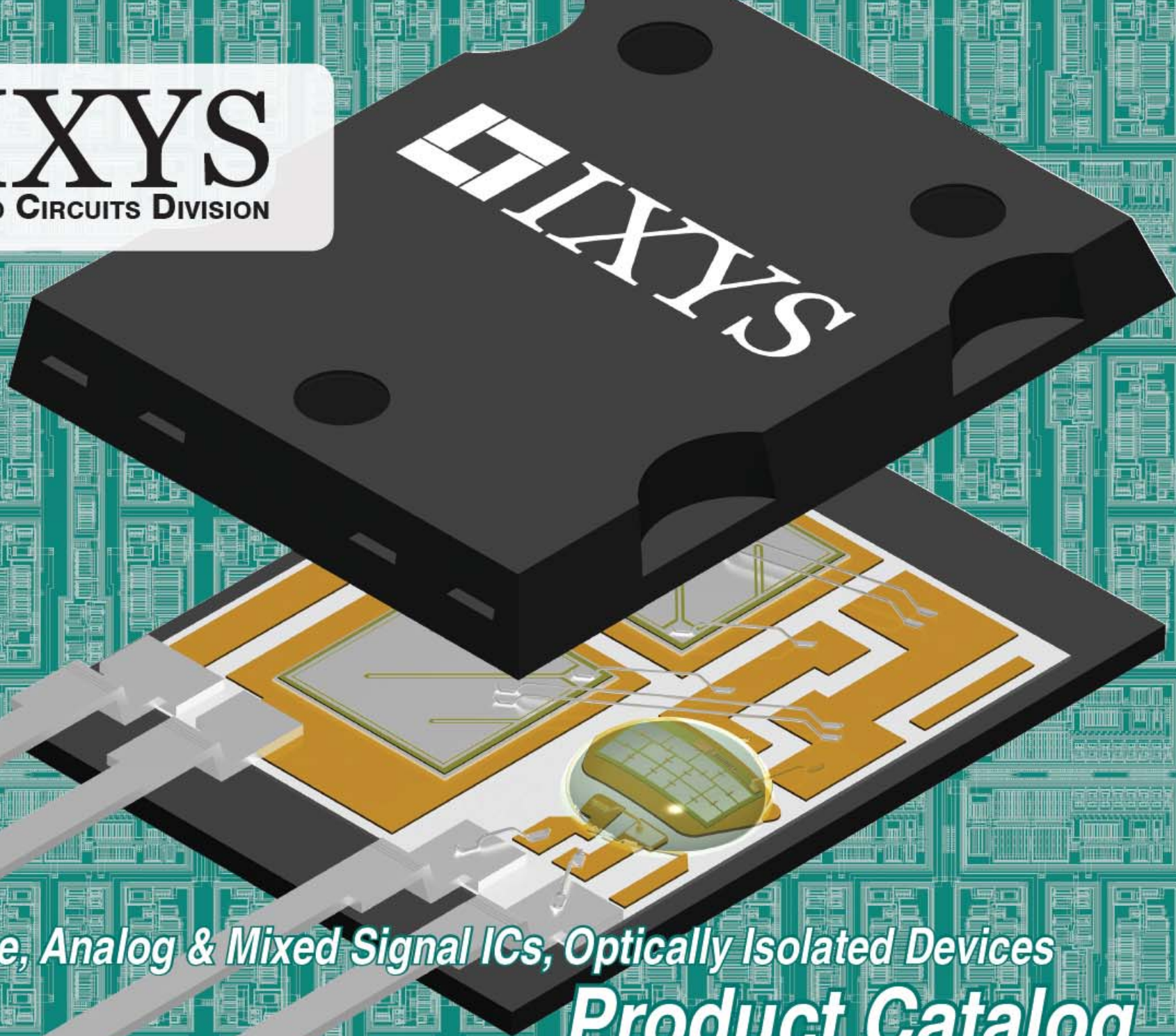




**IXYS**  
INTEGRATED CIRCUITS DIVISION



*High Voltage, Analog & Mixed Signal ICs, Optically Isolated Devices*

***Product Catalog***

# IXYS Integrated Circuits Division



Clare, Inc., founded by Carl P. Clare in 1937 as C. P. Clare & Company, was purchased by IXYS Corporation in 2002, and is now known as IXYS Integrated Circuits Division (as of April, 2012).

IXYS Integrated Circuits Division is a wholly owned subsidiary of IXYS Corporation. Located near 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 components.

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.

- **IGBT and MOSFET Drivers:** High voltage and low-side IGBT and MOSFET drivers, many of which are AEC-Q100 qualified.
- **High Voltage ICs:** High voltage 8-channel and 16-channel analog switches for the medical and imaging markets, high voltage LED drivers, and others.
- **Solid State Relays (SSR):** One of the industry's broadest lines of optically isolated SSRs, available in a wide selection of configurations, blocking voltages, and load currents.
- **Power Market:** Power solid state relays; SCR-based AC power switches (zero-cross & rapid turn-on); and N-channel, depletion-mode, field effect transistors (FET).
- **Lighting:** High voltage LED drivers.
- **High Speed Digital Optical Isolators:** New high speed isolators that pass DC signals, require no refresh clocking, and provide  $3750V_{rms}$  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  $3750V_{rms}$  of galvanic isolation.
- **Portable reader devices:** Drivers for ePaper readers and displays.
- **RFID Devices:** Read-Only and HDX devices for single transponder applications operating in the low frequency (134.2 kHz) range, and supporting ISO 11784/85 standards.
- **Non-volatile Digitally Programmable Capacitor:** Provides capacitive offset trimming for capacitance sensitive circuits.
- **Telecommunications:** a broad range of products:
  - LITELINK® silicon Data Access Arrangement (DAA)
  - Phone-line interface and monitoring devices
  - LCAS: Line Card Access Switch products
  - DC Termination devices for xDSL and ISDN applications
  - Cybergate™ DAA

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LAA127	9	LCA701	7	LIA135	32	PAA191	9	PS1201	16		
LAA127L	9	LCA710	7	LIA136	32	PAA193	9	PS2401	16		
LAA710	9	LCA712	7	LOC110	31	PBA150	11	PS2601	16		
LBA110	11	LCA715	7	LOC111	31	PBB150	10	TS117	18		
LBA110L	11	LCA717	7	LOC112	31	PBB190	10	TS117L	18		
LBA120	11	LCB110	10	LOC117	31	PD1201	16	TS118	18		
LBA120L	11	LCB111	10	LOC210	31	PD2401	16	TS120	18		

# SOLID STATE RELAYS

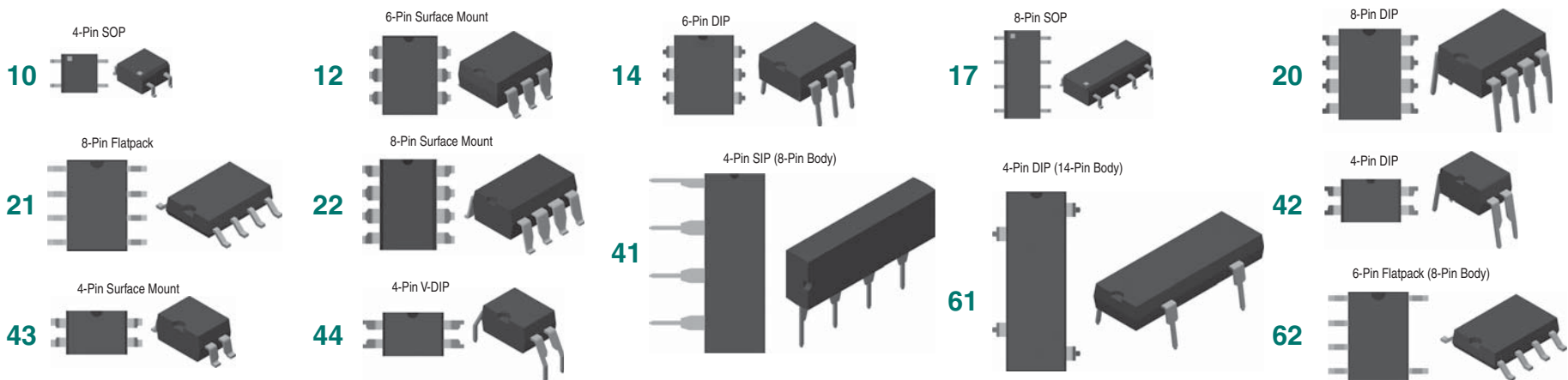
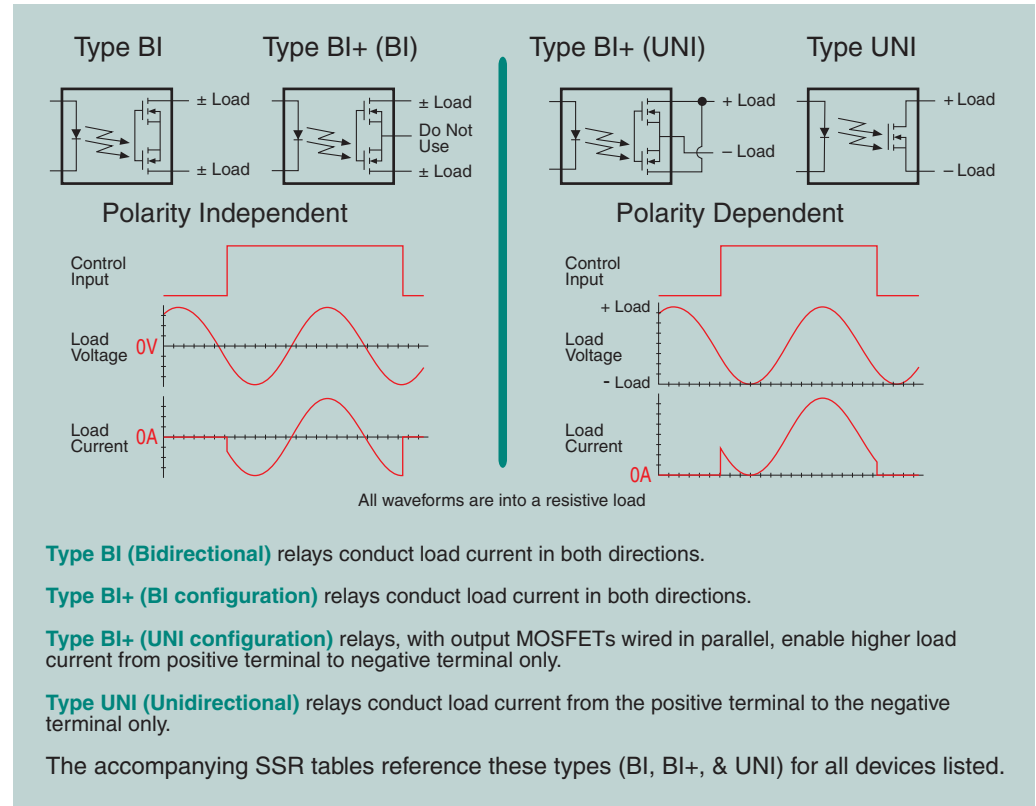
- Replace electromechanical relays
- Replace mechanical switches
- Implement computer control of electromechanical circuits

## Features:

- Low drive current
- High reliability
- No EMI/RFI generation
- Arc-free with no snubbing circuits
- AC or DC switching
- Current limiting devices available
- FCC compatible
- Low off-state leakage

## Applications:

- Telecommunications/data communications
- Instrumentation
- Multiplexers
- Data acquisition/electronic switching
- Meters (Watt-hour, water, gas)
- Medical equipment (patient/equipment isolation)
- Security
- Aerospace
- Industrial controls

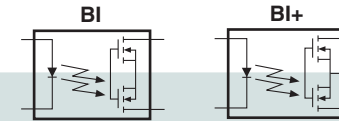


Packages are referenced by number in the accompanying solid state relay selection tables.

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

# • 1-FORM-A RELAYS (NORMALLY OPEN)

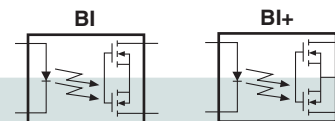
## 1-Form-A Relays: Single-Pole



Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type (Page 6)	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
CPC1020N	BI	30	1200	0.25	2	3 / 3	1500	1	10	High load current, very low on-resistance
LCA717	BI+	30	2000	0.15	2	3 / 3	3750	1	12, 14	High Load Current
CPC1006N	BI	60	75	10	0.5	10 / 10	1500	1	10	Low I <sub>F</sub> , EN 50130-4
CPC1017N	BI	60	100	16	1	10 / 10	1500	1	10	Low I <sub>F</sub> , EN 50130-4
CPC1560	BI+	60	300	5.6	1.1	0.1 / 0.4	3750	1	20, 22	Current limiting with thermal management - see page 13
CPC1014N	BI	60	400	2	2	2 / 1	1500	1	10	EN 50130-4
CPC1018N	BI	60	600	0.8	1	3 / 2	1500	1	10	Low I <sub>F</sub> , EN 50130-4
PLA132	BI+	60	600	1	2	5 / 2	3750	1	12, 14	
CPC1019N	BI	60	750	0.6	2	3 / 3	1500	1	10	
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
CPC1317	BI	70	150	16	1	2.5 / 2.5	3750	1	21	EN 50130-4 (installation class 3), transient voltage suppression (TVS)
CPC1016N	BI	100	100	16	2	2 / 1	1500	1	10	
CPC1008N	BI	100	150	8	2	2 / 1	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
PLA134	BI+	100	350	3	5	5 / 5	3750	1	12, 14	
LCA701	BI+	100	1500	0.3	2	4 / 1	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
LCA120L	BI+	250	150	20	5	3 / 3	3750	1	12, 14	Current limiting
LCA120	BI+	250	170	20	5	3 / 3	3750	1	12, 14	
LCA127L	BI+	250	170	15	5	5 / 5	3750	1	12, 14	Current limiting
LCA129	BI+	250	170	20	2	8 / 8	3750	1	12, 14	
CPC1010N	BI	250	170	11.5	2	3 / 3	1500	1	10	
CPC1510	BI+	250	200	15	2	2 / 2	3750	1	12, 14	Current limiting with thermal management - see page 13
LCA127	BI+	250	200	10	5	5 / 5	3750	1	12, 14	
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
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
CPC1035N	BI	350	100	35	2	2 / 1	1500	1	10	
CPC1335	BI	350	100	35	1	10 / 10	3750	1	21	Low I <sub>F</sub> , EN 50130-4 (installation class 3), transient voltage suppression (TVS)
XCA170	BI+	350	100	50	5	5 / 5	3750	1	12, 14	
CPC1030N	BI	350	120	30	2	2 / 1	1500	1	10	
CPC1230N	BI	350	120	30	2	2 / 1	1500	1	10	EN/IEC 60950-1 Supplementary Insulation (0.4mm distance through insulation)
CPC1330	BI	350	120	30	2	2 / 1	5000	1	42, 43	Enhanced isolation voltage

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

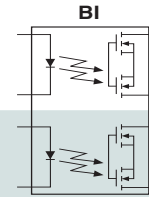
## 1-Form-A Relays: Single-Pole (continued)



Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type (Page 6)	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
CPC1540	BI+	350	120	25	2	2 / 2	3750	1	12, 14	Current limiting with thermal management - see page 13
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
LCA182	BI+	350	120	35	0.25	3 / 3	3750	1	12, 14	Very Low I <sub>F</sub>
CPC1025N	BI	400	120	30	2	2 / 1	1500	1	10	
CPC1225N	BI	400	120	30	2	2 / 1	1500	1	10	EN/IEC 60950-1 Supplementary Insulation (0.4mm distance through insulation)
CPC1390	BI	400	140	22	2	1 / 1	5000	1	42, 43, 44	Enhanced isolation voltage
PLA110	BI+	400	150	22	5	1 / 0.5	3750	1	12, 14	
PLA110L	BI+	400	150	25	5	1 / 0.25	3750	-	12, 14	Current Limiting
PLA190	BI+	400	150	22	5	1 / 0.5	5000	1	12, 14	Enhanced Isolation Voltage
PLA140L	BI+	400	200	13	5	5 / 3	3750	1	12, 14	Current Limiting
PLA140	BI+	400	250	8	5	3 / 1	3750	1	12, 14	
PLA191	BI+	400	250	8	5	3 / 1	5000	1	12, 14	Enhanced Isolation Voltage
CPC1393	BI	600	90	50	2	5 / 5	5000	1	42, 43, 44	Enhanced isolation voltage
PLA143	BI+	600	100	50	2	5 / 5	4000	1	12, 14	Enhanced Isolation Voltage
PLA193	BI+	600	100	50	5	5 / 5	5000	1	12, 14	Enhanced Isolation Voltage, PLA193E is DIN EN 60747-5-5 Certified
CPC1394	BI	600	120	35	2	5 / 3	5000	1	42, 43, 44	Enhanced isolation voltage
CPC1563	BI+	600	120	35	2	2 / 2	3750	1	12, 14	Current limiting with thermal management - see page 13
CPC1593	BI+	600	120	35	2	2 / 2	3750	1	12, 14	Current limiting, thermal management, voltage triggered shutdown - see page 13
PLA194	BI+	600	130	35	2	3 / 2	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
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, High Blocking Voltage (Output Pins 7mm Separation)



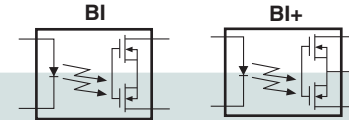
## 1-Form-A Relays: Dual Single-Pole



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)	(Page 6)	
CPC2017N	BI	60	120	16	1	3 / 3	1500	1	17	Low I <sub>F</sub> , EN 50130-4
XAA117	BI	60	150	16	1	5 / 5	3750	1	20, 21, 22	Low I <sub>F</sub>
CPC2014N	BI	60	400	2	2	2 / 1	1500	1	17	EN 50130-4
PAA132	BI	60	600	1	2	5 / 2	3750	1	20, 22	
LAA710	BI	60	1000	0.5	10	2.5 / 0.25	3750	1	20, 22	
LAA108	BI	100	300	8	2	3 / 3	3750	1	20, 21, 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
LAA120L	BI	250	150	25	5	5 / 5	3750	1	20, 21, 22	Current Limiting
LAA120	BI	250	170	20	5	5 / 5	3750	1	20, 21, 22	
LAA127L	BI	250	170	15	5	5 / 5	3750	1	20, 21, 22	Current Limiting
LAA127	BI	250	200	10	5	5 / 5	3750	1	20, 21, 22	
PAA150	BI	250	250	7	5	2.5 / 0.5	3750	1	20, 21, 22	
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
XAA170	BI	350	100	50	5	5 / 5	3750	1	20, 21, 22	
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
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
LAA125L	BI	350	150	18	5	5 / 5	3750	1	20, 21, 22	Current Limiting
LAA125	BI	350	170	16	5	5 / 5	3750	1	20, 21, 22	
CPC2025N	BI	400	120	30	2	2 / 1	1500	1	17	
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
PAA190	BI	400	150	22	5	1 / 0.5	5000	1	20, 22	Enhanced Isolation Voltage
PAA140L	BI	400	200	13	5	5 / 3	3750	1	20, 22	Current Limiting
PAA140	BI	400	250	8	5	3 / 1	3750	1	20, 21, 22	
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

