

## Agilent Optoisolation Products

# Agilent Technologies offers the industry's best isolation technology along with the industry's leading CMR performance

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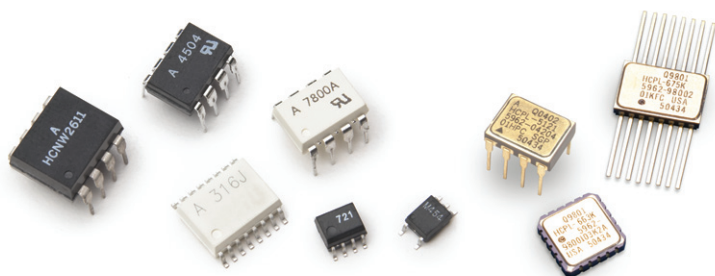
Agilent Technologies optocouplers can be used in an array of isolation applications ranging from power supply and motor control circuits to data communications and digital logic interface circuits.

The primary purpose of an optocoupler is to provide both electrical insulation and signal isolation. The popularity of Agilent Technologies optocouplers is due to cost effective innovations in these areas.

Optocouplers eliminate the effects of electrical noise caused by crosstalk, power glitches and electrical interference. They provide high voltage isolation allowing safe interface between high and low voltages in electrical circuits. They are also used for shifting logic levels.

Agilent's key products include optocouplers with phototransistor output, digital and analog output, high speed and high gain performance, drivers for isolated gate transistors and intelligent power modules, smart current sensors and other application specific devices.

Agilent Technologies offers the industry's best isolation technology along with the industry's leading CMR performance up to 15k V/μs in a broad line of packages. Products include the lowest power dissipation with input current as low as 40 μA, high speed digital optocouplers operating at up to 25 MBd, propagation delays as low as 40 ns, 3.3 V JEDEC compatible optocouplers. Agilent's optocouplers are manufactured with high quality and reliability and have worldwide safety approvals including the highest maximum insulation voltage (VIORM) at 1414 V (per IEC/EN/DIN EN 60747-5-2).



Agilent Technologies offers a broad range of isolation products that provide performance features and benefits that are unmatched in the industry for industrial, computing, consumer, communication, medical, military and aerospace markets.

**Applications for Agilent’s Isolation Products**

**Industrial**

The widest portfolio of optocouplers to meet the extensive requirements of applications in factory automation such as:

- Automated test equipment
- Fieldbus
- Industrial communications
- Industrial networking
- Motor control
- Panel switches
- PLC input/output isolation
- Power distribution systems
- Robotics
- Switching power supplies
- Test and measurement equipment

**Medical**

Agilent offers optocouplers with high linearity and high resolution for severe isolation requirements to:

- Defibrillators
- ECG/EKG
- Endoscopes
- Magnetic resonance imaging
- Patient monitoring

**Communications**

Agilent provides high speed optocouplers in both single and dual surface-mount packages which are used in:

- Automated metering reading
- Digital cross connect
- Distributed power architecture
- ISDN
- Modems
- PBX and central office
- Power line communication
- Power over ethernet
- Telephone switching equipment
- Telephone terminal equipment
- Wireless base station

**Computers and office equipment**

Agilent’s optocouplers with CMOS compatibility and high speed are used to provide interface isolation for:

- Isolated input/output module
- Isolated USB hub
- Printers and plotters

**Consumer Electronics**

Agilent offers lower solution costs with highly integrated optocouplers for many consumer applications, such as:

- Air conditioning
- Alarm systems
- Audio and video equipment
- Electronic gaming
- Fitness equipment
- Induction heating cooker
- Plasma displays
- Washing machines

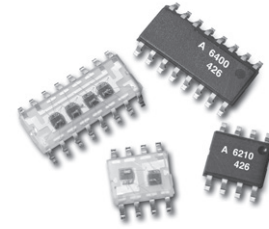
**Government and Aerospace**

Agilent’s high reliability optocouplers are suitable for military and aerospace applications such as:

- Aircraft, satellite and space systems
- Communications
- Computers
- Test systems



# Multi-Channel & Bi-Directional 15 Mbd Digital Logic Gate Optocoupler



### Description

ACSL-6xx0 series are optoisolated, multi-channel and bidirectional, high-speed optocouplers. Integration of multiple optocouplers in monolithic form is achieved through patented process technology. These devices provide full duplex and bidirectional isolated data transfer and communication capability in compact surface mount packages. They are available in 15Mbd speed option, wide supply voltage range and wide temperature range.

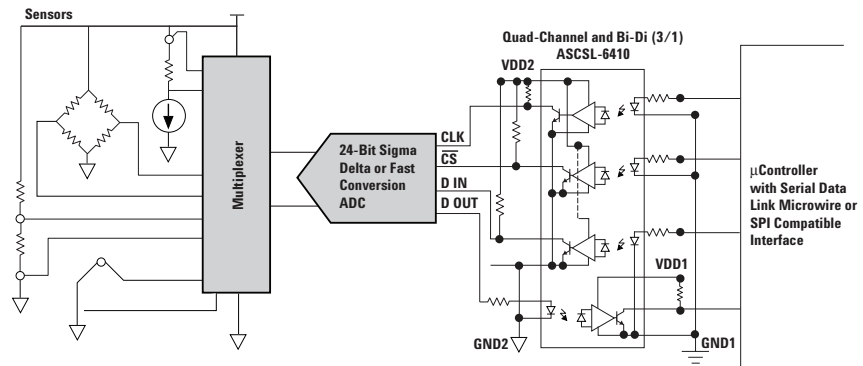
The isolated data acquisition system is ideal for digitizing the output of the sensors that operate in hostile environment. The ADC, in this case, is

a 24-bit sigma delta or fast conversion type, converts the analog voltage to a digital number. The digital number represents the input voltage in discrete steps with finite resolution. The quad-channel and bi-directional, ACSL-6410, provides high CMR of 10kV/μs and electrical isolation of 2500Vrms between the host system and the data acquisition circuitry and sensors. The power supply is also isolated, usually via a transformer to isolate the AC line voltage from the DC voltages generated to power the data acquisition system.

### Applications

- Full Duplex Communication
- Isolated Line Receiver
- Computer-Peripheral Interfaces
- Microprocessor System Interfaces
- Digital Isolation for A/D and D/A Conversion
- Switching Power Supply
- Instrument Input/Output Isolation
- Ground Loop Elimination
- Pulse Transformer Replacement

### Typical Block Diagram



### 20 Mbd Logic Gate Optocoupler Product Selection

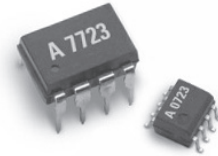
Device	Part No.	Package	I <sub>(on)</sub> mA min	t <sub>PLH</sub> ns max	t <sub>PHL</sub> ns max	P <sub>WD</sub> ns max	t <sub>PSK</sub> ns max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
								CMR V/μs (min)	V <sub>CM</sub> V		
Dual, Bi-Directional	ACSL- 6210-00R	S08	7	100	100	35	40	1000	1000	2500	560
Triple, All-in-One	ACSL- 6300-00T*	S016	7	100	100	35	40	1000	1000	2500	560
Triple, Bi-Directional, 2/1	ACSL- 6310-00T*	S016	7	100	100	35	40	1000	1000	2500	560
Quad, All-in-One	ACSL- 6400-00T*	S016	7	100	100	35	40	1000	1000	2500	560
Quad, Bi-Directional, 3/1	ACSL- 6410-00T*	S016	7	100	100	35	40	1000	1000	2500	560
Quad, Bi-Directional, 2/2	ACSL- 6420-00T*	S016	7	100	100	35	40	1000	1000	2500	560

Notes:

\* - Advanced Information

\* AC Specifications are based on V<sub>DD</sub> = 5 V

# High Speed Digital CMOS Logic Gate Optocoupler



## Description

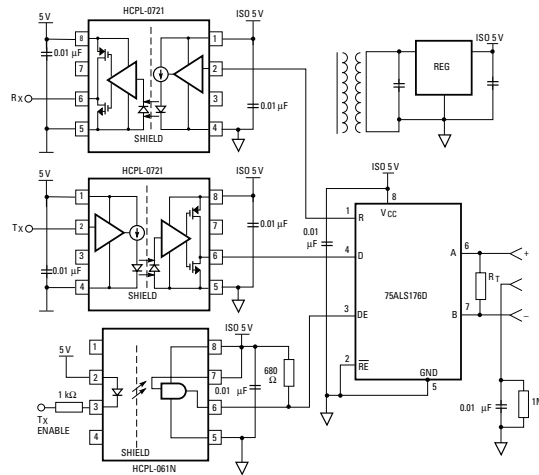
These optocouplers use the latest CMOS IC technology to achieve outstanding performance with very low power consumption. Serial fieldbuses are used today primarily as the communication system for exchange of information between automation system and distributed field devices. PROFIBUS is the leading open fieldbus system and has worldwide acceptance. PROFIBUS is essentially a twisted wire pair serial link that is very similar to RS 485. Profibus speed standard is either lower speed (1.5 MBd) or higher speed (12 MBd).

In this isolated multipoint transmission application circuit, two different optoisolators are utilized (HCPL-0721 and HCPL-061N). The benefits include low input drive current that maximizes LED lifetime/reliability and optimized speed for Profibus and RS-485 applications.

## Applications

- AC plasma display panel level shifting
- CAN Bus
- CC\_Link
- Microprocessor system interface
- Multiplexed data transmission
- Switched mode power supply

## Typical Profibus Block Diagram



## High Speed Digital CMOS Logic Gate Optocoupler Product Selection:

Device	Part No.	Package	I <sub>F(on)</sub> mA min	Max Data Rate MBd min	t <sub>PLH</sub> ns max	t <sub>PHL</sub> ns max	PWD ns max	t <sub>PSK</sub> ns max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
									CMR V/μs (min)	V <sub>CM</sub> V		
Single Channel CMOS Input 	HCPL-0710	S08	-	12.5	40	40	8	20	10000	1000	3750	560*
	HCPL-0720	S08	-	25	40	40	8	20	10000	1000	3750	560*
	HCPL-0721	S08	-	25	40	40	6	20	10000	1000	3750	560*
	HCPL-0723	S08	-	50	22	22	2	16	10000	1000	3750	560*
	HCPL-7710	300 mil DIP	-	12.5	40	40	8	20	10000	1000	3750	630*
	HCPL-7721	300 mil DIP	-	25	40	40	6	20	10000	1000	3750	630*
	HCPL-7720	300 mil DIP	-	25	40	40	8	20	10000	1000	3750	630*
HCPL-7723	300 mil DIP	-	50	22	22	2	16	10000	1000	3750	630*	
LED Input 	HCPL-0708	S08	10	15	60	60	30	40	10000	1000	3750	560*
Dual Channel LED Input 	HCPL-0738	S08	10	15	60	60	30	40	10000	1000	3750	560*

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060.

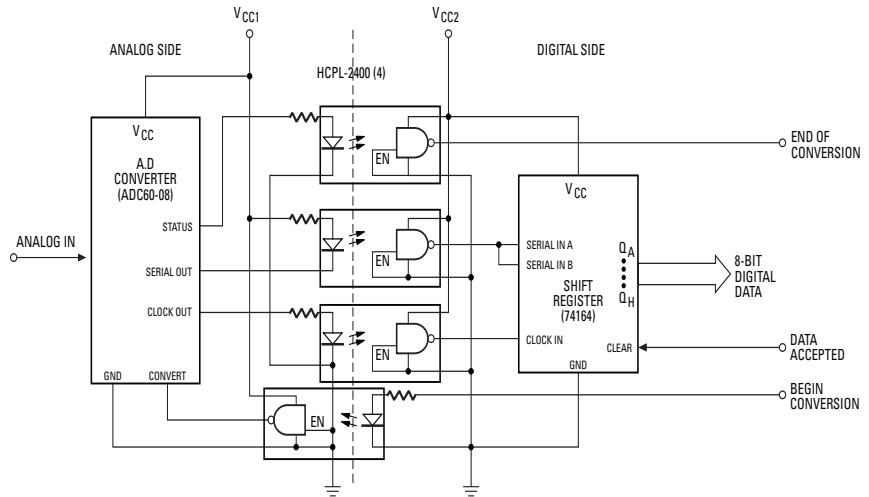
# 20 MBd Logic Gate Optocoupler



## Description

These optocouplers have high data rate capability and low input current requirements. In analog-to-digital converters, designers should isolate the two portions of a circuit so that interference generated by digital switching and clock signals is not coupled to the analog section. The above figure demonstrates the ability of optocouplers to achieve isolation in a high speed parallel interface data communication application. Optocouplers reduce the channel distortion and thereby maximize the reliability of the circuit.

## Typical Block Diagram



## Applications

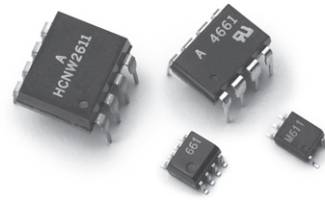
- Computer-Peripheral Interface
- High Speed Disk Drive I/O
- Isolated Bus Driver (Networking Applications)
- Isolation of Higher Speed Logic System
- Switching Noise Elimination

## 20 MBd Logic Gate Optocoupler Product Selection

Device	Part No.	Package	I <sub>F(on)</sub> mA min	t <sub>PLH</sub> ns max	t <sub>PHL</sub> ns max	PWD ns max	t <sub>PSK</sub> ns max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
								CMR V/μs (min)	V <sub>CM</sub> V		
Single Channel 	HCPL-2400	300 mil DIP	4	60	60	25	35	1000	300	3750	630*
Dual Channel 	HCPL-2430	300 mil DIP	4	60	60	25	35	1000	300	3750	-

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060

# 10 MBd Logic Gate Optocoupler



## Description

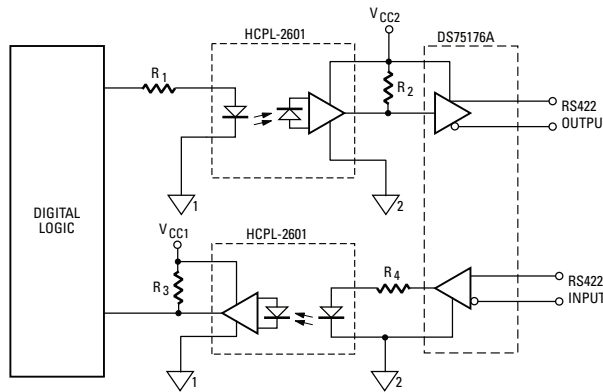
This isolated RS-422 circuit uses two high-speed opto-couplers that can switch up to 10 MBd signals. An isolated power supply Vcc2 is required to power the DS 75176A driver/receiver integrated circuit.

The main benefit is that it prevents common-mode transients from interfering with the signal.

