



# ***Semiconductor***

## ***Product Catalog***

# IXYS Integrated Circuits Division

**In April, 2012, Clare, Inc., officially became IXYS Integrated Circuits Division.**

IXYS Integrated Circuits Division is a wholly owned subsidiary of IXYS Corporation. Conveniently located close to Boston, Massachusetts, USA, IXYS Integrated Circuits Division designs, manufactures, and markets a wide variety of semiconductor devices, and is a major provider of optically isolated electronic products.



Clare, Inc., founded by Carl P. Clare in 1937 as C. P. Clare & Company, designed and manufactured electromechanical relays (EMR) for the rapidly growing power and telephony markets of the time. C. P. Clare & Company products found their way into aviation and communications products from the very beginning of World War II to the end. Continuously operating under various names from 1937 until the present, C. P. Clare & Company, as Clare, Inc., was purchased by IXYS Corporation in 2002, and is now known as IXYS Integrated Circuits Division.

IXYS Integrated Circuits Division's unique mix of high voltage wafer fab, isolation barrier expertise, multi-chip packaging experience, and expertise in analog, power, and mixed signal design points the way to more functionality in a smaller footprint at lower cost for your designs.

- **High Speed Digital Optical Isolators:** New high speed isolators that pass DC signals, require no refresh clocking, and provide 3750V<sub>rms</sub> of galvanic isolation
- **I<sup>2</sup>C Optically Isolated Bus Repeaters:** New high speed repeaters that buffer both I<sup>2</sup>C signals, require no refresh clocking, and provide 3750V<sub>rms</sub> of galvanic isolation
- **High Voltage IGBT and MOSFET Drivers:** High speed, high voltage IGBT and MOSFET drivers, some of which are AEC Q100 qualified
- **Solid State Relays:** one of the industry's broadest lines of optically isolated SSRs, available in a wide selection of configurations, blocking voltages, and load currents
- **High Voltage ICs:** high voltage 8-channel and 16-channel Analog Switches for the medical and imaging markets, high voltage LED Drivers, and others
- **Power market:** Power Solid State Relays (SSR); SCR-based AC Power Switches; and N-Channel, Depletion-Mode, Field Effect Transistors (FET)
- **Illumination:** high voltage, grid-powered, high-brightness LED Drivers
- **Telephony:** a broad range of products that includes Line Card Access Switch (LCAS) products, LITELINK<sup>®</sup> Silicon Data Access Arrangement (DAA), phone-line interface and monitoring devices, DC Termination devices for xDSL and ISDN applications, Cybergate<sup>™</sup> DAA, and others
- **Portable reader devices:** display drivers for today's popular electronic-paper readers

## Hi-Reliability Program

Building on 20 years of experience supplying Hi-Rel parts to the aerospace industry, IXYS Integrated Circuits Division now offers a line of high-reliability Solid State Relays and Optocouplers that feature full product traceability, extremely low PPM failure rates, guaranteed operation from -40°C to +85°C (and up to 105°C upon request), 100% burn-in (HTRB) 48 hours minimum, 100% post burn-in electrical tests at room temperature and at 85°C, thermal cycle (by sample or 100% for 20 cycles).

Any IXYS Integrated Circuits Division Solid State Relay (SSR) or Optocoupler offered in this catalog can be provided as a Hi-Rel device based on extensive additional environmental stressing and screening performed on standard commercial parts. Please see [www.ixysic.com/Products/HiRelProgram.htm](http://www.ixysic.com/Products/HiRelProgram.htm) for full details.

## Custom High Voltage Semiconductor Design Services

IXYS Integrated Circuits Division offers design services to the industry for the custom development of high voltage semiconductor devices. The company'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 IXYS Integrated Circuits Division address many applications requiring a high voltage interface. In addition, the company's techniques for optical isolation for relays and signal processing offer high voltage isolation between the load side and the system controller.

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# Solid State Relays

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

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

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

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

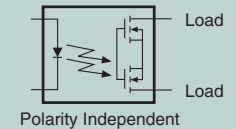
## Features:

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

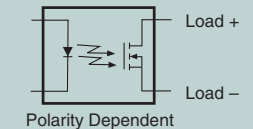
## Applications:

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

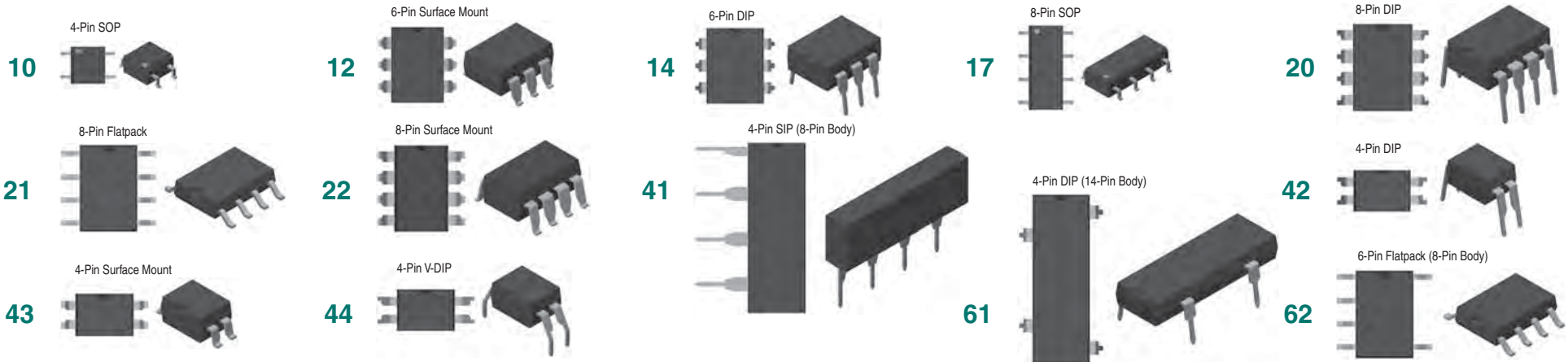
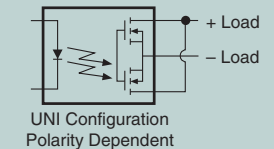
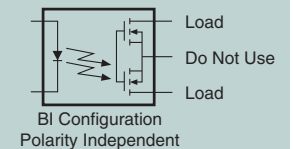
## Bidirectional



## Unidirectional

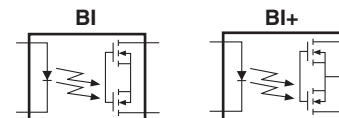


## Bidirectional Plus



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

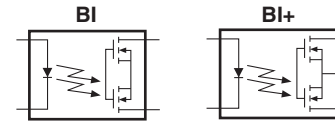
## 1-Form-A Relays: Single-Pole, Normally Open



Part Number	Relay Type	Blocking Voltage (V <sub>p</sub> )	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	Off-State Leakage (μA)	Package Type	Features and Comments
CPC1006N	BI	60	75	10	0.5	10 / 10	1500	1	10	Low I <sub>F</sub> , EN50130-4
CPC1008N	BI	100	150	8	2	2 / 0.5	1500	1	10	
CPC1009N	BI	100	150	8	2	2 / 0.5	1500	0.02	10	Very Low Off-State I <sub>LEAK</sub> = 20nA
CPC1014N	BI	60	400	2	2	2 / 1	1500	1	10	EN50130-4
CPC1016N	BI	100	100	16	2	2 / 0.5	1500	1	10	
CPC1017N	BI	60	100	16	1	10 / 10	1500	1	10	Low I <sub>F</sub> , EN50130-4
CPC1018N	BI	60	600	0.8	1	3 / 2	1500	1	10	Low I <sub>F</sub> , EN50130-4
CPC1019N	BI	60	750	0.6	2	3 / 3	1500	1	10	
CPC1020N	BI	30	1200	0.25	2	3 / 3	1500	1	10	High Load Current, Very Low On-Resistance
CPC1025N	BI	400	120	30	2	2 / 1	1500	1	10	
CPC1030N	BI	350	120	30	2	2 / 1	1500	1	10	
CPC1035N	BI	350	100	35	2	2 / 1	1500	1	10	
CPC1225N	BI	400	120	30	2	2 / 1	1500	1	10	EN/IEC60950-1 Supplementary Isolation Voltage (0.4mm Distance Through Isolation)
CPC1230N	BI	350	120	30	2	2 / 1	1500	1	10	EN/IEC60950-1 Supplementary Isolation Voltage (0.4mm Distance Through Isolation)
CPC1317	BI	70	150	16	1	2.5 / 2.5	3750	1	21	EN50130-4 (Installation Class 3), Transient Voltage Suppression (TVS)
CPC1330	BI	350	120	30	2	2 / 1	5000	1	42, 43	Enhanced Isolation Voltage
CPC1335	BI	350	100	35	1	10 / 10	3750	1	21	Low I <sub>F</sub> , EN50130-4 (Installation Class 3), Transient Voltage Suppression (TVS)
CPC1390	BI	400	140	22	2	1 / 1	5000	1	42, 43, 44	Enhanced Isolation Voltage
CPC1393	BI	600	90	50	2	5 / 5	5000	1	42, 43, 44	Enhanced Isolation Voltage
CPC1394	BI	600	120	35	2	5 / 3	5000	1	42, 43, 44	Enhanced Isolation Voltage
CPC1510	BI+	250	200	15	2	2 / 2	3750	1	12, 14	Current Limited with Thermal Shutdown - See Also Page 14
CPC1540	BI+	350	120	25	2	2 / 2	3750	1	12, 14	Current Limited with Thermal Shutdown - See Also Page 14
CPC1560	BI+	60	300	5.6	1.1	0.1 / 0.4	3750	1	20, 22	Current Limited with Thermal Shutdown - See Also Page 14
CPC1563	BI+	600	120	35	2	2 / 2	3750	1	12, 14	Current Limited with Thermal Shutdown - See Also Page 14
CPC1593	BI+	600	120	35	2	2 / 2	3750	1	12, 14	Current Limited, Thermal Shutdown, Over-Voltage Protection - See Also Page 15
LCA100	BI+	350	120	25	5	5 / 5	3750	1	12, 14	
LCA100L	BI+	350	120	25	5	5 / 5	3750	1	12, 14	Current Limiting
LCA110	BI+	350	120	35	2	3 / 3	3750	1	12, 14	
LCA110L	BI+	350	120	35	2	3 / 3	3750	1	12, 14	Current Limiting
LCA120	BI+	250	170	20	5	3 / 3	3750	1	12, 14	
LCA120L	BI+	250	150	20	5	3 / 3	3750	1	12, 14	Current Limiting
LCA125	BI+	300	170	16	5	5 / 5	3750	1	12, 14	
LCA125L	BI+	300	170	20	5	5 / 5	3750	1	12, 14	Current Limiting
LCA126	BI+	250	170	15	5	5 / 5	3750	1	12, 14	
LCA127	BI+	250	200	10	5	5 / 5	3750	1	12, 14	
LCA127L	BI+	250	170	15	5	5 / 5	3750	1	12, 14	Current Limiting

For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

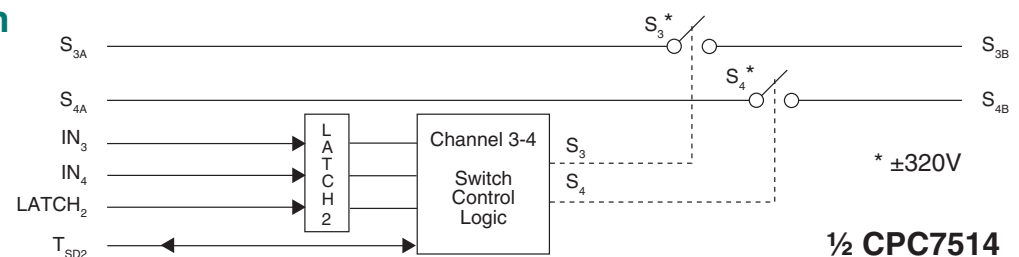
## 1-Form-A Relays: Single-Pole, Normally Open (Continued)



Part Number	Relay Type	Blocking Voltage (V <sub>p</sub> )	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	Off-State Leakage (μA)	Package Type	Features and Comments
LCA129	BI+	250	170	20	2	8 / 8	3750	1	12, 14	
LCA182	BI+	350	120	35	0.25	3 / 3	3750	1	12, 14	Very Low I <sub>F</sub>
LCA701	BI+	100	1500	0.3	2	4 / 1	3750	1	12, 14	High Load Current
LCA710	BI+	60	1000	0.5	10	2.5 / 0.25	3750	1	12, 14	High Load Current
LCA712	BI+	60	1000	0.5	10	2.5 / 0.35	3750	0.01	12, 14	High Load Current, Low I <sub>LEAK</sub>
LCA715	BI+	60	2200	0.15	5	2.5 / 0.25	3750	1	12, 14	High Load Current
LCA717	BI+	30	2000	0.15	2	3 / 3	3750	1	12, 14	High Load Current
OMA160	BI+	250	50	100	10	0.125 / 0.125	3750	0.025	12, 14	Low I <sub>LEAK</sub> , Fast Switching Times
PLA110	BI+	400	150	22	5	1 / 0.5	3750	1	12, 14	
PLA110L	BI+	400	150	25	5	1 / 0.25	3750	1	12, 14	Current Limiting
PLA132	BI+	60	600	1	2	5 / 2	3750	1	12, 14	
PLA134	BI+	100	350	3	5	5 / 5	3750	1	12, 14	
PLA140	BI+	400	250	8	5	3 / 1	3750	1	12, 14	
PLA140L	BI+	400	200	13	5	5 / 3	3750	1	12, 14	Current Limiting
PLA143	BI+	600	100	50	2	5 / 5	4000	1	12, 14	Enhanced Isolation Voltage
PLA150	BI+	250	250	7	5	2.5 / 0.5	3750	1	12, 14	
PLA160	BI+	300	50	100	10	0.05 / 0.05	3750	0.025	12, 14	Low I <sub>LEAK</sub> , Fast Switching Times
PLA170	BI+	800	100	50	5	5 / 5	3750	1	12, 14	
PLA171	BI	800	100	50	2	5 / 5	5000	1	62	Enhanced Isolation Voltage (7mm Output Pin Separation)
PLA190	BI+	400	150	22	5	1 / 0.5	5000	1	12, 14	Enhanced Isolation Voltage
PLA191	BI+	400	250	8	5	3 / 1	5000	1	12, 14	Enhanced Isolation Voltage
PLA192	BI+	600	150	22	5	5 / 5	5000	1	12, 14	Enhanced Isolation Voltage, PLA192E is DIN EN 60747-5-5 Certified
PLA193	BI+	600	100	50	5	5 / 5	5000	1	12, 14	Enhanced Isolation Voltage, PLA193E is DIN EN 60747-5-5 Certified
PLA194	BI+	600	130	35	2	3 / 2	5000	1	12, 14	Enhanced Isolation Voltage
XCA170	BI+	350	100	50	5	5 / 5	3750	1	12, 14	

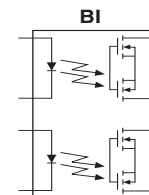
## 1-Form-A Relays: Quad Single-Pole, Normally Open

**See Page 34 for full details.** The CPC7514 Quad High Voltage Isolated Analog Switch Array provides the switching functionality of four independent 1-Form-A relays in a single small economical package. Designed to provide flexible single-ended or differential access to high voltage networks, up to 320V, the CPC7514 is configured as two sets of matched-pair switches. The CPC7514 is self-biasing, and requires no external power supply. Shown to the right is one 2-switch channel.