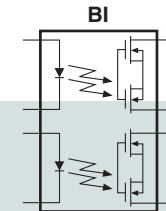
# • 1-FORM-B RELAYS (NORMALLY CLOSED)

## 1-Form-B Relays: Single-Pole



Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type (Page 6)	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
LCB717	BI+	30	1500	0.3	2	2 / 5	3750	1	12, 14	High Load Current
CPC1106N	BI	60	75	10	0.5	10 / 10	1500	1	10	Low I <sub>F</sub> , EN 50130-4
CPC1117N	BI	60	150	16	1	10 / 10	1500	1	10	Low I <sub>F</sub> , EN 50130-4
CPC1114N	BI	60	400	2	2	2 / 5	1500	1	10	
LCB716	BI+	60	500	2	2	3 / 3	3750	1	12, 14	
LCB710	BI+	60	1000	0.6	2	3 / 3	3750	1	12, 14	High Load Current
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	
PLB150	BI+	250	250	7	5	1 / 2.5	3750	1	12, 14	
XCB170	BI+	350	100	50	5	5 / 5	3750	1	12, 14	
CPC1130N	BI	350	120	30	2	2 / 2	1500	5	10	
CPC1135N	BI	350	120	35	2	2 / 2	1500	5	10	
CPC1150N	BI	350	120	50	2	1 / 2	1500	5	10	
CPC1231N	BI	350	120	30	2	2 / 2	1500	5	10	EN/IEC 60950-1 Supplementary Insulation (0.4mm distance through insulation)
LCB110	BI+	350	120	35	5	3 / 3	3750	1	12, 14	
LCB111	BI+	350	120	35	2	5 / 5	3750	1	12, 14	
CPC1333	BI	350	130	30	2	2 / 3	5000	1	42, 43	Enhanced Isolation Voltage
CPC1125N	BI	400	100	35	2	2 / 2	1500	5	10	
PLB190	BI+	400	130	25	2	1 / 2.5	5000	1	12, 14	Enhanced Isolation Voltage
PLB171	BI	800	80	55	2	5 / 5	5000	1	62	Enhanced Isolation Voltage, High Blocking Voltage (Output Pins 7mm Separation)

## 1-Form-B Relays: Dual Single-Pole



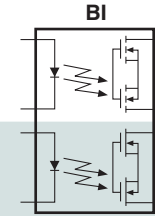
Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type (Page 6)	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
LBB120	BI	250	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	
XBB170	BI	350	100	50	5	5 / 5	3750	1	20, 21, 22	
LBB110	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	
CPC2125N	BI	400	100	35	2	2 / 2	1500	5	17	
PBB190	BI	400	130	25	2	1 / 2.5	5000	1	20, 22	

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

## MISCELLANEOUS RELAYS

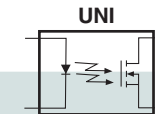
### 1-Form-A & 1-Form-B Combination Relays

Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type (Page 6)	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
CPC2317N	BI	60	120	16	1	3 / 3	1500	1 / 1	17	Low I <sub>F</sub>
LBA710	BI	60	1000	0.6	2	5 / 5	3750	1 / 1	20, 22	High Load Current
LBA716	BI	60	1000	0.4	2	5 / 5	3750	1 / 1	20, 22	High Load Current
LBA120L	BI	250	150	25	5	5 / 5	3750	1 / 1	20, 22	Current Limiting
LBA127L	BI	250	150	15	5	5 / 5	3750	1 / 1	20, 22	Current Limiting
LBA120	BI	250	170	20	5	5 / 5	3750	1 / 1	20, 21, 22	
LBA127	BI	250	200	10	5	5 / 5	3750	1 / 1	20, 21, 22	
PBA150	BI	250	250	7	5	2.5 / 2.5	3750	1 / 1	20, 22	
CPC2330N	BI	350	120	30	2	3 / 3	1500	1 / 5	17	
LBA110	BI	350	120	35	2	3 / 3	3750	1 / 1	20, 21, 22	
LBA110L	BI	350	120	35	5	3 / 3	3750	1 / 1	20, 21, 22	Current Limiting



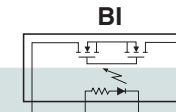
### 1-Form-A Relays: Single-Pole, Unidirectional (DC-only)

Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type (Page 6)	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
CPC1002N	UNI	60	700	0.55	2	5 / 2	1500	1	10	EN 50130-4
CPC1004N	UNI	100	300	4	2	3 / 1	1500	1	10	Extended Operating Temperature Range: -40°C to +110°C



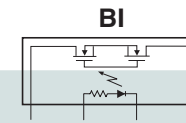
### 1-Form-A Relays: Single-Pole, Voltage-Controlled

Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Voltage	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type (Page 6)	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(V)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
CPC1217	BI	60	200	16	5 - 12	5 / 5	2500	1	41	EN 50130-4, direct drop-in reed relay replacement
CPC1218	BI	60	600	1.1	5 - 12	5 / 5	2500	1	41	EN 50130-4, direct drop-in reed relay replacement
CPC1215	BI	400	500	6	5 - 12	5 / 3	3750	1	61	Direct drop-in reed relay replacement



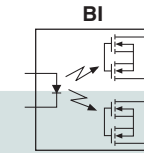
## 1-Form-B Relays: Single-Pole, Voltage-Controlled

Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Voltage	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type (Page 6)	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(V)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
CPC1219	BI	60	200	16	5 - 12	5 / 5	2500	1	41	EN 50130-4, direct drop-in reed relay replacement



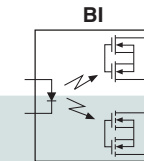
## 2-Form-A Relays: Double-Pole, Single-Throw

Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type (Page 6)	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
LCA220	BI	250	120	20	10	5 / 5	3750	1	20, 22	
LCA210	BI	350	85	35	8	3 / 3	3750	1	20, 22	
LCA210L	BI	350	85	35	8	4 / 4	3750	1	20, 22	Current limiting



## 1-Form-C Relays: Common Input, Single-Pole, Double-Throw

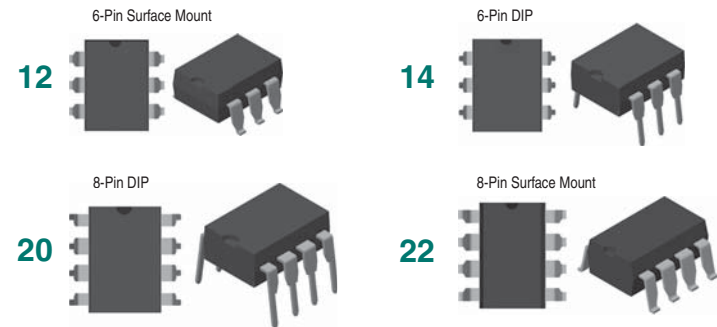
Part Number	Relay Type	Blocking Voltage	Load Current	On Resistance	Input Control Current	Switching Speeds	Isolation Voltage	Off-State Leakage	Package Type (Page 6)	Features and Comments
		(V <sub>p</sub> )	(mA)	(Ω)	(mA)	t <sub>on</sub> / t <sub>off</sub> (ms)	(V <sub>rms</sub> )	(μA)		
LCC120	BI	250	170	20	10	5 / 5	3750	1	20, 22	
LCC110	BI	350	120	35	8	4 / 4	3750	1	20, 21, 22	



# FAULT PROTECTED RELAYS

## CURRENT LIMITING SSRs WITH VOLTAGE TRIGGERED SHUTDOWN & THERMAL MANAGEMENT

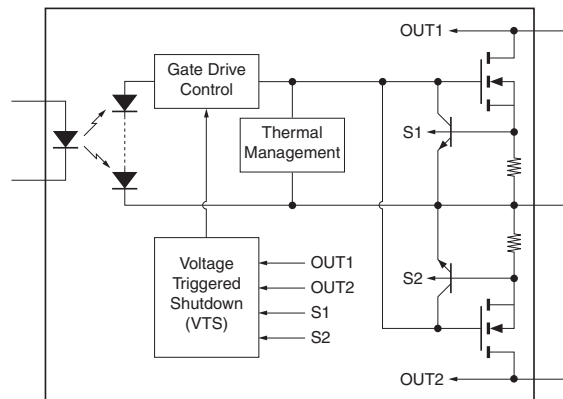
- Active current-limiting circuitry
- Integrated thermal management (ThM)
- Voltage triggered shutdown (VTS)
  - Provide excellent power-cross immunity
  - Ideal for use in electromagnetically noisy environments
  - Resumes normal operation when faults have been removed



Part Number	Blocking Voltage ( $V_p$ )	Input Control Current (mA)	On-Resistance (Maximum)		Load Current (Maximum)		Current Limit (Maximum)		* VTS Threshold ( $V_{TH}$ ) (V)	Switching Speed ( $t_{on} / t_{off}$ ) (ms)	Isolation Voltage ( $V_{rms}$ )	Package Type	Features & Comments
			DC-Only ( $\Omega$ )	AC ( $\Omega$ )	DC-Only (mA)	AC (mA)	DC-Only ( $mA_p$ )	AC ( $mA_p$ )					
CPC1560	60	1.1	1.4	5.6	600	300	1500	900	-	0.1 / 0.4	3750	20, 22	Fast switching speeds
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
CPC1563	600	2	11.75	35	250	120	570	285	100	2 / 2	3750	12, 14	High blocking voltage
CPC1593	600	2	11.75	35	250	120	570	285	21	2 / 2	3750	12, 14	Power supply start-up

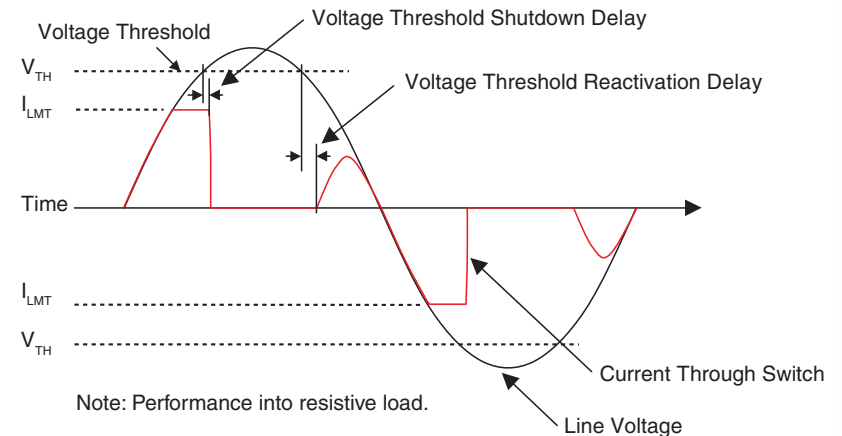
\* Deactivates the switch when the load voltage exceeds the  $V_{TH}$  threshold while the switch is in current limit.

CPC1540, CPC1563, CPC1593



### Applications:

- Telephony hook switch
- VoIP gateways
- I/O subsystems
- Electronic switching
- Medical equipment (Patient/equipment isolation)
- Security
- Aerospace
- Industrial controls



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

# OPTICALLY ISOLATED POWER RELAYS

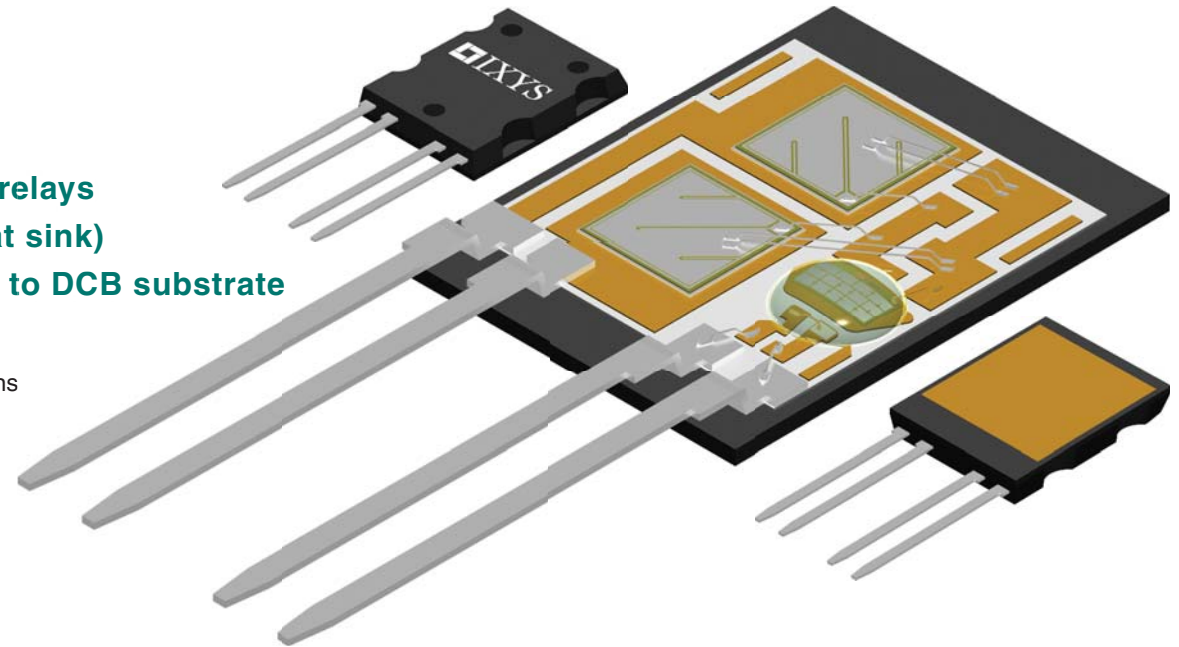
- Blocking voltage up to  $1000V_p$
- On-resistance as low as 0.05 Ohms
- On/off times from 1ms to 25ms
- MOSFET-based AC/DC and DC-only power relays
- Load current up to  $22.8A_{DC}$  (with  $5^{\circ}C/W$  heat sink)
- $2500V_{rms}$  isolation from input to output and to DCB substrate

## Features:

- Isolated, low thermal impedance pad for heat sink applications
- Low input control current
- Low thermal impedances, junction to case ( $\theta_{JC}$ ):
  - 0.30 $^{\circ}C/W$  - ISOPLUS-264
  - 0.35 $^{\circ}C/W$  - i4-PAC
  - 1.50 $^{\circ}C/W$  - Power SIP

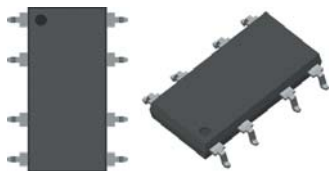
## Applications:

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

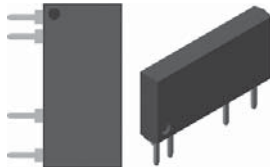


***Metalized, external, Direct Copper Bond (DCB) surface for heat sink applications***

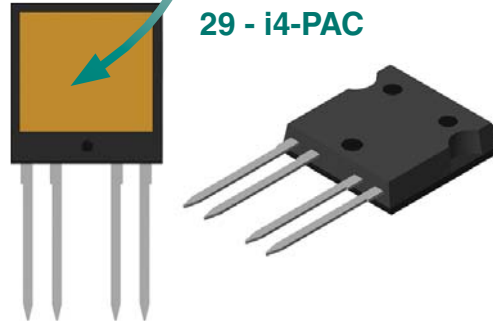
66 - Power SOIC



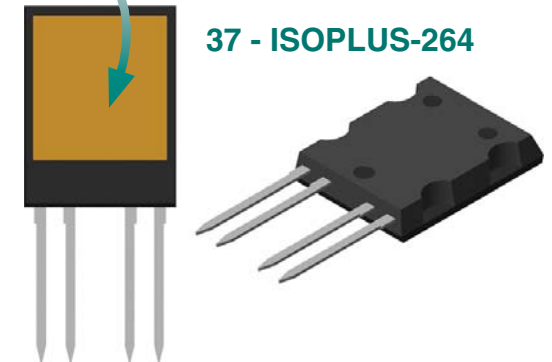
36 - Power SIP



29 - i4-PAC



37 - ISOPLUS-264



## • 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 (Page 16)	Features & Comments
			Without Heat Sink	5°C/W Heat Sink	T <sub>c</sub> =25°C							
CPC1906Y	BI	60	2	-	-	0.3	10	10 / 5	2500	1	36	
CPC1908J	BI	60	3.5	8.5	15	0.3	10	20 / 5	2500	1	29	
CPC1907B	BI	60	6	-	-	0.06	5	5 / 1	5000	1	66	Enhanced isolation voltage
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	
CPC1973Y	BI	400	0.35	-	-	5	10	5 / 3	2500	1	36	
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	
CPC1983B	BI	600	0.5	-	-	6	5	5 / 2	5000	1	66	Enhanced isolation voltage
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
CPC1977J	BI	600	1.25	3.1	12.25	1	10	20 / 5	2500	1	29	
CPC1979J	BI	600	1.4	3.5	14.5	0.75	10	25 / 5	2500	1	37	
CPC1978J	BI	800	0.75	1.85	7.25	2.3	10	20 / 5	2500	1	29	
CPC1981Y	BI	1000	0.18	-	-	18	10	10 / 5	2500	1	36	
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	

## • DUAL 1-FORM-A POWER RELAYS: BIDIRECTIONAL

CPC2907B	BI	60	2	-	-	0.15	5	2.5 / 0.25	4000	1	66	DUAL Power Relay
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## • 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 (Page 16)	Features & Comments
			Without Heat Sink	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: LOAD CURRENT $\leq 1A$

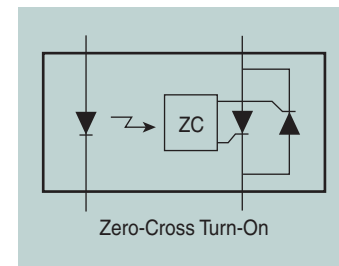
- Blocking voltage from 400V<sub>p</sub> to 800V<sub>p</sub>
- SCR-based AC power switches
- Maximum load current up to 1A<sub>rms</sub>

### Features:

- Load current up to 1A<sub>rms</sub>
- Blocking voltage up to 800V<sub>p</sub>
- 5mA input sensitivity
- Zero-cross turn on  $\leq \frac{1}{2}$  Cycle
- Low EMI and RFI generation
- DC control, AC switching
- Optically isolated
- TTL and CMOS compatible
- High noise immunity
- Machine insertable, wave solderable

