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IXYS
A Littelfuse Technology

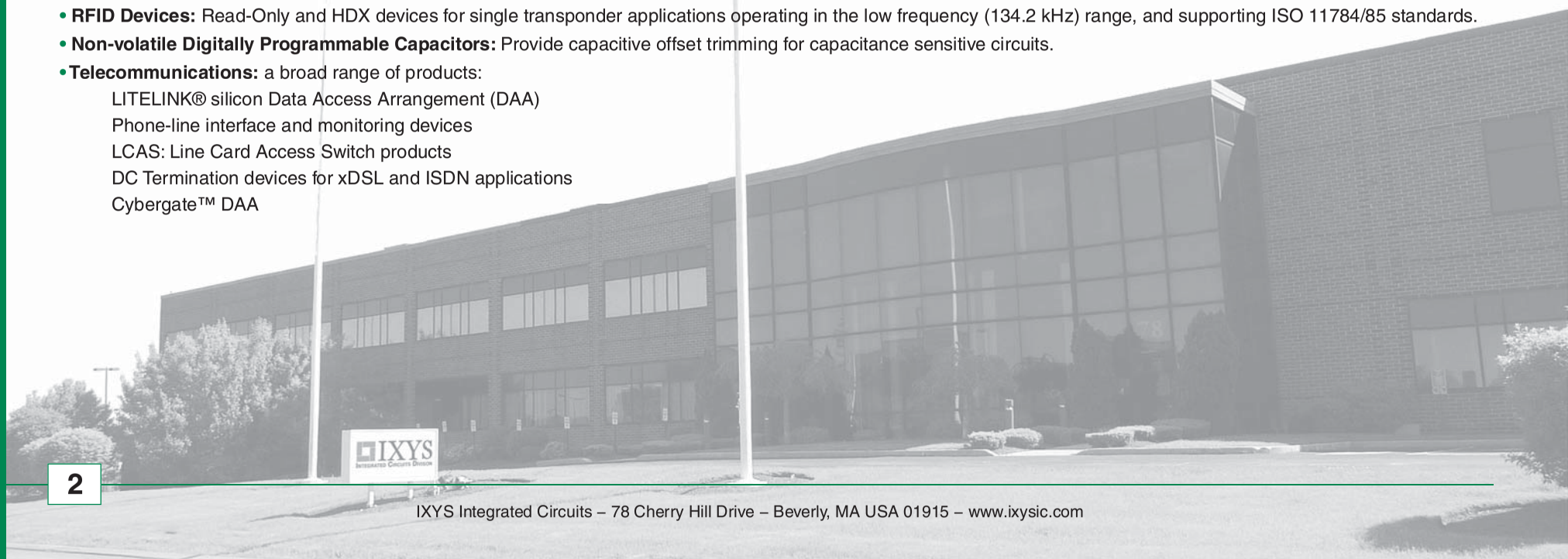
IXYS Integrated Circuits

IXYS Integrated Circuits, formerly a wholly owned subsidiary of IXYS Corporation, is now part of Littelfuse. IXYS Integrated Circuits designs, manufactures, and markets a wide variety of semiconductor devices and is a major provider of optically isolated electronic components.

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

Products and Markets

- **IGBT and MOSFET Drivers:** High voltage, low-side, and optically isolated 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:** High speed isolators that pass DC signals, require no refresh clocking, and provide 3750V_{rms} of galvanic isolation.
- **I^2C Optically Isolated Bus Repeaters:** New high speed repeaters that buffer both I^2C 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 Capacitors:** Provide 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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Note: Drawings and photographs of IXYS Integrated Circuits products shown in this catalog are for illustrative purposes only and do not necessarily portray accurate physical details, marking, or branding. They exist solely to provide additional useful information.

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IX4428	20	LBA127	11	LCB120	10	LOC211	33	PLA140	8	XBB170	10
IX9907	34	LBA127L	11	LCB126	10	M-949-11	41	PLA140L	8	XCA170	8
IX9908	35	LBA710	11	LCB127	10	M-980-02	37	PLA143	8	XCB170	10
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IXD_614	20	LCA110	7	LDA102	32	PAA110	9	PLA192	8		
IXD_614SI	20	LCA110L	7	LDA110	32	PAA110L	9	PLA193	8		
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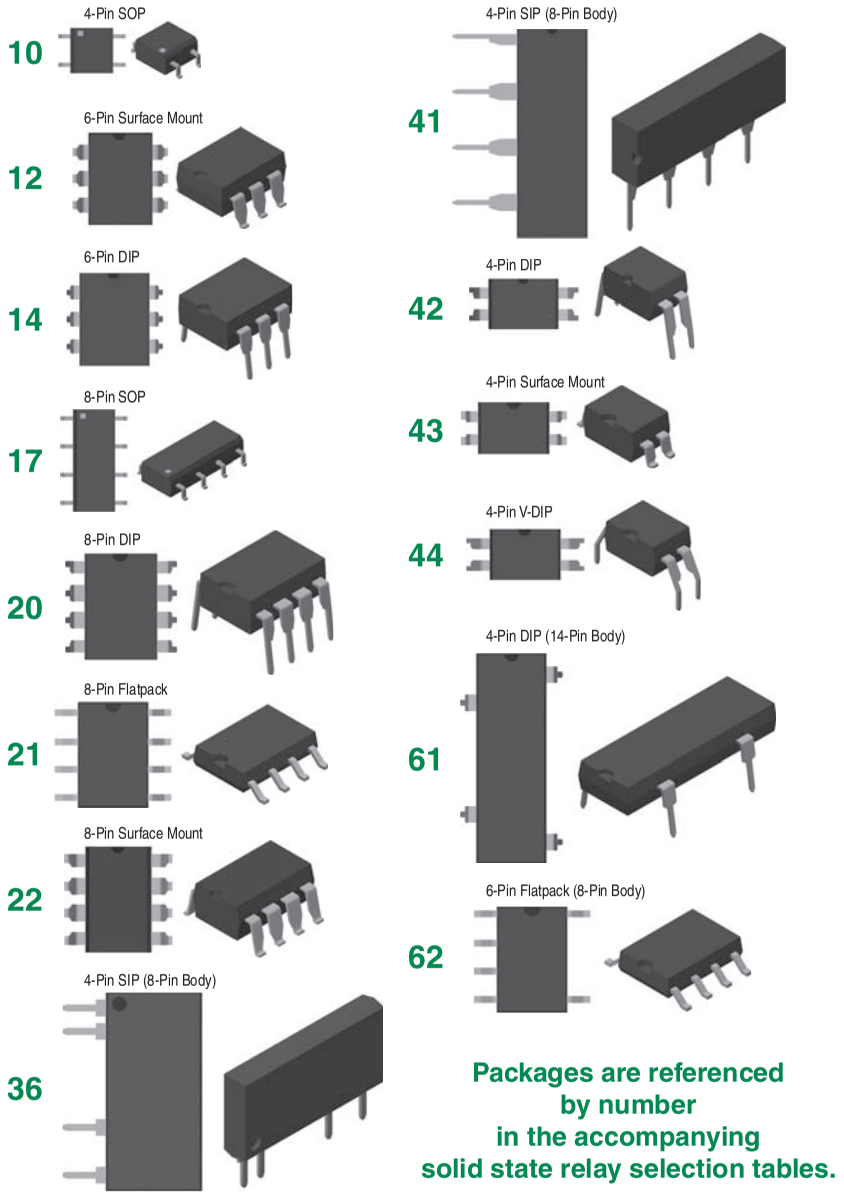
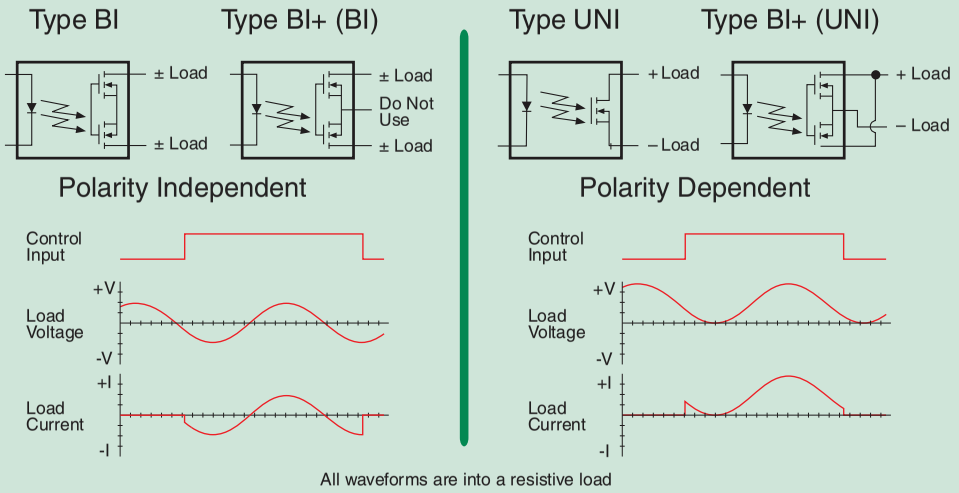
Solid State Relays



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



All waveforms are into a resistive load

Type BI relays conduct load current in both directions.

Type BI+ relays, in BI configuration, conduct load current in both directions.

Type UNI relays conduct load current from the positive terminal to the negative terminal only.

Type BI+ relays, in UNI configuration with output MOSFETs wired in parallel, enable higher load current from positive terminal to negative terminal only.

The accompanying SSR tables reference these types (BI, BI+, & UNI) for all devices listed.

- ***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

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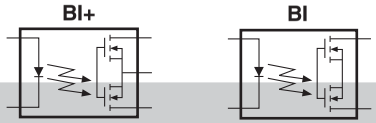
• 1-Form-A Relays (Normally Open)

1-Form-A Relays: Single-Pole



Part Number	Relay Type	Blocking Voltage (V_p)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type (Page 6)	Features and Comments
CPC1006N	BI	60	75	10	0.5	10 / 10	1500	1	10	Low I_F, EN 50130-4
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_{LEAK} ≤ 20nA
CPC1010N	BI	250	170	11.5	2	3 / 3	1500	1	10	
CPC1014N	BI	60	400	2	2	2 / 1	1500	1	10	EN 50130-4
CPC1016N	BI	100	100	16	2	2 / 1	1500	1	10	
CPC1017N	BI	60	100	16	1	10 / 10	1500	1	10	Low I_F, EN 50130-4
CPC1018N	BI	60	600	0.8	1	3 / 2	1500	1	10	Low I_F, EN 50130-4
CPC1019N	BI	60	750	0.6	2	3 / 3	1500	1	10	
CPC1020N	BI	30	1200	0.25	2	3 / 3	1500	1	10	High load current, very low on-resistance
CPC1025N	BI	400	120	30	2	2 / 1	1500	1	10	
CPC1030N	BI	350	120	30	2	2 / 1	1500	1	10	
CPC1035N	BI	350	100	35	2	2 / 1	1500	1	10	
CPC1225N	BI	400	120	30	2	2 / 1	1500	1	10	EN/IEC 60950-1 Supplementary Insulation (0.4mm distance through insulation)
CPC1230N	BI	350	120	30	2	2 / 1	1500	1	10	EN/IEC 60950-1 Supplementary Insulation (0.4mm distance through insulation)
CPC1317	BI	70	150	16	1	2.5 / 2.5	3750	1	21	EN 50130-4 (installation class 3), transient voltage suppression (TVS)
CPC1330	BI	350	120	30	2	2 / 1	5000	1	42, 43	Enhanced isolation voltage
CPC1335	BI	350	100	35	1	10 / 10	3750	1	21	Low I_F, EN 50130-4 (installation class 3), transient voltage suppression (TVS)
CPC1390	BI	400	140	22	2	1 / 1	5000	1	42, 43, 44	Enhanced isolation voltage
CPC1393	BI	600	90	50	2	5 / 5	5000	1	42, 43, 44	Enhanced isolation voltage
CPC1394	BI	600	120	35	2	5 / 3	5000	1	42, 43, 44	Enhanced isolation voltage
CPC1510	BI+	250	200	15	2	2 / 2	3750	1	12, 14	Current limiting with thermal management - see page 13
CPC1511	BI	230	450	4	2.5	4 / 2	3750	1	36	Current limiting with thermal management - see page 13
CPC1540	BI+	350	120	25	2	2 / 2	3750	1	12, 14	Current limiting with thermal management - see page 13
CPC1560	BI+	60	300	5.6	1.1	0.1 / 0.4	3750	1	20, 22	Current limiting with thermal management - see page 13
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
LCA100	BI+	350	120	25	5	5 / 5	3750	1	12, 14	
LCA100L	BI+	350	120	25	5	5 / 5	3750	1	12, 14	Current limiting
LCA110	BI+	350	120	35	2	3 / 3	3750	1	12, 14	
LCA110L	BI+	350	120	35	2	3 / 3	3750	1	12, 14	Current limiting
LCA120	BI+	250	170	20	5	3 / 3	3750	1	12, 14	
LCA120L	BI+	250	150	20	5	3 / 3	3750	1	12, 14	Current limiting
LCA125	BI+	300	170	16	5	5 / 5	3750	1	12, 14	
LCA125L	BI+	300	170	20	5	5 / 5	3750	1	12, 14	Current limiting

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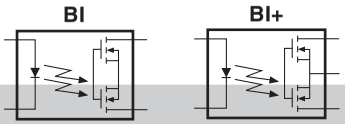
1-Form-A Relays: Single-Pole (continued)



Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type (Page 6)	Features and Comments
LCA127	BI+	250	200	10	5	5 / 5	3750	1	12, 14	
LCA127L	BI+	250	170	15	5	5 / 5	3750	1	12, 14	Current limiting
LCA129	BI+	250	170	20	2	8 / 8	3750	1	12, 14	
LCA182	BI+	350	120	35	0.25	3 / 3	3750	1	12, 14	Very low I_F
LCA701	BI+	100	1500	0.3	2	4 / 1	3750	1	12, 14	High load current
LCA710	BI+	60	1000	0.5	10	2.5 / 0.25	3750	1	12, 14	High load current
LCA712	BI+	60	1000	0.5	10	2.5 / 0.35	3750	0.01	12, 14	High load current, low I_{LEAK}
LCA715	BI+	60	2200	0.15	5	2.5 / 0.25	3750	1	12, 14	High load current
LCA717	BI+	30	2000	0.15	2	3 / 3	3750	1	12, 14	High load current
OMA160	BI+	250	50	100	10	0.125 / 0.125	3750	0.025	12, 14	Low I_{LEAK} , fast switching times
PLA110	BI+	400	150	22	5	1 / 0.5	3750	1	12, 14	
PLA110L	BI+	400	150	25	5	1 / 0.25	3750	-	12, 14	Current limiting
PLA132	BI+	60	600	1	2	5 / 2	3750	1	12, 14	
PLA134	BI+	100	350	3	5	5 / 5	3750	1	12, 14	
PLA140	BI+	400	250	8	5	3 / 1	3750	1	12, 14	
PLA140L	BI+	400	200	13	5	5 / 3	3750	1	12, 14	Current limiting
PLA143	BI+	600	100	50	2	5 / 5	4000	1	12, 14	Enhanced isolation voltage
PLA150	BI+	250	250	7	5	2.5 / 0.5	3750	1	12, 14	
PLA160	BI+	300	50	100	10	0.05 / 0.05	3750	0.025	12, 14	Low I_{LEAK} , fast switching times
PLA170	BI+	800	100	50	5	5 / 5	3750	1	12, 14	
PLA171	BI	800	100	50	2	5 / 5	5000	1	62	Enhanced isolation voltage, high blocking voltage (output pins 7mm separation)
PLA172P	BI	800	100	50	2	5 / 5	5000	1	62	-40°C to +105°C Operational Temperature Range
PLA190	BI+	400	150	22	5	1 / 0.5	5000	1	12, 14	Enhanced isolation voltage
PLA191	BI+	400	250	8	5	3 / 1	5000	1	12, 14	Enhanced isolation voltage
PLA192	BI+	600	150	22	5	5 / 5	5000	1	12, 14	Enhanced isolation voltage, PLA192E is DIN EN 60747-5-5 Certified
PLA193	BI+	600	100	50	5	5 / 5	5000	1	12, 14	Enhanced isolation voltage, PLA193E is DIN EN 60747-5-5 Certified
PLA194	BI+	600	130	35	2	3 / 2	5000	1	12, 14	Enhanced isolation voltage
XCA170	BI+	350	100	50	5	5 / 5	3750	1	12, 14	

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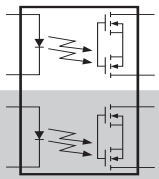
1-Form-A Relays: Dual Single-Pole

