

Am27C512

512 Kilobit (64 K x 8-Bit) CMOS EPROM

DISTINCTIVE CHARACTERISTICS

- **Fast access time**
 - Speed options as fast as 55 ns
- **Low power consumption**
 - 20 μ A typical CMOS standby current
- **JEDEC-approved pinout**
- **Single +5 V power supply**
- **$\pm 10\%$ power supply tolerance standard**
- **100% Flashrite™ programming**
 - Typical programming time of 8 seconds
- **Latch-up protected to 100 mA from -1 V to $V_{CC} + 1$ V**
- **High noise immunity**
- **Versatile features for simple interfacing**
 - Both CMOS and TTL input/output compatibility
 - Two line control functions
- **Standard 28-pin DIP, PDIP, and 32-pin PLCC packages**

GENERAL DESCRIPTION

The Am27C512 is a 512-Kbit, ultraviolet erasable programmable read-only memory. It is organized as 64K words by 8 bits per word, operates from a single +5 V supply, has a static standby mode, and features fast single address location programming. Products are available in windowed ceramic DIP packages, as well as plastic one time programmable (OTP) PDIP and PLCC packages.

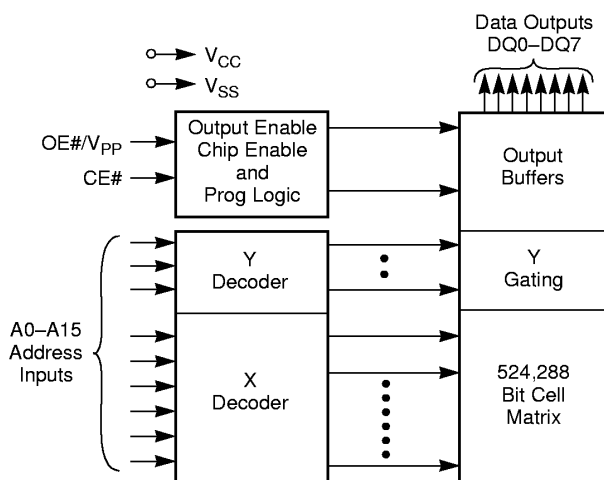
Data can be typically accessed in less than 55 ns, allowing high-performance microprocessors to operate without any WAIT states. The device offers separate Output Enable (OE#) and Chip Enable (CE#) controls,

thus eliminating bus contention in a multiple bus micro-processor system.

AMD's CMOS process technology provides high speed, low power, and high noise immunity. Typical power consumption is only 80 mW in active mode, and 100 μ W in standby mode.

All signals are TTL levels, including programming signals. Bit locations may be programmed singly, in blocks, or at random. The device supports AMD's Flashrite programming algorithm (100 μ s pulses), resulting in a typical programming time of 8 seconds.

BLOCK DIAGRAM



*** For complete Rochester ordering guide, please refer to page 2 ***

Rochester Electronics guarantees performance of its semiconductor products to the original OEM specifications. "Typical" values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing. Rochester Electronics reserves the right to make changes without further notice to any specification herein.

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Rochester Ordering Guide

**Most products can also be offered as RoHS compliant, designated by a -G suffix. Please contact factory for more information.*