## Applications

- Computer-peripheral interface
- Instrument input/output isolation
- Isolated line receiver
- Microprocessor system interface
- Switching power supply

## Typical RS-422 Interface Block Diagram

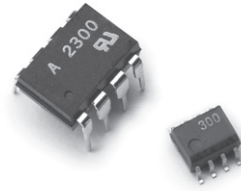


## 10 MBd Logic Gate Optocoupler Product Selection:

Device	Part No.	Package	If(on) mA min	tPLH ns max	tPHL ns max	PWD ns max	tPSK ns max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak		
								CMR V/μs (min)	V <sub>CM</sub> V				
	Single Channel	6N137	300 mil DIP	5	100	100	35	40	-	-	3750/5000 <sup>#</sup>	630*	
		HCNW137	400 mil DIP	5	100	100	40	40	-	-	5000	1414	
		HCNW2601	400 mil DIP	5	100	100	40	40	5000	50	5000	1414	
		HCNW2611	400 mil DIP	5	100	100	40	40	10000	1000	5000	1414	
		HCPL-061A	SO8	3	100	100	45	60	1000	50	3750	560*	
		HCPL-061N	SO8	3	100	100	45	60	15000	1000	3750	560*	
		HCPL-0600	SO8	5	100	100	35	40	-	-	3750	560*	
		HCPL-0601	SO8	5	100	100	35	40	5000	50	3750	560*	
		HCPL-0611	SO8	5	100	100	35	40	10000	1000	3750	560*	
		Dual Channel	HCPL-2601	300 mil DIP	5	100	100	35	40	5000	50	3750/5000 <sup>#</sup>	630*
			HCPL-2611	300 mil DIP	5	100	100	35	40	10000	1000	3750/5000 <sup>#</sup>	630*
			HCPL-261A	300 mil DIP	3	100	100	45	60	1000	50	3750/5000 <sup>#</sup>	630*
			HCPL-261N	300 mil DIP	3	100	100	45	60	15000	1000	3750/5000 <sup>#</sup>	630*
			HCPL-M600	SO5	5	100	100	35	40	-	-	3750	-
		HCPL-M601	SO5	5	100	100	35	40	5000	50	3750	-	
		HCPL-M611	SO5	5	100	100	35	40	10000	1000	3750	-	
		HCPL-063A	SO8	5	100	100	45	60	1000	50	3750	-	
		HCPL-063N	SO8	3	100	100	45	60	15000	1000	3750	-	
		HCPL-0630	SO8	5	100	100	35	40	-	-	3750	-	
	HCPL-0631	SO8	5	100	100	35	40	5000	50	3750	-		
	HCPL-0661	SO8	5	100	100	35	40	10000	1000	3750	-		
	HCPL-263A	300 mil DIP	5	100	100	45	60	1000	50	3750/5000 <sup>#</sup>	-		
	HCPL-263N	300 mil DIP	3	100	100	45	60	15000	1000	3750/5000 <sup>#</sup>	-		
	HCPL-2630	300 mil DIP	5	100	100	35	40	-	-	3750/5000 <sup>#</sup>	-		
	HCPL-2631	300 mil DIP	5	100	100	35	40	5000	50	3750/5000 <sup>#</sup>	-		
	HCPL-4661	300 mil DIP	5	100	100	35	40	10000	1000	3750/5000 <sup>#</sup>	-		

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060, # - with UL 5000V<sub>RMS</sub>/1 minute Option 020

# 8 MBd Logic Gate Optocoupler



## Description

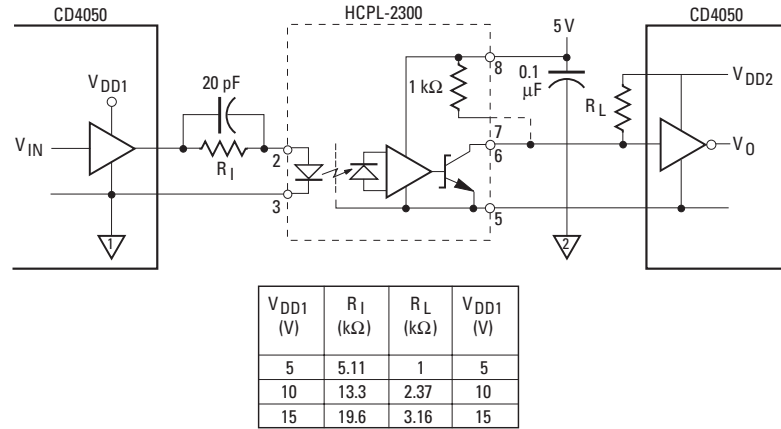
The circuit shows a CMOS interface circuit for 8 MBd applications. Over the temperature range a CMOS CD4050 Hex Buffer can source about 0.7 mA (minimum), which is sufficient to drive the HCPL-2300 optocoupler. The 20 pF capacitor allows peaking currents to assist the LED turn on and off quickly.

The benefits of the applications are that it is a simple interface and it consumes only low power.

## Applications

- Computer-Peripheral Interface
- Digital Isolation for A/D, D/A Conversion
- High Speed, Long Distance Isolated Line Receiver
- Level Shifting
- RS 232C Interface

## Typical CMOS Interface Block Diagram



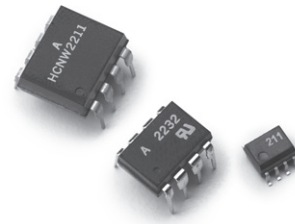
## 8 MBd Logic Gate Optocoupler Product Selection:

Device	Part No.	Package	I <sub>F(on)</sub> mA min	t <sub>PLH</sub> μs max	t <sub>PHL</sub> μs max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
						CMR V/μs (min)	V <sub>CM</sub> V		
<b>Single Channel</b> 	HCPL-0300	S08	0.5	0.16	0.2	100	50	3750	-
	HCPL-2300	300 mil DIP	0.5	0.16	0.2	100	50	3750	630*

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060



# 5 MBd Logic Gate Optocoupler



## Description

The circuit shown in the typical TTL interface block diagram is an interface between two TTL gates using an active output (totem pole) optocoupler, the HCPL-2201. A series switching circuit drives the opto-coupler LED. The active output HCPL-2201 can be directly connected to a TTL gate, and no pull-up resistor is required. The HCPL-2201 can sink enough current to handle up to 16 LSTTL or 4 TTL loads.

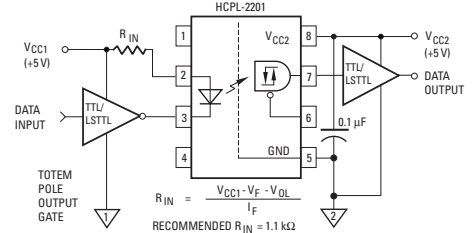
The benefits include no pull-up resistor required on the optocoupler output interface. Low power dissipation on the optocoupler input circuit and up to 20 V supply voltage for the HCPL-2201.

Typically, the 5 MBd logic gate optocoupler is used in Isolated High-Low Gate Drive interface block diagram as shown.

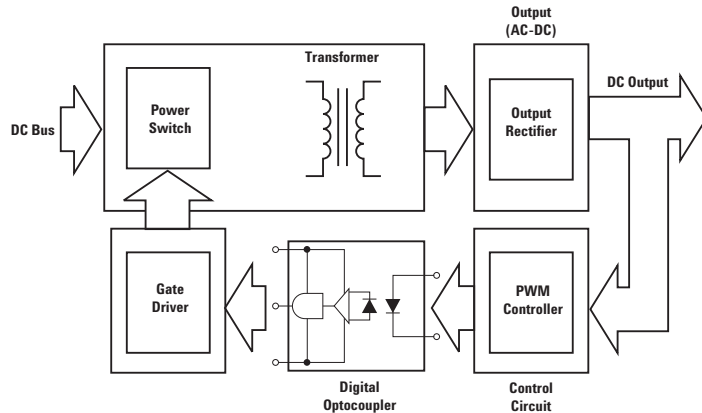
## Applications

- Computer-peripheral interface
- Ground loop
- High speed line receiver
- Microprocessor system interface
- Pulse transformer replacement

## Typical TTL Interface Block Diagram



## Isolated High-Low Gate Drive Interface Block Diagram

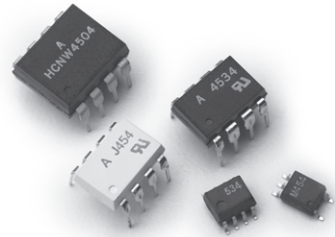


## 5 MBd Logic Gate Optocoupler Product Selection:

Device	Part No.	Package	I <sub>F(on)</sub> mA min	t <sub>PLH</sub> μs max	t <sub>PHL</sub> μs max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
						CMR V/μs (min)	V <sub>CM</sub> V		
<b>Single Channel</b> 	HCNW2201	400 mil DIP	1.6	0.3	0.3	1000	50	5000	1414
	HCNW2211	400 mil DIP	1.6	0.3	0.3	10000	1000	5000	1414
	HCPL-0201	SO8	1.6	0.3	0.3	1000	50	3750	560*
	HCPL-0211	SO8	1.6	0.3	0.3	10000	1000	3750	560*
	HCPL-2219	300 mil DIP	1.6	0.3	0.3	2500	400	3750	630*
	HCPL-2200	300 mil DIP	1.6	0.3	0.3	1000	50	3750	630*
	HCPL-2201	300 mil DIP	1.6	0.3	0.3	1000	50	3750	630*
	HCPL-2211	300 mil DIP	1.6	0.3	0.3	10000	1000	3750	630*
	HCPL-2202	300 mil DIP	1.6	0.3	0.3	1000	50	3750	630*
	HCPL-2212	300 mil DIP	1.6	0.3	0.3	10000	1000	3750	630*
<b>Dual Channel</b> 	HCPL-2231	300 mil DIP	1.8	0.3	0.3	1000	50	3750	-
	HCPL-2232	300 mil DIP	1.8	0.3	0.3	10000	1000	3750	-

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060

# 1 Mbd Transistor Output Optocoupler



## Description

The circuit in the level shifting/TTL interface block diagram shows how a 0 to 5 V logic signal can be level shifted to a -15 to 0 V signal. This circuit can safely be used for level shifting up to ±800 V. The circuit uses an open collector output logic gate, the 74LS405, to drive the LED of the HCPL-4502/3 optocoupler. The HCPL-4502/3 also has an open-collector output. The designer chooses  $R_{IN}$  to agree with the equation shown in the schematic. This equation sets the value of the optocoupler LED forward current. The output of the HCPL-4502/3 requires a pull-up resistor,  $R_L$ . The current-transfer ratio (CTR) of the optocoupler determines the maximum amount of current the optocoupler output can sink while maintaining the output voltage (between pins 5 and 6) of 0.5 V or less.

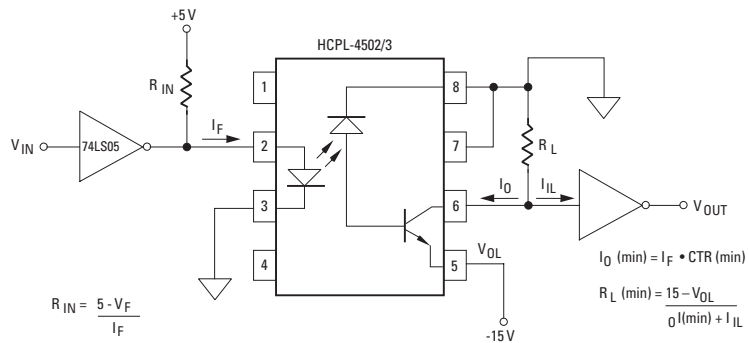
The benefits of the application is that it reduces transient immunity problem and is a convenient way of replacing pulse transformer for high-voltage level shifting.

The HCPL-4502/3 are commonly used in Intelligent Power Module as shown in the block diagram.

## Applications

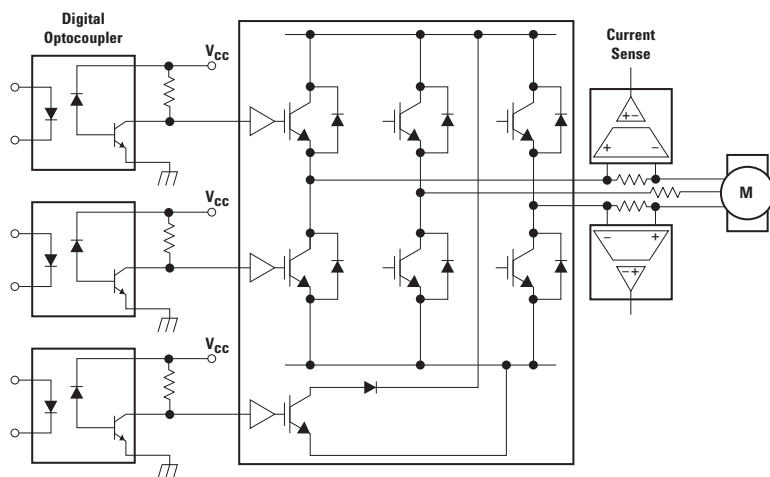
- Analog signal ground isolation
- High speed logic ground isolation
- Line receivers
- Replace pulse transformers
- Replace slow phototransistor isolators

## Typical Level Shifting/TTL Interface Block Diagram

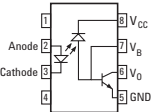
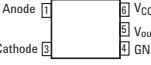
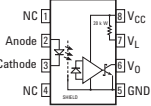
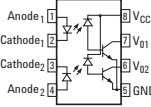


NOTE: FOR BEST CMR PERFORMANCE, CONNECT PIN 7 TO PIN 8.

## Intelligent Power Module (IPM) Based Inverter Block Diagram



**1 Mbd Transistor Output Optocoupler Product Selection:**

Device	Part No.	Package	I <sub>F(on)</sub> mA min	CTR			t <sub>PLH</sub> μs max	t <sub>PHL</sub> μs max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak	
				% min	% max	I <sub>F</sub> mA			CMR V/μs (min)	V <sub>CM</sub> V			
 <p>Single Channel</p>	6N135	300 mil DIP	16	7	50	16	2.0	2.0	1000	10	3750/5000#	630*	
	6N136	300 mil DIP	16	19	50	16	1.0	1.0	1000	10	3750/5000#	630*	
	HCNW135	400 mil DIP	16	5	-	16	2.0	2.0	1000	10	5000	1414	
	HCNW136	400 mil DIP	16	19	150	16	1.0	1.0	1000	10	5000	1414	
	HCNW4502†	400 mil DIP	16	19	50	16	1.0	1.0	1000	10	5000	1414	
	HCNW4503†	400 mil DIP	16	19	50	16	1.0	1.0	15000	1500	5000	1414	
	HCNW4504†	400 mil DIP	12	25	65	12	1.4	1.0	10000	1500	5000	1414	
	HCPL-J454†	300 mil DIP	12	21	65	12	0.7	0.5	15000	1500	3750	891	
	HCPL-0452†	S08	16	19	50	16	1.0	1.0	1000	10	3750	560*	
	HCPL-0453†	S08	16	19	50	16	1.0	1.0	15000	1500	3750	560*	
	HCPL-0454†	S08	12	26	65	12	1.4	1.0	10000	1500	3750	560*	
	HCPL-4502†	300 mil DIP	16	19	50	16	1.0	1.0	1000	10	3750/5000#	630*	
	HCPL-4503†	300 mil DIP	16	19	50	16	1.0	1.0	15000	1500	3750/5000#	630*	
	HCPL-4504†	300 mil DIP	12	26	65	12	1.4	1.0	10000	1500	3750/5000#	630*	
	HCPL-0500	S08	16	7	50	16	2.0	2.0	1000	10	3750	560*	
	HCPL-0501	S08	16	19	50	16	1.0	1.0	1000	10	3750	560*	
	 <p>Single Channel</p>	HCPL-M452	S05	16	20	50	16	1.0	1.0	1000	10	3750	-
		HCPL-M453	S05	16	20	50	16	1.0	1.0	15000	1500	3750	-
HCPL-M454		S05	12	26	65	12	1.4	1.0	10000	1500	3750	-	
HCNW4506		400 mil DIP	10	44	>90	10	0.55	0.40	15000	1500	5000	1414	
HCPL-J456		300 mil DIP	10	44	>90	10	0.55	0.48	15000	1500	3750	891	
HCPL-0466		S08	10	44	>90	10	0.55	0.40	15000	1500	3750	560*	
 <p>Single Channel</p>	HCPL-4506	300 mil DIP	10	44	>90	10	0.55	0.40	15000	1500	3750/5000#	630*	
	HCPL-M456	S05	10	44	>90	10	0.55	0.40	15000	1500	3750	-	
 <p>Dual Channel</p>	HCPL-0530	S08	16	7	50	16	2.0	2.0	1000	10	3750	-	
	HCPL-0531	S08	16	19	50	16	1.0	1.0	1000	10	3750	-	
	HCPL-0534	S08	16	19	50	16	1.0	1.0	15000	1500	3750	-	
	HCPL-2530	300 mil DIP	16	7	50	16	2.0	2.0	1000	10	3750/5000#	-	
	HCPL-2531	300 mil DIP	16	19	50	16	1.0	1.0	1000	10	3750/5000#	-	
	HCPL-4534	300 mil DIP	16	19	50	16	1.0	1.0	15000	1500	3750/5000#	-	