BI



Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type (Page 6)	Features and Comments
CPC2014N	BI	60	400	2	2	2 / 1	1500	1	17	EN 50130-4
CPC2017N	BI	60	120	16	1	3 / 3	1500	1	17	Low I_F, EN 50130-4
CPC2025N	BI	400	120	30	2	2 / 1	1500	1	17	
CPC2030N	BI	350	120	30	2	2 / 1	1500	1	17	
LAA100	BI	350	120	25	5	5 / 5	3750	1	20, 21, 22	
LAA100L	BI	350	120	25	5	5 / 5	3750	1	20, 21, 22	Current limiting
LAA108	BI	100	300	8	2	3 / 3	3750	1	20, 21, 22	
LAA110	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	
LAA110L	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	Current limiting
LAA120	BI	250	170	20	5	5 / 5	3750	1	20, 21, 22	
LAA120L	BI	250	150	25	5	5 / 5	3750	1	20, 21, 22	Current limiting
LAA125	BI	350	170	16	5	5 / 5	3750	1	20, 21, 22	
LAA125L	BI	350	150	18	5	5 / 5	3750	1	20, 21, 22	Current limiting
LAA127	BI	250	200	10	5	5 / 5	3750	1	20, 21, 22	
LAA127L	BI	250	170	10	5	5 / 5	3750	1	20, 21, 22	Current limiting
LAA710	BI	60	1000	0.5	10	2.5 / 0.25	3750	1	20, 22	
OAA160	BI	250	50	100	6	0.125 / 0.125	3750	0.025	20, 21, 22	Very low I_{LEAK}, fast switching times
PAA110	BI	400	150	22	5	1 / 0.25	3750	1	20, 21, 22	
PAA110L	BI	400	150	25	5	1 / 0.5	3750	1	20, 21, 22	Current limiting
PAA127	BI	280	200	10	3	0.5 / 0.5	3750	0.025	20, 21, 22	Very low I_{LEAK}, fast switching times
PAA132	BI	60	600	1	2	5 / 2	3750	1	20, 22	
PAA140	BI	400	250	8	5	3 / 1	3750	1	20, 21, 22	
PAA140L	BI	400	200	13	5	5 / 3	3750	1	20, 22	Current limiting
PAA150	BI	250	250	7	5	2.5 / 0.5	3750	1	20, 21, 22	
PAA190	BI	400	150	22	5	1 / 0.5	5000	1	20, 22	Enhanced isolation voltage
PAA191	BI	400	250	8	5	3 / 1	5000	1	20, 22	Enhanced isolation voltage
PAA193	BI	600	100	50	5	5 / 5	5000	10	20, 22	Enhanced isolation voltage
XAA117	BI	60	150	16	1	5 / 5	3750	1	20, 21, 22	Low I_F
XAA170	BI	350	100	50	5	5 / 5	3750	1	20, 21, 22	

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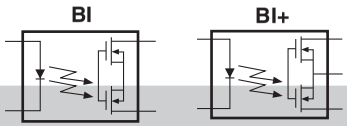
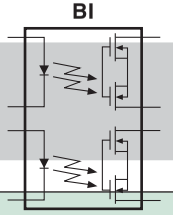
• 1-Form-B Relays (Normally Closed)

1-Form-B Relays: Single-Pole



Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (µA)	Package Type (Page 6)	Features and Comments
CPC1106N	BI	60	75	10	0.5	10 / 10	1500	1	10	Low I_F , EN 50130-4
CPC1114N	BI	60	400	2	2	2 / 5	1500	1	10	
CPC1117N	BI	60	150	16	1	10 / 10	1500	1	10	Low I_F , EN 50130-4
CPC1125N	BI	400	100	35	2	2 / 2	1500	5	10	
CPC1130N	BI	350	120	30	2	2 / 2	1500	5	10	
CPC1135N	BI	350	120	35	2	2 / 2	1500	5	10	
CPC1150N	BI	350	120	50	2	1 / 2	1500	5	10	
CPC1231N	BI	350	120	30	2	2 / 2	1500	5	10	EN/IEC 60950-1 Supplementary Insulation (0.4mm distance through insulation)
CPC1333	BI	350	130	30	2	2 / 3	5000	1	42, 43	Enhanced isolation voltage
LCB110	BI+	350	120	35	5	3 / 3	3750	1	12, 14	
LCB111	BI+	350	120	35	2	5 / 5	3750	1	12, 14	
LCB120	BI+	250	170	20	5	5 / 5	3750	1	12, 14	
LCB126	BI+	250	170	15	5	5 / 5	3750	1	12, 14	
LCB127	BI+	250	200	10	5	5 / 5	3750	1	12, 14	
LCB710	BI+	60	1000	0.6	2	3 / 3	3750	1	12, 14	High load current
LCB716	BI+	60	500	2	2	3 / 3	3750	1	12, 14	
LCB717	BI+	30	1500	0.3	2	2 / 5	3750	1	12, 14	High load current
PLB150	BI+	250	250	7	5	1 / 2.5	3750	1	12, 14	
PLB171	BI	800	80	55	2	5 / 5	5000	1	62	Enhanced isolation voltage, high blocking voltage (output pins 7mm separation)
PLB190	BI+	400	130	25	2	1 / 2.5	5000	1	12, 14	Enhanced isolation voltage
XCB170	BI+	350	100	50	5	5 / 5	3750	1	12, 14	

1-Form-B Relays: Dual Single-Pole



Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (µA)	Package Type (Page 6)	Features and Comments
CPC2125N	BI	400	100	35	2	2 / 2	1500	5	17	
LBB110	BI	350	120	35	5	3 / 3	3750	1	20, 21, 22	
LBB120	BI	250	170	20	5	5 / 5	3750	1	20, 22	
LBB126	BI	250	170	15	5	5 / 5	3750	1	20, 21, 22	
LBB127	BI	250	200	10	5	5 / 5	3750	1	20, 21, 22	
PBB150	BI	250	250	7	5	2.5 / 2.5	3750	1	20, 21, 22	
PBB190	BI	400	130	25	2	1 / 2.5	5000	1	20, 22	
XBB170	BI	350	100	50	5	5 / 5	3750	1	20, 21, 22	

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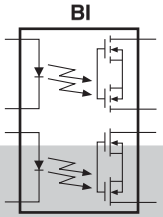
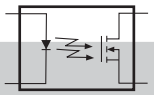
• Miscellaneous Relays

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



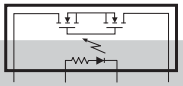
Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage A/B (μA)	Package Type (Page 6)	Features and Comments
CPC2317N	BI	60	120	16	1	3 / 3	1500	1 / 1	17	Low I_F
CPC2330N	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
LBA120	BI	250	170	20	5	5 / 5	3750	1 / 1	20, 21, 22	
LBA120L	BI	250	150	25	5	5 / 5	3750	1 / 1	20, 22	Current limiting
LBA127	BI	250	200	10	5	5 / 5	3750	1 / 1	20, 21, 22	
LBA127L	BI	250	150	15	5	5 / 5	3750	1 / 1	20, 22	Current limiting
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
PBA150	BI	250	250	7	5	2.5 / 2.5	3750	1 / 1	20, 22	

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



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

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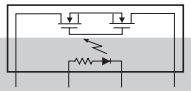
1-Form-B Relays: Single-Pole, Voltage-Controlled

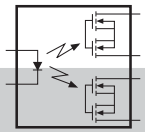
BI



Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Voltage (V)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type (Page 6)	Features and Comments
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

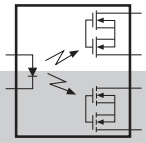
BI



Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type (Page 6)	Features and Comments
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
LCA220	BI	250	120	20	10	5 / 5	3750	1	20, 22	

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

BI



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

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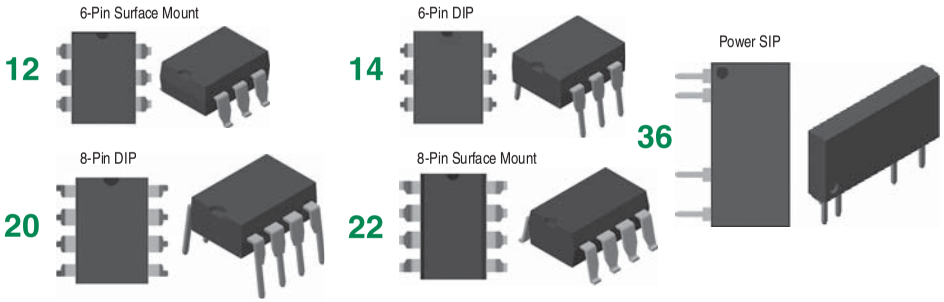
FAULT PROTECTED RELAYS

• CURRENT LIMITING SSRS WITH VOLTAGE TRIGGERED SHUTDOWN & THERMAL MANAGEMENT

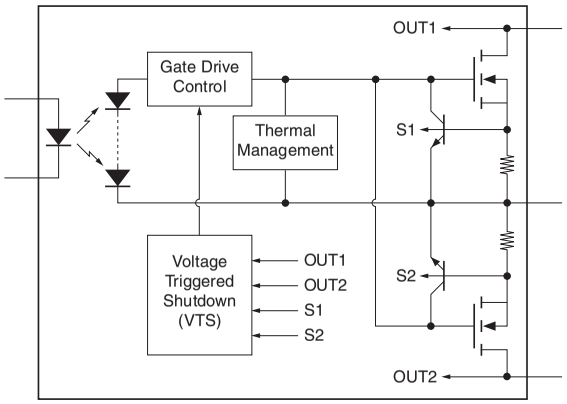
- **Active current-limiting circuitry**
- **Integrated thermal management (ThM)**
- **Voltage triggered shutdown (VTS)**
  - Provide excellent power-cross immunity
  - Ideal for use in electromagnetically noisy environments
  - Resumes normal operation after faults are removed



Part Number	Blocking Voltage	Input Control Current	On-Resistance (Maximum)		Load Current (Maximum)		Current Limit (Maximum)		* VTS Threshold	Switching Speed	Isolation Voltage	Package Type	Features & Comments
			DC-Only	AC	DC-Only	AC	DC-Only	AC					
	(V_P)	(mA)	(Ω)	(Ω)	(mA)	(mA)	(mA_P)	(mA_P)	(V_{TH}) (V)	(t_{on} / t_{off}) (ms)	(V_{rms})		
CPC1510	250	2	3.75	15	350	200	920	450	-	2 / 2	3750	12, 14	Industrial applications
CPC1511	230	2.5	-	4	-	450	-	1400	-	4 / 2	3750	36	Industrial applications
CPC1540	350	2	6.75	25	250	120	570	285	100	2 / 2	3750	12, 14	PSTN hook switch applications
CPC1560	60	1.1	1.4	5.6	600	300	1500	900	-	0.1 / 0.4	3750	20, 22	Fast switching speeds
CPC1563	600	2	11.75	35	250	120	570	285	100	2 / 2	3750	12, 14	High blocking voltage
CPC1593	600	2	11.75	35	250	120	570	285	21	2 / 2	3750	12, 14	Power supply start-up

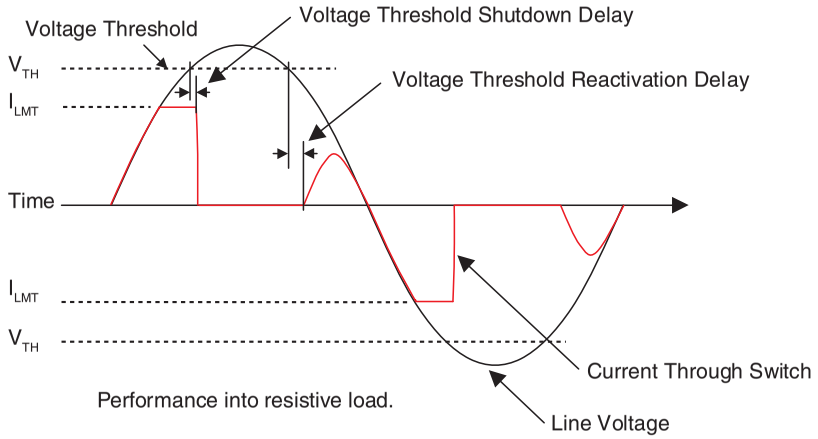
* Deactivates the switch when the load voltage exceeds the V_{TH} threshold while the switch is in current limit.

CPC1540, CPC1563, CPC1593



Applications:

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



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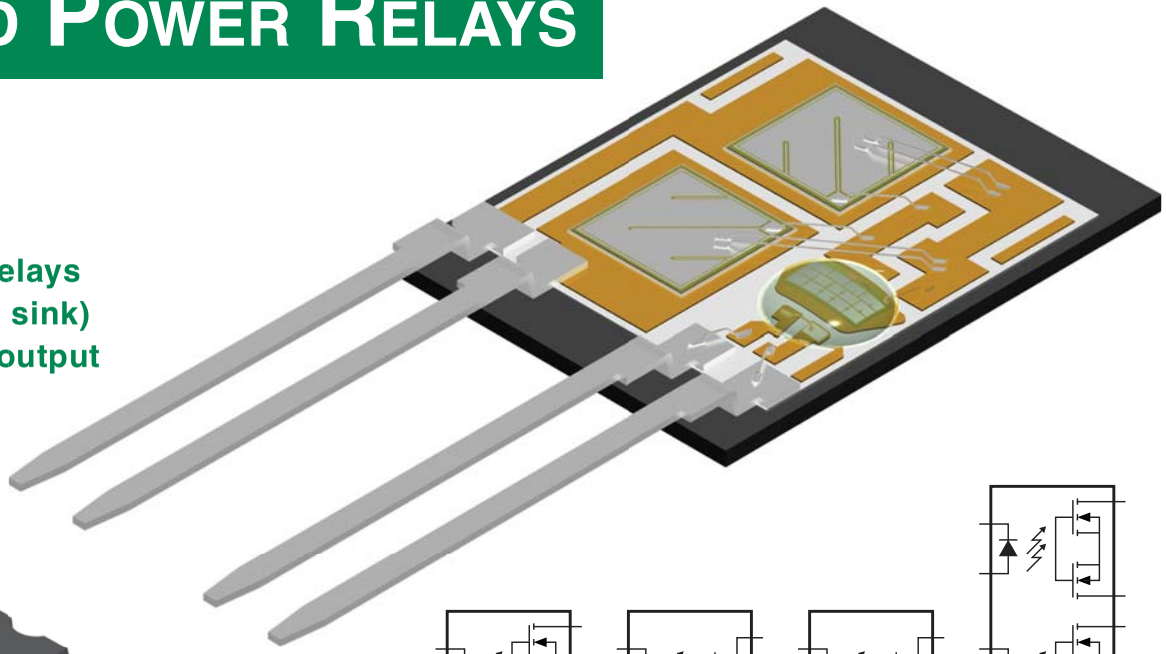
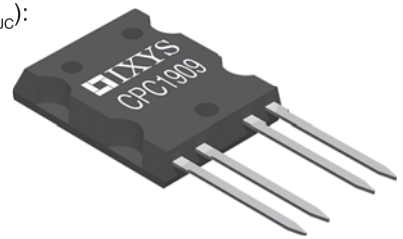
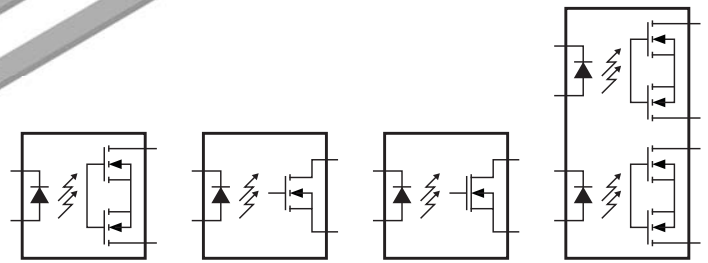
Optically Isolated Power Relays

- **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°C/W heat sink)**
- **$2500V_{rms}$ to $5000V_{rms}$ 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 (θ_{JC}):
  - 0.30°C/W - ISOPLUS-264
  - 0.35°C/W - i4-PAC
  - 1.50°C/W - Power SIP
  - 1.50°C/W - Power SOIC

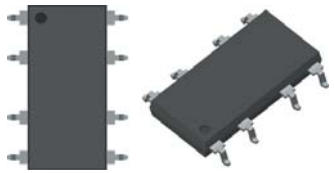




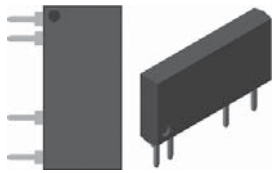
Applications:
- Robotics
- Medical equipment
- Railroad/traffic controls
- Consumer appliances
- Industrial control
- Test and measurement equipment

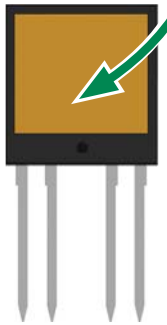
Metallized, external, Direct Copper Bond (DCB) surface for heat sink applications

