

High Performance 1024x4 PROM TiW PROM Family

53/63S440
53/63S441
53/63S441A

Features/Benefits

- 35 ns maximum access time
- **Reliable titanium-tungsten fuses (TiW)** guarantees greater than 98% programming yields
- Low-voltage generic programming
- Pin-compatible with standard Schottky PROMs
- PNP inputs for low input current
- Open collector and three-state outputs

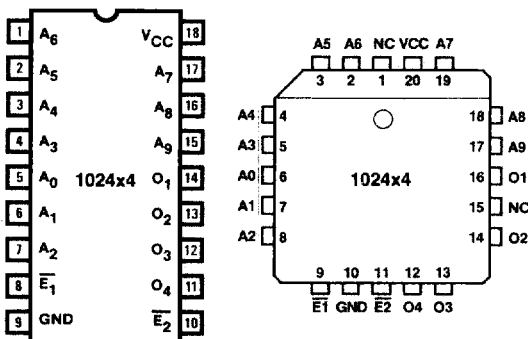
Applications

- Microprogram control stores
- Microprocessor program store
- Look-up table
- Character generator
- Code converter
- Programmable logic element (PLE™) 10 inputs, 4 outputs, 1024 product terms

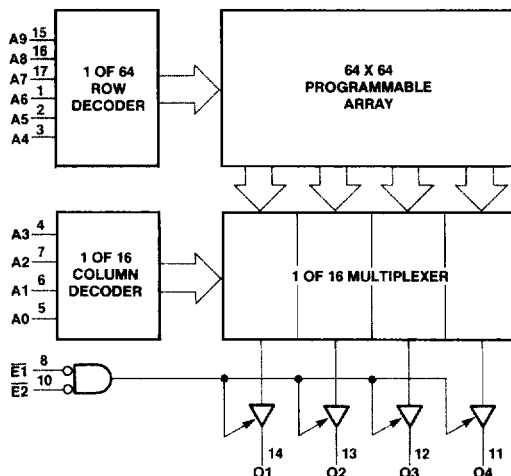
Selection Guide

MEMORY		PACKAGE		OUTPUT	PERFORMANCE	PART NUMBER	
SIZE	ORGANIZATION	PINS	TYPE			0°C to +75°C	-55°C to +125°C
4 K	1024x4	18 (20)	N,J,F,W, (NL),(L)	TS	Enhanced	63S441A	53S441A
				TS	Standard	63S441	53S441
				OC		63S440	53S440

Pin Configuration



Block Diagram



Description

The 53/63S440 and 53/63S441/A are 1024x4 bipolar PROMs featuring low input current PNP inputs, full Schottky clamping with open collector or 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 53/63S440 and 53/63S441/A PROMs are programmed with the same programming algorithm as all other Monolithic Memories' generic TiW PROMs. For details contact the factory.

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Monolithic Memories 

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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° to +150°C	

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 free-air temperature	-55		125	0		75	°C

Electrical Characteristics Over Operating Conditions

SYMBOL	PARAMETER	TEST CONDITION			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	$V_{CC} = \text{MIN}$	$I_I = -18 \text{ mA}$			-1.5		V
I_{IL}	Low-level input current	$V_{CC} = \text{MAX}$	$V_I = 0.4 \text{ V}$			-0.25		mA
I_{IH}	High-level input current	$V_{CC} = \text{MAX}$	$V_I = V_{CC} \text{ MAX}$			40		μA
V_{OL}	Low-level output voltage	$V_{CC} = \text{MIN}$	$I_{OL} = 16 \text{ mA}$	MIL		0.5		V
				COM		0.45		
V_{OH}	High-level output voltage*	$V_{CC} = \text{MIN}$	MIL $I_{OH} = -2 \text{ mA}$		2.4			V
			COM $I_{OH} = -3.2 \text{ mA}$					
I_{OZL}	Off-state output current*	$V_{CC} = \text{MAX}$	$V_O = 0.4 \text{ V}$			-40		μA
I_{OZH}			$V_O = 2.4 \text{ V}$			40		
I_{CEX}	Open collector output current	$V_{CC} = \text{MAX}$	$V_O = 2.4 \text{ V}$			40		μA
			$V_O = 5.5 \text{ V}$			100		
I_{OS}	Output short-circuit current**	$V_{CC} = 5 \text{ V}$	$V_O = 0 \text{ V}$		-20		-90	mA
I_{CC}	Supply current	$V_{CC} = \text{MAX}$ All inputs grounded. All outputs open.			95	140		mA

Switching Characteristics Over Operating Conditions (See standard test load)