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060, # - with UL 5000V<sub>RMS</sub>/1 minute Option 020, † - pin 7 not connected



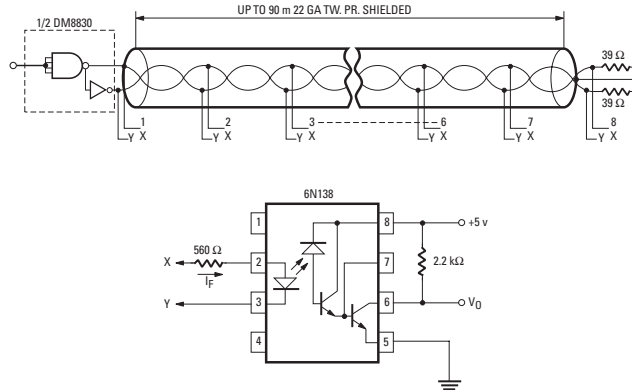
# 100 kBd Darlington Transistor Output Optocoupler

## Description

This differentially driven circuit can use up to eight 6N138 optocouplers at various receiver along the 90 m line. All stations are isolated. The first station would draw approximately 2.7 mA current, and the last station 1.8 mA of LED drive current. The output grounds of the optocoupler may be electrically separate.

The benefits of the application is its simple, low-cost, multidrop circuit for low signaling rates.

## Typical Multidrop Line Receiver Block Diagram



## Applications

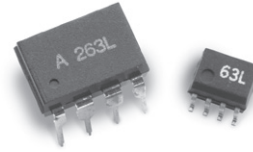
- Digital logic ground isolation
- FIA RS-232C line receiver
- Low power systems and ground isolation
- Telephone ring detector

### 100 kBd Darlington Transistor Output Optocoupler Product Selection:

Device	Part No.	Package	I <sub>F(on)</sub> mA min	CTR			CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
				% min	% max	I <sub>F</sub> mA	CMR V/μs (min)	V <sub>CM</sub> V		
<b>Single Channel</b>  	6N138	300 mil DIP	0.5	300	2600	1.6	1000	10	3750/5000#	-
	6N139	300 mil DIP	0.5	400	5000	0.5	1000	10	3750/5000#	630*
	HCNW138	400 mil DIP	0.5	300	-	1.6	1000	10	5000	1414
	HCNW139	400 mil DIP	0.5	400	-	0.5	1000	10	5000	1414
	HCPL-070A	S08	0.04	800	25000	0.04	1000	10	3750	560*
	HCPL-0700	S08	0.5	300	2600	1.6	1000	10	3750	560*
	HCPL-0701	S08	0.5	400	5000	0.5	1000	10	3750	560*
	HCPL-4701	300 mil DIP	0.04	800	25000	0.04	1000	10	3750/5000#	630*
	HCPL-M700	S05	0.5	300	2600	1.6	1000	10	3750	-
	HCPL-M701	S05	0.5	400	3500	0.5	1000	10	3750	-
<b>Dual Channel</b>  	HCPL-073A	S08	0.04	800	25000	0.04	1000	10	3750	-
	HCPL-0730	S08	0.5	400	5000	0.5	1000	10	3750	-
	HCPL-0731	S08	0.5	400	5000	0.5	1000	10	3750	-
	HCPL-2730	300 mil DIP	0.5	400	5000	0.5	1000	10	3750/5000#	-
	HCPL-2731	300 mil DIP	0.5	400	5000	0.5	1000	10	3750/5000#	-
	HCPL-4731	300 mil DIP	0.04	800	25000	0.04	1000	10	3750/5000#	-

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060, # - with UL 5000V<sub>RMS</sub>/1 minute Option 020

## 3.3 V Digital Optocoupler Family



### Description

Agilent Technologies is proud to introduce a family of 3.3 V optocouplers that will ensure superior isolation performance for your low voltage designs.

Using our optocouplers for your design eliminates the need of using additional level shifting circuitry, and sacrificing board space and power consumption. All these factors contribute to a seamless integration of your design that is cost effective and in line with industry trends of moving away from the 5 V standard to lower voltage standards.

Our new range of 3.3 V optocouplers are the first commercially available optocouplers designed to meet the JEDEC specification for 3.3 V LVTTTL/LVCMOS logic, thereby simplifying the implementation of isolation in systems utilizing 3.3 V logic circuits.

Agilent Technologies' new 3.3 V optocouplers will provide not just a cost-effective solution meeting all the requirements of isolation and insulation in 3.3 V systems, it will also provide the additional benefits of higher data rates and lower power supply requirements.

In order to meet your extensive design needs, Agilent Technologies' 3.3 V technology is available in the widest range of package platform offerings including dual channel as well as single channel versions in both standard DIP and SMT(SO8) packages.

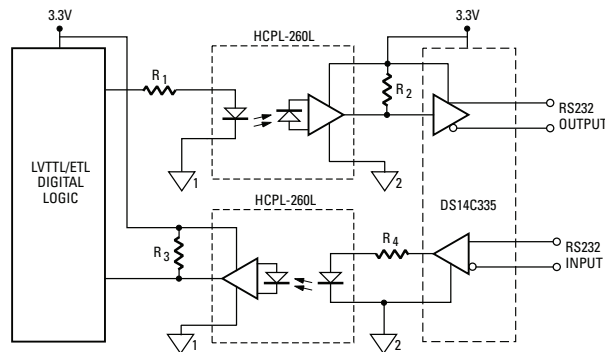
The typical TIA/EIA-232-E interface block diagram illustrates an RS232-E driver/receiver interface that uses HCPL-260L. DS14C335 is an RS232-E driver/receiver that operates on 3.3 V. The low power requirements and high CMR capability of HCPL-260L make it an ideal choice in data transmission and microprocessor interface applications.

A typical Power over Ethernet power source equipment (PSE) block diagram uses two 15 Mbd 3.3 V optocouplers to isolate between the 13 W 48 V power supply and the inter-integrated chip (I<sup>2</sup>C) control bus.

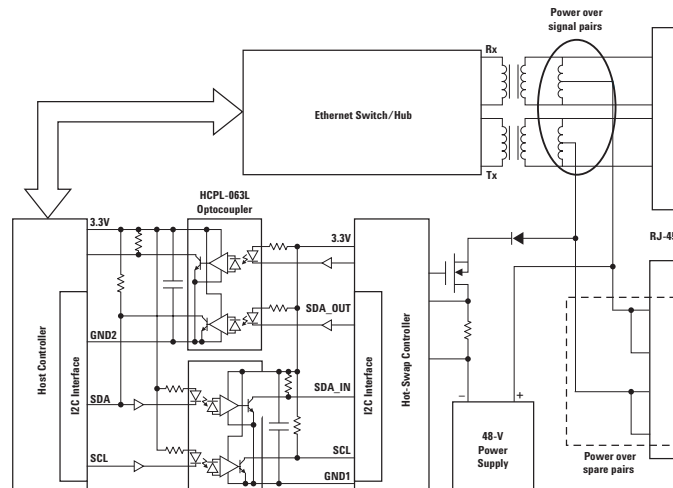
### Applications

- Computer Peripheral Interface
- Digital isolation for A/D, D/A conversion
- Digital logic ground isolation
- Inter-integrated Chip (I<sup>2</sup>C) Control bus.
- Line receivers
- LVTTTL/LVCMOS Interface
- Power over Ethernet
- Pulse transformer replacement

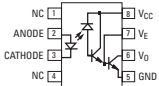
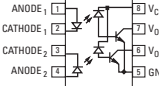
### Typical TIA/EIA-232-E Interface Block Diagram



### Typical Power over Ethernet Power Source Block Diagram

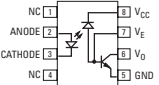
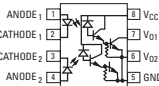


**3.3V Family (100 kBd Darlington Transistor Output Optocoupler)**

Device	Part No.	Package	I <sub>F(on)</sub> mA min	CTR			t <sub>PLH</sub> μs max	t <sub>PHL</sub> μs max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
				% min	% max	I <sub>F</sub> mA			CMR V/μs (min)	V <sub>CM</sub> V		
<b>Single Channel</b> 	HCPL-070L	S08	0.5	400	5000	0.5	90	30	1000	10	3750	560*
	HCPL-270L	300 mil DIP	0.5	400	5000	0.5	90	30	1000	10	3750/ 5000#	630*
<b>Dual Channel</b> 	HCPL-073L	S08	0.5	400	5000	0.5	90	30	1000	10	3750	560*
	HCPL-273L	300 mil DIP	0.5	400	5000	0.5	90	30	1000	10	3750/ 5000#	630*

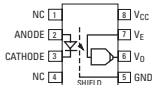
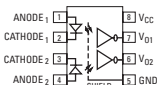
Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060, # - with UL 5000V<sub>RMS</sub>/1 minute Option 020

**3.3V Family (1 MBd Transistor Output Optocoupler)**

Device	Part No.	Package	I <sub>F(on)</sub> mA min	CTR			t <sub>PLH</sub> μs max	t <sub>PHL</sub> μs max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
				% min	% max	I <sub>F</sub> mA			CMR V/μs (min)	V <sub>CM</sub> V		
<b>Single Channel</b> 	HCPL-050L	S08	16	15	50	16	1.0	1.0	1000	10	3750	560*
	HCPL-250L	300 mil DIP	16	15	50	16	1.0	1.0	1000	10	3750/ 5000#	630*
<b>Dual Channel</b> 	HCPL-053L	S08	16	15	50	16	1.0	1.0	1000	10	3750	560*
	HCPL-253L	300 mil DIP	16	15	50	16	1.0	1.0	1000	10	3750/ 5000#	630*

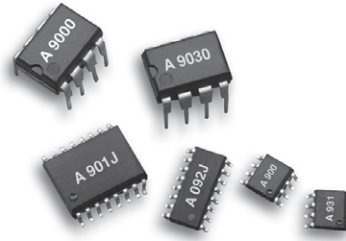
Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060, # - with UL 5000V<sub>RMS</sub>/1 minute Option 020

**3.3V Family (15 MBd Logic Gate Optocoupler)**

Device	Part No.	Package	I <sub>F(on)</sub> mA min	t <sub>PLH</sub> ns max	t <sub>PHL</sub> ns max	P <sub>WD</sub> ns max	t <sub>PSK</sub> ns max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
								CMR V/μs (min)	V <sub>CM</sub> V		
<b>Single Channel</b> 	HCPL-060L	S08	5	90	75	25	40	15000	50	3750	560*
	HCPL-260L	300 mil DIP	5	90	75	25	40	15000	50	3750/5000#	630*
<b>Dual Channel</b> 	HCPL-063L	S08	5	90	75	25	40	15000	50	3750	560*
	HCPL-263L	300 mil DIP	5	90	75	25	40	15000	50	3750/5000#	630*

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060, # - with UL 5000V<sub>RMS</sub>/1 minute Option 020

# Digital Isolator



## Description

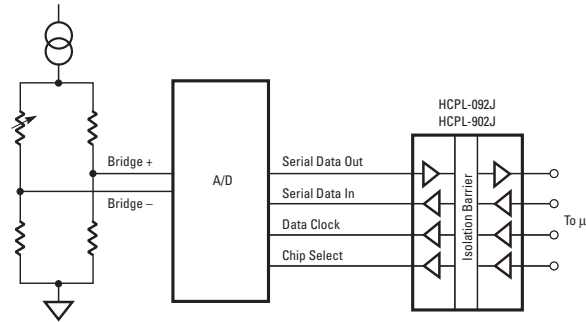
The HCPL-90xx/-09xx series CMOS digital isolators integrated with giant magnetoresistive (GMR) technology enable high speed performance and excellent transient immunity specifications.

All devices operate at 3.3 V or 5 V supply voltages, boasting low power consumption. They are able to withstand high common mode voltages, 15kV/us at  $V_{cm}=1000V$ , and meet UL 1577 and IEC 61010-1 safety ratings.

## Applications

- Digital Fieldbus Isolation
- Multiplexed Data Transmission
- Computer Peripheral Interface
- High Speed Digital Systems
- Isolated Data Interfaces
- Logic Level Shifting

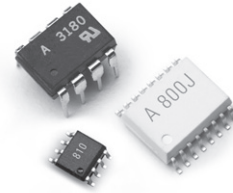
## Typical Isolated A/D Conversion Block Diagram



## Digital Isolator HCPL-09XX AND HCPL-90XX Product Selection:

Device	Part No.	Channel	Package	Max Data Rate MBd min	t <sub>PLH</sub> & t <sub>PHL</sub> (V <sub>CC</sub> =5.0V)		t <sub>PLH</sub> & t <sub>PHL</sub> (V <sub>CC</sub> =3.3V)		P <sub>WD</sub> ns max	t <sub>PSK</sub> ns max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min
					ns max	ns max	ns max	ns max			CMR V/μs (min)	V <sub>CM</sub> V	
	HCPL-0900	Single	S08	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-9000	Single	300 mil DIP	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-0930	Dual	S08	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-9030	Dual	300 mil DIP	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-0931	Dual, Bi-Dir	S08	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-9031	Dual, Bi-Dir	300 mil DIP	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-090J	Quad	S016 Narrow Body	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-900J	Quad	S016 Wide Body	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-091J	Quad, 2/2 Bi-dir	S016 Narrow Body	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-901J	Quad, 2/2 Bi-dir	S016 Wide Body	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-092J	Quad, 3/1 Bi-dir	S016 Narrow Body	100	15	18	3	6	3	6	15000	1000	2500
	HCPL-902J	Quad, 3/1 Bi-dir	S016 Wide Body	100	15	18	3	6	3	6	15000	1000	2500

# Power Line Interface



## Description

The HCPL-800J is a galvanically isolated Powerline Data Access Arrangement IC. It provides the key features of isolation, Tx line driver and Rx amplifier as required in a powerline modem application.

Used together with a simple LC coupling circuit, the HCPL-800J offers a highly integrated, cost effective Analogue Front End (AFE) solution. Optical coupling technology provides very high isolation mode rejection, facilitating excellent EMI and EMC performance. Application robustness is enhanced by the inherent properly block the transfer of damaging surge transients.

