581xB		4	•	•					•	Full	•		3	16 SOIC
CPC7583xA		10	•	•	•	•	•		•	Half	•	100	7	28 SOIC

NEW! CPC7508 LCAS for Ringing SLICs



The CPC7508 is a member of Clare's next generation Line Card Access Switch family. When 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.

Applications:

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



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

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 (10usec x 700usec) 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 reception which is ideal for telephony applications in countries where CID information is present before the ringing signal. The CPC5622 also offers both full- and half-wave ringing signal detection allowing the designer to choose the appropriate interface to the codec/DSP block.

Features:

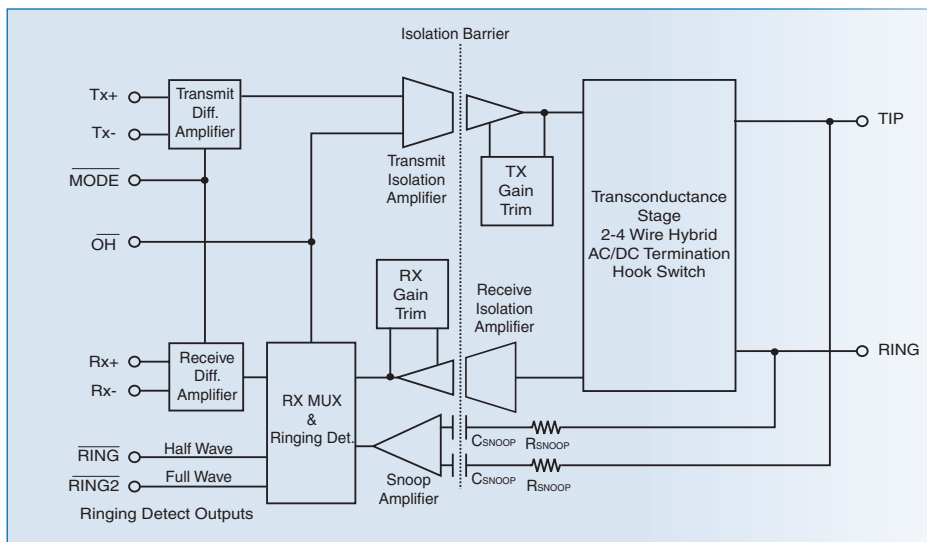
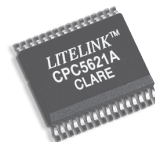
- Voice and data applications
- Modem DAA for speeds up to V.92
- Half-wave or full-wave ringing detection
- Worldwide telephone network compatibility
- Caller-ID reception
- Line side powered from telephone line
- 3.3V to 5V power supply
- Easy interface with modem ICs and voice codecs
- High power transmit option for voice applications (>3dBm)

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	MODE pin	Caller ID	Ringing Detect
CPC5622	LITELINK III	3000	3.3V to 5V	Yes	Continuous	Half & Full wave
CPC5621	LITELINK III	3000	3.3V to 5V	Yes	Selectable	Full wave
CPC5620	LITELINK III	3000	3.3V to 5V	Yes	Selectable	Half wave
CPC5601	Optional Optically Isolated Auxiliary Programmable Driver IC: Enables Host Equipment Control for LITELINK Silicon DAA Devices					
CPC5608	Optional Auxiliary Programmable Driver IC: Enables Host Equipment Control for LITELINK Silicon DAA Devices					

CPC5622 LITELINK III Block Diagram:



Phone Line Monitor Devices

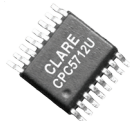
Clare's CPC5712 is a special-purpose Phone Line Monitor with Detectors (PLMD) integrated circuit that is used in various high-voltage telephony applications such as VoIP gateways and IP-PBXs. The device monitors the TIP/RING potential through a high-impedance divider (resistor isolation) to derive two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

NEW! 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)
- Small SOP 16-lead package
- Worldwide telephone network compatibility
- Minimum external components
- High differential input impedance, very low common mode input impedance
- Fixed gain
- 3.0V to 5.5V operation
- Low power consumption
- CMOS logic-level output (TTL compatible)



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:

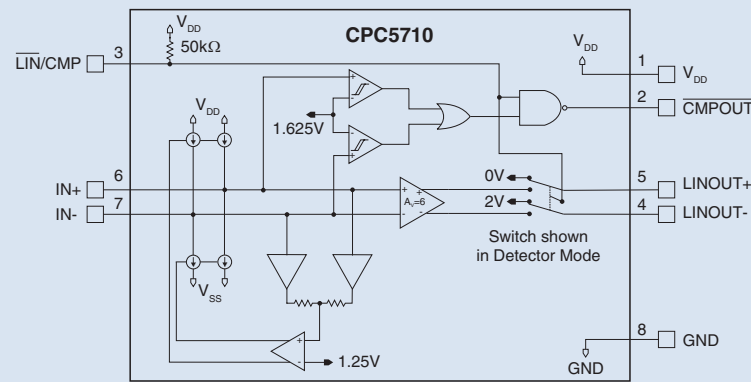
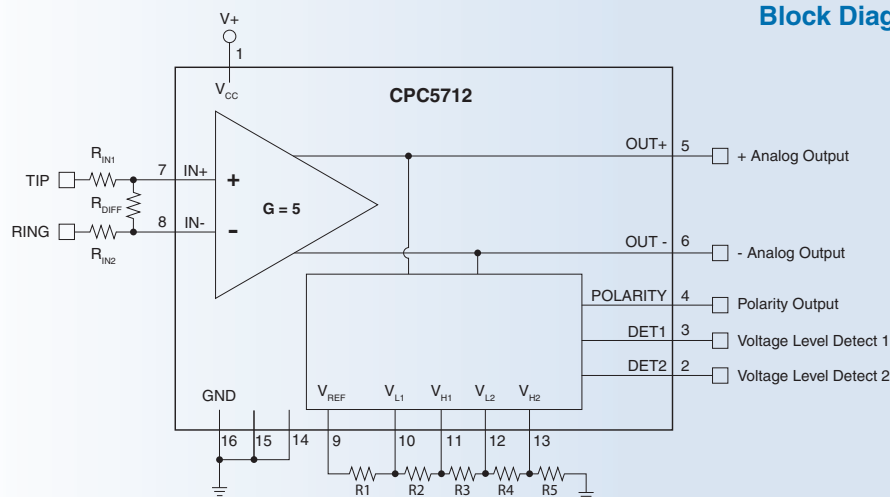
- Differential or single-ended linear output
- Excellent common-mode rejection ratio (CMRR)
- Full-wave ringing level detector comparator with internal threshold, large hysteresis, and TTL logic-level output
- Small SOIC 8-lead package
- Worldwide telephone network compatibility
- Minimum external components
- High differential input impedance, very low common mode input impedance
- Fixed gain
- 3.3V or 5.0V operation
- CMOS logic-level output (TTL compatible)



CPC5710 Applications:

- Display feature (caller ID) signal processing
- Line-in-use detection (Another Phone-Off-Hook)
- Ringing signal level detection
- Battery presence monitoring
- TIP/RING lead voltage monitoring
- Line polarity

Block Diagrams



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.

Features:

- 3750V_{rms} input to output isolation
- Multiple functionality in single package
- Current limiting (part numbers with L suffix)
- Machine insertable, wave solderable
- TTL and CMOS compatible

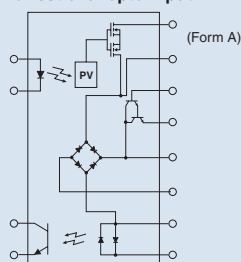
Applications:

- Telecommunication/datacommunication
- Instrumentation
- I/O subsystems
- Electronic switching
- Medical equipment (patient/equipment isolation)
- Security
- Aerospace
- Industrial controls



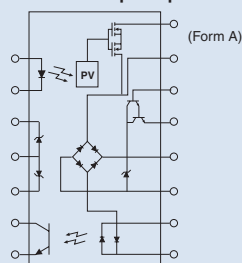
Block Diagrams

No zener protection
Bidirectional opto-input



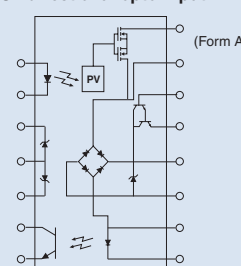
ITC117

Zener protection
Bidirectional opto-input



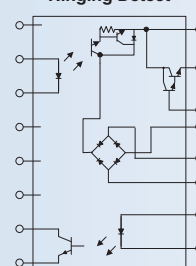
ITC137

Zener protection
Unidirectional opto-input



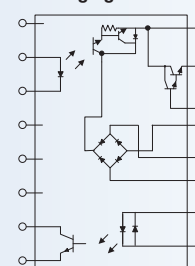
ITC135

With Half-Wave
Ringing Detect



ITC100

With Full-Wave
Ringing Detect



ITC107

Operational temperature range of -40° to 85°C

Part Number	Relay Parameters				Optocoupler Parameters				Isolation Voltage (V _{rms})	Package ¹ Type	Features
	Blocking Voltage (V _p)	Load Current (mA)	On Resistance (Ohms)	Input Control Current (mA)	Breakdown Voltage (V)	Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control Current (mA)			
ITC117	350	120	15	5	20	33	0.5	6	3750	16-Pin SMT	Full-wave ringing detect
ITC117L	350	120	20	5	20	33	0.5	6	3750	16-Pin SMT	With Current Limit
ITC135	350	120	15	5	20	33	0.5	6	3750	16-Pin SMT	Half-wave ringing detect
ITC137	350	120	15	5	20	33	0.5	6	3750	16-Pin SMT	Full-wave ringing detect

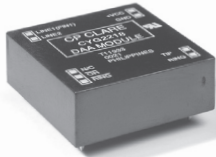
Part Number	Photodarlington Parameters			Bridge Rectifier Parameters		Optocoupler Parameters				Isolation Voltage (V _{rms})	Package ¹ Type	Features
	Blocking Voltage (V _p)	Saturation Voltage (V)	Input Control Current (mA)	Reverse Voltage (V)	Forward Voltage (V)	Breakdown Voltage (V)	Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control Current (mA)			
ITC100	350	1.2	5	350	1.1	20	33	0.5	6	3750	16-Pin SMT	Half-wave ringing detect
ITC107	350	1.2	5	350	1.1	20	33	0.5	6	3750	16-Pin SMT	Full-wave ringing detect

¹ For Package Type, SMT indicates Surface Mount Technology while TH indicates Through-Hole.

