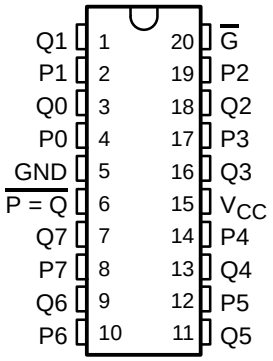
- **Compares Two 8-Bit Words**
- **Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise**
- ***EPIC***™ **(Enhanced-Performance Implanted CMOS) 1-μm Process**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Equivalent of 20-kΩ Pullup Resistor on Q Inputs**
- **Package Options Include Plastic Small-Outline Packages (DW) and Standard Plastic 300-mil DIPs (N)**

DW OR N PACKAGE
(TOP VIEW)



description

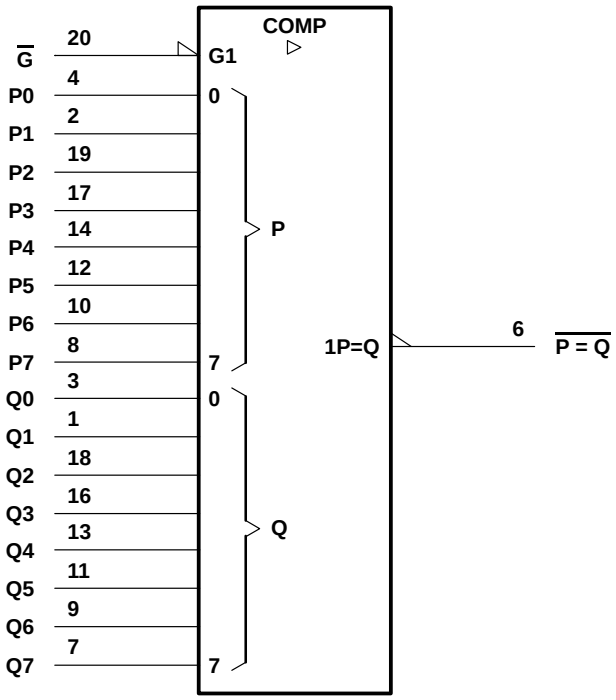
This identity comparator performs comparisons on two 8-bit binary or BCD words. Features include 20-kΩ pullup termination resistors on the Q inputs for analog or switch data and a $\overline{P = Q}$ totem-pole output.

The 74AC11520 is characterized for operation from –40°C to 85°C.

FUNCTION TABLE

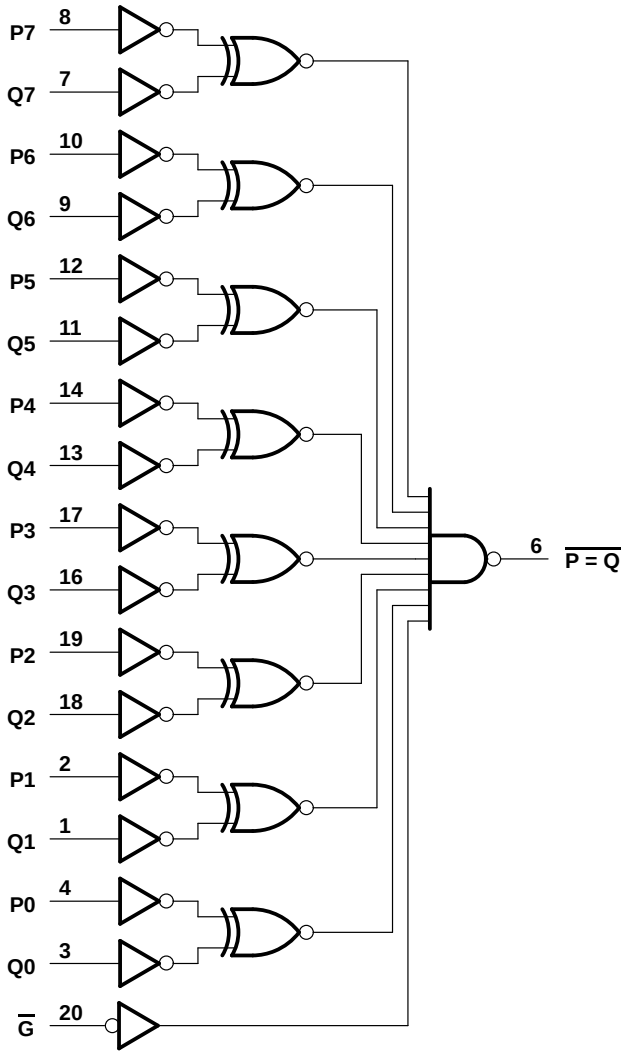
INPUTS		OUTPUT $\overline{P = Q}$
DATA P, Q	ENABLE $\overline{G}$	
P = Q	L	L
P > Q	L	H
P < Q	L	H
X	H	H