66 - Power SOIC

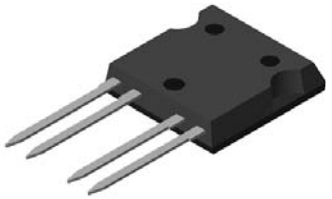


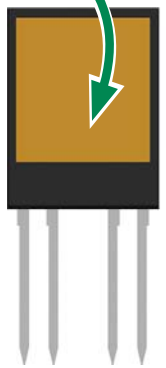
36 - Power SIP



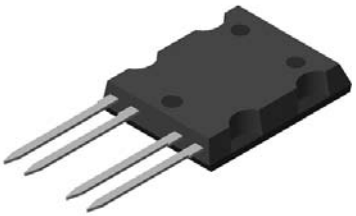


29 - i4-PAC





37 - ISOPLUS-264



For data sheets, go to **www.ixysic.com/Products/ProdList.htm**

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

Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (A_{rms})			On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type (Page 14)	Features & Comments
			Without Heat Sink	5°C/W Heat Sink	T_C=25°C							
CPC1906Y	BI	60	2	-	-	0.3	10	10 / 5	2500	1	36	
CPC1907B	BI	60	6	-	-	0.06	5	5 / 1	5000	1	66	Enhanced isolation voltage
CPC1908J	BI	60	3.5	8.5	15	0.3	10	20 / 5	2500	1	29	
CPC1909J	BI	60	6.5	15	15	0.1	10	25 / 10	2500	1	37	
CPC1916Y	BI	100	2.5	-	-	0.34	10	5 / 3	2500	1	36	
CPC1918J	BI	100	5.25	13	15	0.1	10	25 / 10	2500	1	37	
CPC1926Y	BI	250	0.7	-	-	1.4	10	10 / 10	2500	1	36	
CPC1927J	BI	250	2.7	6.7	15	0.2	10	25 / 10	2500	1	37	
CPC1967J	BI	400	1.35	3.35	13.15	0.85	10	20 / 5	2500	1	29	
CPC1968J	BI	500	2	5	15	0.35	10	20 / 5	2500	1	37	
CPC1973Y	BI	400	0.35	-	-	5	10	5 / 3	2500	1	36	
CPC1977J	BI	600	1.25	3.1	12.25	1	10	20 / 5	2500	1	29	
CPC1978J	BI	800	0.75	1.85	7.25	2.3	10	20 / 5	2500	1	29	
CPC1979J	BI	600	1.4	3.5	14.5	0.75	10	25 / 5	2500	1	37	
CPC1981Y	BI	1000	0.18	-	-	18	10	10 / 5	2500	1	36	
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
CPC1984Y	BI	600	1	-	-	0.66	5	10 / 2	4000	1	36	Enhanced isolation voltage
CPC1986J	BI	1000	0.65	1.6	6.5	3	10	20 / 5	2500	1	29	
CPC1988J	BI	1000	0.9	2.25	9.4	2.5	10	20 / 5	2500	1	37	

• Dual 1-Form-A Power Relay: Bidirectional

CPC2907B	BI	60	2	-	-	0.15	5	2.5 / 0.25	4000	1	66	DUAL power relay

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

Part Number	Relay Type	Blocking Voltage (V_P)	Load Current (A)			On Resistance (Ω)	Input Control Current (mA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Off-State Leakage (μA)	Package Type (Page 14)	Features & Comments
			Without Heat Sink	5°C/W Heat Sink	T_C=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	

• 1-Form-B Power Relay: Single-Pole - Unidirectional

CPC1705Y	UNI	60	3.25	-	-	0.09	5	2 / 12	2500	1	36	Normally CLOSED power relay

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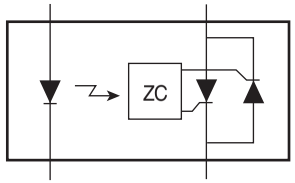
Optically Isolated AC Power Switches

• Optically Isolated AC Power Switches: Load Current ≤1A

- Blocking voltage from $400V_P$ to $800V_P$
- SCR-based AC power switches
- Maximum load current up to $1A_{rms}$



Zero-Cross Turn-On

Features:

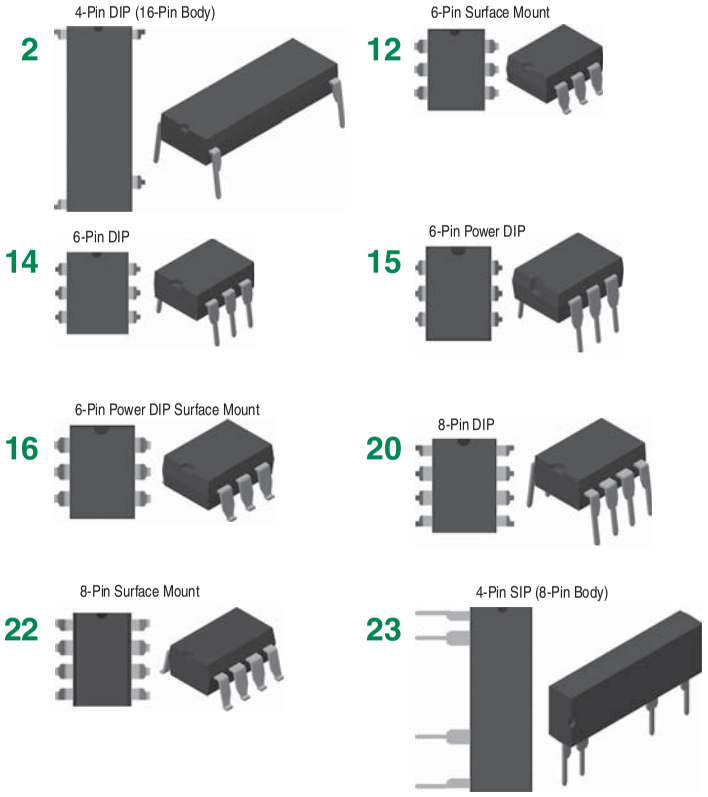
- Load current up to $1A_{rms}$
- Blocking voltage up to $800V_P$
- 5mA input sensitivity
- Zero-cross turn on ≤ ½ Cycle
- Low EMI and RFI generation
- DC control, AC switching
- Optically isolated
- TTL and CMOS compatible
- High noise immunity
- Machine insertable, wave solderable

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

[1] Maximum continuous load current of a single pole or the sum of the load currents with both poles operating simultaneously.



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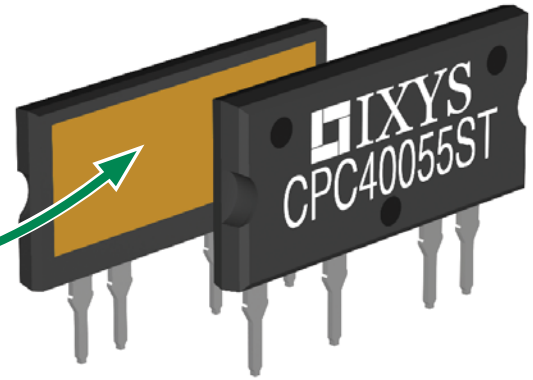
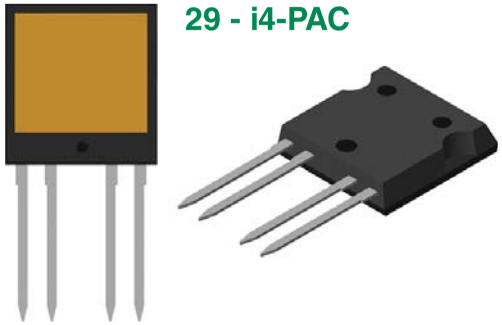
• Optically Isolated AC Power Switches: Load Current >1A

- Blocking voltages of 600V_P and 800V_P
- SCR-based AC power switches
- Zero-cross and Rapid turn-on (non-zero-cross) versions

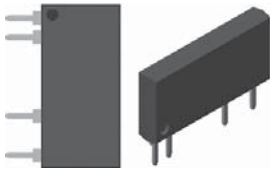
Metallized, external, Direct Copper Bond (DCB) surface for heat sink applications



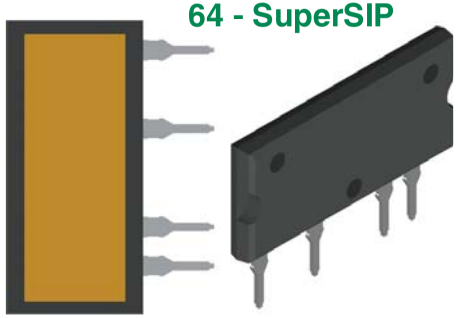
29 - i4-PAC



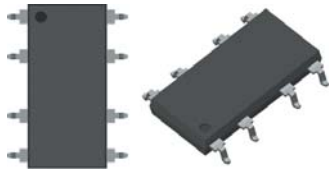
36 - Power SIP



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 load voltage phase, and turn off when the load current crosses zero.

Part Number	Blocking Voltage (V_P)	Load Current: No Heat Sink (A_{rms})	Load Current: 5°C/W Heat Sink (A_{rms})	Load Current: T_C=25°C (A_{rms})	Input Control Current (mA)	Input Control Voltage (V)	Operating Frequency Min / Max (Hz)	Turn-On: Zero-Cross or Rapid	Switching Speed t_{on} / t_{off} (max)	Isolation Voltage (V_{rms})	Package Type	Features
CPC1964B	800	1.5	-	-	5	-	20 - 500	Zero-cross	½ Cycle	5000	66	Enhanced isolation voltage, 12.5mm creepage
CPC1964BX6	600	1.5	-	-	5	-	20 - 500	* Rapid	500µs / ½ Cycle	5000	66	Rapid turn-on, enhanced isolation voltage
CPC1966Y	600	3	-	-	5	-	20 - 500	Zero-cross	½ Cycle	3750	36	
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, 5.7mm creepage
CPC1966YX6	600	3	-	-	5	-	20 - 500	* Rapid	500µs / ½ Cycle	3750	36	Rapid turn-on
CPC1966YX8	800	3	-	-	5	-	20 - 500	* Rapid	**45µs / ½ Cycle	3750	36	Rapid turn-on
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
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

** Typical turn-on values.

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Multifunction Products: SSR/Optocouplers

• General Purpose Multifunction Products (Telecom Multifunction Products - Page 41)

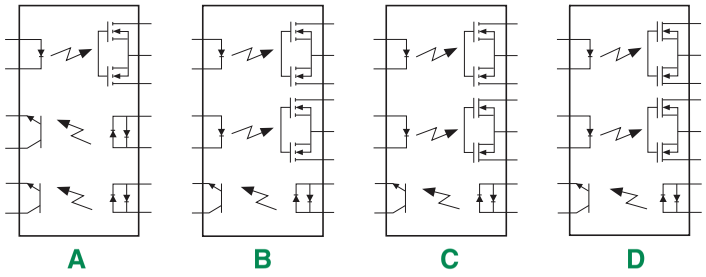
The OptoMOS line of Multifunction Products combines a number of discrete, optically isolated functions into a single package. These products mix and match solid state relays, optocouplers, and Darlington transistors to create highly functional circuits in a single, small package. Multifunction devices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

Features:

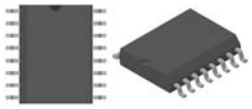
- 3750V_{rms} input-to-output isolation
- Multiple functionality in a single package
- Current limiting (part numbers with "L" suffix)
- Machine insertable, wave solderable
- TTL and CMOS compatible

Applications:

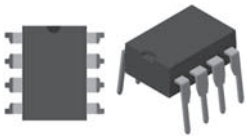
- Telecommunication/datacommunication
- Instrumentation
- I/O subsystems/electronic switching
- Medical equipment (patient/equipment isolation)
- Security
- Aerospace
- Industrial controls



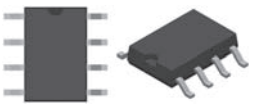
4 16-Pin Low-Profile SOIC



20 8-Pin DIP



21 8-Pin Flatpack



22 8-Pin Surface Mount

Part Number	Style	SSR Characteristics				Optocoupler Characteristics				Isolation Voltage	Package Type	Features and Comments
		Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Breakdown Voltage (V)	Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control Current (mA)	(V_{rms})		
IAA110	B	350	100	35	5	20	33	0.5	6	3750	4	Two 1-Form-A relays, one optocoupler
IAB110	C	350	100	35	5	20	33	0.5	6	3750	4	One 1-Form-A relay, one 1-Form-B relay, one optocoupler
IAD110	A	350	100	35	5	20	33	0.5	6	3750	4	One 1-Form-A relay, two optocouplers
IBB110	D	350	100	35	5	20	33	0.5	6	3750	4	Two 1-Form-B relays, one optocoupler
TS117	E	350	120	35	2	20	33	0.5	6	3750	20, 21, 22	One 1-Form-A relay, one optocoupler
TS117L	E	350	120	35	2	20	33	0.5	6	3750	20, 21, 22	One current-limiting 1-Form-A relay, one optocoupler
TS118	F	350	120	35	5	20	33	0.5	6	3750	20, 21, 22	One 1-Form-B relay, one optocoupler
TS120	G	350	120	35	5	20	300	0.8	2	3750	20, 21, 22	One 1-Form-A relay, one Darlington optocoupler
TS190	E	400	150	22	5	20	33	0.5	6	3750	20, 21, 22	One 1-Form-A relay, one optocoupler
TS190L	E	400	150	25	5	20	33	0.5	6	3750	21	One current-limiting 1-Form-A relay, one optocoupler
XS170	E	350	100	50	2	20	33	0.5	6	3750	20, 22	One 1-Form-A relay, one optocoupler

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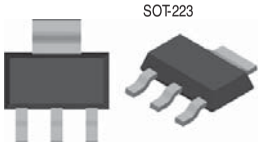
Field Effect Transistors

• N-Channel Depletion Mode FETs

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



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

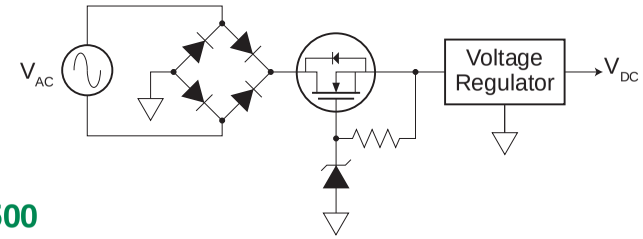
Features:

- Normally closed 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"

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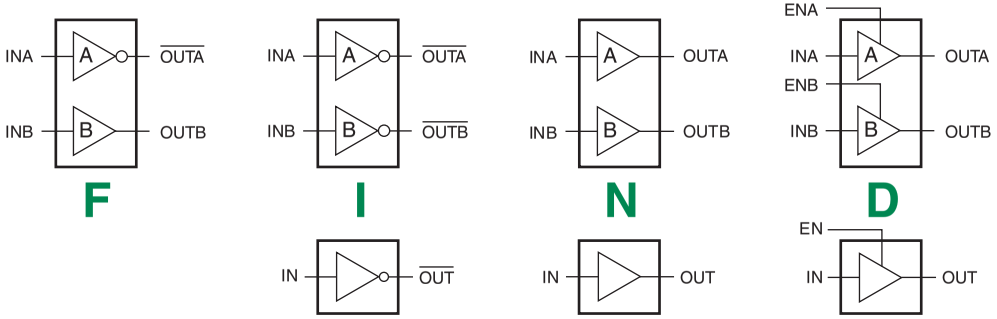
IGBT & MOSFET Gate Drivers

• Low-Side Gate Drivers

Part Number	Output Type	I_{PEAK} T_C=25°C (A_P)	Output Resistance (Ω)	Available Logic Configurations	Enable Function	Under-voltage Lockout (V)	Package Type
IX4426	DUAL	1.5	8	I	-	-	54, 56
IX4427	DUAL	1.5	8	N	-	-	54, 56
IX4428	DUAL	1.5	8	F	-	-	54, 56
IXD_602	DUAL	2	4	F, I, N	-	-	20, 53, 54, 56
IX4423	DUAL	3	4	I	-	-	54
IX4424	DUAL	3	4	N	-	-	54
IX4425	DUAL	3	4	F	-	-	54
IXD_604	DUAL	4	2.5	F, I, N, D	•	-	20, 53, 54, 56
IX4340	DUAL	5	1.5	D	•	$V_{CC} \leq 3.8$	53, 54, 92
IXD_609	SINGLE	9	1	I, N, D	•	-	20, 53, 54, 56, 57, 58
IXD_614	SINGLE	14	0.8	I, N, D	•	-	20, 53, 57, 58
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

AEC-Q100 Qualified Low-Side Gate Drivers

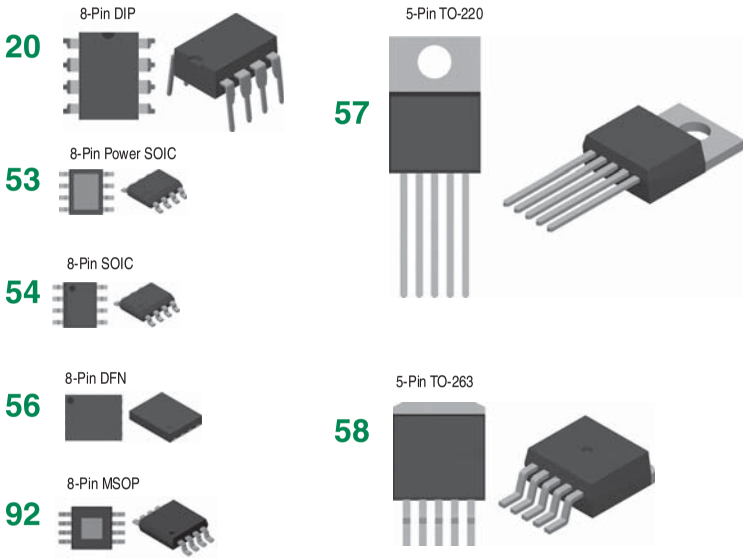
Part Number	Output Type	I_{PEAK} T_C=25°C (A_P)	Output Resistance (Ω)	Available Logic Configurations	Enable Function	Package Type
IXD_604SI	DUAL	4	2.5	F, I, N, D	•	53
IXD_604SIA	DUAL	4	2.5	F, I, N, D	•	54
IX4340NE	DUAL	5	1.5	D	•	53
IXD_609SI	SINGLE	9	1	I, N, D	•	53
IXD_614SI	SINGLE	14	0.8	I, N, D	•	53



IXD_604SI & SIA
IXD_609SI
IXD_614SI
IX4340NE
are AEC-Q100 qualified!

