

High Performance 256x4 PROM TiW PROM Family

53/63S140 53/63S141 53/63S141A

Features/Benefits

- 30 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 or three-state outputs

Applications

- Microprogram control store
- Microprocessor program store
- Look-up table
- Character generator
- Code converter
- Programmable Logic Element (PLE™) with 8 inputs, 4 outputs, and 256 product terms per output

Description

The 53/63S140 and 53/63S141/A are 256x4 bipolar PROMs featuring low input current PNP inputs, full Schottky clamping, and 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.

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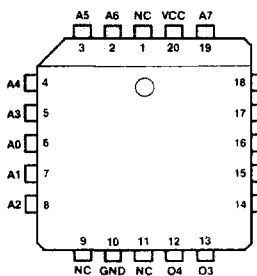
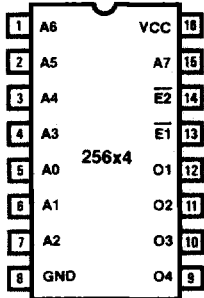
Programming

The 53/63S140 and 53/63S141/A PROMs are programmed with the same programming algorithm as all other Monolithic Memories' generic TiW PROMs. For details contact the factory.

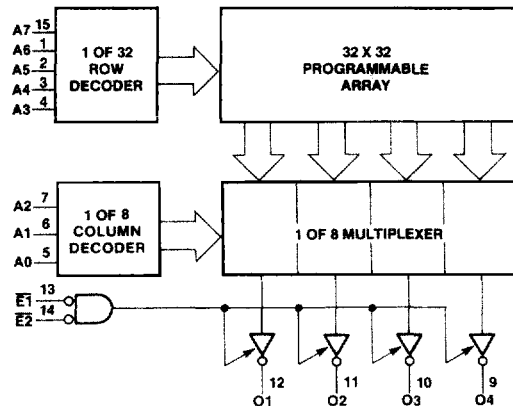
Selection Guide

MEMORY		PACKAGE		OUTPUT	PERFORMANCE	PART NUMBER	
SIZE	ORGANIZATION	PINS	TYPE			0°C to +75°C	-55°C to +125°C
1K	256x4	16 (20)	N,J, (NL),(L), W,F	TS	Enhanced	63S141A	53S141A
					Standard	63S141	53S141
				OC	Enhanced	63S140	53S140
					Standard	63S140	53S140

Pin Configurations



Block Diagram



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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	$V_{CC} = \text{MIN}$	$I_{OL} = 16 \text{ mA}$	COM	0.45	V	
				MIL	0.5		
V_{OH}	High-level output voltage*	$V_{CC} = \text{MIN}$	COM $I_{OH} = -3.2 \text{ mA}$	2.4		V	
			MIL $I_{OH} = -2 \text{ mA}$				
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.			80	130	mA

Switching Characteristics Over Operating Conditions (See standard test load)

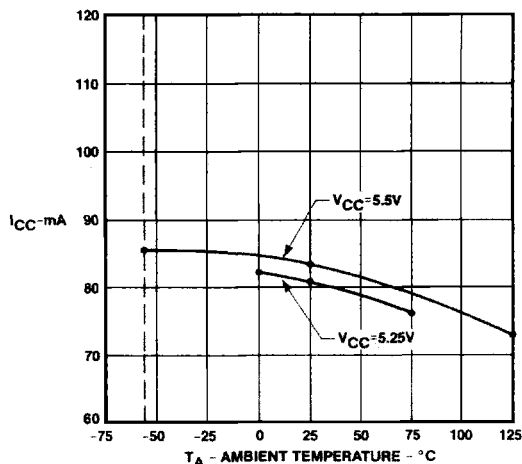
OPERATING CONDITIONS	DEVICE TYPE	t_{AA} (ns) ADDRESS ACCESS TIME		t_{EA} AND t_{ER} (ns) ENABLE ACCESS TIME RECOVERY TIME		UNIT
		TYP†	MAX	TYP†	MAX	
		COMMERCIAL	63S141A	20	30	
	63S140, 63S141	20	45	10	25	
MILITARY	53S141A	20	40	10	25	
	53S140, 53S141	20	55	10	30	

* Three-state only.

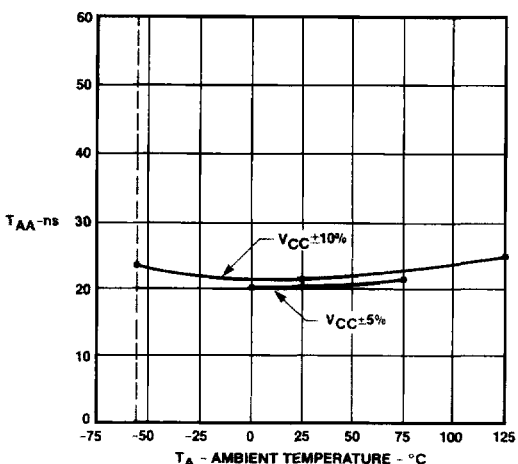
** Not more than one output should be shorted at a time and duration of the short-circuit should not exceed one second.

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

Typical I_{CC} vs Temperature

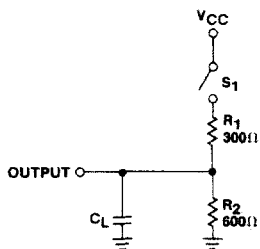


Typical T_{AA} vs Temperature



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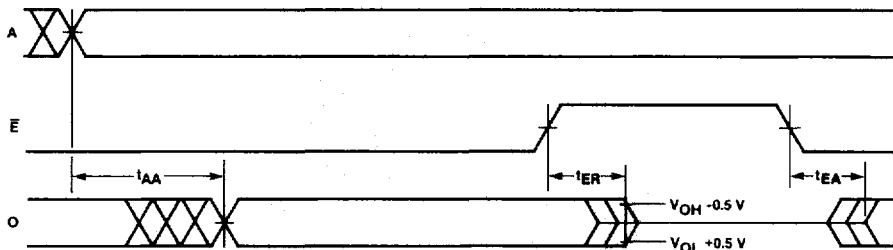
Switching Test Load



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} is tested with switch S_1 closed, $C_L = 30$ pF and measured at 1.5 V output level.
 5. For open collector devices, TEA and TER are measured at the 1.5 V output level with S_1 closed and $C_L = 30$ pF.
 6. For three-state devices, TEA 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.
- TER is tested with $C_L = 50$ 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.

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

Metal Mask Layout

