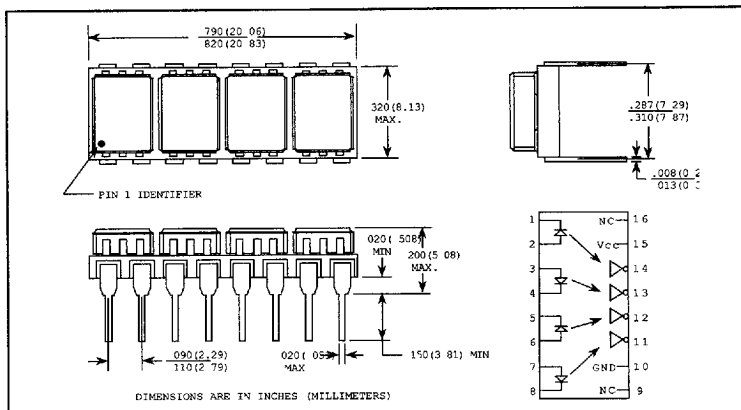
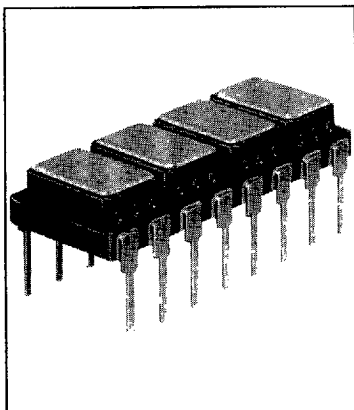


Four Channel Low Input Current Optocoupler Type HDA140A



Functions

- Key parameters guaranteed over temperature
- Hermetically sealed
- High density packaging
- Low power consumption
- High current transfer ratio
- Low input current requirement

Description

The HDA140A consists of four ceramic surface mount optocouplers attached to a dual in-line leaded mother board. This package is superior to single cavity construction because it eliminates any possibility of crosstalk between channels while still meeting the 6N140A JEDEC physical and electrical requirements. The photodiode and the first stage transistor of each channel are connected in common, permitting lower output saturation voltage and higher speed operation than possible with conventional photodarlington optocouplers.

Custom tested HDA140A devices for programs requiring special military processing can be supplied in accordance with Optek's own special environmental, electrical screening and quality conformance testing.

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Operating Temperature	-55°C to +150°C
Storage Temperature	-65°C to +150°C
Lead Solder Temperature (1.6mm below seating plane for 10 sec.)	260°C
Input Diode	
Peak Input Current (each channel, $\leq 1\text{ms}$ duration, 500 pps)	20mA
Average Input Current, I_F (each channel)	10.0mA ⁽¹⁾
Reverse Input Voltage, V_R (each channel)	5.0V

Output Photodetector

Output Current, I_O (each channel)	40mA
Output Voltage, V_O (each channel)	-0.5 to 20V ⁽²⁾
Supply Voltage, V_{CC}	-0.5 to 20V ⁽²⁾
Output Power Dissipation (each channel)	50mW ⁽³⁾

Notes:

- (1) Derate I_F at 0.25mA/°C above 110°C.
- (2) Pin 10 (Ground) should be most negative voltage at the detector side. Keeping V_{CC} as low as possible, greater than 2.0 volts, will provide the lowest total I_{OH} over temperature.
- (3) Output power is collector output power plus one fourth of the total supply power. Derate at 1.25mW/°C above 110°C.
- (4) I_{OHX} is leakage current resulting from channel to channel optical crosstalk. $I_F = 2.0\mu\text{A}$ for channel under test. For all other channels $I_F = 10.0\text{mA}$.

