

29F52 • 29F53 8-Bit Registered Transceiver

General Description

The 29F52 and 29F53 are 8-bit registered transceivers. Two 8-bit back to back registers store data flowing in both directions between two bidirectional buses. Separate clock, clock enable and 3-STATE output enable signals are provided for each register. The A_0 - A_7 output pins are guaranteed to sink 24 mA while the B_0 - B_7 output pins are designed for 64 mA.

The 29F53 is an inverting option of the 29F52. Both transceivers are AMD Am2952/2953 functional equivalents.

Features

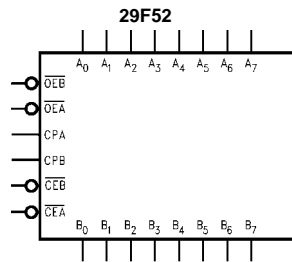
- 8-bit registered transceivers
- Separate clock, clock enable and 3-STATE output enable provided for each register
- AMD Am2952/2953 functional equivalents
- Both inverting and non-inverting options available
- 24-Pin slimline package

Ordering Code:

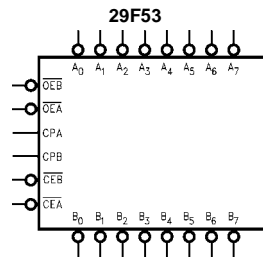
| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| 29F52SC | M24B | 24-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| 29F52SPC | N24C | 24-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |
| 29F53SPC | N24C | 24-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

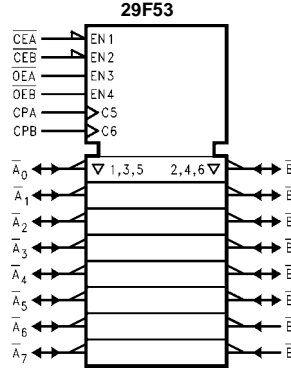
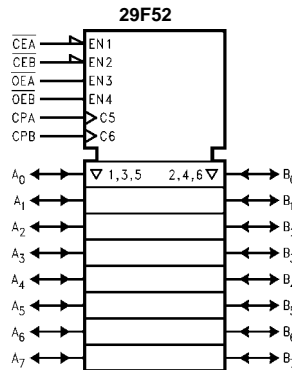
Logic Symbols



IEEE/IEC

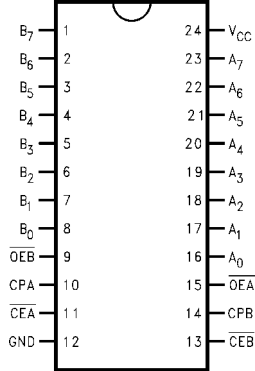


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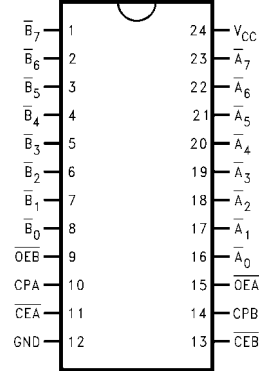


Connection Diagrams

Pin Assignment for DIP and SOIC
29F52



Pin Assignment for DIP
29F53



Unit Loading/Fan Out

| Pin Names | Description | U.L. HIGH/LOW | Input I_H/I_L Output I_{OH}/I_{OL} |
|------------------|--|----------------------------|---|
| A_0-A_7 | A-Register Inputs/ B-Register 3-STATE Outputs | 3.5/1.083 | 70 μ A/0.65 mA |
| B_0-B_7 | B Register Inputs/ A-Register 3-STATE Outputs | 150/40 (33.3) 3.5/1.083 | -3 mA/24 mA (20 mA) 70 μ A/0.65 mA |
| \overline{OE} | Output Enable A-Register | 600/106.6 (80) | -12 mA/64 mA (48 mA) |
| CPA | A-Register Clock | 1.0/1.0 | 20 μ A/-0.6 mA |
| \overline{CEA} | A-Register Clock Enable | 1.0/1.0 | 20 μ A/-0.6 mA |
| \overline{OEB} | Output Enable B-Register | 1.0/1.0 | 20 μ A/-0.6 mA |
| CPB | B-Register Clock | 1.0/1.0 | 20 μ A/-0.6 mA |
| \overline{CEB} | B-Register Clock Enable | 1.0/1.0 | 20 μ A/-0.6 mA |