logic symbol†

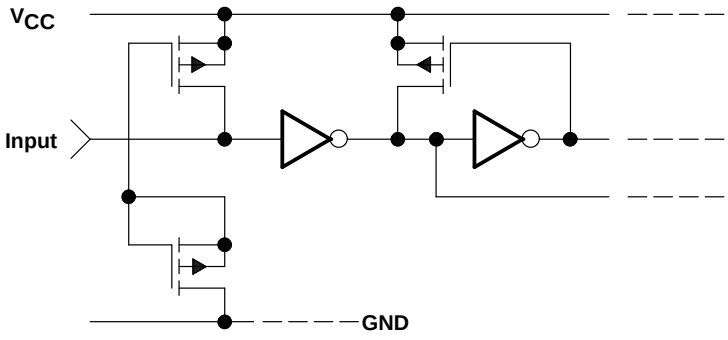


† This symbol is in accordance with ANSI/IEEE Std 91–1984 and IEC Publication 617–12.

logic diagram (positive logic)



schematic of Q inputs



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, V_{CC} . . . . . –0.5 V to 7 V
Input voltage range, V_I (see Note 1) . . . . . –0.5 V to V_{CC} + 0.5 V
Output voltage range, V_O (see Note 1) . . . . . –0.5 V to V_{CC} + 0.5 V
Input clamp current, I_{IK} (V_I < 0 or V_I > V_{CC}) . . . . . ±20 mA
Output clamp current, I_{OK} (V_O < 0 or V_O > V_{CC}) . . . . . ±50 mA
Continuous output current, I_O (V_O = 0 to V_{CC}) . . . . . ±50 mA
Continuous current through V_{CC} or GND . . . . . ±100 mA
Maximum power dissipation at T_A = 55°C (in still air) (see Note 2): DW package . . . . . 1.6 W
N package . . . . . 1.3 W
Storage temperature range, T_{stg} . . . . . –65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils, except for the N package, which has a trace length of zero.

recommended operating conditions

			MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage		3	5	5.5	V
V_{IH}	High-level input voltage	V_{CC} = 3 V	2.1			V
		V_{CC} = 4.5 V	3.15			
		V_{CC} = 5.5 V	3.85			
V_{IL}	Low-level input voltage	V_{CC} = 3 V			0.9	V
		V_{CC} = 4.5 V			1.35	
		V_{CC} = 5.5 V			1.65	
V_I	Input voltage		0		V_{CC}	V
V_O	Output voltage		0		V_{CC}	V
I_{OH}	High-level output current	V_{CC} = 3 V			–4	mA
		V_{CC} = 4.5 V			–24	
		V_{CC} = 5.5 V			–24	
I_{OL}	Low-level output current	V_{CC} = 3 V			12	mA
		V_{CC} = 4.5 V			24	
		V_{CC} = 5.5 V			24	
$\Delta t/\Delta v$	Input transition rise or fall rate		0		10	ns/V
T_A	Operating free-air temperature		–40		85	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS		V_{CC}	T_A = 25°C			MIN	MAX	UNIT
				MIN	TYP	MAX			
V_{OH}	I_{OH} = –50 μA		3 V	2.9	2.9		2.9		V
			4.5 V	4.4			4.4		
			5.5 V	5.4			5.4		
	I_{OH} = –4 mA		3 V	2.58			2.48		
	I_{OH} = –24 mA		4.5 V	3.94			3.8		
			5.5 V	4.94			4.8		
	I_{OH} = –75 mA†		5.5 V				3.85		
V_{OL}	I_{OL} = 50 μA		3 V			0.1		0.1	V
			4.5 V			0.1		0.1	
			5.5 V			0.1		0.1	
	I_{OL} = 12 mA		3 V			0.36		0.44	
	I_{OL} = 24 mA		4.5 V			0.36		0.44	
			5.5 V			0.36		0.44	
	I_{OL} = 75 mA†		5.5 V					1.65	
I_{IH}	$V_I = V_{CC}$,	Q inputs only	5.5 V			10		10	μA
I_{IL}	V_I = GND,	Q inputs only	5.5 V		–0.3	–0.6		–1	mA
I_I	$V_I = V_{CC}$ or GND,	P and $\overline{G}$ inputs only	5.5 V			±0.1		±1	μA
I_{CC}	Q inputs at GND,	Other inputs $V_I = V_{CC}$ or GND	5.5 V		2.3	4.8		8	mA
	Q inputs open,	Other inputs $V_I = V_{CC}$ or GND	5.5 V			8		80	μA
C_i	$V_I = V_{CC}$ or GND		5 V		3.5				pF