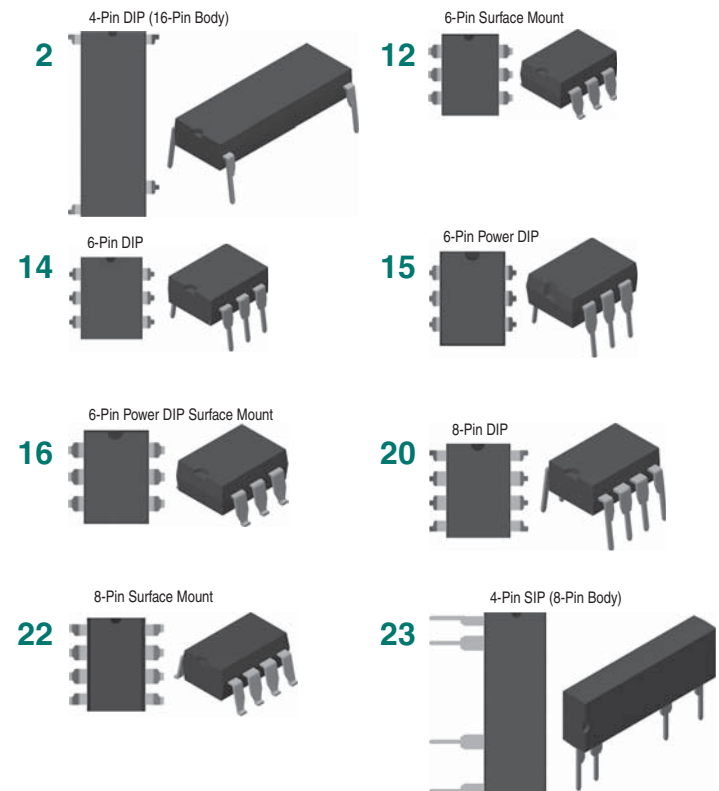
### Applications:

- Programmable controls
- Process control
- Power control panels
- Remote switching
- Gas pump electronics
- Large relay control circuits
- Contactors
- Solenoids
- Motor controls
- Heater controls



Part Number	Blocking Voltage (V <sub>p</sub> )	Load Current (A <sub>rms</sub> )	Input Control Current (mA)	Operating Frequency Min / Max (Hz)	Isolation Voltage (V <sub>rms</sub> )	Package Type
CPC1943	400	0.5	5	20 - 500	3750	15, 16
PM1204	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
PD1201	400	1	5	20 - 500	3750	2
PS1201	400	1	5	20 - 500	3750	23
PM1205	500	0.5	5	20 - 500	3750	15, 16
PD2401	500	1	5	20 - 500	3750	2
PS2401	500	1	5	20 - 500	3750	23
CPC1961 Dual	600	0.25 <sup>1</sup>	5	20 - 500	3750	20, 22
CPC1963	600	0.5	5	20 - 500	3750	15, 16
PM1206	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
PD2601	600	1	5	20 - 500	3750	2
PS2601	600	1	5	20 - 500	3750	23
CPC1972	800	0.25	5	20 - 500	3750	12, 14
CPC1964G	800	1	5	20 - 500	2500	2
CPC1964Y	800	1	5	20 - 500	2500	23

<sup>1</sup> Maximum continuous load current of a single pole or the sum of the load currents with both poles operating simultaneously.



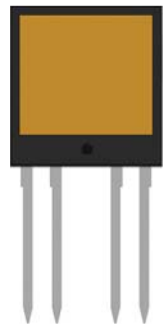
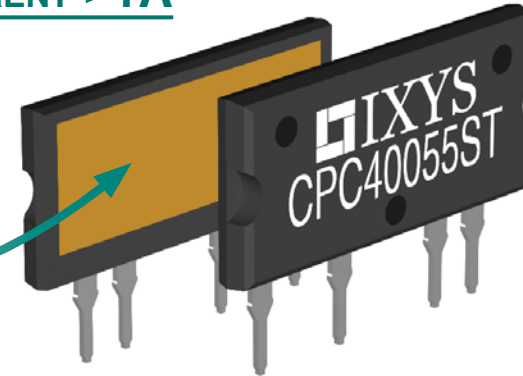
NEW!  
NEW!



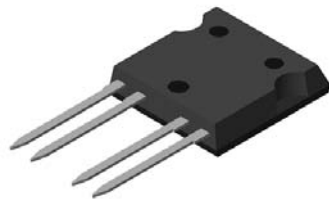
## • OPTICALLY ISOLATED AC POWER SWITCHES: LOAD CURRENT >1A

- Blocking voltages of 600V<sub>p</sub> and 800V<sub>p</sub>
- SCR-based AC power switches
- Zero-cross and Rapid turn-on (non-zero-cross) versions

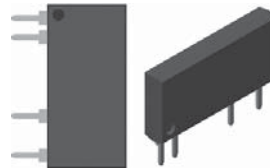
*Metallized, external, Direct Copper Bond (DCB) surface for heat sink applications*



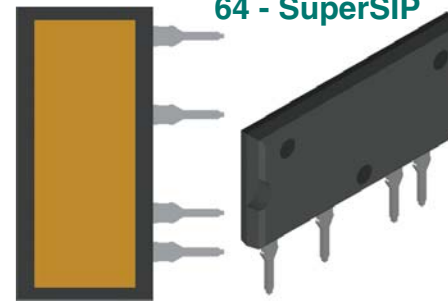
29 - i4-PAC



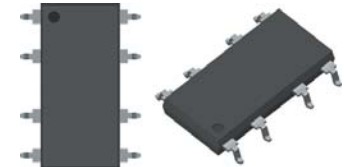
36 - Power SIP



64 - SuperSIP



66 - Power SOIC



### \* Rapid turn-on (non-zero-cross)

Rapid turn-on devices turn on when the control input goes true regardless of the phase of the load voltage, and turn off when the load voltage crosses zero.

Part Number	Blocking Voltage (V <sub>p</sub> )	Load Current			Input Control Current (mA)	Input Control Voltage (V)	Operating Frequency Min / Max (Hz)	Turn-On: Zero-Cross or Rapid	Switching Speed t <sub>on</sub> / t <sub>off</sub> (max)	Isolation Voltage (V <sub>rms</sub> )	Package Type	Features
		No Heat Sink (A <sub>rms</sub> )	5°C/W Heat Sink (A <sub>rms</sub> )	T <sub>c</sub> =25°C (A <sub>rms</sub> )								
* CPC1964BX6	600	1.5	-	-	5	-	20 - 500	Rapid	500µs / ½ Cycle	5000	66	Rapid turn-on, enhanced isolation voltage
CPC1976	600	2	-	-	5	-	20 - 500	Zero-Cross	½ Cycle	3750	36	
* CPC1976YX6	600	2	-	-	5	-	20 - 500	Rapid	500µs / ½ Cycle	3750	36	Rapid turn-on
CPC1966	600	3	-	-	5	-	20 - 500	Zero-Cross	½ Cycle	3750	36	
* CPC1966YX6	600	3	-	-	5	-	20 - 500	Rapid	500µs / ½ Cycle	3750	36	Rapid turn-on
CPC1964B	800	1.5	-	-	5	-	20 - 500	Zero-Cross	½ Cycle	5000	66	Enhanced isolation voltage, 12.5mm creepage
CPC1966B	800	3	-	-	5	-	20 - 500	Zero-Cross	½ Cycle	5000	66	Enhanced isolation voltage, 12.5mm creepage
* CPC1966BX8	800	3	-	-	5	-	20 - 500	Rapid	**45µs / ½ Cycle	3750	66	Rapid turn-on, 12.5mm creepage
* CPC1966YX8	800	3	-	-	5	-	20 - 500	Rapid	**45µs / ½ Cycle	3750	36	Rapid turn-on
CPC1998J	800	5	20	50	5	-	20 - 500	Zero-Cross	½ Cycle	2500	29	High load current
CPC40055ST	800	5	20	40	5	-	20 - 500	Zero-Cross	½ Cycle	2500	64	High load current, 9.5mm creepage
CPC44055ST	800	5	20	40	-	9 - 16	20 - 500	Zero-Cross	½ Cycle	2500	64	High load current, 9.5mm creepage

\*\* Typical turn-on values.

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

# MULTIFUNCTION PRODUCTS: SSR/OPTOCOUPLEDERS

## • GENERAL PURPOSE MULTIFUNCTION PRODUCTS (TELECOM MULTIFUNCTION PRODUCTS - PAGE 43)

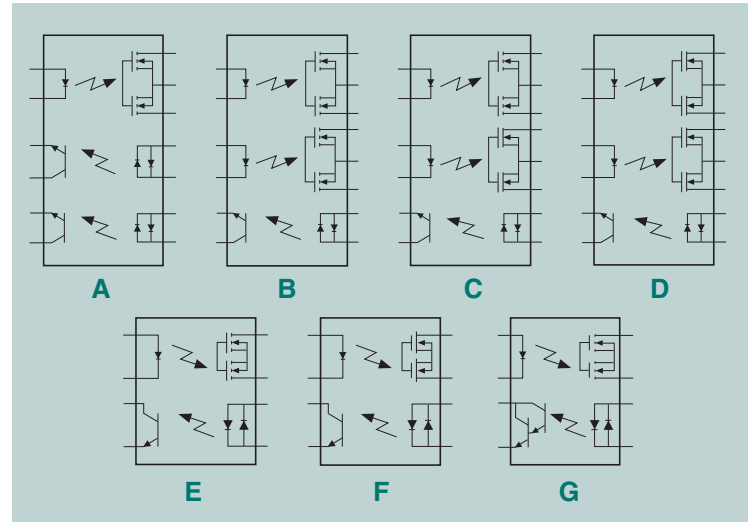
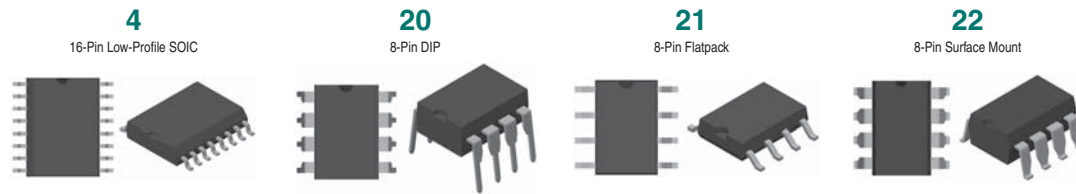
The OptoMOS line of Multifunction Products combines a number of discrete, optically isolated functions into a single package. These products mix and match solid state relays, optocouplers, and Darlington transistors to create highly functional circuits in a single, small package. Multifunction devices allow designers to consolidate circuit functions into a single device, thus 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	SSR Characteristics				Optocoupler Characteristics				Isolation Voltage (V <sub>rms</sub> )	Package Type	Features and Comments
		Blocking Voltage (V <sub>p</sub> )	Current Handling (mA)	On Resistance (Ω)	Input Control Current (mA)	Breakdown Voltage (V)	Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control Current (mA)			
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
XS170	E	350	100	50	2	20	33	0.5	6	3750	20, 22	One 1-Form-A relay, 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
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

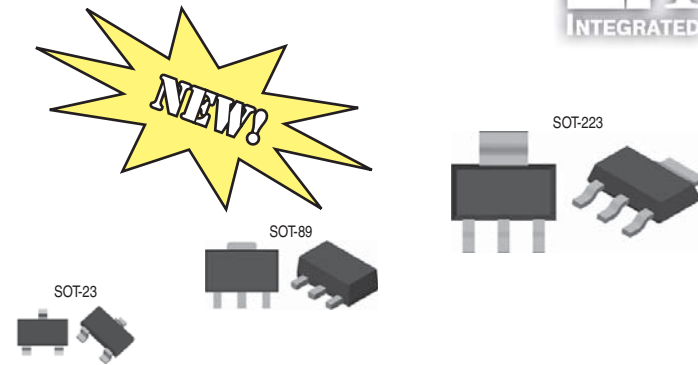
For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

IXYS Integrated Circuits Division – 78 Cherry Hill Drive – Beverly, MA USA 01915 – [www.ixysic.com](http://www.ixysic.com)

# FIELD EFFECT TRANSISTORS

## • N-CHANNEL DEPLETION MODE FETs

- Normally on MOSFETs present low resistance with no power applied
- Ideal for security applications
- IGBT speed enhancement
- LED drivers



Part Number	$V_{(BR)DSX}$	$I_D$	$R_{DS(on)}$	$V_{GS(off)}$	$V_{GS(off)}$	Package Type	Features & Comments
	(V)	Min (mA)	Max ( $\Omega$ )	Min (V)	Max (V)		
CPC3701	60	600	1	-1.4	-3.1	SOT-89	
CPC3710	250	220	10	-1.6	-3.9	SOT-89	
CPC3703	250	360	4	-1.6	-3.9	SOT-89	
<b>NEW!</b> CPC3902	250	400	2.5	-1.4	-3.1	SOT-89, SOT-223	
CPC3708	350	130	14	-2	-3.6	SOT-89, SOT-223	
CPC3720	350	130	22	-1.6	-3.9	SOT-89	
CPC5602	350	130	14	-2	-3.6	SOT-223	Designed for use with LITELINK designs
CPC3730	350	140	35	-1.6	-3.9	SOT-89	
CPC3714	350	240	14	-1.6	-3.9	SOT-89	
<b>NEW!</b> CPC3909	400	300	6	-1.4	-3.1	SOT-89, SOT-223	
CPC5603	415	130	14	-2	-3.6	SOT-223	Designed for use with LITELINK designs
<b>NEW!</b> CPC3960	600	100	44	-1.4	-3.1	SOT-223	
<b>NEW!</b> CPC3982	800	20	380	-1.4	-3.1	SOT-23	Very small package
<b>NEW!</b> CPC3980	800	100	45	-1.4	-3.1	SOT-223	

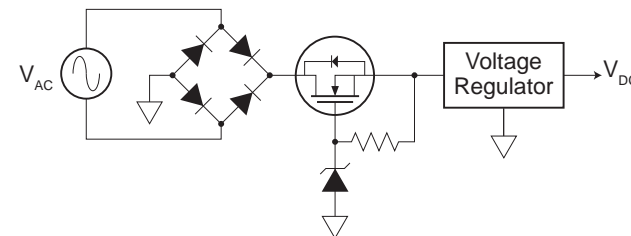
### Features:

- Normally on depletion mode devices offer low  $R_{DS(on)}$  at cold temperatures
- Low on-resistance
- High input impedance
- Low  $V_{GS(off)}$  voltage

### Applications:

- Power fail switches
- Discrete normally closed relays
- Constant current, high brightness LED drivers
- High voltage pre-regulators
- Power inverters
- Power supplies

### N-Channel Depletion Mode MOSFET as Pre-Regulator



See Application Note AN-500  
 “Depletion-Mode Power MOSFETs and Applications”

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

# IGBT & MOSFET GATE DRIVERS

**NEW!**  
IXD\_604SI & SIA, IXD\_609SI, and IXD\_614SI  
are 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	Under-voltage Lockout (V)	Package Type
IXD_630	SINGLE	30	0.4	I, N, D	•	$V_{CC} \leq 12.5$	57, 58
IXD_630M	SINGLE	30	0.4	I, N, D	•	$V_{CC} \leq 9$	57, 58
IXD_614	SINGLE	14	0.8	I, N, D	•	-	20, 53, 57, 58
IXD_609	SINGLE	9	1	I, N, D	•	-	20, 53, 54, 56, 57, 58
IXD_604	DUAL	4	2.5	F, I, N, D	•	-	20, 53, 54, 56
IX4423	DUAL	3	4	I	-	-	54
IX4424	DUAL	3	4	N	-	-	54
IX4424G	DUAL	3	4	N	-	-	20
IX4425	DUAL	3	4	F	-	-	54
IXD_602	DUAL	2	4	F, I, N	-	-	20, 53, 54, 56
IX4426	DUAL	1.5	8	I	-	-	54, 56
IX4427	DUAL	1.5	8	N	-	-	54, 56
IX4428	DUAL	1.5	8	F	-	-	54, 56

### Features:

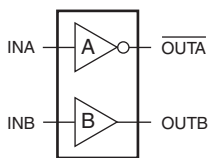
- 1.5A to 30A peak source/sink drive current
- Wide operating voltage range: 4.5V to 35V
- -40°C to +125°C extended operating temperature range
- Logic input withstands negative swing of up to -5V
- Matched rise and fall times
- Low propagation delay time
- Low 10μA supply current
- Low output impedance

### Applications:

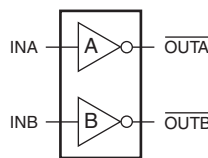
- Efficient power MOSFET and IGBT switching
- Switch mode power supplies
- Motor controls
- DC to DC converters
- Class-D switching amplifiers
- Pulse transformer driver

## AEC-Q100 Qualified Low-Side Gate Drivers

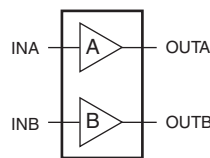
Part Number	Output Type	$I_{PEAK}$ $T_C=25^\circ\text{C}$ (A <sub>p</sub> )	Output Resistance (Ω)	Available Logic Configurations	Enable Function	Package Type
IXD_614SI	SINGLE	14	0.8	I, N, D	•	53
IXD_609SI	SINGLE	9	1	I, N, D	•	53
IXD_604SI	DUAL	4	2.5	F, I, N, D	•	53
IXD_604SIA	DUAL	4	2.5	F, I, N, D	•	54



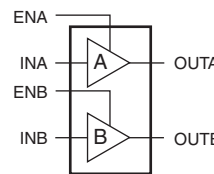
**F**



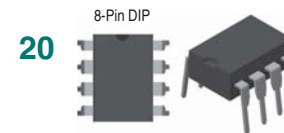
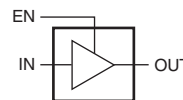
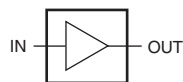
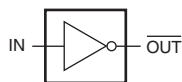
**I**



