

4518B

DUAL 4-BIT DECADE COUNTER

DESCRIPTION — The 4518B is a Dual 4-Bit Internally Synchronous BCD Counter. Each counter has both an active HIGH Clock Input (CP₀) and an active LOW Clock Input (\overline{CP}_1), buffered Outputs from all four bit positions (Q₀-Q₃) and an active HIGH overriding asynchronous Master Reset Input (MR).

The counter advances on either the LOW-to-HIGH transition of the CP₀ Input if \overline{CP}_1 is HIGH or the HIGH-to-LOW transition of the CP₁ Input if CP₀ is LOW (see the Truth Table). Either Clock Input (CP₀, \overline{CP}_1) may be used as the Clock Input to the counter and the other Clock Input may be used as a Clock Inhibit Input.

A HIGH on the Master Reset Input (MR) resets the counter (Q₀-Q₃ = LOW) independent of the Clock Inputs (CP₀, \overline{CP}_1).

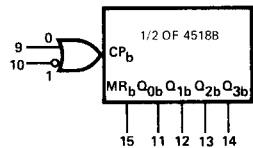
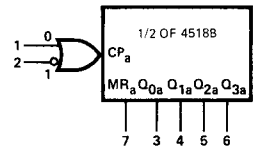
- TYPICAL COUNT FREQUENCY OF 10 MHz AT V_{DD} = 10 V
- TRIGGERED ON EITHER A LOW-TO-HIGH OR A HIGH-TO-LOW TRANSITION
- ASYNCHRONOUS ACTIVE HIGH MASTER RESET
- BUFFERED OUTPUTS FROM ALL FOUR BIT POSITIONS
- FULLY SYNCHRONOUS COUNTING

TRUTH TABLE

CP ₀	\overline{CP}_1	MR	MODE
	H	L	Counter Advances
	L	L	Counter Advances
	X	L	No Change
	X	L	No Change
	L	L	No Change
	L	L	No Change
X	X	H	Reset (Asynchronous)

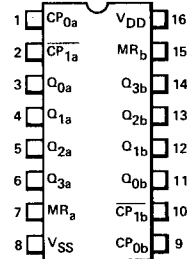
X = Don't Care
 L = LOW Level
 H = HIGH Level
 = Positive-Going Transition
 = Negative-Going Transition

LOGIC SYMBOLS



V_{DD} = Pin 16
 V_{SS} = Pin 8

CONNECTION DIAGRAM DIP (TOP VIEW)

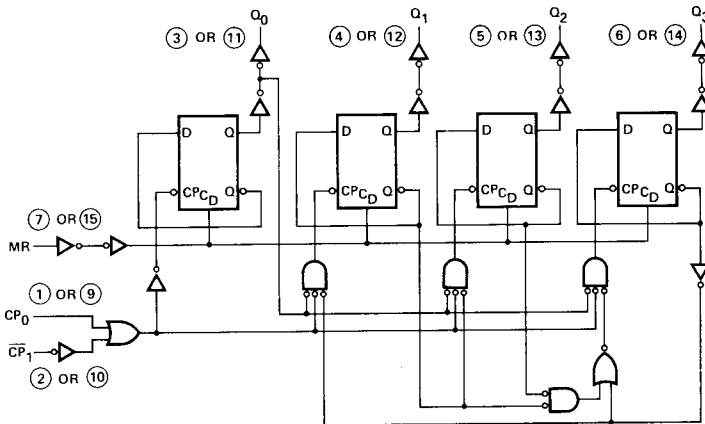


NOTE:
 The Flatpak version has the same pinouts (Connection Diagram) as the Dual In-line Package.

PIN NAMES

- CP_{0a}, CP_{0b} Clock Input (L → H (Triggered))
- \overline{CP}_1a , \overline{CP}_1b Clock Input (H → L (Triggered))
- MR_a, MR_b Master Reset Inputs
- Q_{0a}-Q_{3a} Outputs
- Q_{0b}-Q_{3b} Outputs

1/2 OF A 4518B LOGIC DIAGRAM



V_{DD} = Pin 16
 V_{SS} = Pin 8
 ○ = Pin Number

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			
I_{DD}	Quiescent Power	XC			20			40			80	μ A	MIN, 25°C	All inputs at 0 V or V_{DD}
					150			300			600		MAX	
	Supply Current	XM			5			10			20	μ A	MIN, 25°C	
					150			300			600		MAX	

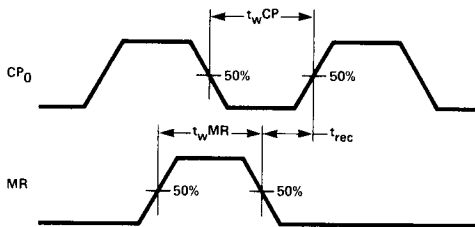
AC CHARACTERISTICS AND SET-UP REQUIREMENTS: V_{DD} as shown, $F_{SS} = 0$ V, $T_A = 25^\circ$ C (See Note 2)