Output Control

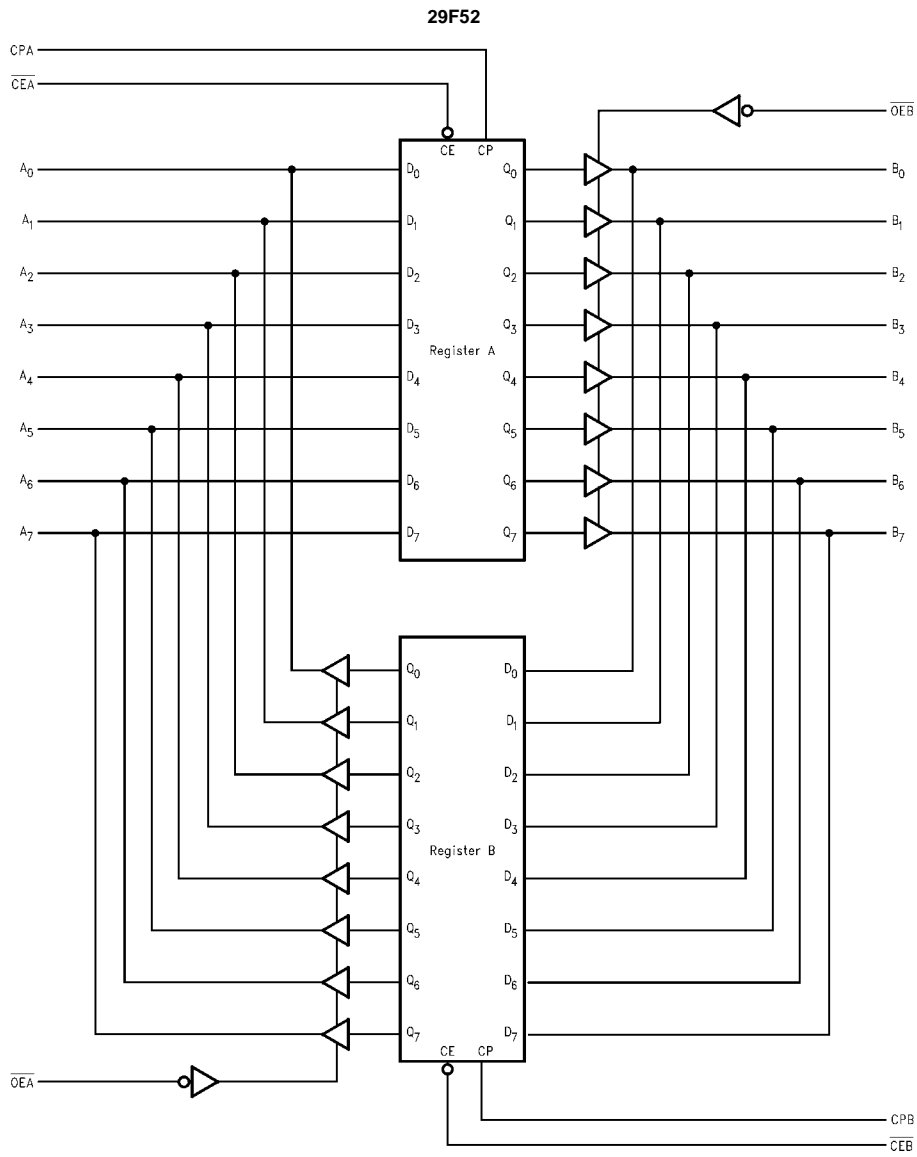
| OE | Internal Q | Y-Output | | Function |
|----|---------------|----------|-------|-----------------|
| | | 29F52 | 29F53 | |
| H | X | Z | Z | Disable Outputs |
| L | L | L | H | Enable Outputs |
| L | H | H | L | |

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = HIGH Impedance
N = LOW-to-HIGH Transition
NC = No Change

Register Function Table (Applies to A or B Register)