Cybergate Data Access Arrangement (DAA) Modules

Cybergate Family

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

Cybergate Data Access Arrangements

Cybergate Data Access Arrangements								Features					
Part Number	Region	Hook Switch Resistance	DC Loop Current	Return Loss (min.)	Insertion Loss (max.)	Ringing Voltage Detection	Isolation Voltage	Ringing Detection		Caller ID	Loop Current Detect	911 Emergency	2-4 Wire Conversion
		(Ohm)	(mA)	(dB)	TX - Transmit (dB) RX - Receive (dB)	Range (V _{rms})	(V _{rms})	Full Wave	Half Wave				
CYG2000	N. America Asia	15	20-120	18	Tx 7 Rx 7	20-150	1000		•				
CYG2001	N. America Asia	15	20-120	18	Tx 7 Rx 7	20-150	1000	•					
CYG2010	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		•	•			
CYG2031	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		•				
CYG2120	Spain	35	5-120	14	Tx 7 Rx 7	28-150	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		•				

*All of the parts listed are in a DIP package, operate using a 5V power supply, have a minimum On-hook impedance of 10MΩ, Maximum Total Harmonic Distortion (THD) of 0.01%, and a tip to ring surge protection voltage of 300V.

DC Termination ICs

CPC1465 SHDSL/ISDN DC Termination IC

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 in a 16-pin SOIC or DFN.

Features:

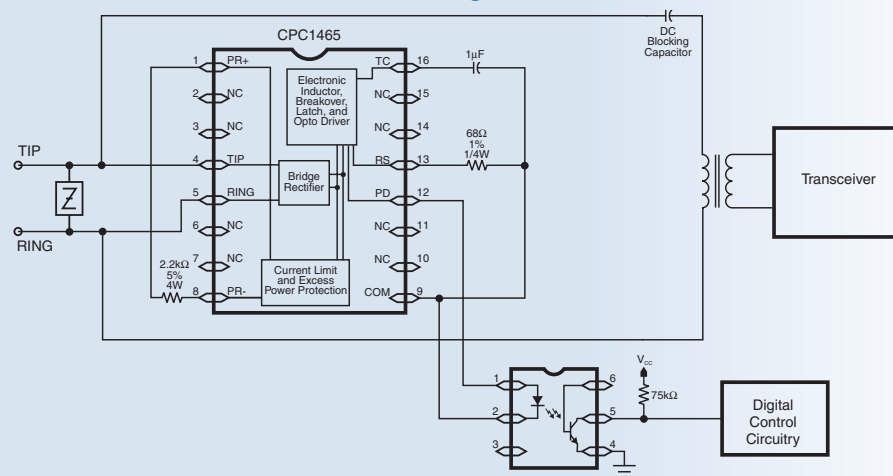
- Meets wetting (sealing) current requirements per ITU-T G.991.2
- Integrated bridge rectifier for polarity correction
- Uses inexpensive optocoupler for DC signaling
- Electronic inductor, breakover, and latch circuits
- Current limiting and excess power protection circuits
- ANSI SHDSL and ISDN compatible
- MLT and SARTS compatible
- Excellent linearity (70dB typ.)

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



Block Diagram



NEW! CPC1466 Broadband ADSL/VDSL DC Termination IC

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. only broadband services).

Features:

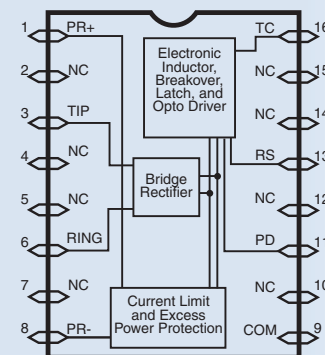
- Meets wetting (sealing) current requirements per ITU-T G.992.3
- Integrated bridge rectifier for polarity correction
- Uses inexpensive optocoupler for DC sealing current monitoring
- Electronic inductor, breakover, and latch circuits
- Current limiting and excess power protection circuits
- ADSL/VDSL compatible with low-pass filter network
- MLT and SARTS compatible
- Compatible with Portable Test Sets
- Small SOIC and DFN packages

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



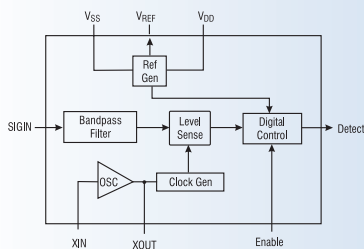
Block Diagram



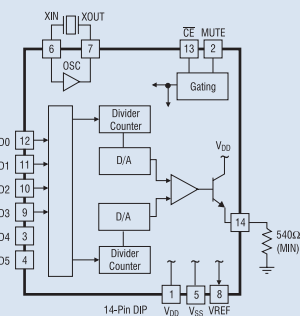
Tone Products

Tone Signaling Products include Call Progress Detectors and Generators, Line Sense Relays, and MF Trunk Signaling ICs.

