

HCPL2730 DUAL-CHANNEL OPTOCOUPLEDERS/OPTO

SO05020

- Dual-Channel Optocouplers
- High Current Transfer Ratio . . . 1800% Typ at $I_f = 0.5 \text{ mA}$
- Low Input Current Requirement . . . 0.5 mA
- High-Speed Switching . . . 100 kbit/s Typ
- High Common-Mode Transient Immunity . . . 1000 V/μsec Typ
- High-Voltage Ele
- High Output Cur
- UL Recognized .

description

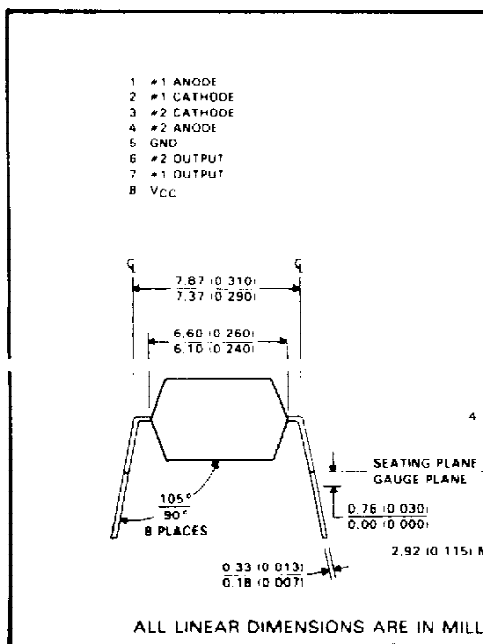
These devices are useful where large c high-voltage isolation between circuits. line monitors, high-voltage status indica

The HCPL2730 and HCPL2731 dual-cha diodes and integrated high-gain photor to achieve conventional photodarlington for low leakage.

The HCPL2730 is designed for use pri minimum current-transfer ratio of 300% one TTL-load output utilizing a 2.2-kΩ

The HCPL2731 is designed for use in a minimum current-transfer ratio of 40 range of 0°C to 70°C.

mechanical data

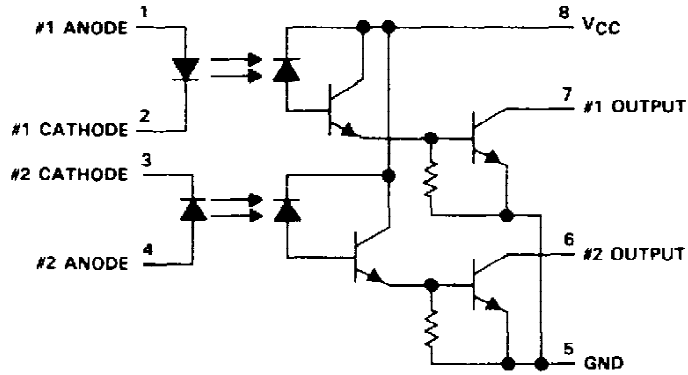


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POST OFF

**HCPL2730, HCPL2731
DUAL-CHANNEL OPTOCOUPLERS/OPTOISOLATORS**

schematic



absolute maximum ratings at 25°C free-air temperature range (unless otherwise

Supply and output voltage range, V_{CC} and V_O : HCPL2730	
HCPL2731	
Reverse input voltage	
Peak input forward current per channel (pulse duration = 1 ms, 50% duty cycle) ..	
Average forward input current per channel at (or below) 50°C free-air	
temperature (see Note 1)	
Output current per channel at (or below) 35°C free-air temperature (see Note 2) ..	
Input power dissipation per channel at (or below) 50°C free-air temperature (see N	
Output power dissipation per channel at (or below) 35°C free-air	
temperature (see Note 4)	
Operating temperature range	
Storage temperature range	
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	

- NOTES: 1. Derate linearly above 50°C free-air temperature at a rate of 0.67 mA/°C.
 2. Derate linearly above 35°C free-air temperature at a rate of 1.2 mA/°C.
 3. Derate linearly above 50°C free-
 4. Derate linearly above 35°C free-

electrical characteristics over operating (noted)

