

# Am25S09

Quad Two-Input, High-Speed Register

## DISTINCTIVE CHARACTERISTICS

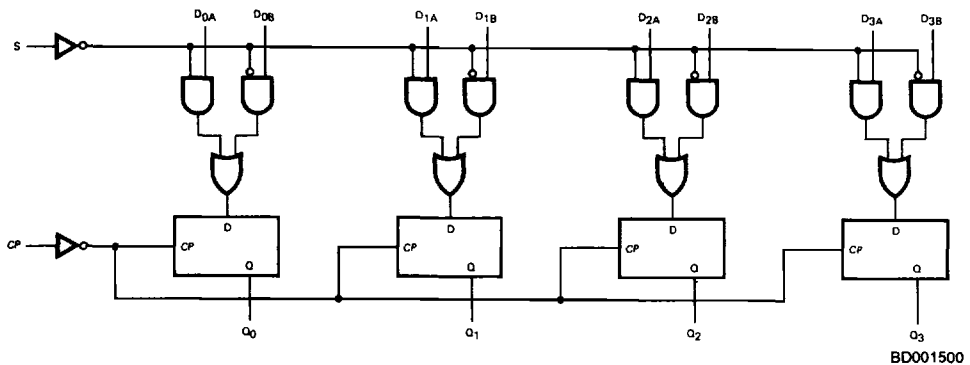
- Four-bit register accepts data from one of two 4-bit input fields.
- Edge-triggered clock action
- High-speed Schottky technology.
- Electrically tested and optically inspected dice for the assemblers of hybrid products.

## GENERAL DESCRIPTION

The Am25S09 is a dual port high-speed, four-bit register using advanced Schottky technology to reduce the effect of transistor storage time. The register consists of four D flip-flops with a buffered common clock, and a two-input multiplexer at the input of each flip-flop. A common select line, S, controls the four multiplexers. Data on the four

inputs selected by the S line is stored in the four flip-flops at the clock LOW-to-HIGH transition. When the S input is LOW, the  $D_{1A}$  input data will be stored in the register. When the S input is HIGH, the  $D_{2B}$  input data will be stored in the register.

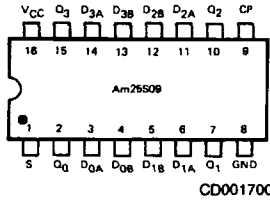
## BLOCK DIAGRAM



## RELATED PRODUCTS

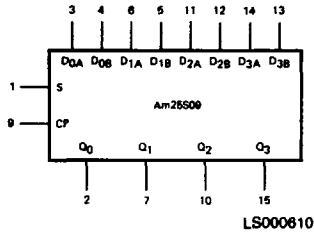
Part No.	Description
Am25LS09	Low Power Version
Am25S07/08	8/4-Bit Register
Am25LS07/08	8/4-Bit Low Power Register

### CONNECTION DIAGRAM Top View

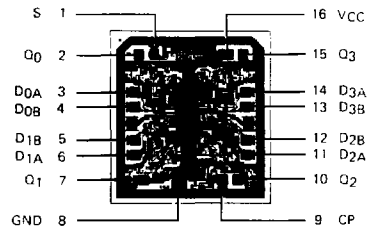


Note: Pin 1 is marked for orientation

### LOGIC SYMBOL



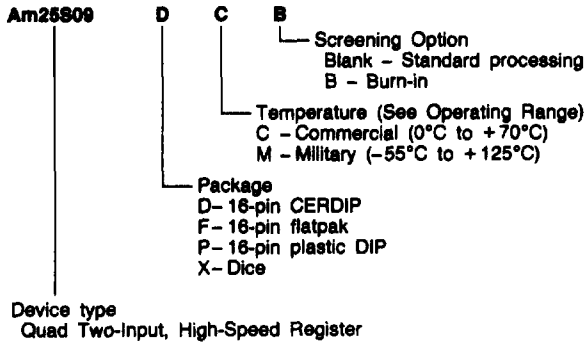
### METALLIZATION AND PAD LAYOUT



DIE SIZE: 0.067" x 0.073"

### ORDERING INFORMATION

AMD products are available in several packages and operating ranges. The order number is formed by a combination of the following: Device number, speed option (if applicable), package type, operating range and screening option (if desired).



Valid Combinations	
Am25S09	PC DC, DM FM XC, XM

**Valid Combinations**  
Consult the AMD sales office in your area to determine if a device is currently available in the combination you wish.