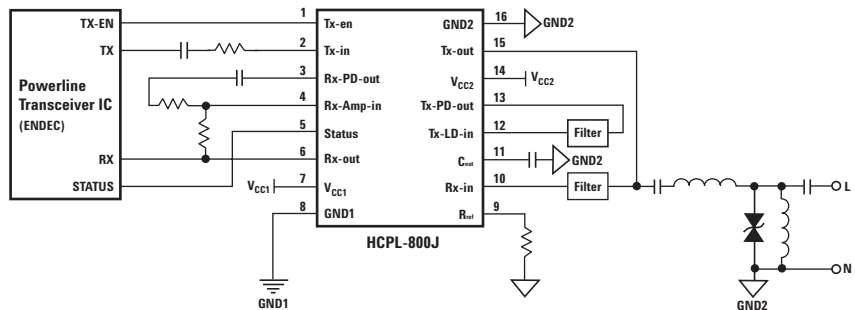
Excellent transmitter performance is achieved with the use of a high efficiency, low distortion line driver stage. Transmitter robustness is further enhanced with integrated load detection and over-temperature protection functions.

The HCPL-800J is designed to work with various transceiver ICs and significantly simplify the implementation of a powerline modem.

## Applications

- Automatic Meter Reading (AMR)
- Powerline Modem
- Home Automation/Control
- Security and Surveillance
- General Purpose Isolated Transceiver
- Internet Appliances

## Typical Power Line Modem



## Powerline DAA IC Product Selection

Device	Part No.	Package	Signal Path	Bandwidth kHz. typ	Io App. typ	Harmonic Distortion dBc, max		Isolation	IMRR dB, typ	VISO VRMS min	VIORM V, peak
						HD2	HD3				
	HCPL-800J	SO16	Tx/Rx	500	1.0	-60	-65	Yes	80	3750	891

## Line Driver Product Selection

Device	Part No.	Package	Signal Path	GBWP MHz typ	Io App. typ	Harmonic Distortion dBc, max		Isolation	IMRR dB, typ	VISO VRMS min	VIORM V, peak
						HD2	HD3				
	HCPL-8100	DIP8	Tx Only	3.5	1.0	-60	-65	No	—	—	—
	HCPL-0810	S08	Tx Only	3.5	1.0	-60	-65	No	—	—	—



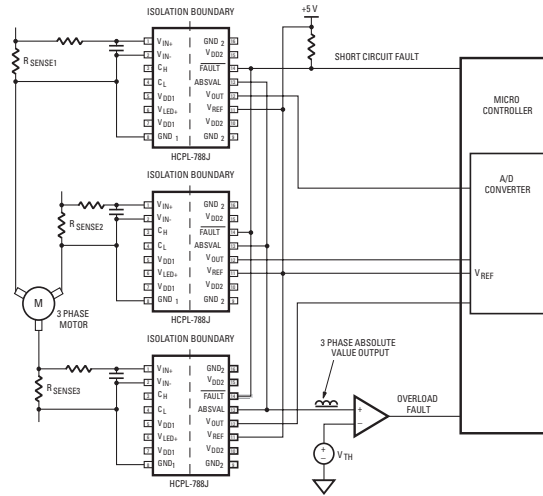
# Miniature Analog Isolation Amplifier



## Description

The HCPL-788J can be used for isolating the motor current sensing element from the control circuit while at the same time transmitting precision analog signals over-current fault signals. This circuit requires a high precision-sensing resistor for monitoring the motor current. The single-ended output allows it to directly interface with the A/D port of the micro-controller. Other benefits include an in-built fault detection high CMR and smaller size compared to Hall effect devices.

## Low Cost Three Phase Current Sensing with Short Circuit and Overload Detection

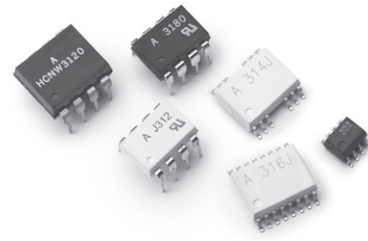


## Miniature Analog Isolation Amplifier Product Selection

Device	Part No.	Package	Gain Toler. % max	Non-Linearity % max	Prop Delay $\mu$ s max	CMR - V/ $\mu$ s@V <sub>CM</sub>		Output Configuration	V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak	
						CMR V/ $\mu$ s (min)	V <sub>CM</sub> V				
	HCPL-7860	300 mil DIP	Isolated 12 bit A/D Converter with Isolated Modulator						3750	891	
	HCPL-7560	300 mil DIP	Isolated 8 bit A/D Converter with Isolated Modulator						3750	891*	
	HCPL-786J	SO16	Isolated 12 bit A/D Converter with Isolated Modulator with better creepage and clearance						3750	891	
	HCPL-0872	SO16	Digital Interface IC for A/D Converter						-	-	
	HCPL-7800A	300 mil DIP	1	0.2	9.9	10000	1000	Differential	3750	891	
	HCPL-7800	300 mil DIP	3	0.2	9.9	10000	1000	Differential	3750	891	
	HCPL-7840	300 mil DIP	5	0.2	9.9	10000	1000	Differential	3750	891*	
	HCPL-788J	SO16	5	0.4	20	10000	1000	Single-ended	3750	891	
			<ul style="list-style-type: none"> <li>Smart Current Sensor with integrated fast short circuit detection (3<math>\mu</math>s)</li> <li>Analog Output direct compatible with A/D converters</li> <li>1<math>\mu</math>V/<math>^{\circ}</math>C offset change vs temperature</li> </ul>					<ul style="list-style-type: none"> <li>16 kHz bandwidth</li> <li>Absolute value signal</li> <li>Fault Detection</li> </ul>			
	HCPL-7510	300 mil DIP	3	0.4	9.9	10000	1000	Single-ended	3750	891*	
	HCPL-7520	300 mil DIP	5	0.4	9.9	10000	1000	Single-ended	3750	891*	

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060

# Integrated Gate Drive Optocoupler



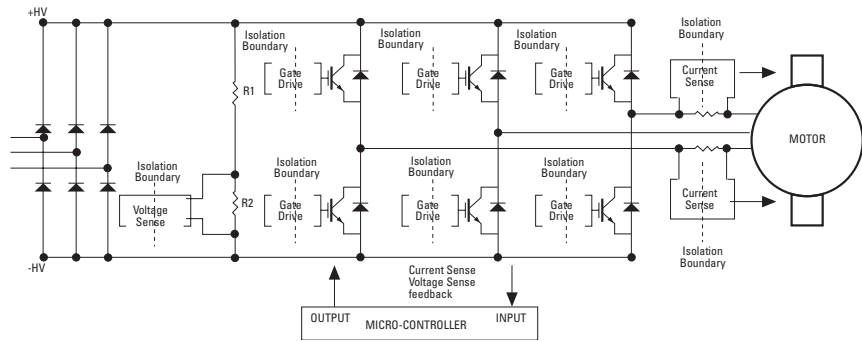
## Description

In typical motor drive and power control systems, there are several signals between the power devices and the micro-controller that need isolation and additional customized functions such as gate drive and current/voltage sensing. Agilent gate drive and isolation amplifier products provide low cost, high performance solutions for motor control applications.

High performance motor drives require precision timing for turning on and off the power devices on the inverter. The micro-controller that controls these functions needs to be isolated from high voltage inverter

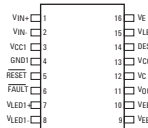
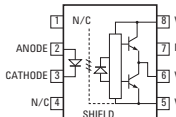
side. Agilent offers a variety of optoisolators that have built in gate drive capability. For those solutions that require lower output power capability, IPM interface optocouplers will meet the need.

## Typical Motor Drive Block Diagram



## Integrated Gate Drive Optocoupler Product S

Device	Part No.	Package	I <sub>f(on)</sub> mA min	I <sub>out</sub> A min	t <sub>PLH</sub> µs max	t <sub>PHL</sub> µs max	PDD µs max	V <sub>CC</sub> V max	CMR - V/µs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
									CMR V/µs (min)	V <sub>CM</sub> V		
Single Channel	HCNW3120	400 mil DIP	10	2.0	0.5	0.5	0.3	30	15000	1500	5000	1414
	HCPL-J312	300 mil DIP	7	2.0	0.5	0.5	0.35	30	15000	1500	3750	891
	HCPL-J314	300 mil DIP	8	0.4	0.7	0.7	0.5	30	10000	1500	3750	891
	HCPL-T250	300 mil DIP	7	0.5	0.5	0.5	-	30	5000	600	3750	630*
	HCPL-T251	300 mil DIP	8	0.1	1.0	1.0	-	30	10000	600	3750	-
	HCPL-0302	SO8	7	0.2	0.7	0.7	0.5	30	10000	1000	3750	566*
	HCPL-0314	SO8	8	0.4	0.7	0.7	0.5	30	10000	1000	3750	566*
	HCPL-3000	300 mil DIP	8	0.5	5	5	-	18	-	-	5000	-
	HCPL-3020	300 mil DIP	7	0.2	0.7	0.7	0.5	30	10000	1000	3750	630*
	HCPL-3100	300 mil DIP	12	0.1	2	2	-	24	-	-	5000	-
	HCPL-3101	300 mil DIP	8	0.1	0.5	0.5	-	24	-	-	5000	-
	HCPL-3120	300 mil DIP	7	2.0	0.5	0.5	0.35	30	15000	1500	3750	630*
	HCPL-3140	300 mil DIP	8	0.4	0.7	0.7	0.5	30	10000	1000	3750	630*
	HCPL-3150	300 mil DIP	7	0.5	0.5	0.5	0.35	30	15000	1500	3750	630*
	HCPL-3180	300 mil DIP	10	2.0	0.2	0.2	0.09	20	10000	1500	3750	630*
	HCPL-316J	SO16	-	2.0	0.5	0.5	0.3	30	15000	1500	3750	891
	- 2.0 A Highly Integrated Gate Drive Optocoupler with over-current Protection and Fault Feedback - CMOS compatible - Under Voltage Lock-Out Protection (UVLO) with Hysteresis											
Dual Channel	HCPL-314J	SO16	8	0.4	0.7	0.7	0.5	30	10000	1500	3750	891
	HCPL-315J	SO16	7	0.5	0.5	0.5	0.35	30	15000	1500	3750	891



Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060.



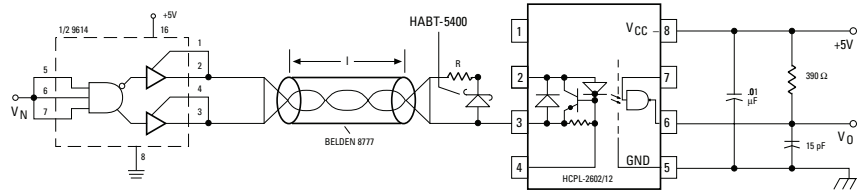
# Line Receiver

## Description

The HCPL-2602/12 have input current regulators and integrated high gain photo detectors. The input regulator serves as a line terminator for line receiver applications. The higher LED threshold voltage provides improved immunity to differential noise and the rejection internally shielded detector provides better common-mode rejection with no sacrifice in speed.

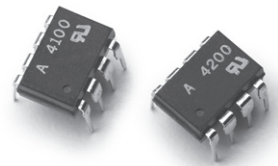
The figure illustrates an unbalanced line receiver using the integrated voltage-clamp input optocoupler, HCPL-2602. TTL data is converted to a differential signal via the differential line driver, and transmitted over twisted-pair wire. The Schottky diode helps to improve the turn-on and turn-off delays.

## Typical Block Diagram



## Line Receiver Product Selection:

Device	Part No.	Package	Output Collector Output mA max	t <sub>PLH</sub> μs max	t <sub>PHL</sub> μs max	CMR - V/μs@VCM		V <sub>ISO</sub> V <sub>RMS</sub> min
						CMR V/μs (min)	V <sub>CM</sub> V	
	HCPL-2602	300 mil DIP	50	100	100	1000	50	3750
	HCPL-2612	300 mil DIP	50	100	100	3500	300	3750
40 ns max propagation delay skew (part to part) Line termination circuitry included								

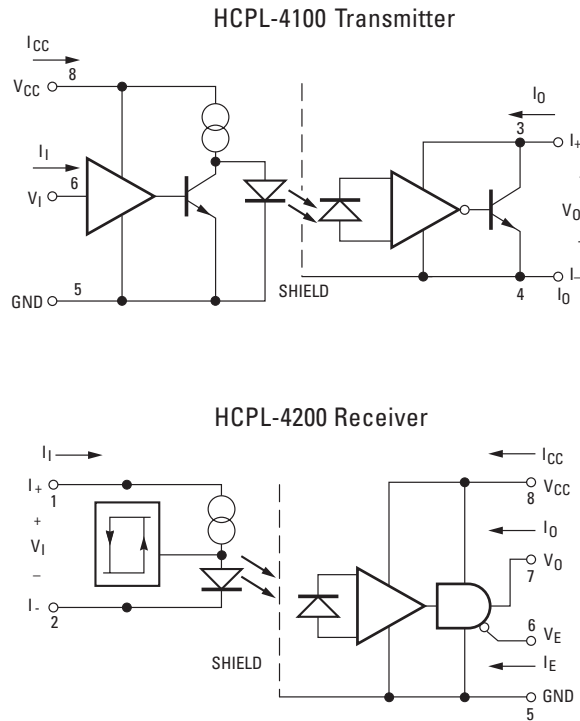


## 20 mA Current Loop Transmitter/Receiver

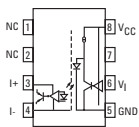
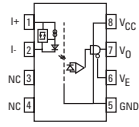
### Description

Data transmission between electronic equipment which are physically separated by distance of more than few feet can be achieved using HCPL-4100 (transmitter) and the HCPL-4200 (receiver) optocouplers. These devices include specialized circuits for 20 mA digital current loop applications. These optocouplers are designed to easily interface TTL and CMOS logic systems to current loop systems. 20 mA current loop systems conventionally signal a logic high state by transmitting 20 mA of loop current and signal a logic low state by allowing no more than few milli amperes of loop current. Optical coupling loop breaks ground loops and provide very high immunity to common mode interference. These devices are simple to use in a data transmission system for industrial applications and maintains data integrity.

### Typical Block Diagram



### 20 mA Current Loop Transmitter/Receiver Product Selection:

Device	Part No.	Package	Data Rate kBd @ (meters)	t <sub>PLH</sub> μs max	t <sub>PHL</sub> μs max	CMR - V/μs@V <sub>CM</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min
						CMR V/μs (min)	V <sub>CM</sub> V	
Transmitter 	HCPL-4100	300 mil DIP	20 (400)	1.6	1.0	1000	50	3750
CMOS compatible data input for HCPL-4100								
Receiver 	HCPL-4200	300 mil DIP	20 (1400)	1.6	1.0	1000	50	3750
CMOS compatible data input for HCPL-4200								

# AC/DC to Logic Interface



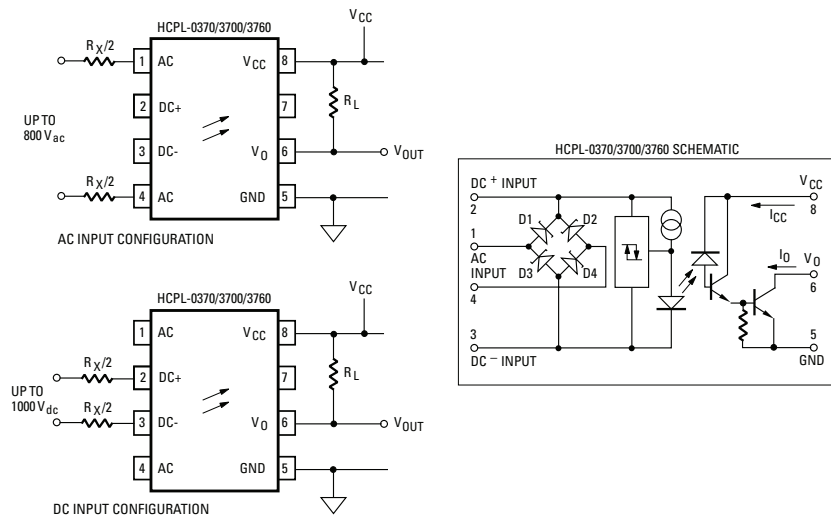
## Description

In the implementation of an interface from an electrically noisy environment into logic systems, it is often desirable to establish some current or voltage switching point or input switching threshold which is resolved in the design of HCPL-3700 optocoupler. This device combines an ac or dc voltage and/or current detection function with a high sensing input buffer ICs which permit control of threshold levels over a wide range sensing industrial control system, ring detection in telephone system micro-processor interfacing.

