Am25LS2521

Eight-Bit Equal-to Comparator

DISTINCTIVE CHARACTERISTICS

- 8-bit byte oriented equal comparator
- Cascadable using $\overline{E}_{IN}$
- High-speed, Low-Power Schottky technology

- t_{pd} A · B to $\overline{E}_{OUT}$ in 9ns
- Standard 20-pin package

GENERAL DESCRIPTION

The Am25LS2521 is an 8-bit "equal to" comparator capable of comparing two 8-bit words for "equal to" with provision for expansion or external enabling. The matching of the two 8-bit inputs plus a logic LOW on the $\overline{E}_{IN}$ produces an active LOW on the output $\overline{E}_{OUT}$.

The logic expression for the device can be expressed as:
$$\overline{E}_{OUT} = \overline{(A_0 \odot B_0)(A_1 \odot B_1)(A_2 \odot B_2)(A_3 \odot B_3)(A_4 \odot B_4)}$$

$\overline{(A_5 \odot B_5)}Y(A6 \odot B6)(A_7 \odot B_7)\overline{E}_{IN}$. It is obvious that the expression is valid where $A_0 - A_7$ and $B_0 - B_7$ are expressed as either assertions or negations. This is also true for pair of terms i.e. A_0 can be compared with B_0 at the same time $\overline{A}_1$ is compared with $\overline{B}_1$. It is only essential that the polarity of the paired terms be maintained.
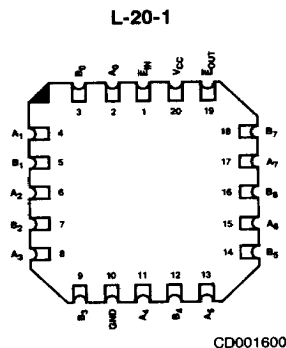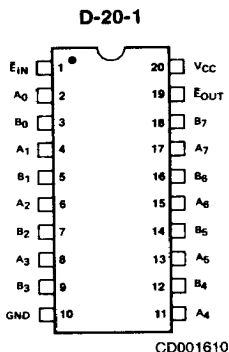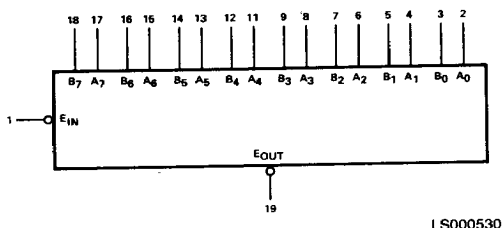
BLOCK DIAGRAM
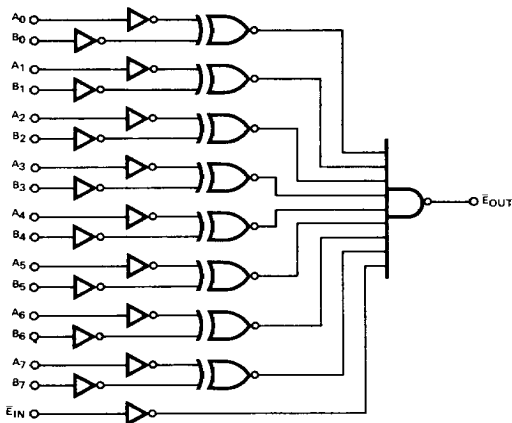
BD001390

RELATED PRODUCTS

Part No.	Description
Am29806	Chip Select Decoder
Am29809	9-Bit Comparator

03619B

CONNECTION DIAGRAM
Top View

D-20-1

Pin	Signal		Signal	Pin
1	E_{IN}		V_{CC}	20
2	A_0		E_{OUT}	19
3	B_0		B_7	18
4	A_1		A_7	17
5	B_1		B_6	16
6	A_2		A_6	15
7	B_2		B_5	14
8	A_3		A_5	13
9	B_3		B_4	12
10	GND		A_4	11

CD001610

L-20-1

CD001600

Note: Pin 1 is marked for orientation

LOGIC SYMBOL

LS000530

METALLIZATION AND PAD LAYOUT

E_{IN}	1		20	V_{CC}
A_0	2		19	E_{OUT}
			18	B_7
B_0	3		17	A_7
A_1	4		16	B_6
B_1	5		15	A_6
A_2	6		14	B_5
B_2	7		13	A_5
A_3	8		12	B_4
B_3	9		11	A_4
			10	GND

DIE SIZE 0.068" x 0.058"
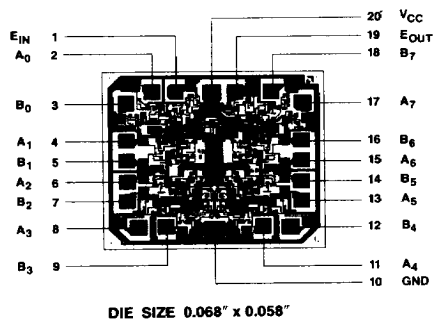
ORDERING INFORMATION

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).

Am25LS2521   D   C   B

Screening Option
Blank – Standard processing
B – Burn-in

Temperature (See Operating Range)
C – Commercial (0°C to +70°C)
M – Military (−55°C to +125°C)

Package
D– 20-pin CERDIP
F– 20-pin flatpak
L– 20-pin leadless chip carrier
P– 20-pin plastic DIP
X– Dice

Device type
8-Bit Equal-to-Comparator

Valid Combinations	
Am25LS2521	PC DC, DM FM LC, LM 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.