Features:
- 1.5A to 30A peak source/sink drive current
- Wide operating voltage range
- -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 output impedance

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



For data sheets, go to **www.ixysic.com/Products/ProdList.htm**

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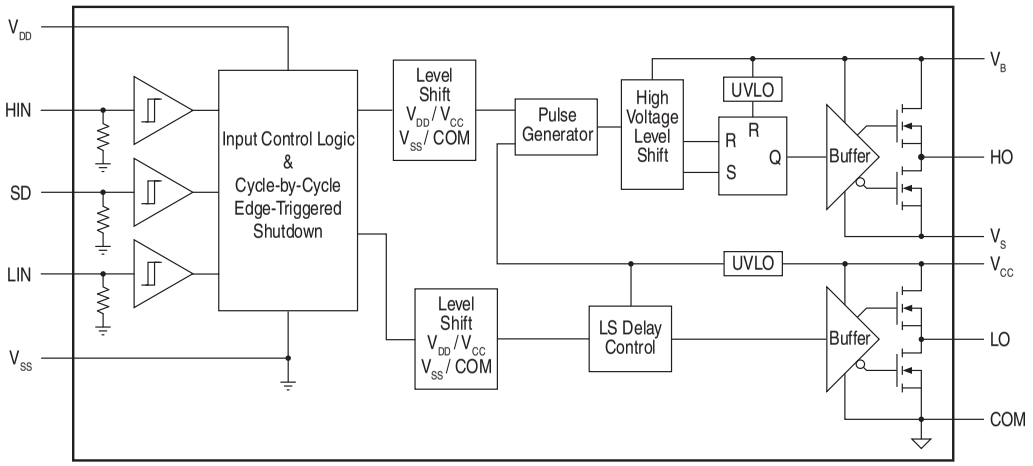
• IX2113: 600V High-Side & Low-Side Gate Driver

- **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**

IX2113



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

• IX21844: High Voltage Half-Bridge Gate Driver

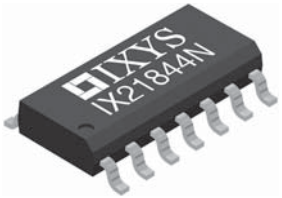
- **Programmable dead-time can be set between 400ns and 5µs**
- **Floating high-side channel can drive an N-channel power MOSFET or IGBT 600V from the common reference**

Features:

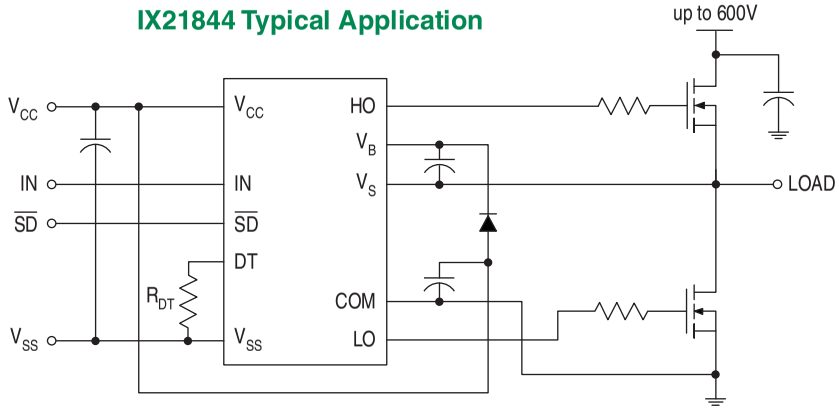
- Floating channel for bootstrap operation to 600V with an absolute maximum rating of 700V
- Outputs can source 1.4A and sink 1.8A
- Gate drive supply range from 10V to 20V
- Tolerant to negative voltage transients: dV/dt immune
- 3.3V and 5V logic compatible
- Under-voltage lockout for both high-side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



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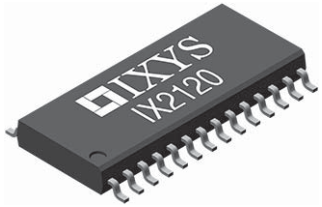
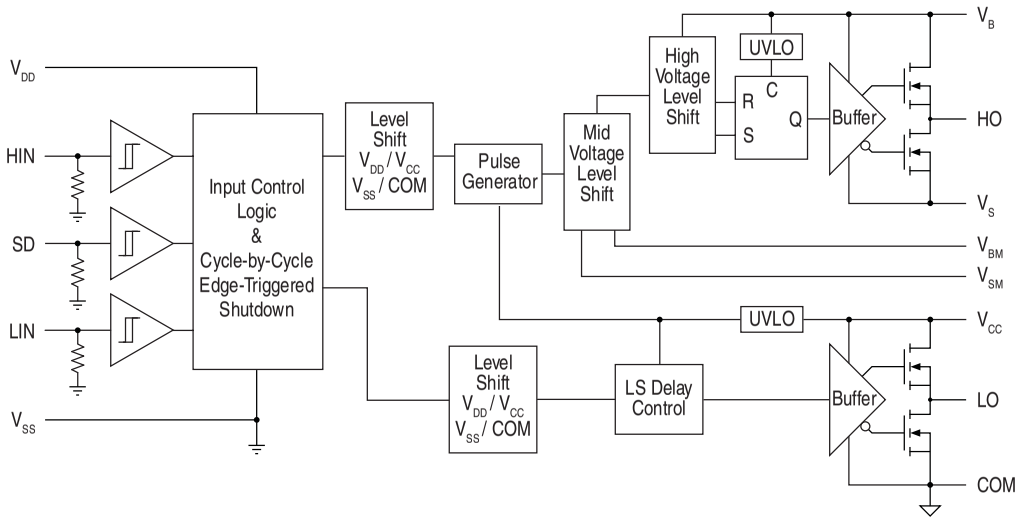
• IX2120: 1200V High and Low Side Gate Driver

• 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



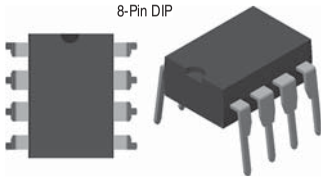
• IX2127: 600V High Side IGBT & MOSFET Gate Driver

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

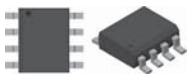
Features:
- Floating channel designed for bootstrap operation up to 600V
- Tolerant to negative transient voltages; dV/dt immune
- Under-voltage lockout
- 3.3V, 5V, and 12V input logic compatible
- Open-drain $\overline{\text{FAULT}}$ indicator pin shows over-current shutdown
- Output in-phase with the input

Applications:
- High speed gate driver
- Motor drive inverter

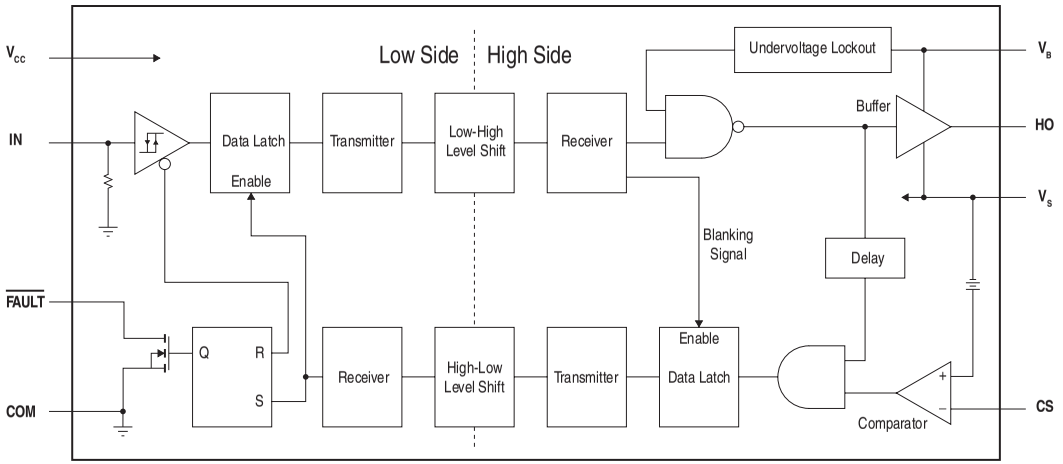
8-Pin DIP



8-Pin SOIC



IX2127 Functional Block Diagram



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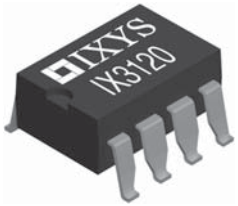
• IX3120: 2.5A Output Optically Coupled Gate Driver

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

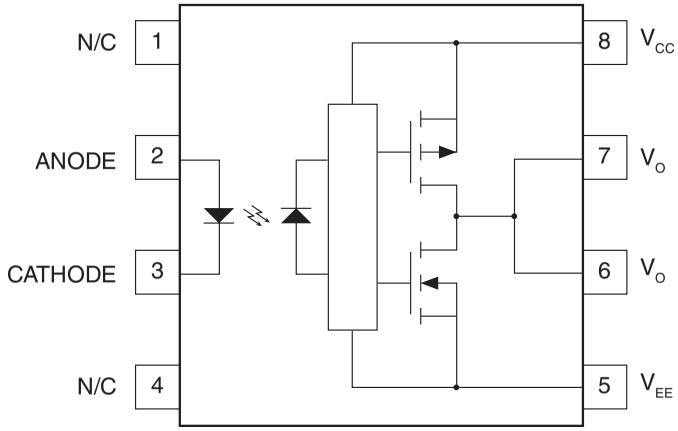
Features:
- 25kV/µs minimum common-mode rejection (CMR) at 1500V_{CM}
- Under-voltage lockout with hysteresis
- 3750V_{rms} input-to-output isolation
- Wide temperature range: -40°C to +100°C

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/µs).

IX3120

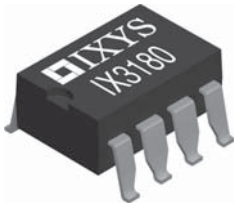


• IX3180: 2.5A Output Hi Speed Gate Driver Optocoupler

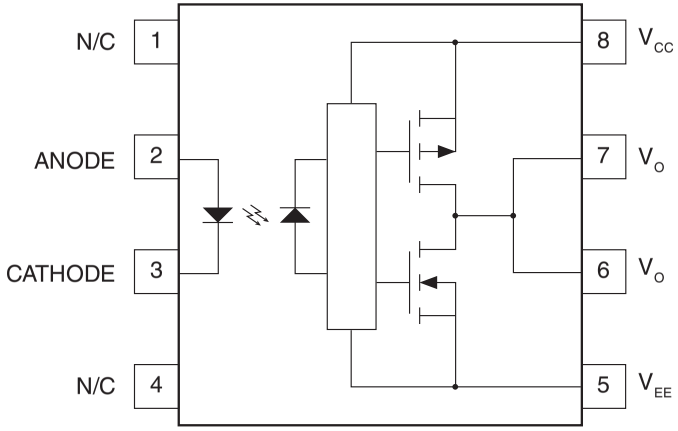
• 2.5A maximum peak output current
• Wide operating voltage range: 10V to 20V

Features:
- 200ns maximum propagation delay over temperature range
- 20ns typical pulse width distortion
- 10kV/µs minimum common-mode rejection (CMR) at 1500V_{CM}
- Wide operating voltage range: 10V to 20V
- Under-voltage lockout with hysteresis
- 3750V_{rms} 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



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• IX332B: 2.5 Amp Output Current IGBT Gate Driver Optocoupler

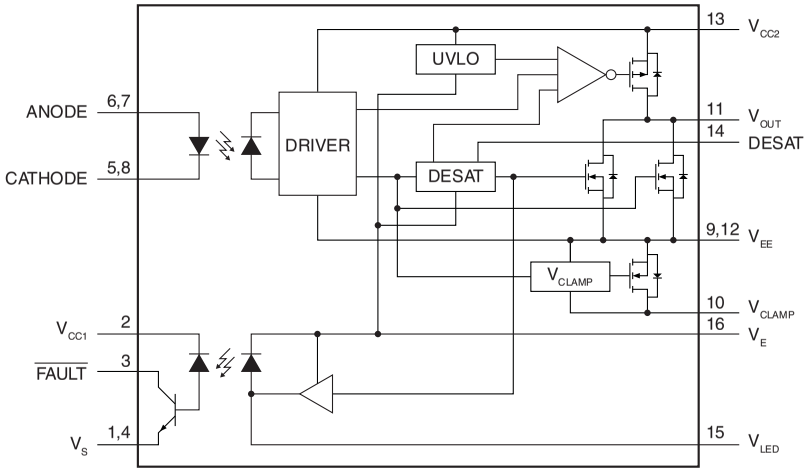
The IX332B is an advanced 2.5A output current, optically isolated, IGBT gate driver that integrates VCEdesaturation detection, UVLO fault status feedback, and active Miller clamping.

The IX332B is constructed as a power optocoupler with 4250Vrms isolation between the control input and power output stages. In addition, an optically isolated, open-collector feedback circuit relays FAULT status to the controller. Both optical isolation circuits employ highly efficient infrared LEDs.

Featuring soft IGBT turn-off, isolated fault feedback, under voltage lock-out with hysteresis, active Miller clamping, and VCE desaturation detection, the IX332B offers engineers design flexibility and maximum circuit protection.

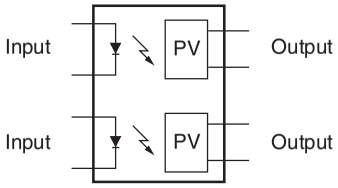
Features:
- Under Voltage Lock-Out Protection (UVLO) with Hysteresis
- Floating outputs for parallel or series configuration
- Desaturation Detection
- "Soft" IGBT Turn-off
- Miller Clamping
- Open Collector Isolated fault feedback

Applications:
- Isolated IGBT/Power MOSFET gate driver



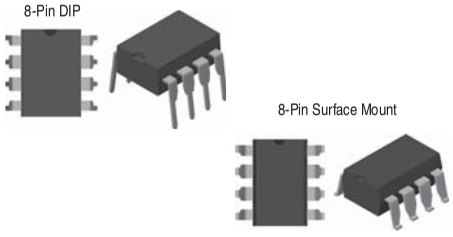
• Optically Isolated Photovoltaic Gate Drivers

- **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_{OC} (V)	Nominal Short-Circuit Current I_{SC} (μA)	Switching Speeds t_{on} / t_{off} (ms)	Isolation Voltage (V_{rms})	Package Type
FDA215	5	5.5	2.5	5 / 5	3750	8-pin DIP, 8-pin surface mount
FDA217	5	11.75	4.5	2 / 0.5	3750	8-pin DIP, 8-pin surface mount

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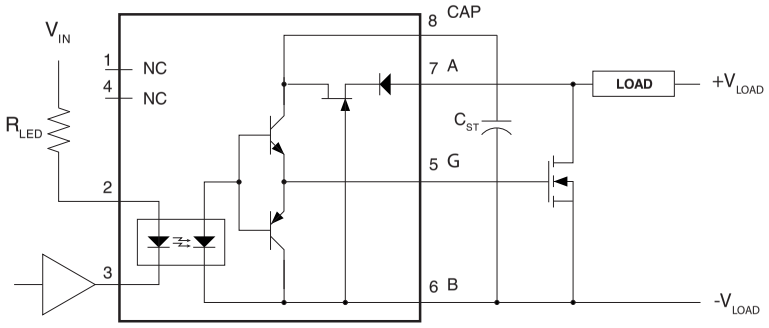
• Optically Isolated Load-Biased Gate Drivers

- **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



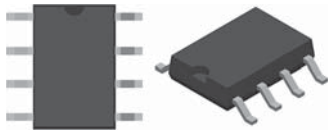
Features:

- 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

8-Pin Flatpack



Part Number	Input Control Current (mA)	Gate Voltage @ I_F=5mA (V_G)	Blocking Voltage (V_P)	Regulated Capacitor Voltage ($V_{CAP-MAX}$)	Switching Speeds t_{on} / t_{off} (µs)	Isolation Voltage (V_{rms})
CPC1580	2.5	7.5 - 12	65	V_{DS} - 0.2V	40 / 400	3750
CPC1590	2.5	7.5 - 12	200	16	40 / 400	3750

• CPC1596: 570V Optically Isolated Load-Biased Gate Driver

Features:

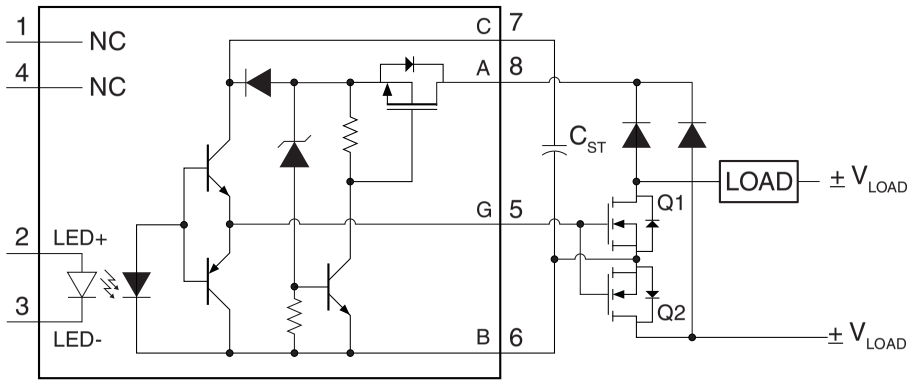
- Requires No Load-side Power Supply
- Drives External Power MOSFET
- Only 2.5mA Input LED Current to Drive External MOSFET
- 3750Vrms Input-to-Output Isolation

