

# Am25LS2521

Eight-Bit Equal-to Comparator

## DISTINCTIVE CHARACTERISTICS

- 8-bit byte oriented equal comparator
- Cascadable using  $\bar{E}_{IN}$
- High-speed, Low-Power Schottky technology
- $t_{pd}$  A · B to  $\bar{E}_{OUT}$  in 9ns
- Standard 20-pin package

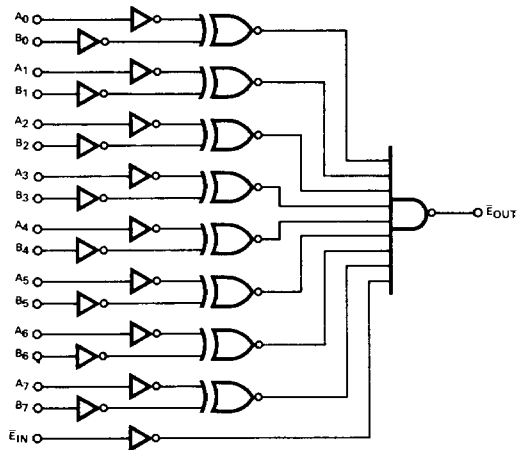
## GENERAL DESCRIPTION

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  $\bar{E}_{IN}$  produces an active LOW on the output  $\bar{E}_{OUT}$ .

The logic expression for the device can be expressed as:  
 $\bar{E}_{OUT} = (\bar{A}_0 \odot \bar{B}_0) (A_1 \odot B_1) (A_2 \odot B_2) (A_3 \odot B_3) (A_4 \odot B_4)$

$(\bar{A}_5 \odot \bar{B}_5) Y(A_6 \odot B_6) (A_7 \odot B_7) \bar{E}_{IN}$ . 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  $\bar{A}_1$  is compared with  $\bar{B}_1$ . It is only essential that the polarity of the paired terms be maintained.

## BLOCK DIAGRAM

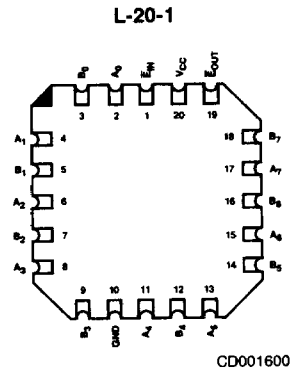
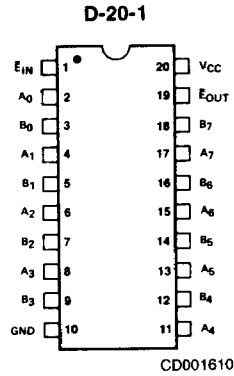


BD001390

## RELATED PRODUCTS

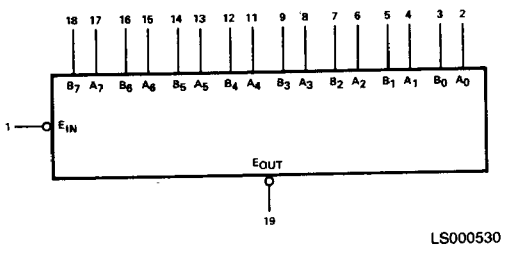
Part No.	Description
Am29806	Chip Select Decoder
Am29809	9-Bit Comparator