| Rochester Part Number | AMD Part Number | Package | Temperature |
|-----------------------|-----------------|-------------------|----------------|
| AM27C512-55DC | AM27C512-55DC | CDIP-28 | 0° to +70°C |
| AM27C512-55DC5 | AM27C512-55DC5 | CDIP-28 | 0° to +70°C |
| AM27C512-55DCB | AM27C512-55DCB | CDIP-28 | 0° to +70°C |
| AM27C512-55JC | AM27C512-55JC | LDCC-32, Plastic | 0° to +70°C |
| AM27C512-55JC5 | AM27C512-55JC5 | LDCC-32, Plastic | 0° to +70°C |
| AM27C512-55PC | AM27C512-55PC | PDIP-28 | 0° to +70°C |
| AM27C512-55PC5 | AM27C512-55PC5 | PDIP-28 | 0° to +70°C |
| AM27C512-70DC | AM27C512-70DC | CDIP-28 | 0° to +70°C |
| AM27C512-70DCB | AM27C512-70DCB | CDIP-28 | 0° to +70°C |
| AM27C512-70DI | AM27C512-70DI | CDIP-28 | -40° to +85°C |
| AM27C512-70DIB | AM27C512-70DIB | CDIP-28 | -40° to +85°C |
| AM27C512-70EC | AM27C512-70EC | TSSOP-32, Plastic | 0° to +70°C |
| AM27C512-70EI | AM27C512-70EI | TSSOP-32, Plastic | -40° to +85°C |
| AM27C512-70JC | AM27C512-70JC | LDCC-32, Plastic | 0° to +70°C |
| AM27C512-70JI | AM27C512-70JI | LDCC-32, Plastic | -40° to +85°C |
| AM27C512-90DC | AM27C512-90DC | CDIP-28 | 0° to +70°C |
| AM27C512-90DCB | AM27C512-90DCB | CDIP-28 | 0° to +70°C |
| AM27C512-90DE | AM27C512-90DE | CDIP-28 | -55° to +125°C |
| AM27C512-90DEB | AM27C512-90DEB | CDIP-28 | -55° to +125°C |
| AM27C512-90DI | AM27C512-90DI | CDIP-28 | -40° to +85°C |
| AM27C512-90DIB | AM27C512-90DIB | CDIP-28 | -40° to +85°C |
| AM27C512-90EC | AM27C512-90EC | TSSOP-32, Plastic | 0° to +70°C |
| AM27C512-90EI | AM27C512-90EI | TSSOP-32, Plastic | -40° to +85°C |
| AM27C512-90JC | AM27C512-90JC | LDCC-32, Plastic | 0° to +70°C |
| AM27C512-90JI | AM27C512-90JI | LDCC-32, Plastic | -40° to +85°C |
| AM27C512-90LC | AM27C512-90LC | LLCC-32, Ceramic | 0° to +70°C |
| AM27C512-90LCB | AM27C512-90LCB | LLCC-32, Ceramic | 0° to +70°C |
| AM27C512-90LE | AM27C512-90LE | LLCC-32, Ceramic | -55° to +125°C |
| AM27C512-90LEB | AM27C512-90LEB | LLCC-32, Ceramic | -55° to +125°C |
| AM27C512-90LI | AM27C512-90LI | LLCC-32, Ceramic | -40° to +85°C |
| AM27C512-90LIB | AM27C512-90LIB | LLCC-32, Ceramic | -40° to +85°C |
| AM27C512-90PC | AM27C512-90PC | PDIP-28 | 0° to +70°C |
| AM27C512-90PI | AM27C512-90PI | PDIP-28 | -40° to +85°C |
| AM27C512-120DC | AM27C512-120DC | CDIP-28 | 0° to +70°C |
| AM27C512-120DCB | AM27C512-120DCB | CDIP-28 | 0° to +70°C |
| AM27C512-120DE | AM27C512-120DE | CDIP-28 | -55° to +125°C |
| AM27C512-120DEB | AM27C512-120DEB | CDIP-28 | -55° to +125°C |
| AM27C512-120DI | AM27C512-120DI | CDIP-28 | -40° to +85°C |
| AM27C512-120DIB | AM27C512-120DIB | CDIP-28 | -40° to +85°C |
| AM27C512-120EC | AM27C512-120EC | TSSOP-32, Plastic | 0° to +70°C |
| AM27C512-120EI | AM27C512-120EI | TSSOP-32, Plastic | -40° to +85°C |
| AM27C512-120JC | AM27C512-120JC | LDCC-32, Plastic | 0° to +70°C |
| AM27C512-120JI | AM27C512-120JI | LDCC-32, Plastic | -40° to +85°C |
| AM27C512-120LC | AM27C512-120LC | LLCC-32, Ceramic | 0° to +70°C |
| AM27C512-120LCB | AM27C512-120LCB | LLCC-32, Ceramic | 0° to +70°C |