Applications:

Optically Isolated AC or DC Relays for:

- Industrial Controls
- Instrumentation
- Medical Equipment Isolation
- Electronic Switching
- I/O Subsystems
- Appliances

CPC1596



CPC1596 AC Application Circuit

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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 20Ω
- Low charge injection, low capacitance analog switches
- Very low quiescent current: 30nA typical
- -58dB off-isolation at 5MHz
- Internal bleed resistors: CPC7232 & CPC7701

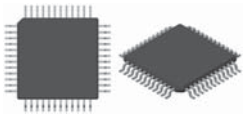
Applications:

- Piezoelectric transducer drivers
- Ultrasound imaging
- Printers
- Industrial controls and measurement

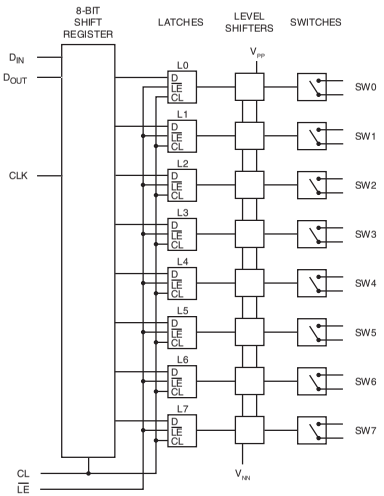
Part Number	Number of Channels	Channel On-Resistance (Ω)	Bleed Resistors (kΩ)	Clock Frequency (MHz)	Turn-On Time (µs)	Turn-Off Time (µs)	Package Type
CPC7220	8	20	-	5	5	5	50
CPC7232	8	21	20 - 50	5	5	5	50
CPC7601	16	25	-	8	5	5	50
CPC7701	16	25	20 - 50	8	5	5	50

48-Pin LQFP

50

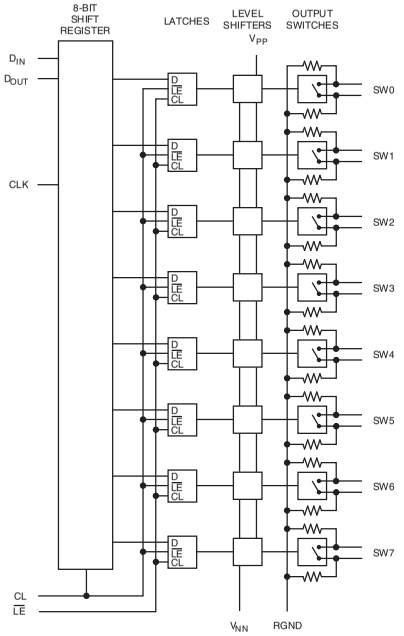


CPC7220

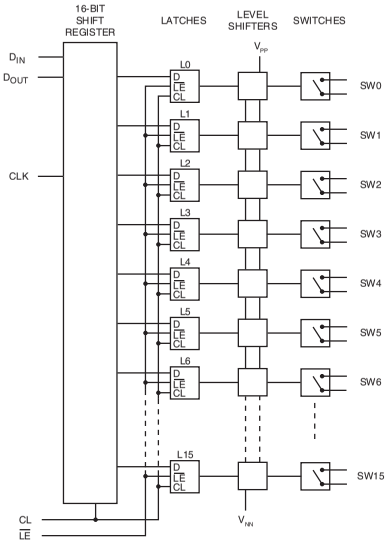


8 Switches

CPC7232

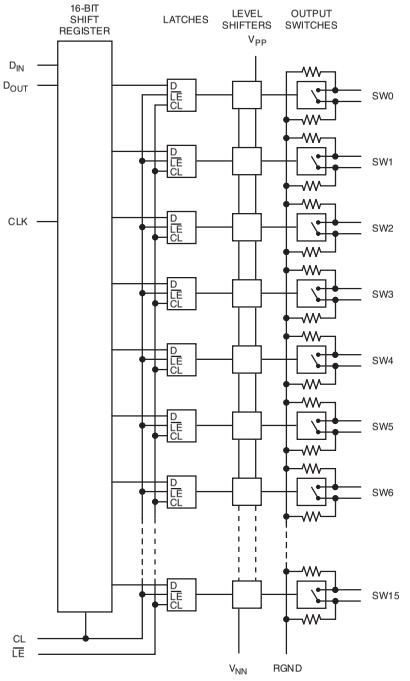


CPC7601



16 Switches

CPC7701



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• 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:

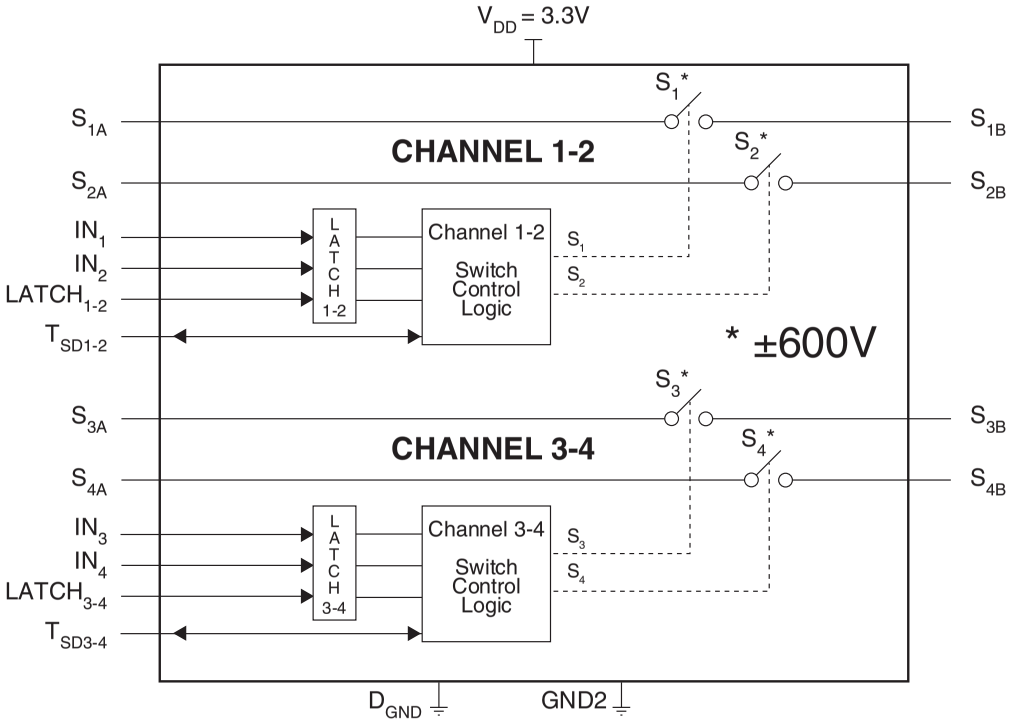
- Switch voltage up to 600V
- 110dB switch-to-switch isolation at 5kHz
- Flexible switch configurations
- Smart logic for power-up/hot-plug state control
- **3.3V operation** with very low power consumption
- Switch current limiting and thermal shutdown protect against fault conditions
- TTL logic-level 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

28-Pin SOIC

CPC7524



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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**

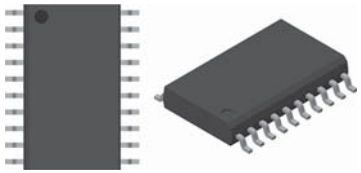
Features:

- Low, matched R_{ON}
- Switch voltage up to ±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

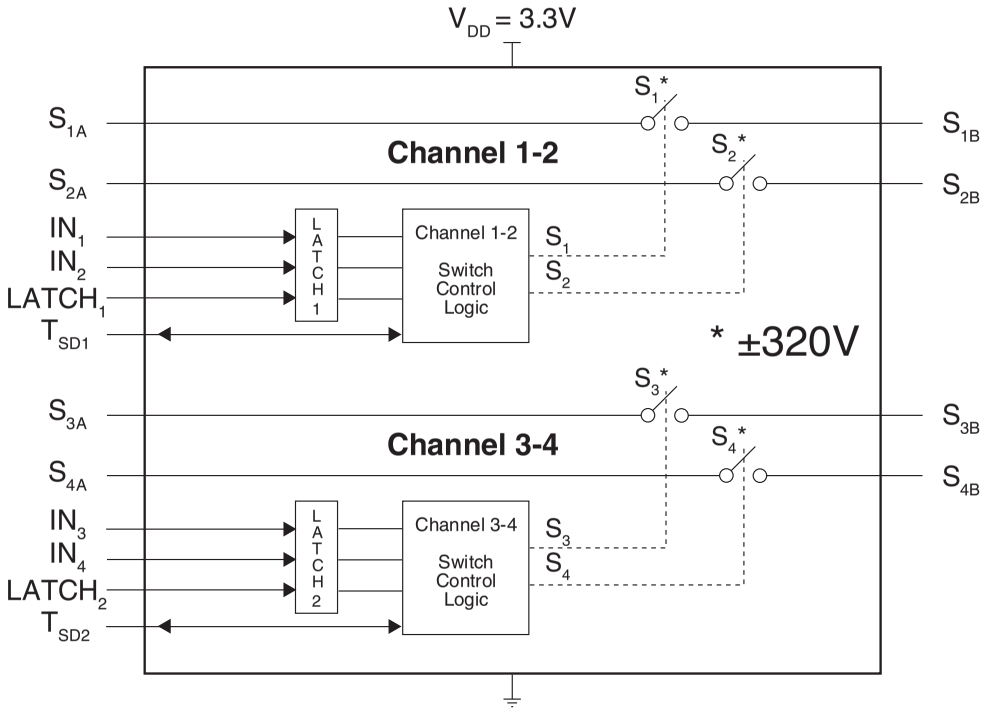
Applications:

- 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)

20-Pin SOIC



CPC7514



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

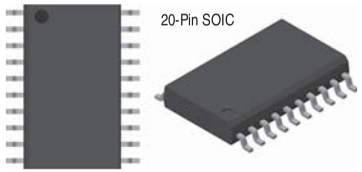
- **Provides single-ended or differential access to high voltage networks**
- **Self-biasing: no external high-voltage supplies required**

Features:

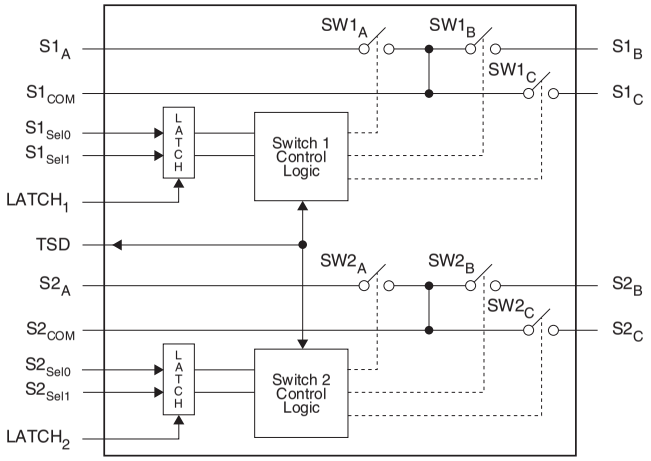
- Low, matched R_{ON}
- Guaranteed break-before-make (BBM)
- Switch voltage up to ±320V
- 60dB off-isolation at 1MHz
- Smart logic for power-up/hot-plug state control
- 5V operation with very low power consumption
- Thermal shutdown protects against fault conditions
- Latched TTL logic level inputs

Applications:

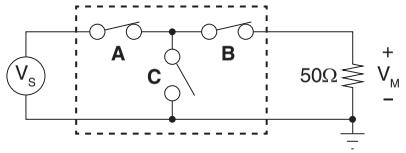
- Instrumentation
- Industrial controls and monitoring
- Multiplexed ultrasonic transducer switching
- Automatic test equipment (ATE)
- Battery monitoring and charging



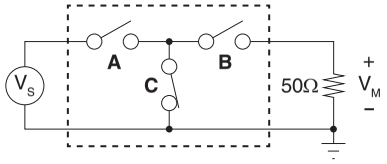
CPC7512



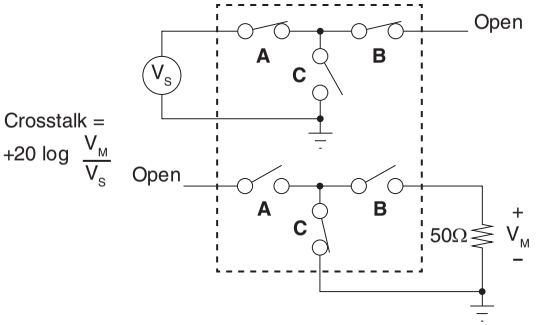
Insertion Loss = $+20 \log \frac{V_S}{V_M}$

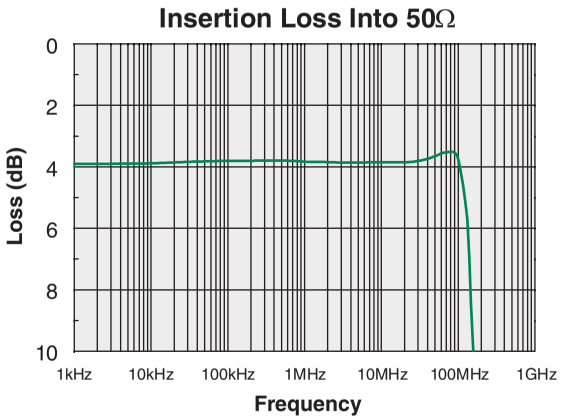


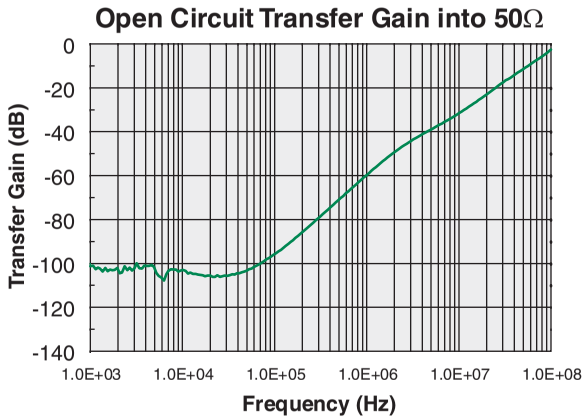
Open Circuit = $+20 \log \frac{V_M}{V_S}$

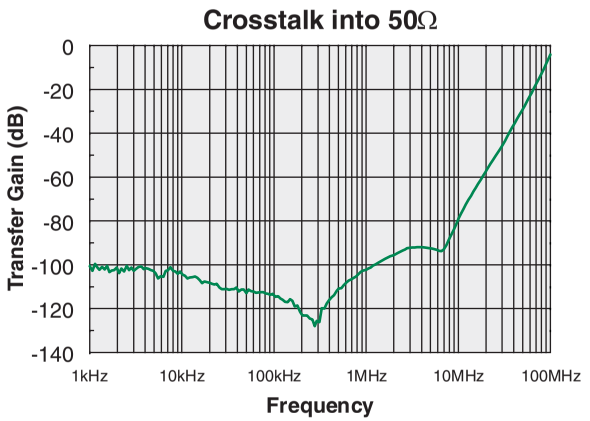


Crosstalk = $+20 \log \frac{V_M}{V_S}$









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High Speed Digital Optical Isolators

• Optically Isolated I²C Bus Repeaters: CPC5902 & CPC5903

- **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**

See Application Note TB-101 "Optically Isolating an I²C Interface"

CPC5902 Features:

- Bidirectionally buffers both I²C signals
- Extends and isolates I²C interfaces
- Supports standard and fast mode I²C (400kbps)
- Side B fast-mode compliant: V_{DDB} > 4.5V
- Supports I²C clock stretching
- No internal clock - low EM & RF generation
- 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 I²C bus
- Slew-limited drivers reduce EMI
- Immune to external EMI & RF emissions
- High voltage isolation

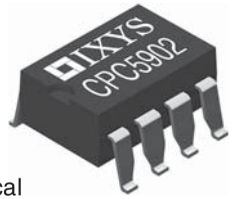
CPC5903 Features:

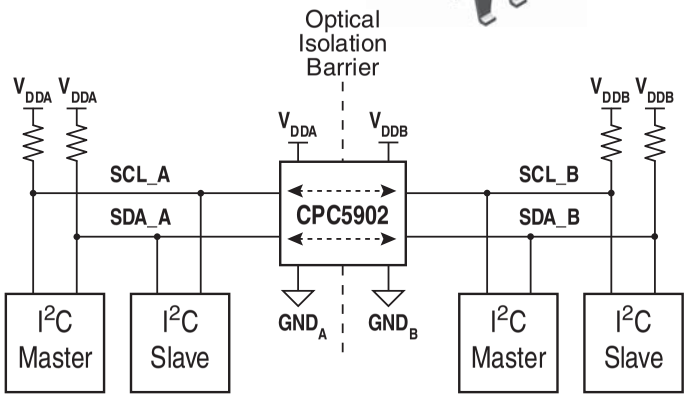
- Bidirectionally buffers SDA I²C signal
- Side A extends and isolates I²C interfaces
- Standard-mode and fast-mode I²C
- Side B fast-mode compliant: V_{DDB} > 4.5V
- Operates on 2.7V to 5.5V
- No internal clock - low EM & RF generation
- Voltage level translation
- Slew-limited drivers reduce EMI
- Power down to Hi-Z does not load I²C bus
- 3750V_{rms} galvanic isolation
- Immune to external EMI & RF emissions
- High voltage isolation

Applications:

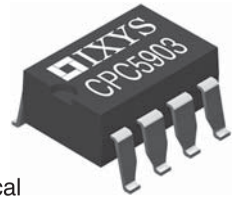
- Power-over-Ethernet (POE)
- I²C bus length extender
- Isolated control and signal monitoring
- Power supply high-side interface
- I²C logic level translation

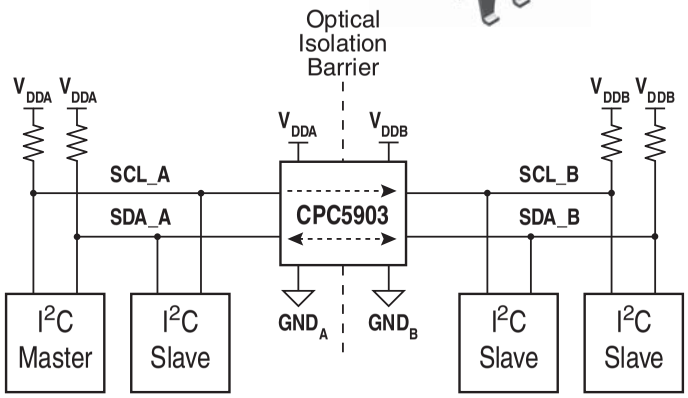
CPC5902





CPC5903





For data sheets, go to **www.ixysic.com/Products/ProdList.htm**

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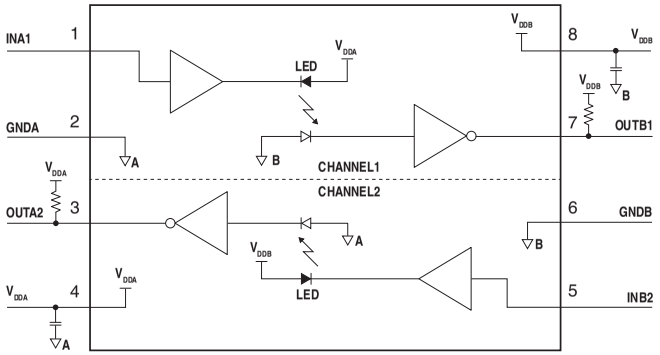
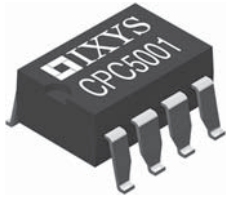
• Single-Channel Each Direction Digital Optical Isolator: CPC5001

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

CPC5001



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_{rms} galvanic isolation from input to output
- Power down to Hi-Z does not load outputs
- 5 Mbaud data rate



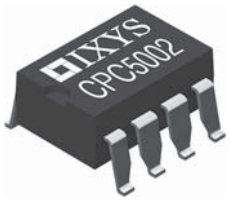
Applications:
- Isolated signal monitoring and control
- Power-over-Ethernet, POE
- Power supply high-side interface
- Logic level translation
- Microprocessor system interface
- Inter integrated circuit (I^2C) interface
- Serial peripheral interface
- Full duplex communication
- Isolated line receiver
- Isolated data acquisition systems

• Dual High Speed Digital Optical Isolator: CPC5002

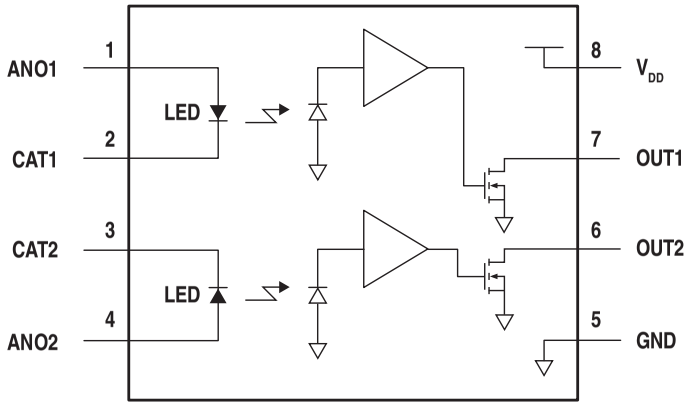
- **3750V_{rms} galvanic isolation from input to output**
- **Passes DC signals - no refresh clock needed**

Features:
- Dual optics isolate two signals
- **10 Mbaud** data rate
- Operates over 2.7V < V_{DD} < 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^2C bus isolation



CPC5002



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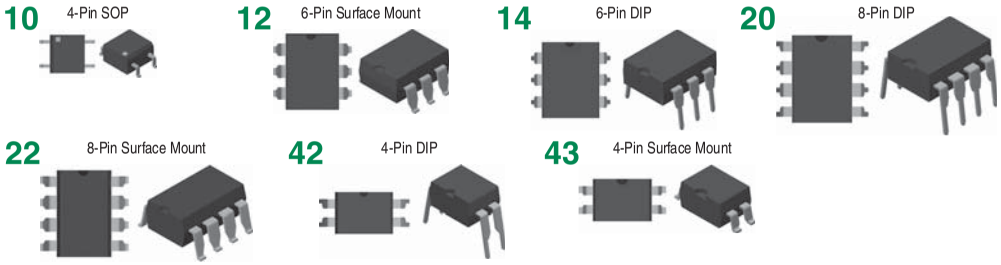
OPTOCOUPLERS

• SINGLE & DUAL OPTOCOUPLERS

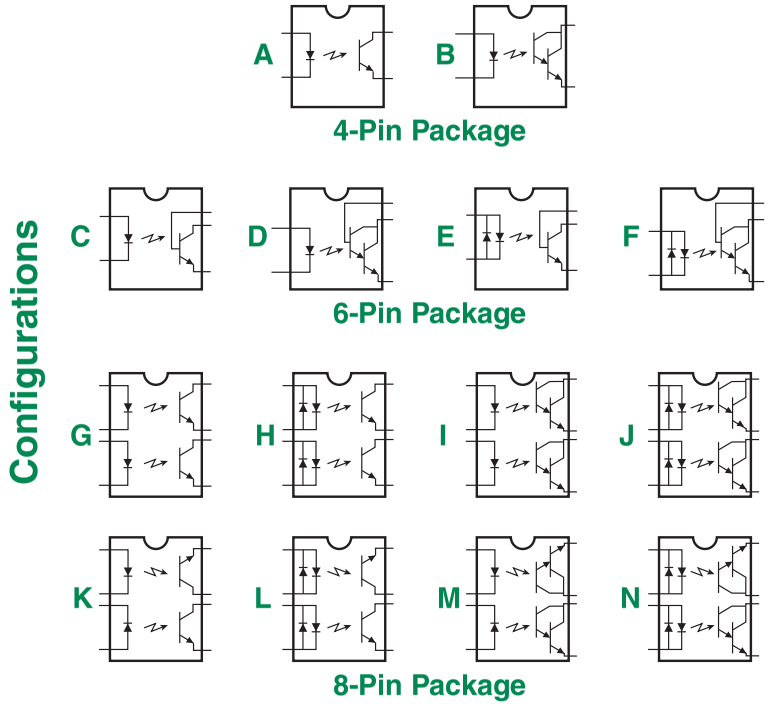
- **Single-transistor output or Darlington transistor output for higher current gain**
- **Single-LED for unidirectional input signal or dual-LED input for bidirectional input signal**
- **Input-to-output isolation: 1500V_{rms}, 3750V_{rms}, or 5000V_{rms}**

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
CPC1001N	30	330	0.3	0.2	1500	10	A
CPC1301	350	5500	1.2	1	5000	42, 43	B
CPC1302	350	5500	1.2	1	3750	20, 22	I
CPC1303	30	1000	0.5	0.2	5000	42, 43	A
LDA100	30	300	0.5	1	3750	12, 14	E
LDA101	30	300	0.5	1	3750	12, 14	C
LDA102	30	350	0.5	1	3750	12, 14	C
LDA110	30	8500	1	1	3750	12, 14	F
LDA111	30	8500	1	1	3750	12, 14	D
LDA200	30	300	0.5	1	3750	20, 22	L
LDA201	30	300	0.5	1	3750	20, 22	K
LDA202	30	300	0.5	1	3750	20, 22	H
LDA203	30	300	0.5	1	3750	20, 22	G
LDA210	30	8500	1	1	3750	20, 22	N
LDA211	30	8500	1	1	3750	20, 22	M
LDA212	30	8500	1	1	3750	20, 22	J
LDA213	30	8500	1	1	3750	20, 22	I



For data sheets, go to **www.ixysic.com/Products/ProdList.htm**

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• Linear Optocouplers

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

Features:

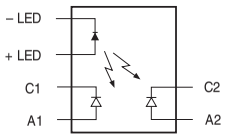
- Couples analog & digital signals
- 3750V_{rms} input-to-output isolation
- Bandwidth >200kHz in photoconductive mode
- Bandwidth 40kHz in photovoltaic mode
- High gain stability
- Low input-to-output capacitance
- Low power consumption
- 0.01% servo linearity
- THD 87dB typical

Applications:

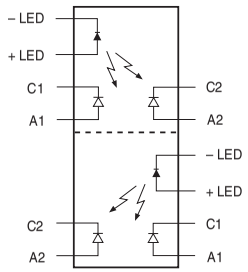
- Power supply feedback voltage/current
- Medical sensor interfacing
- Isolation of process control transducers
- Isolated 4-20mA converters
- Telephony isolation

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_{rms})	Package Type
LOC110	0.004 - 0.03	0.004 - 0.03	0.668 - 1.179	2 - 10	3750	20, 21, 22
LOC111	0.008 - 0.03	0.006 - 0.03	0.733 - 1.072	2 - 10	3750	20, 21, 22
LOC112	0.004 - 0.03	0.004 - 0.03	0.733 - 1.072	2 - 10	3750	20, 21, 22
LOC117	0.008 - 0.03	0.006 - 0.03	0.887 - 1.072	2 - 10	3750	20, 21, 22
LOC210	0.004 - 0.03	0.004 - 0.03	0.773 - 1.072	2 - 10	3750	4
LOC211	0.008 - 0.03	0.006 - 0.03	0.773 - 1.072	2 - 10	3750	4

LOC11x



LOC21x

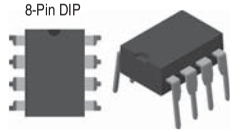


16-Pin SOIC

4

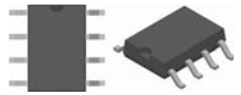
8-Pin DIP

20



8-Pin Flatpack

21



8-Pin Surface Mount

22

Two fundamental operating configurations:

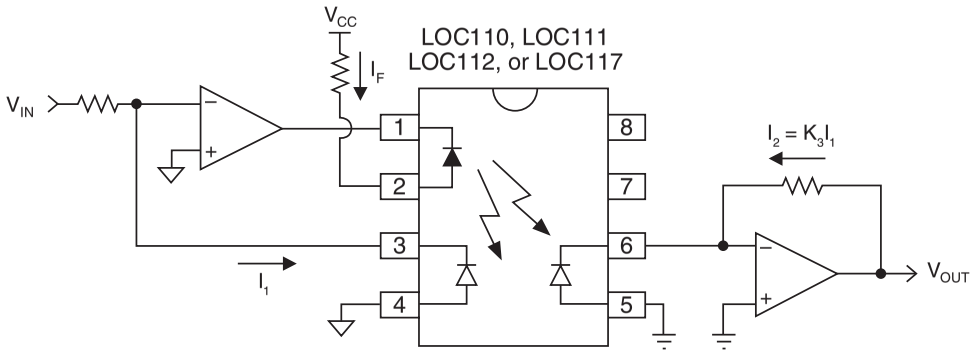
Photoconductive Mode:

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

Photovoltaic Mode:

- **14-bit linearity**
- **40kHz bandwidth**

Isolation Amplifier (Photovoltaic Mode)



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Lighting & Display Products

• High Voltage LED Drivers

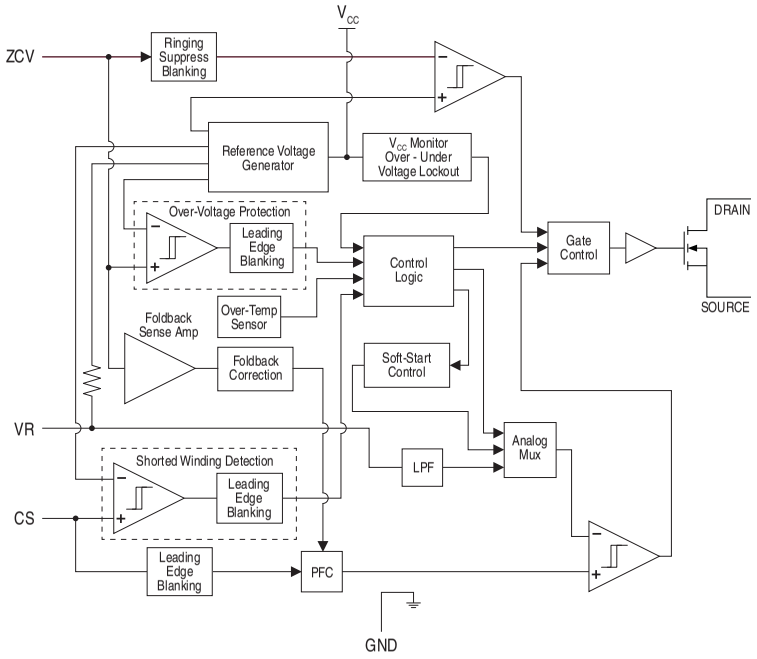
IX9907: High Voltage, Dimmable LED Driver with PFC Control

- **Optimized for phase-cut dimmable, off-line LED applications**
- **Multiple safety features ensure full system protection**

Features:

- Internal 650V, 2Ω power MOSFET
- Single stage, primary control with PFC and dimming features
- >90% efficiency
- >98% power factor
- Wide operating voltage range
- Digital soft start
- Foldback correction and cycle-by-cycle peak current control
- Output over-current and over-voltage protection
- Over-temperature protection
- Under-voltage lockout

IX9907
Block Diagram



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

IX9907, MXHV9910

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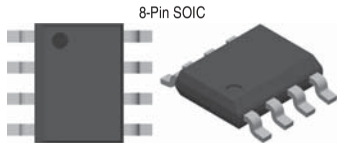
CPC9909: High Efficiency, High Brightness Off-Line LED Driver

- **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



IX9908, CPC9909

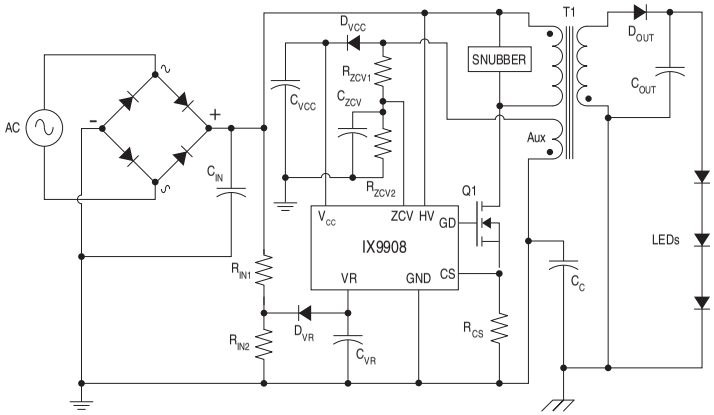
IX9908: High Voltage, Dimmable LED Driver with PFC Control

- **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

IX9908



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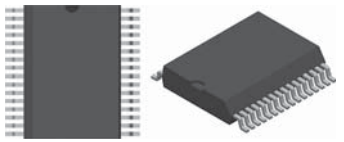
TELECOMMUNICATIONS PRODUCTS

• 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 surface mount 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)

32-Pin SOIC



The 3kV$_{rms}$ 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 for information on codec reference designs that offer programmable AC termination impedance for global applications. LITELINK complies with international PSTN agency requirements.