### CONNECTION DIAGRAM Top View

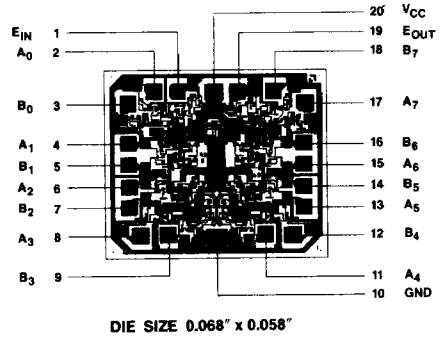


Note: Pin 1 is marked for orientation

### LOGIC SYMBOL

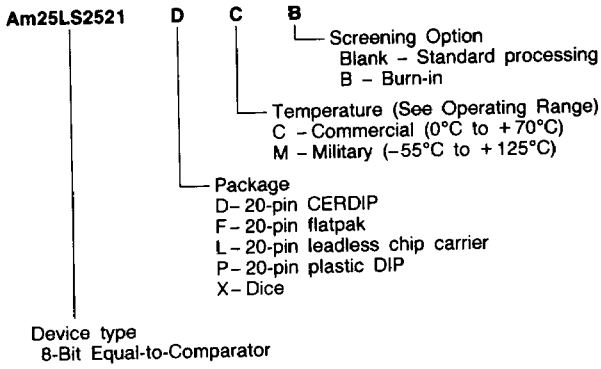


### METALLIZATION AND PAD LAYOUT



### 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).



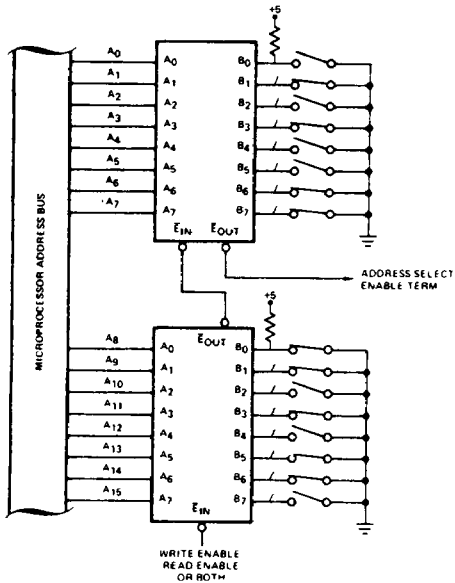
Valid Combinations	
Am25LS2521	PC DC, DM FM LC, LM XC, XM

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

## PIN DESCRIPTION

Pin No.	Name	I/O	Description
	A <sub>0</sub> -A <sub>7</sub>	I	A input to comparator.
	B <sub>0</sub> -B <sub>7</sub>	I	B input to comparator.
1	$\overline{E}_{IN}$	I	Enable active LOW.
19	$\overline{E}_{OUT}$	O	EQUAL output active LOW.

## APPLICATION



AF000651

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**

**MAX, ENABLE (HIGH-to-LOW) DELAY  
OVER 16-BITS  
(Commercial Range)**

t <sub>PHL</sub>	A <sub>i</sub> or B <sub>i</sub> to E <sub>OUT</sub>	19ns
t <sub>PHL</sub>	$\overline{E}_{IN}$ to E <sub>OUT</sub>	12.5ns
Total		31.5ns

### 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<sub>CC</sub> 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 <sub>OH</sub>	Output HIGH Voltage	V <sub>CC</sub> = MIN V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OH</sub> = -440µA	MIL	2.5		Volts
			COM'L	2.7		
V <sub>OL</sub>	Output LOW Voltage	V <sub>CC</sub> = MIN V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 4.0 mA		0.4	Volts
			I <sub>OL</sub> = 8.0mA		0.45	
			I <sub>OL</sub> = 12mA		0.5	
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.	MIL		0.7	Volts
			COM'L		0.8	
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = MIN, I <sub>IN</sub> = -18mA			-1.5	Volts
i <sub>IL</sub>	Input LOW Current	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4V	A <sub>i</sub> , B <sub>i</sub>		-0.36	mA
			E		-0.72	
i <sub>IH</sub>	Input HIGH Current	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7V	A <sub>i</sub> , B <sub>i</sub>		20	µA
			E		40	
I <sub>I</sub>	Input HIGH Current	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0V	A <sub>i</sub> , B <sub>i</sub>		0.1	mA
			E		0.2	
I <sub>SC</sub>	Output Short Circuit Current (Note 3)	V <sub>CC</sub> = MAX	-15		-85	mA
I <sub>CC</sub>	Power Supply Current (Note 4)	V <sub>CC</sub> = MAX		27	40	mA

- Notes: 1. Typical limits are at V<sub>CC</sub> = 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. E = GND, all other inputs and outputs open.

**SWITCHING CHARACTERISTICS** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = 5.0\text{V}$ )

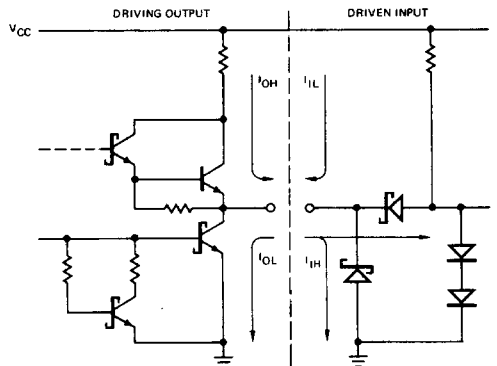
Parameters	Description	Test Conditions	Min	Typ	Max	Units
$t_{PLH}$	A <sub>i</sub> or B <sub>j</sub> to $\overline{\text{Equal}}$	$C_L = 15\text{pF}$ $R_L = 2.0\text{k}\Omega$		9	15	ns
$t_{PHL}$				9	15	
$t_{PLH}$	$\overline{\text{E}}$ to $\overline{\text{Equal}}$			5	7	ns
$t_{PHL}$				6	8	

**SWITCHING CHARACTERISTICS** over operating range unless otherwise specified\*

Parameters	Description	Test Conditions	COMMERCIAL		MILITARY		Units
			Am25LS2521		Am25LS2521		
			Min	Max	Min	Max	
$t_{PLH}$	A <sub>i</sub> or B <sub>j</sub> to	$C_L = 50\text{pF}$ $R_L = 2.0\text{k}\Omega$		20		22	ns
$t_{PHL}$	$\overline{\text{Equal}}$ Output			19		21	
$t_{PLH}$	$\overline{\text{E}}$ to $\overline{\text{Equal}}$ 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



Note: Actual current flow direction shown.