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Rochester Ordering Guide (continued)

| Rochester Part Number | AMD Part Number | Package | Temperature |
|-----------------------|-----------------|-------------------|----------------|
| AM27C512-120LE | AM27C512-120LE | LLCC-32, Ceramic | -55° to +125°C |
| AM27C512-120LEB | AM27C512-120LEB | LLCC-32, Ceramic | -55° to +125°C |
| AM27C512-120LI | AM27C512-120LI | LLCC-32, Ceramic | -40° to +85°C |
| AM27C512-120LIB | AM27C512-120LIB | LLCC-32, Ceramic | -40° to +85°C |
| AM27C512-120PC | AM27C512-120PC | PDIP-28 | 0° to +70°C |
| AM27C512-120PI | AM27C512-120PI | PDIP-28 | -40° to +85°C |
| AM27C512-150DC | AM27C512-150DC | CDIP-28 | 0° to +70°C |
| AM27C512-150DCB | AM27C512-150DCB | CDIP-28 | 0° to +70°C |
| AM27C512-150DE | AM27C512-150DE | CDIP-28 | -55° to +125°C |
| AM27C512-150DEB | AM27C512-150DEB | CDIP-28 | -55° to +125°C |
| AM27C512-150DI | AM27C512-150DI | CDIP-28 | -40° to +85°C |
| AM27C512-150DIB | AM27C512-150DIB | CDIP-28 | -40° to +85°C |
| AM27C512-150EC | AM27C512-150EC | TSSOP-32, Plastic | 0° to +70°C |
| AM27C512-150EI | AM27C512-150EI | TSSOP-32, Plastic | -40° to +85°C |
| AM27C512-150JC | AM27C512-150JC | LDCC-32, Plastic | 0° to +70°C |
| AM27C512-150JI | AM27C512-150JI | LDCC-32, Plastic | -40° to +85°C |
| AM27C512-150LC | AM27C512-150LC | LLCC-32, Ceramic | 0° to +70°C |
| AM27C512-150LCB | AM27C512-150LCB | LLCC-32, Ceramic | 0° to +70°C |
| AM27C512-150LE | AM27C512-150LE | LLCC-32, Ceramic | -55° to +125°C |
| AM27C512-150LEB | AM27C512-150LEB | LLCC-32, Ceramic | -55° to +125°C |
| AM27C512-150LI | AM27C512-150LI | LLCC-32, Ceramic | -40° to +85°C |
| AM27C512-150LIB | AM27C512-150LIB | LLCC-32, Ceramic | -40° to +85°C |
| AM27C512-150PC | AM27C512-150PC | PDIP-28 | 0° to +70°C |
| AM27C512-150PI | AM27C512-150PI | PDIP-28 | -40° to +85°C |
| AM27C512-200DC | AM27C512-200DC | CDIP-28 | 0° to +70°C |
| AM27C512-200DCB | AM27C512-200DCB | CDIP-28 | 0° to +70°C |
| AM27C512-200DE | AM27C512-200DE | CDIP-28 | -55° to +125°C |
| AM27C512-200DEB | AM27C512-200DEB | CDIP-28 | -55° to +125°C |
| AM27C512-200DI | AM27C512-200DI | CDIP-28 | -40° to +85°C |
| AM27C512-200DIB | AM27C512-200DIB | CDIP-28 | -40° to +85°C |
| AM27C512-200EC | AM27C512-200EC | TSSOP-32, Plastic | 0° to +70°C |
| AM27C512-200EI | AM27C512-200EI | TSSOP-32, Plastic | -40° to +85°C |
| AM27C512-200JC | AM27C512-200JC | LDCC-32, Plastic | 0° to +70°C |
| AM27C512-200JI | AM27C512-200JI | LDCC-32, Plastic | -40° to +85°C |
| AM27C512-200LC | AM27C512-200LC | LLCC-32, Ceramic | 0° to +70°C |
| AM27C512-200LCB | AM27C512-200LCB | LLCC-32, Ceramic | 0° to +70°C |
| AM27C512-200LE | AM27C512-200LE | LLCC-32, Ceramic | -55° to +125°C |
| AM27C512-200LEB | AM27C512-200LEB | LLCC-32, Ceramic | -55° to +125°C |
| AM27C512-200LI | AM27C512-200LI | LLCC-32, Ceramic | -40° to +85°C |
| AM27C512-200LIB | AM27C512-200LIB | LLCC-32, Ceramic | -40° to +85°C |
| AM27C512-200PC | AM27C512-200PC | PDIP-28 | 0° to +70°C |
| AM27C512-200PI | AM27C512-200PI | PDIP-28 | -40° to +85°C |
| AM27C512-255DC | AM27C512-255DC | CDIP-28 | 0° to +70°C |
| AM27C512-255DCB | AM27C512-255DCB | CDIP-28 | 0° to +70°C |
| AM27C512-255DE | AM27C512-255DE | CDIP-28 | -55° to +125°C |