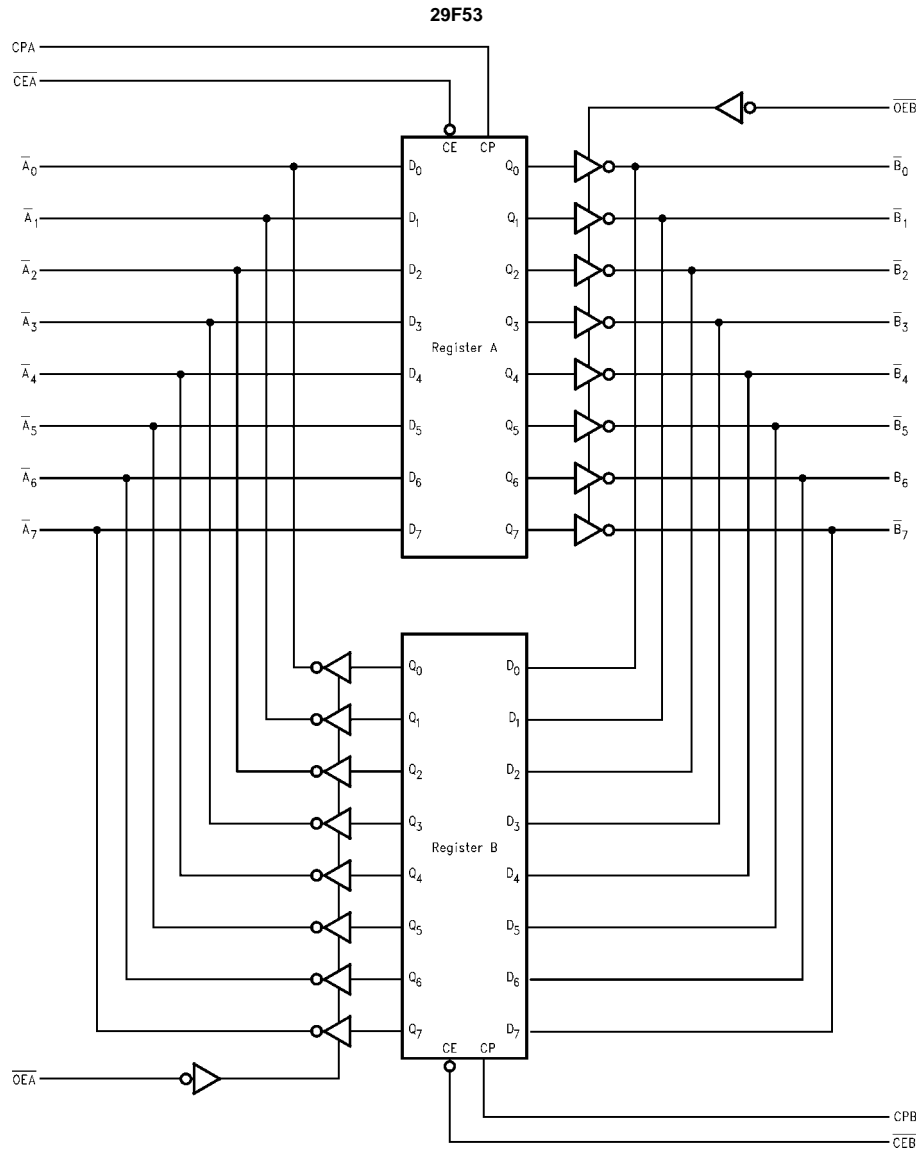
| Inputs | | | Internal Q | Function |
|--------|----|----|---------------|-----------|
| D | CP | CE | | |
| X | X | H | NC | Hold Data |
| L | N | L | L | Load Data |
| H | N | L | H | |

Block Diagrams



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Block Diagrams (Continued)
Block Diagrams (continued)



Absolute Maximum Ratings(Note 1)

| | |
|--|--------------------------------------|
| Storage Temperature | -65°C to +150°C |
| Ambient Temperature under Bias | -55°C to +125°C |
| Junction Temperature under Bias | -55°C to +150°C |
| V _{CC} Pin Potential to Ground Pin | -0.5V to +7.0V |
| Input Voltage (Note 2) | -0.5V to +7.0V |
| Input Current (Note 2) | -30 mA to +5.0 mA |
| Voltage Applied to Output in HIGH State (with V _{CC} = 0V) | |
| Standard Output | -0.5V to V _{CC} |
| 3-STATE Output | -0.5V to +5.5V |
| Current Applied to Output in LOW State (Max) | twice the rated I _{OL} (mA) |

Recommended Operating Conditions

| | |
|------------------------------|----------------|
| Free Air Ambient Temperature | 0°C to +70°C |
| Supply Voltage | +4.5V to +5.5V |

Note 1: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: Either voltage limit or current limit is sufficient to protect inputs.