Type HDA140A

Electrical Characteristics (T_A = -55°C to 125°C, unless otherwise noted)

Symbol	Parameter	Min	Typ	Max	Units	Test Conditions
Input Diode						
V _F *	Forward Voltage			1.70	V	I _F = 1.60mA, T _A = 25°C
BV _R *	Reverse Breakdown Voltage	5.0			V	I _R = 10.0μA, T _A = 25°C
$\frac{\Delta V_F}{\Delta T_A}$	Temperature Coefficient of Forward Voltage		-1.80		mV/°C	I _F = 1.60mA
Coupled						
CTR*	Current Transfer Ratio	300	1500		%	I _F = 0.50mA, V _O = 0.4V, V _{CC} = 4.5V
		300	1000		%	I _F = 1.60mA, V _O = 0.4V, V _{CC} = 4.5V
		200	500		%	I _F = 5.0mA, V _O = 0.4V, V _{CC} = 4.5V
V _{OL}	Logic Low Output Voltage		0.1	0.4	V	I _F = 0.50mA, I _{OL} = 1.50mA, V _{CC} = 4.5V
V _{OL}	Logic Low Output Voltage		0.2	0.4	V	I _F = 5.0mA, I _{OL} = 10.0mA, V _{CC} = 4.5V
I _{OH} X	Logic High Output Current		.001	250	μA	I _F = 2.0mA (channel under test)
I _{OH} *	Logic High Output Current		.001	250	μA	V _O = V _{CC} = 18V (see note 4)
I _{CC} L*	Logic Low Supply Current		1.70	4.0	mA	I _{F1} = I _{F2} = I _{F3} = I _{F4} = 1.60mA, V _{CC} = 18V
I _{CC} H*	Logic High Supply Current		.001	40	μA	I _{F1} = I _{F2} = I _{F3} = I _{F4} = 0mA, V _{CC} = 18V
I _{I-O} *	Input-Output Insulation Leakage Current			1.0	μA	45% Relative Humidity, T _A = 25°C, t = 5sec, V _{I-O} = 1500VDC
R _{I-O}	Resistance (input-output)		10 ¹²		Ω	V _{I-O} = 500VDC
C _{I-O}	Capacitance (input-output)		1.50		pF	f = 1.00MHz, T _A = 25°C
C _{I-I}	Capacitance (input-input)		1.00		pF	f = 1.00MHz, T _A = 25°C
C _{IN}	Input Capacitance		60		pF	f = 1.00MHz, V _F = 0, T _A = 25°C
I _{I-I}	Input-Input Insulation Leakage Current		0.50		nA	45% Relative Humidity, V _H = 500V, T _A = 25°C, t = 5 sec
R _{I-I}	Resistance (input-input)		10 ¹²		Ω	V _{I-I} = 500V, T _A = 25°C
Switching Specification (T_A = 25°C)						
t _{PLH} *	Propagation Delay Time to Logic High at Output		6.0	60	μs	I _F = 0.50mA, R _L = 4.7kΩ, V _{CC} = 5.0V
			4.0	20	μs	I _F = 5.0mA, R _L = 680kΩ, V _{CC} = 5.0V
t _{PHL} *	Propagation Delay Time to Logic Low at Output		30	100	μs	I _F = 0.50mA, R _L = 4.7kΩ, V _{CC} = 5.0V
			2.0	5.0	μs	I _F = 5.0mA, R _L = 680kΩ, V _{CC} = 5.0V
CM _H	Common Mode Transient Immunity at Logic High Level Output	500	1000		V/μs	I _F = 0, R _L = 1.5kΩ, I _{VCM} = 50V _{p-p} , V _{CC} = 5.0V
CM _L	Common Mode Transient Immunity at Logic Low Level Output	-500	-1000		V/μs	I _F = 1.60mA, R _L = 1.5kΩ, I _{VCM} = 50V _{p-p} , V _{CC} = 5.0V

*JEDEC Registered Data

Optek reserves the right to make changes at any time in order to improve design and to supply the best product possible.

Optek Technology, Inc. 1215 W. Crosby Road Carrollton, Texas 75006 (214)323-2200 Fax (214)323-2396

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