† Not more than one output or input should be tested at a time and the duration of the test should not exceed 10 ms.

switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	P or Q	$\overline{P = Q}$	1.5	12	16.5	1.5	18.6	ns
t_{PHL}			1.5	10.4	14.4	1.5	16.3	
t_{PLH}	$\overline{G}$	$\overline{P = Q}$	1.5	6.9	9	1.5	10	ns
t_{PHL}			1.5	6.3	8.6	1.5	9.5	

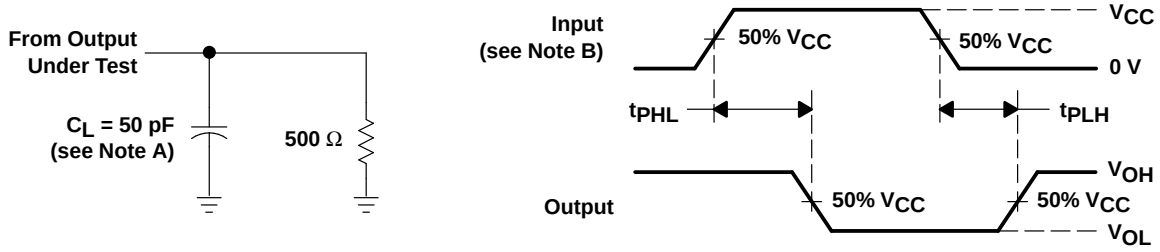
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (INPUT)	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	P or Q	$\overline{P = Q}$	1.5	8.1	11.1	1.5	12.6	ns
t_{PHL}			1.5	7.1	10.1	1.5	11.3	
t_{PLH}	$\overline{G}$	$\overline{P = Q}$	1.5	4.9	6.6	1.5	7.4	ns
t_{PHL}			1.5	4.8	7.1	1.5	7.8	

operating characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance	C_L = 50 pF,	f = 1 MHz	42	pF

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT VOLTAGE WAVEFORMS

NOTES: A. C_L includes probe and jig capacitance.
B. Input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
C. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

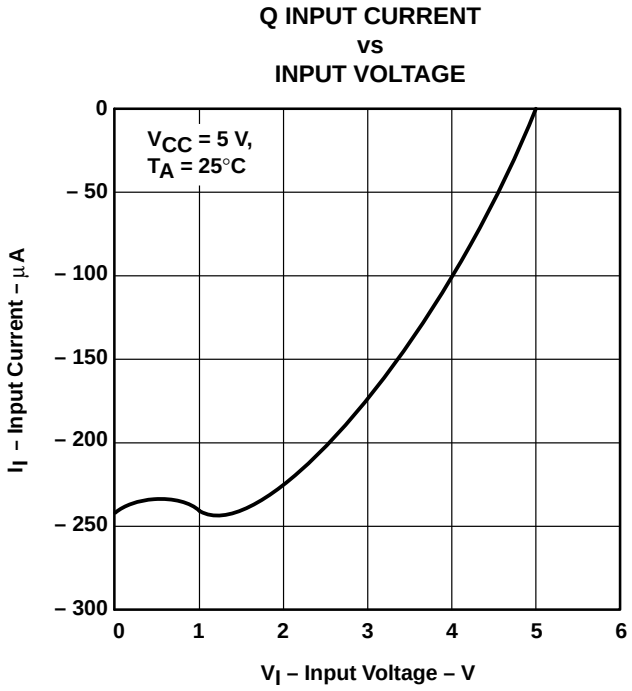


Figure 2

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