Block Diagrams



M-980-02



M-991

Call Progress Detectors and Generators

Clare's family of Call Progress Detectors and Generators provides 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 to 5 Volt supply
- Linear input (detectors) and output (generator)
- Inexpensive band detector with wide dynamic range (>38dB)
- Low power consumption
- Detectors available for both common call progress and SIT tones
- Available in both DIP and SOIC packages

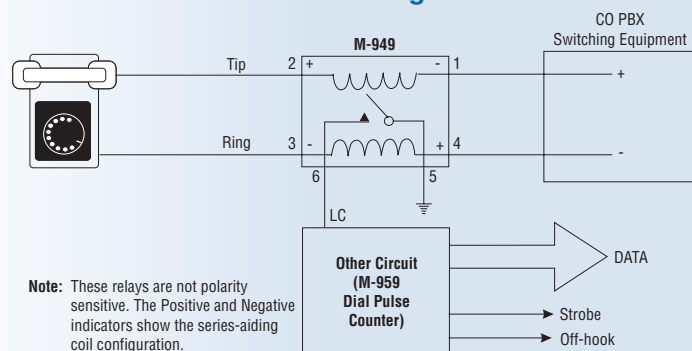
Applications:

- PBX circuits
- Billing systems
- Test equipment
- Point of Sale terminals
- Pay telephones

Part Number	Function (315-640Hz)	Detection Frequencies				Special Information Tones (SIT)	Package Type
		Band (350 + 440Hz)	Dial Tone (440 + 480Hz)	Audible Ringing (480 + 620Hz)	Busy Tone		
M-980-02	Detector	•					16-Pin SMT, 8-Pin TH
M-982-02	Detector		•	•	•		20-Pin SMT, 22-Pin TH
M-985-01	Detector		•	•	•	•	20-Pin SMT, 22-Pin TH
M-991	Generator		•	•	•		16-Pin SMT, 14-Pin TH

Line Sense Relays

Block Diagram



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

- Senses telephone line current from 15 to 200mA
- Used by control circuitry for on-hook/off-hook monitoring, switch hook flash detection and rotary dial pulse
- Meets high isolation voltage requirement of 4000V
- Meets UL and British Standard specifications
- Includes 1-Form-A relay contact

M-959 Dial Pulse Counter and Hook Status Monitor

- Independent hook status monitoring
- Time-guarded dial pulse counting
- 10 or 20 PPS dialing speeds pin selectable
- Valid data output strobe

MF Trunk Signaling Devices

MF signaling ICs, available in a variety of formats, eliminate the need for additional software required to implement MF signaling protocols in trunk circuits. Used in MF trunk signaling applications, these products include a family of PCM digital MF transceivers in a variety of formats. Signaling formats include R1 (A Law and μ Law), and R2 Specification.

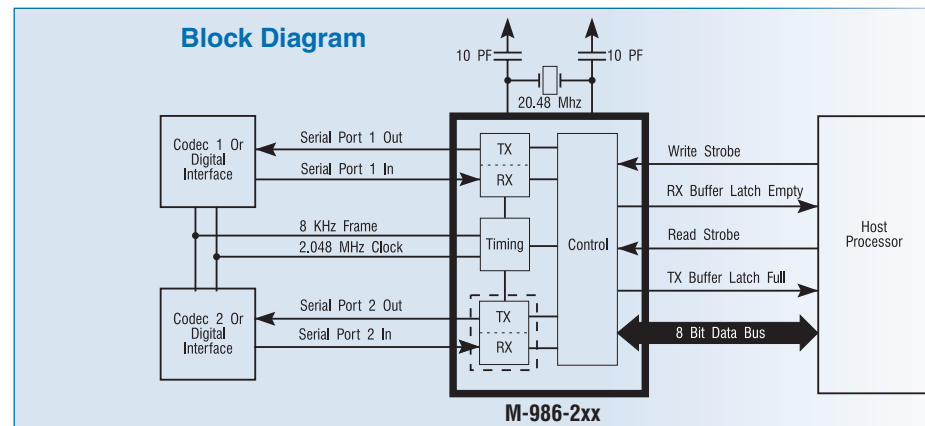
The M-993 is a stand-alone generator that provides a simple, inexpensive method of generating analog R1 MF signaling tones. Already used in thousands of systems worldwide, these products give the system designer a proven method of providing MF signaling capability.

Features:

- Direct PCM interface to chip
- Manual or Compelled Mode operation for R2 signaling
- 2.048 MHz clocking
- Dual Channel
- Microprocessor read/write interface
- R1 and R2 formats provided

Applications:

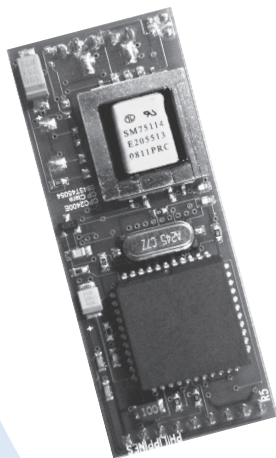
- Trunk Circuits requiring MF trunk signaling in R1 or R2 signaling formats



Part Number	Function	CCITT R1	CCITT R2	A Law PCM	μ Law PCM	PCM In/Out	Analog out	Package Type
M-986-2A1	Transceiver	•		•	•	•		44-Pin SMT, 40-Pin TH
M-986-2R2	Transceiver		•	•		•		44-Pin SMT, 40-Pin TH
M-993	Generator	•					•	14-Pin TH

CPC2400E: Embedded Modem Module (EMM)

The Embedded Modem Module combines a datapump and microcontroller with the Data Access Arrangement (DAA) to deliver an all-in-one solution for V.22 bis 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.