The HCPL-0370/3700/3760 Threshold-Sensing Optocoupler can be used for sensing the ac/dc power on/off condition. At the optocoupler input, only a pair of series resistors  $R_{X/2}$  are required to limit the current. The ac signal can be filtered with a capacitor at either the input or the output of the optocoupler. The value of  $R_X$  determines the threshold sensing voltage.

HCPL-0370/3700/3760's low threshold current reduces power dissipation and its in-built diode bridge and hysteresis circuit reduces the number of external components to be used.

## Typical Block Diagram



## AC/DC to Logic Interface Product Selection:

Device	Part No.	Package	Input Threshold Current		Hysteresis mA typ	$t_{PLH}$ $\mu s$ max	$t_{PHL}$ $\mu s$ max	CMR - V/ $\mu s$ @ $V_{CM}$		$V_{ISO}$ $V_{RMS}$ min
			mA					CMR V/ $\mu s$ (min)	$V_{CM}$ V	
			min	max						
	HCPL-0370	S08	1.96	3.11	1.2	40	15	600	140	3750
	HCPL-3700	300 mil DIP	1.96	3.11	1.2	40	15	600	140	3750
	HCPL-3760	300 mil DIP	0.87	1.56	0.6	40	15	600	140	3750
CMOS compatible output										



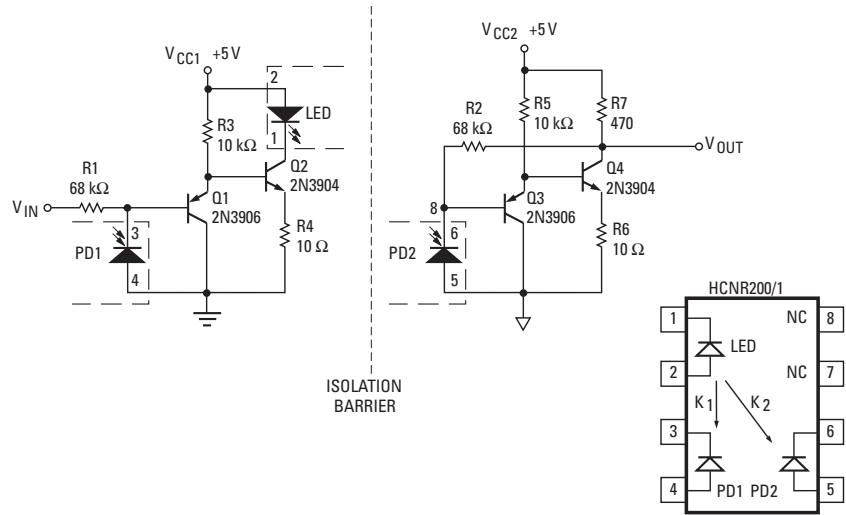
# High Linearity Analog Optocoupler

## Description

Analog Isolation Applications with Linear Optocouplers Agilent's HCNR200/1 constitute basic optical coupling building blocks for high linearity isolation applications. The HCNR200/1 constitute a high performance LED and two closely matched photodiodes. The output photodiode produces a photocurrent that is linearly related to the light output of LED. These optocouplers are highly suitable for the use in the feedback path of switched mode power supplies and motor speed and position measurement. Very high linearity and excellent low transfer gain variation are the advantages of using HCNR200/1.

This is a high-speed, low-cost isolation amplifier for use in the feedback path of switch-mode power supplies or motor speed and position measurement. This circuit can be used in applications where high bandwidth, low-cost, and stable gain are required.

## Typical Block Diagram



## High Linearity Analog Optocoupler Product Selection:

Device	Part No.	Package	Transfer Gain % max	DC Non-Linearity % max	CTR		V <sub>ISO</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
					% min	% max		
	HCNR200	400 mil DIP	+/-15	0.25	0.25	0.75	5000	1414*
	HCNR201	400 mil DIP	+/-5	0.05	0.36	0.72	5000	1414*
-65 ppm/°C gain temperature coefficient 1.5 MHz bandwidth								

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 050

# Wideband Analog/Video Optocoupler



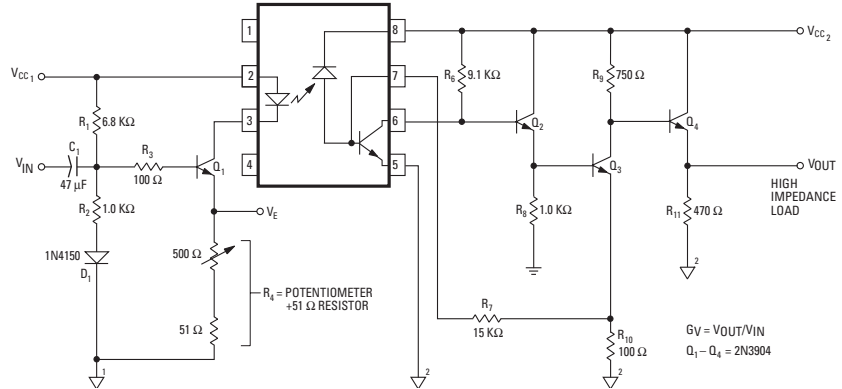
## Description

The HCPL-4562 and HCNW 4562 are recommended for a very high bandwidth (up to 15 Mhz) AC analog designs such as coupling audio or video signals.

This circuit, with the HCPL-4562 Wideband Analog/Video Optocoupler, is optimized for video signal coupling. The peaked response of the detector circuit helps extend the frequency range over which the gain is relatively constant. The number of gain stages, the overall circuit topology, and the dc bias point are all chosen to maximize the bandwidth.

HCPL-4562 provides simple and cost effective solution for coupling audio and video signals.

## Typical Block Diagram

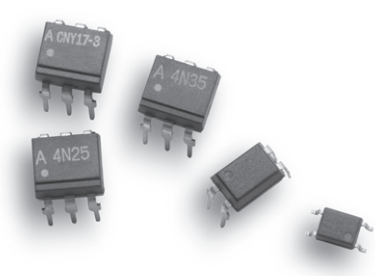


## Wideband Analog/Video Optocoupler Product Selection:

Device	Part No.	Package	Bandwidth MHz typ	DC Non-Linearity % max	CTR % typ	IMRR dB typ	V <sub>iso</sub> V <sub>RMS</sub> min	V <sub>IORM</sub> V peak
	HCPL-4562	300 mil DIP	17	0.25	45	122	3750/5000 <sup>#</sup>	630 <sup>*</sup>
	HCNW4562	400 mil DIP	9	0.15	52	119	5000	1414
0.3%/degree C gain temperature coefficient								

Notes: \* - with IEC/EN/DIN EN 60747-5-2 Option 060 # - with UL 5000VRMS/1 minute Option 020

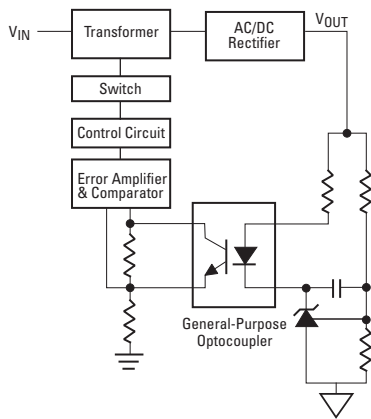
# General Purpose Lead Free Phototransistor Optocoupler



## Description

In switched-mode power supplies, optocouplers are the preferred choice for providing isolated feedback for the regulation loop. For this application, they do an excellent job of isolation, minimizing circuit complexity and reducing cost.

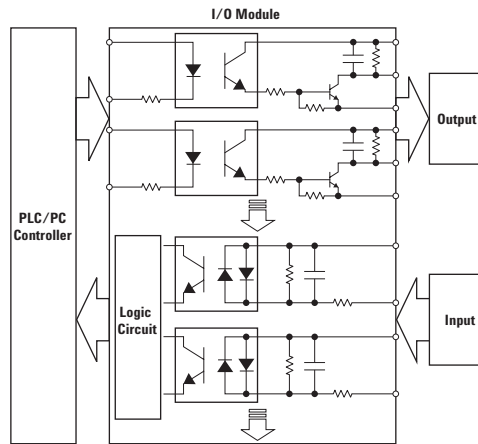
## Typical Switched-mode Power Supply Block Diagram



## Applications

- Ground Loop Elimination
- Interface between Logic Circuits
- I/O or Microprocessor Interfacing
- Level Shifting
- Regulation Feedback Circuits in SMPS

## Programmable Logic Controller I/O Units



## General Purpose Lead Free Phototransistor Optocoupler Product Selection

Device	Part No.	Package	CTR				V <sub>CE(sat)</sub>			t <sub>r</sub> /t <sub>f</sub> μs typ	V <sub>(BR)CEO</sub> V min	V <sub>F</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	Note
			% min	% max	I <sub>F</sub> mA	V <sub>CE</sub> V	V max	I <sub>F</sub> mA	I <sub>C</sub> mA			V max	I <sub>F</sub> mA		
Single Channel 4 pin 	HCPL-181-000E#	SO4	50	600	5	5	0.2	20	1	4/3	80	1.4	20	3750	1
	HCPL-817-000E*	300 mil DIP	50	600	5	5	0.2	20	1	4/3	35	1.4	20	5000	1/2
Single Channel 6 pin 	4N25-000E	300 mil DIP	20	-	10	10	0.5	50	2	3/3	30	1.5	10	2500	1/2
	4N35-000E	300 mil DIP	100	-	10	10	0.3	50	2	3/3	30	1.5	10	3550	1/2
	CNY17-1-000E	300 mil DIP	40	80	10	5	0.3	10	2.5	5/5	70	1.7	60	5000	1/2
	CNY17-2-000E	300 mil DIP	63	125	10	5	0.3	10	2.5	5/5	70	1.7	60	5000	1/2
	CNY17-3-000E	300 mil DIP	100	200	10	5	0.3	10	2.5	5/5	70	1.7	60	5000	1/2
	CNY17-4-000E	300 mil DIP	160	320	10	5	0.3	10	2.5	5/5	70	1.7	60	5000	1/2

## AC Input Optocoupler

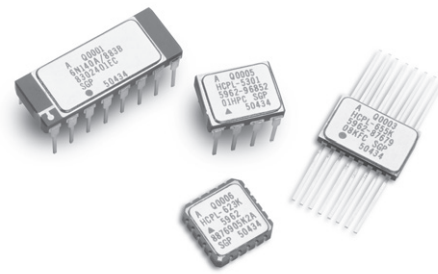
Device	Part No.	Package	CTR				V <sub>CE(sat)</sub>			t <sub>r</sub> /t <sub>f</sub> μs typ	V <sub>(BR)CEO</sub> V min	V <sub>F</sub>		V <sub>ISO</sub> V <sub>RMS</sub> min	Note
			% min	% max	I <sub>F</sub> mA	V <sub>CE</sub> V	V max	I <sub>F</sub> mA	I <sub>C</sub> mA			V max	I <sub>F</sub> mA		
Single Channel 4 pin 	HCPL-354-000E	SO4	20	400	±1	5	0.2	±20	1	4/3	35	1.4	±20	3750	1
	HCPL-354-00AE	SO4	50	150	±1	5	0.2	±20	1	4/3	35	1.4	±20	3750	1
	HCPL-814-000E	300 mil DIP	20	300	±1	5	0.2	±20	1	4/3	35	1.4	±20	5000	1/2
	HCPL-814-00AE	300 mil DIP	50	150	±1	5	0.2	±20	1	4/3	35	1.4	±20	5000	1/2

Notes: 1 - IEC/EN/DIN EN 60747-5-2 Option 060E available, 2 - 0.4" Lead Spacing Option W00E available.

\* - CTR rank with Option 00LE, 00AE, 00BE, 00CE and 00DE available, # - CTR rank with option 00AE, 00BE, 00CE and 00DE available



## Hermetic High Performance Optocouplers



Over the past several years we have seen a demand for more sophisticated hardware, smarter weapons systems, and more electronics. As such, the need for high performance signal isolation and insulation has never been greater.

Isolating one portion of an electrical circuit from another is the primary function of an optocoupler. These devices isolate different voltage levels between the input and output source. Agilent's optocouplers are ideally suited for isolating highly sensitive portions of a circuit from the effects of transmitted common mode signals; offering a variety of input and output characteristics that enable their use in high speed, high performance applications. Agilent hermetic optocouplers excel in designs for harsh environments that require an exceptionally strong, rugged enclosure.

Hermetic optocouplers are used in the following applications: Military end use equipment and systems, aerospace including commercial aircraft and space flight, life rated, high reliability applications, e.g., train control and medical equipment.

For design ease, we offer most functions in 8- and 16-Pin DIPs, 20 terminal LCCC's and 16-Pin Flat Packs with various lead configurations for thru-hole or surface mount, with either single, dual or quad channels. These products are capable of operation and storage over the full military

temperature range of  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  and can be purchased as either commercial product or with full MIL-PRF-38534 Class Level H or K testing. All devices are manufactured and tested on a MIL-PRF-38534 certified line and are included in the DSCC (Defense Supply Center, Columbus) Qualified Manufacturers List QML-38534 for Hybrid Microcircuits.

Agilent has supplied high reliability hermetic optocoupler products since 1975 for use in state-of-the-art applications. To meet the requirements of high reliability, products must be designed with rugged capabilities. They must be able to withstand severe levels of environmental stress and exposure without failure over extended periods of time. We have accomplished this objective in designing optocouplers that have proven their merits in numerous advanced space and defense programs in the international marketplace. Agilent's continuity and support of the industry has remained stable, with zero product obsolescence. We are committed to continued process and performance upgrades, backed up with diligent notification to our customers of any changes made.

If use in radiation environments is a concern, the shallow depth and small junctions featured in Agilent's IC process provides high radiation immunity. Although the devices are not manufactured as "Rad-Hard", they have proven tolerant to radiation effects, which is substantiated by available data.

Statistical Process Control and extensive reliability monitoring (life testing of hundreds of thousands of hours) are standard processes for hermetic optocouplers. Control charts are utilized at each critical step of the process and reviewed by product engineering to assure expected quality and reliability.

