Am2956/Am2957

Octal Latches with Three-State Outputs

DISTINCTIVE CHARACTERISTICS

- 8-bit, high-speed parallel latches
- Am2956 has non-inverting inputs
- Am2957 has inverting inputs
- V_{OL} = 0.5V (max) at I_{OL} = 32mA
- Hysteresis on latch enable input for improved noise margin
- 3-state outputs interface directly with bus organized systems

GENERAL DESCRIPTION

The Am2956 and Am2957 are octal latches with 3-state outputs for bus organized system applications. The latches appear to be transparent to the data (data changes asynchronously) when latch enable, G, is HIGH. When G is LOW, the data that meets the set-up times is latched. Data appears on the bus when the output enable, $\overline{OE}$, is LOW.

When $\overline{OE}$ is HIGH the bus output is in the high-impedance state.

The Am2956 presents non-inverted data at the outputs while the Am2957 is inverting.

The devices are packaged in a space-saving (0.3-inch row spacing) 20-pin package.

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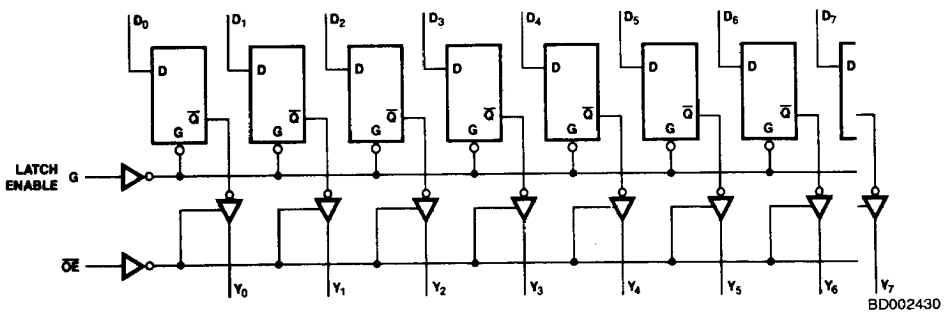
BLOCK DIAGRAM



Inputs D_0 through D_7 are inverted on the Am2957.

RELATED PRODUCTS

Part No.	Description
Am29841-46	8, 9, 10-Bit Latches

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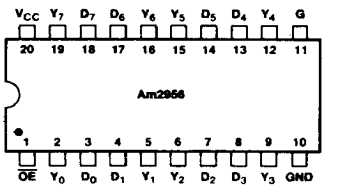
CONNECTION DIAGRAM
Top View

D-20, P-20



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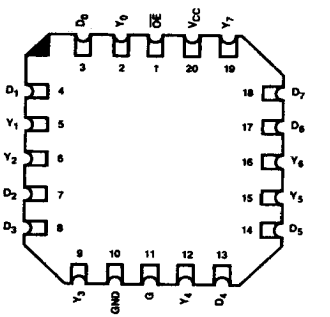

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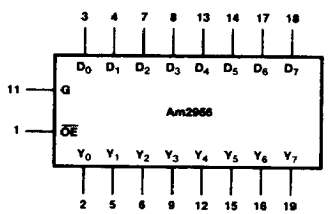
Note: Pin 1 is marked for orientation

F-20 pin configuration identical to D-20, P-20.

LOGIC SYMBOL



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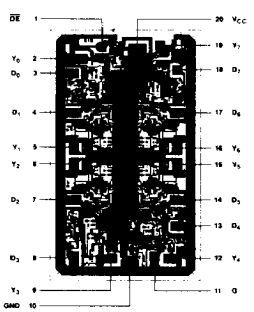
Note: Inputs D_0 through D_7 are inverted on the Am2957

METALLIZATION AND PAD LAYOUT
Am2956



DIE SIZE 0.066" x 0.119"

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).