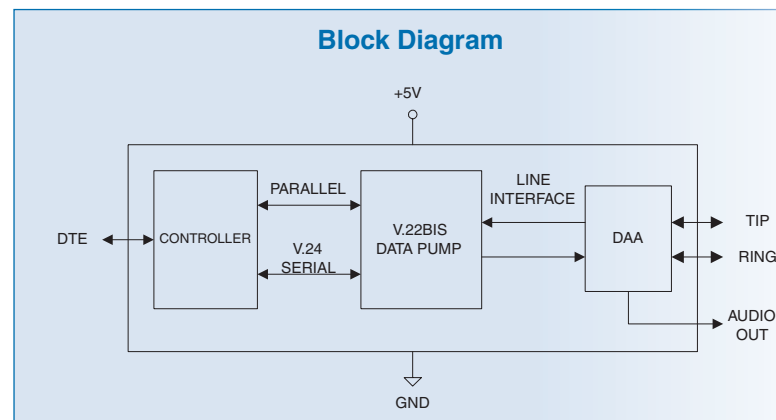


Features:

- 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



Display Products

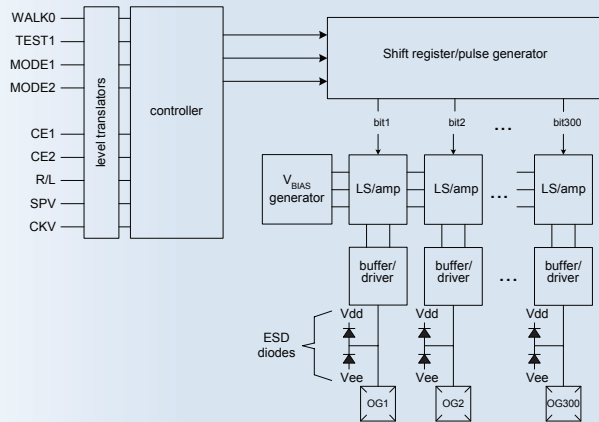
ePaper Source and Gate Drivers

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.

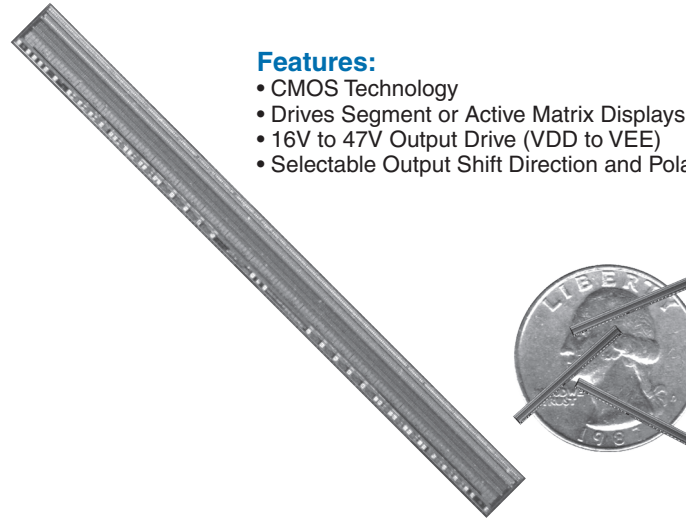
MXEI2300 output switching modes are: one pulse, continuous two pulse, jumping two pulse, or no pulse pattern. MXEI2300 can be cascaded up to a maximum of four devices.

Block Diagram



Features:

- CMOS Technology
- Drives Segment or Active Matrix Displays
- 16V to 47V Output Drive (VDD to VEE)
- Selectable Output Shift Direction and Polarity

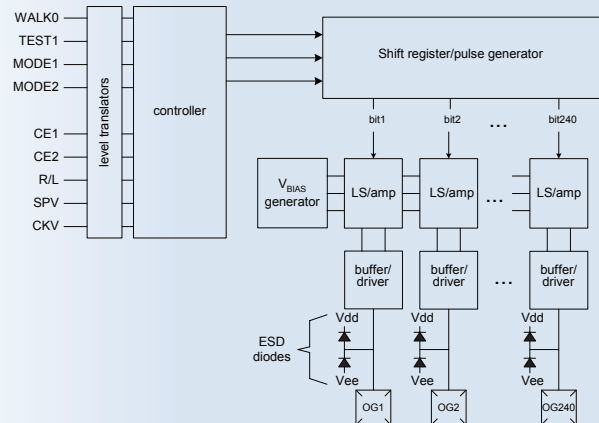


MXEI2240 240-Output ePaper Gate Driver

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.

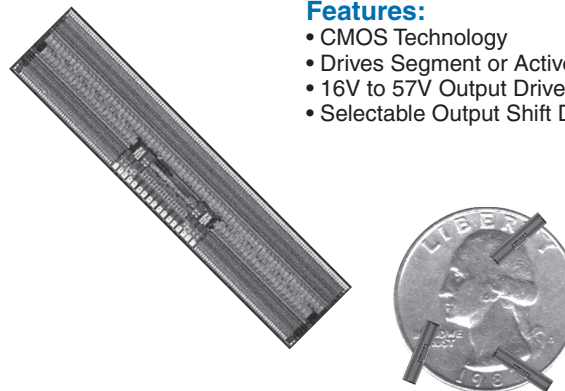
MXEI2240 output switching modes are: one pulse, continuous two pulse, jumping two pulse, or no pulse pattern. MXEI2240 can be cascaded up to a maximum of four devices.