Agilent Technologies is a champion of DSCC's QML and SMD (Standard Microcircuit Drawing) programs. We support standardization, which results in cost-effectiveness and a streamlined acquisition process. As such Agilent offers all Class H and Class K products under SMD numbers. Each Hi-Rel device is dual marked with the DSCC SMD and Agilent part numbers.

These COTS (commercial Off The Shelf) devices are built to give you extremely reliable, high quality products. Agilent Technologies is both DSCC certified and qualified to manufacture Class H (military approved) and Class K (space approved) hermetic optocouplers per the requirements of MIL-PRF-38534 Option 1 QCI (in-line inspection) or Option 2 QCI (end-of-line inspection).

Our Screening and Quality Conformance Inspection is outlined on the following page. Custom programs may include full Group A, B, C, and D inspection if required.

**Screening per MIL-PRF-38534**

Procedure	Method	Conditions	Class H	Class K
Nondestruct bond pull	2023		N/A	100%
Internal visual	2017		100%	100%
Temperature cycle	1010	Condition C, -65°C to +125°C,		
10 cycles	100%	100%		
Constant acceleration	2001	5Kg's, Y1 and Y2**	100%	100%
Visual inspection		Internal requirements	100%	100%
PIND*	2020	Condition A	N/A	N/A*
Serialization			N/A	100%
Pre-Burn-In Elec. Test		Group A, subgroup 1 (except II-0) (DC @ +25°C)	100%	100%
Burn-In	1015	Condition B, +125°C, 160 hours		
Condition B, +125°C, 320 hours	100%			
100%				
Interim Elec. Test		Group A, subgroup 1 (except II-0) (DC @ +25°C)	N/A	100%
Post Burn-In Elec. Test		Group A, subgroup 1, (DC @ +25°C), 10% PDA		
Group A, subgroup 1, (DC @ +25°C), 2% PDA	100%			
100%				
Final Elec. Test		Group A, subgroup 2 (DC @ +125°C)		
Group A, subgroup 3 (DC @ -55°C)				
Group A, subgroup 9 (AC @ +25°C)	100%			
100%				
100%	100%			
100%				
100%				
Fine Leak	1014	Cond. A	100%	100%
Gross Leak	1014	Cond. A	100%	100%
Radiographics	2012		N/A	100%
External visual	2009		100%	100%

\* PIND and RGA (Internal Water Vapor Content) testing (Group C) is no longer required on Agilent optocouplers due to the construction of the devices. DSCC approved this test optimization in 2002.

\*\* Condition exceeds Performance Specification.

**Quality Conformance Inspection**

**Group A Testing**

Group A testing is satisfied per the in-line verification testing requirements of MIL-PRF-38534 for Class H devices utilizing Option 1.

Group A testing is performed end of line sample testing requirements of MIL-PRF-38534 for Class K devices utilizing Option 2.

**Group B Testing**

Group B testing is satisfied by performing in-line process monitors as required by MIL-PRF-38534 for Class H devices utilizing Option 1.

Group B testing is satisfied by performing end of line sampling as required by MIL-PRF-38534 for Class K devices utilizing Option 2.

**Group C Testing**

Group C testing is performed only on the first inspection lot and as required to evaluate or qualify changes per the requirements of MIL-PRF-38534.

**Group D Testing**

Group D testing is not performed. Note that Group D requirements are satisfied during incoming inspection element evaluation.

Please be advised that Class H and Class K devices have very similar Screening and Quality Conformance Inspection requirements as shown above. Class K devices, however, have substantially more stringent element evaluation and assembly criteria. The quality and reliability of a Class K device must be built in, not tested out.

**Hermetically Sealed High Speed Logic Gate Optocouplers**

Single Channel Schematic	Commercial Part Number	Class H	DSCC SMD Class H *	Class K	DSCC SMD Class K *	Package				No. of Channels	Typical Data Rate	Common Mode @ V <sub>CM</sub> = 50V	Input Current	Withstand Test Voltage
						8 pin DIP	16 pin DIP	16 pin FP	20 pad LCCC					
	HCPL-5200	HCPL-5201	5962-8876801	HCPL-520K	5962-8876802K	•				1	5MBd	1000V/μs	2-8 mA	1500 Vdc
	HCPL-5230	HCPL-5231	5962-8876901	HCPL-523K	5962-8876904K	•				2	5MBd	1000V/μs	2-8 mA	1500 Vdc
	HCPL-6230	HCPL-6231	5962-8876902	HCPL-623K	5962-8876905K				•	2	5MBd	1000V/μs	2-8 mA	1500 Vdc
	HCPL-6250	HCPL-6251	5962-8876903	HCPL-625K	5962-8876906K			•		4	5MBd	1000V/μs	2-8 mA	1500 Vdc
	HCPL-5400	HCPL-5401	5962-8957001	HCPL-540K	5962-8957002K	•				1	20MBd	500V/μs	6-10 mA	1500 Vdc
	HCPL-5430	HCPL-5431	5962-8957101	HCPL-543K	5962-8957103K	•				2	20MBd	500V/μs	6-10 mA	1500 Vdc
	HCPL-6430	HCPL-6431	5962-8957102	HCPL-643K	5962-8957104K				•	2	20MBd	500V/μs	6-10 mA	1500 Vdc
	6N134	6N134/883B	8102801	HCPL-268K	5962-9800101K			•		2	10MBd	1000V/μs	10 mA	1500 Vdc
	HCPL-5600	HCPL-5601	5962-9085501H	HCPL-560K	5962-9085501K	•				1	10MBd	1000V/μs	10 mA	1500 Vdc
	HCPL-5630	HCPL-5631	8102802	HCPL-563K	5962-9800102K	•				2	10MBd	1000V/μs	10 mA	1500 Vdc
	HCPL-5650	HCPL-5651	8102805			•				2	10MBd	1000V/μs	10 mA	2500 Vdc
	HCPL-6630	HCPL-6631	8102803	HCPL-663K	5962-9800103K				•	2	10MBd	1000V/μs	10 mA	1500 Vdc
	HCPL-6650	HCPL-6651	8102804	HCPL-665K	5962-9800104K			•		4	10MBd	1000V/μs	10 mA	1500 Vdc
	HCPL-1930	HCPL-1931	5962-8957201	HCPL-193K	5962-8957202K			•		2	10MBd	1000V/μs	10 mA	1500 Vdc

\*DSCC SMD number does not include extensions for lead form and finish

**Hermetically Sealed High Speed Transistor Optocouplers**

Single Channel Schematic	Commercial Part Number	Class H	DSCC SMD Class H *	Class K	DSCC SMD Class K *	Package				No. of Channels	Typical Data Rate	Current Transfer Ratio	Input Current	Withstand Test Voltage
						8 pin DIP	16 pin DIP	16 pin FP	20 pad LCCC					
	4N55	4N55/883B	5962-8767901	HCPL-257K	5962-8767905K			•		2	700 KBd	9% min	16 mA	1500 Vdc
	HCPL-5500	HCPL-5501	5962-9085401H	HCPL-550K	5962-9085401K	•				1	700 KBd	9% min	16 mA	1500 Vdc
	HCPL-5530	HCPL-5531	5962-8767902	HCPL-553K	5962-8767906K	•				2	700 KBd	9% min	16 mA	1500 Vdc
	HCPL-6530	HCPL-6531	5962-8767903	HCPL-653K	5962-8767907K				•	2	700 KBd	9% min	16 mA	1500 Vdc
	HCPL-6550	HCPL-6551	5962-8767904	HCPL-655K	5962-8767908K			•		4	700 KBd	9% min	16 mA	1500 Vdc

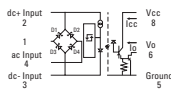
\*DSCC SMD number does not include extensions for lead form and finish

**Hermetically Sealed High Gain Optocouplers**

Single Channel Schematic	Commercial Part Number	Class H	DSCC SMD Class H *	Class K	DSCC SMD Class K *	Package				No. of Channels	Typical Data Rate	Current Transfer Ratio	Input Current	Withstand Test Voltage
						8 pin DIP	16 pin DIP	16 pin FP	20 pad LCCC					
	6N140A	6N140A/883B	8302401	HCPL-177K	5962-9800201K			•		4	100 KBd	300% min	0.5-5 mA	1500 Vdc
	HCPL-5700	HCPL-5701	5962-8981001	HCPL-570K	5962-8981002K	•				1	100 KBd	300% min	0.5-5 mA	1500 Vdc
	HCPL-5730	HCPL-5731	5962-8978501	HCPL-573K	5962-8978503K	•				2	100 KBd	300% min	0.5-5 mA	1500 Vdc
	HCPL-6730	HCPL-6731	5962-8978502	HCPL-673K	5962-8978504K				•	2	100 KBd	300% min	0.5-5 mA	1500 Vdc
	HCPL-6750	HCPL-6751	8302401	HCPL-675K	5962-9800201K			•		4	100 KBd	300% min	0.5-5 mA	1500 Vdc

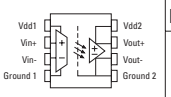
\*DSCC SMD number does not include extensions for lead form and finish

**Hermetically Sealed AC/DC to Logic Interface Optocouplers**

Single Channel Schematic	Commercial Part Number	Class H	DSCC SMD Class H *	Class K	DSCC SMD Class K *	8 pin DIP	No. of Channels	Typical Data Rate	Input Threshold Current	Output Current	Withstand Test Voltage
	HCPL-5760	HCPL-5761	5962-8947701	HCPL-576K	5962-8947702K	•	1	100 KHz	2.5 mA TH+ 1.3 mA TH-	2.6 mA	1500 Vdc

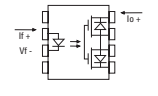
\*DSCC SMD number does not include extensions for lead form and finish

**Hermetically Sealed Power MOSFET**

Single Channel Schematic	Commercial Part Number	Class H	DSCC SMD Class H *	Class E	DSCC SMD Class E *	Package 8 pin DIP	No. of Channels	Output Withstand Voltage	Output On-Resistance	Maximum Load Current	Maximum Off-State Leakage	Input Current	Input/Output Insulation
	HSSR-7110	HSSR-7111	5962-9314001H	HSSR-711E	5962-9314001E	•	1	90 V	1.0 Ohm	0.8 A ac 1.6 A dc	250 mA	10-20mA	1500 Vdc
		HSSR-7112	5962-9314002H			•	1	90 V	1.0 Ohm	0.8 A ac 1.6 A dc	250 mA	5-20mA	1500 Vdc

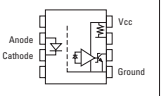
\*DSCC SMD number does not include extensions for lead form and finish

**Hermetically Sealed Analog Isolation Amplifier**

Single Channel Schematic	Commercial Part Number	Class H	DSCC SMD Class H *	Class K	DSCC SMD Class K *	Package 8 pin DIP	No. of Channels	Gain Tolerance (max %)	Non-Linearity (max %)	Prop Delay $\mu$ s (max)	CMR V/ $\mu$ s (min)	Bandwidth KHz (typ.)	Offset mV (typ.)
	HCPL-7850	HCPL-7851	5962-9755701H			•	1	5	0.1	11	5000	100	0.6

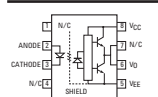
\*DSCC SMD number does not include extensions for lead form and finish

**Hermetically Sealed Intelligent Power Module and Gate Drive Interface**

Single Channel Schematic	Commercial Part Number	Class H	DSCC SMD Class H *	Class K	DSCC SMD Class K *	Package 8 pin DIP	No. of Channels	Typical Data Rate	Current Transfer Ratio	Input Current	Common Mode @ V <sub>CM</sub> =1000V	Withstand Test Voltage
	HCPL-5300	HCPL-5301	5962-9685201H	HCPL-530K	5962-9685201K	•	1	2MBd	30 % min	10-20 mA	10kV/ $\mu$ s	1500 Vdc

\*DSCC SMD number does not include extensions for lead form and finish

**Hermetically Sealed Output Current IGBT Gate Drive**

Single Channel Schematic	Commercial Part Number	Class H	DSCC SMD Class H *	Class K	DSCC SMD Class K *	Package 8 pin DIP	No. of Channels	Peak Output Current	UVLO+	UVLO-	Input Current	Common Mode @ V <sub>CM</sub> =1000V	Withstand Test Voltage
	HCPL-5120	HCPL-5121	5962-0420401H			•	1	2.0 A	13.5V max	9.5V min	10-18 mA	10kV/ $\mu$ s	1500 Vdc
	HCPL-5150	HCPL-5151	5962-0420501H			•	1	0.5 A	13.5V max	9.5V min	10-18 mA	10kV/ $\mu$ s	1500 Vdc

\*DSCC SMD number does not include extensions for lead form and finish

## Quick Guide to Direct Upgrades

Upgrade Part	Feature	Benefit
<b>Improved Isolation/Insulation</b> Ability to protect surrounding circuitry against physical damages resulting from differential voltages.	HCNW family offers highest available working voltage ratings with regulatory approval per VDE 0884 of 1414 V peak.	Meets international safety regulations and standards. Provide better isolation and overall safety performance.
<b>High CMR</b> Common-mode transient rejection or signal isolation of data through suppression of noise transients.	Agilent offers guaranteed CMR performance up to 15 kv/μs (30 kv/μs typical) which is the highest available in the market.	Improves system performance, and reliability. More robust systems and better data integrity meet EMI and ESD requirements.
<b>Drive Current, I<sub>f</sub></b> Low Drive Current, LED or light-emitting diode drive current.	Agilent offers the lowest I <sub>f</sub> (up to 40 μA) devices in the market and broadest HCMOS compatibility.	Eliminates additional LED drive circuitry. Improves system efficiency and reduces power consumption and LED degradation.
<b>Propagation Delay, T<sub>p</sub></b> It is a figure of merit to describe how quickly a logic signal can propagate through the system.	High Speed digital optocouplers to meet wide range of applications with T <sub>p</sub> as low as 40 ns.	Increase switching efficiency and better speed performance.
<b>Surface Mount Device</b> SMD permits more component density than DIP.	Smaller package to deliver the same functionality as standard DIP. True surface mount technology and standard footprint.	Lower assembly cost, easier and faster handling as well as better solderability.
<b>Energy Saving</b> The new 3.3V family of LV Compatible optocouplers to meet the industry standard.	Low Power Consumption and High Speed. Meets JEDEC low voltage requirements.	More than 50% power saving. Better Pulse Width Distortion and CMR performance.