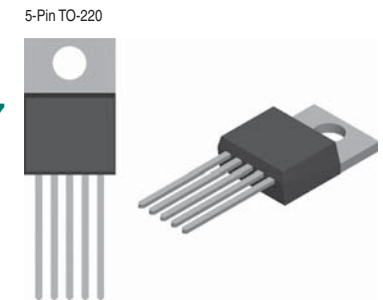
**N**



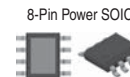
**D**



20



57



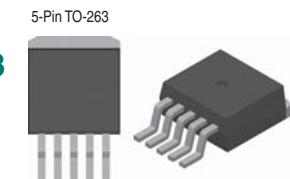
53



54



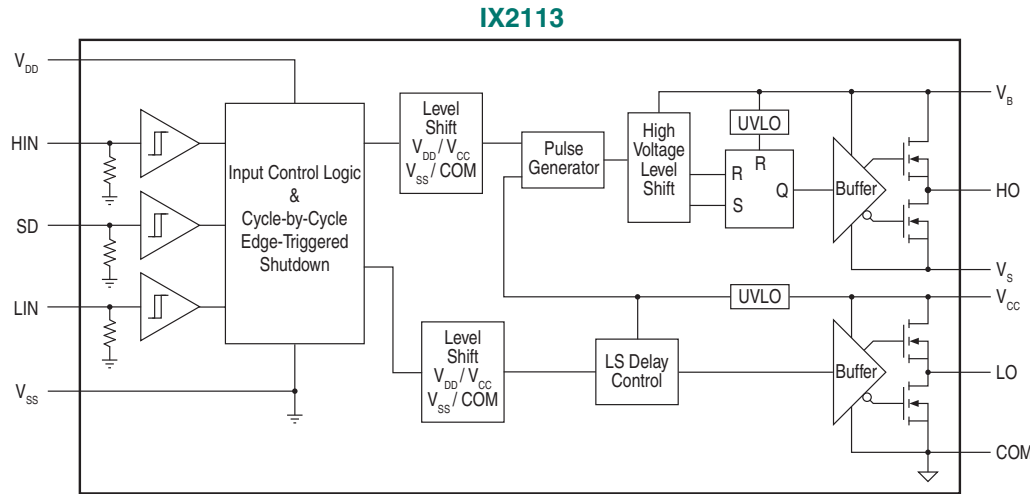
56



58

## • 600V HIGH-SIDE & LOW-SIDE GATE DRIVER: IX2113

- High-side channel can drive an N-channel power MOSFET or IGBT 600V from the common reference
- Configured with independent high-side and low-side referenced output channels



### Features:

- Floating channel for bootstrap operation up to 600V with an absolute maximum rating of 700V
- Outputs capable of sourcing and sinking 2A
- Gate drive supply range from 10V to 20V
- Tolerant to negative voltage transients: dV/dt immune
- 3.3V logic compatible
- Under-voltage lockout for both high-side and low-side outputs
- Matched propagation delays



## • HIGH VOLTAGE HALF-BRIDGE GATE DRIVER: IX21844

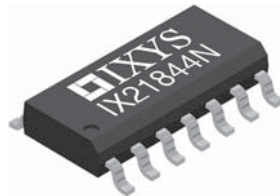
- Programmable dead-time can be set between 400ns and 5ms
- Floating high-side channel can drive an N-channel power MOSFET or IGBT 600V from the common reference

### Features:

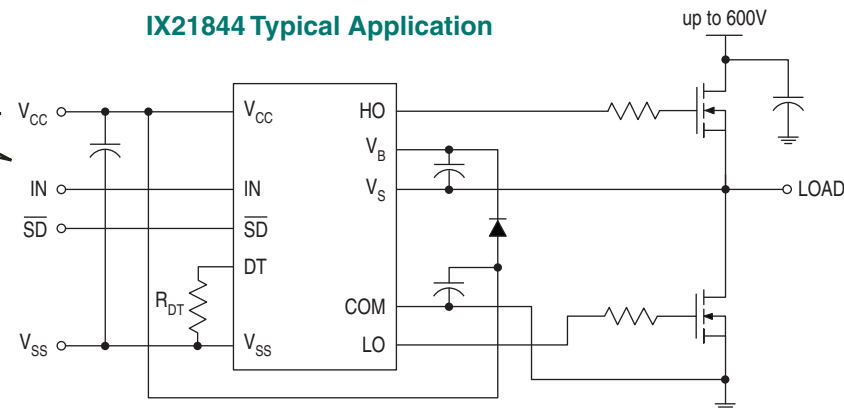
- Floating channel for bootstrap operation to 600V with an absolute maximum rating of 700V
- Outputs can source 1.4A and sink 1.8A
- Gate drive supply range from 10V to 20V
- Tolerant to negative voltage transients: dV/dt immune
- 3.3V and 5V logic compatible
- Under-voltage lockout for both high-side and low-side outputs
- Matched propagation delays

### Applications:

- Switch mode power supplies
- Motor driver inverters
- DC/DC converters
- Uninterruptable power supplies (UPS)



### IX21844 Typical Application



## • 600V HIGH SIDE IGBT & MOSFET GATE DRIVER: IX2127

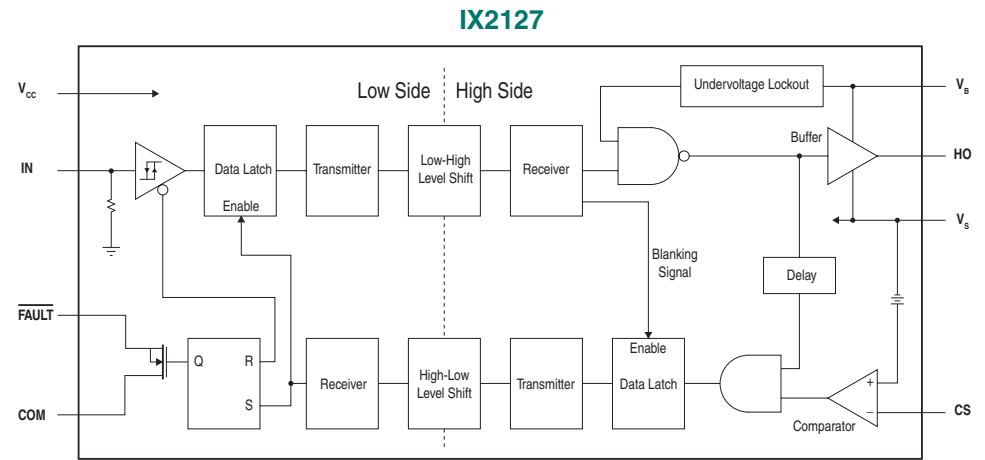
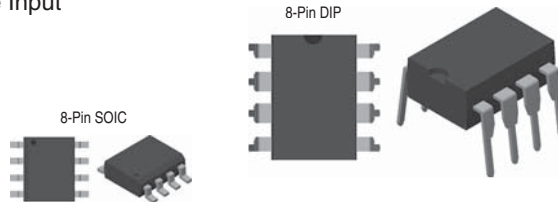
- Stable operation in high dV/dt noise environments
- Outputs typically source 250mA and sink 500mA

### Features:

- Floating channel designed for bootstrap operation up to 600V
- Tolerant to negative transient voltages; dV/dt immune
- Under-voltage 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



## • DUAL LOW SIDE IGBT GATE DRIVER: IX2204

- Provide a negative gate drive voltage to ensure the turn-off of high power IGBTs
- Outputs can be paralleled for IGBT gates that require higher drive current

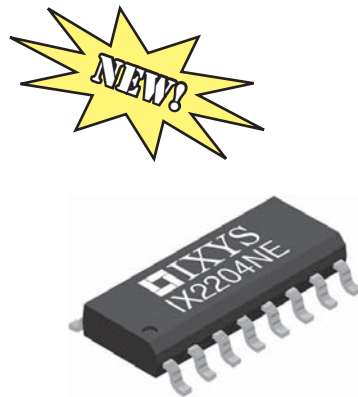
The IX2204 has a programmable two-level turn-off feature that protects the device against excessive voltages when the IGBT is being turned off due to an over-current situation.

### Features:

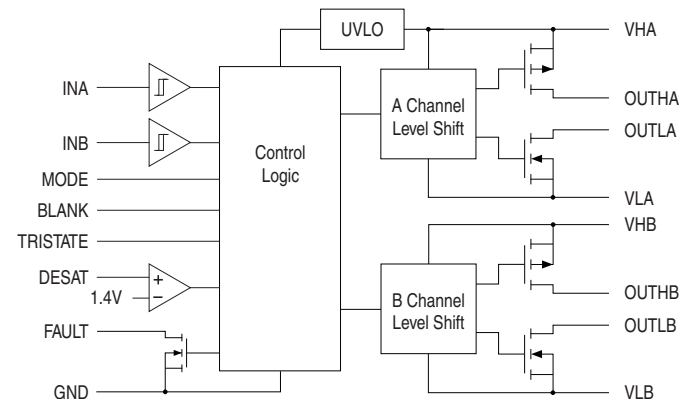
- High output current: 2A source/4A sink
- Wide operating voltage range: -10V to +26V
- Negative gate drive capability
- Desaturation detection circuit
- Separate source and sink outputs
- Programmable blanking and output tristate
- TTL compatible inputs
- -40°C to +125°C extended operating temperature range
- Under-voltage lockout circuitry
- Fault status output

### Applications:

- Ideal for driving SiC devices
- Efficient IGBT switching
- Motor controls
- Switch mode power supplies



IX2204 Functional Block Diagram



## • 1200V HIGH AND LOW SIDE GATE DRIVER: IX2120

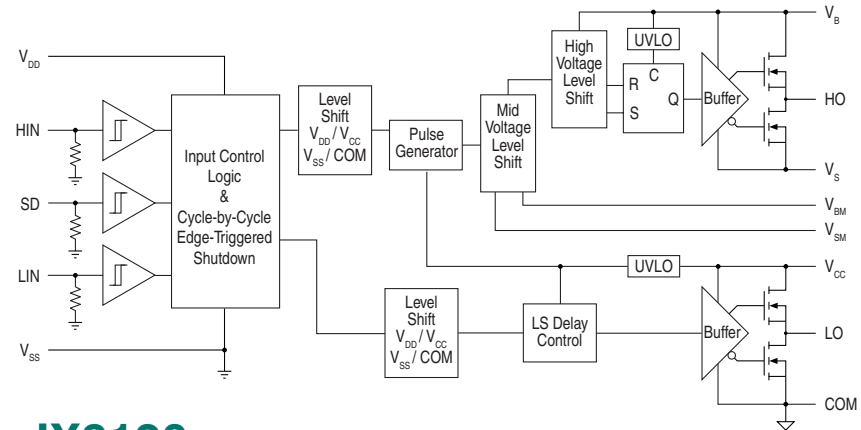
- Floating Channel for Bootstrap Operation to +1200V
- Outputs Capable of Sourcing and Sinking 2A

### Features:

- Gate Drive Supply Range From 15V to 20V
- Enhanced Robustness due to SOI Process
- Tolerant to Negative Voltage Transients: dV/dt Immune
- 3.3V Logic Compatible
- Undervoltage Lockout for Both High-Side and Low-Side Outputs



IX2120 Functional Block Diagram



## • 2.5A OUTPUT OPTICALLY COUPLED GATE DRIVER: IX3120

- 2.5A maximum peak output current
- Wide operating voltage range: 15V to 30V

### Features:

- 25kV/ $\mu$ s minimum common-mode rejection (CMR) at 1500V<sub>CM</sub>
- Under-voltage lockout with hysteresis
- 3750V<sub>rms</sub> input-to-output isolation
- Wide temperature range: -40°C to +100°C

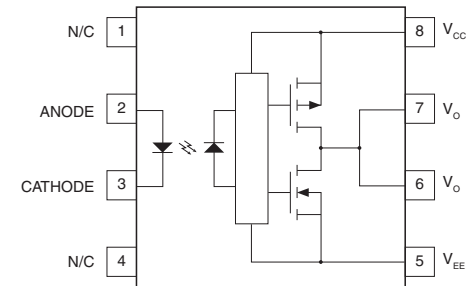
### Applications:

- Isolated IGBT/MOSFET gate drive
- Switch mode power supplies
- Industrial inverters
- Motor drivers

Ideally suited for use in motor control and inverter applications due to its low input LED current, high output peak current, and high noise immunity (25kV/ $\mu$ s).



IX3120



## • 2.5A OUTPUT HI SPEED GATE DRIVER OPTOCOUPLER: IX3180

- 2.5A maximum peak output current
- Wide operating voltage range: 10V to 20V

### Features:

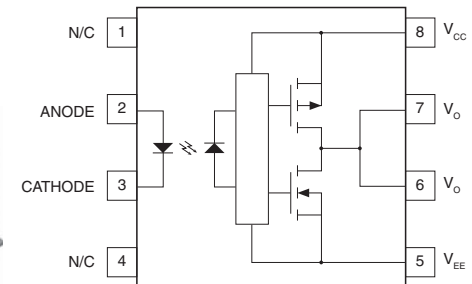
- 200ns maximum propagation delay over temperature range
- 20ns typical pulse width distortion
- 10kV/ $\mu$ s minimum common-mode rejection (CMR) at 1500V<sub>CM</sub>
- Wide operating voltage range: 10V to 20V
- Under-voltage lockout with hysteresis
- 3750V<sub>rms</sub> input-to-output isolation
- Wide temperature range: -40°C to +100°C

### Applications:

- High performance DC/DC converters
- High performance switching power supplies
- Motor control inverter applications
- Motor drivers



IX3180

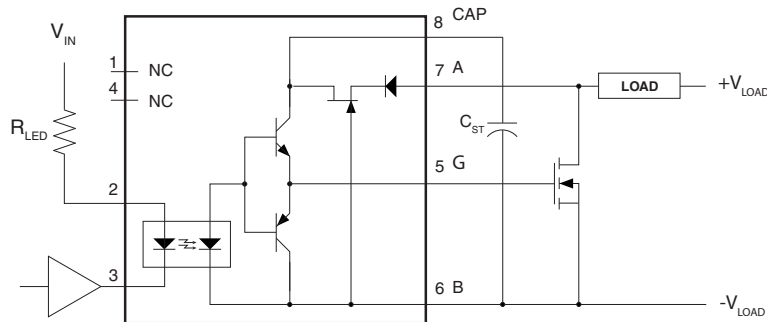


For data sheets, go to [www.ixysic.com/Products/ProdList.htm](http://www.ixysic.com/Products/ProdList.htm)

## • OPTICALLY ISOLATED LOAD-BIASED GATE DRIVERS

- High speed, optically isolated gate driver ICs
- Output driver powered from load voltage; no external power supply required
- On-chip circuitry charges an external capacitor whose charge enables fast turn-on

CPC1590 Application Diagram

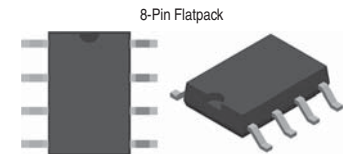


### Features:

- No external IC power supply
- Low drive power requirements (TTL/CMOS compatible)
- Load voltages up to 200V
- Fast switching times - 40μsec on, 400μsec off

### Applications:

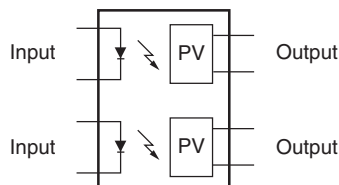
- Instrumentation
- Multiplexers
- I/O subsystems
- Meters (Watt-Hour, water, gas)
- Medical equipment (patient/equipment isolation)
- Security
- Aerospace
- Industrial controls



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> (μs)	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

## • OPTICALLY ISOLATED PHOTOVOLTAIC GATE DRIVERS

- Dual optically isolated photovoltaic devices
- Well suited for use in discrete solid state relay designs

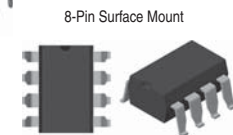
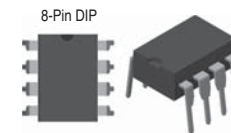


### Features:

- 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 <sub>OC</sub> (V)	Nominal Short-Circuit Current I <sub>SC</sub> (μA)	Switching Speeds t <sub>on</sub> / t <sub>off</sub> (ms)	Isolation Voltage (V <sub>rms</sub> )	Package Type
FDA215	5	5.5	2.5	5 / 5	3750	8-pin DIP, 8-pin surface mount
FDA217	5	11.75	4.5	2 / 0.5	3750	8-pin DIP, 8-pin surface mount

NEW!



# High Voltage Products

## High Voltage Analog Switch Arrays

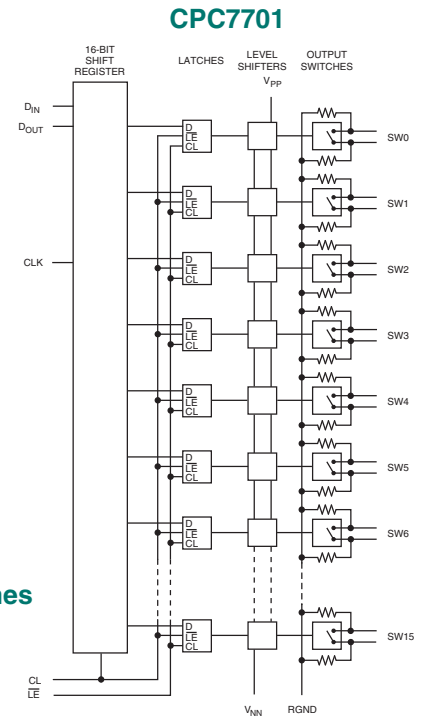
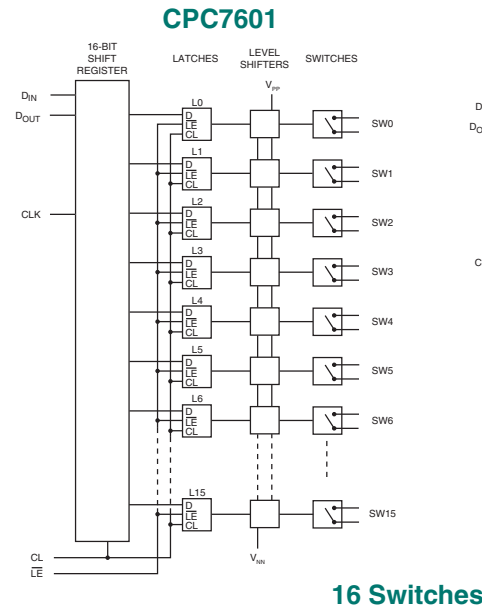
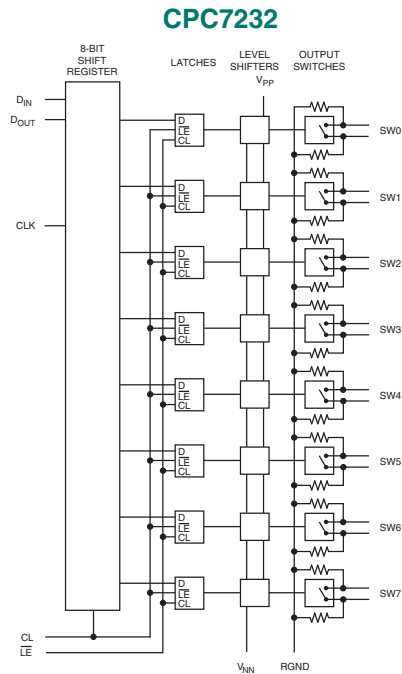
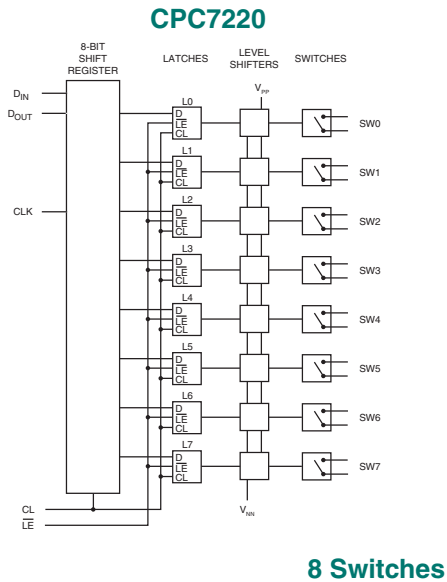
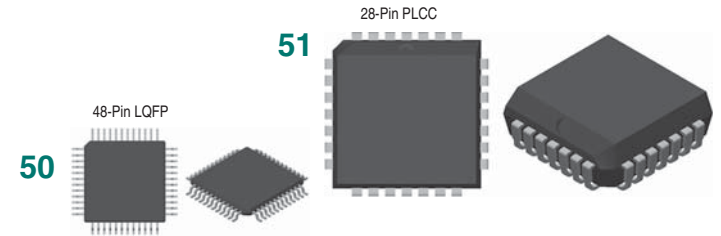
### Features:

- 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 VOLTAGE ISOLATED ANALOG SWITCHES



## CPC7524: 600V Quad High Voltage Isolated Analog Switch Array

- Provides flexible single-ended or differential access to high voltage networks
- Configured as two sets of matched, paired switches for improved differential performance

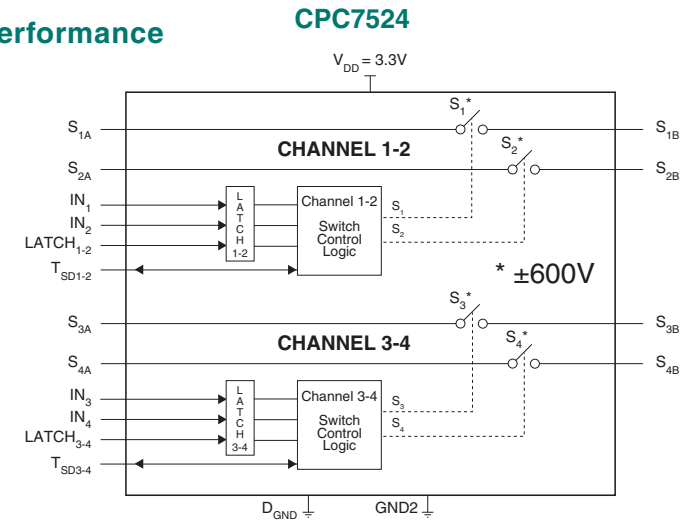
### Features:

- Switch voltage up to 600V
- 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 and thermal shutdown protect against fault conditions
- TTL logic-level Inputs
- Input latch
- Matched  $R_{ON}$
- Clean, bounce-free switching
- Monolithic IC reliability
- 28-pin SOIC package

### Applications:

- Instrumentation
- Industrial controls and monitoring
- Automatic test equipment (ATE)
- Battery monitoring and charging circuits
- Worldwide AC mains monitor

**3.3V Supply!**



## CPC7514: 320V Quad High Voltage Isolated Analog Switch Array

- Provides single-ended or differential access to high voltage networks
- Self-biasing - no external high-voltage supplies required

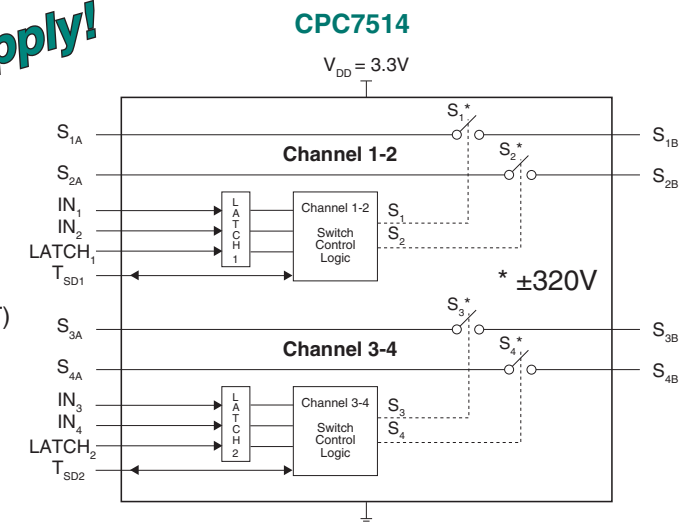
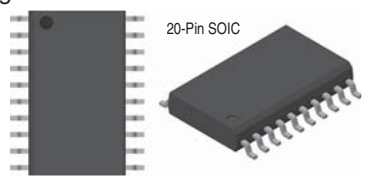
### Features:

- Low, matched  $R_{ON}$
- Switch voltage up to  $\pm 320V$
- 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)
- Optical network units (ONU)
- Hybrid fiber coax (HFC)

**3.3V Supply!**



High Voltage Products

## CPC7512: 320V Dual Shunt-Isolated High Voltage High Frequency Analog Switch

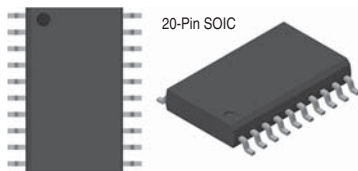
- Provides single-ended or differential access to high voltage networks
- Self-biasing - no external high-voltage supplies required

### Features:

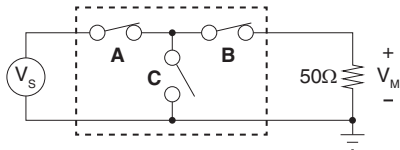
- Low, matched  $R_{ON}$
- Guaranteed break-before-make (BBM)
- Switch voltage up to  $\pm 320V$
- 60dB off-isolation at 1MHz
- Smart logic for power-up/hot-plug state control
- 5V operation with very low power consumption
- Thermal shutdown protects against fault conditions
- Latched TTL logic level inputs

### Applications:

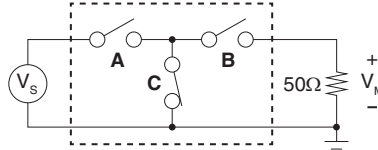
- Instrumentation
- Industrial controls and monitoring
- Multiplexed ultrasonic transducer switching
- Automatic test equipment (ATE)
- Battery monitoring and charging



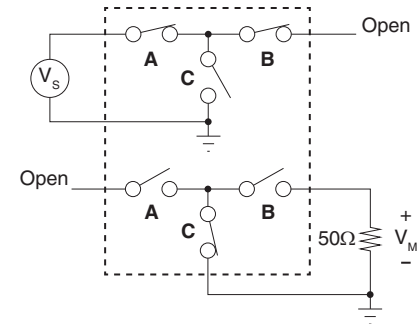
$$\text{Insertion Loss} = +20 \log \frac{V_s}{V_M}$$



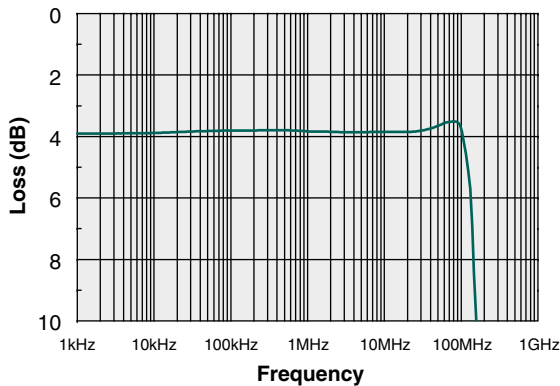
$$\text{Open Circuit} = +20 \log \frac{V_M}{V_s}$$



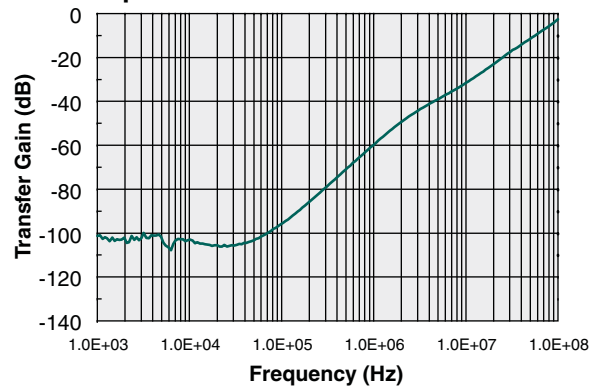
$$\text{Crosstalk} = +20 \log \frac{V_M}{V_s}$$



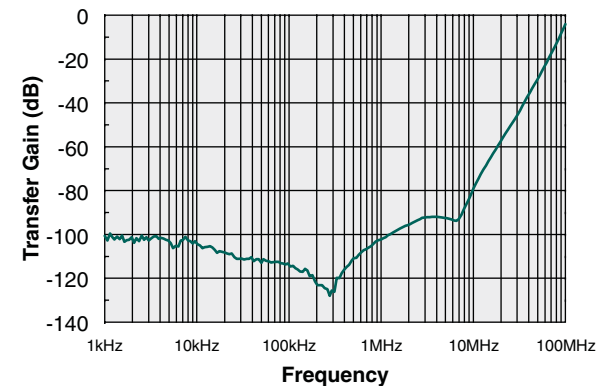
Insertion Loss Into 50Ω



Open Circuit Transfer Gain into 50Ω



Cross Talk into 50Ω



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

# High Speed Digital Optical Isolators

## • OPTICALLY ISOLATED I<sup>2</sup>C BUS REPEATERS: CPC5902 & CPC5903

See Application Note TB-101  
"Optically Isolating an I<sup>2</sup>C Interface"

- CPC5902 bidirectionally buffers clock and data signals
- CPC5903 bidirectionally buffers data signal, unidirectionally buffers clock signal
- Logic level translation for levels as low as 2.7V or as high as 5.5V
- Passes DC signals - no refresh clock needed - no clock noise generated

### CPC5902 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)
- Side B fast-mode compliant:  $V_{DDB} > 4.5V$
- 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
- Power down to Hi-Z does not load I<sup>2</sup>C bus
- Slew-limited drivers reduce EMI

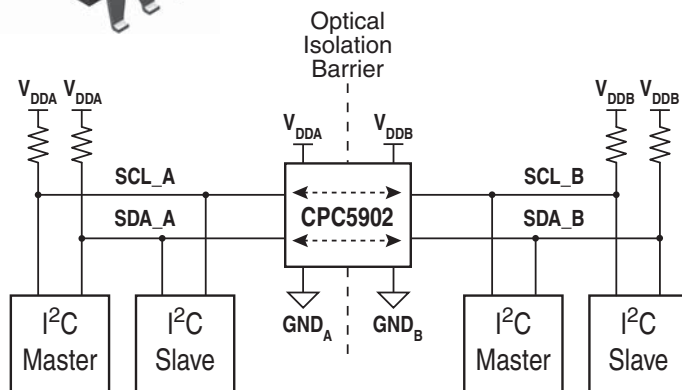
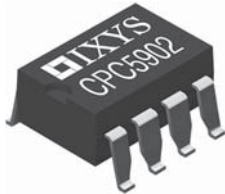
### CPC5903 Features:

- 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:  $V_{DDB} > 4.5V$
- Operates on 2.7V to 5.5V
- No internal clock - low EM & RF generation
- Voltage level translation
- Slew-limited drivers reduce EMI
- Power down to Hi-Z does not load I<sup>2</sup>C bus
- 3750V<sub>rms</sub> galvanic isolation

### Applications:

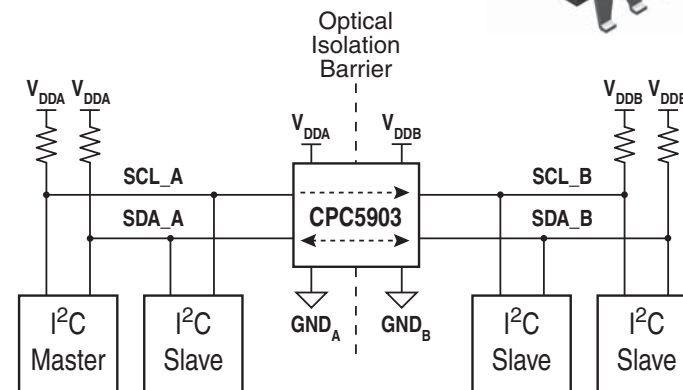
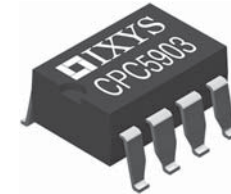
- Power-over-Ethernet (POE)
- I<sup>2</sup>C bus length extender
- Isolated control and signal monitoring
- Power supply high-side interface
- I<sup>2</sup>C logic level translation

CPC5902



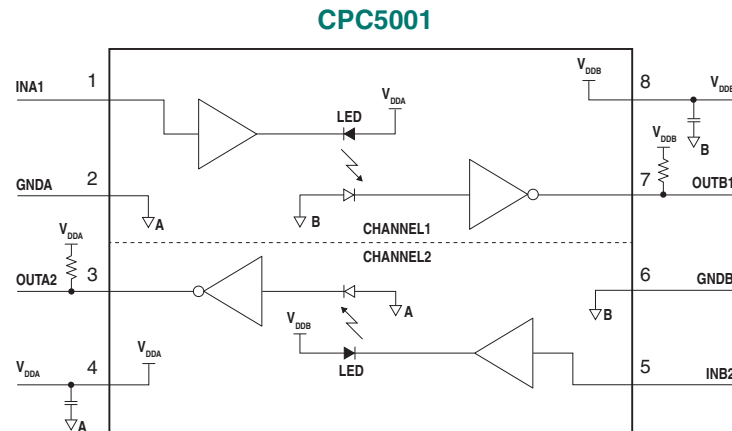
- No internal clock - minimal EM & RF emissions
- Immune to external EMI and RFI
- High voltage isolation

CPC5903



## • SINGLE-CHANNEL EACH DIRECTION DIGITAL OPTICAL ISOLATOR: CPC5001

- Logic level translation for levels as low as 2.7V or as high as 5.5V
- Passes DC signals - no refresh clock needed

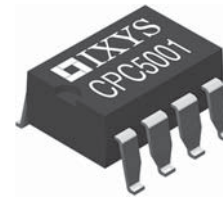


### Features:

- Isolates one signal in each direction
- Operates from 2.7V to 5.5V
- Buffered inputs - no external LED drive required
- Hysteresis at inputs for noise rejection
- Slew-limited drivers reduce EMI
- 3750V<sub>rms</sub> galvanic isolation from input to output
- Power down to Hi-Z Does Not Load Outputs
- 5Mbaud data rate

### Applications:

- Isolated signal monitoring and control
- Power-over-Ethernet, POE
- 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



## • DUAL HIGH SPEED DIGITAL OPTICAL ISOLATOR: CPC5002

- 3750V<sub>rms</sub> galvanic isolation from input to output
- Passes DC signals - no refresh clock needed

### Features:

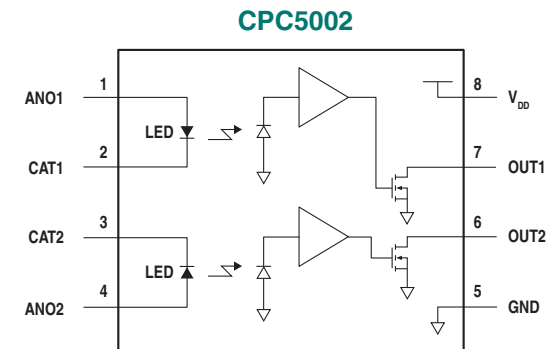
- Dual optics isolate two signals
- Operates over 2.7V < V<sub>DD</sub> < 5.5V
- Power down to Hi-Z does not load outputs
- Low-power CMOS reduces supply current
- LED drive current only 1.5mA
- High speed: 10Mbaud typical

### Applications:

- Isolated line receiver
- Ground loop elimination
- ADC/DAC digital noise isolation
- 4-wire I<sup>2</sup>C bus isolation



**10 Mbaud!**



# OPTOCOUPLERS

## • SINGLE & DUAL OPTOCOUPLERS

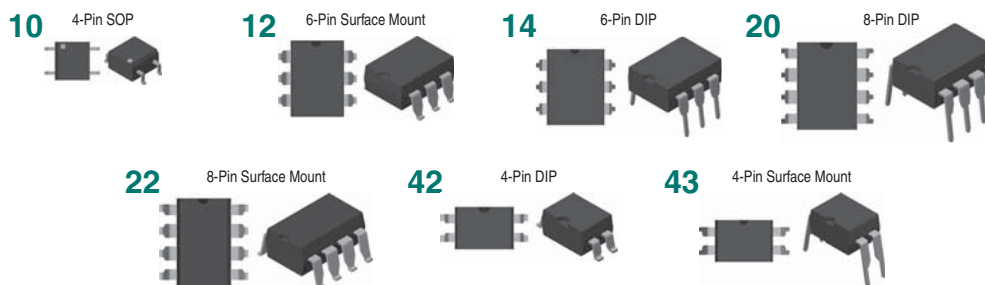
- Single-transistor output or Darlington transistor output for higher current gain
- Single-LED for unidirectional input signal or dual-LED input for bidirectional input signal
- Input-to-output isolation:  $1500V_{rms}$ ,  $3750V_{rms}$ , or  $5000V_{rms}$

### Features:

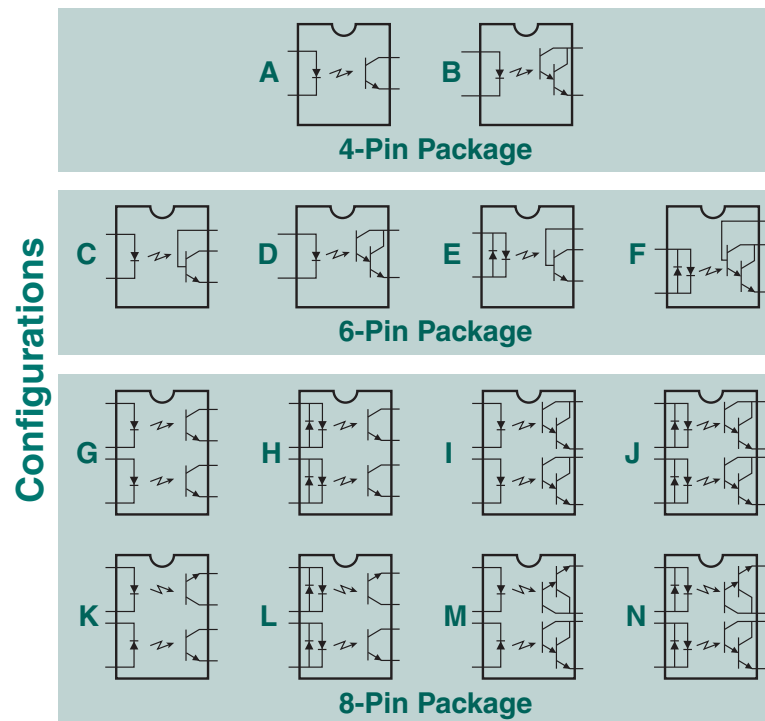
- AC and DC compatible inputs
- Machine insertable, wave solderable

