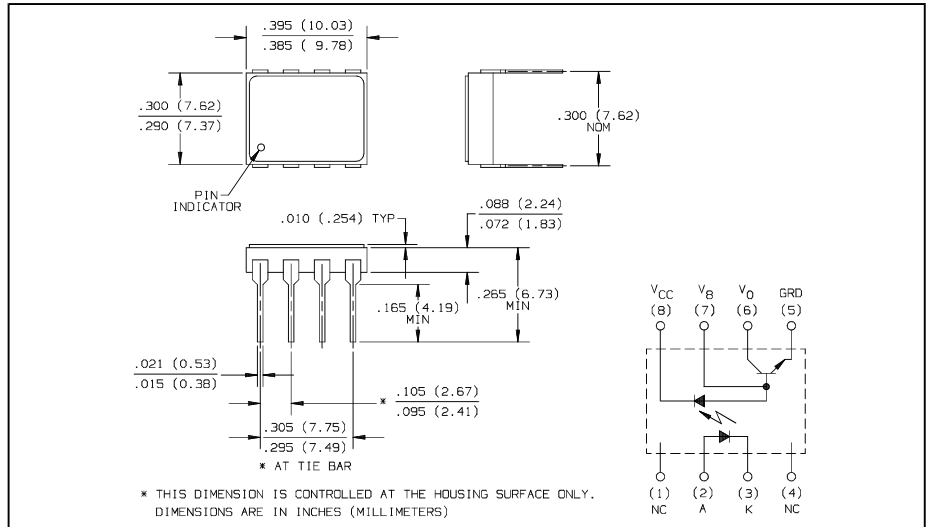
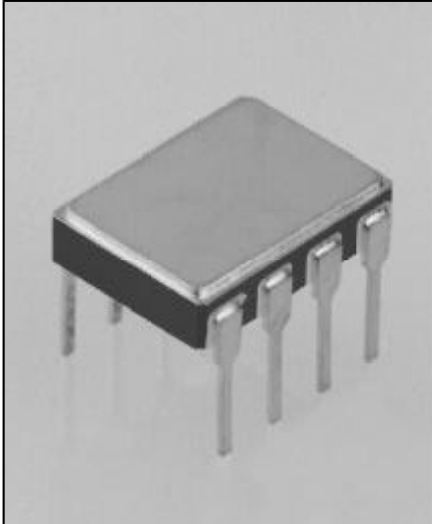


High Speed Optocouplers

Types HDC135, HDC136, HDC135B, HDC136B



Features

- High speed
- TTL compatible
- High common mode transient immunity
- Wide bandwidth
- Open collector output

Description

Optek's HDC135 and HDC136 are high speed optocouplers, consisting of IR emitters and integrated photodetectors in hermetic side brazed dual-in-line 8 pin packages. Electrical characteristics are similar to the 6N135 and 6N136 optocouplers but with full military temperature range operation.

The HDC135B and HDC136B are high reliability optocouplers with 100% processing and Group Testing patterned after MIL-STD-883 Method 5004 and 5005 for class B.

Typical screening and lot acceptance tests are provided on page 13-4.

Minimum orders will apply to processed devices.

Absolute Maximum Ratings (No derating required up to 70° C)

Storage Temperature Range	-55° C to +150° C
Operating Temperature Range	-55° C to +125° C
Lead Soldering Temperature [1/16 inch (1.6 mm) from case for 10 seconds]	260° C
Average Input Current - I _F	25 mA ⁽¹⁾
Peak Output Current - I _F (50% duty cycle, 1 ms pulse width)	50 mA ⁽²⁾
Peak Transient Input Current - I _F (≤ 1 μs pulse width, 300 pps)	1.0 A
Reverse Input Voltage - V _R	5.0 V
Input Power Dissipation	45 mW ⁽³⁾
Average Output Current - I _O	8.0 mA
Peak Output Current	16.0 mA
Emitter-Base Reverse Voltage	5.0 V
Supply and Output Voltage - V _{CC} , V _O	-0.5 V to 15 V
Base Current - I _B	5.0 mA
Output Power Dissipation	100 mW ⁽⁴⁾

Caution: This component is susceptible to damage from electrostatic discharge. Normal static prevention procedures should be used in handling.

Notes:

- (1) Derate linearly above 70° C free-air temperature at a rate of 0.45 mA/° C.
- (2) Derate linearly above 70° C free-air temperature at a rate of 0.9 mA/° C.
- (3) Derate linearly above 70° C free-air temperature at a rate of 0.8 mW/° C.
- (4) Derate linearly above 70° C free-air temperature at a rate of 1.8 mW/° C.
- (5) CM_H is the maximum allowable dV/dt on the leading edge of a common mode pulse to assure that the output will not switch from high to low.
- (6) CM_L is the maximum negative dV/dt allowable on the trailing edge of a common mode pulse to assure that the output will not switch from low to high.
- (7) Test conditions represents 1 TTL unit load with 5.6 kΩ pull-up resistor.
- (8) Test conditions represents 1 LSTTL unit load with a 6.1 kΩ pull-up resistor.
- (9) Device considered a two-terminal device: pins 2 and 3 shorted together and pins 5, 6, 7 and 8 shorted together.