5V Part	Recommended 3.3V Part
5V DIP Single	3.3V DIP Single
6N135/6N136 6N137/HCPL-2601	HCPL-250L HCPL-260L
6N138/6N139	HCPL-270L
5V S08 Single	3.3V S08 Single
HCPL-0500 HCPL-0501 HCPL-0600 HCPL-0601 HCPL-0700 HCPL-0701	HCPL-050L HCPL-060L  HCPL-070L
5V DIP Dual	3.3V DIP Dual
HCPL-2530 HCPL-2531 HCPL-2630 HCPL-2631 HCPL-2730 HCPL-2731	HCPL-253L HCPL-263L  HCPL-273L
5V S08 Duals	3.3V S08 Dual
HCPL-0530 HCPL-0531 HCPL-0630 HCPL-0631 HCPL-0730 HCPL-0731	HCPL-053L HCPL-063L  HCPL-073L

Shaded Text—RECOMMENDED FOR NEW DESIGNS

CMR	Recommended Part	Remark
6N135 6N136 HCPL-4502	HCPL-4503	Higher CMR
	HCPL-4504 HCPL-J454	Higher CMR + Higher Switching Speed
	HCPL-4506 HCPL-J456	Higher CMR + Higher Switching Speed + Lower <i>I</i> <sub>f</sub>
HCPL-0500	HCPL-0453	Higher CMR
HCPL-0501	HCPL-0454	Higher CMR + Higher Switching Speed
HCPL-4502	HCPL-0466	Higher CMR + Higher Switching Speed + Lower <i>I</i> <sub>f</sub>
HCNW135	HCNW4503	Higher CMR
HCNW136	HCNW4504	Higher CMR + Higher Switching Speed
HCNW4502	HCNW4506	Higher CMR + Higher Switching Speed + Lower <i>I</i> <sub>f</sub>
HCPL-2530	HCPL-4534	Higher CMR + Higher CTR
HCPL-0530	HCPL-053	
6N137	HCPL-2611	Higher CMR
HCPL-2601	HCPL-261N	Higher CMR + Lower <i>I</i> <sub>f</sub>
HCPL-0600	HCPL-0611	Higher CMR
HCPL-0601	HCPL-061N	Higher CMR + Lower <i>I</i> <sub>f</sub>
HCPL-2630	HCPL-4661	Higher CMR
HCPL-2631	HCPL-263N	Higher CMR + Lower <i>I</i> <sub>f</sub>
HCPL-0630	HCPL-0661	Higher CMR
HCPL-0631	HCPL-063N	Higher CMR + Lower <i>I</i> <sub>f</sub>
6N138	HCPL-4701	Higher CMR + Lower <i>I</i> <sub>f</sub>
HCPL-0700	HCPL-070A	
HCPL-2730	HCPL-4731	
HCPL-0730	HCPL-073A	Higher CMR
HCPL-2200	HCPL-2219	
HCPL-2201	HCPL-2211	
HCPL-2202	HCPL-2212	
HCPL-0201	HCPL-0211	
HCNW2201	HCNW2211	
HCPL-2231	HCPL-2232	

<i>I</i> <sub>f</sub>	Recommended Part	Remark
6N135 6N136 HCPL-4502	HCPL-4506 HCPL-J456	Lower <i>I</i> <sub>f</sub> + Higher CMR + Higher Switching Speed
	HCPL-0500	
HCPL-0501 HCPL-4502		
HCNW135	HCNW4506	
HCNW136 HCNW4502		
6N137		
HCPL-2601	HCPL-261N	Lower <i>I</i> <sub>f</sub> + Higher CMR
HCPL-0600	HCPL-061A	Lower <i>I</i> <sub>f</sub>
HCPL-0601	HCPL-061N	Lower <i>I</i> <sub>f</sub> + Higher CMR
HCPL-2630	HCPL-263A	Lower <i>I</i> <sub>f</sub>
HCPL-2631	HCPL-263N	Lower <i>I</i> <sub>f</sub> + Higher CMR
HCPL-0630	HCPL-063A	Lower <i>I</i> <sub>f</sub>
HCPL-0631	HCPL-063N	Lower <i>I</i> <sub>f</sub> + Higher CMR
6N138	HCNW4503	Lower <i>I</i> <sub>f</sub> + Higher CMR
HCPL-0700	HCNW4504	
HCPL-2730	HCNW4506	
HCPL-0730	HCPL-4534	

SMD	Recommended Part
6N135	HCPL-0500
6N136	HCPL-0501
6N137	HCPL-0600
6N138	HCPL-0700
6N139	HCPL-0701
HCPL-2201	HCPL-0201
HCPL-2211	HCPL-0211
HCPL-2530	HCPL-0530
HCPL-2531	HCPL-0531
HCPL-2601	HCPL-0601
HCPL-2611	HCPL-0611
HCPL-261A	HCPL-061A
HCPL-261N	HCPL-061N
HCPL-2631	HCPL-0631
HCPL-263A	HCPL-063A
HCPL-263N	HCPL-063N
HCPL-2730	HCPL-0730
HCPL-2731	HCPL-0731
HCPL-4502	HCPL-0452
HCPL-4503	HCPL-0453
HCPL-4504	HCPL-0454
HCPL-4506	HCPL-0466
HCPL-4534	HCPL-0534
HCPL-4661	HCPL-0661
HCPL-4701	HCPL-070A
HCPL-4731	HCPL-073A

NOTE: All SMD (S08) parts are prefix with "0".

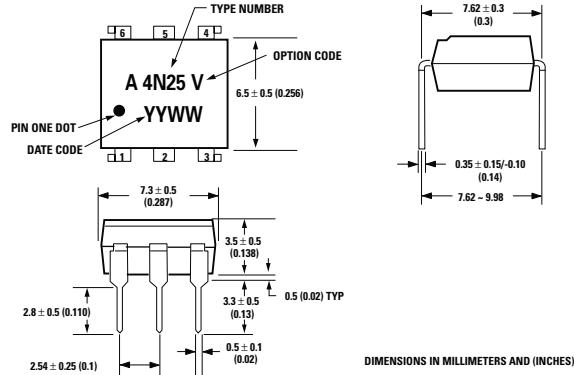
Safety Regulatory	Recommended Part
6N135	HCNW135
6N136	HCNW136
6N137	HCNW137
6N138	HCNW138
6N139	HCNW139
HCPL-2201	HCNW2201
HCPL-2211	HCNW2211
HCPL-2601	HCNW2601
HCPL-2611	HCNW2611
HCPL-4502	HCNW4502
HCPL-4503	HCNW4503
HCPL-4504	HCNW4504
HCPL-4506	HCNW4506
HCPL-4562	HCNW4562

NOTE: All HCNW have better safety regulatory specification.

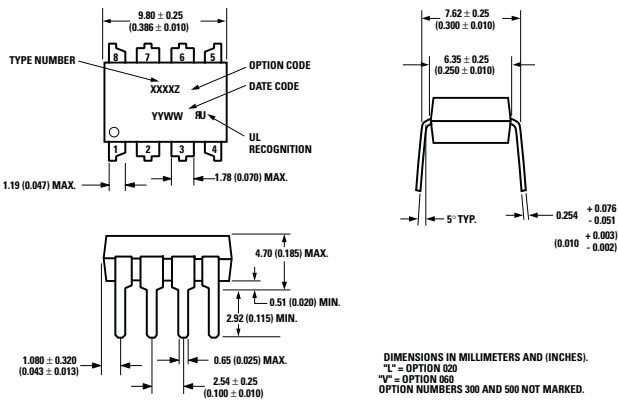
Shaded Text—RECOMMENDED FOR NEW DESIGNS

# Optocoupler Package Dimensions

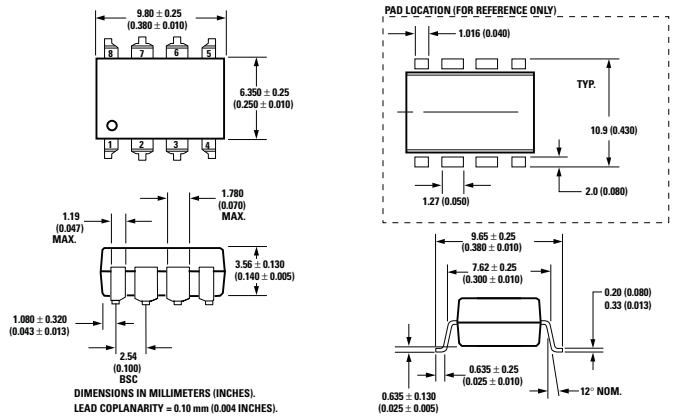
## 300 mil 6-pin DIP



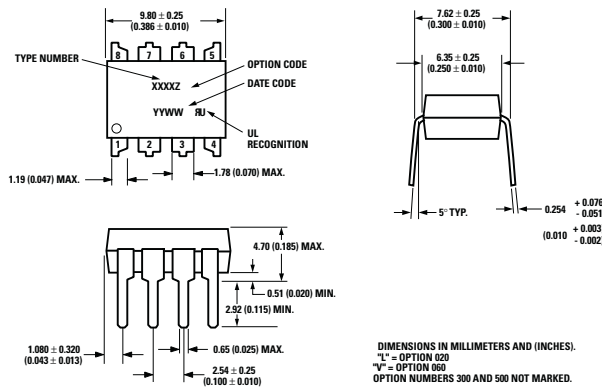
## 300 mil 8-pin DIP



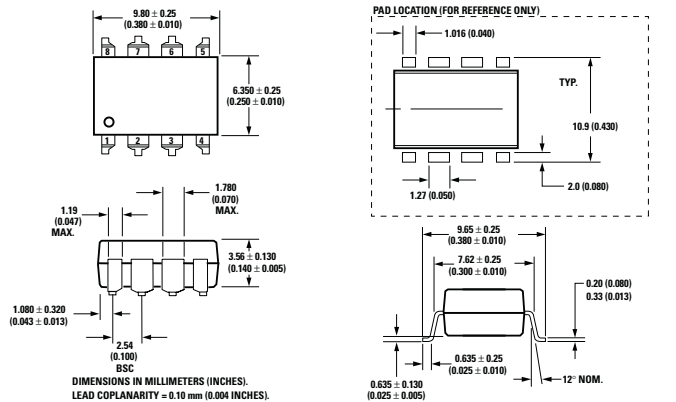
## 300 mil 8-pin DIP Gullwing Option 300



## 300 mil 8-pin DIP (white)

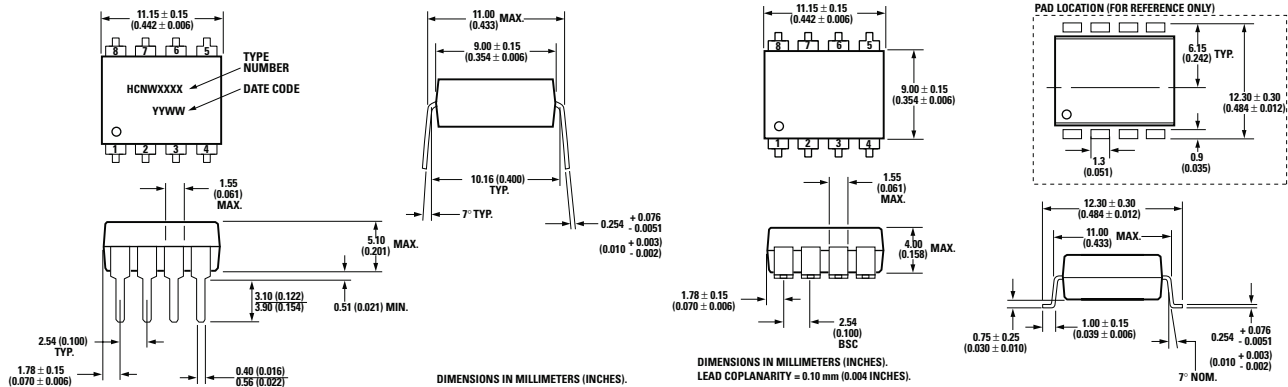


## 300 mil 8-pin DIP (white) Gullwing Option 300

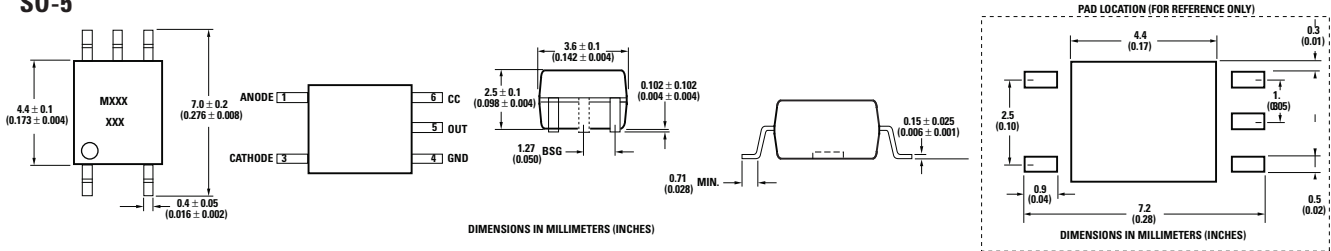


# Optocoupler Package Dimensions Continued

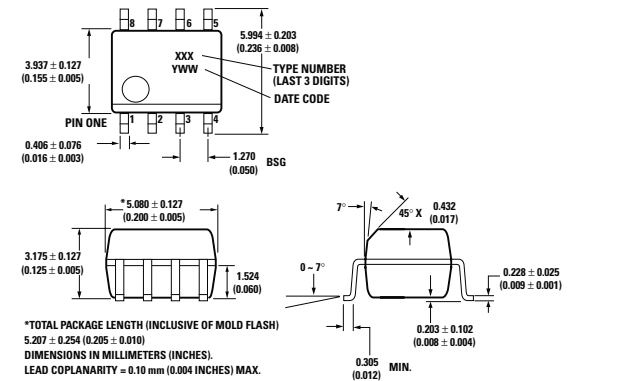
## 400 mil 8-pin DIP



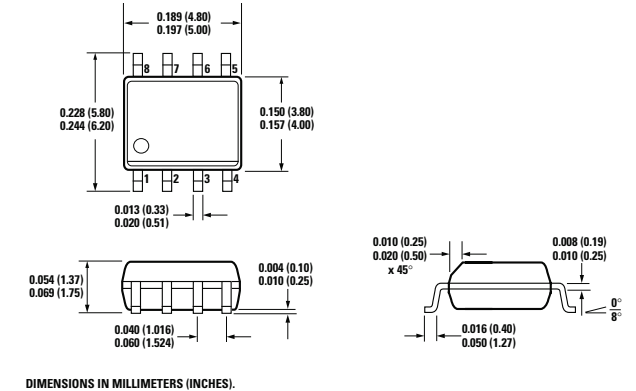
## S0-5



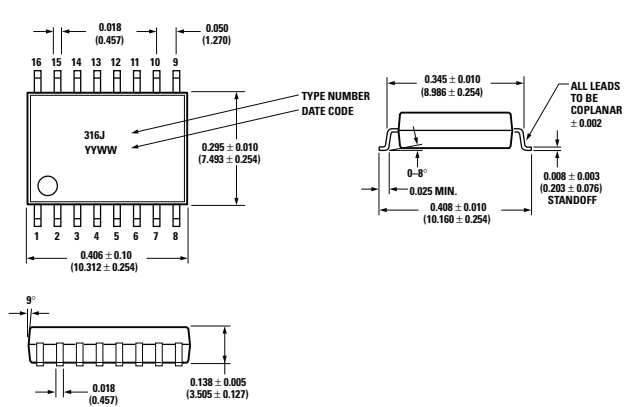
## S0-8 SMD



## S0-8 SMD (HCPL-0810)



## S0-16 SMD



## Options Available

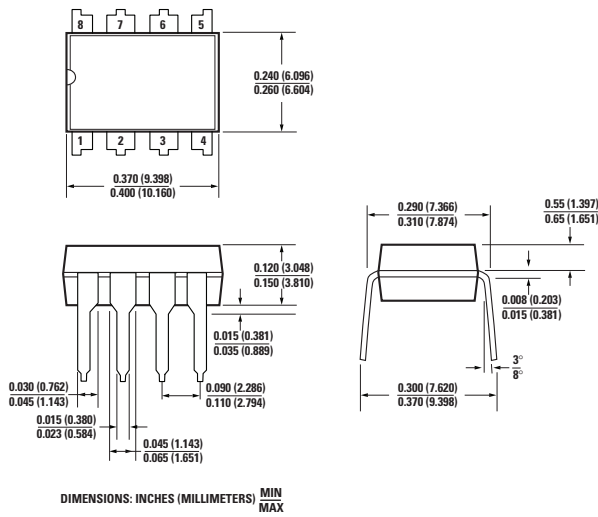
- 020 = UL 5000 V<sub>rms</sub>/1 Minute Option
- 060 = IEC/EN/DIN EN 60747-5-2 Approved Part Option
- 300 = Gull Wing Surface Mount Option
- 500 = Tape & Reel Packaging Option
- xxxE = Lead Free Option