### Applications:

- Modem switching (laptops, notebooks, PDAs)
- Voltage detection
- TIP/RING circuits
- Ringing detection
- Loop detection
- Current sensing
- Telecom switching



Part Number	Minimum Breakdown Voltage ( $BV_{CEO}$ )	Typical Current Transfer Ratio (%)	Maximum Saturation Voltage (V)	Input Control Current (mA)	Minimum Isolation Voltage ( $V_{rms}$ )	Package Type	Configuration
LDA100	30	300	0.5	1	3750	12, 14	E
LDA101	30	300	0.5	1	3750	12, 14	C
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
CPC1001N	30	330	0.3	0.2	1500	10	A
LDA102	30	350	0.5	1	3750	12, 14	C
CPC1303	30	1000	0.5	0.2	5000	42, 43	A
LDA110	30	8500	1	1	3750	12, 14	F
LDA111	30	8500	1	1	3750	12, 14	D
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
CPC1301	350	5500	1.2	1	5000	42, 43	B
CPC1302	350	5500	1.2	1	3750	20, 22	I



## • LINEAR OPTOCOUPLERS

- Input LED drives two photodiodes: (1) isolated output (2) feedback to correct for the input LED's non-linearity

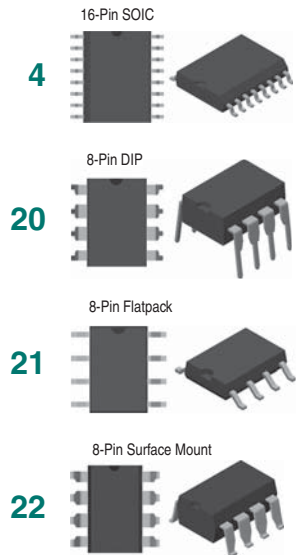
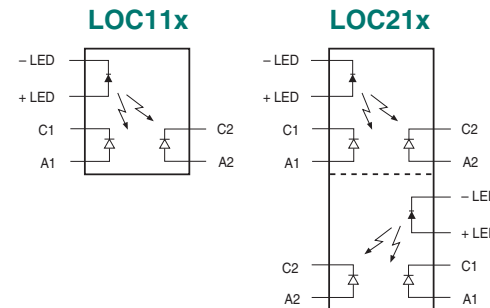
### Features:

- Couples analog & digital signals
- 3750V<sub>rms</sub> input-to-output isolation
- Bandwidth >200kHz in photoconductive mode
- Bandwidth 40kHz in photovoltaic mode
- High gain stability
- Low input-to-output capacitance
- Low power consumption
- 0.01% servo linearity
- THD 87dB typical
- Machine insertable, wave solderable

### Applications:

- Power supply feedback/current
- Medical sensor interfacing
- Isolation of process control transducers
- Isolated 4-20mA converters
- Digital telephone isolation

Part Number	Servo Gain $K1=I_1/I_F$ (Min - Max)	Forward Gain $K2=I_2/I_F$ (Min - Max)	Transfer Gain $K3=K_2/K_1$ (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



## Two Fundamental Operating Configurations:

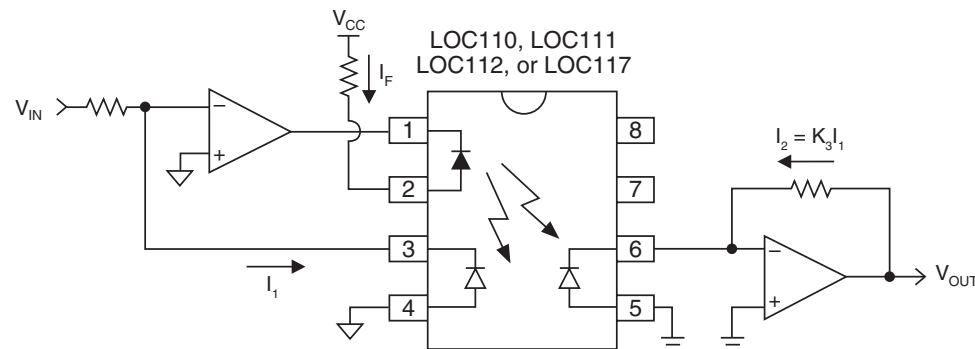
### Photoconductive Mode:

- Wide bandwidth (>200kHz)
- 8-bit linearity

### Photovoltaic Mode:

- 14-bit linearity
- 40kHz bandwidth

## Isolation Amplifier (Photovoltaic Mode)



# • OPTICALLY ISOLATED ERROR AMPLIFIERS

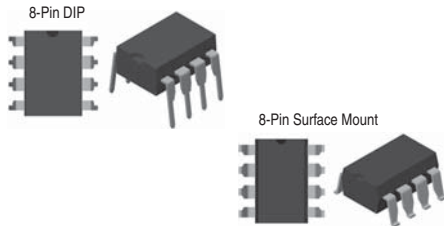
## Features:

- Low voltage operation:
  - 1.6V: LIA135 & LIA136
  - 2.7V: LIA120 & LIA130
- Optocoupler, precision reference, and error amplifier in a single package
- LIA120: 70dB linearity typical

## Application:

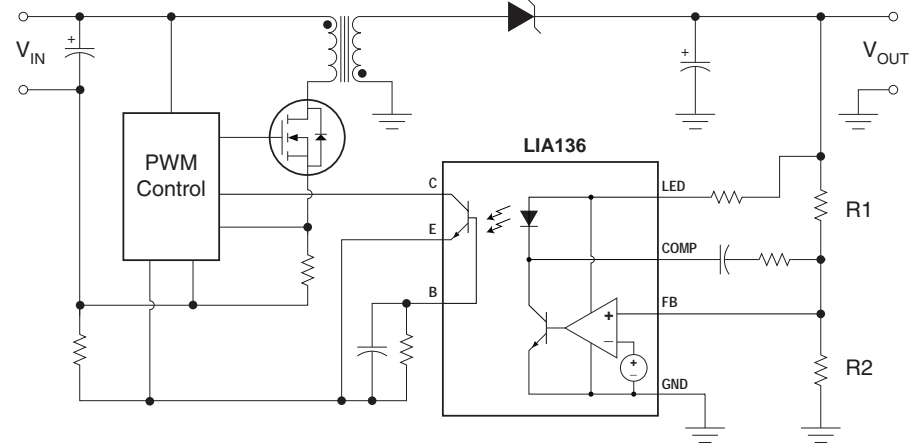
- SMPS feedback loops
- Power supply feedback

**Low 1.6V Operation!**  
LIA135 and LIA136

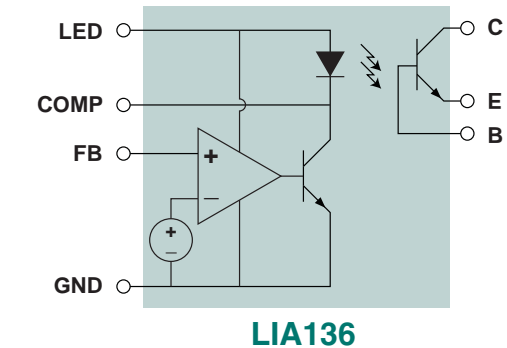
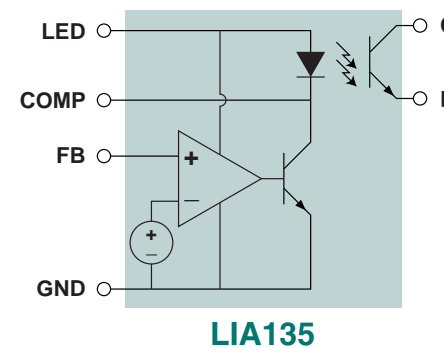
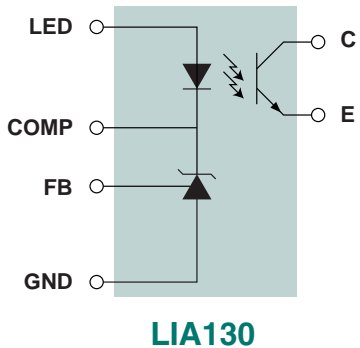
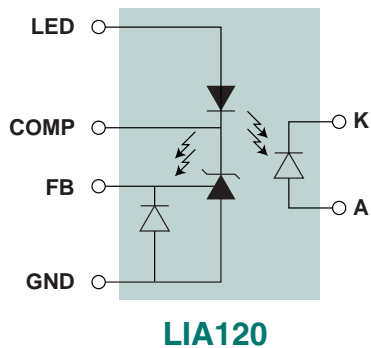


**NEW!**  
**NEW!**

## Optical Feedback for Ultra-Low-Voltage Power Supplies



Part Number	Reference Voltage (V)	V <sub>REF</sub> Tolerance			Isolation Voltage (V <sub>rms</sub> )	Package Type
		25°C (%)	-40°C to +85°C (%)	-40°C to +125°C (%)		
LIA120	1.240	1	2.5	-	3750	8-pin surface mount
LIA130	1.240	1	1.5	-	3750	8-pin DIP, 8-pin surface mount
LIA135	1.299	0.5	1	-	3750	8-pin DIP, 8-pin surface mount
LIA136	1.299	0.5	-	1.5	3750	8-pin DIP, 8-Pin surface mount



K = Cathode, A = Anode  
 C = Collector, E = Emitter, B = Base  
 LED = LED Anode, COMP = Compensation, FB = Feedback, GND = Ground



# LIGHTING & DISPLAY PRODUCTS

## • HIGH VOLTAGE LED DRIVERS

### IX9908: High Voltage, Dimmable LED Driver with PFC Control

- Ideal for quasi-resonant flyback LED bulb designs
- Supports phase-cut dimming and power factor correction
- Multiple safety features ensure full system protection

**Features:**

- Single stage, primary control with PFC and dimming features
- >90% efficiency
- >98% power factor
- Wide operating voltage range: up to 600V
- Digital soft start
- Cycle-by-cycle peak current control

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

- 8V to 550V input voltage range
- Linear or PWM brightness control inputs
- Drives multiple LEDs in series/parallel

**Features:**

- >90% efficiency
- Stable operation at >50% duty cycle
- Regulated LED current
- Resistor-programmable minimum off-time
- Drives external power MOSFET, enabling high LED output current applications
- Buck or boost configuration

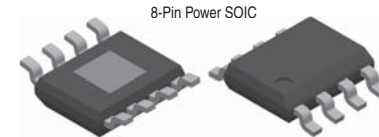
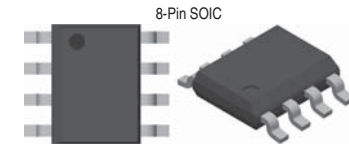
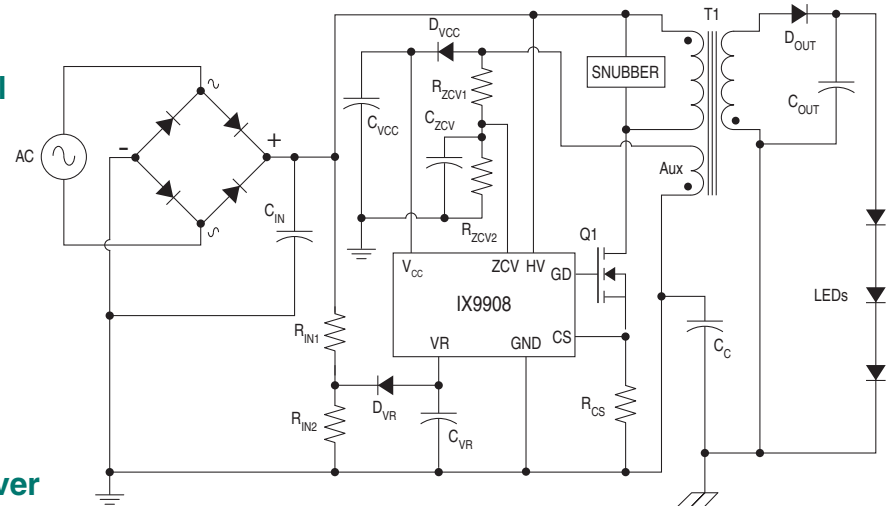
### MXHV9910: High Voltage, Off-Line LED Driver

- Signage, decorative LED lighting
- Flat-panel display RGB backlighting
- 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

IX9908  
Typical Application



**NEW! Application Notes:**

**AN-302: IX9908 Design Considerations (nominal 115V<sub>rms</sub> - 60Hz)**

**AN-303: IX9908 Design Considerations (nominal 230V<sub>rms</sub> - 50Hz)**

**AN-304: IX9908 Design Calculator**

## • ePAPER GATE & SOURCE DRIVERS

### IXEP1400: 400-Channel ePaper Source Driver

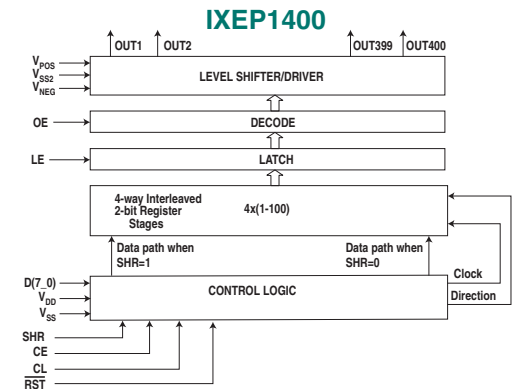
- 8-bit data bus inputs four 2-bit words at a time
- 400-bit long, 2-bit wide serial-input parallel-output digital shift register
- Operating temperature range: -40°C to +85°C
- Available as gold-bumped die in wafer form or waffle pack

#### Features:

- +/-15V output driver supply voltage
- Drives segment or active matrix displays
- 3-level gray scale
- 50MHz clock frequency
- Bidirectional data transfer
- 2.7V to 5.5V logic supply voltage
- Cascadable

#### Applications:

- eBooks & eReaders
- Electronic shelf labels & point-of-purchase displays
- Mobile phones & portable handheld devices
- Smart cards
- Signage



### IXEP2300: 300-Output ePaper Gate Driver

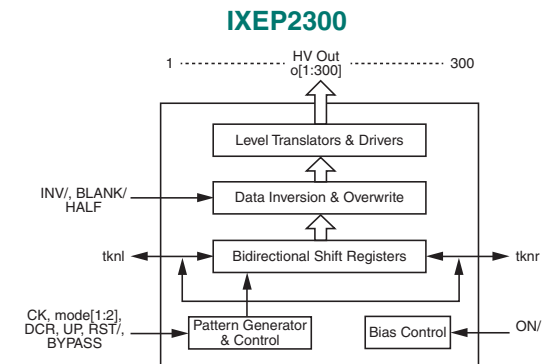
- Internal pattern generator enables minimal controller interface
- Global blanking and inversion facilitates power-up and power-down
- Token-passing capability
- Sleep mode reduces power consumption
- Available as gold-bumped die in wafer form or waffle pack

#### Features:

- 300 output gate driver
- 42V HV output drive capable ( $V_{DD}$  to  $V_{EE}$ )
- 3.3V logic operation
- Internal pattern generator
- Reset, blanking, polarity inversion
- Bypass function
- Cascadable with bidirectional shift control

#### Applications:

- eBooks & eReaders
- Electronic shelf labels & point-of-purchase displays
- Mobile phones & portable handheld devices
- Smart cards
- Signage

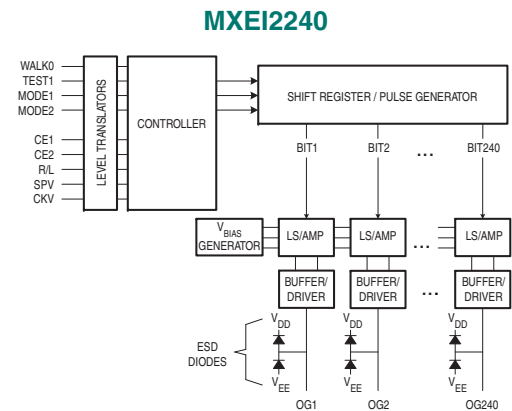


### MXEI2240: 240-Output ePaper Gate Driver

- Perfect for driving eBook and eReader displays, portable handheld devices, smart cards
- Output switching modes: one pulse, continuous two pulse, jumping two pulse, no pulse
- May be cascaded up to four deep
- 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



## MXE11480: ±15V Selectable 400/800 Channel ePaper Source Driver

- Perfect for driving eBook and eReader displays, portable handheld devices, smart cards
- Output switching modes: one pulse, continuous two pulse, jumping two pulse, no pulse
- May be cascaded up to four deep
- Available as gold-bumped die in wafer form or waffle pack

### Features:

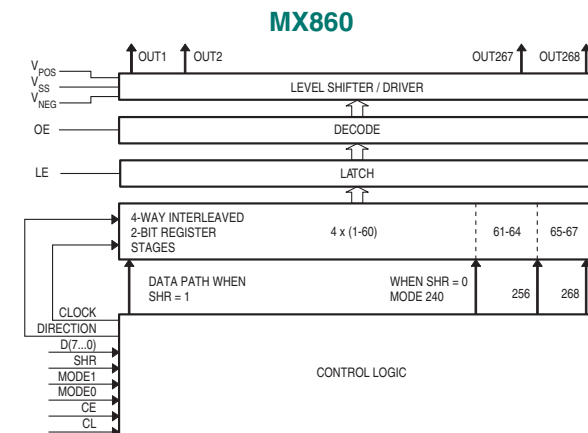
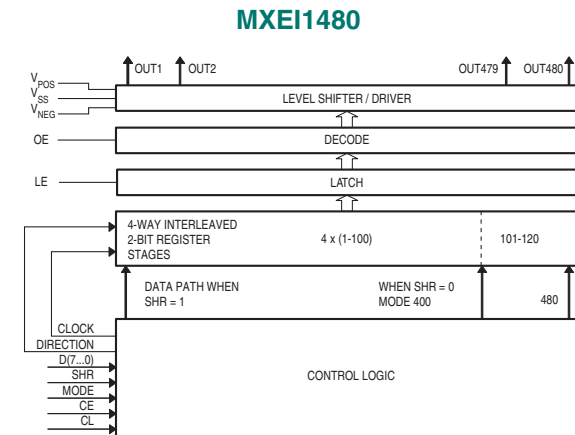
- CMOS technology
- ±15V output driver supply voltage
- Drives segment or active matrix displays
- 4-level gray scale
- 25MHz clock frequency
- Bidirectional data transfer
- Selectable register length
- 2.7V to 5.5V logic supply voltage

## MX860: ±15V ePaper Source Driver

- Selectable 240-bit, 256-bit, 268-bit long, 2-bit wide serial-in, parallel-out shift register
- Level conversion on each output converts 2 digital bits into  $V_{POS}$ ,  $V_{SS}$ , or  $V_{NEG}$  output
- Available as gold-bumped die in wafer form or waffle pack

### 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

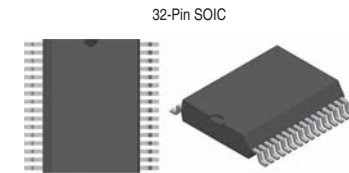


# TELECOMMUNICATIONS PRODUCTS

## LITELINK™ SILICON DAA PHONE LINE INTERFACE

- Industry's only single-package silicon Data Access Arrangement (DAA)
- Ideal for both voice and data (V.22bis to V.90/V.92) applications in particularly dense circuit environments
- Internal optical isolation barrier eliminates high-cost transformer or capacitive isolation circuits
- Saves cost through reduced passive component count and smaller printed circuit board space
- Available in a thin 32-pin SOIC package

Part Number	Isolation Voltage ( $V_{rms}$ )	Power Supply (V)	Caller ID	Ringing Detect
CPC5622	3000	3.3 - 5	Continuous	Half-wave & full-wave
CPC5621	3000	3.3 - 5	Selectable ( $\overline{CID}=0$ )	Full-wave ( $\overline{CID}=1$ )
CPC5620	3000	3.3 - 5	Selectable ( $\overline{CID}=0$ )	Half-wave ( $\overline{CID}=1$ )



The 3kV<sub>rms</sub> internal isolation barrier exceeds all worldwide regulatory requirements. 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.