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)





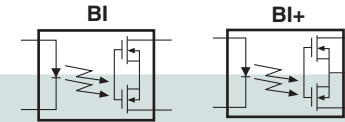
## 1-Form-A Relays: Dual Single-Pole, Normally Open

Part Number	Relay Type	Blocking Voltage (V <sub>p</sub> )	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	Off-State Leakage (μA)	Package Type	Features and Comments
CPC2014N	BI	60	400	2	2	2 / 1	1500	1	17	EN50130-4
CPC2017N	BI	60	120	16	1	3 / 3	1500	1	17	Low I <sub>F</sub> , EN50130-4
CPC2025N	BI	400	120	30	2	2 / 1	1500	1	17	
CPC2030N	BI	350	120	30	2	2 / 1	1500	1	17	
LAA100	BI	350	120	25	5	5 / 5	3750	1	20, 21, 22	
LAA100L	BI	350	120	25	5	5 / 5	3750	1	20, 21, 22	Current Limiting
LAA108	BI	100	300	8	2	3 / 3	3750	1	20, 21, 22	
LAA110	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	
LAA110L	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	Current Limiting
LAA120	BI	250	170	20	5	5 / 5	3750	1	20, 21, 22	
LAA120L	BI	250	150	25	5	5 / 5	3750	1	20, 21, 22	Current Limiting
LAA125	BI	350	170	16	5	5 / 5	3750	1	20, 21, 22	
LAA125L	BI	350	150	18	5	5 / 5	3750	1	20, 21, 22	Current Limiting
LAA126	BI	250	170	15	5	5 / 5	3750	1	20, 22	
LAA126L	BI	250	170	20	5	5 / 5	3750	1	20, 22	Current Limiting
LAA127	BI	250	200	10	5	5 / 5	3750	1	20, 21, 22	
LAA127L	BI	250	170	10	5	5 / 5	3750	1	20, 21, 22	Current Limiting
LAA710	BI	60	1000	0.5	10	2.5 / 0.25	3750	1	20, 22	
OAA160	BI	250	50	100	3	0.125 / 0.125	3750	0.025	20, 21, 22	Very Low I <sub>LEAK</sub> , Fast Switching Times
PAA110	BI	400	150	22	5	1 / 0.25	3750	1	20, 21, 22	
PAA110L	BI	400	150	25	5	1 / 0.5	3750	1	20, 21, 22	Current Limiting
PAA127	BI	280	200	10	3	0.5 / 0.5	3750	0.025	20, 21, 22	Very Low I <sub>LEAK</sub> , Fast Switching Times
PAA132	BI	60	600	1	2	5 / 2	3750	1	20, 22	
PAA140	BI	400	250	8	5	3 / 1	3750	1	20, 21, 22	
PAA140L	BI	400	200	13	5	5 / 3	3750	1	20, 22	Current Limiting
PAA150	BI	250	250	7	5	2.5 / 0.5	3750	1	20, 21, 22	
PAA190	BI	400	150	22	5	1 / 0.5	5000	1	20, 22	Enhanced Isolation Voltage
PAA191	BI	400	250	8	5	3 / 1	5000	1	20, 22	Enhanced Isolation Voltage
PAA193	BI	600	100	50	5	5 / 5	5000	10	20, 22	Enhanced Isolation Voltage
XAA117	BI	60	150	16	1	5 / 5	3750	1	20, 21, 22	Low I <sub>F</sub>
XAA170	BI	350	100	50	5	5 / 5	3750	1	20, 21, 22	

For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

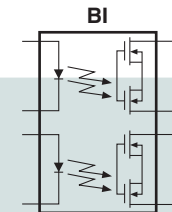
## 1-Form-B Relays: Single-Pole, Normally Closed

Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
CPC1106N	BI	60	75	10	0.5	10 / 10	1500	1	10	Low I <sub>F</sub> , EN50130-4
CPC1114N	BI	60	400	2	2	2 / 5	1500	1	10	
CPC1117N	BI	60	150	16	1	10 / 10	1500	1	10	Low I <sub>F</sub> , EN50130-4
CPC1125N	BI	400	100	35	2	2 / 2	1500	1	10	
CPC1130N	BI	350	120	30	2	2 / 2	1500	5	10	
CPC1135N	BI	350	120	35	2	2 / 2	1500	5	10	
CPC1150N	BI	350	120	50	2	1 / 2	1500	5	10	
CPC1231N	BI	350	120	30	2	2 / 2	1500	5	10	
CPC1333	BI	350	130	30	2	2 / 3	5000	1	42, 43	Enhanced Isolation Voltage
LCB110	BI+	350	120	35	5	3 / 3	3750	1	12, 14	
LCB111	BI+	350	120	35	2	5 / 5	3750	1	12, 14	
LCB120	BI+	250	170	20	5	5 / 5	3750	1	12, 14	
LCB126	BI+	250	170	15	5	5 / 5	3750	1	12, 14	
LCB127	BI+	250	200	10	5	5 / 5	3750	1	12, 14	
LCB710	BI+	60	1000	0.6	2	3 / 3	3750	1	12, 14	
LCB716	BI+	60	500	2	2	3 / 3	3750	1	12, 14	High Load Current
LCB717	BI+	30	1500	0.3	2	2 / 5	3750	1	12, 14	
PLB150	BI+	250	250	7	5	1 / 2.5	3750	1	12, 14	
PLB190	BI+	400	130	25	2	1 / 2.5	5000	1	12, 14	
XCB170	BI+	350	100	50	5	5 / 5	3750	1	12, 14	Enhanced Isolation Voltage



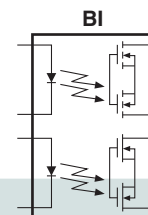
## 1-Form-B Relays: Dual Single-Pole, Normally Closed

Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
CPC2125N	BI	400	100	35	2	2 / 2	1500	1	17	
LBB110	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	
LBB120	BI	250	170	20	5	5 / 5	3750	1	20, 22	
LBB126	BI	250	170	15	5	5 / 5	3750	1	20, 21, 22	
LBB127	BI	250	200	10	5	5 / 5	3750	1	20, 21, 22	
PBB150	BI	250	250	7	5	2.5 / 2.5	3750	1	20, 21, 22	
PBB190	BI	400	130	25	2	1 / 2.5	5000	1	20, 22	
XBB170	BI	350	100	50	5	5 / 5	3750	1	20, 21, 22	



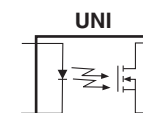
For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

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



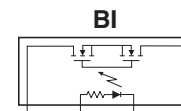
Part Number	Relay Type	Blocking Voltage (V <sub>p</sub> )	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	Off-State Leakage (μA)	Package Type	Features and Comments
CPC2317N	BI	60	120	16	1	3 /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

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



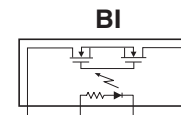
Part Number	Relay Type	Blocking Voltage (V <sub>p</sub> )	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	Off-State Leakage (μA)	Package Type	Features and Comments
CPC1002N	UNI	60	700	0.55	2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

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



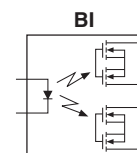
Part Number	Relay Type	Blocking Voltage (V <sub>p</sub> )	Load Current (mA)	On Resistance (Ω)	Input Control Voltage (V)	Switching Speeds t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	Off-State Leakage (μA)	Package Type	Features and Comments
CPC1215	BI	400	500	6	5 - 12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

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



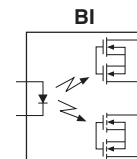
Part Number	Relay Type	Blocking Voltage (V <sub>p</sub> )	Load Current (mA)	On Resistance (Ω)	Input Control Voltage (V)	Switching Speeds t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	Off-State Leakage (μA)	Package Type	Features and Comments
CPC1219	BI	60	200	16	5 - 12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

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



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

## 1-Form-C Relays: Common Input



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

For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)



## Multifunction SSR Products

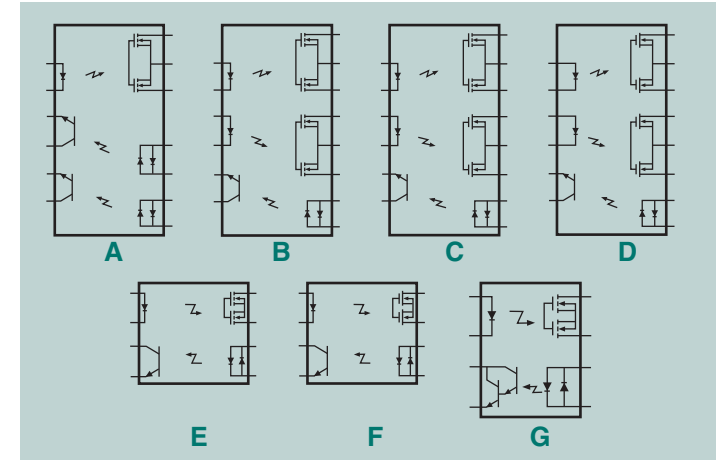
The OptoMOS line of Multifunction products combines optically isolated discrete component functions into a single package. These products mix and match solid state relays, optocouplers, and Darlington transistors to create highly functional circuits in a single, small package. Multifunction devices allow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

### Features:

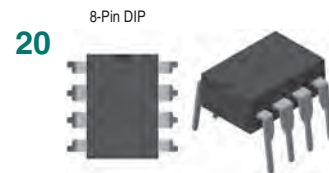
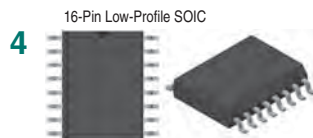
- 3750V<sub>rms</sub> Input to Output Isolation
- Multiple Functionality in a Single Package
- Current Limiting (Part Numbers with "L" Suffix)
- Machine Insertable, Wave Solderable
- TTL and CMOS Compatible

### Applications:

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



Part Number	Style	Relay Characteristics				Optocoupler Characteristics				Isolation Voltage	Package Type	Features and Comments
		Blocking Voltage	Current Handling	On Resistance	Input Control Current	Breakdown Voltage	Current Transfer Ratio	Saturation Voltage	Input Control Current			
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	(V)	(%)	(V)	(mA)	(V <sub>rms</sub> )		
IAA110	B	350	100	35	5	20	33	0.5	6	3750	4	Two 1-Form-A Relays, One Optocoupler
IAB110	C	350	100	35	5	20	33	0.5	6	3750	4	One 1-Form-A Relay, One 1-Form-B Relay, One Optocoupler
IAD110	A	350	100	35	5	20	33	0.5	6	3750	4	One 1-Form-A Relay, Two Optocouplers
IBB110	D	350	100	35	5	20	33	0.5	6	3750	4	Two 1-Form-B Relays, One Optocoupler
TS117	E	350	120	35	2	20	33	0.5	6	3750	20, 21, 22	One 1-Form-A Relay, One Optocoupler
TS117L	E	350	120	35	2	20	33	0.5	6	3750	20, 21, 22	One Current-Limiting 1-Form-A Relay, One Optocoupler
TS118	F	350	120	35	5	20	33	0.5	6	3750	20, 21, 22	One 1-Form-B Relay, One Optocoupler
TS120	G	350	120	35	5	20	300	0.8	2	3750	20, 21, 22	One 1-Form-A Relay, One Darlington Optocoupler
TS122	E	250	170	20	5	20	33	0.5	6	3750	20, 21, 22	One 1-Form-A Relay, One Optocoupler
TS190	E	400	150	22	5	20	33	0.5	6	3750	20, 21, 22	One 1-Form-A Relay, One Optocoupler
TS190L	E	400	150	25	5	20	33	0.5	6	3750	21	One Current-Limiting 1-Form-A Relay, One Optocoupler
XS170	E	350	100	50	2	20	33	0.5	6	3750	20, 21, 22	One 1-Form-A Relay, One Optocoupler



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

# Integrated Protection Solid State Relay Series

## Current Limited SSRs with Thermal Management

These specialized OptoMOS relays are single-pole, normally open (1-Form-A) Solid State Relays, with an integrated current limit feature, that can replace electromechanical relays while enhancing the robustness of wireline-interface applications. They are constructed using a GaAlAs LED for actuation control and an integrated monolithic die for the switch output. The active current-limit circuitry in these relays also has a thermal management feature that provides excellent power cross immunity for improved survivability in harsh environments. These features greatly improve the robustness of end systems that use these devices, when compared to systems using relays without integrated current limit. These devices may be used in both unidirectional DC applications as well as bidirectional AC applications.

CPC1540 and CPC1563 incorporate an additional safety feature, voltage limiting, that quickly shuts the device down if a high voltage transient, >100V, occurs in the load while current limiting is in effect. These two devices are ideal for use in noisy environments where such transients can be expected.

### Features:

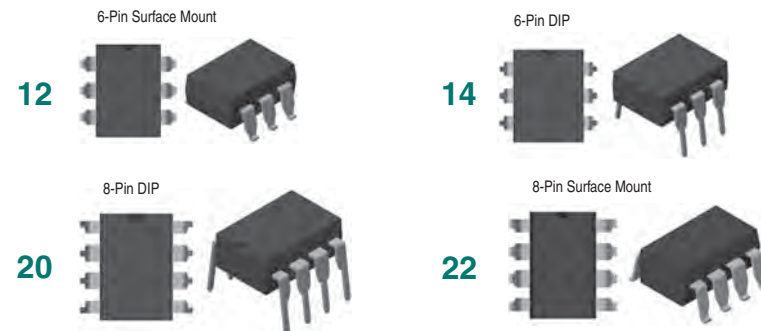
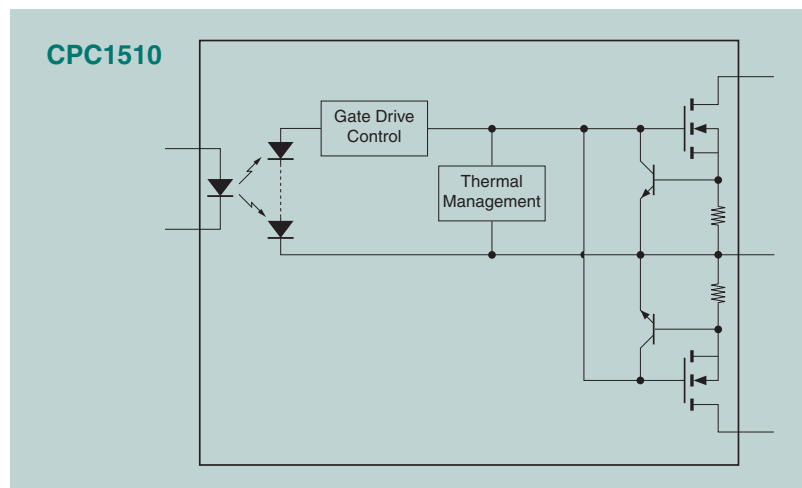
- Integrated Active Current-Limit Protection
- Thermal Management
- Low Input Control Current
- Low Drive Power Requirements
- 3750V<sub>rms</sub> Isolation, Input-to-Output

### Applications:

- Telephony Hook Switch
- VoIP Gateways
- I/O Subsystems
- Electronic Switching
- Medical Equipment (Patient / Equipment Isolation)
- Security
- Aerospace
- Industrial Controls

Part Number	Blocking Voltage  (V <sub>p</sub> )	Input Control Current  (mA)	On-Resistance (Maximum)		Load Current (Maximum)		Current Limit (Maximum)		* Over-Voltage Threshold  (V)	Switching Speed  t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage  (V <sub>rms</sub> )	Package Type	Features & Comments
			DC-Only (Ω)	AC (Ω)	DC-Only (mA)	AC (mA)	DC-Only (mA <sub>p</sub> )	AC (mA <sub>p</sub> )					
CPC1510	250	2	3.75	15	350	200	920	450	-	2 / 2	3750	12, 14	Industrial Applications
CPC1540	350	2	6.75	25	250	120	570	285	100	2 / 2	3750	12, 14	PSTN Hook Switch Applications
CPC1560	60	1.1	1.4	5.6	600	300	1500	900	-	0.1 / 0.4	3750	20, 22	Fast Switching Speeds
CPC1563	600	2	11.75	35	250	120	570	285	100	2 / 2	3750	12, 14	High Blocking Voltage

\* Provides additional current limiting after primary current limit has been enabled due to a fault condition.



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

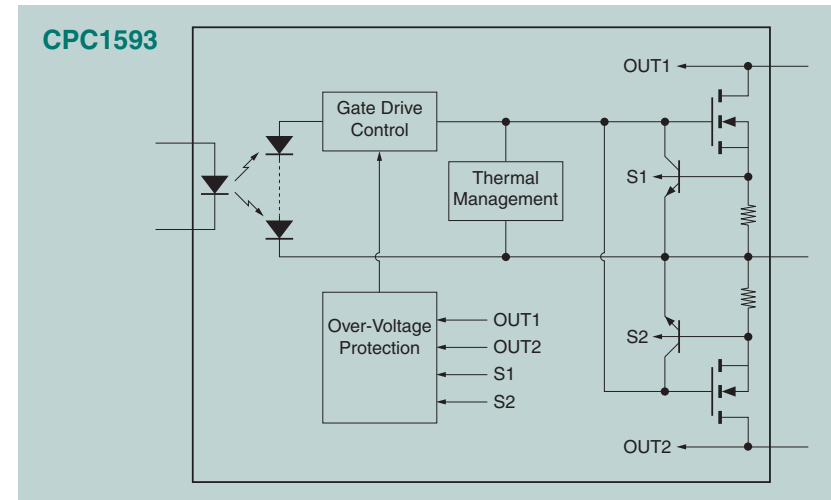
# Current Limited SSR with Thermal Management & Over Voltage Protection

The new CPC1593 OptoMOS solid-state relay (SSR) adds special over-voltage protection (OVP) to current limiting and thermal management. The 21V OVP level, if enabled during current limiting, shuts the switch down, thus limiting the power dissipated by the switch and preventing damage to the device due to extended fault conditions.

The CPC1593 is designed for use in AC environments where fault conditions can persist for long periods of time, and where, upon removal of the fault, return to normal operation is expected. The CPC1593 is designed to survive extended power cross conditions.