03619B

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

9

PIN DESCRIPTION

Pin No.	Name	I/O	Description
	A_0-A_7	I	A input to comparator.
	B_0-B_7	I	B input to comparator.
1	$\overline{E}_{IN}$	I	Enable active LOW.
19	$\overline{E}_{OUT}$	O	$\overline{EQUAL}$ output active LOW.

APPLICATION
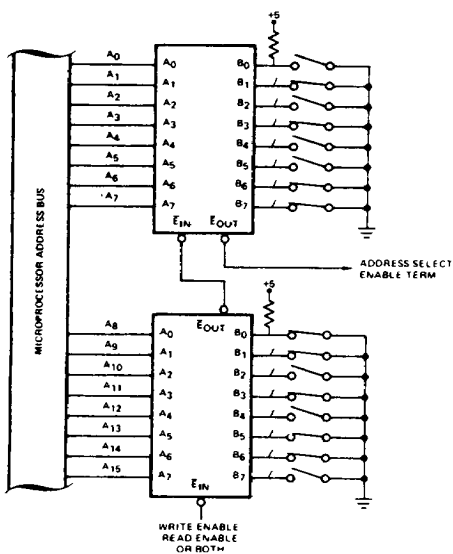
AF000651

MAX, $\overline{ENABLE}$ (HIGH-to-LOW) DELAY OVER 16-BITS
(Commercial Range)

t_{PHL}	A_i or B_i to $\overline{E}_{OUT}$	19ns
t_{PHL}	$\overline{E}_{IN}$ to $\overline{E}_{OUT}$	12.5ns
Total		31.5ns

Note: This part does not have internal pull up resistors. In this application external pull ups should be added to the 16 ports.

MICROPROCESSOR ENABLE CONTROLLED, SELECTABLE, ADDRESS DECODER

03619B

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
   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 +7.0V
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
V_{OH}	Output HIGH Voltage	V_{CC} = MIN V_{IN} = V_{IH} or V_{IL} I_{OH} = −440µA	MIL	2.5			Volts
			COM'L	2.7			
V_{OL}	Output LOW Voltage	V_{CC} = MIN V_{IN} = V_{IH} or V_{IL}	I_{OL} = 4.0 mA			0.4	Volts
			I_{OL} = 8.0mA			0.45	
			I_{OL} = 12mA			0.5	
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.	MIL			0.7	Volts
			COM'L			0.8	
V_I	Input Clamp Voltage	V_{CC} = MIN, I_{IN} = −18mA				−1.5	Volts
I_{IL}	Input LOW Current	V_{CC} = MAX, V_{IN} = 0.4V	A_i, B_i			−0.36	mA
			$\overline{E}$			−0.72	
I_{IH}	Input HIGH Current	V_{CC} = MAX, V_{IN} = 2.7V	A_i, B_i			20	µA
			$\overline{E}$			40	
I_I	Input HIGH Current	V_{CC} = MAX, V_{IN} = 7.0V	A_i, B_i			0.1	mA
			$\overline{E}$			0.2	
I_{SC}	Output Short Circuit Current (Note 3)	V_{CC} = MAX		−15		−85	mA
I_{CC}	Power Supply Current (Note 4)	V_{CC} = MAX			27	40	mA

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 appropriate 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. $\overline{E}$ = GND, all other inputs and outputs open.

9

03619B

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

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

Parameters	Description	Test Conditions	Min	Typ	Max	Units
t_{PLH}	A_i or B_i to $\overline{Equal}$	$C_L = 15pF$ $R_L = 2.0k\Omega$		9	15	ns
t_{PHL}				9	15	
t_{PLH}	$\overline{E}$ to $\overline{Equal}$			5	7	ns
t_{PHL}				6	8	

SWITCHING CHARACTERISTICS over operating range unless otherwise specified*

Parameters	Description	Test Conditions	COMMERCIAL Am25LS2521 Min	Max	MILITARY Am25LS2521 Min	Max	Units
t_{PLH}	A_i or B_i to $\overline{Equal}$ Output	$C_L = 50pF$ $R_L = 2.0k\Omega$		20		22	ns
t_{PHL}				19		21	
t_{PLH}	$\overline{E}$ to $\overline{Equal}$ Output			10.5		12	ns
t_{PHL}				12.5		15	

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

Am25LS2521
LOW-POWER SCHOTTKY INPUT/OUTPUT
CURRENT INTERFACE CONDITIONS
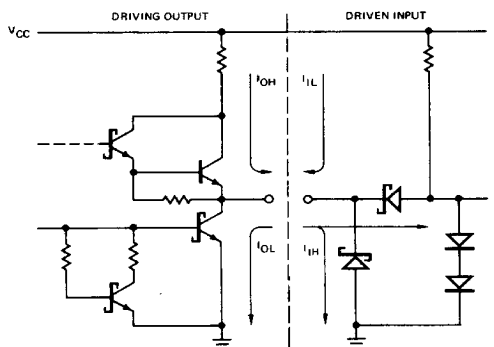
IC000180

Note: Actual current flow direction shown.

03619B

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