

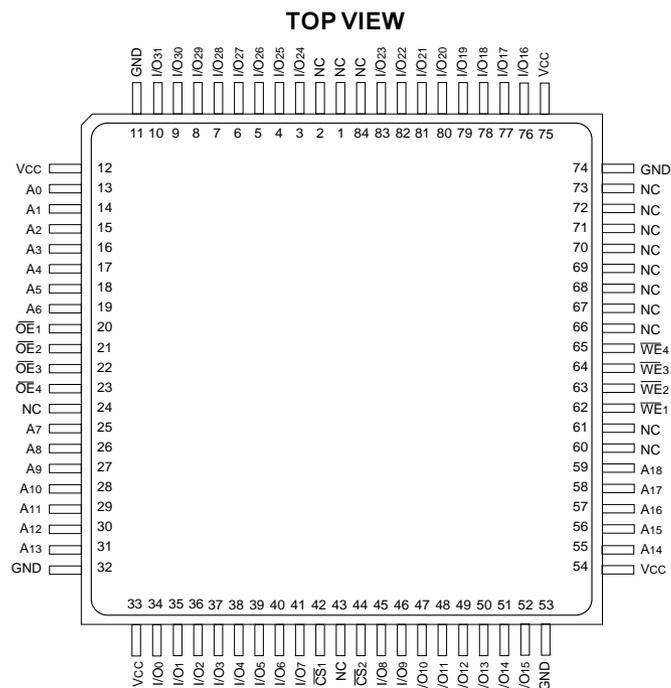
# 1Mx32 SRAM 3.3V MODULE PRELIMINARY\*

## FEATURES

- Access Times of 17, 20, 25ns
- 84 lead, 28mm CQFP, (Package 511)
- Organized as two banks of 512Kx32, User Configurable as 2Mx16 or 4Mx8
- Commercial, Industrial and Military Temperature Ranges
- TTL Compatible Inputs and Outputs
- 3.3 Volt Power Supply
- Low Power CMOS
- Built-in Decoupling Caps and Multiple Ground Pins for Low Noise Operation
- Weight  
WS1M32V-XG3X - 20 grams typical

\* This data sheet describes a product under development, not fully characterized, and is subject to change without notice.

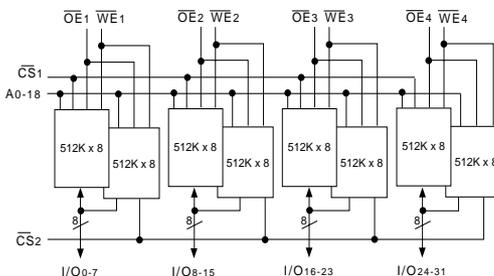
### PIN CONFIGURATION FOR WS1M32V-XG3X



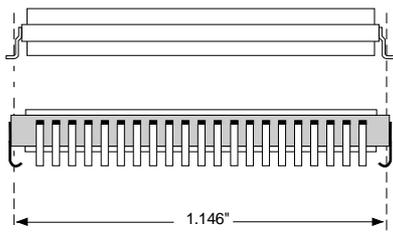
### PIN DESCRIPTION

I/O0-31	Data Inputs/Outputs
A0-18	Address Inputs
$\overline{WE}$ 1-4	Write Enables
$\overline{CS}$ 1-2	Chip Selects
$\overline{OE}$ 1-4	Output Enables
Vcc	+3.3V Power Supply
GND	Ground
NC	Not Connected

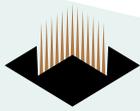
### BLOCK DIAGRAM



NOTE:  $\overline{CS}$ 1 &  $\overline{CS}$ 2 are used as bank select



The WEDC 84 lead G3 CQFP fills the same fit and function as the JEDEC 84 lead CQFJ or 84 PLCC. But the G3 has the TCE and lead inspection advantage of the CQFP form.



## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Operating Temperature	T <sub>A</sub>	-55	125	°C
Storage Temperature	T <sub>STG</sub>	-65	+150	°C
Signal Voltage Relative to GND	V <sub>G</sub>	-0.5	4.6	V
Junction Temperature	T <sub>J</sub>		150	°C
Supply Voltage	V <sub>CC</sub>	-0.5	4.6	V

## TRUTH TABLE

$\overline{CS}$	$\overline{OE}$	$\overline{WE}$	Mode	Data I/O	Power
H	X	X	Standby	High Z	Standby
L	L	H	Read	Data Out	Active
L	X	L	Write	Data In	Active
L	H	H	Out Disable	High Z	Active

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V <sub>CC</sub>	3.0	3.6	V
Input High Voltage	V <sub>IH</sub>	2.2	V <sub>CC</sub> + 0.3	V
Input Low Voltage	V <sub>IL</sub>	-0.3	+0.8	V

## CAPACITANCE (T<sub>A</sub> = +25°C)

Parameter	Symbol	Conditions	Max	Unit
$\overline{OE}$ 1-4 capacitance	COE	V <sub>IN</sub> = 0 V, f = 1.0 MHz	20	pF
$\overline{WE}$ 1-4 capacitance	CWE	V <sub>IN</sub> = 0 V, f = 1.0 MHz	20	pF
$\overline{CS}$ 1-2 capacitance	CCS	V <sub>IN</sub> = 0 V, f = 1.0 MHz	50	pF
Data I/O capacitance	CI/O	V <sub>I/O</sub> = 0 V, f = 1.0 MHz	20	pF
Address input capacitance	CAD	V <sub>IN</sub> = 0 V, f = 1.0 MHz	70	pF

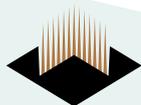
This parameter is guaranteed by design but not tested.

## DC CHARACTERISTICS

(V<sub>CC</sub> = 3.3V ± 0.3V, T<sub>A</sub> = -55°C to +125°C)

Parameter	Sym	Conditions			Units
			Min	Max	
Input Leakage Current	I <sub>LI</sub>	V <sub>IN</sub> = GND to V <sub>CC</sub>		10	μA
Output Leakage Current	I <sub>LO</sub>	$\overline{CS}$ = V <sub>IH</sub> , $\overline{OE}$ = V <sub>IH</sub> , V <sub>OUT</sub> = GND to V <sub>CC</sub>		10	μA
Operating Supply Current (x 32 Mode)	I <sub>CC</sub> x 32	$\overline{CS}$ = V <sub>IL</sub> , $\overline{OE}$ = V <sub>IH</sub> , f = 5MHz, V <sub>CC</sub> = 3.6V		520	mA
Standby Current	I <sub>SB</sub>	$\overline{CS}$ = V <sub>IH</sub> , $\overline{OE}$ = V <sub>IH</sub> , f = 5MHz, V <sub>CC</sub> = 3.6V		400	mA
Output Low Voltage	V <sub>OL</sub>	I <sub>OL</sub> = 4.0mA		0.4	V
Output High Voltage	V <sub>OH</sub>	I <sub>OH</sub> = -4.0mA	2.4		V

NOTE: DC test conditions: V<sub>IH</sub> = V<sub>CC</sub> - 0.3V, V<sub>IL</sub> = 0.3V  
Contact Factory for low power option



## AC CHARACTERISTICS

(V<sub>CC</sub> = 3.3V, GND = 0V, T<sub>A</sub> = -55°C to +125°C)

Parameter	Symbol	-17		-20		-25		Units
		Min	Max	Min	Max	Min	Max	
Read Cycle Time	t <sub>RC</sub>	17		20		25		ns
Address Access Time	t <sub>AA</sub>		17		20		25	ns
Output Hold from Address Change	t <sub>OH</sub>	0		0		0		ns
Chip Select Access Time	t <sub>ACS</sub>		17		20		25	ns
Output Enable to Output Valid	t <sub>OE</sub>		10		10		12	ns
Chip Select to Output in Low Z	t <sub>CLZ</sub> '	1		1		1		ns
Output Enable to Output in Low Z	t <sub>OLZ</sub> '	0		0		0		ns
Chip Disable to Output in High Z	t <sub>CHZ</sub> '		12		12		12	ns
Output Disable to Output in High Z	t <sub>OHZ</sub> '		12		12		12	ns

1. This parameter is guaranteed by design but not tested.

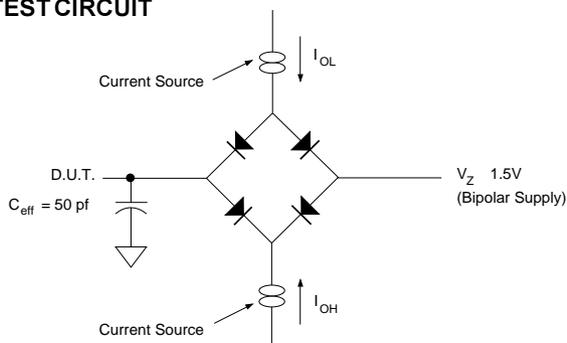
## AC CHARACTERISTICS

(V<sub>CC</sub> = 3.3V, GND = 0V, T<sub>A</sub> = -55°C to +125°C)

