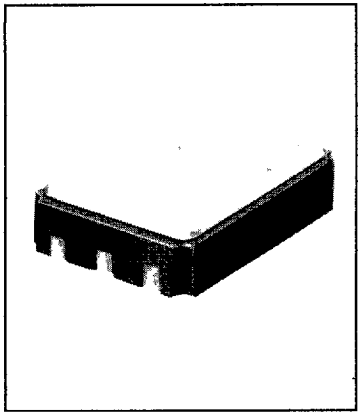
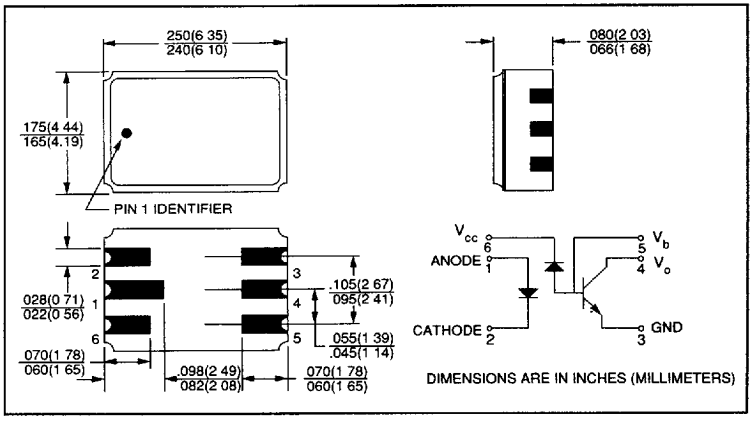
High Speed Optocouplers
Types HCC135, HCC136, HCC135TXV, HCC136TXV





Features

- High speed - 1 megabit/second
- TTL compatible
- High common mode transient immunity
- Wide bandwidth
- Open collector output
- Hermetic surface mount

Description

Optek's HCC135 and HCC136 are high speed optocouplers consisting of IR emitters and integrated photodetectors. Their electrical characteristics are such that they can be substituted for 6N135 and 6N136 in applications where hermetic devices are required and board space is at a premium.

The HCC package is a ceramic surface mount leadless chip carrier which is compatible with epoxy and reflow solder mounting technologies.

The HCC135TXV and HCC136TXV are high reliability optocouplers with 100% processeing and Group Testing patterned after MIL-STD-883 Method 5008.

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

Storage Temperature	-55°C to +150°C
Operating Temperature	-55°C to +125°C
Lead Soldering Temperature [1/16 inch (1.6mm) from case for 10 seconds)	260°C
Average Input Current - I_F	25mA(1)
Peak Output Current - I_F (50% duty cycle, 1ms pulse width)	50mA(2)
Peak Transient Input Current - I_F (≤ 1µs pulse width, 300pps)	1.0A
Reverse Input Voltage - V_R	5.0V
Input Power Dissipation	45mW(3)
Average Output Current - I_O	8.0mA
Peak Output Current	16.0mA
Emitter-Base Reverse Voltage	5.0V
Supply and Output Voltage - V_{CC}, V_O	-0.5V to 15V
Base Current - I_B	5.0mA
Output Power Dissipation	100mW(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 0.45mA/°C.
(2) Derate linearly above 70°C free-air temperature at a rate of 0.9mA/°C.
(3) Derate linearly above 70°C free-air temperature at a rate of 0.8mW/°C.
(4) Derate linearly above 70°C free-air temperature at a rate of 1.8mW/°C.
(5) CMH 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) CML 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 1 and 2 shorted together and pins 3, 4, 5 and 6 shorted together.

Types HCC135, HCC136, HCC135TXV, HCC136TXV

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

SYMBOL	PARAMETER		MIN	TYP*	MAX	UNITS	TEST CONDITIONS
CTR	Current Transfer Ratio	HCC135	7.0	19.0		%	I_F = 16.0mA, V_O = 0.40V,
		HCC136	19.0	25.0		%	V_{CC} = 4.5V, T_A = 25°C
		HCC135	5.0	15.0		%	I_F = 16.0mA, V_O = 0.50V
		HCC136	15.0	23.0		%	V_{CC} = 4.5V
V_{OL}	Logic Low Output Voltage	HCC135		0.100	0.40	V	I_F = 16.0mA, I_O = 1.10mA, V_{CC} = 4.5V
		HCC136		0.100	0.40	V	I_F = 16.0mA, I_O = 2.4mA, V_{CC} = 4.5V
I_{OH}	Logic High Output Current			3.0	500	nA	I_F = 0mA, V_O = V_{CC} = 5.5V, T_A = 25°C
				0.010	1.00	µA	I_F = 0mA, V_O = V_{CC} = 15.0V, T_A = 25°C
					50	µA	I_F = 0mA, V_O = V_{CC} = 15.0V
I_{CCL}	Logic Low Supply Current			40		µA	I_F = 16.0mA, V_O = open, V_{CC} = 15.0V
I_{CCH}	Logic High Supply Current			0.020	1.00	µA	I_F = 0mA, V_O = open, V_{CC} = 15.0V, T_A = 25°C
					2.0	µA	I_F = 0mA, V_O = open, V_{CC} = 15.0V
V_F	Input Forward Voltage			1.50	1.70	V	I_F = 16.0mA, T_A = 25°C
$\frac{\Delta V_F}{\Delta T_A}$	Temperature Coefficient of Forward Voltage			-1.80		mV/°C	I_F = 16.0mA
BV_R	Input Reverse Breakdown Voltage		5.0			V	I_R = 10.0µA, T_A = 25°C
C_{IN}	Input Capacitance			42		pF	f = 1.00MHz, V_F = 0
I_{IO}	Input-Output Insulation Leakage Current				1.00	µA	45% Relative Humidity, t = 5.0 sec, V_{IO} = 1000Vdc, T_A = 25°C (Note 9)
R_{IO}	Input-Output Resistance			10^{12}		Ω	V_{IO} = 500 Vdc (Note 9)
C_{IO}	Input-Output Capacitance			0.50		pF	f = 1.00MHz (Note 9)
h_{FE}	Transistor DC Current Gain			150		—	V_O = 5.0V, I_O = 3.0mA

Switching Specifications (T_A = 25°C) V_{CC} = 5.0V, I_F = 16.0mA unless otherwise noted

t_{PHL}	Propagation Delay Time	HCC135		0.50	1.50	µs	R_L = 4.1kΩ (Note 8)
	to Logic Low at Output	HCC136		0.20	0.80	µs	R_L = 1.90kΩ (Note 7)
t_{PLH}	Propagation Delay Time	HCC135		0.40	1.50	µs	R_L = 4.1kΩ (Note 8)
	to Logic High at Output	HCC156		0.30	0.80	µs	R_L = 1.90kΩ (Note 7)
CM_H	Common Mode Transient Immunity at Logic High Level Output	HCC135		1000		V/µs	I_F = 0mA, V_{CM} = 10.0Vp-p, R_L = 4.1kΩ (Notes 6,8)
		HCC136		1000		V/µs	I_F = 0mA, V_{CM} = 10.0Vp-p, R_L = 1.90kΩ (Notes 6, 7)
CM_L	Common Mode Transient Immunity at Logic Low Level Output	HCC135		-1000		V/µs	V_{CM} =10.0Vp-p, R_L =4.1kΩ, (Notes 5, 8)
		HCC136		-1000		V/µs	V_{CM} =10.0Vp-p, R_L =1.90kΩ, (Notes 5, 7)

*All typicals at T_A = 25°C and V_{CC} = 5.0V, unless otherwise noted.

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