Remarks: The notation '#' is used for existing products, while (new) products launched since 15th July 01 will use '-'

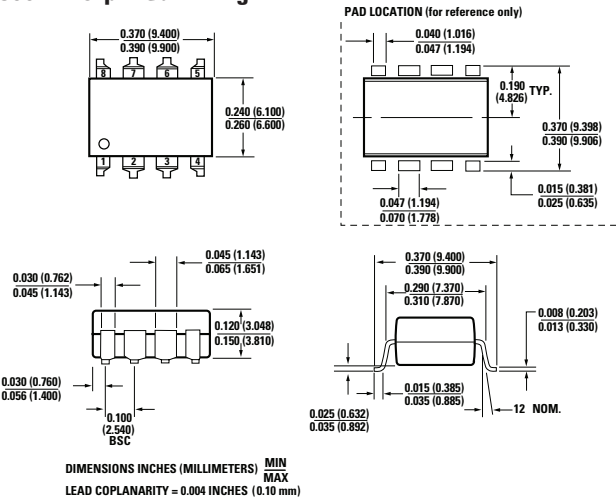


# Digital Isolator Package Dimensions

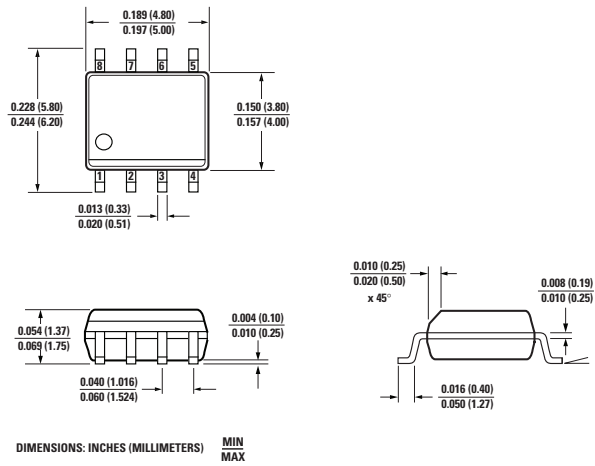
## 300 mil 8-pin DIP



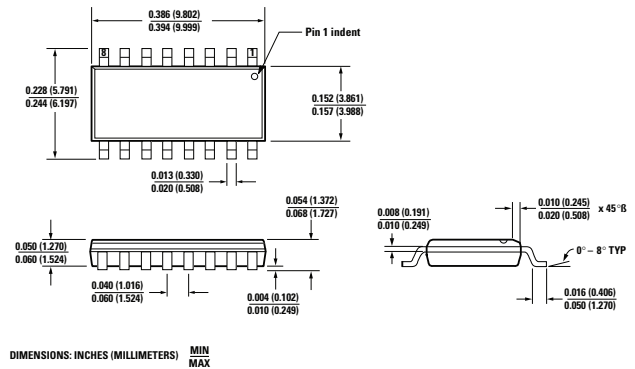
## 300 mil 8-pin Gull Wing



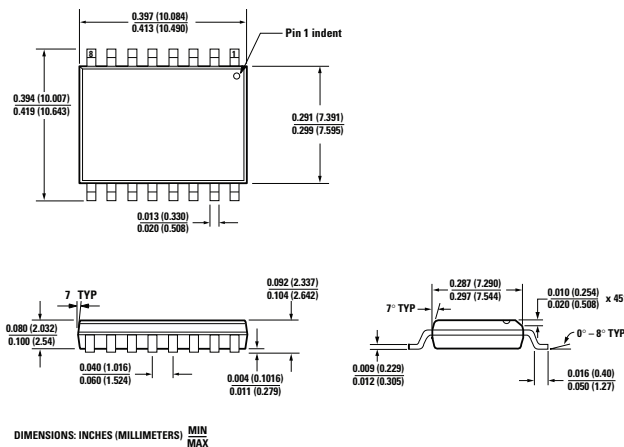
## SO-8 SMD



## Narrowbody SOIC-16 pin



## Widebody SOIC-16 pin

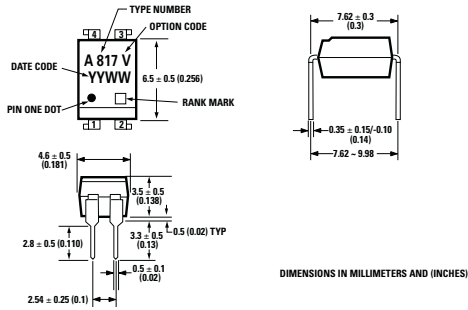


### Options Available

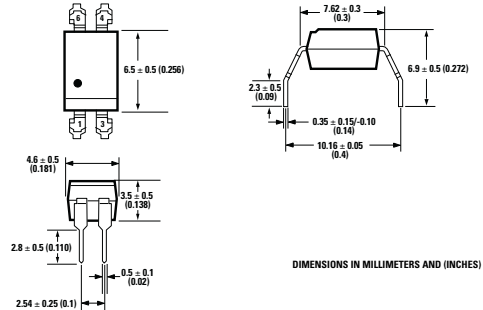
300 = Lead Bend SMD Option  
 500 = Tape and Reel Packaging Option  
 xxxE = Lead Free Option  
 Remarks: The notation '#' is used for existing products, while (new) products launched since 15th July 01 will use '-'.

# Phototransistor Package Dimensions

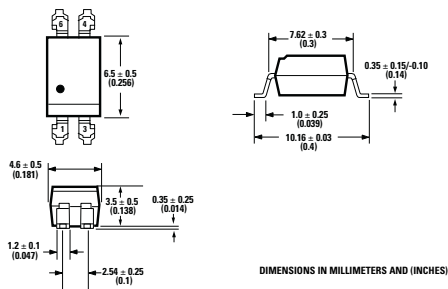
## 300 mil 4-pin DIP



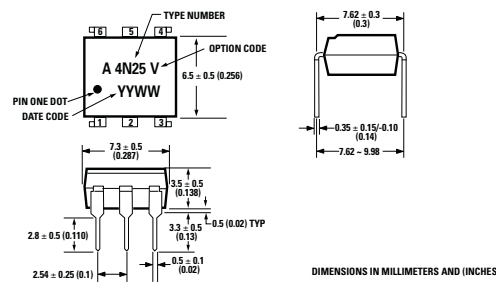
## 400 mil 4-pin 0.4" Lead Spacing Option



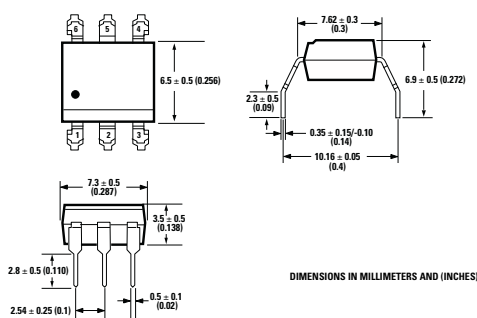
## 300 mil 4-pin Lead Bend SMD Option



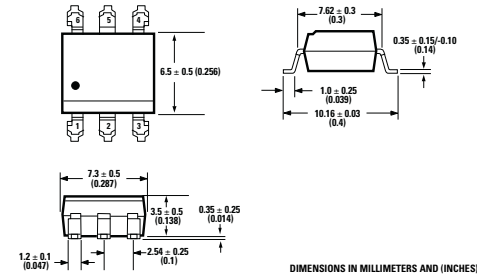
## 300 mil 6-pin DIP



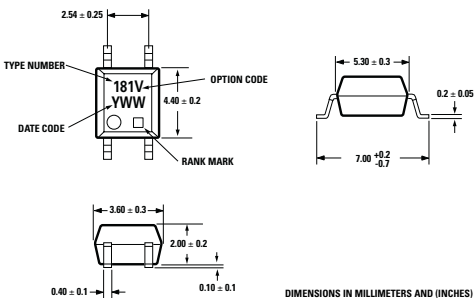
## 400 mil 6-pin 0.4" Lead Spacing Option



## 400 mil 6-pin Lead Bend SMD Option



## 4-pin Miniflat SMD



### Options Available

- 060E = IEC/EN/DIN EN 60747-5-2 Option
- W00E = 0.4" Lead Spacing Option
- 300E = Lead Bend SMD Option
- 500E = Tape and Reel Packaging Option
- 00LE = CTR: 50-100%
- 00AE = CTR: 80-160%
- 00BE = CTR: 130-260%
- 00CE = CTR: 200-400%
- 00DE = CTR: 300-600%

Remarks: The notation '# ' is used for existing products, while (new) products launched since 15th July 01 will use '- '.

Function vs Application Matrix – Digital Isolation

Function		Digital Isolation							Analog Isolation					
Market	Application	Power Device Drive		Data Communication			A-D Isolation		Voltage Monitor	Current Sensing	Voltage Sensing	Signal Amp	Powerline Comm	Power Supply Feedback
		Inverter	IPM Interface	Field Bus	RS422/485	Others	ADC/DAC	V-F Converter						
Industrial	Automated Test Equipment			8	1, 6	3, 4, 5, 11, 17, (18)		2, 6, (18)	13					
	Board CPU			8	1, 6	3, 4, 5, 11, 17, (18)	6, (18)	2, 6, (18)						
	Elevator	9	2			17			13	10	10, 14, 15			
	FFT/Data Logger					17	6, 7, (18)							
	Industrial Induction Cooking	9	2			17				10	10, 14, 15			
	Industrial Networking			7, 8, (18)	1, 6, (18)	3, 4, 5, 11, 17, (18)								
	Instrument			8	1, 6	3, 4, 5, 11, 17, (18)	6, (18)							17
	Motor Control	9	2	7, 8	6	3, 4, 5, 11, 17, (18)	6, (18)	2, 6, (18)	13	10	10, 14, 15			17
	NC/Robot	9	2	7, 8	6	3, 4, 5, 11, 17, (18)	6, (18)		13	10	10, 14, 15			
	On-board Power Supply					17	6, (18)							17
	Panel Switches			8	1, 6	3, 4, 5, 11, 17, (18)	6, (18)							
	PLC			7, 8, (18)	1, 6, (18)	3, 4, 5, 12, 17, (18)	6, (18)	2, 6, (18)	13					
	Power Distribution System	9	2	8		3, 4, 5, 12, 17, (18)			13					17
	Process Meter			7, 8, (18)	1, 6, (18)	12, 17, (18)	6, (18)	2, 6, (18)	13		14, 15			
	Remote Meter Reading												19	
	Servo Driver	9	2	7, 8	6	3, 4, 5, 11, 17, (18)	6, (18)		13	10	10, 14, 15			17
	Sewing Machine	9	2			17			13	10	10, 14, 15			17
	Solar Generator	9	2			17			13	10	10, 14, 15			17
	Switching Power Supply	9	2			17			10	10	10, 14, 15			17
	Test & Measurement Equipment			7, 8, (18)	1, 6, (18)	3, 4, 5, 11, 17, (18)	6, (18)		13					
Thermo Counter/Recorder			8	6	3, 4, 5, 11, 17, (18)	6, (18)	2, 6, (18)							
Welding	9	2						13	10	10, 14, 15				
Medical	Defibrillator	9												
	Electrocardiograph (ECG/EKG)					6, 7 (18)	6, 7 (18)				10			
	Endoscopes					6, 7 (18)	6, 7 (18)				10			
	Esophagus Photoplethysmography (PPG)					6, 7 (18)	6, 7 (18)				10			
	Magnetic Resonance Imaging (MRI)	9				6, 7 (18)	6, 7 (18)		10		10			
	Patient Monitoring			7, 8		6, 7 (18)	6, 7 (18)				10			
Transportation	EV	9	2	7, 8		6			13	10				
	Transportation System	9	2	7, 8		6								
Computing and Office Automation	ECR, POS				2,4,5,6	6, 7, 8, 17, (18)								17
	Isolated I/O				2,4,5,6	6, 7, 8, 17, (18)								
	Isolated USB				2,4,5,6	6, 7, 8, 17, (18)								
	Network				2,4,5,6	6, 7, 8, 17, (18)								
UPS	9	2			17			13	10	10, 14, 15			17	
Consumer	Air Conditioning	9	2			17				10				17
	Electronic Gaming				6	6, 17, (18)								17
	Fitness Equipment	9	2					13	10		10			17
	Induction Heating Cookers	9	2											
	Musical (MIDI)					6, 17, (18)								
	Plasma Displays					2, 6, 8, 9, 17								
	Refrigerator	9	2			17								17
	Washing Machines	9	2			17								17
Communications	ISDN				1,2,3	7, 8, 17			13					17
	PBX and Central Office				1,2,3	3, 17			13					17
	Power Line Communication											19		
	Power-Over-Ethernet (PoE)			7, 8		1, 6								
	Telephone Switching Equipment					6, 7, 8, 17, (18)								17
	Telephone Terminal Equipment					6, 7, 8, 17, (18)								17
	Wireless Base Station					6, 7, 8, 17, (18)								17
Aerospace/Defense/Government		16		16	16				16	16	16			

- 3.3V Digital Optocoupler Family
- 1 MBd Transistor Output Optocoupler
- 100 kBd Darlington Transistor Output Optocoupler
- 5 MBd Logic Gate Optocoupler
- 8 MBd Logic Gate Optocoupler
- 10 MBd Logic Gate Optocoupler
- 20 MBd Logic Gate Optocoupler

- High Speed Digital CMOS Logic Gate Optocoupler
- Integrated Gate Drive Optocoupler
- Miniature Analog Isolation Amplifier
- Line Receiver
- 20 mA Current Loop Transmitter/Receiver
- AC/DC to Logic Interface
- High Linearity Analog Optocoupler

- Wideband Analog/Video Optocoupler
- Hermetic High Performance Optocoupler
- General Purpose Phototransistor Optocoupler
- High Speed Digital Isolator
- Power Line Interface

## About Agilent

Agilent Technologies is a leading provider of innovative technologies for electronics and life sciences. Agilent delivers a wide range of solutions and services, including semiconductors, test and measurement, and chemical analysis, for the leading corporations around the world.

Agilent offers semiconductor solutions for mobile handsets, storage, computing, and networking systems, and a wide range of optoelectronics products for applications including industrial, automotive, and consumer systems. Agilent has an extremely broad range of technology and system expertise to help customers stay ahead in the fast-moving electronics industry.

Agilent's semiconductor solutions include fiber-optic transceivers and IC products for storage, computing and networking. For mobile handsets, Agilent offers camera modules, radio frequency devices, infrared transceivers, light and proximity sensors, and LEDs for backlighting. Agilent's optoelectronics solutions include a broad range of LED solutions, the world's most comprehensive line of isolation devices, motion control components for office automation and industrial systems, optical navigation solutions for computer mice, and fiber-optic transceivers for industrial and automotive applications.

Agilent's broad range of isolation products provide performance features and benefits that are unmatched in the industry for industrial, computing, consumer, communication, medical, military and aerospace markets.

For product information and a complete list of distributors, please go to our web site.

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