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Rochester Ordering Guide (continued)

| Rochester Part Number | AMD Part Number | Package | Temperature |
|-----------------------|-----------------|-------------------|----------------|
| AM27C512-255DEB | AM27C512-255DEB | CDIP-28 | -55° to +125°C |
| AM27C512-255DI | AM27C512-255DI | CDIP-28 | -40° to +85°C |
| AM27C512-255DIB | AM27C512-255DIB | CDIP-28 | -40° to +85°C |
| AM27C512-255EC | AM27C512-255EC | TSSOP-32, Plastic | 0° to +70°C |
| AM27C512-255EI | AM27C512-255EI | TSSOP-32, Plastic | -40° to +85°C |
| AM27C512-255JC | AM27C512-255JC | LDCC-32, Plastic | 0° to +70°C |
| AM27C512-255JI | AM27C512-255JI | LDCC-32, Plastic | -40° to +85°C |
| AM27C512-255LC | AM27C512-255LC | LLCC-32, Ceramic | 0° to +70°C |
| AM27C512-255LCB | AM27C512-255LCB | LLCC-32, Ceramic | 0° to +70°C |
| AM27C512-255LE | AM27C512-255LE | LLCC-32, Ceramic | -55° to +125°C |
| AM27C512-255LEB | AM27C512-255LEB | LLCC-32, Ceramic | -55° to +125°C |
| AM27C512-255LI | AM27C512-255LI | LLCC-32, Ceramic | -40° to +85°C |
| AM27C512-255LIB | AM27C512-255LIB | LLCC-32, Ceramic | -40° to +85°C |
| AM27C512-255PC | AM27C512-255PC | PDIP-28 | 0° to +70°C |
| AM27C512-255PI | AM27C512-255PI | PDIP-28 | -40° to +85°C |

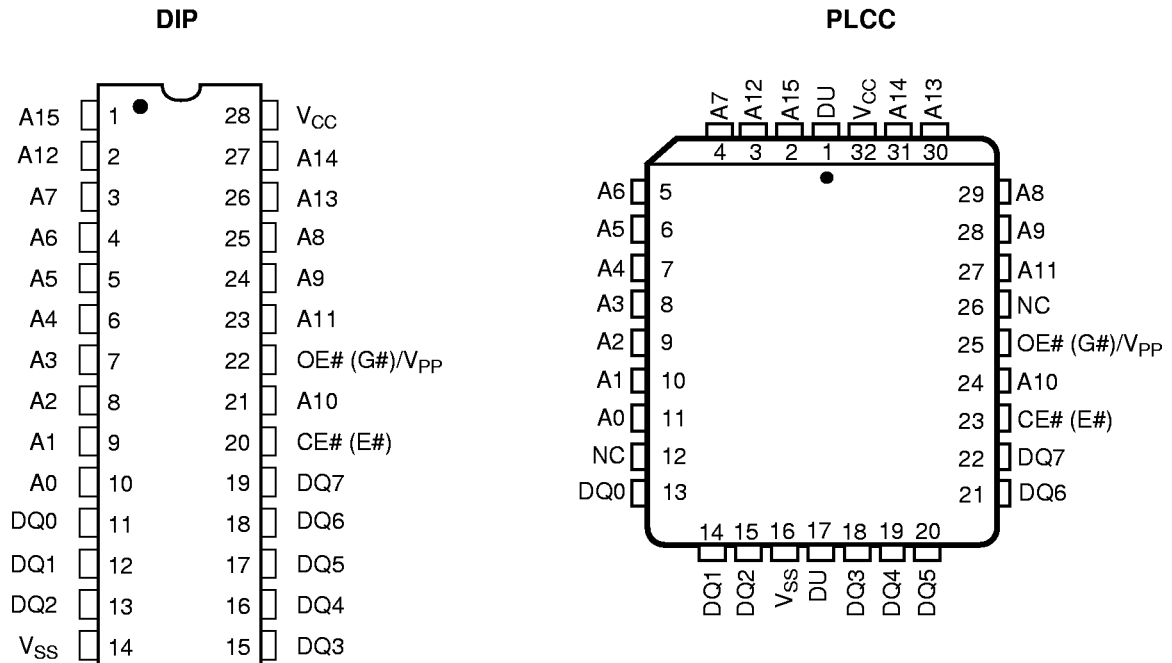
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PRODUCT SELECTOR GUIDE