Am2956/2957 **D** **C** **B**

- B — Screening Option: Blank – Standard processing; B – Burn-in
- C — Temperature (See Operating Range): C – Commercial (0°C to +70°C); M – Military (–55°C to +125°C)
- D — Package: D– 20-pin CERDIP; F – 20-pin flatpak; L – 20-pin leadless chip carrier; P – 20-pin plastic DIP; X – Dice
- Am2956/2957 — Device type: Octal Latches with 3-State Outputs

Valid Combinations	
Am2956 Am2957	PC DC, DCB, DM, DMB FM, FMB LC, LCB, LM, LMB 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
	$D_I/\overline{D_I}$	I	The latch data inputs (Am2956, non-inverting/Am2957, inverting).
11	G	I	The latch enable input. The latches are transparent when G is HIGH. Input data is latched on the HIGH-to-LOW transition.
	Y_I	O	The 3-state latch outputs.
1	$\overline{OE}$	I	The output enable control. When $\overline{OE}$ is LOW, the outputs Y_I are enabled. When $\overline{OE}$ is HIGH, the outputs Y_I are in the high-impedance (off) state.

FUNCTION TABLES

Am2956

Inputs			Internal	Outputs	Function
$\overline{OE}$	G	D_I	Q_I	Y_I	
H	X	X	X	Z	Hi-Z
L	H	L	L	L	Transparent
L	H	H	H	H	
L	L	X	NC	NC	Latched

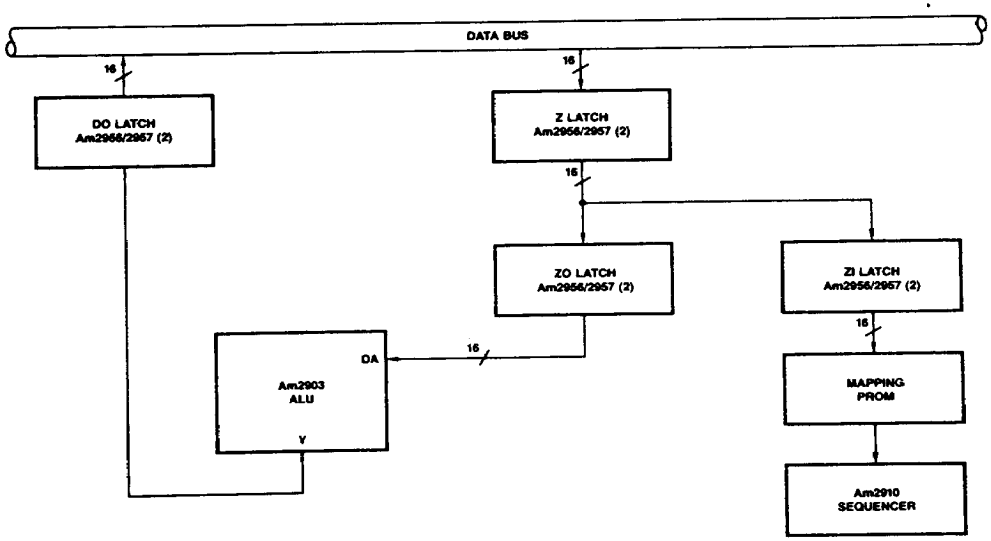
Am2957

Inputs			Internal	Outputs	Function
$\overline{OE}$	G	$\overline{D_I}$	Q_I	Y_I	
H	X	X	X	Z	Hi-Z
L	H	L	H	H	Transparent
L	H	H	L	L	
L	L	X	NC	NC	Latched

H = HIGH
L = LOW
X = Don't Care

NC = No Change
Z = High Impedance

APPLICATION



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Transparent Latches are used in high performance CPU designs. The Z Latch configuration shown provides overlapped fetch of machine instructions and operand data.