Parameter	Symbol	-17		-20		-25		Units
		Min	Max	Min	Max	Min	Max	
Write Cycle Time	t <sub>WC</sub>	17		20		25		ns
Chip Select to End of Write	t <sub>CW</sub>	15		15		17		ns
Address Valid to End of Write	t <sub>AW</sub>	15		15		17		ns
Data Valid to End of Write	t <sub>DW</sub>	11		12		13		ns
Write Pulse Width	t <sub>WP</sub>	15		15		17		ns
Address Setup Time	t <sub>AS</sub>	2		2		2		ns
Address Hold Time	t <sub>AH</sub>	0		0		0		ns
Output Active from End of Write	t <sub>OW</sub> '	2		3		4		ns
Write Enable to Output in High Z	t <sub>WHZ</sub> '		9		11		13	ns
Data Hold Time	t <sub>DH</sub>	0		0		0		ns

1. This parameter is guaranteed by design but not tested.

### AC TEST CIRCUIT

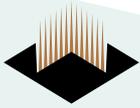


### AC TEST CONDITIONS

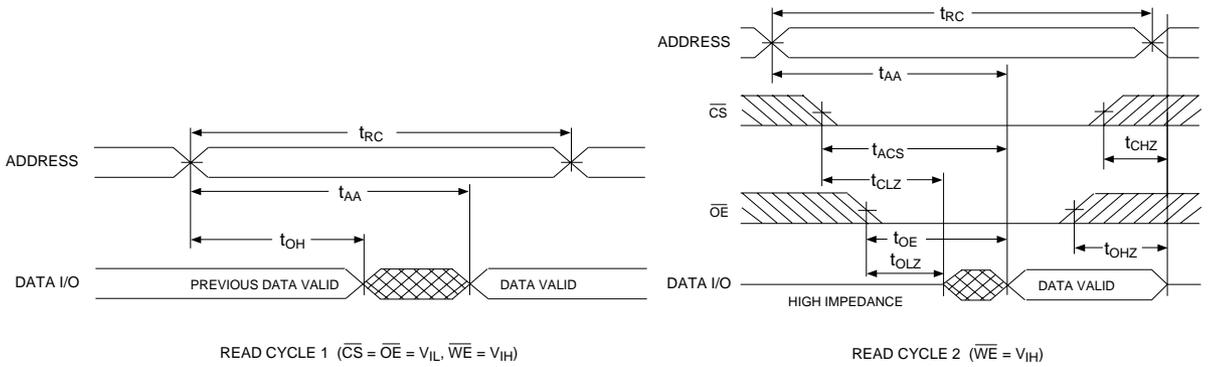
Parameter	Typ	Unit
Input Pulse Levels	V <sub>IL</sub> = 0, V <sub>IH</sub> = 2.5	V
Input Rise and Fall	5	ns
Input and Output Reference Level	1.5	V
Output Timing Reference Level	1.5	V

#### NOTES:

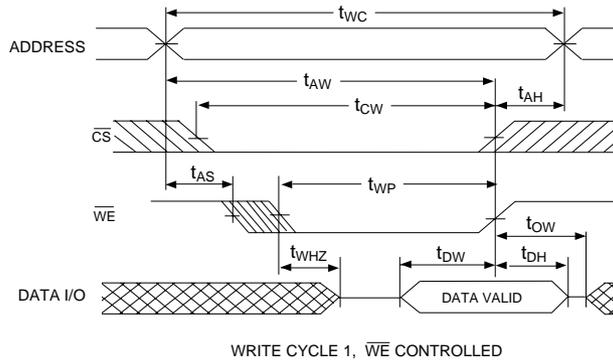
V<sub>Z</sub> is programmable from -2V to +7V.  
 I<sub>OL</sub> & I<sub>OH</sub> programmable from 0 to 16mA.  
 Tester Impedance Z<sub>0</sub> = 75 Ω.  
 V<sub>Z</sub> is typically the midpoint of V<sub>OH</sub> and V<sub>OL</sub>.  
 I<sub>OL</sub> & I<sub>OH</sub> are adjusted to simulate a typical resistive load circuit.  
 ATE tester includes jig capacitance.



