53/63S281/A

High Performance 256x8 PROM TiW PROM Family

Advanced Micro Devices

FEATURES/BENEFITS

- **28-ns maximum access time**
- **Reliable titanium-tungsten fuses (TiW) guarantee greater than 98% programming yields**
- **Low-voltage generic programming**
- **PNP inputs for low input current**
- **Three-state outputs**

APPLICATIONS

- **Microprogram control store**
- **Microprocessor program store**
- **Look-up table**
- **Character generator**
- **Code converter**
- **Programmable Logic Element (PLE™) with 8 Inputs, 8 Outputs, and 256 product terms**

GENERAL DESCRIPTION

The 53/63S281/A are 256x8 bipolar PROMs featuring low input current PNP inputs, full Schottky clamping, and three-state outputs. The titanium-tungsten fuses store a logical low and are programmed to the high state. Special on-chip circuitry and extra fuses provide preprogramming testing which assures high programming yields and high reliability.

The 63 series is specified for operation over the commercial temperature and voltage range. The 53 series is specified for the military ranges.

PROGRAMMING

The 53/63S281/A PROMs are programmed with the same programming algorithm as all other Advanced Micro Devices generic TiW PROMs. For details contact the factory.

SELECTION GUIDE

Memory			Package		Performance	Part Number	
Size	Organization	Output	Pins	Type		0°C to +75°C	–55°C to +125°C
32K	4096x8	TS	24 (28)	CD 024 PD 024 CFM 024 PL 028 CL 028	Standard	63S3281	53S3281
					Enhanced	63S3281A	53S3281A
					Super Speed	—	53S3281B

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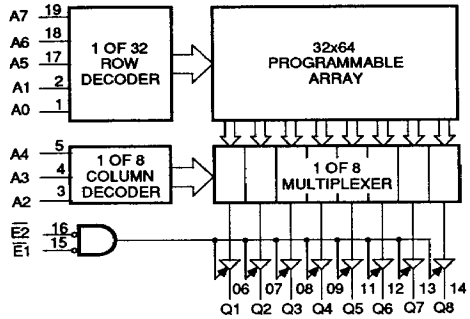
BLOCK DIAGRAM
DIP Pinout



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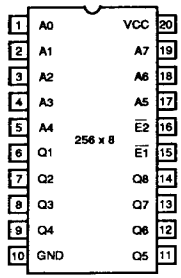
PIN CONFIGURATIONS



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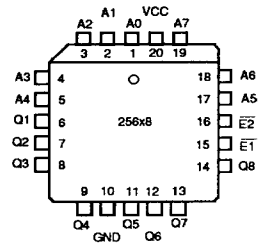

Plastic Chip Carrier

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Note: LCC pinout identical to PLCC.

ABSOLUTE MAXIMUM RATINGS

	Operating	Programming
Supply voltage V_{CC}	−0.5 V to 7 V	12 V
Input voltage	−1.5 V to 7 V	7 V
Input current	−30 mA to +5 mA	
Off-state output voltage	−0.5 V to 5.5 V	12 V
Storage temperature	−65°C to +150°C	

Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only, and 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 to Absolute Maximum Rating conditions for extended periods of time may affect reliability. Absolute Maximum Ratings are for system design reference; parameters given are not tested.

Operating Conditions

Symbol	Parameter	Military†			Commercial			Unit
		Min.	Nom.	Max.	Min.	Nom.	Max.	
V_{CC}	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
T_A	Operating temperature*	−55		125	0		75	°C

* *This is defined as the instant-on case temperature.*

† *Military burn-in is in accordance with the current revision of MIL-STD-883, Test Method 1015, Conditions A through E. Test conditions are selected at AMD's option.*

DC Electrical Characteristics Over Operating Conditions. For APL Products, Group A, Subgroups 1, 2, 3 are tested unless otherwise noted.