Block Diagram



Features:

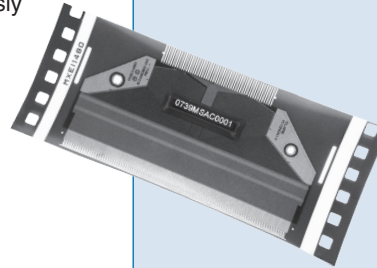
- CMOS Technology
- Drives Segment or Active Matrix Displays
- 16V to 57V Output Drive (VDD to VEE)
- Selectable Output Shift Direction and Polarity



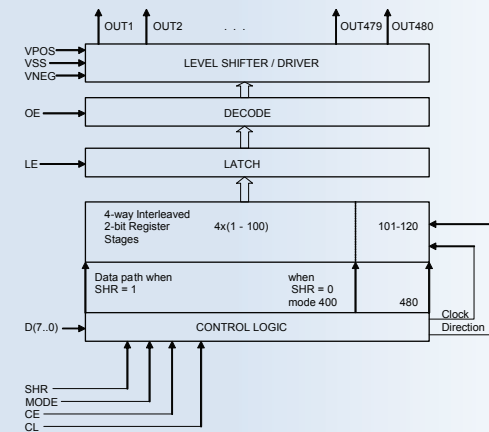
MXE11480 +/-15V ePaper Source Driver

Clare's MXE11480 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 VPOS, VSS, or VNEG analog output voltages. An 8-bit input bus simultaneously inputs 4 groups of 2 bits each.

- 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



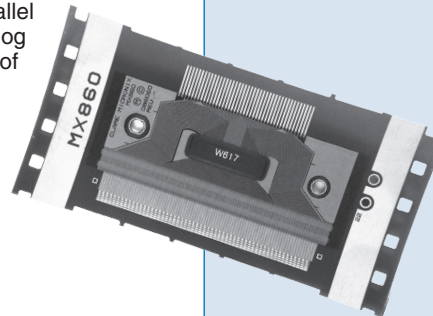
Block Diagram



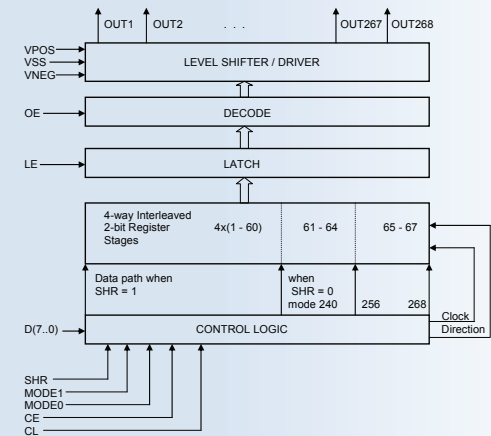
MX860 +/-15V ePaper Source Driver

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 VPOS, VSS, or VNEG analog output voltages. An 8-bit input bus simultaneously inputs 4 groups of 2 bits each.

- 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



Block Diagram



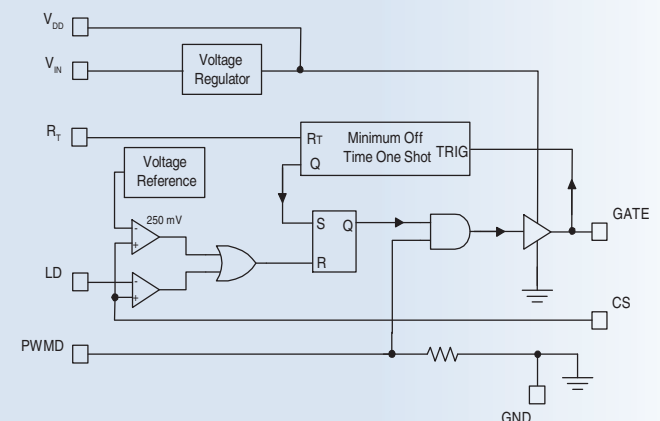
NEW! CPC9909 High Efficiency, High Brightness, Off-Line LED Driver

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

- 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



Block Diagram



NEW! MXHV9910 High Voltage, Off-Line LED Driver



The MXHV9910 is a low-cost, high-brightness (HB) LED driver manufactured using Clare's high-voltage BCDMOS on SOI process. This driver has internal circuitry that allows it to operate from a universal AC line or from 8VDC to 450VDC. This highly versatile input operating voltage enables this IC to be used in a broad range of HB LED applications.

The driver features a fixed-frequency, peak-current control method, which provides an ideal solution for driving multiple LEDs in series and in parallel. 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.

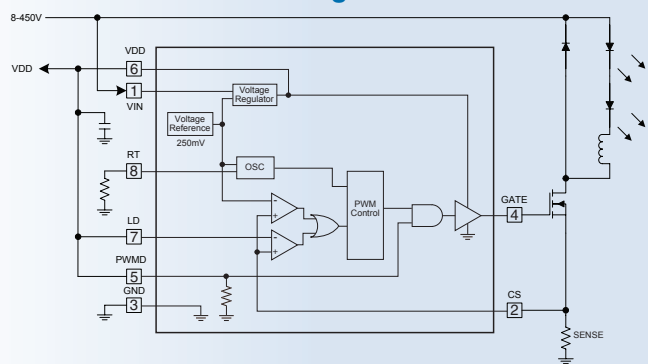
Features:

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

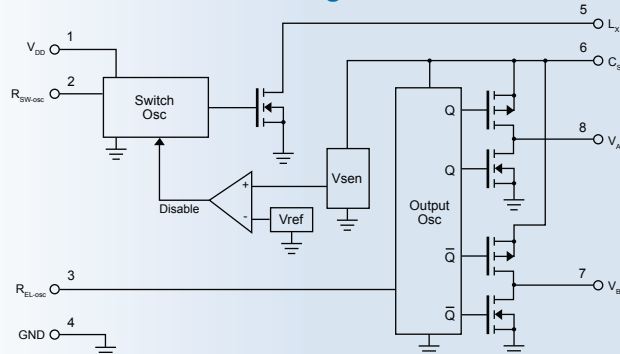
Applications:

- Flat-Panel Display RGB Backlighting
- Signage and Decorative LED Lighting
- DC/DC or AC/DC LED Driver Applications

Block Diagram



Block Diagram



CPC6826 Electroluminescent Backlamp Driver



The CPC6826 is an electroluminescent (EL) lamp driver designed for applications operating from an input supply voltage range of 1.8V to 3.5V. The architecture features an integrated boost switching supply with an H-bridge driver circuit to illuminate the EL lamp. Three passive components are required to complete the boost switcher circuit: an inductor, a capacitor, and a diode. The internal high-voltage H-bridge provides a nominal 170V_{PP} output between pins V_A and V_B.

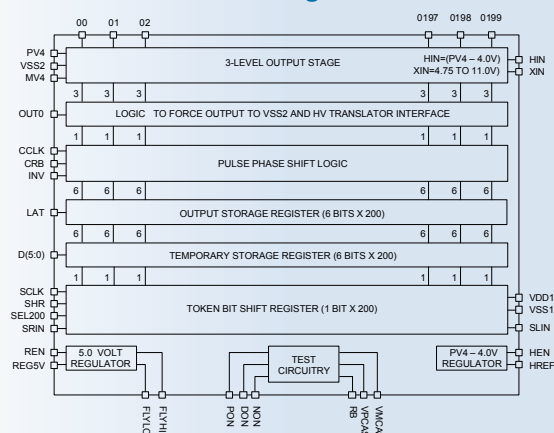
Features:

- 1.8V to 3.5V Supply Voltage
- DC to AC Conversion
- Adjustable Output Frequency
- Adjustable Switch Frequency
- Output Voltage Regulation
- 170V_{PP} H-Bridge Drive Output
- Enable/Disable Function
- MSOP-8 Package

Applications:

- Mobile Cellular Phones
- Keypad Illumination
- Instrument Panels

Block Diagram



MXED401 200 Column Cholesteric LCD Driver

Clare introduces the MXED401, targeted for the emerging non-volatile reflective LCD market, specifically bistable and multi-stable Cholesteric LCD's. The MXED401 supports 200 phase-controlled voltage data outputs. This is the first standard product driver for ChLCD display panels.



The MXED401 driver functions as a level shifter with a resting state at ground potential. Proper operation of the logic enables gray-scale capability. The output is a 128 Counter Clock (CCLK) event where each channel is a low resistive switch to external symmetric (with respect to ground) voltage supplies.

Features:

- Black & White and Gray-Scale Display Driver
- Cholesteric LCD (ChLCD) Compatible
- 200 Output Channels, Cascadable
- 192-Channel Mode
- Token-Based Bidirectional Data Transfer
- 6-Bit Data to Support 64-Level Gray-Scale
- ±2V to ±7V Panel Drive
- 4mA Minimum Source/Sink at ±7V Output Levels

Applications:

- Drive Reflective-Type Liquid Crystal Displays

Other ICs

MX884 High-Side Current Monitor

MX884 targets power management applications where high noise immunity and low cost are primary requirements. Its integrated 10-bit ADC provides high resolution, making it ideal for current monitoring systems. The MX884 enables digital power management, in which a microcontroller can readily monitor the current in a system, and perform other control functions in power systems and motion control products.

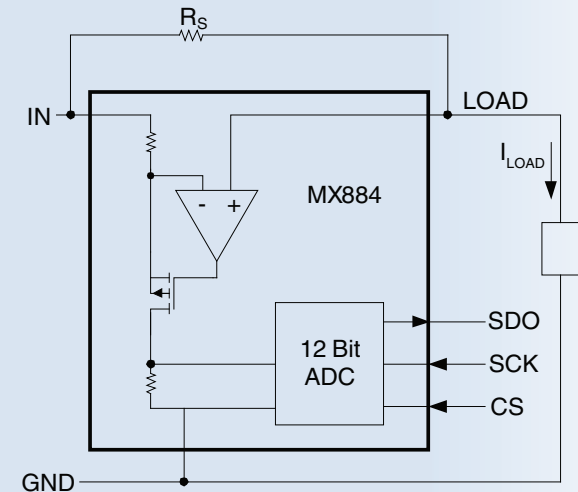
The MX884 converts a small voltage developed across an external current-sense resistor to a 10-bit digital output. It features a wide common-mode input supply voltage range of 3V to 60V, and easily interfaces to most microcontrollers. The design is simple yet cost-effective, requiring very few external components, making it especially suitable for high volume applications.



Features:

- 3V to 60V Operating Range
- Integrated 10-Bit DAC
- 3-Wire Serial Interface
- Microcontroller Compatible
- Low Power
- Minimum External Components
- TSOT-23 RoHS Compliant Package

Block Diagram



MX856 & MX857 High-Speed Level Shifters

MX856 and MX857 are high-speed, single-channel level shifters with complementary output drivers. The MX856 features a 5.0V positive supply, and the MX857 features a 3.3V positive supply.

