OCE PROM MEMORY User Manual

OCE28F256X User's Manual

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User Manual

1. DESCRIPTION

The OCE28F256X amorphous silicon anti-fuse PROM is a high performance, asynchronous, radiation-hardened, 32K x 8 programmable memory device. The OCE28F256X PROM features fully asynchronous operation requiring no external clocks or timing strobes. An advanced radiation-hardened twin-well CMOS process technology is used to implement the OCE28F256X. The combination of radiation-hardness, fast access time, and low power consumption make the OCE28F256X ideal for high speed systems designed for operation in radiation environments.

2. FEATURES

- Programmable, read-only, asynchronous, radiation-hardened, 32K x 8 memory
  - Supported by industry standard programmer
- 45ns and 40ns maximum address access time (-55 ℃ to 125℃)
- TTL compatible input and TTL/CMOS compatible output levels
- Three-state data bus
- Low operating and standby current
  - Operating: 125mA maximum @25MHz
  - Standby: 2mA maximum
- VDD: 5.0 volts + 10%
- Radiation-hardened process and design; total dose irradiation testing to MIL-STD-883, Method 1019
  - Total dose: 1E5 rad(Si)
  - SUE: > 37.3MeV-cm^2/mg
  - SEL: > 75 MeV-cm^2/mg
  - AC and DC testing at factory
- Packaging options:
  - 28-lead 50-mil center flatpack (0.490 x 0.74)

3. BLOCK DIAGRAM

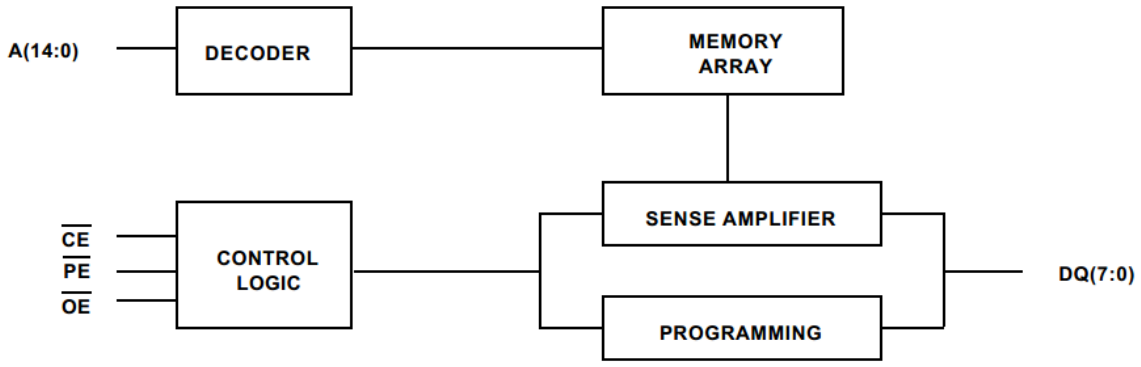


Figure 1 –PROM Block Diagram

4. DEVICE OPERATION

The OCE28F256X has three control inputs: Chip Enable (#CE), Program Enable (#PE), and Output Enable (#OE); fifteen address inputs, A(14:0); and eight bidirectional data lines, DQ(7:0). #CE is the device enable input that controls chip selection, active, and standby modes. Asserting #CE causes IDD to rise to its active value and decodes the fifteen address inputs to select one of 32,768 words in the memory. #PE controls program and read operations. During a read cycle, OE must be asserted to enable the outputs.

#OE	#PE	#CE	I/O MODE	MODE
X	1	1	Three-state	Standby
0	1	0	Data Out	Read
1	0	0	Data In	Program
1	1	0	Three-state	Read[1]