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Refer to Page 13-1 for Essential Information on Military Devices

ABSOLUTE MAXIMUM RATINGS

Storage Temperature ..... −65°C to +150°C
(Ambient) Temperature 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_{CC} max
DC Input Voltage ..... −0.5V to +5.5V
DC Output Current, Into Outputs 30mA
DC Input Current ..... −30 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
V_{OH}	Output HIGH Voltage		V_{CC} = MIN, V_{IN} = V_{IH} or V_{IL}	MIL, I_{OH} = −2.0mA	2.4	3.4		Volts
				COM'L, I_{OH} = −6.5mA	2.4	3.1		
V_{OL}	Output LOW Voltage		V_{CC} = MIN, V_{IN} = V_{IH} or V_{IL}	I_{OL} = 20mA			.46	Volts
				I_{OL} = 32mA			.5	
V_{IH}	Input HIGH Level		Guaranteed input logical HIGH voltage for all inputs		2.0			Volts
V_{IL}	Input LOW Level		Guaranteed input logical LOW voltage for all inputs				0.8	Volts
V_I	Input Clamp Voltage		V_{CC} = MIN, I_{IN} = −18mA				−1.2	Volts
I_{IL}	Input LOW Current		V_{CC} = MAX, V_{IN} = 0.5V				−250	μA
I_{IH}	Input HIGH Current		V_{CC} = MAX, V_{IN} = 2.7V				50	μA
I_I	Input HIGH Current		V_{CC} = MAX, V_{IN} = 5.5V				1.0	mA
I_{OZ}	Off-State (High-Impedance) Output Current		V_{CC} = MAX	V_O = 0.5V			−50	μA
				V_O = 2.4V			50	
I_{SC}	Output Short Circuit Current (Note 3)		V_{CC} = MAX		−40		−100	mA
I_{CC}	Power Supply Current (Note 4)	2956	V_{CC} = MAX			105	160	mA
		2957				110	168	

Notes:1. Typical limits are at V_{CC} = 5.0V, 25°C ambient and maximum loading.
2. For conditions shown as MIN or MAX use the appropiate value specified under Operating Ranges for the applicable device type.
3. Not more than one output should be shorted at a time. Duration of the short circuit test should not exceed one second.
4. Inputs grounded; outputs open.

SWITCHING CHARACTERISTICS (T_A = +25°C, V_{CC} = 5.0V)
Am2956

Parameters	Description	Test Conditions	Min	Typ	Max	Units
t_{PLH}	Enable to Output	C_L = 15pF, R_L = 280Ω		7	14	ns
t_{PHL}				12	18	ns
t_{PLH}	Data Input to Output			5	9	ns
t_{PHL}				9	13	ns
t_s(H)	HIGH Data to Enable		0			ns
t_s(L)	LOW Data to Enable		0			ns
t_h(H)	HIGH Data to Enable		10			ns
t_h(L)	LOW Data to Enable		10			ns
t_{pwH}	Enable Pulse Width		6			ns
t_{pwL}			7.3			ns
t_{ZH}	$\overline{OE}$ to Y_i			8	15	ns
t_{ZL}				11	18	ns
t_{HZ}	$\overline{OE}$ to Y_i	C_L = 5pF, R_L = 280Ω		6	9	ns
t_{LZ}				8	12	ns

*Switching Characteristics' performance over the operating temperature range is guaranteed by testing defined in Group A, Subgroup 9.

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SWITCHING CHARACTERISTICS (T_A = +25°C, V_{CC} = 5.0V)
Am2957

Parameters	Description	Test Conditions	Min	Typ	Max	Units
t_{PLH}	Enable to Output	C_L = 15pF, R_L = 280Ω		17	24	ns
t_{PHL}				19	26	ns
t_{PLH}	Data Input to Output			10	14	ns
t_{PHL}				14	20	ns
t_s(H)	HIGH Data to Enable		0			ns
t_s(L)	LOW Data to Enable		0			ns
t_h(H)	HIGH Data to Enable		10			ns
t_h(L)	LOW Data to Enable		10			ns
t_{pwH}	Enable Pulse Width		6			ns
t_{pwL}			7.3			ns
t_{ZH}	$\overline{OE}$ to Y_i			8	15	ns
t_{ZL}				11	18	ns
t_{HZ}	$\overline{OE}$ to Y_i	C_L = 5pF, R_L = 280Ω		6	9	ns
t_{LZ}				8	10	ns

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Refer to Page 13-1 for Essential Information on Military Devices