Symbol	Parameter	Test Conditions			Min.	Typ.†	Max	Unit
V_{IL}	Low-level input voltage**						0.8	V
V_{IH}	High-level input voltage**				2			V
V_{IC}	Input clamp voltage	V_{CC} = MIN	I_I = −18 mA				−1.5	V
I_{IL}	Low-level input current	V_{CC} = MAX	V_I = 0.4 V				−0.25	mA
I_{IH}	High-level input current	V_{CC} = MAX	V_I = V_{CC} MAX				40	µA
V_{OL}	Low-level output voltage	V_{CC} = MIN	I_{OL} = 16 mA	Com			0.45	V
				Mil			0.5	
V_{OH}	High-level output voltage	V_{CC} = MIN	Com	I_{OH} = −3.2 mA	2.4			V
			Mil	I_{OH} = −2 mA				
I_{OZL}	Off-state output current	V_{CC} = MAX	V_O = 0.4 V				−40	µA
I_{OZH}			V_O = 2.4 V				40	
I_{OS}	Output short-circuit current*	V_{CC} = 5 V	V_O = 0 V		−20		−90	mA
I_{CC}	Supply current	V_{CC} = MAX. All inputs grounded. All outputs open.				90	140	mA

* *Not more than one output should be shorted at a time and duration of the short-circuit should not exceed one second.*

** *V_{IL} and V_{IH} are input conditions of output tests and are not themselves directly tested. V_{IL} and V_{IH} are absolute voltages with respect to device ground and include all overshoots due to system and/or tester noise. Do not attempt to test these values without suitable equipment.*

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Switching Characteristics Over Operating Conditions (See standard test load). For APL Products, Group A, Subgroups 9, 10, 11 are tested unless otherwise noted.††

Operating Conditions	Device Type	t_{AA} (ns) Address Access Time		t_{EA} AND t_{ER} (ns) Enable Access Time Recovery Time		Unit
		Typ.†	Max.	Typ.†	Max.	
Commercial	63S281A	21	28	18	25	ns
	63S281	21	45	18	25	
Military	53S281A	21	40	18	30	
	53S281	21	50	18	30	

† Typicals at 5.0 V V_{CC} and 25°C T_A.

†† Subgroups 7 and 8 apply to Functional tests.

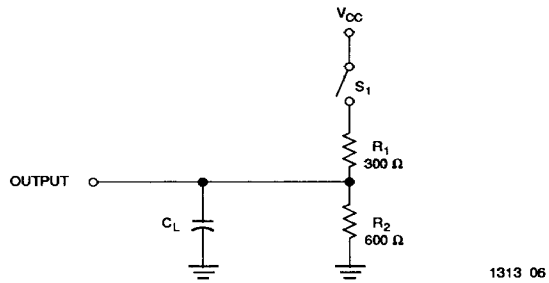

Figure 3. Switching Test Load

WAVEFORM	INPUTS	OUTPUTS
	DON'T CARE: CHANGE PERMITTED	CHANGING: STATE UNKNOWN
	NOT APPLICABLE	CENTER LINE IS HIGH IMPEDANCE STATE
	MUST BE STEADY	WILL BE STEADY

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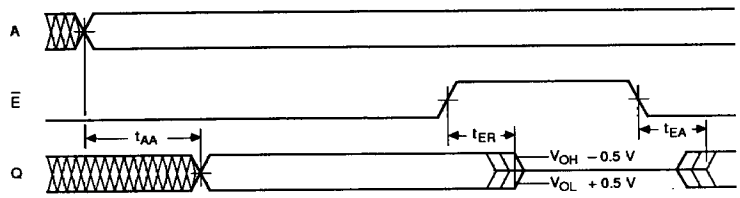
Figure 4. Definition of Timing Diagram



NOTES:
1. INPUT PULSE AMPLITUDE 0 V TO 3.0 V.
2. INPUT RISE AND FALL TIMES 2–5 ns FROM 0.8 V TO 2.0 V.
3. INPUT ACCESS MEASURED AT THE 1.5 V LEVEL.
4. t_{AA} IS TESTED WITH SWITCH S_1 CLOSED. C_L = 30 pF AND MEASURED AT 1.5 V OUTPUT LEVEL.
5. t_{EA} IS MEASURED AT THE 1.5 V OUTPUT LEVEL WITH C_L = 30 pF. S_1 IS OPEN FOR HIGH IMPEDANCE TO "1" TEST, AND CLOSED FOR HIGH IMPEDANCE TO "0" TEST.
   t_{ER} IS TESTED WITH C_L = 5 pF. S_1 IS OPEN FOR "1" TO HIGH IMPEDANCE TEST, MEASURED AT V_{OH} – 0.5 V OUTPUT LEVEL; S_1 IS CLOSED FOR "0" TO HIGH IMPEDANCE TEST, MEASURED AT V_{OL} + 0.5 V OUTPUT LEVEL.

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Figure 5. Definition of Waveforms

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