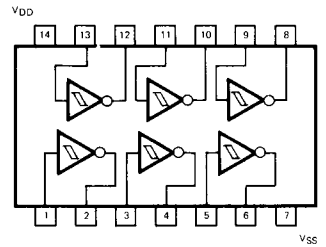
40014B/74C14/54C14

HEX SCHMITT TRIGGER

DESCRIPTION – The 40014B is a general purpose Hex Schmitt Trigger offering positive and negative threshold voltages, V_{T+} and V_{T-}, which show very low variation with temperature (typically 0.0005V/°C at V_{DD} = 10V) and guaranteed hysteresis, V_{T+} to $V_{T-} \geqslant 0.2\ V_{DD}$. Outputs are fully buffered for highest noise immunity. The 40014B is a direct replacement for the 74C14/54C14.

LOGIC AND CONNECTION DIAGRAM
DIP (TOP VIEW)



NOTE:
The flatpak version has the same pinouts (Connection Diagram) as the dual in-line package.

DC CHARACTERISTICS: V_{DD} as shown, V_{SS} = 0 V (See Note 1)

SYMBOL	PARAMETER		LIMITS									UNITS	TEMP	TEST CONDITIONS
			V_{DD} = 5 V			V_{DD} = 10 V			V_{DD} = 15 V					
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX			
V_{T+}	Positive-Going Threshold Voltage		2.9	3.6	4.3	6	6.8	8.6	9	10	12.9	V	All	$V_{IN} = V_{SS}$ to V_{DD}
V_{T-}	Negative-Going Threshold Voltage		0.7	1.4	1.9	1.4	3.2	4	2.1	5	6	V	All	$V_{IN} = V_{DD}$ to V_{SS}
V_{T+} to V_{T-}	Hysteresis		1	2.2	3.6	2	3.6	7.2	3	5	10.8	V	All	Guaranteed Hysteresis = V_{T+} Minus V_{T-}
I_{DD}	Quiescent Power Supply Current	XC			1			2			4	μA	MIN, 25°C	All Inputs at 0 V or V_{DD}
					7.5			15			30		MAX	
		XM			0.25			0.5			1	μA	MIN, 25°C	
					7.5			15			30		MAX	

AC CHARACTERISTICS: V_{DD} as shown, V_{SS} = 0 V, T_A = 25°C.

SYMBOL	PARAMETER	LIMITS									UNITS	TEST CONDITIONS (See Note 2)
		V_{DD} = 5 V			V_{DD} = 10 V			V_{DD} = 15 V				
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
t_{PLH}	Propagation Delay		90	200		42	100		35	80	ns	C_L = 50 pF, R_L = 200 kΩ Input Transition Times ⩽ 20 ns
t_{PHL}			90	200		42	100		35	80		
t_{TLH}	Output Transition Time		70	135		30	75		22	45	ns	
t_{THL}			70	135		30	75		22	45		

NOTES:
1. Additional DC Characteristics are listed in this section under 4000B Series CMOS Family Characteristics.
2. Propagation Delays and Output Transition Times are graphically described in this section under 4000B Series CMOS Family Characteristics.

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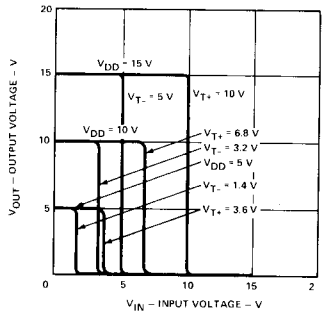
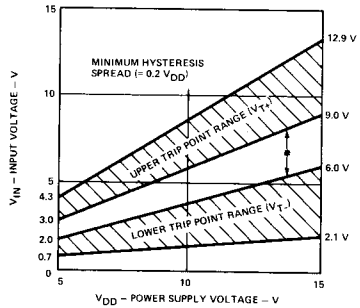
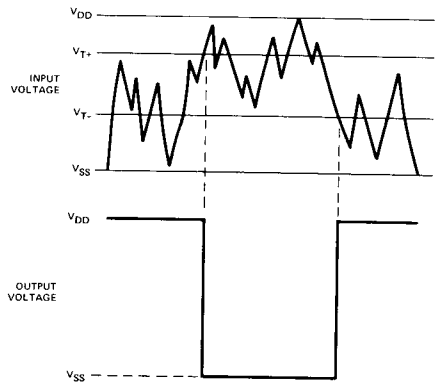
TYPICAL PERFORMANCE CHARACTERISTICS



TYPICAL TRANSFER CHARACTERISTICS

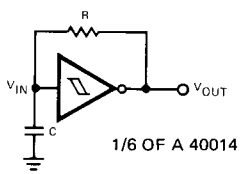


GUARANTEED TRIP POINT RANGE



LOW POWER OSCILLATOR

TYPICAL APPLICATION



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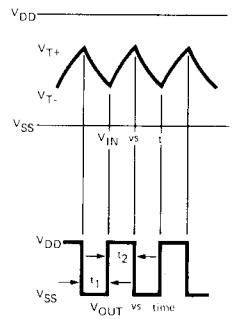

$$t_1 = RC\,Ln\left(\frac{V_{T+}}{V_{T-}}\right)$$

$$t_2 = RC\,Ln\left(\frac{V_{DD} - V_{T-}}{V_{DD} - V_{T+}}\right)$$

$$f \approx \frac{1}{RC\,Ln\left[\frac{V_{T+}(V_{DD} - V_{T-})}{V_{T-}(V_{DD} - V_{T+})}\right]}$$

NOTE:
The equations assume that $t_1 + t_2 \gg t_{PLH} + t_{PHL}$.