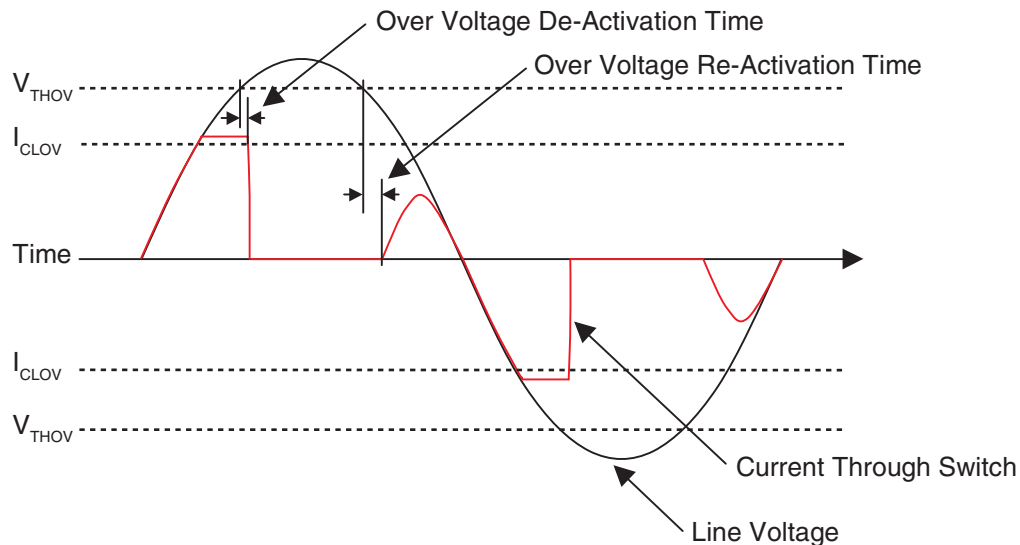
When all fault conditions have been removed, the CPC1593 recommences normal operation, and automatically resets all of its protection circuits. No intervention is necessary.

This self-resetting triple protection scheme not only protects the CPC1593's load, but also protects the CPC1593 itself, thus creating a highly effective switching mechanism that can survive in the harshest operating environments.



Part Number	Blocking Voltage (V <sub>p</sub> )	On-Resistance (Maximum)		Load Current (Maximum)		Current Limit (Maximum)		Input Control Current (mA)	Switching Speed t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	* Over-Voltage Threshold (V)	Package Type	Features & Comments
		DC-Only (Ω)	AC (Ω)	DC-Only (mA)	AC (mA)	DC-Only (mA <sub>p</sub> )	AC (mA <sub>p</sub> )						
CPC1593	600	11.75	35	250	120	570	285	2	2 / 2	3750	21	12, 14	Power Supply Start-Up Protection

\* Provides additional current limiting after primary current limit has been enabled due to a fault condition.



**Ensures  
Power-Cross Survival!**

## Features:

- 600V<sub>p</sub> Blocking Voltage
- Integrated Active Current-Limit Protection
- Integrated Thermal Regulation
- Integrated Over-Voltage Protection



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For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## Power Relays

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

Our Power Relays are now offered in four package types, which offer between 2500V<sub>rms</sub> and 5000V<sub>rms</sub> of input to output isolation. 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 package has a thermal resistance of 0.35°C/W while the ISOPLUS-264 package has an even lower thermal impedance of 0.30°C/W.

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

On the back of the i4-PAC and ISOPLUS-264 packages, the electrically non-conductive surface of the DCB ceramic substrate provides 2500V<sub>rms</sub> 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.

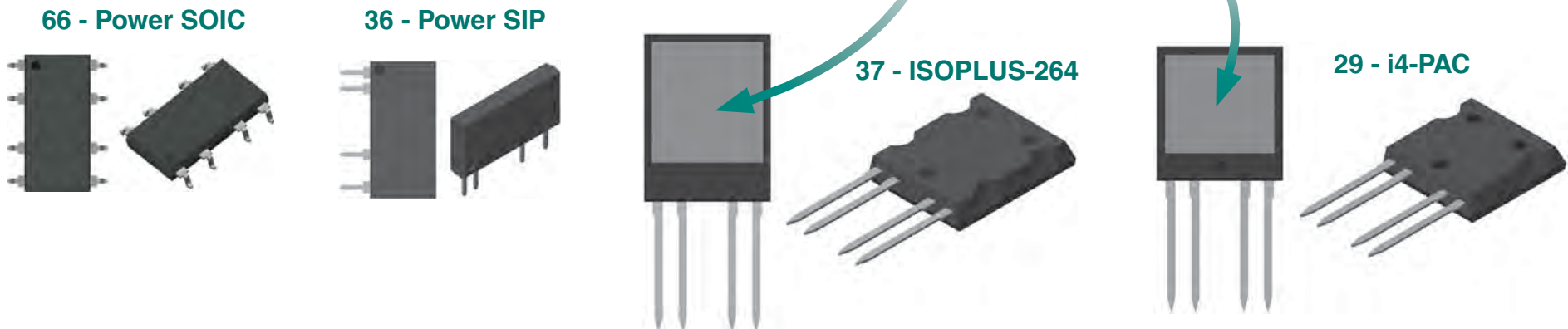
### Features:

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

### Applications:

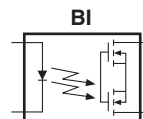
- Robotics
- Medical Equipment
- Railroad / Traffic Controls
- Consumer Appliances
- Industrial Control
- Test and Measurement Equipment

### Electrically Isolated Thermal Pad



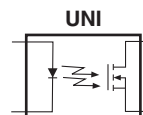
For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)





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

Part Number	Relay Type	Blocking Voltage (V <sub>p</sub> )	Load Current (A <sub>rms</sub> )			On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	Off-State Leakage (μA)	Package Type	Features & Comments
			Free Air	5°C/W Heat Sink	T <sub>c</sub> =25°C							
CPC1906Y	BI	60	2	-	-	0.3	10	10 / 5	2500	1	36	
CPC1907B	BI	60	6	-	-	0.06	5	5 / 1	5000	1	66	Enhanced Isolation Voltage
CPC1908J	BI	60	3.5	8.5	15	0.3	10	20 / 5	2500	1	29	
CPC1909J	BI	60	6.5	15	15	0.1	10	25 / 10	2500	1	37	
CPC1916Y	BI	100	2.5	-	-	0.34	10	5 / 3	2500	1	36	
CPC1918J	BI	100	5.25	13	15	0.1	10	25 / 10	2500	1	37	
CPC1926Y	BI	250	0.7	-	-	1.4	10	10 / 10	2500	1	36	
CPC1927J	BI	250	2.7	6.7	15	0.2	10	25 / 10	2500	1	37	
CPC1967J	BI	400	1.35	3.35	13.15	0.85	10	20 / 5	2500	1	29	
CPC1968J	BI	500	2	5	15	0.35	10	20 / 5	2500	1	37	
CPC1973Y	BI	400	0.35	-	-	5	10	5 / 3	2500	1	36	
CPC1977J	BI	600	1.25	3.1	12.25	1	10	20 / 5	2500	1	29	
CPC1978J	BI	800	0.75	1.85	7.25	2.3	10	20 / 5	2500	1	29	
CPC1979J	BI	600	1.4	3.5	14.5	0.75	10	25 / 5	2500	1	37	
CPC1981Y	BI	1000	0.18	-	-	18	10	10 / 5	2500	1	36	
CPC1983Y	BI	600	0.5	-	-	6	5	5 / 2	2500	1	36	
CPC1983YE	BI	600	0.5	-	-	6	5	5 / 2	4000	1	36	Enhanced Isolation Voltage
CPC1986J	BI	1000	0.65	1.6	6.5	3	10	20 / 5	2500	1	29	
CPC1988J	BI	1000	0.9	2.25	9.4	2.5	10	20 / 5	2500	1	37	



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

Part Number	Relay Type	Blocking Voltage (V <sub>p</sub> )	Load Current (A)			On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	Off-State Leakage (μA)	Package Type	Features & Comments
			Free Air	5°C/W Heat Sink	T <sub>c</sub> =25°C							
CPC1706Y	UNI	60	4	-	-	0.09	5	5 / 2	2500	1	36	
CPC1708J	UNI	60	4	11.85	24	0.08	10	20 / 5	2500	1	29	
CPC1709J	UNI	60	9	22.8	32	0.05	10	20 / 5	2500	1	37	
CPC1718J	UNI	100	6.75	17.5	32	0.075	10	20 / 5	2500	1	37	
CPC1726Y	UNI	250	1	-	-	0.75	10	5 / 2	2500	1	36	
CPC1727J	UNI	250	3.4	8.6	20	0.09	10	20 / 5	2500	1	37	
CPC1777J	UNI	600	1.5	4.6	15	0.5	10	20 / 5	2500	1	29	
CPC1779J	UNI	600	1.65	4.12	15	0.4	10	20 / 5	2500	1	37	
CPC1786J	UNI	1000	0.65	1.75	6.9	2	10	20 / 5	2500	1	29	
CPC1788J	UNI	1000	1	2.45	10.3	1.25	10	20 / 5	2500	1	37	

For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

# Optically Isolated AC Power Switches

## Optically Isolated AC Power Switches: $I_{LOAD} \leq 1A$

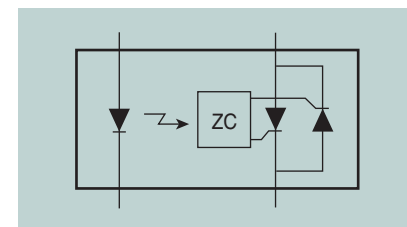
The OptoMOS line of power products uses dual power-SCR outputs to produce an alternative to optocoupler and Triac circuits. These AC Power Switches provide a blocking voltage of up to  $800V_P$ . In addition, tightly controlled zero-cross circuitry ensures switching of AC loads while minimizing the generation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

### Features:

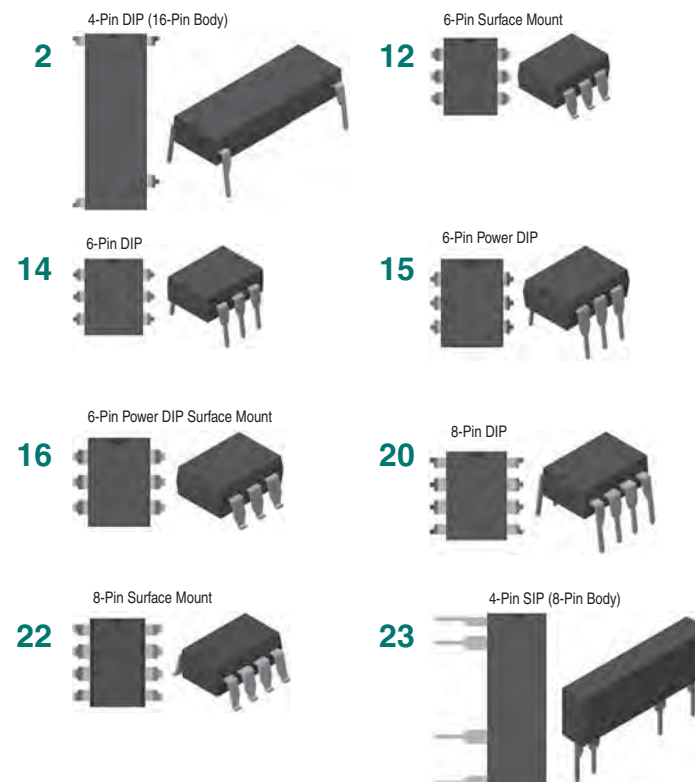
- Load Current up to  $1A_{rms}$
- Blocking Voltage up to  $800V_P$
- 5mA Sensitivity
- Zero-Crossing Turn-On
- DC Control, AC Switching
- Optically Isolated
- TTL and CMOS Compatible
- Low EMI and RFI Generation
- High Noise Immunity
- VDE Compatible
- Machine Insertable, Wave Solderable
- Switching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

### Applications:

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



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



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

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

Our solid-state AC Power Switches are capable of handling very high load currents. With blocking voltages up to 800V<sub>p</sub> and tightly controlled zero-cross circuitry (ensuring switching of AC loads while minimizing the generation of transients), these robust AC Power Switches enable simpler power switching designs.

Optically coupled input and output circuits provide up to 5000V<sub>rms</sub> of isolation and noise immunity between control and load circuits. These arc-free, heavy-duty AC power switches are ideal for controlling a variety of AC circuits in industrial environments where electromagnetic interference would disrupt the operation of electromechanical relays or where explosive atmospheres exist.

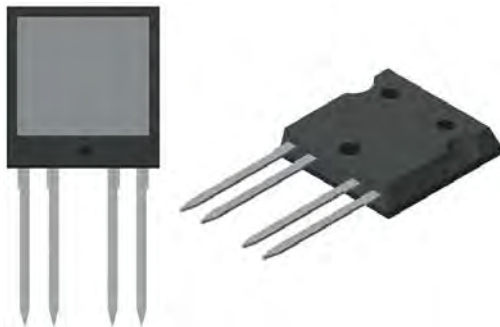
### Features:

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

### Applications:

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

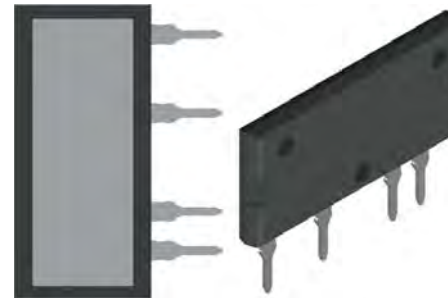
### 29 - i4-PAC



### 36 - Power SIP



### 64 - Super SIP



### 66 -Power SOIC



Part Number	Blocking Voltage (V <sub>p</sub> )	Load Current			Input Control Current (mA)	Input Control Voltage (V)	Operating Frequency Min / Max (Hz)	Isolation Voltage (V <sub>rms</sub> )	Package Type	Features
		No Heat Sink (A <sub>rms</sub> )	With 5°C/W Heat Sink (A <sub>rms</sub> )	T <sub>c</sub> =25°C (A <sub>rms</sub> )						
CPC1964B	800	1.5	-	-	5	-	20 - 500	5000	66	Enhanced Isolation Voltage
CPC1966	600	3	-	-	5	-	20 - 500	3750	36	
CPC1966B	800	3	-	-	5	-	20 - 500	5000	66	Enhanced Isolation Voltage
CPC1976	600	2	-	-	5	-	20 - 500	3750	36	
CPC1998	800	5	20	50	5	-	20 - 500	2500	29	High Load Current
CPC40055	800	5	20	50	5	-	20 - 500	2500	64	High Load Current
CPC44055	800	5	20	50	-	9 - 16	20 - 500	2500	64	High Load Current

For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

# Gate Drivers

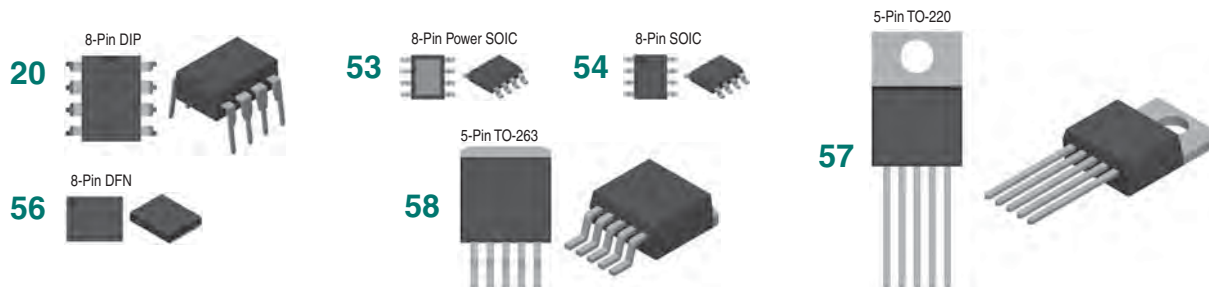
These ultra-fast, high current MOSFET and IGBT gate drivers are optimized for high efficiency performance in motor drive and power conversion applications. With output current ratings of 1.5A to 30A, they are designed to switch the largest MOSFETs and IGBTs with minimum switching times and at frequencies up to 10MHz. Depending on the output current rating, these gate drivers are offered in DFN (56), SOIC (54), Power SOIC (53), DIP (20), TO-220 (57), and TO-263 (58) packages.

The 30A IXD\_630 features an undervoltage lockout (UVLO) that keeps the output LOW until a sufficient level of  $V_{CC}$  is present.

