

GD4021B

8-BIT SHIFT REGISTER

DESCRIPTION — The 4021B is an Edge-Triggered 8-Bit Shift Register (Parallel-to-Serial Converter) with a synchronous Serial Data Input (D_S), a Clock Input (CP), an asynchronous active HIGH Parallel Load Input (PL), eight asynchronous Parallel Data Inputs (P_0 - P_7) and Buffered Parallel Outputs from the last three stages (Q_5 - Q_7).

Information on the Parallel Data Inputs (P_0 - P_7) is asynchronously loaded into the register while the Parallel Load Input (PL) is HIGH, independent of the Clock (CP) and Serial Data (D_S) inputs. Data present in the register is stored on the HIGH-to-LOW transition of the Parallel Load Input (PL).

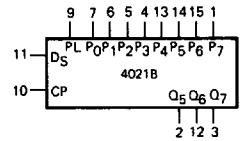
When the Parallel Load Input is LOW, data on the Serial Data Input (D_S) is shifted into the first register position and all the data in the register is shifted one position to the right on the LOW-to-HIGH transition of the Clock Input (CP).

- TYPICAL SHIFT FREQUENCY OF 18.1 MHz AT $V_{DD} = 10 V$
- PARALLEL-TO-SERIAL DATA TRANSFER
- BUFFERED OUTPUTS AVAILABLE LAST THREE STAGES
- CLOCK INPUT IS L → H EDGE-TRIGGERED

PIN NAMES

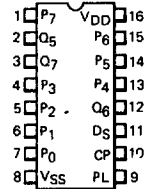
PL	Parallel Load Input
P_0 - P_7	Parallel Data Inputs
D_S	Serial Data Input
CP	Clock Input (L → H Edge-Triggered)
Q_5 - Q_7	Buffered Parallel Outputs from the Last Three Stages

LOGIC SYMBOL



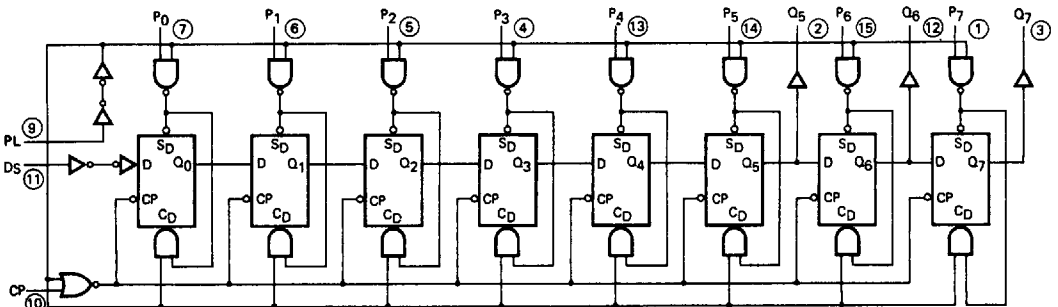
V_{DD} = Pin 16
 V_{SS} = Pin 8

CONNECTION DIAGRAM DIP (TOP VIEW)



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

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)

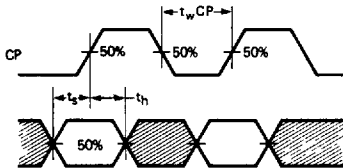
SYMBOL	PARAMETER		LIMITS									UNITS	TEMP	TEST CONDITIONS
			$V_{DD} = 5$ V			$V_{DD} = 10$ V			$V_{DD} = 15$ V					
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX			
I_{DD}	Quiescent Power Supply Current	XC			20			40			80	μ A	MIN, 25°C	All inputs at 0 V or V_{DD}
				150			300			600	MAX			
	XM			5			10			20	μ A	MIN, 25°C		
				150			300			600		MAX		

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

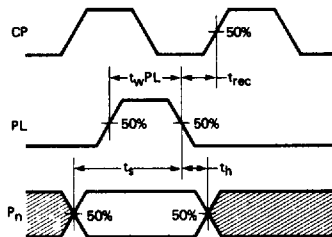
SYMBOL	PARAMETER		LIMITS									UNITS	TEST CONDITIONS
			$V_{DD} = 5$ V			$V_{DD} = 10$ V			$V_{DD} = 15$ V				
			MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX		
t_{PLH}	Propagation Delay, CP to Q_n		134			59			40		ns	$C_L = 50$ pF, $R_L = 200$ k Ω Input Transition Times < 20 ns	
t_{PHL}			184			74			49				
t_{PLH}	Propagation Delay, PL to Q_n		188			78			54				
t_{PHL}			274			105			72				
t_{TLH}	Output Transition Time		58			31			22				
t_{THL}			69			27			22				
t_{wCP}	CP Minimum Pulse Width		61			21			14				
t_{wPL}	PL Minimum Pulse Width		67			24			16				
t_{rec}	PL Recovery Time		71			28			21				
t_s	Set-Up Time D_S to CP		51			16			12				
t_h	Hold Time D_S to CP		49			15			11				
t_s	Set-Up Time P_n to PL		78			28			18				
t_h	Hold Time, P_n to PL		72			26			16				
f_{MAX}	Shift Frequency (Note 3)		7.8			18.1			21		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 CLOCK PULSE WIDTH AND SET-UP AND HOLD TIMES, D_S TO CP



MINIMUM PL PULSE WIDTH, RECOVERY TIME FOR PL, AND SET-UP AND HOLD TIMES, P_n TO PL

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