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
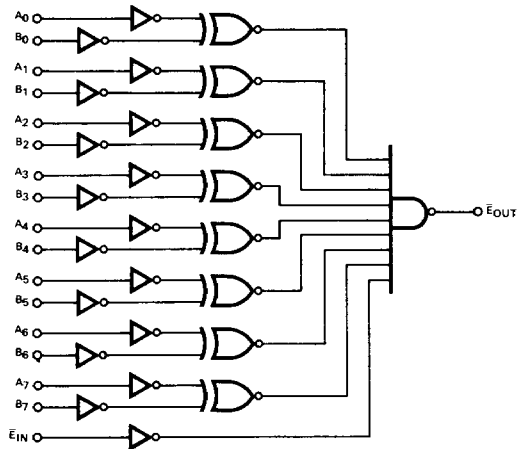
BD001390

RELATED PRODUCTS

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

03619B

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

CONNECTION DIAGRAM
Top View

D-20-1

```
EIN   [ 1 •        20 ]  VCC
A0    [ 2          19 ]  EOUT
B0    [ 3          18 ]  B7
A1    [ 4          17 ]  A7
B1    [ 5          16 ]  B6
A2    [ 6          15 ]  A6
B2    [ 7          14 ]  B5
A3    [ 8          13 ]  A5
B3    [ 9          12 ]  B4
GND   [ 10         11 ]  A4
```

CD001610

L-20-1

CD001600
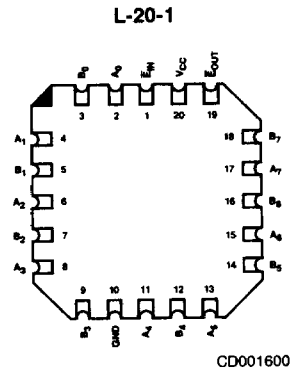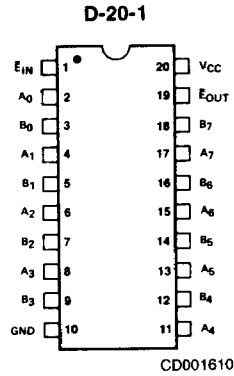
Note: Pin 1 is marked for orientation

LOGIC SYMBOL

```
18 17 16 15 14 13 12 11  9 '8  7  6  5  4  3  2
B7 A7 B6 A6 B5 A5 B4 A4 B3 A3 B2 A2 B1 A1 B0 A0
```

1 —o EIN

EOUT
o
19

LS000530
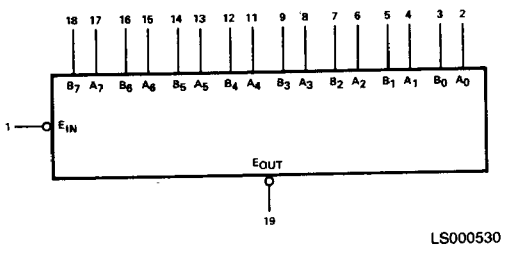
METALLIZATION AND PAD LAYOUT

```
EIN   1                         20   VCC
A0    2                         19   EOUT
                                18   B7
B0    3
                                17   A7
A1    4                         16   B6
B1    5                         15   A6
A2    6                         14   B5
B2    7                         13   A5
A3    8                         12   B4
                                11   A4
B3    9                         10   GND
```

DIE SIZE 0.068" x 0.058"
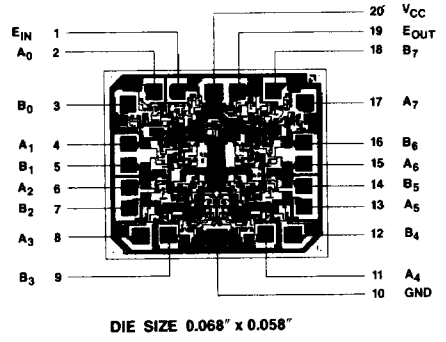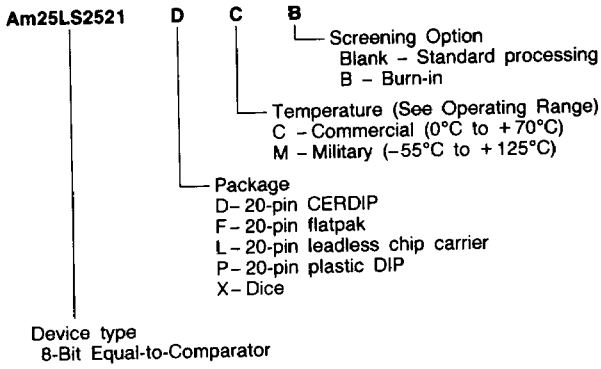
ORDERING INFORMATION

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).
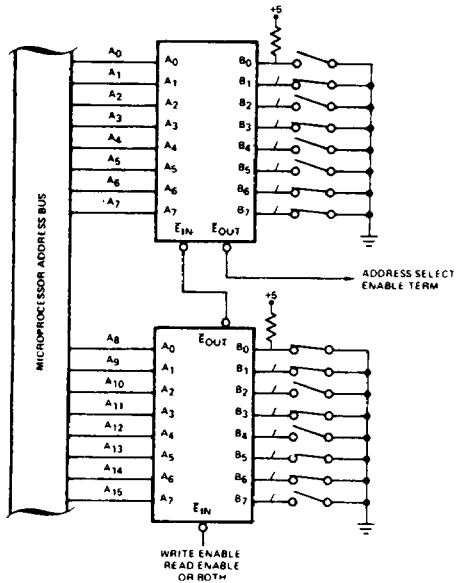
Am25LS2521   D   C   B

└── 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.

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

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

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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
    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.

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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 Equal	C_L = 15pF R_L = 2.0kΩ		9	15	ns
t_{PHL}				9	15	
t_{PLH}	E to Equal			5	7	ns
t_{PHL}				6	8	

SWITCHING CHARACTERISTICS over operating range unless otherwise specified*

Parameters	Description	Test Conditions	COMMERCIAL Am25LS2521		MILITARY Am25LS2521		Units
			Min	Max	Min	Max	
t_{PLH}	A_i or B_i to Equal Output	C_L = 50pF R_L = 2.0kΩ		20		22	ns
t_{PHL}				19		21	
t_{PLH}	E to 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
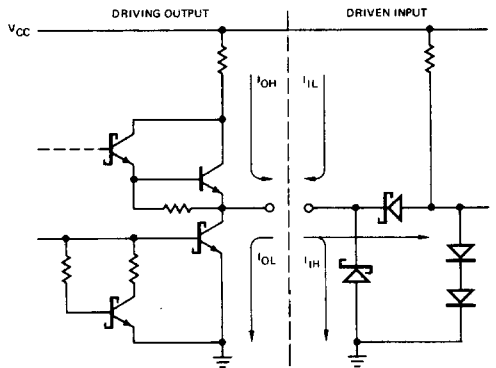
Note: Actual current flow direction shown.

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