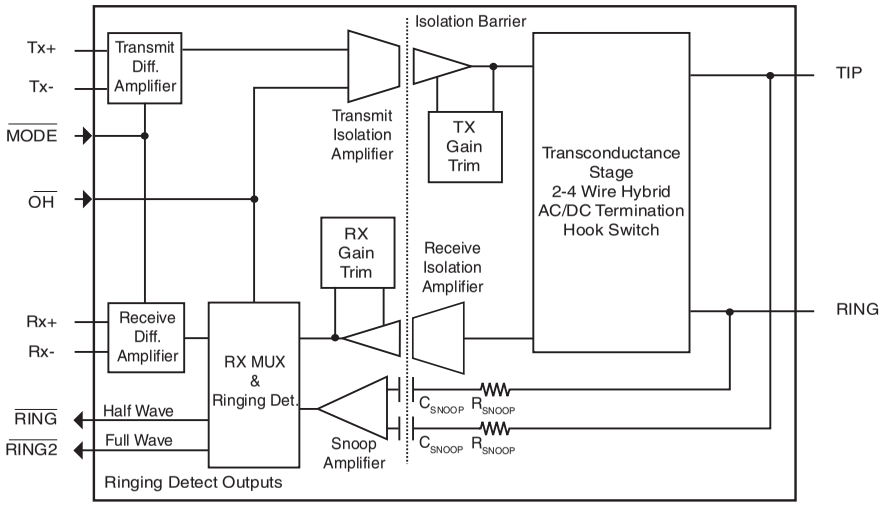
Features:

- 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

CPC5622



For data sheets, go to **www.ixysic.com/Products/ProdList.htm**

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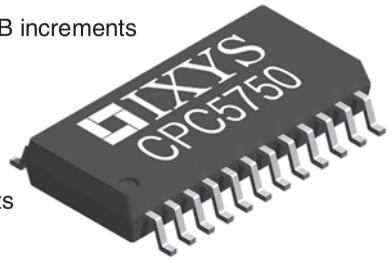
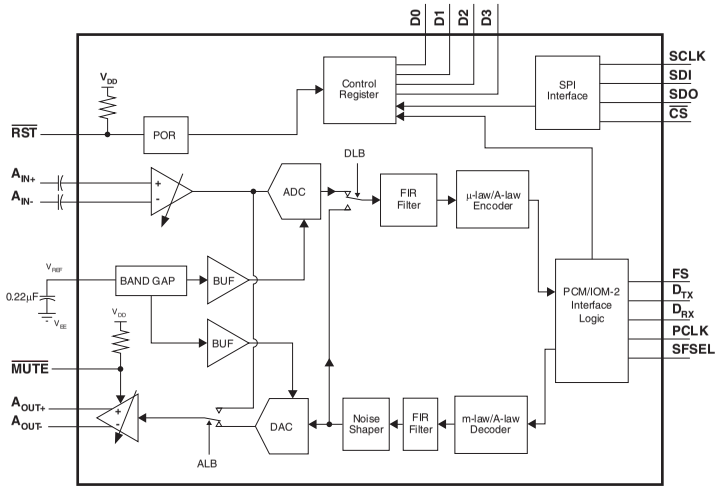
• Single-Channel Voice-Band Codec: CPC5750

Features:

- μ-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 600Ω
- 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} = 20μA
- 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 2.8V to 5.5V supply**

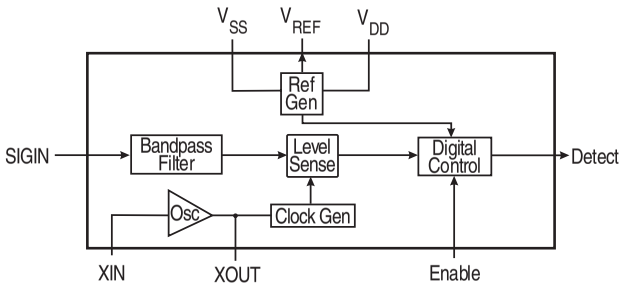
Features:

- Receive common call progress tones
- The M-980-02 operates with a single 2.8-5.5 volt supply
- Linear input (detector)
- Inexpensive band detector with wide dynamic range (>38dB)
- Low power consumption

Applications:

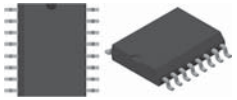
- PBX circuits
- Billing systems
- Test equipment
- Point-of-sale terminals

M-980-02: Call Progress Tone Detector

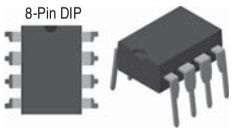


Part Number	Function (315 - 640Hz)	Package Types
M-980-02	Tone detector	16-pin SOIC, 8-pin DIP

16-Pin SOIC



8-Pin DIP



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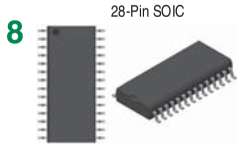
• Line Card Access Switches (LCAS)

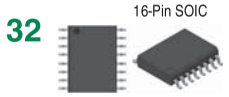
Features:

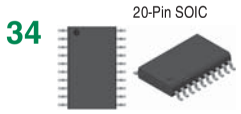
- Monolithic IC reliability
- Impulse noise reduction
- Low, matched on-resistance
- Built-in zero-cross ringing switching
- Small surface mount SOIC packages
- Ultra-low power consumption of <10.5mW
- Robust power-cross and lightning surge performance
- Current limiting, thermal shutdown, and SLIC protection

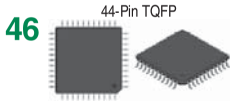
Applications:

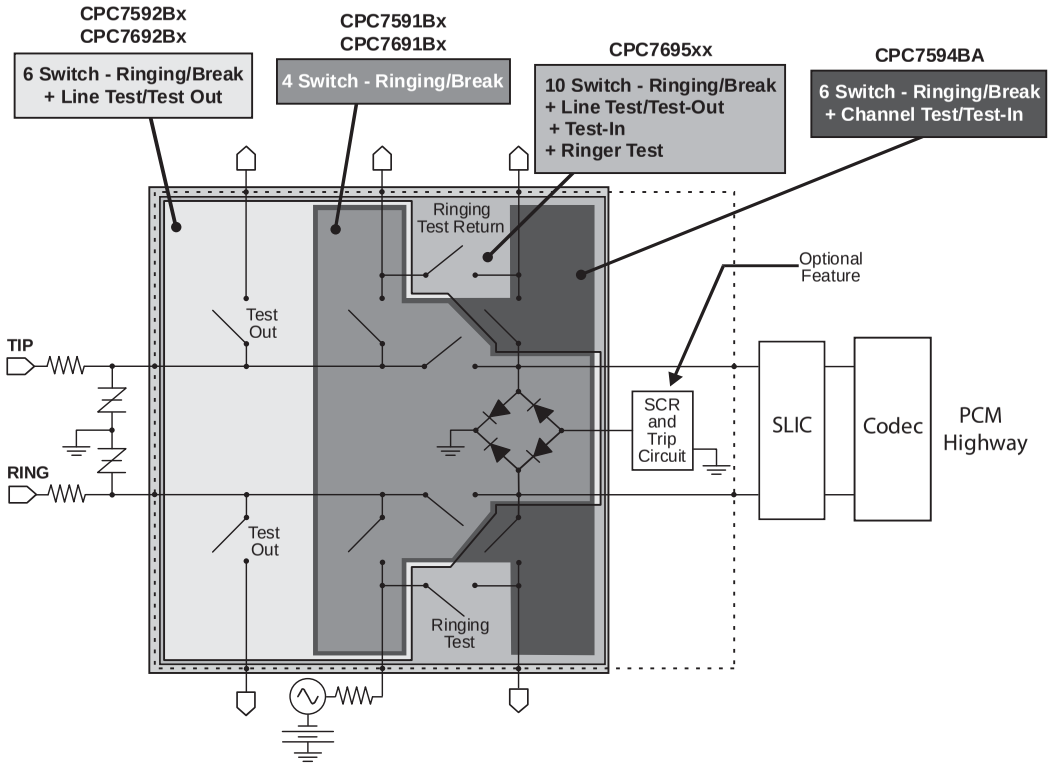
- PBX systems
- VoIP gateways
- Channel banks
- Pair gain systems
- Central offices (CO)
- Fiber in the loop (FITL)
- Hybrid fiber coax (HFC)
- Digital loop carriers (DLC)
- Digitally added main line (DAML)











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

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• 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**

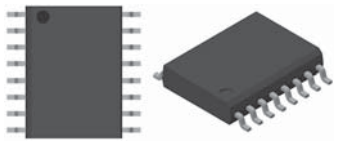
Features:

- 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

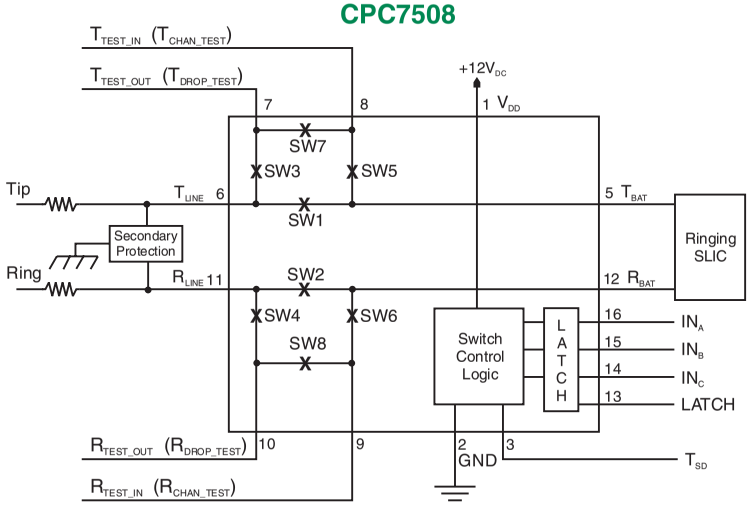
Applications:

- Fiber to the home (FTTH)
- Fiber in the loop (FITL)
- VoIP gateways
- PBX systems
- Digitally added main line (DAML)
- Hybrid fiber coax (HFC)

16-Pin SOIC



CPC7508



• 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		•			

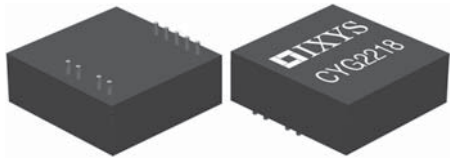
Features:

- 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



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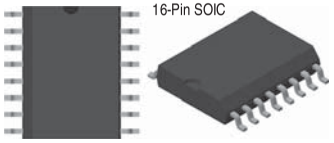
• DC Termination ICs (xDSL, ISDN)

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**

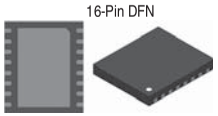
Features:

- 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.)

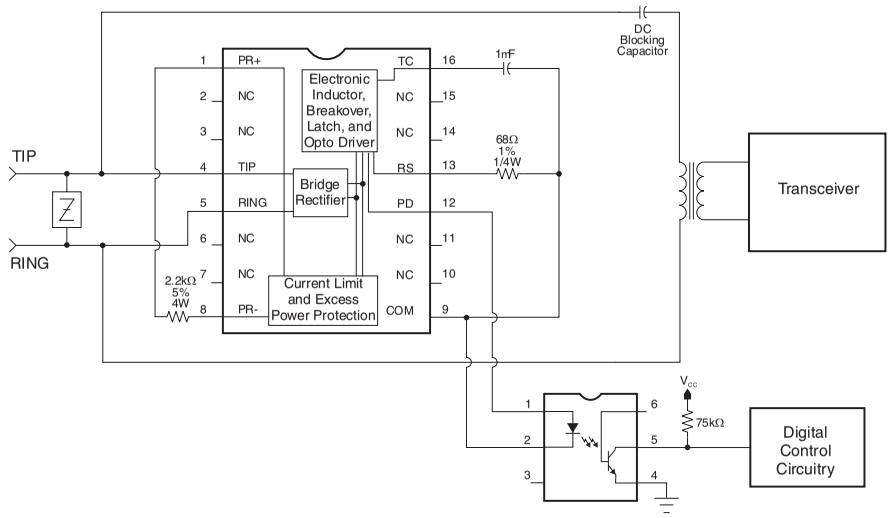


Applications:

- 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



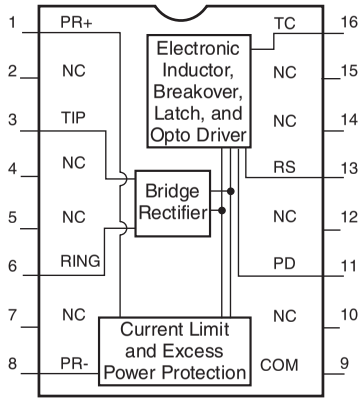
CPC1465 & Application Circuit

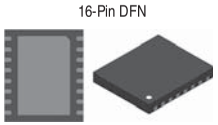


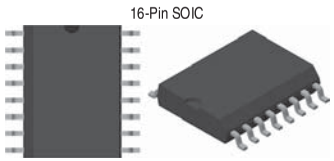
CPC1466: Broadband ADSL/VDSL

- **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

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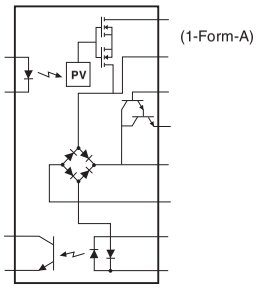
• Telecom Multifunction Products (General Purpose Multifunction Products - Page 18)

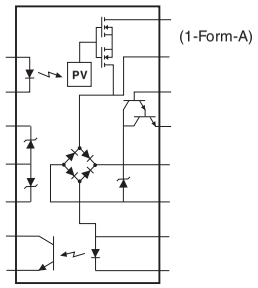
Multifunction devices allow designers to consolidate circuit functions into a single device, freeing up valuable board space and reducing component count. Designed specifically for the telecommunications industry, the Integrated Telecom Circuit (ITC) series is well suited for voice telephony and modem 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.

No Zener Protection Bidirectional Opto-Input



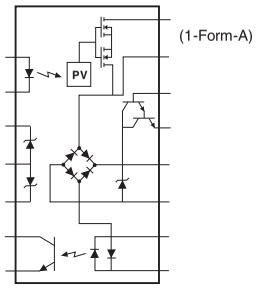
ITC117(L)

Zener Protection Unidirectional Opto-Input



ITC135

Zener Protection Bidirectional Opto-Input

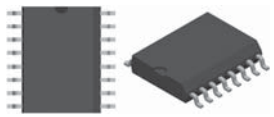


ITC137

Features:

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

16-Pin SOIC



Applications:

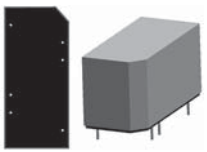
- Telecommunication/datacommunication
- Instrumentation
- I/O subsystems
- Electronic switching
- Medical equipment (patient/equipment isolation)
- Security
- Aerospace
- Industrial controls

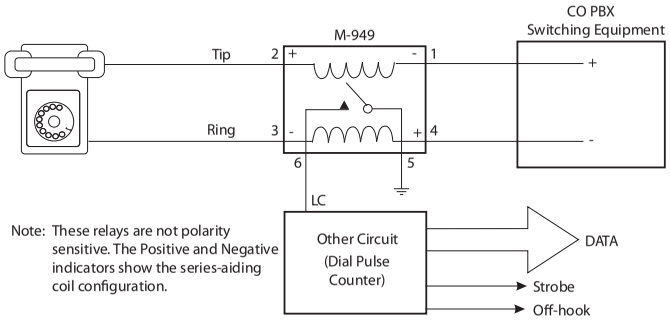
Part Number	Relay Parameters				Optocoupler Parameters				Isolation Voltage	Package Type	Features
	Blocking Voltage (V_P)	Load Current (mA)	On Resistance (Ω)	Input Control Current (mA)	Breakdown Voltage (V)	Current Transfer Ratio (%)	Saturation Voltage (V)	Input Control Current (mA)	(V_{rms})		
ITC117P	350	120	15	5	20	33	0.5	6	3750	16-pin SOIC	Full-wave ringing detect
ITC117PL	350	120	20	5	20	33	0.5	6	3750	16-pin SOIC	Full-wave ringing detect, current limiting
ITC135P	350	120	15	5	20	33	0.5	6	3750	16-pin SOIC	Half-wave ringing detect
ITC137P	350	120	15	5	20	33	0.5	6	3750	16-pin SOIC	Full-wave ringing detect

• 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





Note: These relays are not polarity sensitive. The Positive and Negative indicators show the series-aiding coil configuration.