| Family Part Number | | Am27C512 | | | | | | |
|----------------------|----------------------------------|----------|-----|-----|------|------|------|------|
| Speed Options | $V_{CC} = 5.0\text{ V} \pm 5\%$ | -55 | | | | | | -255 |
| | $V_{CC} = 5.0\text{ V} \pm 10\%$ | -55 | -70 | -90 | -120 | -150 | -200 | |
| Max Access Time (ns) | | 55 | 70 | 90 | 120 | 150 | 200 | 250 |
| CE# (E#) Access (ns) | | 55 | 70 | 90 | 120 | 150 | 200 | 250 |
| OE# (G#) Access (ns) | | 35 | 40 | 40 | 50 | 50 | 50 | 50 |

CONNECTION DIAGRAMS

Top View



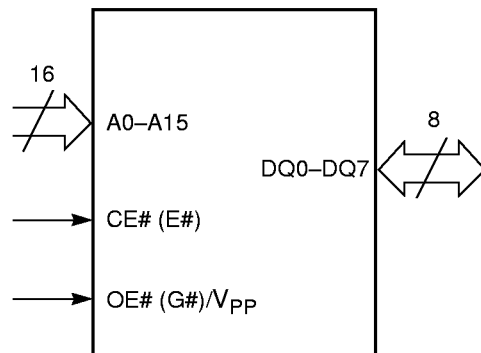
Notes:

1. JEDEC nomenclature is in parenthesis.
2. Don't use (DU) for PLCC.

PIN DESIGNATIONS

- A0–A15 = Address Inputs
- CE# (E#) = Chip Enable Input
- DQ0–DQ7 = Data Input/Outputs
- OE# (G#)/ V_{PP} = Output Enable Input
Program Voltage Input
- V_{CC} = V_{CC} Supply Voltage
- V_{SS} = Ground
- NC = No Internal Connection

LOGIC SYMBOL



ABSOLUTE MAXIMUM RATINGS

| | |
|---|----------------------------|
| Storage Temperature | |
| OTP Products | −65°C to +125°C |
| All Other Products | −65°C to +150°C |
| Ambient Temperature | |
| with Power Applied | −55°C to +125°C |
| Voltage with Respect to V_{SS} (Note 1) | |
| All pins except A9, V_{PP} , V_{CC} | −0.6 V to $V_{CC} + 0.6$ V |
| A9 and V_{PP} (Note 2) | −0.6 V to 13.5 V |
| V_{CC} | −0.6 V to 7.0 V |

Notes:

1. Minimum DC voltage on input or I/O pins −0.5 V. During voltage transitions, the input may overshoot V_{SS} to −2.0 V for periods of up to 20 ns. Maximum DC voltage on input and I/O pins is $V_{CC}+0.5$ V. During voltage transitions, input and I/O pins may overshoot to $V_{CC} + 2.0$ V for periods up to 20 ns.
2. Minimum DC input voltage on A9 is −0.5 V. During voltage transitions, A9 and V_{PP} may overshoot V_{SS} to −2.0 V for periods of up to 20 ns. A9 and V_{PP} must not exceed +13.5 V at any time.