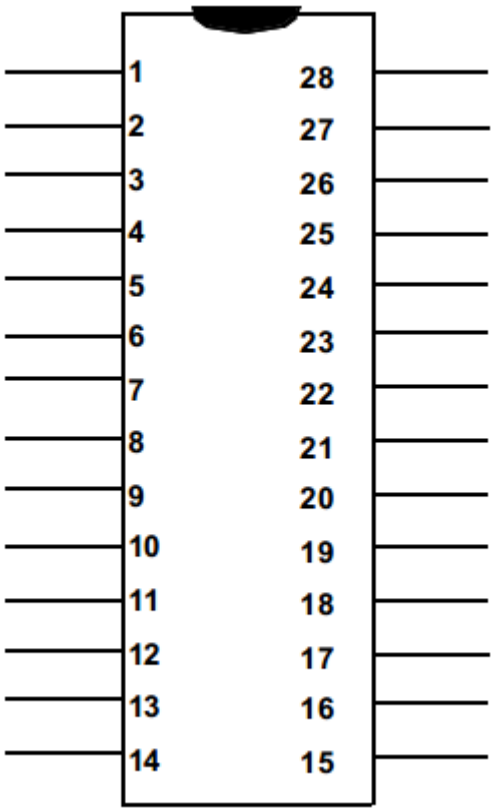
Table 1. Device Operation Truth Table[2]

[1] Device active; outputs disabled.
[2] "X" is defined as a "don't care" condition.

5. PIN ASSIGNEMENT

Symbol	Pin#		Pin#	Symbol
A14	**1**		**28**	V_{DD}
A12	**2**		**27**	#PE
A7	**3**		**26**	A13
A6	**4**		**25**	A8
A5	**5**		**24**	A9
A4	**6**		**23**	A11
A3	**7**		**22**	#OE
A2	**8**		**21**	A10
A1	**9**		**20**	#CE
A0	**10**		**19**	DQ7
DQ0	**11**		**18**	DQ6
DQ1	**12**		**17**	DQ5
DQ2	**13**		**16**	DQ4
V_{SS}	**14**		**15**	DQ3

Table 2– Pin Assignment



Top view

6. PIN DESCRIPTION

Pin	Name
#CE	Chip Enable
#OE	Output Enable
#PE	Program Enable
A0 ~ A14	Address
DQ0~ DQ7	Data input/output
V_{DD}/V_{SS}	Power supply/ground

Table 3 – Pin Description

7. ELECTRICALSPECIFICATIONS

7.1. ABSOLUTEMAXIMUMRATINGS

Parameter	Symbol	Value	Unit
DC supply voltage	V_{DD}	-0.3 to +7.0	V
Voltage on any pin	$V_{I/O}$	-0.5 to (V_{DD} + 0.5)	V
Power Dissipation	P_D	1.5	W

Thermal resistance Junction to case	R_J	3.3	°C/W
DC input current	I_I	±10	mA
Operating temperature	T_A	E：0~ +70 S：-55~ +125	°C
Storage temperature	T_{STG}	-65 to +150	°C

Table 4 –Absolute Maximum Ratings

7.2. Recommended DC Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply voltage	V_{DD}	4.5	—	5.5	V
Case temperature range	T_C	-55	—	+125	°C
High-level input voltage	V_{IH}	2.4	—	—	V
Low-level input voltage	V_{IL}	—	—	0.8	V

Table 5 - Recommended DC Operating Conditions

7.3. DC CHARACTERISTICS

Symbol	Parameter	Condition	Min	Typical	Max	Unit
V_{OL}	Output voltage low level	I_{OL}= 4.0mA, V_{DD} = 4.5V (TTL)	——	-	0.4	V
V_{OH}	Output voltage high level	I_{OH} = -2.0mA, VDD = 4.5V (TTL)	2.4	-	——	V
I_{DD1}(OP)	Supply current operating @25.0MHz (40ns product) @22.2MHz (45ns product)	TTL inputs levels (I_{OUT} = 0), V_{IL} = 0.2V V_{DD}, #PE = 5.5V	——	-	125 117	mA mA
I_{DD2}(SB)	Supply current standby	CMOS input levels V_{IL} = V_{SS}+0.25V CE = V_{DD}- 0.25 V_{IH} = V_{DD} - 0.25V	——	-	2	mA

Table 6 - DC Characteristics

8. READ CYCLE

A combination of #PE greater than V_{IH}(min), and #CE less than V_{IL}(max) defines a read cycle. Read access time is measured from the latter of device enable, output enable, or valid address to valid data output.