DC Electrical Characteristics

| Symbol | Parameter | Min | Typ | Max | Units | V _{CC} | Conditions |
|------------------------------------|---|---|---------------------------------|--------------|-------|-----------------|--|
| V _{IH} | Input HIGH Voltage | 2.0 | | | V | | Recognized as a HIGH Signal |
| V _{IL} | Input LOW Voltage | | | 0.8 | V | | Recognized as a LOW Signal |
| V _{CD} | Input Clamp Diode Voltage | | | -1.2 | V | Min | I _{IN} = -18 mA (Non I/O Pins) |
| V _{OH} | Output HIGH Voltage | 10% V _{CC} 10% V _{CC} 10% V _{CC} 5% V _{CC} 5% V _{CC} | 2.5 2.4 2.0 2.7 2.7 | | V | Min | I _{OH} = -1 mA (A _n) I _{OH} = -3 mA (A _n , B _n) I _{OH} = -15 mA (B _n) I _{OH} = -1 mA (A _n) I _{OH} = -3 mA (A _n , B _n) |
| V _{OL} | Output LOW Voltage | 10% V _{CC} 10% V _{CC} | | 0.5 0.55 | V | Min | I _{OL} = 24 mA (A _n) I _{OL} = 64 mA (B _n) |
| I _{IH} | Input HIGH Current | | | 20 | μA | Max | V _{IN} = 2.7V (Non-I/O Pins) |
| I _{BVI} | Input HIGH Current Breakdown Test | | | 100 | μA | Max | V _{IN} = 7.0V (Non-I/O Pins) |
| I _{BVIT} | Input HIGH Current Breakdown Test (I/O) | | | 1.0 | mA | Max | V _{IN} = 5.5V (A _n , B _n) |
| I _{IL} | Input LOW Current | | | -0.6 | mA | Max | V _{IN} = 0.5V (Non-I/O Pins) |
| I _{IH} + I _{OZH} | Output Leakage Current | | | 70 | μA | Max | V _{OUT} = 2.7V (A _n , B _n) |
| I _{IL} + I _{OZL} | Output Leakage Current | | | -650 | μA | Max | V _{OUT} = 0.5V (A _n , B _n) |
| I _{OS} | Output Short-Circuit Current | -60 -100 | | -150 -225 | mA | Max | V _{OUT} = 0V (A _n) V _{OUT} = 0V (B _n) |
| I _{CEx} | Output HIGH Leakage Current | | | 250 | μA | Max | V _{OUT} = V _{CC} (A _n , B _n) |
| I _{ZZ} | Bus Drainage Test | | | 500 | μA | 0.0V | V _{OUT} = 5.25V (A _n , B _n) |
| I _{CCH} | Power Supply Current | | 130 | 190 | mA | Max | V _O = HIGH |
| I _{CCL} | Power Supply Current | | | 190 | mA | Max | V _O = LOW |
| I _{CCZ} | Power Supply Current | | | 190 | mA | Max | V _O = HIGH Z |