Types HDC135, HDC136, HDC135B, HDC136B

Electrical Characteristics (Over recommended temperature $T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$, unless otherwise noted)

SYMBOL	PARAMETER	MIN	TYP*	MAX	UNITS	TEST CONDITIONS	
CTR	Current Transfer Ratio	HDC135	7.0	19.0		%	$I_F = 16\text{ mA}$, $V_O = 0.40\text{ V}$, $V_{CC} = 4.5\text{ V}$, $T_A = 25^\circ\text{C}$
		HDC136	19.0	25.0		%	
VOL	Logic Low Output Voltage	HDC135	5.0	15.0		%	$I_F = 16\text{ mA}$, $V_O = 0.50\text{ V}$, $V_{CC} = 4.5\text{ V}$
		HDC136	15.0	23.0		%	
VOL	Logic Low Output Voltage	HDC135		0.100	0.40	V	$I_F = 16\text{ mA}$, $I_O = 1.10\text{ mA}$, $V_{CC} = 4.5\text{ V}$
		HDC136		0.100	0.40	V	$I_F = 16\text{ mA}$, $I_O = 2.4\text{ mA}$, $V_{CC} = 4.5\text{ V}$
IOH	Logic High Output Current			3.0	500	nA	$I_F = 0\text{ mA}$, $V_O = V_{CC} = 5.5\text{ V}$, $T_A = 25^\circ\text{C}$
				0.010	1.00	μA	$I_F = 0\text{ mA}$, $V_O = V_{CC} = 15\text{ V}$, $T_A = 25^\circ\text{C}$
					50	μA	$I_F = 0\text{ mA}$, $V_O = V_{CC} = 15\text{ V}$
ICCL	Logic Low Supply Current		40		μA	$I_F = 16\text{ mA}$, $V_O = \text{open}$, $V_{CC} = 15\text{ V}$	
ICCH	Logic High Supply Current		0.020	1.00	μA	$I_F = 0\text{ mA}$, $V_O = \text{open}$, $V_{CC} = 15\text{ V}$, $T_A = 25^\circ\text{C}$	
				2.0	μA	$I_F = 0\text{ mA}$, $V_O = \text{open}$, $V_{CC} = 15\text{ V}$	
VF	Input Forward Voltage		1.50	1.70	V	$I_F = 16\text{ mA}$, $T_A = 25^\circ\text{C}$	
$\frac{\Delta V_F}{\Delta T_A}$	Temperature Coefficient of Forward Voltage		-1.80		$\text{mV}/^\circ\text{C}$	$I_F = 16\text{ mA}$	
BVR	Input Reverse Breakdown Voltage	5.0			V	$I_R = 10\text{ }\mu\text{A}$, $T_A = 25^\circ\text{C}$	
CIN	Input Capacitance		42		pF	$f = 1\text{ MHz}$, $V_F = 0$	
IIO	Input-Output Insulation Leakage Current			1.00	μA	45% Relative Humidity, $t = 5\text{ sec}$, $V_{IO} = 1000\text{ Vdc}$, $T_A = 25^\circ\text{C}$ (Note 9)	
RIO	Input-Output Resistance		10^{12}		Ω	$V_{IO} = 500\text{ Vdc}$ (Note 9)	
CIO	Input-Output Capacitance		0.50		pF	$f = 1\text{ MHz}$ (Note 9)	
hFE	Transistor DC Current Gain		150		—	$V_O = 5\text{ V}$, $I_O = 3\text{ mA}$	
Switching Specification ($T_A = 25^\circ\text{C}$) $V_{CC} = 5.0\text{ V}$, $I_F = 16.0\text{ mA}$ unless otherwise noted							
tPHL	Propagation Delay Time to Logic Low at Output	HDC135	0.50	1.50	μs	$R_L = 4.1\text{ k}\Omega$ (Note 8)	
		HDC136	0.60	1.00	μs	$R_L = 1.90\text{ k}\Omega$ (Note 7)	
tPLH	Propagation Delay Time to Logic High at Output	HDC135	0.40	1.50	μs	$R_L = 4.1\text{ k}\Omega$ (Note 8)	
		HDC136	0.80	1.00	μs	$R_L = 1.90\text{ k}\Omega$ (Note 7)	
CMH	Common Mode Transient Immunity at Logic High Level Output	HDC135	1000		$\text{V}/\mu\text{s}$	$I_F = 0\text{ mA}$, $V_{CM} = 10\text{ Vp-p}$, $R_L = 4.1\text{ k}\Omega$ (Notes 6,8)	
		HDC136	1000		$\text{V}/\mu\text{s}$	$I_F = 0\text{ mA}$, $V_{CM} = 10\text{ Vp-p}$, $R_L = 1.90\text{ k}\Omega$ (Notes 6,7)	
CML	Common Mode Transient Immunity at Logic Low Level Output	HDC135	-1000		$\text{V}/\mu\text{s}$	$V_{CM} = 10\text{ Vp-p}$, $R_L = 4.1\text{ k}\Omega$, (Notes 5,8)	
		HDC136	-1000		$\text{V}/\mu\text{s}$	$V_{CM} = 10\text{ Vp-p}$, $R_L = 1.90\text{ k}\Omega$ (Notes 5,7)	

* All typicals at $T_A = 25^\circ\text{C}$ and $V_{CC} = 5\text{ V}$, unless otherwise noted

HI-RELOPTO
COMPONENTS

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