## PIN DESCRIPTION

Pin No.	Name	I/O	Description
3 6 11 14	D0A, D1A, D2A, D3A	I	The "A" word into the two-input multiplexer of the D flip-flops.
4 5 12 13	D0B, D1B, D2B, D3B	I	The "B" word into the two-input multiplexer of the D flip-flops.
2,7 10,15	Q0, Q1, Q2, Q3	O	The outputs of the four D-type flip-flops of the register.
1	S	I	Select. When the select is LOW, the A word is applied to the D inputs of the flip-flops. When the select is HIGH, the B word is applied to the D inputs of the flip-flops.
9	CP	I	Clock Pulse. Clock pulse for the register. Enters data on the LOW-to-HIGH transition of the clock line.

## FUNCTION TABLE

SELECT S	CLOCK CP	DATA D <sub>1A</sub>	INPUTS D <sub>1B</sub>	OUTPUT Q <sub>i</sub>
L	↑	L	X	L
L	↑	H	X	H
H	↑	X	L	L
H	↑	X	H	H

H = HIGH Voltage Level

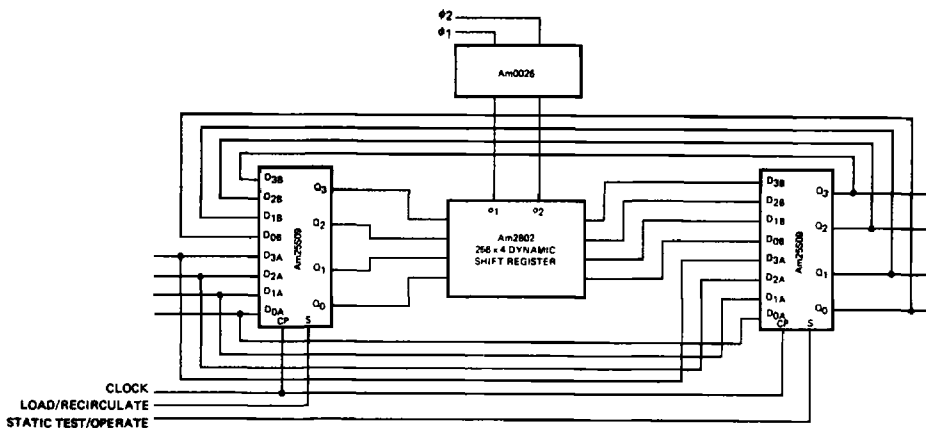
L = LOW Voltage Level

X = Don't Care

i = 0, 1, 2, or 3

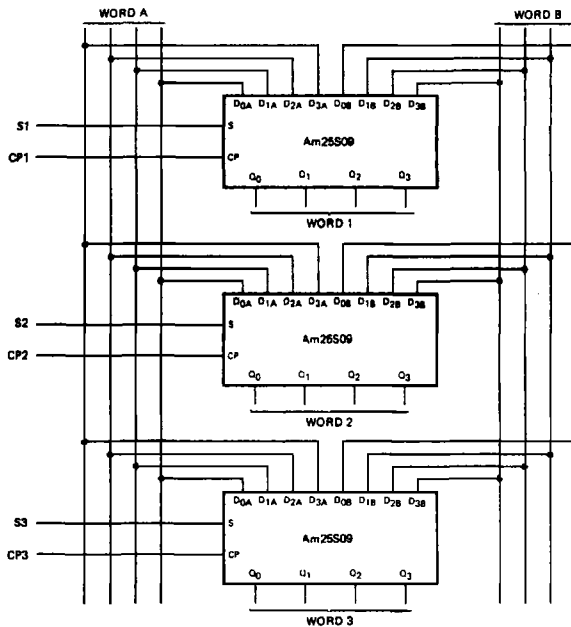
↑ = LOW-to-HIGH Transition

## APPLICATIONS



AF000760

Am25S09 used in 258 x 4 memory system with load/recirculate control, and 1 x 4 static test capability for the system. MOS interface is one load at each end. This circuit is especially useful in digital filtering where special algorithms require a static single step operation for testing purposes.



AF000770

Am25S09 used to store a word from either data bus A or data bus B.

**ABSOLUTE MAXIMUM RATINGS**

Storage Temperature .....	-65°C to +150°C
Temperature (Ambient) Under Bias .....	-55°C to +125°C
Supply Voltage to Ground Potential (Pin 16 to Pin 8) Continuous .....	-0.5V to +7.0V
DC Voltage Applied to Outputs For High Output State .....	-0.5V to +V <sub>CC</sub> max
DC Input Voltage .....	-0.5V to +5.5V
DC Output Current, Into Outputs .....	30mA
DC Input Current .....	-30mA to +5.0mA

Stresses above those listed under **ABSOLUTE MAXIMUM RATINGS** may cause permanent device failure. Functionality at or above these limits is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability.