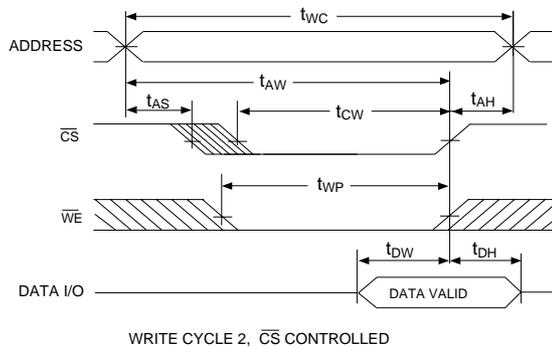
**TIMING WAVEFORM - READ CYCLE**



**WRITE CYCLE -  $\overline{WE}$  CONTROLLED**

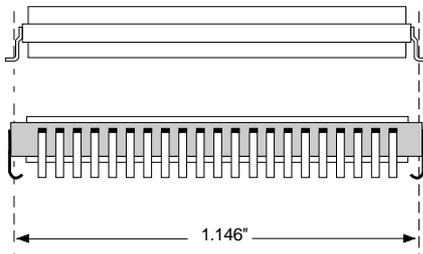
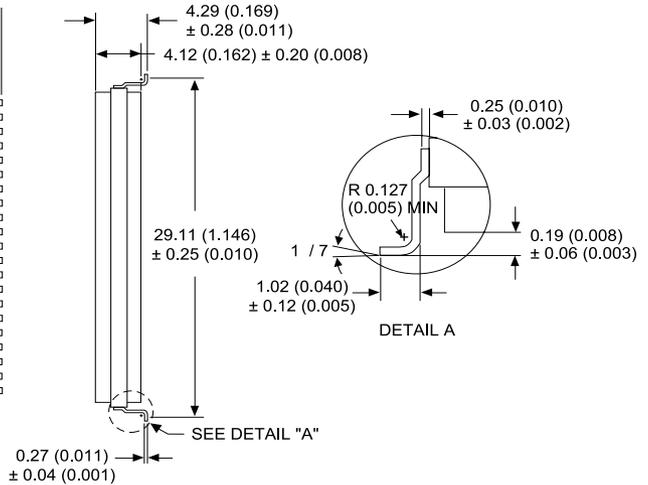
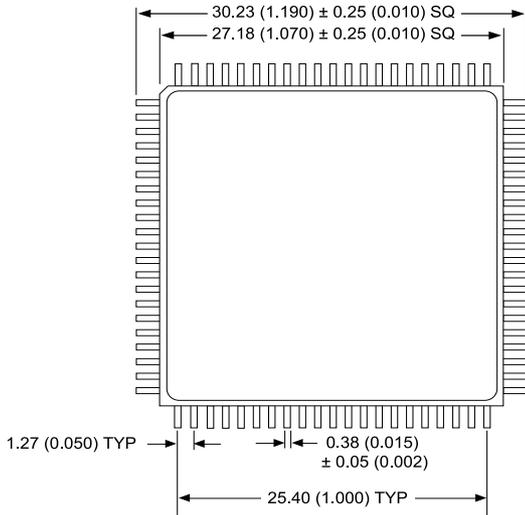


**WRITE CYCLE -  $\overline{CS}$  CONTROLLED**



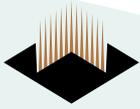


PACKAGE 511: 84 LEAD, CERAMIC QUAD FLAT PACK (G3)



The WEDC 84 lead G3 CQFP fills the same fit and function as the JEDEC 84 lead CQFJ or 84 PLCC. But the G3 has the TCE and lead inspection advantage of the CQFP form.

ALL LINEAR DIMENSIONS ARE MILLIMETERS AND PARENTHETICALLY IN INCHES



**ORDERING INFORMATION**

**W S 1M32 V - XX G3 X X**

**LEAD FINISH:**

Blank = Gold plated leads  
A = Solder dip leads

**DEVICE GRADE:**

M = Military                    -55°C to +125°C  
C = Commercial                -40°C to +85°C  
I = Industrial                    0° to +70°C

**PACKAGETYPE:**

G3 = 28 mm CQFP (Package 511)

**ACCESS TIME (ns)**

**Low Voltage Supply 3.3V ± 10%**

**ORGANIZATION, two banks of 512Kx32**

User configurable as 2Mx16 or 4Mx8

**SRAM**

**WHITE ELECTRONIC DESIGNS CORP.**