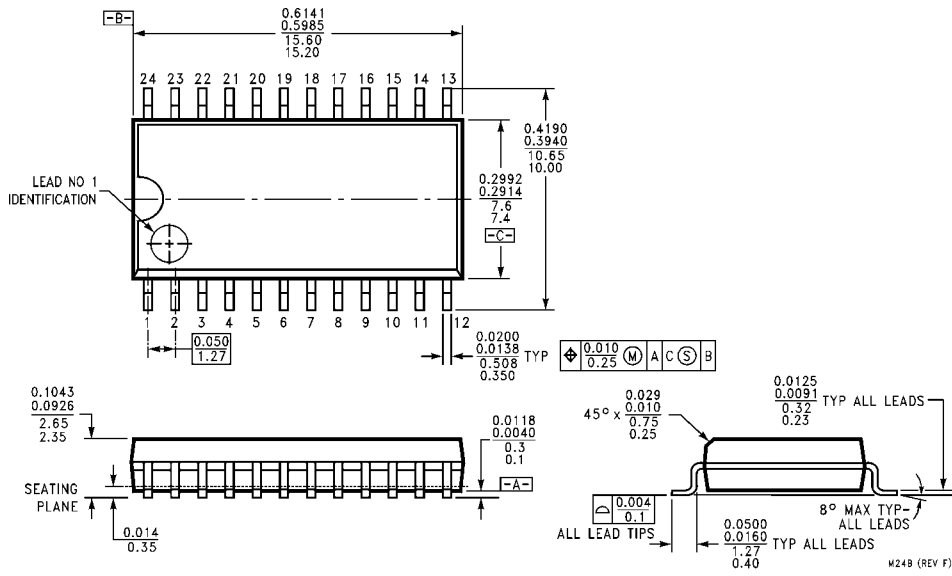
AC Electrical Characteristics

| Symbol | Parameter | T _A = +25°C V _{CC} = +5.0V C _L = 50 pF | | | T _A = -55°C to +125°C V _{CC} = +5.0V C _L = 50 pF | | T _A = 0°C to +70°C V _{CC} = +5.0V C _L = 50 pF | | Units |
|------------------|--|---|-----|-----|---|-----|--|------|-------|
| | | Min | Typ | Max | Min | Max | Min | Max | |
| t _{PLH} | Propagation Delay | 3.0 | 5.5 | 7.5 | | | 2.5 | 8.5 | ns |
| t _{PHL} | CPA or CPB to A _n or B _n | 4.0 | 7.0 | 9.0 | | | 3.5 | 10.0 | |
| t _{pZH} | Output Enable Time | 2.5 | 5.5 | 7.5 | | | 2.0 | 8.5 | ns |
| t _{pZL} | $\overline{\text{OEA}}$ or $\overline{\text{OEB}}$ to A _n or B _n | 3.5 | 7.0 | 9.5 | | | 3.0 | 10.5 | |
| t _{PHZ} | Output Disable Time | 2.5 | 6.5 | 9.0 | | | 2.0 | 10.0 | ns |
| t _{PLZ} | $\overline{\text{OEA}}$ or $\overline{\text{OEB}}$ to A _n or B _n | 2.5 | 5.5 | 7.5 | | | 2.0 | 8.5 | |

AC Operating Requirements

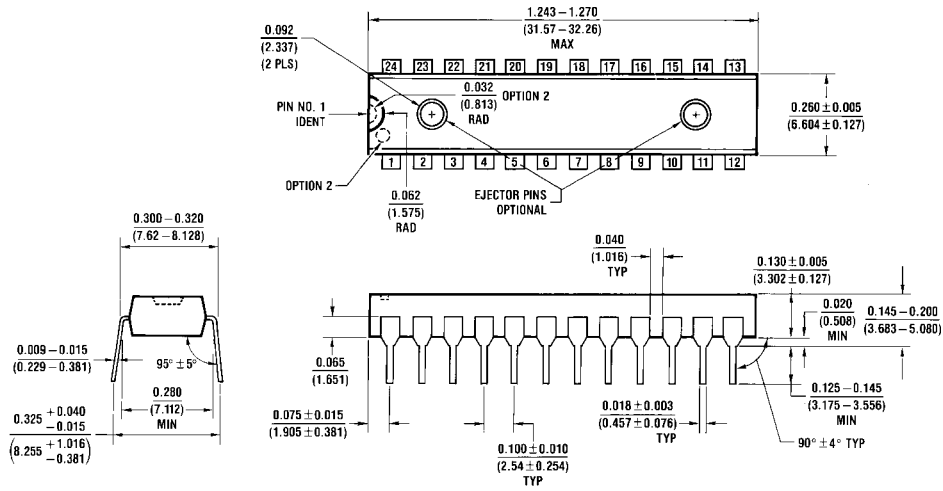
| Symbol | Parameter | T _A = +25°C V _{CC} = +5.0V | | T _A = -55°C to +125°C V _{CC} = +5.0V | | T _A = 0°C to +70°C V _{CC} = +5.0V | | Units |
|--------------------|--|---|-----|---|-----|--|-----|-------|
| | | Min | Max | Min | Max | Min | Max | |
| t _S (H) | Setup Time, HIGH or LOW | 4.0 | | | | 4.5 | | ns |
| t _S (L) | A _n or B _n to CPA or CPB | 4.0 | | | | 4.5 | | |
| t _H (H) | Hold Time, HIGH or LOW | 2.0 | | | | 2.5 | | ns |
| t _H (L) | A _n or B _n to CPA or CPB | 2.0 | | | | 2.5 | | |
| t _S (H) | Setup Time, HIGH or LOW | 1.0 | | | | 1.5 | | ns |
| t _S (L) | $\overline{\text{CEA}}$ or $\overline{\text{CEB}}$ to CPA or CPB | 4.0 | | | | 4.5 | | |
| t _H (H) | Hold Time, HIGH or LOW | 2.0 | | | | 2.5 | | ns |
| t _H (L) | $\overline{\text{CEA}}$ or $\overline{\text{CEB}}$ to CPA or CPB | 2.0 | | | | 2.5 | | |
| t _W (H) | Pulse Width, HIGH or LOW | 3.0 | | | | 3.5 | | ns |
| t _W (L) | CPA or CPB | 3.0 | | | | 3.5 | | |

Physical Dimensions inches (millimeters) unless otherwise noted



**24-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
Package Number M24B**

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



24-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N24C

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