## IXD\_604SI (8-Pin Power SOIC) & SIA (8-Pin SOIC) and IXD\_609SI (8-Pin Power SOIC) AEC Q100 Qualified!

### Low-Side Gate Drivers

Part Number	Output Type	$I_{PEAK}$ $T_c=25^\circ\text{C}$ (A <sub>p</sub> )	Output Resistance (Ω)	Available Logic Configurations	Enable Function	Undervoltage Lockout (V)	Package Type
IX4423	DUAL	3	4	D			54
IX4424	DUAL	3	4	E			54
IX4425	DUAL	3	4	F			54
IX4426	DUAL	1.5	9	D			54, 56
IX4427	DUAL	1.5	9	E			54, 56
IX4428	DUAL	1.5	9	F			54, 56
IXD_602	DUAL	2	4	D, E, F			20, 53, 54, 56
IXD_604	DUAL	4	2.5	D, E, F, G	• (G)		20, 53, 54, 56
IXD_609	SINGLE	9	1	A, B, C	• (A)		20, 53, 54, 56, 57, 58
IXD_614	SINGLE	14	0.8	A, B, C	• (A)		20, 53, 57, 58
IXD_630	SINGLE	30	0.4	A, B, C	• (A)	$V_{CC} \leq 12.5$	57, 58
IXD_630M	SINGLE	30	0.4	A, B, C	• (A)	$V_{CC} \leq 9$	57, 58

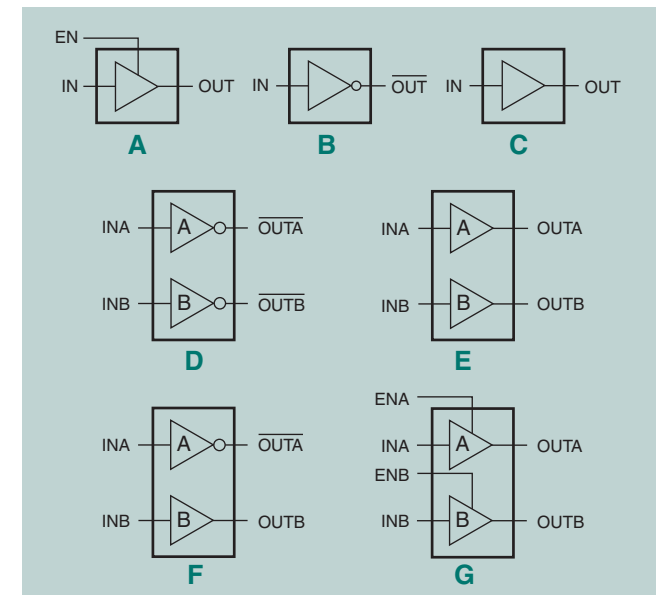


### Features:

- 1.5A to 30A Peak Source/Sink Drive Current
- Wide Operating Voltage Range: 4.5V to 35V
- -40°C to +125°C Extended Operating Temperature Range
- Logic Input Withstands Negative Swing of up to 5V
- Matched Rise and Fall Times
- Low Propagation Delay Time
- Low 10μA Supply Current
- Low Output Impedance

### Applications:

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



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)



## IX2127 600V High-Side MOSFET and IGBT Gate Driver

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

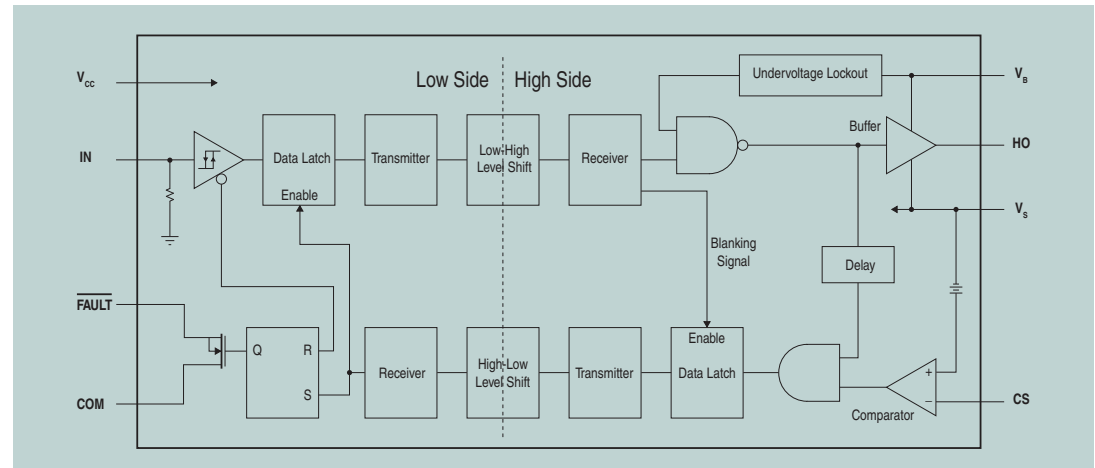
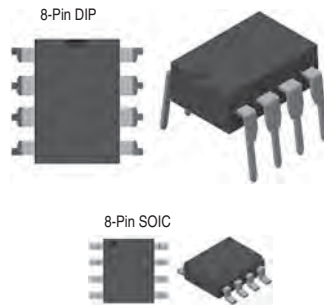
The IX2127 detects an over-current condition in the driven MOSFET or IGBT device, and shuts down drive to that device. An open-drain output, FAULT, indicates that an over-current shutdown has occurred. The gate driver output typically can source 250mA and sink 500mA, which is suitable for fluorescent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

### Features:

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

### Applications:

- High Speed Gate Driver
- Motor Drive Inverter



## MX6895 -550V Full Bridge Gate Driver

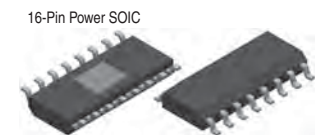
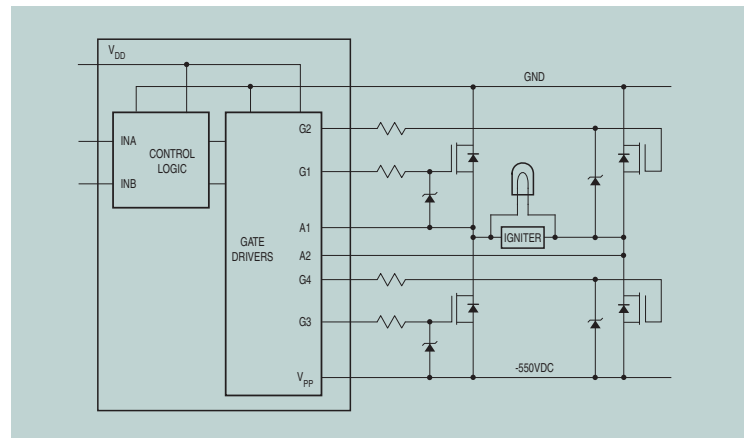
Built on our high voltage integrated circuit (HVIC) technology, the MX6895 combines high-side and low-side N-channel power MOSFET drivers in a full bridge configuration. The circuit is optimally configured to be used as a commutator for High Intensity Discharge (HID) lamps. This device is provided in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

### Features:

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

### Applications:

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



## IX3120 2.5A-Output Optically Coupled Gate Driver

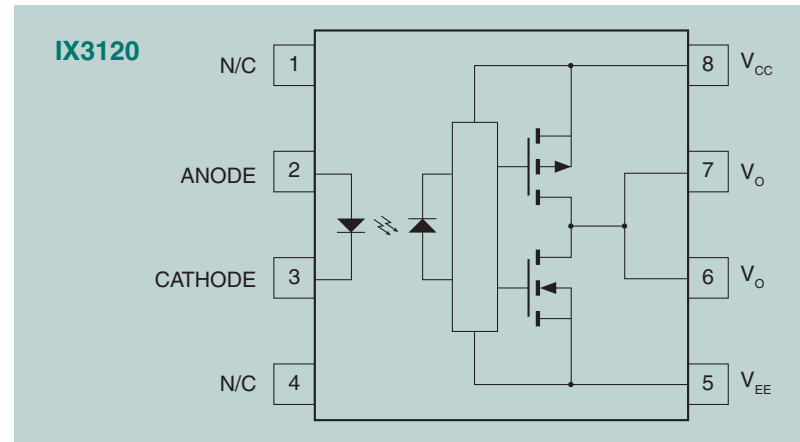
The IX3120 gate driver includes an input infrared LED that is optically coupled to a power output stage. The power output stage is capable of sourcing or sinking 2.5A of peak current, which is ideal for driving IGBTs and MOSFETs in the mid-power range. The gate driver optocoupler with its low input LED current, high output peak current, and high noise immunity (25kV/ $\mu$ s) is ideally suited for use in motor control and inverter applications. The IX3120 is provided in an 8-pin DIP package and an 8-pin surface mount package.

### Features:

- 2.5A Maximum Peak Output Current
- 25kV/ $\mu$ s Minimum Common Mode Rejection (CMR) at 1500V<sub>CM</sub>
- Wide Operating Voltage Range: 15V to 30V
- Under Voltage Lockout with Hysteresis
- 3750V<sub>rms</sub> Input to Output Isolation
- Wide Temperature Range: -40°C to +100°C

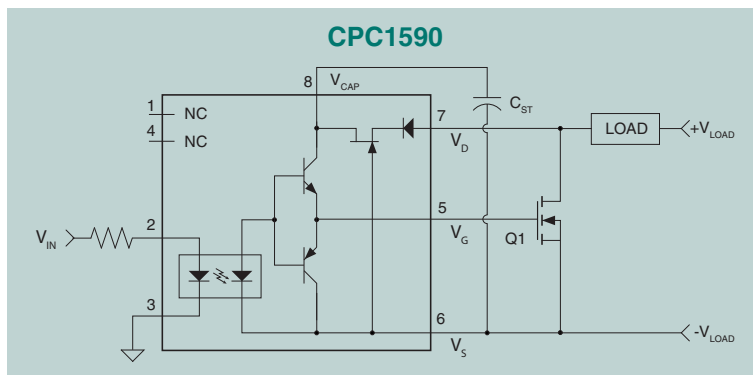
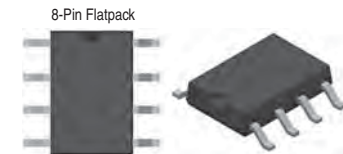
### Applications:

- Isolated IGBT/MOSFET Gate Drive
- Switch Mode Power Supplies
- Industrial Inverters
- Motor Drivers



## Optically Isolated Gate Drivers

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



### Features:

- No External IC Power Supply
- Low Drive Power Requirements (TTL/CMOS Compatible)
- Load Voltages up to 200V
- Fast Switching Times - On: 40 $\mu$ sec / Off: 400 $\mu$ sec

### Applications:

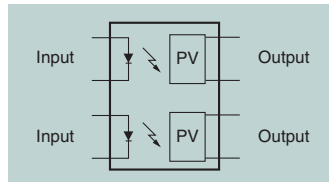
- Instrumentation
- Multiplexers
- I/O Subsystems
- Meters (Watt-Hour, Water, Gas)
- Medical Equipment (Patient/Equipment Isolation)
- Security
- Aerospace
- Industrial Controls

Part Number	Input Control Current (mA)	Gate Voltage @ I <sub>F</sub> =5mA (V <sub>G</sub> )	Blocking Voltage (V <sub>P</sub> )	Regulated Capacitor Voltage (V <sub>CAP-MAX</sub> )	Switching Speeds t <sub>on</sub> / t <sub>off</sub> ( $\mu$ s)	Isolation Voltage (V <sub>rms</sub> )
CPC1580	2.5	7.5 - 12	65	V <sub>DS</sub> - 0.2V	40 / 400	3750
CPC1590	2.5	7.5 - 12	200	16	40 / 400	3750

For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## Optically Isolated Dual MOSFET Gate Drivers

These Dual Optically Isolated Photodiode Arrays, which can produce an open-circuit voltage of up to 12V, are well suited for use in discrete solid state relay designs. The FDA215 and the FDA217 are provided in either an 8-pin DIP package or in an 8-pin surface-mount package.



### Features:

- Isolated 5.5V to 12V Photovoltaic Output
- Floating Outputs for Parallel or Series Configuration

### Applications:

- MOSFET Driver
- Isolated Floating Power Source



Part Number	Input Control Current (mA)	Nominal Open-Circuit Voltage $V_{oc}$ (V)	Nominal Short-Circuit Current $I_{sc}$ ( $\mu$ A)	Switching Speeds $t_{on} / t_{off}$ (ms)	Isolation Voltage ( $V_{rms}$ )	Package Type
FDA215	5	5.5	2.5	5 / 5	3750	8-Pin DIP, 8-Pin Surface Mount
FDA217	5	12	4.5	2 / 0.5	3750	8-Pin DIP, 8-Pin Surface Mount

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

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

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

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

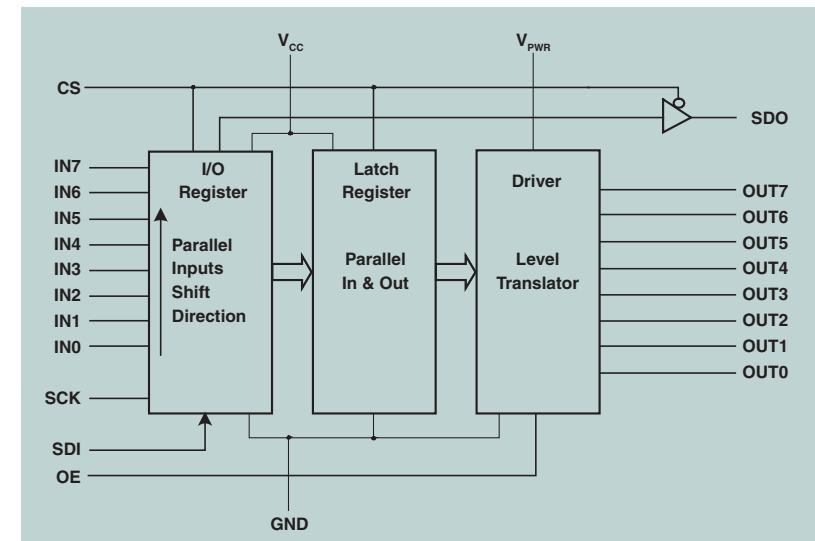
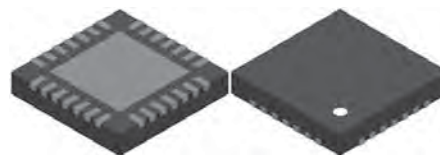
### Features:

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

### Applications:

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

28-Pin QFN



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

# High Voltage Analog Switches

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

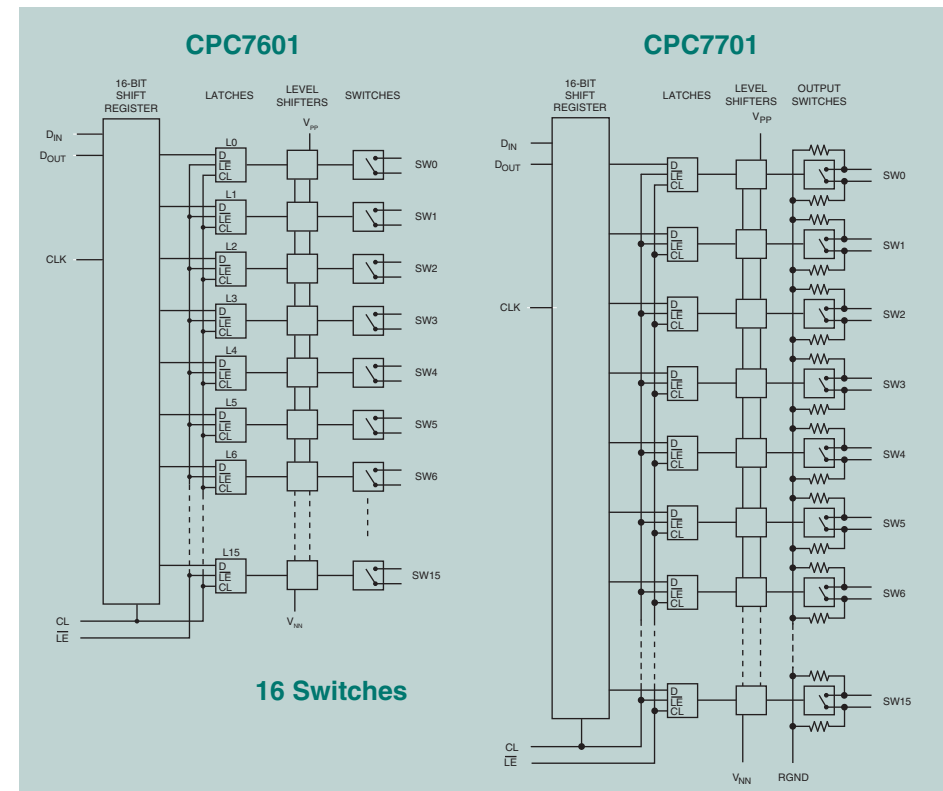
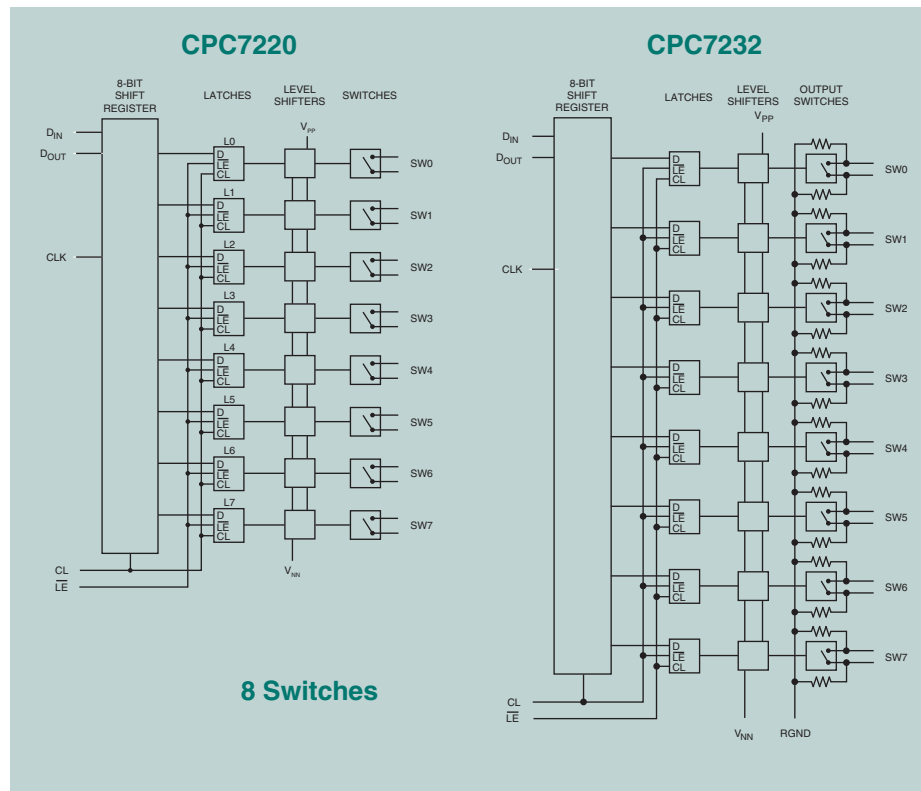
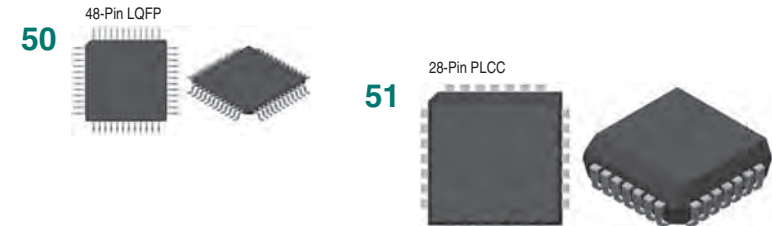
## Features:

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

## Applications:

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

Part Number	Number of Channels	Channel On-Resistance ( $\Omega$ )	Bleed Resistors ( $k\Omega$ )	Clock Frequency (MHz)	Turn-On Time ( $\mu s$ )	Turn-Off Time ( $\mu s$ )	Package Type
CPC7220	8	20	-	5	5	5	50, 51
CPC7232	8	21	20 - 50	5	5	5	50, 51
CPC7601	16	25	-	8	5	5	50
CPC7701	16	25	20 - 50	8	5	5	50



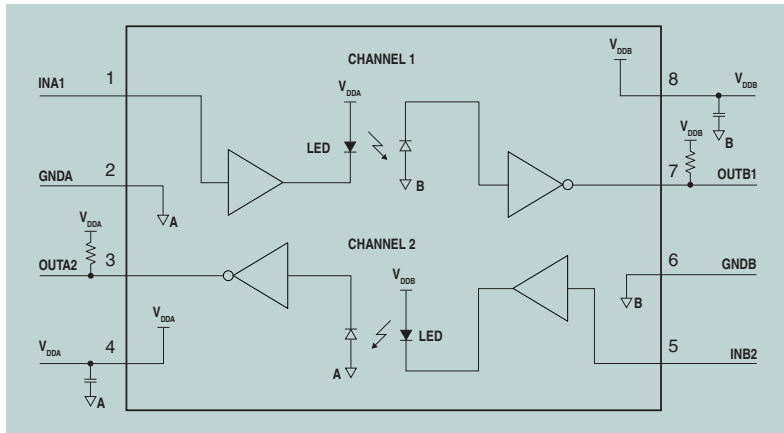
For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)



# High Speed Digital Optical Isolators

## CPC5001 Single-Channel, Each Direction Digital Optical Isolator

The CPC5001 is a non-inverting digital optical isolator with buffered-logic inputs and open-drain outputs. Channel1 propagates a signal from SideA to SideB, while Channel2 sends a signal from SideB to SideA. It provides galvanic isolation across voltage differences up to 3750Vrms. When the two sides are powered by different supply voltages, it also functions as a logic level translator for levels as low as 2.7V or as high as 5.5V. Available in an 8-pin DIP or 8-pin surface mount package, it functionally replaces two logic buffers and two single-channel optoisolators. Internal bandgap references regulate the LED drive currents to 3mA to reduce peak power requirements. Unlike transformer or capacitive isolators, optical isolation passes DC signals, and does not need to be clocked periodically to refresh state. Buffered signals will always return to their proper value after a transient interruption at either side.



### Features:

- Isolates One Signal in Each Direction
- Operates From 2.7V to 5.5V
- Buffered Inputs - No External LED Drive Required
- Voltage Level Translation
- Hysteresis at Inputs for Noise Rejection
- Slew Limited Drivers Reduce EMI
- Power Down to Hi-Z Does Not Load Outputs
- 5Mbd Data Rate

### Applications:

- Isolated Signal Monitoring and Control
- Power-Over-Ethernet
- Power Supply High-Side Interface
- Logic Level Translation
- Microprocessor System Interface
- Inter Integrated Circuit (I<sup>2</sup>C) Interface
- Serial Peripheral Interface
- Full Duplex Communication
- Isolated Line Receiver
- Isolated Data Acquisition Systems

## CPC5002 - Dual High-Speed Digital Optical Isolator

The CPC5002 is a high speed dual optical logic isolator with open-drain outputs. It galvanically isolates two open-drain logic signals across voltage differences up to 3750V<sub>rms</sub>. Turning on the LED forces the output to turn on, which pulls the voltage at any external pullup resistor towards ground. Its high-gain CMOS comparator requires only 1.4mA of supply current, and only 1.5mA of LED drive current. Unlike transformer or capacitive isolators, optical isolation passes DC logic-level signals, and does not need to be clocked periodically to refresh state. Buffered signals will always return to their proper value after a transient interruption at either side. Available in 8-pin DIP and surface mount packages.

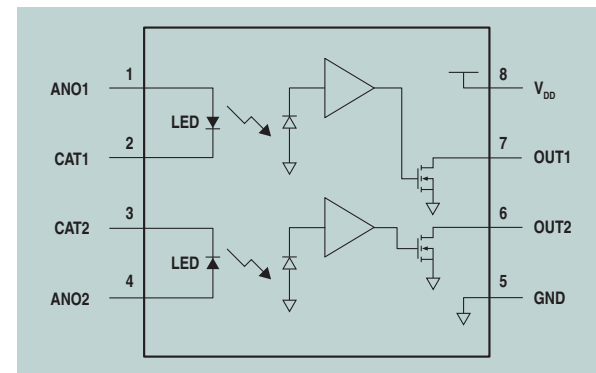
### Features:

- Dual Optics Isolates Two Signals
- Operates Over 2.7V < V<sub>DD</sub> < 5.5V
- 3750V<sub>rms</sub> Galvanic Isolation
- Power-Down to Hi-Z Does Not Load Outputs
- Low-Power CMOS Reduces Supply Current
- LED Drive Current Only 1.5mA
- High Speed: 10Mbaud Typical

### Applications:

- Isolated Line Receiver
- Ground Loop Elimination
- ADC/DAC Digital Noise Isolation
- 4-Wire I<sup>2</sup>C Bus Isolation

**10 Mbaud!**



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

# CPC5902 Optically Isolated I<sup>2</sup>C Bus Repeater

The CPC5902 is a dual, optically isolated, bidirectional logic-bus repeater. It galvanically isolates two open-drain logic signals, and provides a galvanic isolation of 3750V<sub>rms</sub>. When the two sides' supply voltages are configured with different voltages, the CPC5902 also functions as a logic level translator for levels as low as 2.7V or as high as 5.5V.

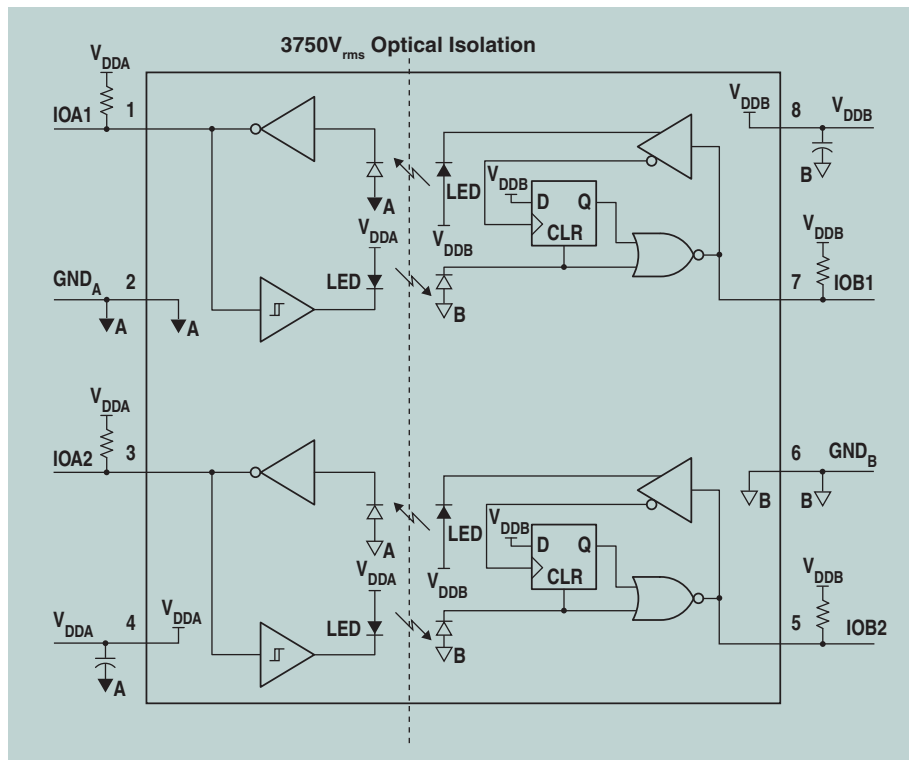
Unlike transformer or capacitive isolators, this optically isolated repeater passes logic-level DC signals, and does not need to be clocked periodically to sustain logic states. Buffered signals will always return to their proper value after a transient interruption on either side. As a result, the CPC5902 does not generate the clocking or modulation signal interference that other types of bus repeaters can generate. Available in 8-pin DIP and surface mount packages.

## Features:

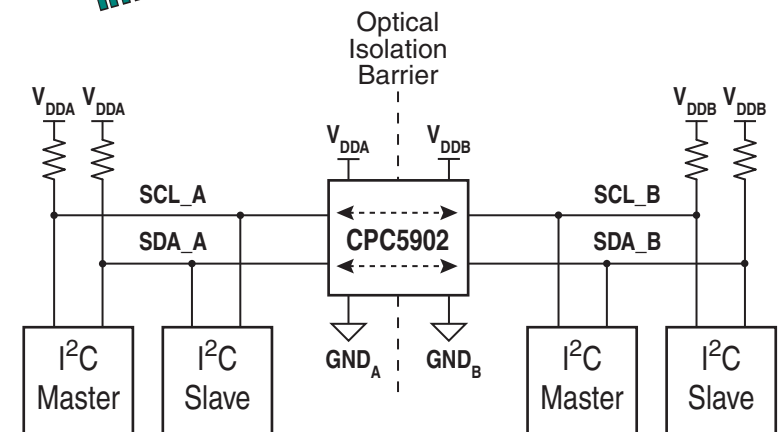
- Bidirectionally Buffers Both I<sup>2</sup>C Signals
- Extends and Isolates I<sup>2</sup>C Interfaces
- Supports Standard and Fast Mode I<sup>2</sup>C (400kbps)
- Supports I<sup>2</sup>C Clock Stretching
- Operates on 2.7V to 5.5V
- Supports DC Logic Level Buffering Without Refresh
- Glitch-Free Operation
- Powerdown to Hi-Z Does Not Load I<sup>2</sup>C
- Slew-Limited Drivers Reduce EMI
- Tested Above 6kV<sub>p</sub> for Adverse Environments

## Applications:

- Power Over Ethernet
- I<sup>2</sup>C Bus Length Extender
- Isolated Control and Signal Monitoring
- Power Supply High-Side Interface



**No Internal Clock - Minimal EM & RF Emissions**  
**High Voltage Isolation**  
**Immune to External EMI and RFI**



Visit our web site and download our Tech Brief, TB-101: "Optically Isolating an I<sup>2</sup>C Interface"

# CPC5903 Optically Isolated I<sup>2</sup>C Bus Repeater

The CPC5903 is a dual, optically isolated, logic-bus repeater. It galvanically isolates two open-drain logic signals, and provides galvanic isolation across voltage differences up to 3750V<sub>rms</sub>. When the two sides are powered by different supply voltages, it also functions as a logic level translator for levels as low as 2.7V or as high as 5.5V. It enables full bidirectional isolation of the I<sup>2</sup>C data signal and unidirectional isolation of the I<sup>2</sup>C clock signal.

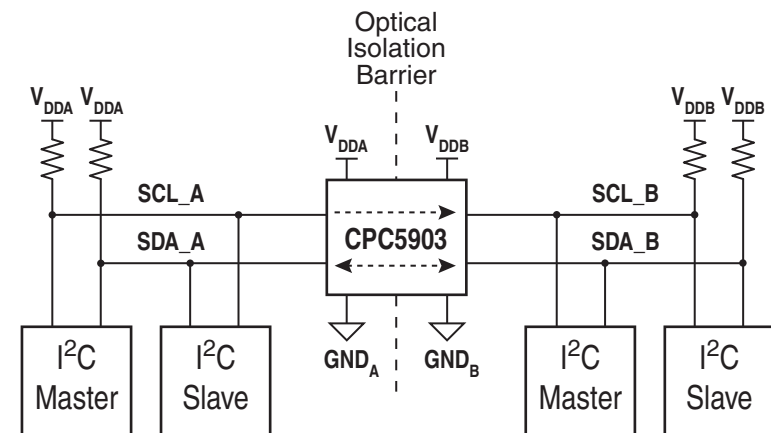
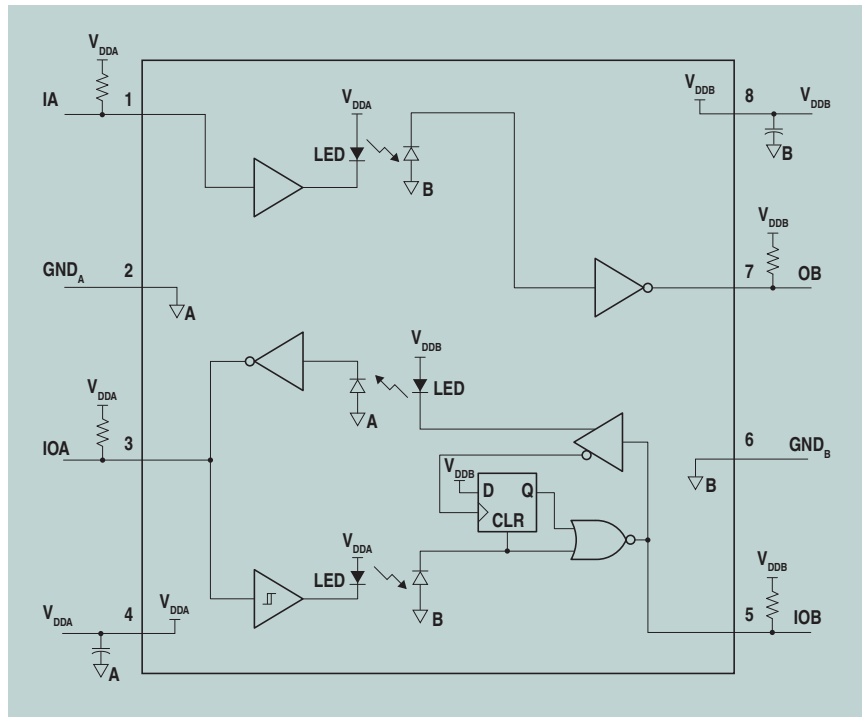
Unlike transformer or capacitive isolators, optical isolation passes DC logic-level signals, and does not need to be clocked periodically to refresh state. Buffered signals will always return to their proper value after a transient interruption at either side. Available in 8-pin DIP and surface mount packages.