PARAMETER	TEST
V_F Input forward voltage	$I_F = 1.6 \text{ mA}$
α_{VF} Temperature coefficient of forward voltage	$I_F = 1.6 \text{ mA}$
V_{BR} Input breakdown voltage	$I_R = 10 \mu\text{A}$, $V_{CC} = 4.5$ $I_{OL} = 4.8 \text{ mA}$
V_{OL} Low-level output voltage	$V_{CC} = 4.5$ $I_{OL} = 8 \text{ mA}$
	$V_{CC} = 4.5$ $I_{OL} = 15 \text{ mA}$
	$V_{CC} = 4.5$ $I_{OL} = 24 \text{ mA}$
	$V_{CC} = 7 \text{ V}$ $I_F = 0$, $V_{CC} = 18$ $I_F = 0$,
I_{OH} High-level output current	$V_{CC} = 7 \text{ V}$ $I_F = 0$, $V_{CC} = 18$ $I_F = 0$,
I_{CCH} Supply current, high-level output	$V_{CC} = 7 \text{ V}$ $I_F = 0$,
	$V_{CC} = 18$ $I_F = 0$,
I_{CCL} Supply current, low-level output	$V_{CC} = 7 \text{ V}$ $I_{F1} = 1.6 \text{ mA}$ $I_B = 0$
	$V_{CC} = 18$ $I_{F1} = 1.6 \text{ mA}$ $I_B = 0$
CTR Current transfer ratio	$V_{CC} = 4.5$ $I_F = 0.5 \text{ mA}$ See Note 5
	$V_{CC} = 4.5$ $I_F = 1.6 \text{ mA}$ See Note 5
r_{ii} Input-input resistance	$V_{ii} = 500 \text{ V}$
r_{io} Input-output resistance	$V_{io} = 500 \text{ V}$
I_{ii} Input-input insulation leakage current	$V_{ii} = 500 \text{ V}$ RH = 45%
	$V_{io} = 300 \text{ V}$ $T_A = 25^\circ\text{C}$ See Note 6
C_i Input capacitance	$V_F = 0$,
C_{ii} Input-input capacitance	$f = 1 \text{ MHz}$
C_{io} Input-output capacitance	$f = 1 \text{ MHz}$

† All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

NOTES: 5. Current transfer ratio is defined as the ratio of output current to input current.

6. These parameters are measured between the input and output terminals.

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switching characteristics at $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

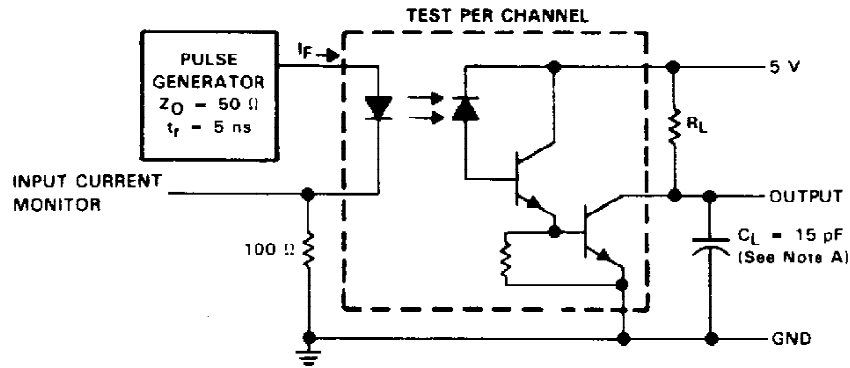
PARAMETER	TEST CONDITIONS	HCPL2730			HCPL2731			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
t_{PHL} Propagation delay time, high-to-low level output	$I_F = 1.6\text{ mA}$, $R_L = 2.2\text{ k}\Omega$, See Figure 1		2	20		2	20	μs
	$I_F = 0.5\text{ mA}$, $R_L = 4.7\text{ k}\Omega$, See Figure 1					7	100	
	$I_F = 12\text{ mA}$, $R_L = 270\ \Omega$, See Figure 1		0.4	2		0.4	2	
t_{PLH} Propagation delay time, low-to-high-level output	$I_F = 1.6\text{ mA}$, $R_L = 2.2\text{ k}\Omega$, See Figure 1		4	35		5	35	μs
	$I_F = 0.5\text{ mA}$, $R_L = 4.7\text{ k}\Omega$, See Figure 1					6	60	
	$I_F = 12\text{ mA}$, $R_L = 270\ \Omega$, See Figure 1		3	10		2	10	
$\frac{dV_{CM}}{dt}$ (H) Common-mode input transient immunity, high-level output	$V_{CM} = 10\text{ V}_{p-p}$, $I_F = 0$, $R_L = 2.2\text{ k}\Omega$, See Notes 7 and 8, See Figure 2		500			500		$\text{V}/\mu\text{s}$
$\frac{dV_{CM}}{dt}$ (L) Common-mode input transient immunity, low-level output	$V_{CM} = 10\text{ V}_{p-p}$, $I_F = 1.6\text{ mA}$, $R_L = 2.2\text{ k}\Omega$, See Figure 2 See Notes 7 and 8		-500			-500		$\text{V}/\mu\text{s}$