The input buffers accept digital TTL or CMOS level signals, amplify them to the VCC and GND supply rails, and generate complementary outputs. The translator level-shifts these output signals by amplifying them to the VCC and VEE supply rails.

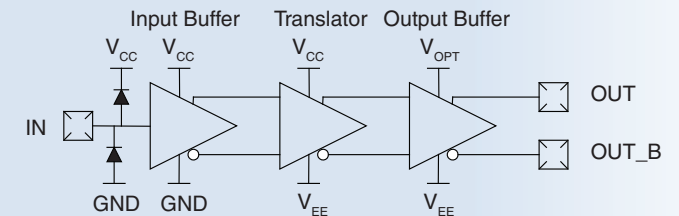
The output drivers then buffer the signals to VOPT and VEE. VOPT may be set within the range of VCC and GND. The output drivers also adjust the complementary signals for minimized skew error.



Features:

- CMOS Technology
- TTL/CMOS Compatible Inputs
- Low Switching Noise
- 5ns Typical True/Complement Output Skew
- 5ns Typical Output Rise and Fall Times
- Up to 20V Output Voltage
- Output-High Voltage Programmable via VOPT
- Output-Low Voltage Programmable via VEE

Block Diagram



MX887D & MX887P μ Power 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 $5\mu\text{A}$ at $3.0\text{V}_{\text{SUPPLY}}$.

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 a high-impedance state, while the output of the MX887P switches between the supply voltage and GND.

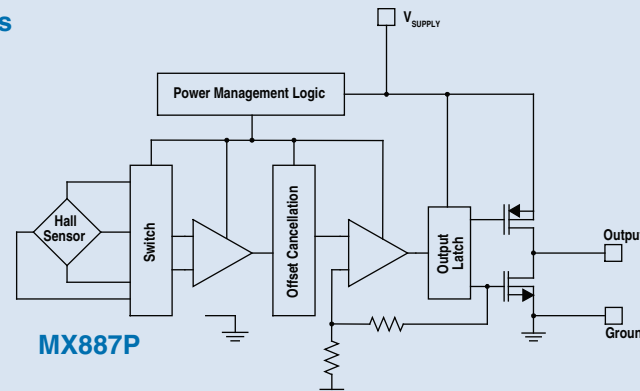
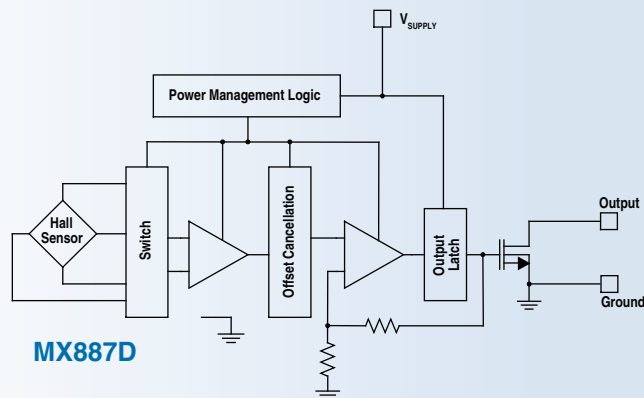
MX887D and MX887P are ideal reed relay replacements, especially in low-power portable device applications.

Applications:

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



Block Diagrams



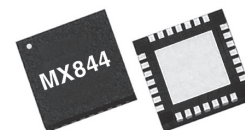
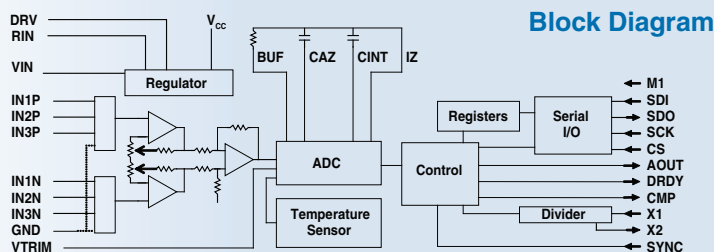
MX844 12-Bit Multi-Channel Power & Temperature Sensor

MX844 is a fully integrated subsystem that measures temperature plus differential current and voltage. An internal temperature sensor measures ambient temperature with $\pm 2.5^\circ\text{C}$ accuracy. Current and voltage measurements are made differentially through a 4-input multiplexer connected to a programmable-gain, fully differential sense amplifier. The differential sense amplifier is optimized to measure very small positive or negative voltages near ground for low-side bidirectional sensing.

Controller interrupt or over-voltage/over-current signals may be generated by a pair of 12-bit digital comparators configured as a window comparator or as simple threshold detectors.

Features:

- Wide Input Supply Range: 4.5V to 40V
- Programmable-Gain Differential Amplifier
- 4-Channel Differential Input Multiplexer
- Integrated, Dual-Slope 12-Bit ADC
- 4-Wire Synchronous Serial Data Support or Asynchronous Serial "Talk-Only" Data
- Serial Data Output (SDO) with Data Ready Pin
- Fine Calibration of Full-Scale Range
- Bidirectional Current Sense
- Internal Temperature Sensor with 0.2°C Resolution
- Compatible with 3.3V and 5V Microcontrollers



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