## Features:

- Bidirectionally Buffers SDA I<sup>2</sup>C Signal
- Side A Extends and Isolates I<sup>2</sup>C Interfaces
- Standard-mode and Fast-mode I<sup>2</sup>C
- Side B Fast-mode Compliant V<sub>DDB</sub> > 4.5V
- Operates on 2.7V to 5.5V
- No Internal Clock - Low EM & RF Generation
- Voltage Level Translation
- Slew-Limited Drivers Reduce EMI
- Powerdown to Hi-Z Does Not Load I<sup>2</sup>C
- 3750V<sub>rms</sub> Galvanic Isolation

## Applications:

- Isolated Signal Monitoring and Control
- Power-over-Ethernet
- Power Supply High Side Interface
- I<sup>2</sup>C Bus Length Extenders
- I<sup>2</sup>C Logic Level Translation



Visit our web site and download our Tech Brief, TB-101: "Optically Isolating an I<sup>2</sup>C Interface"

# Optocouplers

## Single & Dual Optocouplers

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

### Features:

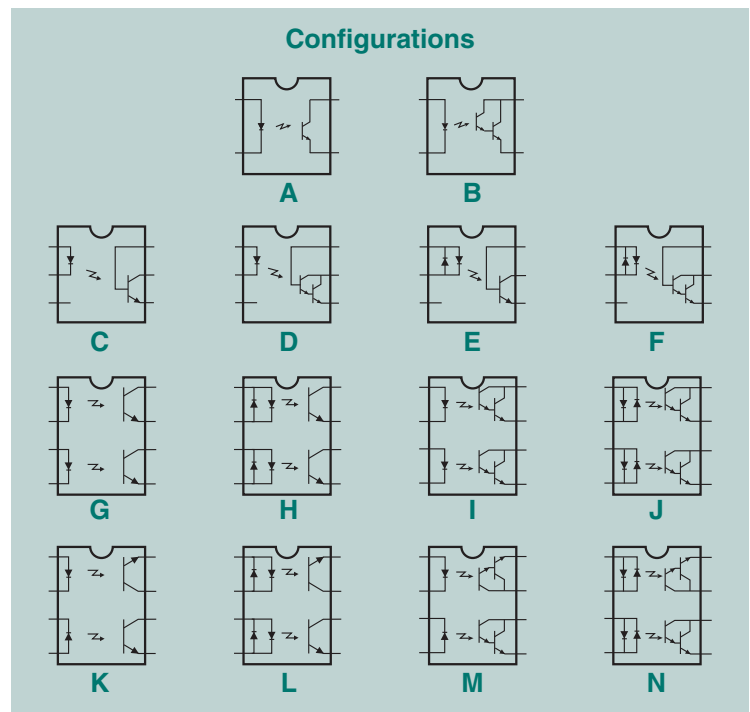
- AC and DC Compatible Inputs
- 1500V<sub>rms</sub>, 3750V<sub>rms</sub>, 5000V<sub>rms</sub> I/O Isolation
- Machine Insertable, Wave Solderable

### Applications:

- Voltage Detection
- Tip/Ring Circuits
- Modem Switching (Laptops, Notebooks, PDAs)

- Loop Detection
- Ringing Detection
- Current Sensing
- Telecom Switching

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



10



12



14



20



22



42



43

For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## Linear Optocouplers

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

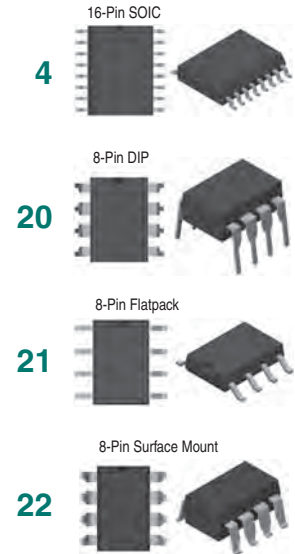
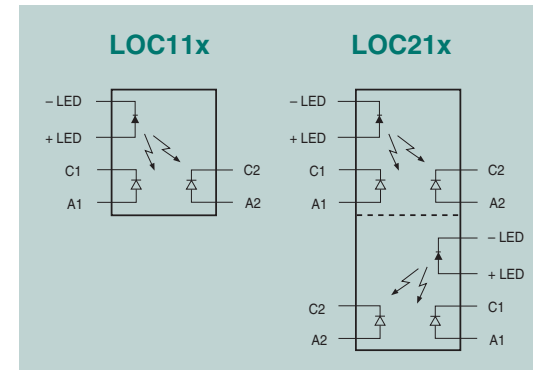
### Features:

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

Part Number	Servo Gain K1 (Min / Max)	Forward Gain K2 (Min / Max)	Transfer Gain K3 (Min / Max)	Input Control Current (mA)	Isolation Voltage (V <sub>rms</sub> )	Package Type
LOC110	0.004 / 0.03	0.004 / 0.03	0.668 / 1.179	2 - 10	3750	20, 21, 22
LOC111	0.008 / 0.03	0.006 / 0.03	0.733 / 1.072	2 - 10	3750	20, 21, 22
LOC112	0.004 / 0.03	0.004 / 0.03	0.733 / 1.072	2 - 10	3750	20, 21, 22
LOC117	0.008 / 0.03	0.006 / 0.03	0.887 / 1.072	2 - 10	3750	20, 21, 22
LOC210	0.004 / 0.03	0.004 / 0.03	0.773 / 1.072	2 - 10	3750	4
LOC211	0.008 / 0.03	0.006 / 0.03	0.773 / 1.072	2 - 10	3750	4

### Applications:

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



## Optically Isolated Error Amplifiers

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

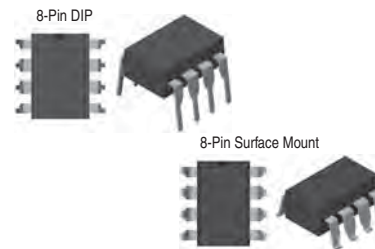
These devices are well suited for isolated high-gain feedback amplifiers that require excellent linearity and low temperature variation such as power supply feedback stages, modem and audio transformer replacements, industrial control signals, and sensor feedback.

### Features:

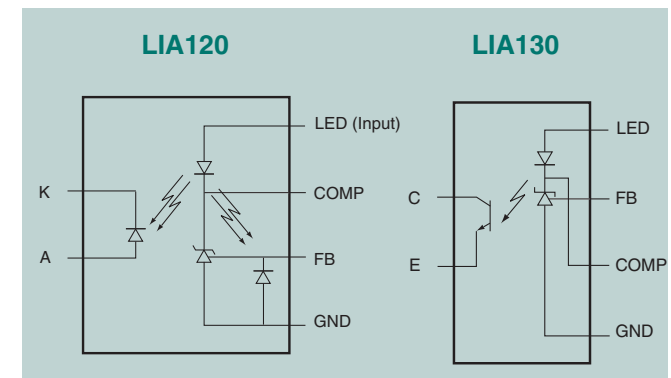
- 70dB Linearity Typical
- Optocoupler, Precision Reference, and Error Amplifier in a Single Package
- Low Voltage Operation: 2.7V

### Application:

- Power Supply Feedback



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



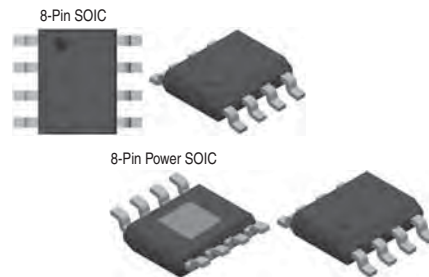
For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## CPC9909 High Efficiency, High Brightness Off-Line LED Driver

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

### Features:

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

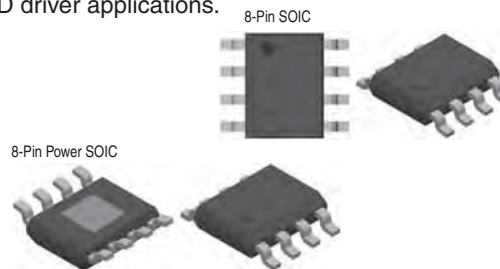


## MXHV9910 High Voltage, Off-Line LED Driver

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

### Features:

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

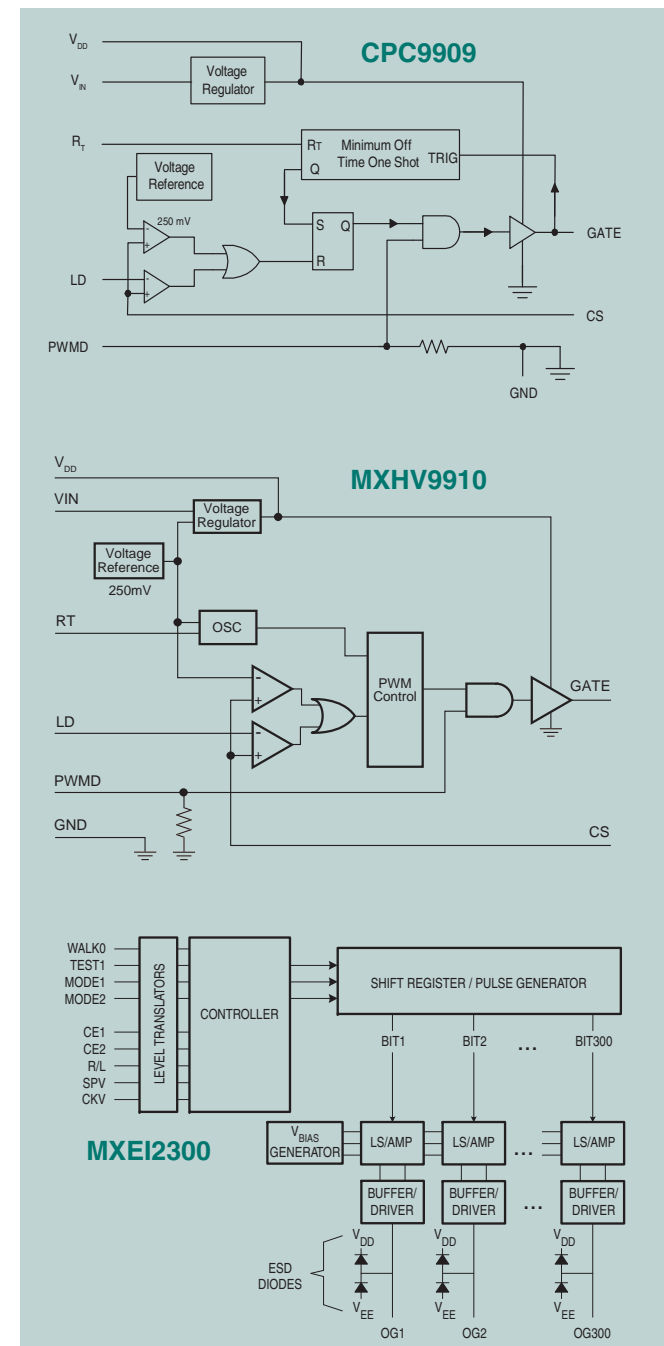
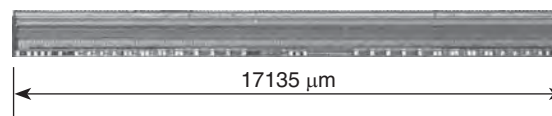


## MXEI2300 300-Output ePaper Gate Driver

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

### Features:

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



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

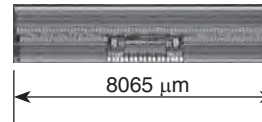


## MXEI2240 240-Output ePaper Gate Driver

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

### Features:

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



## MXEI1480 ±15V ePaper Source Driver

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

### Features:

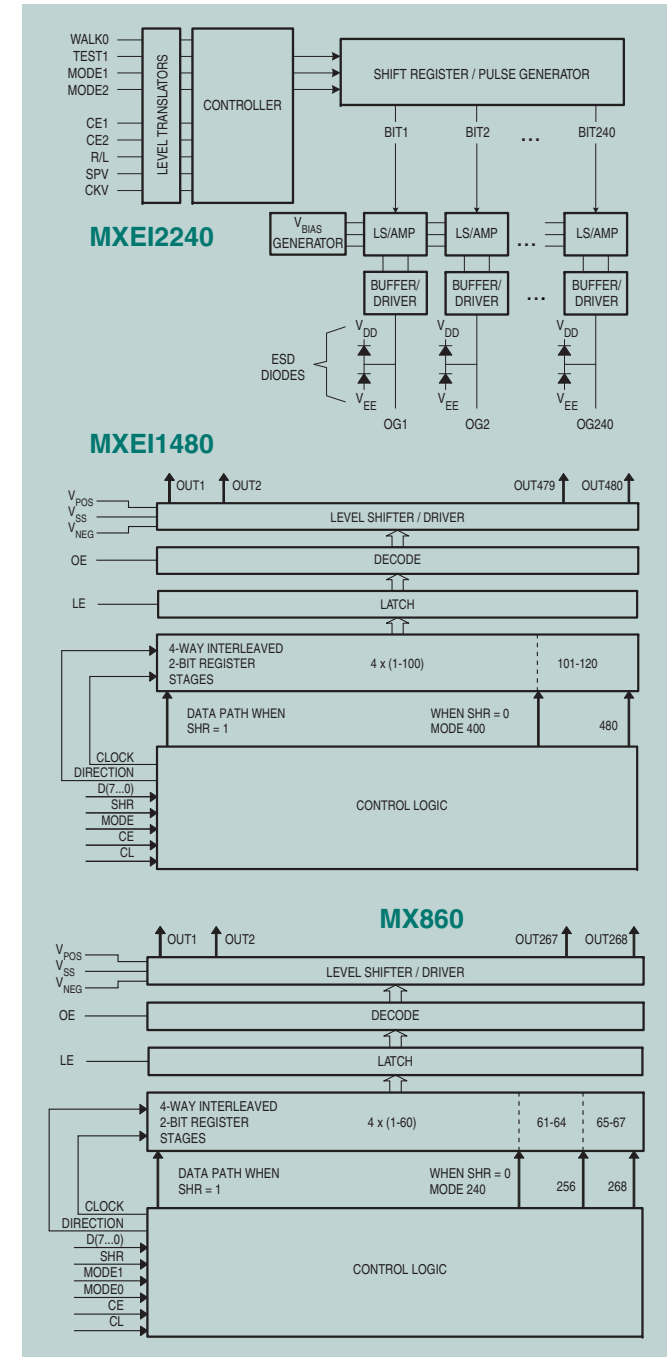
- CMOS Technology
- ±15V Output Driver Supply Voltage
- Drives Segment or Active Matrix Displays
- 4-Level Gray Scale
- 25MHz Clock Frequency
- Bidirectional Data Transfer
- Selectable Register Length
- 2.7V to 5.5V Logic Supply Voltage
- Cascadable

## MX860 ±15V ePaper Source Driver

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

### Features:

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



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

# Telecommunications Products

## Line Card Access Switches - LCAS

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

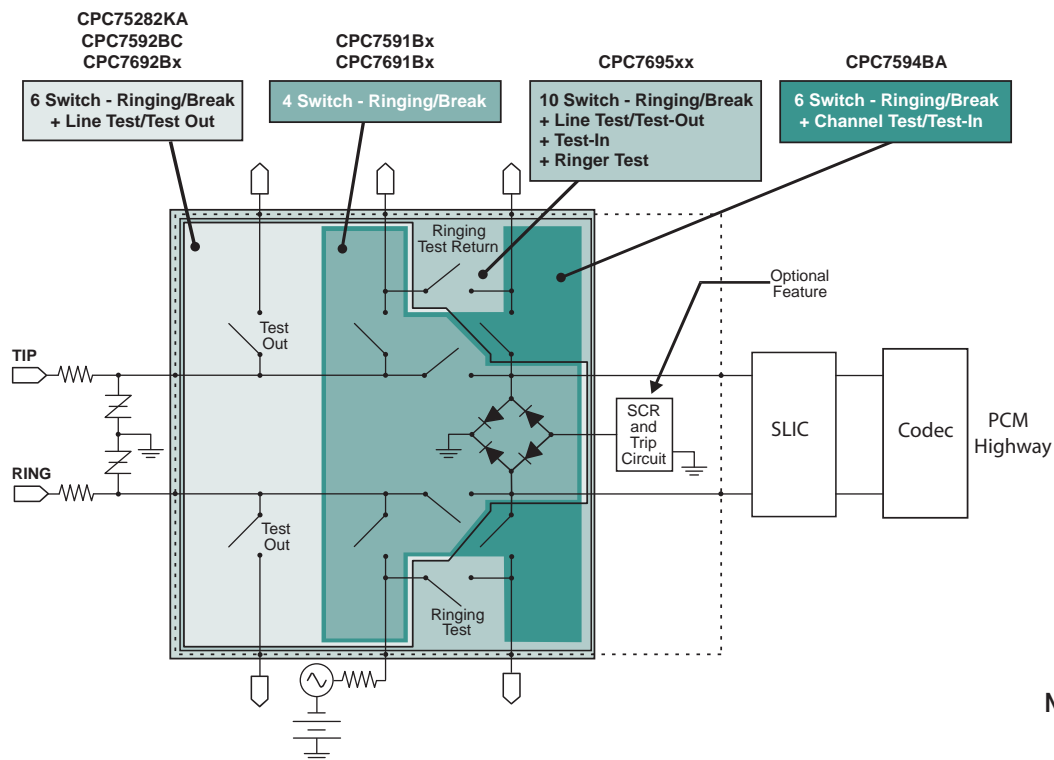
New features include: (1) TTL compatible inputs, (2) Smart logic for safe power up and hot plug state control, and (3) Increased dV/dt immunity.