- NOTES: 7. Common-mode transient immunity, high-level output, is the maximum rate of rise of the common-mode input voltage that does not cause the output voltage to drop below 2 V. Common-mode input transient immunity, low-level output, is the maximum rate of fall of the common-mode input voltage that does not cause the output voltage to rise above 0.8 V.
8. In applications where dV/dt may exceed 50,000 $\text{V}/\mu\text{s}$ (such as static discharge) a series resistor, R_{CC} , should be included to protect the detector IC from destructively high surge currents. The recommended value is:

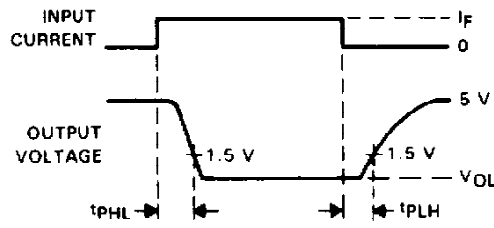
$$R_{CC} = \frac{1}{0.15 I_F (\text{mA})} \text{ k}\Omega$$

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PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



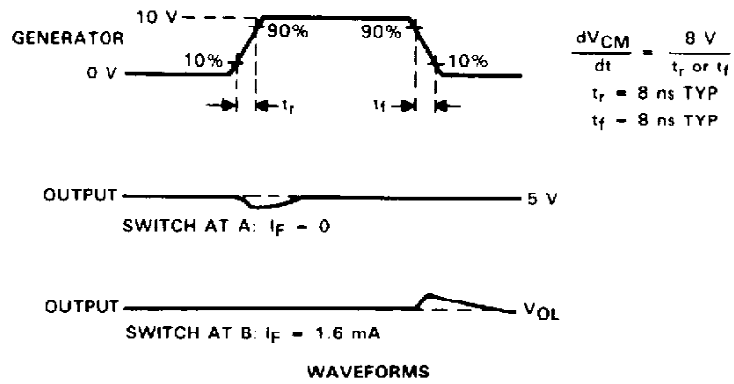
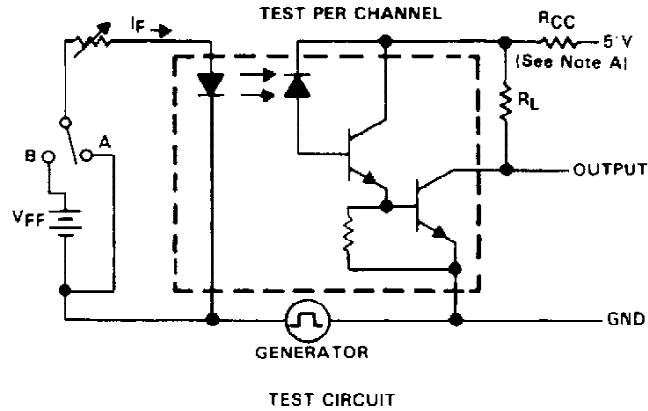
WAVEFORMS

NOTE A: C_L includes probe and stray capacitances.