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure of the device to absolute maximum ratings for extended periods may affect device reliability.

OPERATING RANGES

Commercial (C) Devices

Ambient Temperature (T_A) 0°C to +70°C

Industrial (I) Devices

Ambient Temperature (T_A) −40°C to +85°C

Extended (E) Devices

Ambient Temperature (T_A) −55°C to +125°C

Supply Read Voltages

V_{CC} for ± 5% devices +4.75 V to +5.25 V

V_{CC} for ± 10% devices +4.50 V to +5.50 V

Operating ranges define those limits between which the functionality of the device is guaranteed.

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DC CHARACTERISTICS over operating range (unless otherwise specified)

| Parameter Symbol | Parameter Description | Test Conditions | Min | Max | Unit |
|------------------|----------------------------------|--|-------------|----------------|---------|
| V_{OH} | Output HIGH Voltage | $I_{OH} = -400 \mu A$ | 2.4 | | V |
| V_{OL} | Output LOW Voltage | $I_{OL} = 2.1 \text{ mA}$ | | 0.45 | V |
| V_{IH} | Input HIGH Voltage | | 2.0 | $V_{CC} + 0.5$ | V |
| V_{IL} | Input LOW Voltage | | -0.5 | +0.8 | V |
| I_{LI} | Input Load Current | $V_{IN} = 0 \text{ V to } V_{CC}$ | | 1.0 | μA |
| I_{LO} | Output Leakage Current | $V_{OUT} = 0 \text{ V to } V_{CC}$ | C/I Devices | 1.0 | μA |
| | | | E Devices | 5.0 | |
| I_{CC1} | V_{CC} Active Current (Note 2) | $CE\# = V_{IL}$, $f = 10 \text{ MHz}$, $I_{OUT} = 0 \text{ mA}$ | | 25 | mA |
| I_{CC2} | V_{CC} TTL Standby Current | $CE\# = V_{IH}$ | | 1.0 | mA |
| I_{CC3} | V_{CC} CMOS Standby Current | $CE\# = V_{CC} \pm 0.3 \text{ V}$ | | 100 | μA |

Caution: The device must not be removed from (or inserted into) a socket when V_{CC} or V_{PP} is applied.

Notes:

- V_{CC} must be applied simultaneously or before V_{PP} and removed simultaneously or after V_{PP}
- I_{CC1} is tested with $OE\# = V_{IH}$ to simulate open outputs.
- Minimum DC Input Voltage is -0.5 V . During transitions, the inputs may overshoot to -2.0 V for periods less than 20 ns . Maximum DC Voltage on output pins is $V_{CC} + 0.5 \text{ V}$, which may overshoot to $V_{CC} + 2.0 \text{ V}$ for periods less than 20 ns .

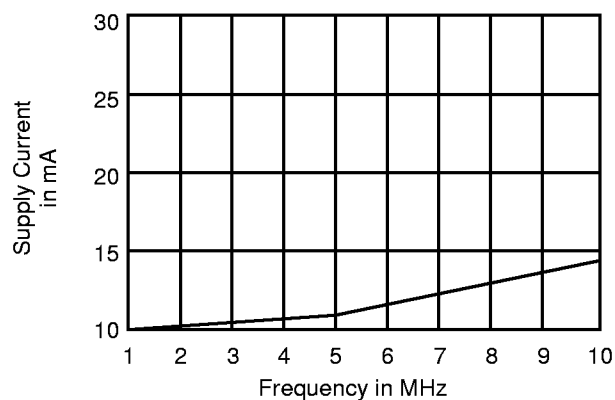


Figure 1. Typical Supply Current vs. Frequency
 $V_{CC} = 5.5 \text{ V}$, $T = 25^\circ\text{C}$