### Features:

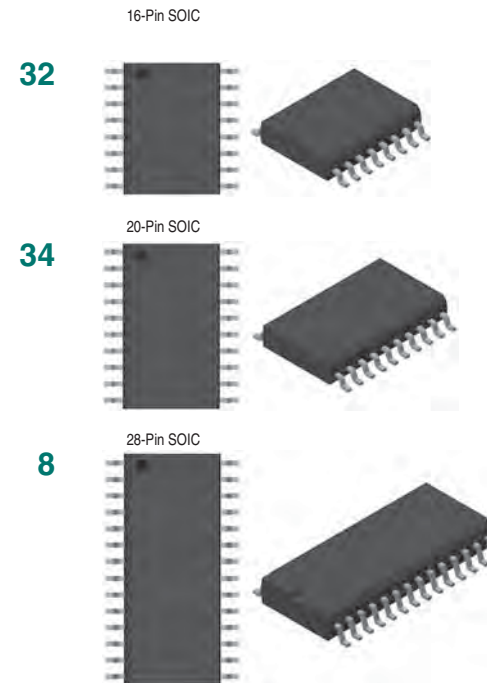
- Small Surface Mount SOIC or DFN Packages
- Monolithic IC Reliability
- Low, Matched On-Resistance
- Built-in Zero-Cross Switching
- Impulse Noise Reduction
- Current Limiting, Thermal Shutdown, and SLIC Protection
- Robust Power Cross and Lightning Surge Performance
- Ultra-Low Power Consumption of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

### Applications:

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



**1500V/μs!**  
**Switch dV/dt Immunity**  
**CPC769x Family**



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

Part Number	Minimum 1500V/ $\mu$ s dV/dt	Switch Pairs						Zero-Cross Switching	Protection Features				Logic States	Package Type
		# Switches	Break	Ringing	Test Out	Test In	Ringing Test		Current Limit	Diode Bridge	Protection SCR	Minimum Hold Current (mA)		
CPC7691BA	•	4	•	•				•	•	•	•	110	3	32
CPC7691BB	•	4	•	•				•	•	•	•	110	3	32
CPC7692BA	•	6	•	•	•			•	•	•	•	110	4	32
CPC7692BC	•	6	•	•	•			•	•	•	•	110	5	32
CPC7695xA	•	10	•	•	•	•	•	•	•	•	•	110	7	8, 34
CPC7695xB	•	10	•	•	•	•	•	•	•	•	•	110	7	8, 34
CPC7695xC	•	10	•	•	•	•	•	•	•	•	•	110	8	8, 34
CPC7591BA		4	•	•				•	•	•	•	110	3	32
CPC7591BB		4	•	•				•	•	•	•	110	3	32
CPC7592BC		6	•	•	•			•	•	•	•	110	5	32
CPC7594BA		6	•	•		•		•	•	•	•	110	4	32

## Dual LCAS: 6-Pole CPC75282

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

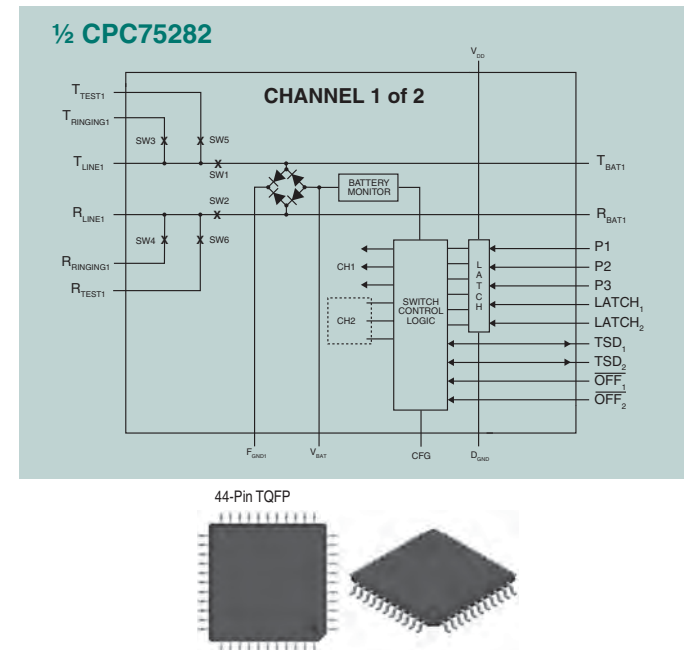
The CPC75282 Dual LCAS device is designed to provide ringing and test access to the telephone loop in Central Office, Digitally Added Main Line, Private Branch Exchange, Digital Loop Carrier, and Hybrid Fiber Coax/Fiber-In-The-Loop analog line card applications. Test access switches provide access to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

### Features:

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

### Applications:

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



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## LCAS for Ringing SLIC: CPC7508

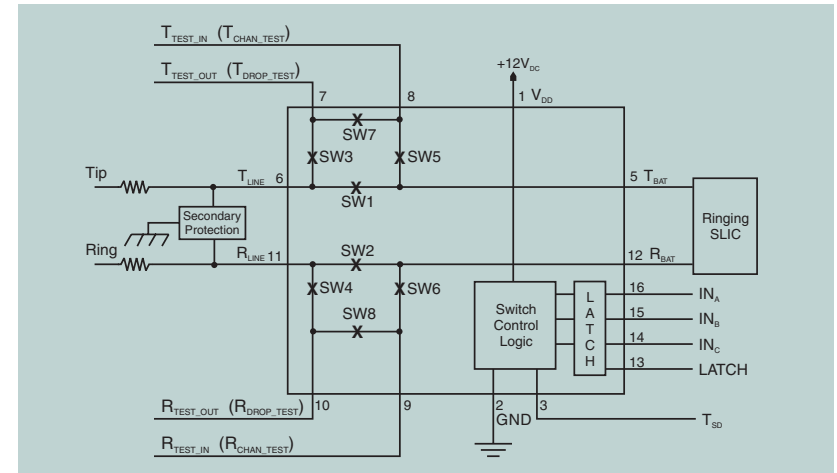
The CPC7508 is a member of our next generation Line Card Access Switch family. Used with ringing SLICs, it provides the necessary functions to replace the two 2-Form-C electromechanical test relays used in contemporary Fiber To The Home (FTTH) and Optical Network Unit (ONU) deployments as well as Voice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

### Features:

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

### Applications:

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



## Quad High Voltage Isolated Analog Switch Array: CPC7514

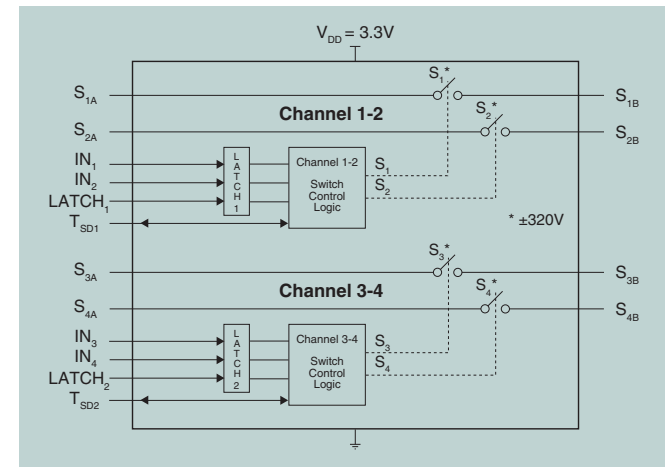
The CPC7514 Quad High Voltage (HV) isolated Analog Switch Array builds upon our Line Card Access Switch (LCAS) design and fabrication expertise for telecom and non-telecom applications. This monolithic solid state device provides the switching functionality of four normally open (1-Form-A) relays in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

### Features:

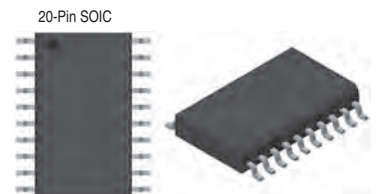
- Low, Matched  $R_{ON}$
- Switch Voltage up to 320V
- 320V Logic Input to Switch Output Isolation
- 110dB Switch-to-Switch Isolation at 5kHz
- Flexible Switch Configurations
- Smart Logic for Power-Up / Hot-Plug State Control
- 3.3V Operation with Very Low Power Consumption
- Switch Current Limiting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

### Applications:

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



**3.3V Supply!**



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## LITELINK™ Silicon DAA, Phone Line Interface

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

The 3kV<sub>rms</sub> internal isolation barrier exceeds all worldwide regulatory requirements. In addition, the LITELINK application circuit is capable of surviving 6kV (10μsec x 700μsec) lightning surge waveforms making it the most robust silicon DAA on the market.

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

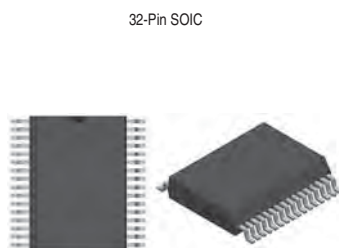
The newest device is the CPC5622 that offers continuous Caller-ID (CID) signal monitoring, which is ideal for telephony applications in countries where CID information is present before the ringing signal. The CPC5622 also offers both full-wave and half-wave ringing signal detection, enabling the designer to choose the appropriate interface to the codec/DSP block.

### Features:

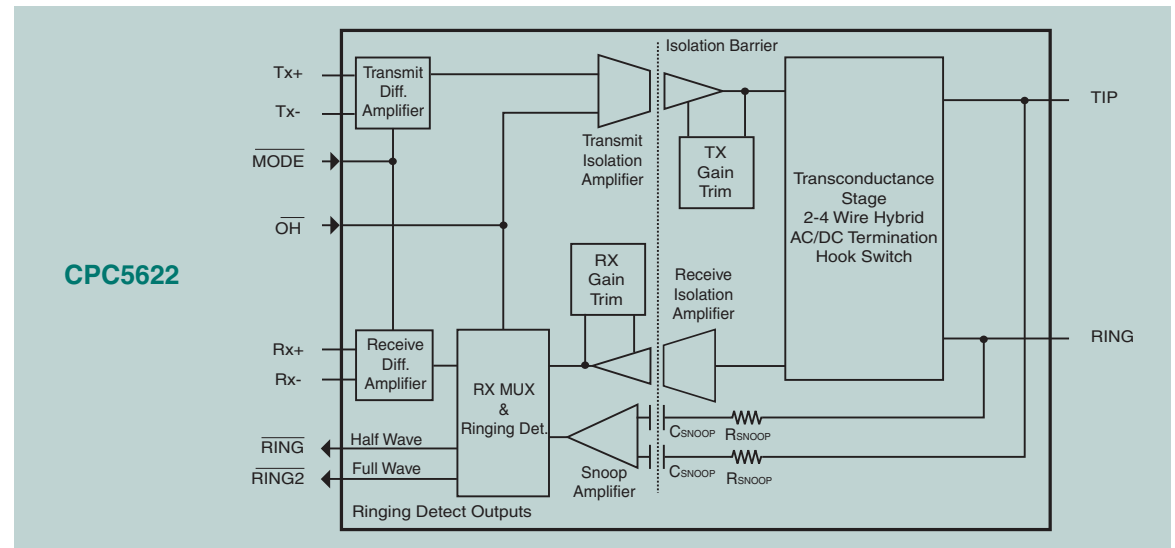
- Voice and Data Applications
- Modem DAA for Speeds up to V.92
- Half-Wave or Full-Wave Ringing Detection
- Worldwide Telephone Network Compatibility
- Caller-ID Reception
- Line Side Powered from Telephone Line
- 3.3V to 5V Power Supply
- Easy Interface with Modem ICs and Voice Codecs
- High Power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

### Applications:

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



Part Number	Isolation Voltage (V <sub>rms</sub> )	Power Supply (V)	Caller ID	Ringing Detect
CPC5622	3000	3.3 - 5	Continuous	Half-Wave & Full-Wave
CPC5621	3000	3.3 - 5	Selectable	Full-Wave
CPC5620	3000	3.3 - 5	Selectable	Half-Wave
CPC5601	Optional Optically Isolated Auxiliary Programmable Driver IC: Enables Host Equipment Control For LITELINK Silicon DAA Devices			
CPC5608	Low-Power Transistor Array (see page 39)			



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## Voltage Monitor Devices

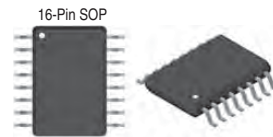
The CPC5712 is a special-purpose “Voltage Monitor with Detectors” integrated circuit that is used in various high voltage telephony applications such as VoIP gateways and IP-PBXs, as well as non-telephony applications in instrumentation and industrial control. The device monitors the TIP/RING potential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

CPC5710N is a versatile building block for designing telephone line monitoring circuits. The device has two outputs: a scaled, linear representation of the input TIP/RING voltage, and a switchable, internally set comparator output. The comparator output provides a ringing detect signal, the level of which is set by the resistor values selected for the input network. A formula for selecting these input resistors is given in the CPC5710 Data Sheet that is available at our web site. The Data Sheet also includes an application circuit that derives Line-in-Use (LIU) and line polarity information from the scaled output signal. This high-impedance, resistive-barrier application circuit is fully compliant to the EN60950 safety standard, and meets the ITU-T K.21 over-voltage and over-current specifications (with appropriate PCB layout).

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

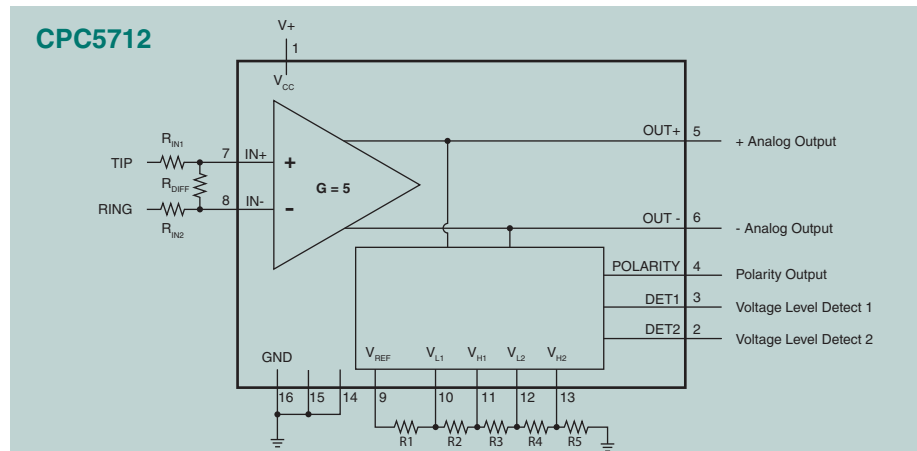
### CPC5712 Features:

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



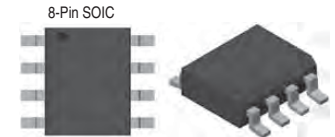
### CPC5712 Applications:

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



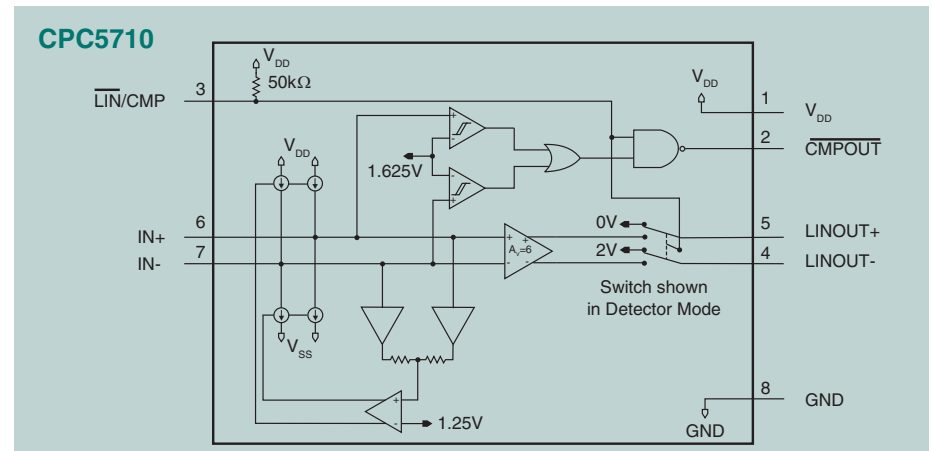
### CPC5710 Features:

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



### CPC5710 Applications:

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



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)



## DC Termination IC: CPC1465 SHDSL/ISDN

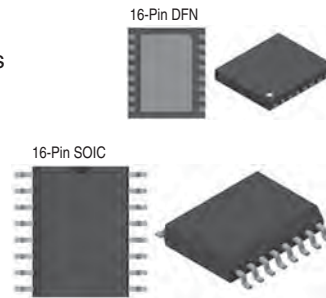
The CPC1465 provides a polarity-insensitive DC termination for wetting (sealing) current on the CPE side conforming to ITU-T G.991.2 to eliminate corrosion on G.SHDSL/ISDN lines. The CPC1465 has excellent linearity (70dB typ.) to minimize harmonic distortion, and well-controlled turn-on and turn-off characteristics to minimize injecting impulse noise with in-band signal energy into the G.SHDSL channel. This DC termination IC, which interfaces with the tip/ring pair, is rated at 300V, and is able to handle power cross and lightning transients with appropriate protection. Manufactured in our proven 320V Silicon-On-Insulator (SOI) process, the CPC1465 is packaged as a 16-pin SOIC or as a 16-pin DFN.