FIGURE 1. SWITCHING TEST CIRCUIT AND WAVEFORMS

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PARAMETER MEASUREMENT INFORMATION



NOTE A: In applications where dV/dt may exceed $50,000 \text{ V}/\mu\text{s}$ (such as static discharge) a series resistor, R_{CC} , should be included to protect the detector IC from destructively high surge currents. The recommended value is:

$$R_{CC} = \frac{1}{0.15 I_F (\text{mA})} \text{ k}\Omega$$

FIGURE 2. TRANSIENT IMMUNITY TEST CIRCUIT AND WAVEFORMS

HCPL2730, HCPL2731 DUAL-CHANNEL OPTOCOUPLEDERS/OPTOISOLATORS

TYPICAL CHARACTERISTICS

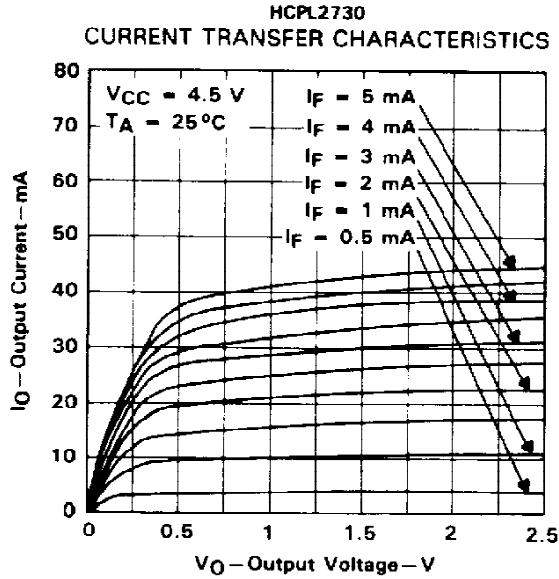


FIGURE 3

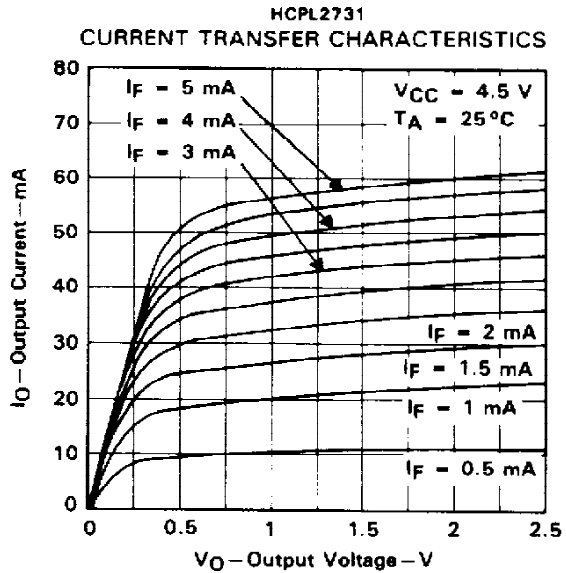


FIGURE 4

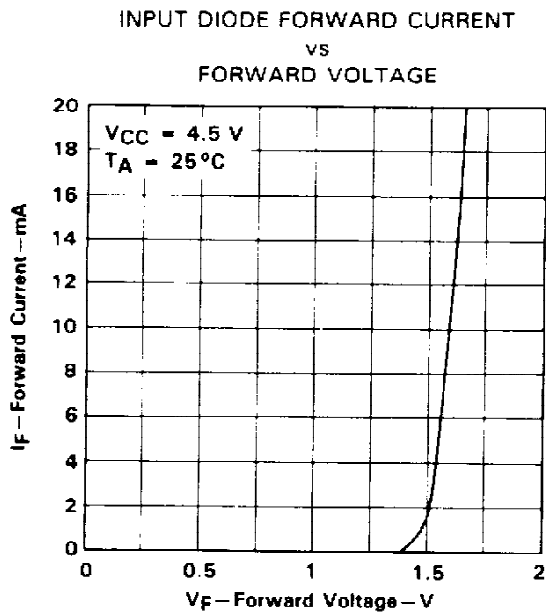


FIGURE 5

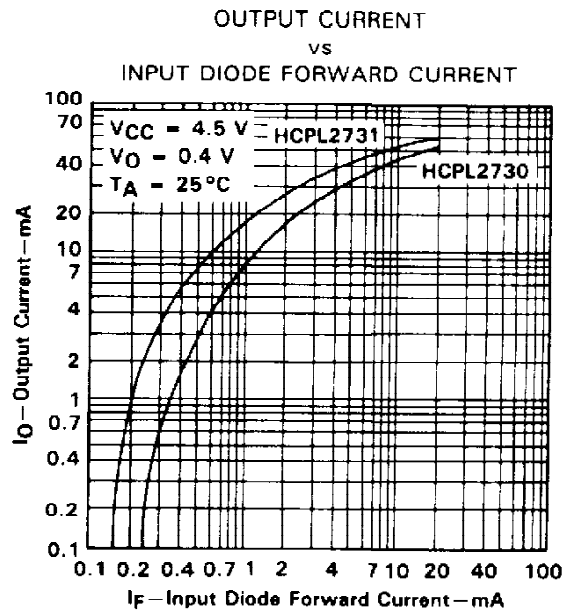


FIGURE 6

**HCPL2730, HCPL2731
DUAL-CHANNEL OPTOCOUPLER**

CURRENT TRANSFER
vs
INPUT DIODE FORWARD

$V_{CC} = 4.5\text{ V}$

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TYPICAL CHARACTERISTICS

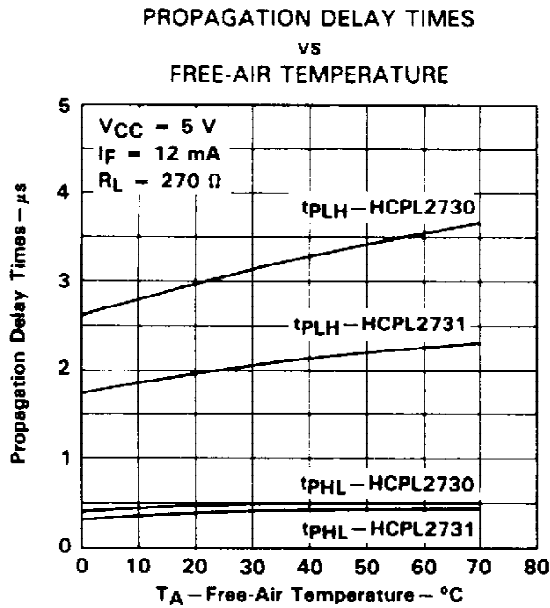


FIGURE 11

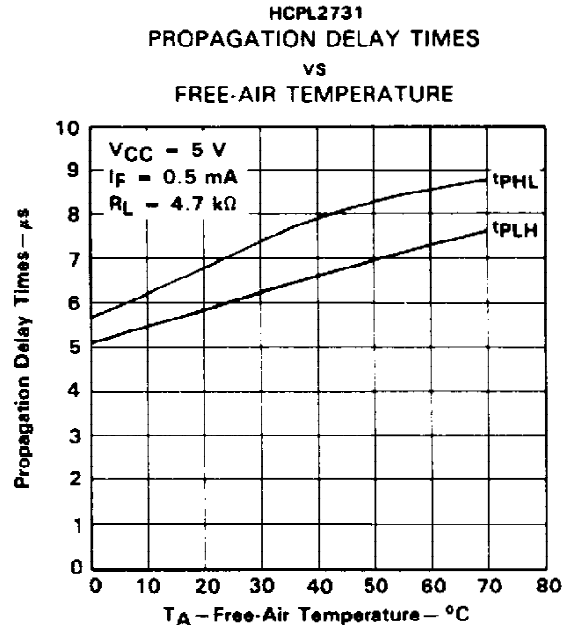


FIGURE 12

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