An address access read is initiated by a change in address inputs while the chip is enabled with #OE asserted and #PE deasserted. Valid data appears on data output, DQ(7:0), after the specified $t_{AVQV}$is satisfied. Outputs remain active throughout the entire cycle. As long as device enable and output enable are active, the address inputs may change at a rate equal to the minimum read cycle time.

8.1. AC CHARACTERISTICS

(V_{DD} = 5.0V ±10%; -55°C < TC < +125°C)

Symbol	Parameter	Min	Max	Unit

t_{AVAV}	Read cycle time	45	——	ns
t_{AVQV}	Read access time	——	45	ns
t_{AXQX}	Output hold time	0	——	ns
t_{GLQX}	#OE-controlled output enable time	0	——	ns
t_{GLQV}	#OE-controlled access time	——	15	ns
t_{GHQZ}	#OE-controlled output three-state time	——	15	ns
t_{ELQX}	#CE-controlled output enable time	0		ns
t_{ELQV}	#CE-controlled access time	——	45	ns
t_{EHQZ}	#CE-controlled output three-state time	——	15	ns

Table 7 - ACCharacteristics

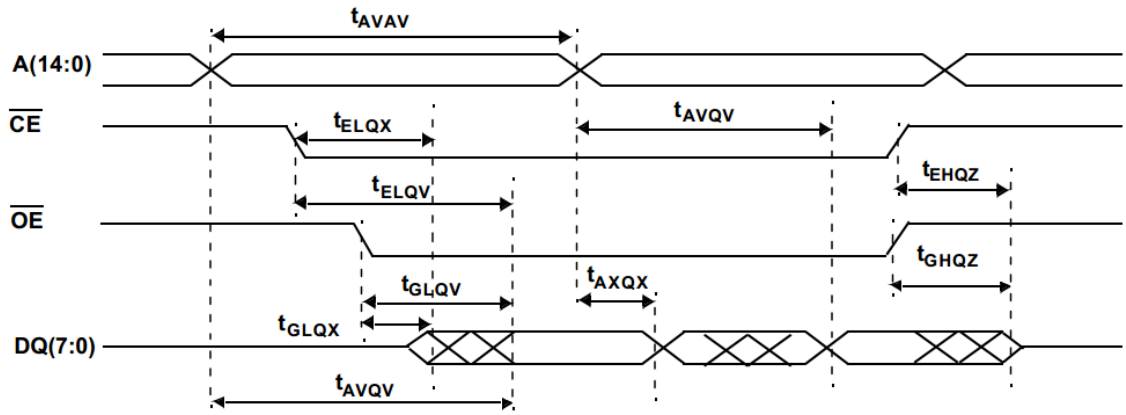


Figure 2-PROM Read Cycle

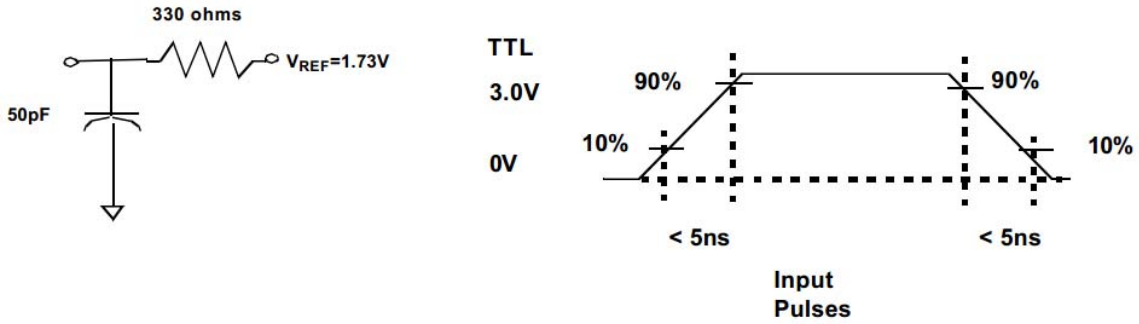


Figure 3-AC Test Loads and Input Waveforms

9. ORDERING INFORMATION

Part numbering:

1	2	3
OCE	**28F256**	**E**

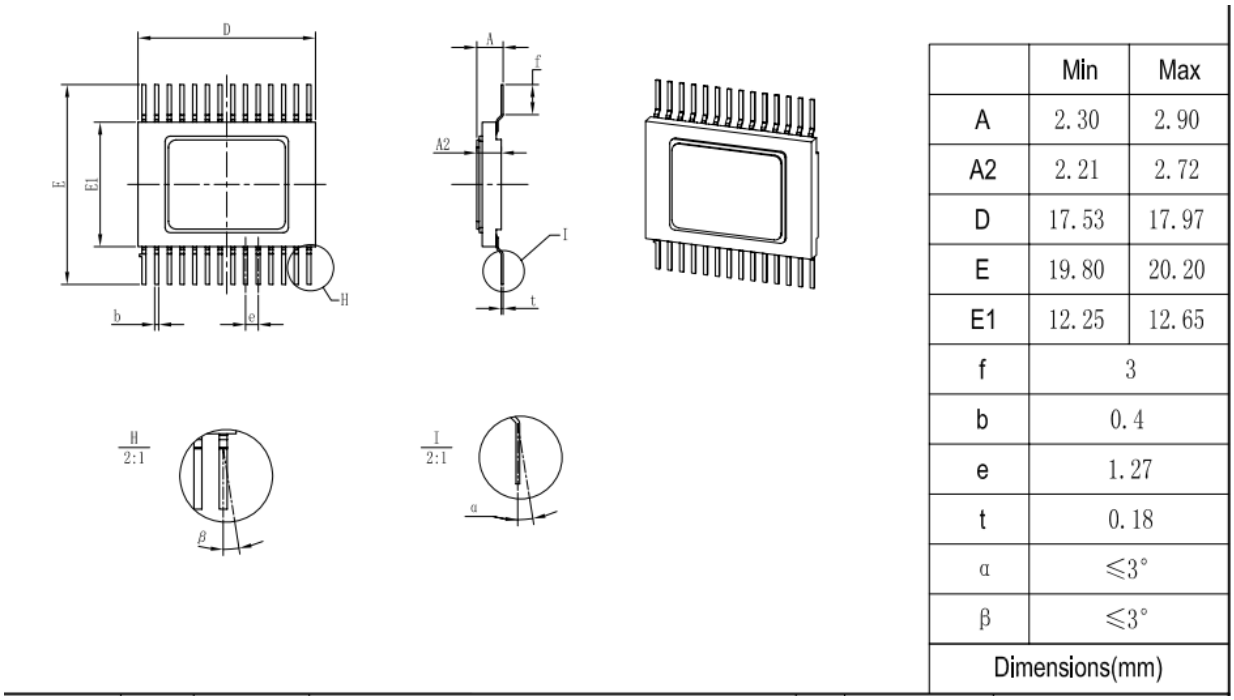
28F256:32Kx8 One Time Programmable PROM

Quality:E= Sample, 0～70℃, Generic Radiation Data Available; S= Space,-55~+125℃, Radiation Data Tested

Part Number	Capacity (bit)	Radiation			Bus Width (bit)	Temp range (℃)	Quality Flow
		TID[3]	SEL[4]	SEU[5]			
OCE28F256E	256k	-	-	-	8	0~+70	Sample
OCE28F256S	256k	1E5	>75	37.3	8	-55~+125	Space

Table 8 –Part numbers

10. PACKAGE TYPE AND DIMENSIONS



	Min	Max
A	2.30	2.90
A2	2.21	2.72
D	17.53	17.97
E	19.80	20.20
E1	12.25	12.65
f	3	
b	0.4	
e	1.27	
t	0.18	
α	≤3°	
β	≤3°	
Dimensions(mm)		

Figure 4–Mechanical outlines

[3] TID: Total Dose（Krads(Si)）
[4] SEL:LET Threshold（Mev.cm2/mg）
[5] SEU:SEU Threshold（Mev.cm2/mg）

11. REVISIONHISTORY

Revision	Date	Description of Change
A0	Mar,13,2018	First created.

Table 9 –Revision history