### Features:

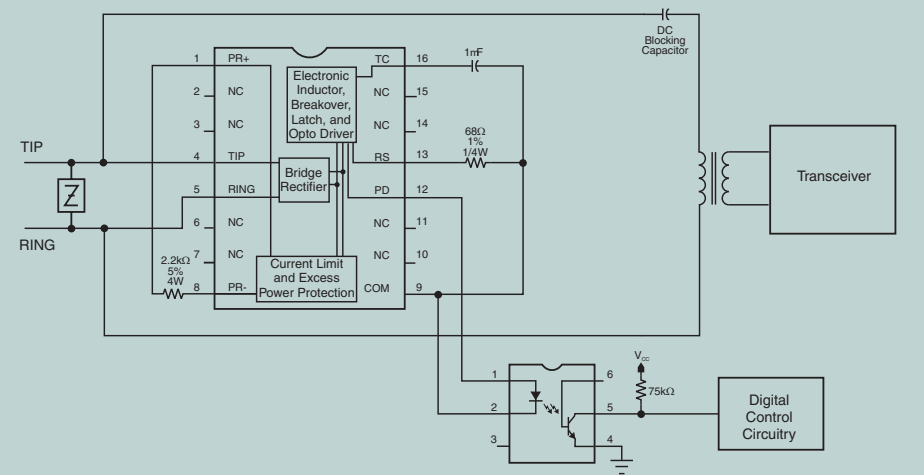
- Meets Wetting (Sealing) Current Requirements Per ITU-T G.991.2
- Integrated Bridge Rectifier for Polarity Correction
- Uses Inexpensive Optocoupler for DC Signaling
- Electronic Inductor, Breakover, and Latch Circuits
- Current Limiting and Excess Power Protection Circuits
- ANSI SHDSL and ISDN Compatible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

### Applications:

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



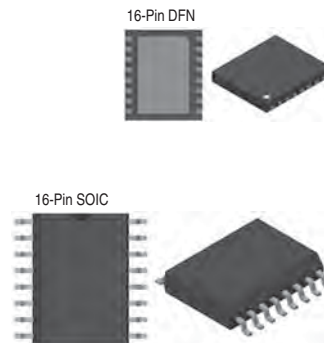
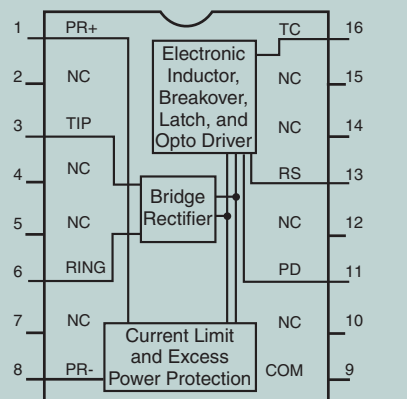
### CPC1465 & Application Circuit



## DC Termination IC: CPC1466 Broadband ADSL/VDSL

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

### CPC1466



### Features:

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

### 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

For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## Telecom Multifunction Products

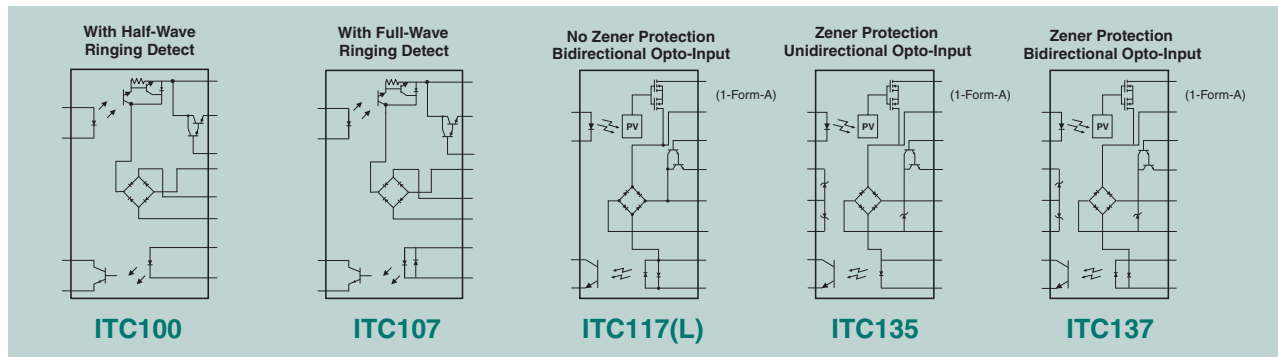
The OptoMOS line of Multifunction Products combines optically isolated discrete component functions into a single package. These products mix and match solid state relays, optocouplers, bridge rectifiers, Darlington transistors, and Zener diodes to create highly functional circuits in a single, small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

### Features:

- 3750V<sub>rms</sub> 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

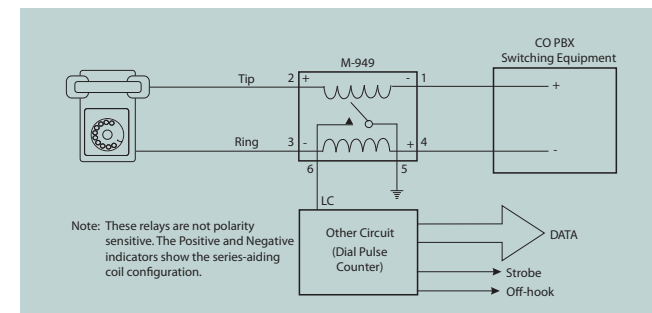


Part Number	Relay Parameters				Optocoupler Parameters				Isolation Voltage (V <sub>rms</sub> )	Package Type	Features
	Blocking Voltage (V <sub>p</sub> )	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Breakdown Voltage (V)	Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control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

## Line Sense Relay

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

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



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## Cybergate™ Data Access Arrangement (DAA) Modules

The Cybergate family is a 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
- Gyrator Circuitry
- Meets Most Regulatory Agency Requirements

### Applications:

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



### Small Package Size!

1.07" x 1.07" x 0.4"  
27.18mm x 27.18mm x 10.16mm

Part Number	Region	Hook Switch Resistance (Ω)	DC Loop Current (mA)	Return Loss (Min) (dB)	Insertion Loss (Max) TX - Transmit (dB) RX - Receive (dB)	Ringing Voltage Detection Range (V <sub>rms</sub> )	Isolation Voltage (V <sub>rms</sub> )	FEATURES				
								Ringing Detection		Caller ID	Loop Current Detect	2-4 Wire Conversion
CYG2000	N. America Asia	15	20-120	18	TX 7 RX 7	20-150	1000		•			
CYG2011	N. America Asia	15	20-120	18	TX 7 RX 7	20-150	1000	•			•	
CYG2020	N. America Asia	15	20-120	18	TX 7 RX 7	20-150	1000		•	•		
CYG2100	Europe	35	5-120	14	TX 7 RX 7	29-150	1500		•			
CYG2110	France	35	5-120	14	TX 7 RX 7	29-150	1500		•			
CYG2111	CTR-21	35	5-60	14	TX 7.5 RX 7.5	29-150	1500		•			
CYG2217	N. America Asia	15	20-120	39	TX 7 RX 1	20-150	1000		•			•
CYG2218	N. America Asia	15	20-120	39	TX 1 RX 1	20-150	1000		•			•
CYG2320	Australia	-	5-120	14	TX 7 RX 7	29 MIN	1500		•			

## Low Power Transistor Array: CPC5608

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

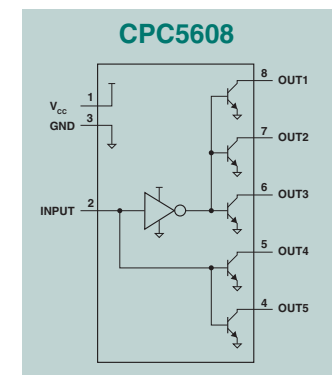


### Features:

- No Static Current Draw from Power Supply (CMOS Control)
- Low-Voltage Operation (V<sub>CC</sub> = 2.5V)
- Low Output Transistor Leakage

### Applications:

- Portable Battery Equipment
- Telephony
- Instrumentation



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## Call Progress Tone Detector

This Call Progress device is an inexpensive band detector that provides an accurate method of detecting common call progress tones including busy tone, dial tone, call waiting tones, and others. The detector is available in both DIP and SOIC packages, and operates on a 3V to 5V supply.

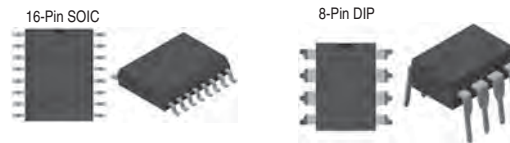
### Features:

- Receive Common Call Progress Tones
- The M-980-02 Operates with a Single 3-5 Volt Supply
- Linear Input (Detector)
- Inexpensive Band Detector with Wide Dynamic Range (>38dB)
- Low Power Consumption

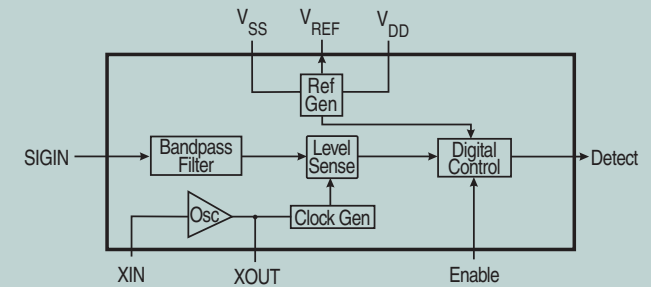
### Applications:

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

Part Number	Function (315 - 640Hz)	Package Types
M-980-02	Tone Detector	16-Pin SOIC, 8-Pin DIP



### M-980-02: Call Progress Tone Detector



## Embedded Modem Module: CPC2400E

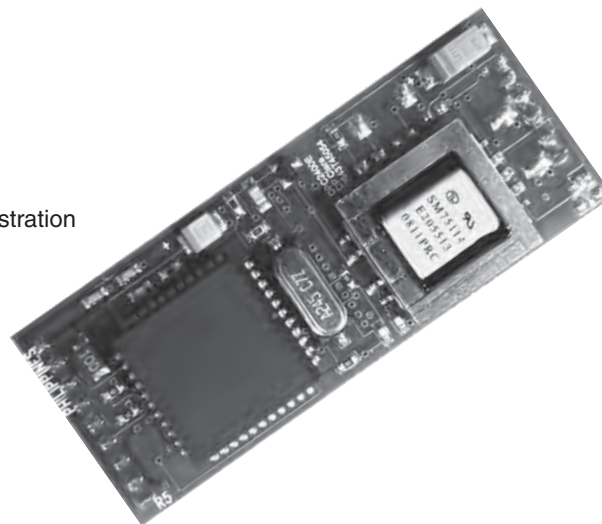
The Embedded Modem Module (EMM) combines a datapump and microcontroller with the Data Access Arrangement (DAA) to deliver an all-in-one solution for V.22bis modem transaction-oriented applications. This plug-and-play module provides a total solution complete with transferable FCC registration. It supports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

### Features:

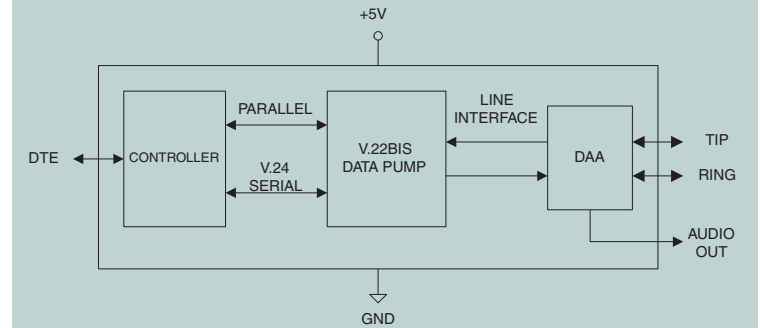
- Easy Integration and Installation
- Small Footprint of 1.00" x 2.50"
- Low Power Consumption
- 5V Power Supply Operation
- Supports V.22bis, V.22, V.23
- FCC Part 15B Compliant
- FCC Part 68 User Transferable Registration
- UL Approved

### Applications:

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



### CPC2400E

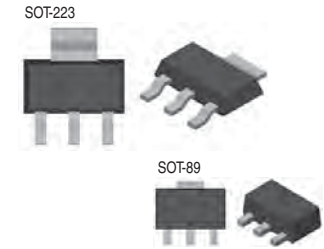


# Discrete Components

## N-Channel Depletion Mode FETs

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

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



Part Number	$V_{(BR)DSX}$ (V)	$R_{DS(on)}$ Max ( $\Omega$ )	$V_{GS(off)}$ Min (V)	$V_{GS(off)}$ Max (V)	$I_{DSS}$ @ $V_{GS} = 0V$ Min (mA)	$I_D$ @ $V_{GS} = -0.57V$ Min (mA)	Package Type	Features & Comments
CPC3701	60	1	-0.8	-2.9	600	-	SOT-89	
CPC3703	250	4	-1.6	-3.9	360	-	SOT-89	
CPC3708	350	14	-2	-3.6	-	130	SOT-89, SOT-223	
CPC3710	250	10	-1.6	-3.9	220	-	SOT-89	
CPC3714	350	14	-1.6	-3.9	240	-	SOT-89	
CPC3720	350	22	-1.6	-3.9	130	-	SOT-89	
CPC3730	350	30	-1.6	-3.9	140	-	SOT-89	
CPC5602	350	14	-2	-3.6	-	130	SOT-223	Designed for Use with LITELINK Designs
CPC5603	415	14	-2	-3.6	-	130	SOT-223	Designed for Use with LITELINK Designs

## Diode Bridges

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

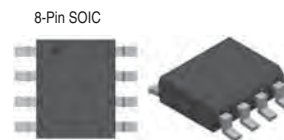
The CPC7557N is an integrated diode bridge built on our High Voltage SOI technology. Very small in size, this integrated diode bridge device offers a space-saving method for inclusion of a highly reliable, monolithic, full-wave bridge rectifier into today's miniature circuit designs.

### Features:

- Monolithic Construction
- Surface Mount Package

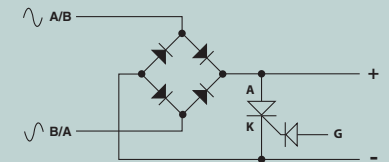
### Applications:

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

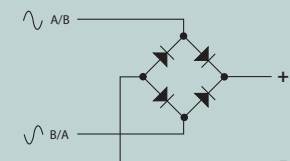


Part Number	Reverse Voltage (V)	Forward Current (mA <sub>rms</sub> )	Diode $V_F$ Drop (V)	Thyristor Current (mA)	Reverse Leakage $I_{LEAK}$ ( $\mu A$ )
CPC7556	100	240	0.97	120	1
CPC7557	100	240	0.97	-	1

CPC7556



CPC7557



For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## Other Semiconductor Products

### Hall-Effect Switches

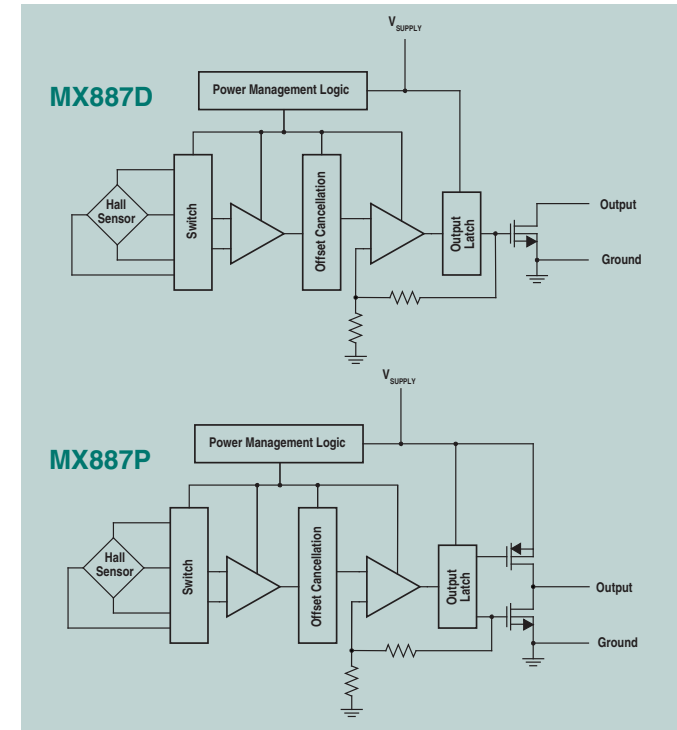
The MX887D and MX887P integrated Hall-Effect switches target the requirements of low-power portable devices with battery operating voltages from 2.5V to 5.5V. On-chip power management circuitry reduces the effective average current to just 5 $\mu$ A at 3V supply voltage.

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

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

#### Applications:

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



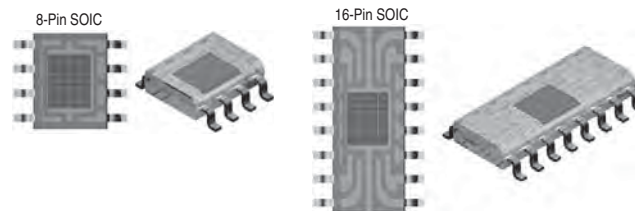
### Solar Cells

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

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

#### Features:

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



#### Applications:

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



The following application notes can be downloaded from our web site at [www.ixysic.com](http://www.ixysic.com)

## General

- AN-131 Handling MOS Devices

## Solid State Relays

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

## High Voltage LED Drivers

- AN-301 CPC9909 Design Considerations
- AN-300 MXHV9910 Design Considerations

## Gate Drivers

- AN-401 MOSFET / IGBT Drivers Theory and Applications
- AN-400 IX2127 Design Considerations
- AN-202 CPC1590 Application Technical Information
- AN-201 Using the CPC1580 Isolated Gate Driver IC

## Linear Optocouplers

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

## Multifunction Products for Telecom

- AN-151 FXO/DAA Design Using IXYS Integrated Circuits Division OptoMOS Components
- AN-114 ITC117P Integrated Telecom Circuit
- AN-112 Ground-Start Supervision Circuit Using IXYS Integrated Circuits Division's IAA110

## High Speed Digital Opto Isolators

- TB-101 Optically Isolating an I<sup>2</sup>C Interface

## Line Interface Products

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

## LITELINK Silicon DAA

- AN-158 LITELINKIII Application Circuit Calculations
- AN-157 Increased LITELINK Transmit Power
- AN-146 Guidelines for Effective LITELINK Designs
- AN-112 Ground-Start Supervision Circuit Using IXYS Integrated Circuits Division's IAA110
- AN-102 Loop Current Detection for LITELINK



## Tone Signaling Products

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



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