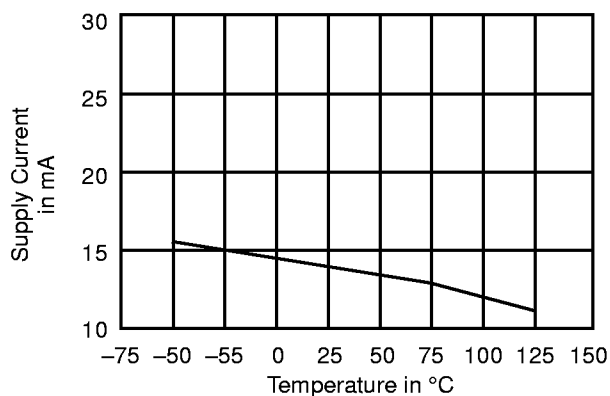
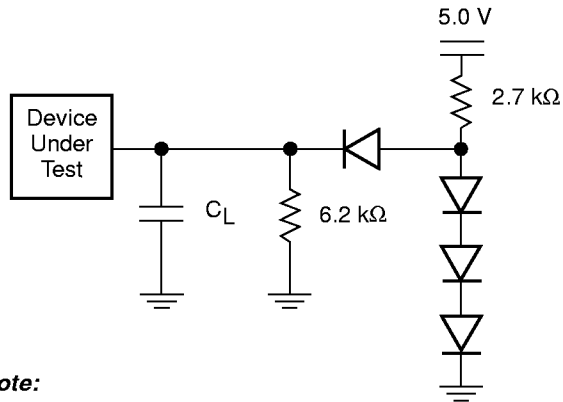


Figure 2. Typical Supply Current vs. Temperature
 $V_{CC} = 5.5 \text{ V}$, $f = 10 \text{ MHz}$

TEST CONDITIONS



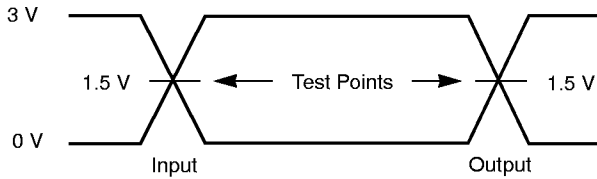
Note:
Diodes are IN3064 or equivalents.

Figure 3. Test Setup

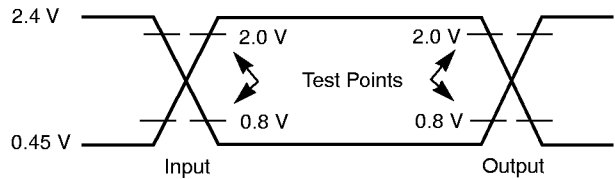
Table 1. Test Specifications

| Test Condition | -55 | All others | Unit |
|--|------------|------------|------|
| Output Load | 1 TTL gate | | |
| Output Load Capacitance, C_L (including jig capacitance) | 30 | 100 | pF |
| Input Rise and Fall Times | ≤ 20 | | ns |
| Input Pulse Levels | 0.0–3.0 | 0.45–2.4 | V |
| Input timing measurement reference levels | 1.5 | 0.8, 2.0 | V |
| Output timing measurement reference levels | 1.5 | 0.8, 2.0 | V |

SWITCHING TEST WAVEFORM



Note: For $C_L = 30$ pF.



Note: For $C_L = 100$ pF.

KEY TO SWITCHING WAVEFORMS

| WAVEFORM | INPUTS | OUTPUTS |
|----------|----------------------------------|--|
| | Steady | |
| | Changing from H to L | |
| | Changing from L to H | |
| | Don't Care, Any Change Permitted | Changing, State Unknown |
| | Does Not Apply | Center Line is High Impedance State (High Z) |