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Voltage Monitoring & Sensing ICs

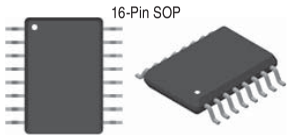
• Voltage Monitoring Devices

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:

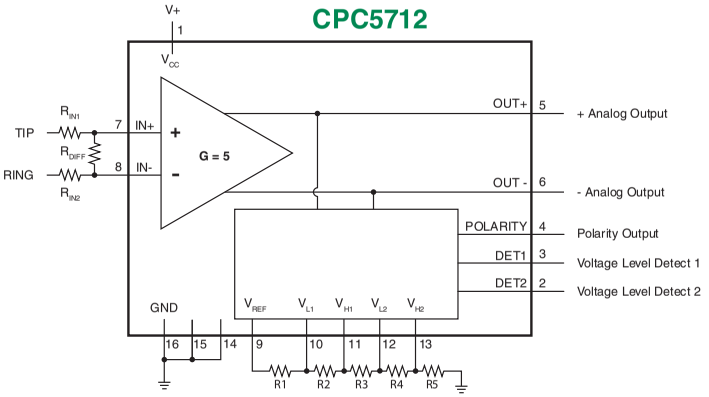
- 2 independent, programmable level-detectors with programmable hysteresis
- Fixed-level polarity detector with hysteresis
- Differential linear output
- Excellent common-mode rejection ratio (CMRR)
- Worldwide telephone network compatibility
- Minimum external components
- High differential input impedance, very low common-mode input impedance
- Fixed gain, 3V to 5.5V operation
- Low power consumption
- CMOS logic level output (TTL compatible)



Applications:

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

CPC5712



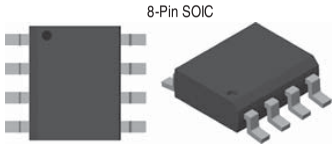
Resistors set the Voltage Level Detect Thresholds

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**

Features:

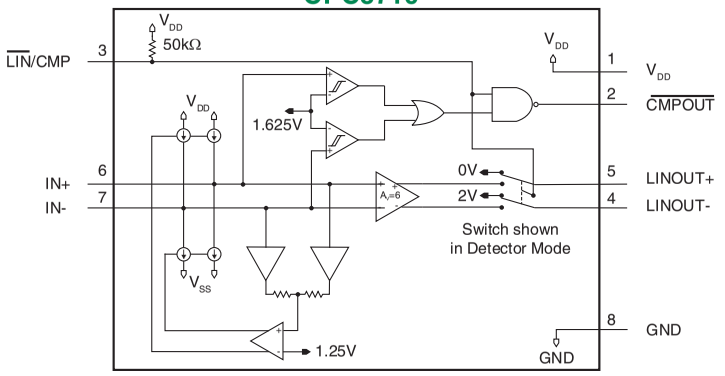
- Differential or single-ended linear output
- Full-wave ringing level detector comparator with internal threshold, large hysteresis, and TTL logic level output
- High common-mode rejection ratio (CMRR)
- Worldwide telephone network compatibility, virtually undetectable in use
- High differential input impedance, very low common-mode input impedance
- Fixed gain, 3.3V or 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

CPC5710



For data sheets, go to **www.ixysic.com/Products/ProdList.htm**

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• Low Voltage Error Amplifier with a High Voltage Darlington Transistor: IX9915

The IX9915 integrates an error amplifier with a precision reference and a 350V Darlington transistor in a single package. The error amplifier can be operated from 1.3V to 12.5V over the operational temperature range. The breakdown voltage of the Darlington transistor is 350V.

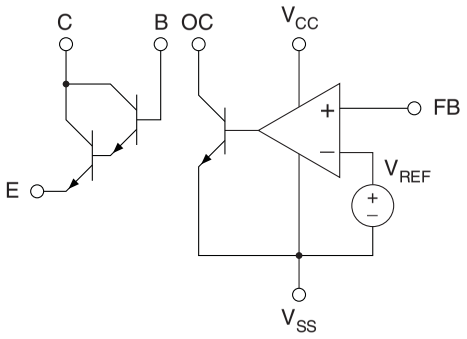
The integrated combination of a 4-terminal 431 type shunt regulator with a high voltage Darlington transistor is ideal for use in LED lamp bleeder control circuits.

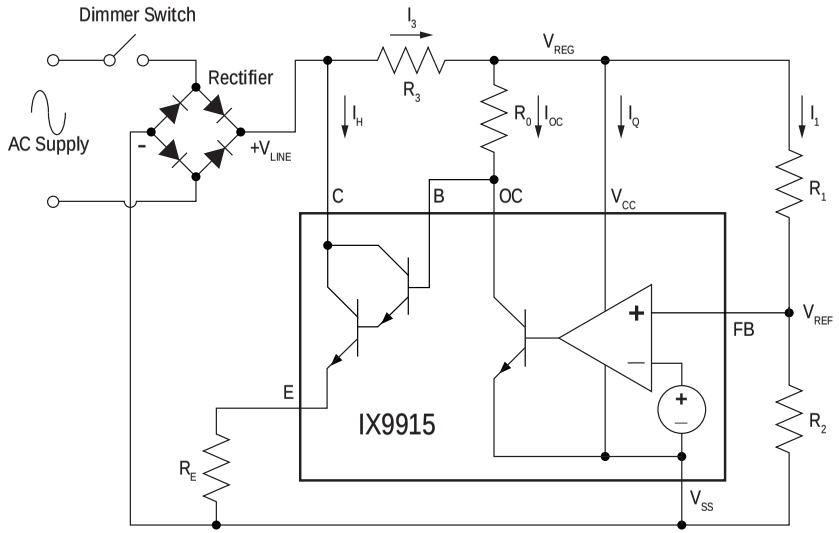
Features:

- Precision reference, error amplifier, and a high voltage Darlington transistor in a single package
- 1.299V±1% reference @25°C (±1.5% @-40°C to 85°C)
- Error amplifier supply voltage range: 1.3V to 12.5V over temperature
- Breakdown voltage of Darlington transistor: 350V

Applications:

- LED lamps
- Low voltage power supply feedback
- AC-to-DC off-line power supplies
- DC-to-DC converters





IX9915 Application Diagram

The high voltage Darlington transistor will bleed the current when V_{LINE} is lower than the predetermined voltage. The 4-terminal 431 type shunt regulator is used to monitor V_{LINE} voltage and control the Darlington transistor bleeding the current (ON) or not (OFF). When V_{LINE} reaches the predetermined voltage, the shunt regulator starts to regulate to drive V_{OC} going low, and turns off the Darlington transistor to make sure this bleeder circuitry only burns a little power at the higher V_{LINE} voltage. Maximum bleeding current I_H can be controlled by properly choosing R_E and V_{REG}.

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• Optically Isolated Error Amplifiers

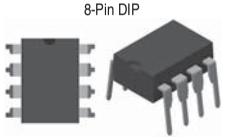
Features:

- 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:

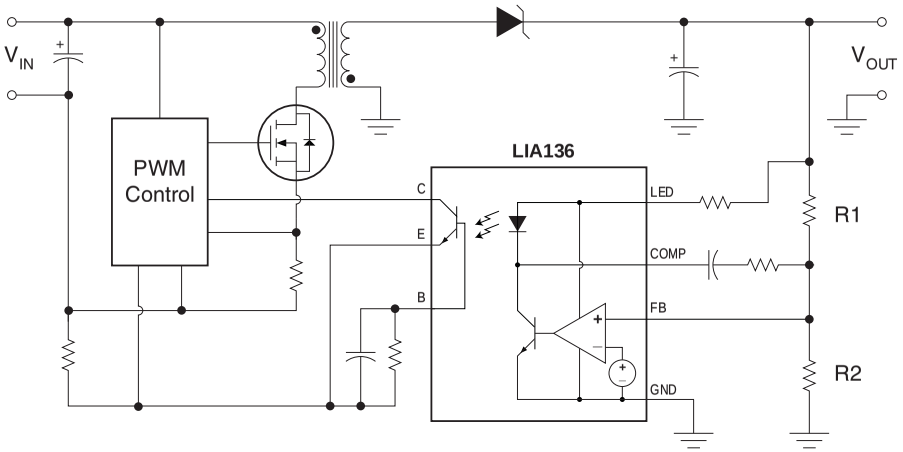
- SMPS feedback loops
- Power supply feedback

8-Pin DIP

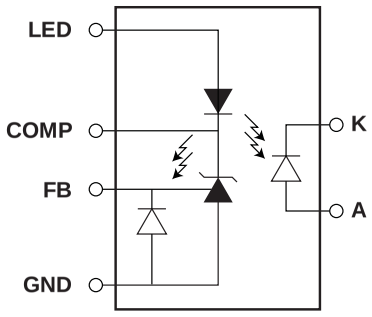


8-Pin Surface Mount

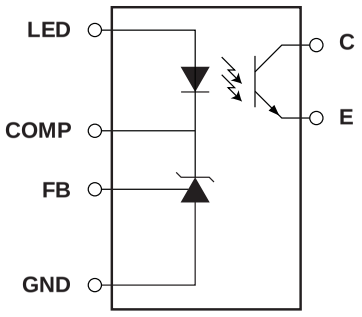
Optical Feedback for Ultra-Low-Voltage Power Supplies



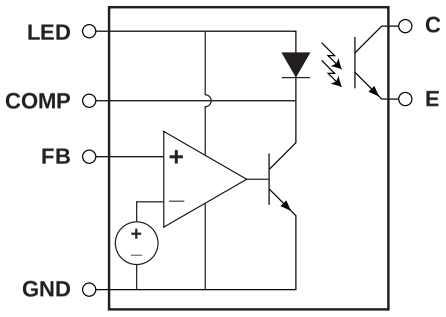
Part Number	Reference Voltage (V)	V_{REF} Tolerance 25°C (%)	V_{REF} Tolerance -40°C to +85°C (%)	V_{REF} Tolerance -40°C to +110°C (%)	Isolation Voltage (V_{rms})	Package Type
LIA120	1.240	1	2.5	-	3750	8-pin surface mount
LIA130	1.240	1	1.5	-	3750	8-pin DIP, 8-pin surface mount
LIA135	1.299	0.5	1	-	3750	8-pin DIP, 8-pin surface mount
LIA136	1.299	0.5	-	1.5	3750	8-pin DIP, 8-pin surface mount



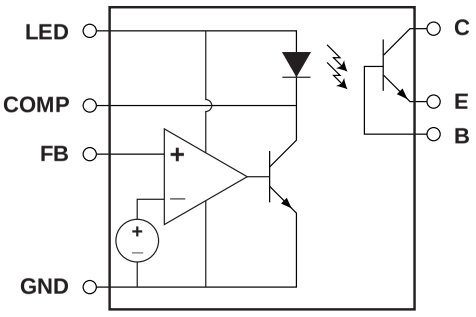
LIA120



LIA130



LIA135



LIA136

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

For data sheets, go to **www.ixysic.com/Products/ProdList.htm**

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RFID Products

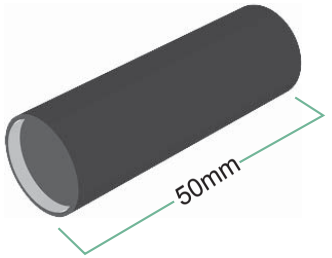
• RFID Tags

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 and ISO 11785 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	• 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

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Digitally Programmable Capacitors

• Wide Capacitance Range, Non-volatile, Digital Programmable Capacitor: NCD2400M

The NCD2400M is a dedicated electronic calibrator for oscillators, with reliable performance at 105°C as required by OCXO applications.

This product can be used in series or shunt configuration, to support a wide variety of tuning circuit topologies.

Digitally controlled capacitance trimming information is communicated via a 2-wire (I^2C compatible) interface. The calibration value can be stored in the internal, re-programmable, non-volatile memory..

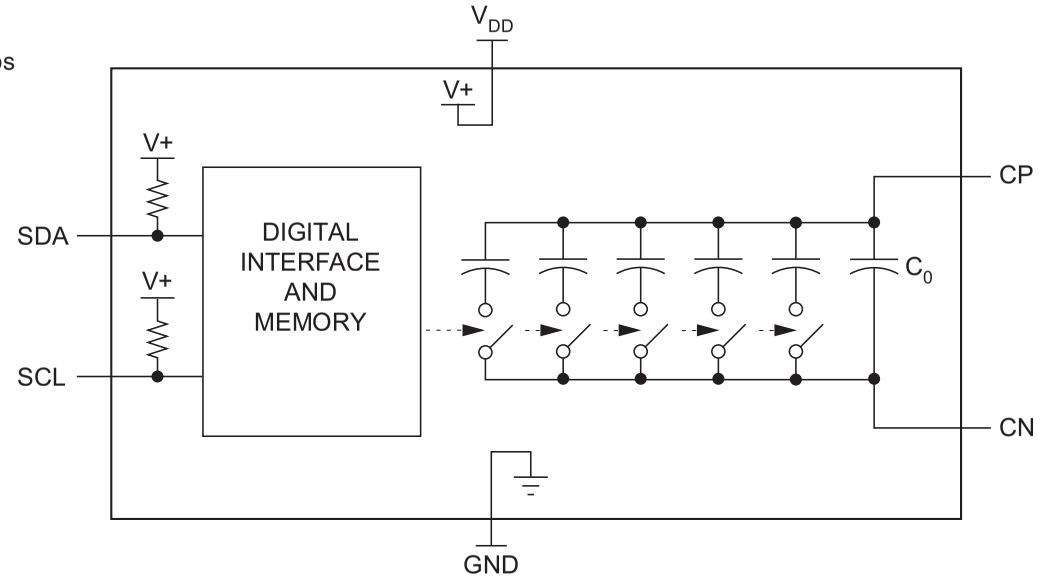
Features:

- Operating frequency range of DC to 150MHz
- 512-state digital programmable capacitor
- Series and shunt configurations supported:
  - C_{shunt} = 12.5pF to 194pF (15.6:1 tuning ratio) in discrete 355fF steps
  - C_{series} = 1.7pF to 194pF in discrete 376fF steps
- Operation at 105°C
- 2-wire (I^2C compatible) serial interface
- EEPROM non-volatile memory
- Wide power supply range (2.5 to 5.5V)
- 2 x 2 x 0.65 mm 6-pin DFN package, MSL 1

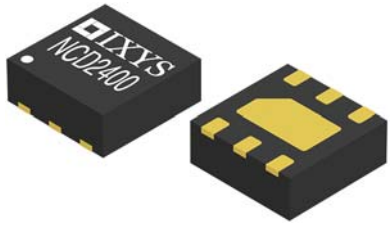
Applications:

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

NCD2400M Functional Block Diagram



DFN package: 2mm x 2mm



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• 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.

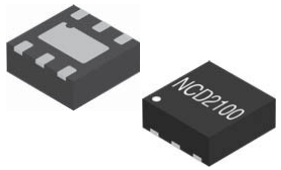
Features:

- Operating frequency range 200kHz to 250MHz (contact the factory for operation at higher frequencies)
- 1024 programmable capacitance values
- Capacitance range 6.6pF to 37.553pF
- Very small CDAC3 capacitance step size: 63fF
- Operating temperature range: -40°C to +85°C
- Operating supply voltage: 2.5V to 5.5V
- Device size: 2mm x 2mm (DFN-6), 2.9mm x 2.8mm (TSOT-6)

Applications:

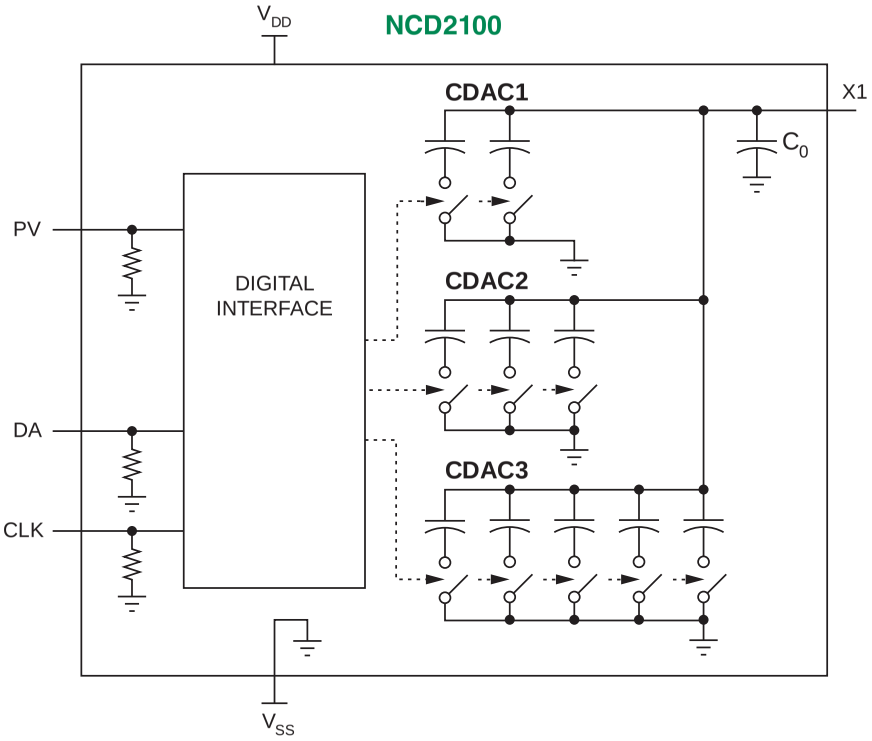
- VCXOs
- Crystal oscillators
- Tunable RF stages
- RFID tags
- Industrial wireless control
- Capacitor sensor trimming

DFN package: 2mm x 2mm



TSOT package: 2.8mm x 2.9mm

Capacitance range: 6.6pF to 37.553pF



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Worldwide Sales Offices

AMERICAS

World Headquarters
IXYS Integrated Circuits
78 Cherry Hill Drive
Beverly, MA USA 01915-1048

☎ +1 978 524 6700
+1 978 524 4700
Toll-Free: 1 800 272 5273

CUSTOMER SERVICE
☎ +1 978 524 6768
+1 978 524 4900

EUROPE

European Customer Service Centre
IXYS Semiconductor BV
Schipholweg 103
2316 XC Leiden, Netherlands

☎ 0031-(0)71 3031500
0031-(0)71 3031509
E-mail: customerservice@ixys.de

ASIA

Littelfuse Far East
Taiwan Rep. Office
8/F No. 181
Sec. 2 Tiding Blvd.
Taipei 114
Taiwan

☎ +886 2 2523 6368
☎ +886 2 87511234 ext. 101
E-mail: sales@ixysic.com.tw

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