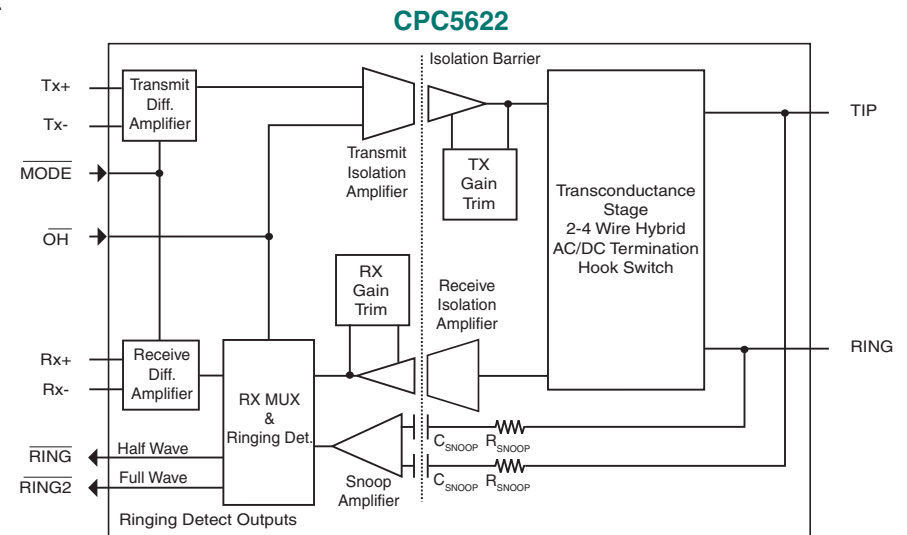
LITELINK offers the lowest operational phone line quiescent current. The device easily interfaces to commonly available standard single-ended or differential voice and modem codecs on the market. Contact IXYS Integrated Circuits Division for information on codec reference designs that offer programmable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

### 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



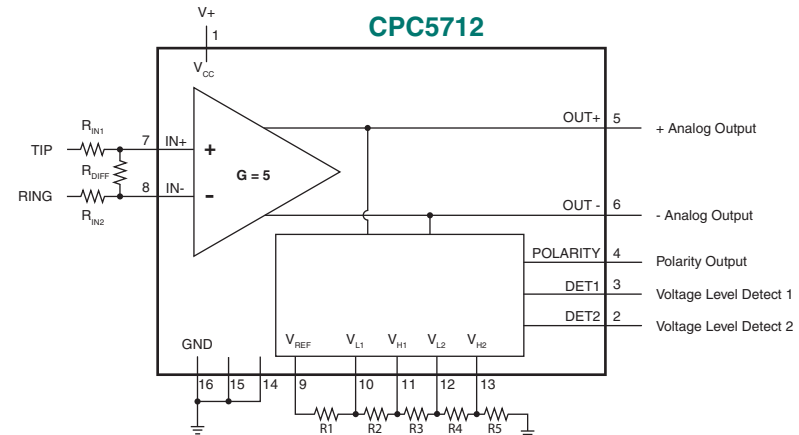
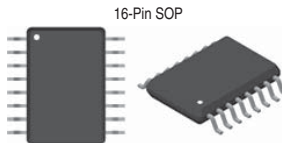
## VOLTAGE MONITOR DEVICES

### CPC5712

- Special-purpose “Voltage Monitor with Detectors” integrated circuit used in high voltage telephony applications
- Derives two voltage level detects, polarity information, and a scaled, linear representation of the phone line voltages
- Non-telephony applications include instrumentation and industrial controls; virtually undetectable in use

#### Features:

- 2 independent, programmable level-detectors with programmable hysteresis
- Fixed-level polarity detector with hysteresis
- Differential linear output
- Excellent common-mode rejection ratio (CMRR)
- 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)



Resistors set the Voltage Level Detect Thresholds

#### Applications:

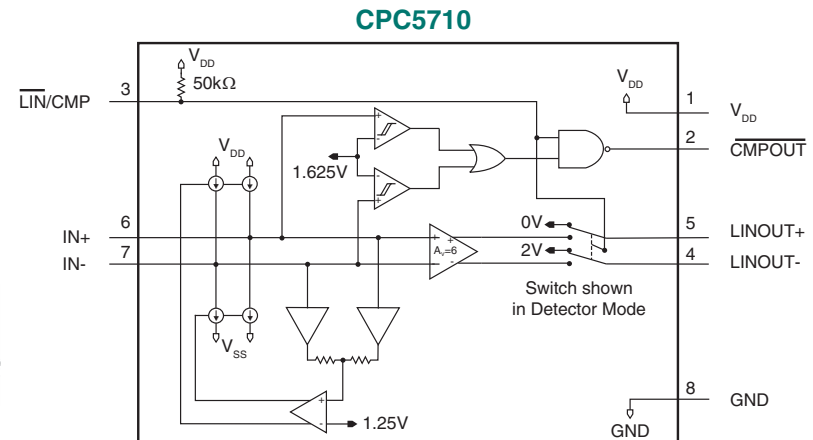
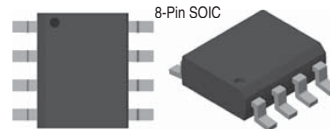
- VoIP gateways, IP-PBX, xDSL
- TIP/RING monitoring: polarity detection for caller ID, enhanced 911, line-in-use, battery detection, PSTN check

### CPC5710

- Telephone line monitor circuit provides linear representation of phone line signal and a ringing detect signal
- Ringing detect signal is set by external resistor network
- Virtually undetectable in use

#### 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)
- 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)



#### Applications:

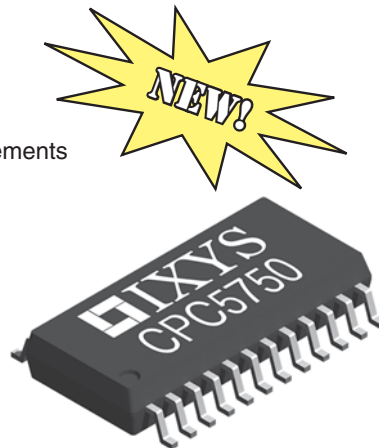
- Display feature (caller ID) signal buffering
- Line-in-use detection (another-phone-off-hook)
- Battery presence monitoring
- TIP/RING voltage monitoring
- Line polarity

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

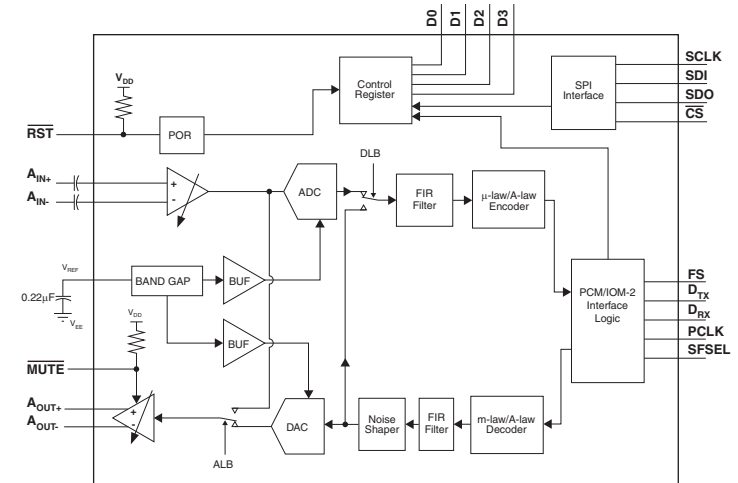
## • SINGLE-CHANNEL VOICE-BAND CODEC: CPC5750

### Features:

- $\mu$ -law and A-law ITU G.711 companding codec
- Operates on +3.3V power
- Differential analog signal paths
- Programmable transmit and receive gain, +/-12dB in 0.1dB increments
- Transmit path 60Hz rejection filter
- Differential amplifier drives +3.2dBm into 600 $\Omega$
- Stable gain over temperature
- PCM and IOM-2 GCI telecommunication interfaces
- Short and long frame syncs supported
- Independent transmit and receive programmable time slots
- Accepts PCLK from 512kHz to 8.192MHz
- SPI serial interface for control in PCM mode
- Programmable power down-mode,  $I_{DD} = 20\mu A$
- Analog and digital loopback modes for testing



### CPC5750 Block Diagram



## • CALL PROGRESS TONE DETECTOR: M-980-02

- Detects common call progress tones including busy tone, dial tone, call waiting tones, and others
- Operates on a 3V to 5V supply

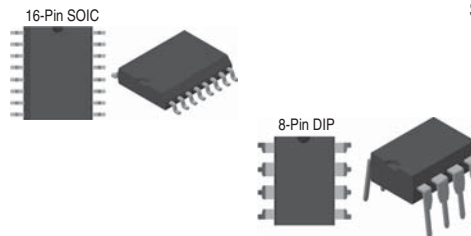
### Features:

- 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

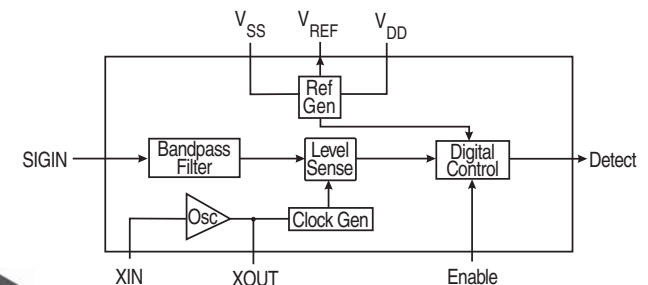
### Applications:

- 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



## • DC TERMINATION ICs (xDSL, ISDN)

### CPC1465: SHDSL/ISDN

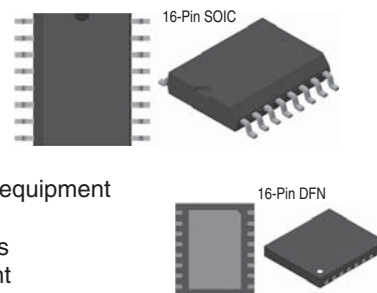
- Polarity-insensitive DC termination for wetting (sealing) current on the CPE side
- Conforms to ITU-T G.991.2 to eliminate corrosion on G.SHDSL/ISDN lines
- Well controlled turn-on and turn-off minimizes injecting impulse noise into the G.SHDSL channel

#### Features:

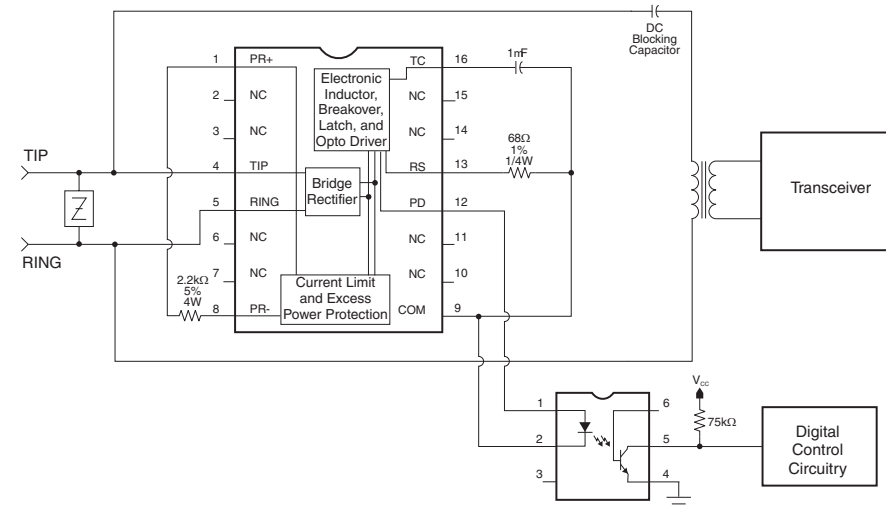
- Integrated bridge rectifier for polarity correction
- Uses inexpensive optocoupler for DC signaling
- Electronic inductor, breakover, and latch circuits
- Current limiting and excess power protection circuits
- ANSI SHDSL and ISDN compatible
- MLT and SARTS compatible
- Excellent linearity (70dB typ.)

#### 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



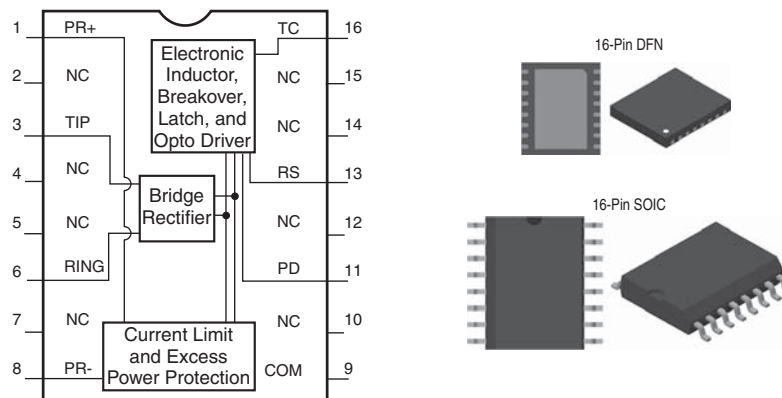
### CPC1465 & Application Circuit



### CPC1466: Broadband ADSL/VDSL

- DC Termination IC for broadband ADSL/VDSL applications
- Eliminates phone line corrosion on DSL twisted-pair, broadband-only lines

### 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

#### 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)

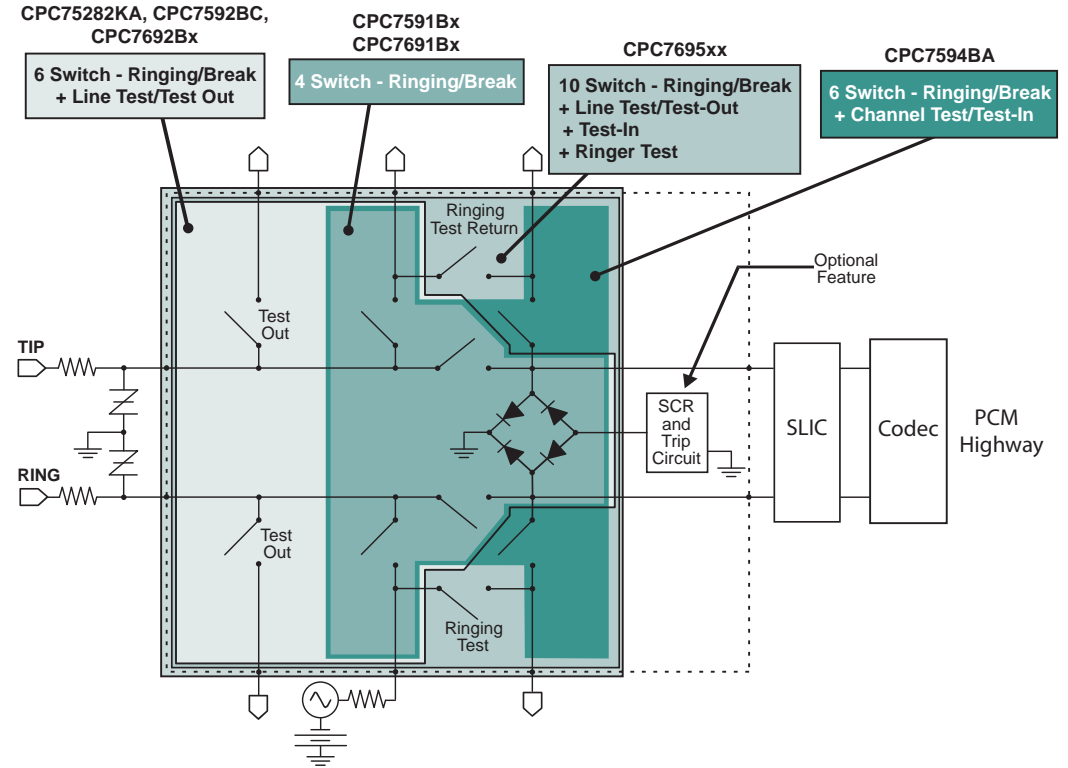
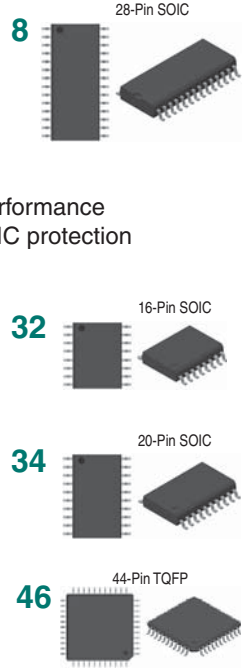
# LINE CARD ACCESS SWITCHES (LCAS)

## Features:

- Monolithic IC reliability
- Impulse noise reduction
- Low, matched on-resistance
- Built-in zero-cross ringing switching
- Small surface mount SOIC packages
- Ultra-low power consumption of <10.5mW
- Robust power-cross and lightning surge performance
- Current limiting, thermal shutdown, and SLIC protection
- CPC75282: dual, 6-pole device

## Applications:

- PBX systems
- VoIP gateways
- Channel banks
- Pair gain systems
- Central offices (CO)
- Fiber in the loop (FITL)
- Hybrid fiber coax (HFC)
- Digital loop carriers (DLC)
- Digitally added main line (DAML)



Part Number	Minimum 1500V/ $\mu$ s dV/dt	Switch Pairs					Zero-Cross Switching	Current Limit	Protection Features			Logic States	Package Type
		# Switches	Break	Ringing	Test Out	Test In			Ringing Test	Diode Bridge	Protection SCR		
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
CPC75282 Dual *		6	•	•	•		•	•	•	•	110	6	46