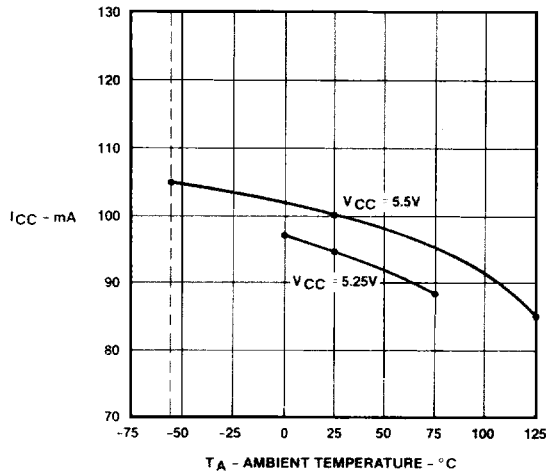
OPERATING CONDITIONS	DEVICE TYPE	t_{AA} (ns) ADDRESS ACCESS TIME		t_{EA} AND t_{ER} (ns) ENABLE ACCESS TIME RECOVERY TIME		UNIT
		TYP†	MAX	TYP†	MAX	
COMMERCIAL	63S441A	24	35	16	25	ns
	63S440, 63S441	24	45	16	25	
MILITARY	53S441A	24	50	16	30	
	53S440, 53S441	24	55	16	30	

* Three-state only.

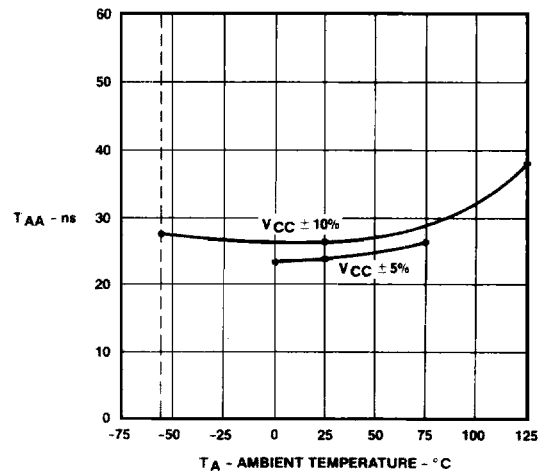
** Not more than one output should be shorted at a time and duration of the short-circuit should not exceed one second.

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

Typical I_{CC} vs Temperature

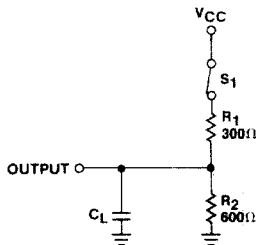


Typical T_{AA} vs Temperature



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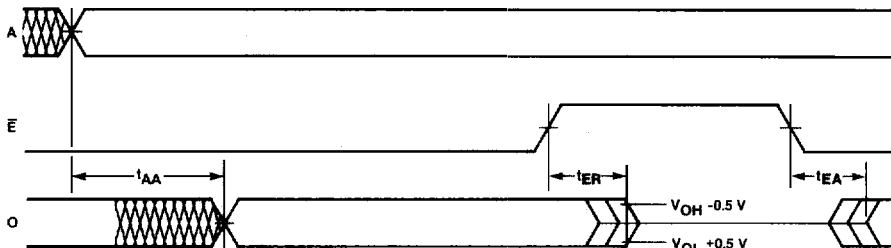
Switching Test Load



Definition of Timing Diagram

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

Definition of Waveforms



- 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} and t_{EA} are tested with switch S_1 closed, $C_L = 30$ pF and measured at 1.5 V output level.
 5. t_{ER} is tested with $C_L = 5$ pF and S_1 closed. "1" to high-impedance test is measured at $V_{OH} - 0.5$ V output level, "0" to high-impedance test is measured at $V_{OL} + 0.5$ V output level.

Commercial Programmers

Monolithic Memories PROMs are designed and tested to give a programming yield greater than 98%. If your programming yield is lower, check your programmer. It may not be properly calibrated.

Programming is final manufacturing — it must be quality-controlled. Equipment must be calibrated as a regular routine,

ideally under the actual conditions of use. Each time a new board or a new programming module is inserted, the whole system should be checked. Both timing and voltages must meet published specifications for the device.

Remember — The best PROMs available can be made unreliable by improper programming techniques.

PROM PROGRAMMING EQUIPMENT INFORMATION

SOURCE AND LOCATION

Data I/O Corp.
10525 Willows Rd. N.E.
Redmond, WA 98073

Kontron Electronics, Inc.
630 Price Ave.
Redwood City, CA 94063

Digelec Inc.
586 Weddell Dr. Suite 1
Sunnyvale, CA 94089

Stag Microsystems Inc.
528-5 Weddell Dr.
Sunnyvale, CA 94089

Die Configuration