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AC CHARACTERISTICS

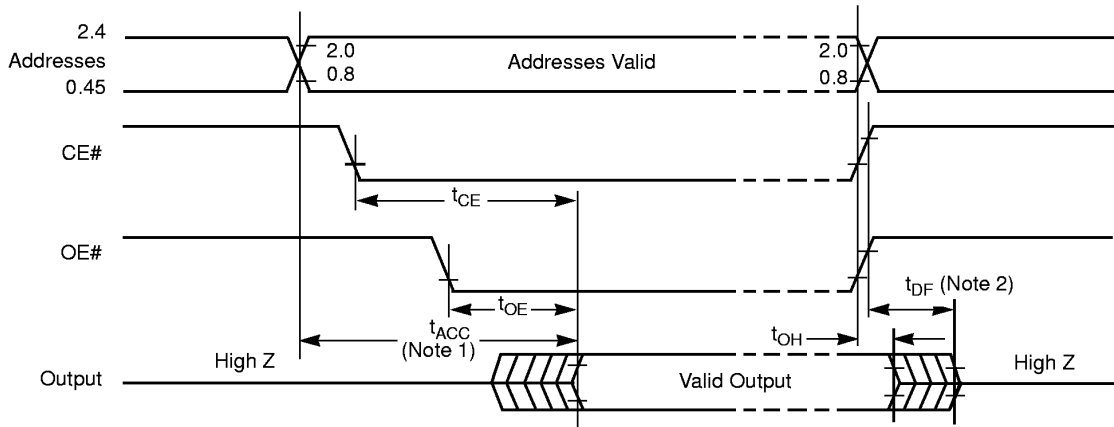
| Parameter Symbols | | Description | Test Setup | Am27C512 | | | | | | | Unit | |
|--------------------------|----------------------|---|---------------------|----------|-----|-----|------|------|------|------|------|----|
| JEDEC | Standard | | | -55 | -70 | -90 | -120 | -150 | -200 | -255 | | |
| t_{AVQV} | t_{ACC} | Address to Output Delay | CE#, OE# = V_{IL} | Max | 55 | 70 | 90 | 120 | 150 | 200 | 250 | ns |
| t_{ELQV} | t_{CE} | Chip Enable to Output Delay | OE# = V_{IL} | Max | 55 | 70 | 90 | 120 | 150 | 200 | 250 | ns |
| t_{GLQV} | t_{OE} | Output Enable to Output Delay | CE# = V_{IL} | Max | 35 | 40 | 40 | 50 | 50 | 75 | 75 | ns |
| t_{EHQZ} t_{GHQZ} | t_{DF} (Note 2) | Chip Enable High or Output Enable High to Output High Z, Whichever Occurs First | | Max | 25 | 25 | 25 | 30 | 30 | 30 | 30 | ns |
| t_{AXQX} | t_{OH} | Output Hold Time from Addresses, CE# or OE#, Whichever Occurs First | | Min | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ns |

Caution: Do not remove the device from (or insert it into) a socket or board that has V_{PP} or V_{CC} applied.

Notes:

- V_{CC} must be applied simultaneously or before V_{PP} and removed simultaneously or after V_{PP} .
- This parameter is sampled and not 100% tested.
- Switching characteristics are over operating range, unless otherwise specified.
- See Figure 3 and Table 1 for test specifications.

SWITCHING WAVEFORMS



Notes:

- OE# may be delayed up to $t_{ACC} - t_{OE}$ after the falling edge of the addresses without impact on t_{ACC} .
- t_{DF} is specified from OE# or CE#, whichever occurs first.

PACKAGE CAPACITANCE

| Parameter Symbol | Parameter Description | Test Conditions | CDV028 | | PL 032 | | PD 028 | | Unit |
|------------------|-----------------------|-----------------|--------|-----|--------|-----|--------|-----|------|
| | | | Typ | Max | Typ | Max | Typ | Max | |
| C_{IN} | Input Capacitance | $V_{IN} = 0$ | 10 | 12 | 9 | 12 | 6 | 10 | pF |
| C_{OUT} | Output Capacitance | $V_{OUT} = 0$ | 10 | 13 | 9 | 12 | 6 | 10 | pF |

Notes:

- This parameter is only sampled and not 100% tested.
- $T_A = +25^\circ\text{C}$, $f = 1\text{ MHz}$.

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