**OPERATING RANGES**

## Commercial (C) Devices

Temperature .....	0°C to +70°C
Supply Voltage .....	+4.75V to +5.25V

## Military (M) Devices

Temperature .....	-55°C to +125°C
Supply Voltage .....	+4.5V to +5.5V

Operating ranges define those limits over which the functionality of the device is guaranteed.

**DC CHARACTERISTICS** over operating range unless otherwise specified

Parameters	Description	Test Conditions (Note 2)	Min	Typ (Note 1)		Max	Units
				COM'L	MIL		
V <sub>OH</sub>	Output HIGH Voltage	V <sub>CC</sub> = MIN, I <sub>OH</sub> = -1.0mA V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	2.7	3.4			Volts
V <sub>OL</sub>	Output LOW Voltage	V <sub>CC</sub> = MIN, I <sub>OL</sub> = 20mA V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>		0.3	0.5		Volts
V <sub>IH</sub>	Input HIGH Level	Guaranteed input logical HIGH Voltage for all inputs	2.0				Volts
V <sub>IL</sub>	Input LOW Level	Guaranteed input logical LOW voltage for all inputs			0.8		Volts
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = MIN, I <sub>IN</sub> = -18mA			-1.2		Volts
I <sub>IL</sub> (Note 3)	Input Load Input LOW Current	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.5V			-2		mA
I <sub>IH</sub> (Note 3)	Unit Load Input HIGH Current	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7V			50		μA
I <sub>I</sub>	Input HIGH Current	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 5.5V			1.0		mA
I <sub>SC</sub>	Output Short Circuit Current (Note 4)	V <sub>CC</sub> = MAX	-40		-100		mA
I <sub>CC</sub>	Power Supply Current	V <sub>CC</sub> = MAX (Note 5)		75	120		mA

## Notes:

- Typical limits are at V<sub>CC</sub> = 5.0V, 25°C ambient and maximum loading.
- For conditions shown as MIN or MAX, use the appropriate value specified under Operating Ranges for the applicable device type.
- Actual input currents = Unit Load Current x Input Load Factor (See Loading Rules).
- Not more than one output should be shorted at a time. Duration of the short circuit test should not exceed one second.
- Measured with Select and Clock inputs at 4.5V; all data inputs at 0V; all outputs open.

**SWITCHING CHARACTERISTICS** (T<sub>A</sub> = +25°C)

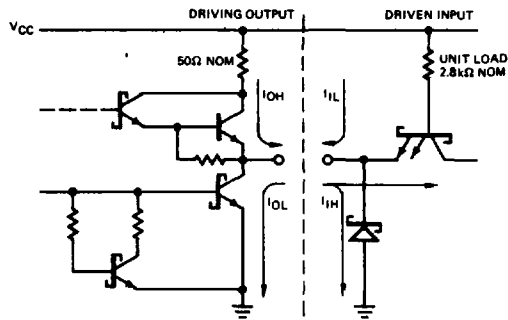
Parameters	Description	Test Conditions	Min	Typ	Max	Units
t <sub>PLH</sub>	Clock to Q HIGH	V <sub>CC</sub> = 5.0V, C <sub>L</sub> = 15pF, R <sub>L</sub> = 280Ω		8	12	ns
t <sub>PHL</sub>	Clock to Q LOW			11.5	17	ns
t <sub>pw</sub>	Clock Pulse Width		7			ns
t <sub>s</sub>	Data Set-up Time		5.5			ns
t <sub>s</sub>	Select Input Set-up Time		10			ns
t <sub>h</sub>	Data Hold Time		3			ns
t <sub>h</sub>	Select Input Hold Time		3			ns

**LOADING RULES (In Unit Loads)**

Input/Output	Pin Nos.	Input Unit Load	Fan-out	
			Output HIGH	Output LOW
S	1	1	-	-
Q <sub>0</sub>	2	-	20	10
D <sub>0A</sub>	3	1	-	-
D <sub>0B</sub>	4	1	-	-
D <sub>1B</sub>	5	1	-	-
D <sub>1A</sub>	6	1	-	-
Q <sub>1</sub>	7	-	20	10
GND	8	-	-	-
CP	9	1	-	-
Q <sub>2</sub>	10	-	20	10
D <sub>2A</sub>	11	1	-	-
Q <sub>2B</sub>	1	1	-	-
D <sub>3B</sub>	13	1	-	-
D <sub>3A</sub>	14	1	-	-
Q <sub>3</sub>	15	-	20	10
V <sub>CC</sub>	16	-	-	-

A Schottky TTL Unit Load is defined as 50µA measured at 2.7V HIGH and -2.0mA measured at 0.5V LOW.

**SCHOTTKY INPUT/OUTPUT CURRENT INTERFACE CONDITIONS**



Note: Actual current flow direction shown