SYMBOL	PARAMETER	LIMITS									UNITS	TEST CONDITIONS
		$V_{DD} = 5$ V			$V_{DD} = 10$ V			$V_{DD} = 15$ V				
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
t_{PLH}	Propagation Delay, CP_0 or $\overline{CP_1}$ to Q_n		220	480		95	210		60	168	ns	CL = 50 pF, R _L = 200 kΩ Input Transition Times ≤ 20 ns
t_{PLH}	to Q_n		220	480		95	210		60	168		
t_{PHL}	Propagation Delay, MR to Q_n		220	480		90	210		60	168	ns	
t_{TLH}	Output Transition Time		65	135		35	70		25	45	ns	
t_{THL}			65	135		35	70		25	45		
t_{WMR}	MR Minimum Pulse Width	180	70		70	30		56	20		ns	
t_{WCP}	CP_0 or $\overline{CP_1}$ Minimum Pulse Width	275	120		120	50		96	35		ns	
t_{rec}	MR Recovery Time	40	15		25	5		20	0		ns	
t_s	Set-Up Time, CP_0 to $\overline{CP_1}$	275	130		125	57		100	40		ns	
t_s	Set-Up Time, $\overline{CP_1}$ to CP_0	275	130		125	57		100	40		ns	
f_{MAX}	Input Count Frequency (Note 3)	2	4		4	10		5	12		MHz	

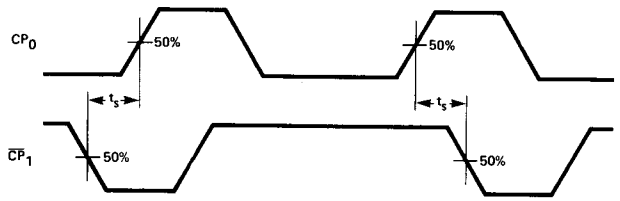
NOTES:

- Additional DC Characteristics are listed in this section under 4000B Series CMOS Family Characteristics.
- Propagation Delays and Output Transition Times are graphically described in this section under 4000B Series CMOS Family Characteristics.
- For f_{MAX} , input rise and fall times are greater than or equal to 5 ns and less than or equal to 20 ns.
- It is recommended that input rise and fall times to the Clock Input be less than 15 μ s at $V_{DD} = 5$ V, 4 μ s at $V_{DD} = 10$ V, and 3 μ s at $V_{DD} = 15$ V.

SWITCHING WAVEFORMS



MINIMUM PULSE WIDTHS FOR CP_0 , $\overline{CP_1}$ AND MR AND MR RECOVERY TIME



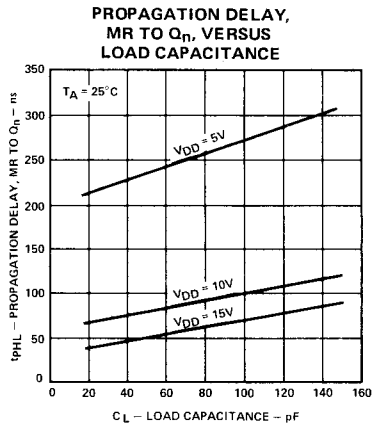
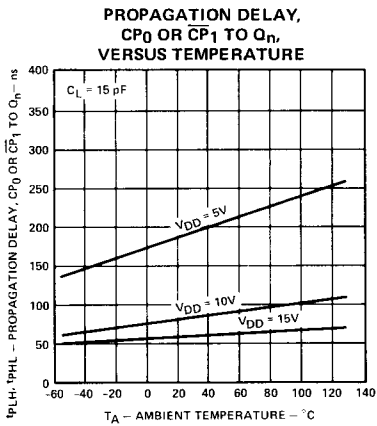
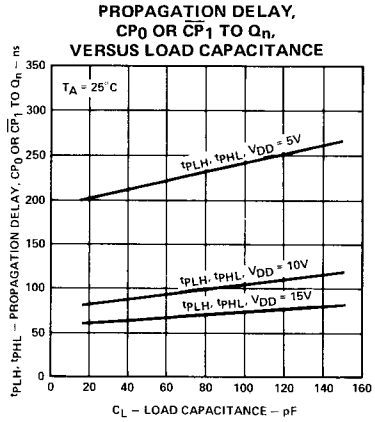
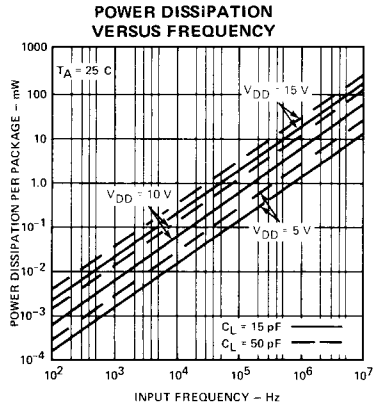
SET-UP TIMES, CP_0 TO $\overline{CP_1}$ AND $\overline{CP_1}$ TO CP_0

CONDITIONS: $\overline{CP_1}$ = HIGH and the device triggers on a LOW-to-HIGH transition at CP_0 . The timing also applies when CP_0 = LOW and the device triggers on a HIGH-to-LOW transition at $\overline{CP_1}$.

NOTE:

Set-up and Hold Times are shown as positive values but may be specified as negative values.

TYPICAL ELECTRICAL CHARACTERISTICS



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