\* CPC75282 is not recommended for new designs

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



## • LCAS FOR RINGING SLIC: CPC7508

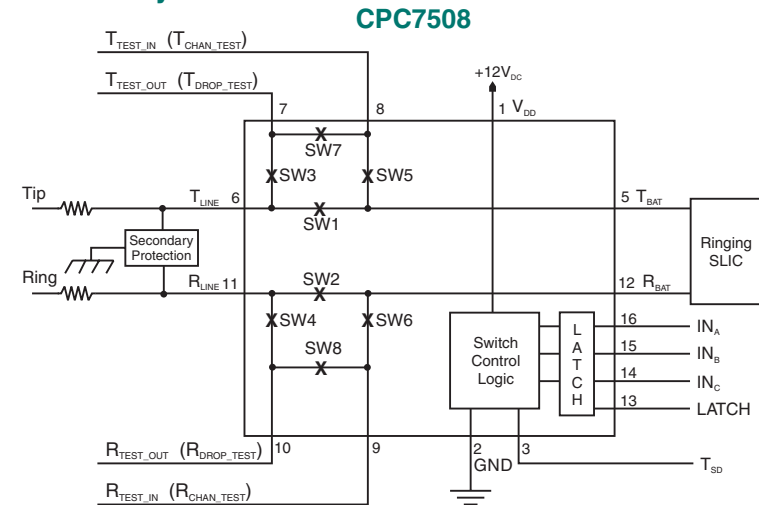
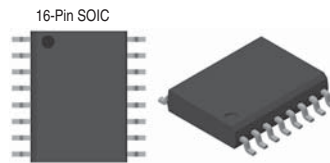
- Next generation LCAS device used with ringing SLICs
- Replaces the two 2-Form-C electromechanical test relays used in fiber-to-the-home and optical network deployments
- Provides TIP and RING line break, drop test, and channel test functionality
- Requires only a single +12V supply

### 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)



## • CYBERGATE™ DATA ACCESS ARRANGEMENT (DAA) MODULES

- Completely functional V.34 DAA circuit in a 1.07" x 1.07" x 0.4" plastic module
- Surge protection, transient protection Zener diodes, ringing detection, hook switch, gyrator, and a transformer
- Caller-ID (CID) and loop current detection are also available as options

Part Number	Region	Features				
		Ringing Detection		Caller ID	Loop Current Detect	2-4 Wire Conversion
		Full Wave	Half Wave			
CYG2000	N. America, Asia		•			
CYG2011	N. America, Asia	•			•	
CYG2020	N. America, Asia		•	•		
CYG2100	European Union Except France & Spain		•			
CYG2110	France		•			
CYG2111	CTR-21		•			
CYG2217	N. America, Asia		•			•
CYG2218	N. America, Asia		•			•
CYG2320	Australia		•			

### Features:

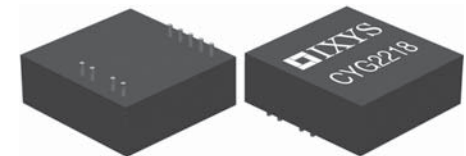
- 28.8kbps
- Optional caller ID and loop current sense
- Ringing detection
- Low power hook switch
- Surge protection
- Gyrator circuitry
- Meets most regulatory agency requirements

### 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



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

## • EMBEDDED MODEM MODULE: CPC2400E

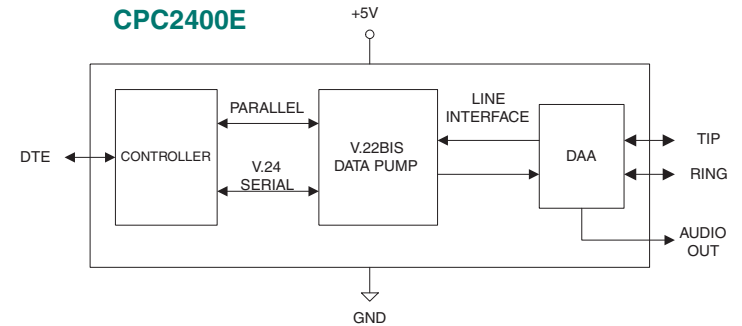
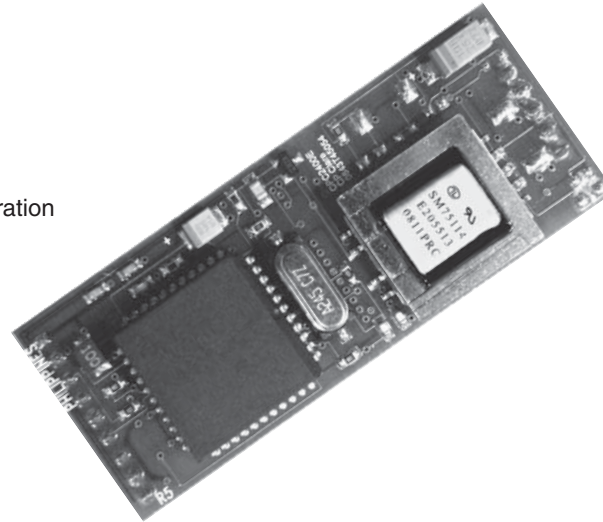
- All-in-one DAA solution for V.22bis modem transaction-oriented applications includes datapump and microcontroller
- Plug-and-play module provides a total solution complete with transferable FCC registration
- Standard serial V.24 TTL interface to DTE equipment features fast handshake time of 1.6 seconds

### 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:

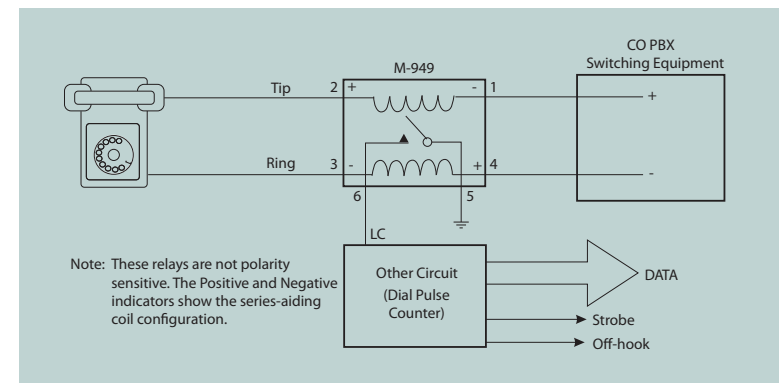
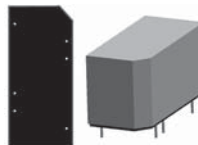
- Point-of-sale (POS)
- Gaming equipment
- Utility metering
- Lock boxes
- Remote monitoring
- Embedded applications
- Medical appliances



## • LINE SENSE RELAY: M-949-11

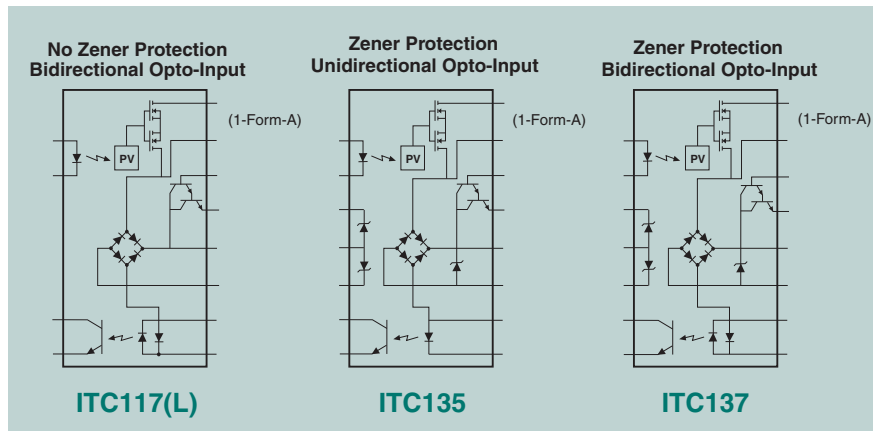
### M-949-11 Balanced Dual Coil Telephone Line Current Sensing Relay

- 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



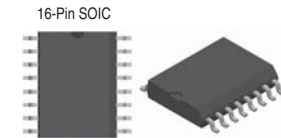
## • TELECOM MULTIFUNCTION PRODUCTS (GENERAL PURPOSE MULTIFUNCTION PRODUCTS - PAGE 18)

The OptoMOS line of Telecom Multifunction Products combines a number of discrete optically isolated 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

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

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# RFID PRODUCTS

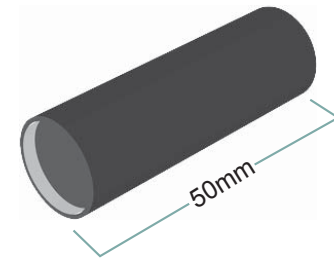
## • RFID TAGS

### **NCD1015ZP: Low Frequency, Half-Duplex, Robust 50mm Transponder**

- Read-Only RFID device for single transponder applications in the area of electronic identification
- Supports ISO 11784/85 standards

The passive transponder uses the applied RF signal to obtain the energy needed to send the 64-bit ID code to the reader. Return data transmission from the transponder to the reader utilizes FSK encoded modulation.

- Air interface • Contact-less, sequential power & data transmission (HDX)
- Radio frequency center frequency • 134.2 kHz
- Tag-to-reader transmission • FSK modulation, NRZ: "0" ~ 134.4kHz; "1" ~ 124.2kHz
- Tag-to-reader data rate • RF/16 (~8kbits/sec)
- On-chip 16-bit CRC generator • Reverse CRC-CCITT as used in ISO/IEC 11785
- Identification data page • 64 bits data + 16 bits CRC



### **NCD1015M: Low Frequency, Half-Duplex RFID Integrated Circuit**

- HDX (R/W) RFID device for single transponder applications in the area of electronic identification
- Supports ISO 11784/85 standards

The NCD1015M contains an ASIC and 2 internal capacitors: one, a resonant capacitor, and the other a storage capacitor. The ASIC contains 3 memory blocks of 32 bits each, based on field programmable, non-volatile EEPROM. Each block contains 32 data bits. Blocks 1 and 2 are referred to as the 64-bit identification data page 1, which is secured by an associated 16-bit CRC. Block 0 offers the option to lock the RFID device. Once the device is locked, it is compatible with ISO 11784/85 standards.

The HDX transponder IC receives Write-Block requests from the reader as a pulse interval encoded, 100% amplitude modulated data signal.

Return data transmission from the transponder to the reader utilizes FSK encoded modulation. This is achieved by a serial data stream controlled Frequency Shift Keying (FSK) of the transponder's resonant circuit oscillation with an additional on-chip modulation capacitor between the two transponder terminals HF and GND. The passive transponder uses the supplied RF signal to obtain the energy needed to send the 64-bit ID code to the reader.

- Air interface • Contact-less, sequential power & data transmission (HDX)
- Radio frequency center frequency • 134.2 kHz typically
- Reader-to-tag transmission • Pulse interval encoding (PIE) ~1 to 2kBits/s
- Tag-to-reader transmission • FSK modulation, NRZ: "0" ~134.2kHz; "1" ~124.2kHz
- Tag-to-reader data rate • RF/16 (~8kbits/sec)
- On-chip 16-bit CRC generator • Reverse CRC-CCITT as used in ISO/IEC 11785
- Identification data • 64 bits data + 16 bits CRC



# OTHER SEMICONDUCTOR PRODUCTS

## • NON-VOLATILE DIGITAL PROGRAMMABLE CAPACITOR: NCD2100

The NCD2100 is an EEPROM-based digitally programmable variable capacitor that provides capacitive offset trimming for capacitance sensitive circuits. Programming the non-volatile EEPROM register value or implementing on demand capacitance value changes are easily accomplished by means of the simple two-wire serial bus.

Providing 1024 discrete capacitance values over a nominal value range of 6.6pF to 37.553pF with very small step sizes, the NCD2100 is well suited to ensure proper operation of capacitive critical circuits. Additionally, to ensure interoperability over a broad array of design environments, the device is rated for operation with supply voltages of 2.5V to 5.5V across the temperature range of -40°C to +85°C.

### Features:

- Very small CDAC3 capacitance step size: 0.063pF
- 1024 programmable capacitance values
- Operating frequency up to 250MHz  
(contact the factory for operation at higher frequencies)
- Operating supply voltage: 2.5V to 5.5V
- Operating temperature range: -40°C to +85°C
- Device size: 2mm x 2mm (DFN-6), 2.9mm x 2.8mm (TSOT-6)

### Applications:

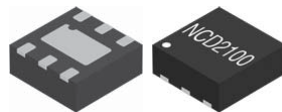
- VCXOs
- Crystal oscillators
- Tunable RF stages
- RFID tags
- Industrial wireless control
- Capacitor sensor trimming



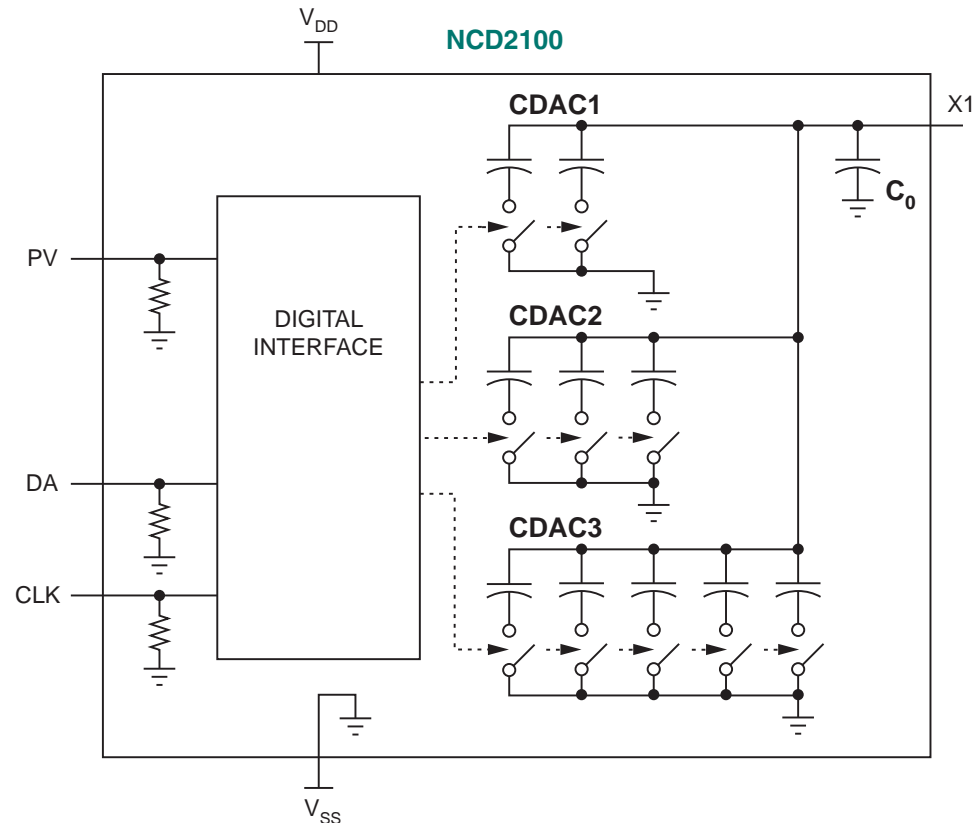
TSOT Package: 2.8mm x 2.9mm



DFN Package: 2mm x 2mm



Capacitance range: 6.6pF to 37.553pF



## • HALL-EFFECT SWITCHES: MX887D & MX887P

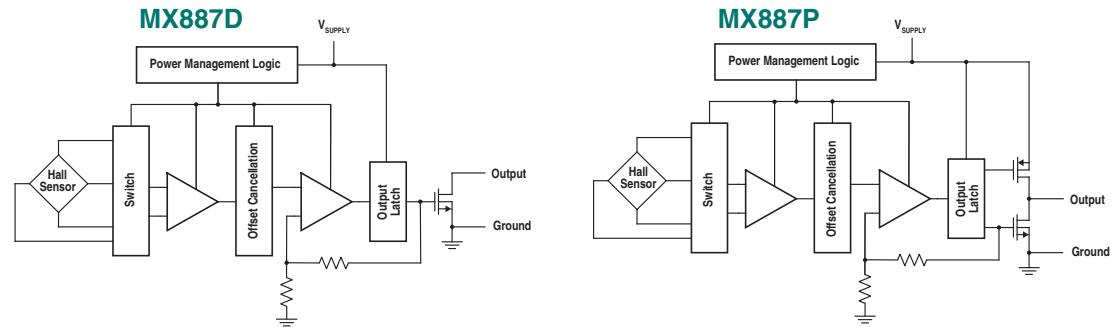
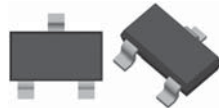
The **MX887D** and **MX887P** integrated Hall-Effect switches target the requirements of low-power portable devices with battery operating voltages from 2.5V to 5.5V. On-chip power management circuitry reduces the effective average current to just 5µA at 3V supply voltage.

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

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

### Applications:

- Handheld portable devices
- White goods
- Automotive - body systems
- Security systems
- High-reliability reed switch replacement



## • LOAD DRIVER: MX877

- 8-channel, high voltage switch with 8-bit parallel or serial input control
- 3-wire serial interface connects directly to a microprocessor using an industry standard protocol
- Designed to operate over a temperature range of -40°C to +85°C

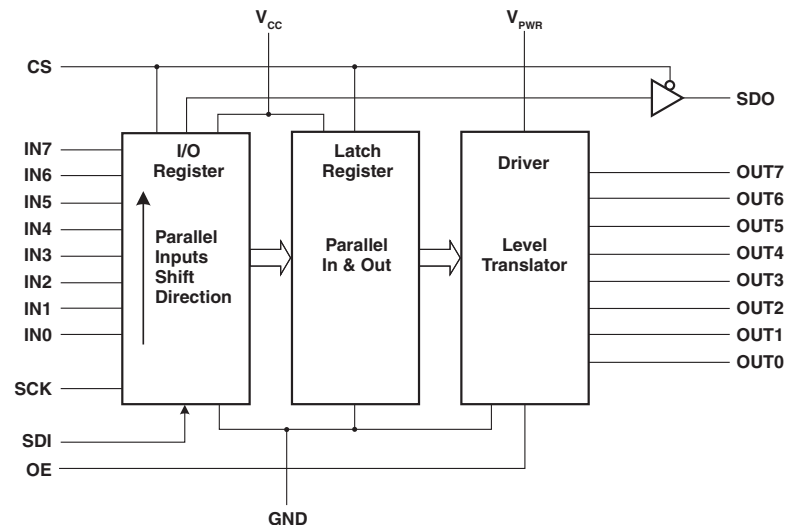
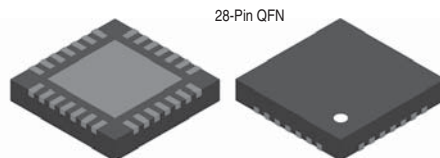
The **MX877**, with push-pull output configuration, can drive up to 80mA at 60V. Outputs can be paralleled for increased drive current up to a device total of 400mA sink or source.

### 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



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

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