



512Kx32 SRAM MODULE

PRELIMINARY*

FEATURES

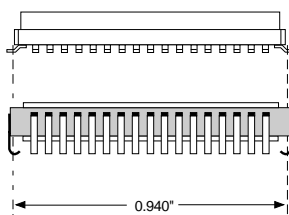
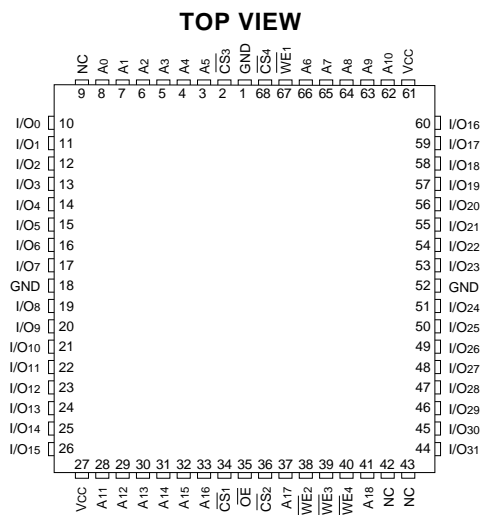
- Access Times of 15**, 17, 20, 25, 35, 45, 55ns
- Packaging
 - 68 lead, 23.88mm Low Profile CQFP, 3.56mm (0.140")
- Organized as 512Kx32, User Configurable as 1Mx16 or 2Mx8
- Commercial, Industrial and Military Temperature Ranges
- TTL Compatible Inputs and Outputs
- 5 Volt Power Supply

- Low Power CMOS
- Built-in Decoupling Caps and Multiple Ground Pins for Low Noise Operation

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

** 15ns Access Time available only in Commercial and Industrial Temperature. This speed is not fully characterized and is subject to change without notice.

FIG. 1 PIN CONFIGURATION FOR WED8LM32513C-E

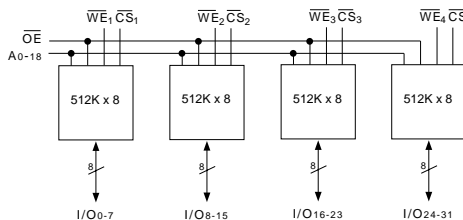


The WEDC 68 lead CQFP fills the same fit and function as the JEDEC 68 lead CQFJ or 68 PLCC. But the CQFP has the TCE and lead inspection advantage of the CQFP form.

PIN DESCRIPTION

I/O0-31	Data Inputs/Outputs
A0-18	Address Inputs
WE1-4	Write Enables
CS1-4	Chip Selects
OE	Output Enable
VCC	Power Supply
GND	Ground
NC	Not Connected

BLOCK DIAGRAM





ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Operating Temperature	T _A	-55	+125	°C
Storage Temperature	T _{STG}	-65	+150	°C
Signal Voltage Relative to GND	V _G	-0.5	V _{CC} +0.5	V
Junction Temperature	T _J		150	°C
Supply Voltage	V _{CC}	-0.5	7.0	V

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V _{CC}	4.5	5.5	V
Input High Voltage	V _{IH}	2.2	V _{CC} + 0.3	V
Input Low Voltage	V _{IL}	-0.5	+0.8	V
Operating Temp (Mil)	T _A	-55	+125	°C

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	H	H	Out Disable	High Z	Active
L	X	L	Write	Data In	Active

CAPACITANCE

(T_A = +25°C)

Parameter	Symbol	Conditions	Max	Unit
\overline{OE} capacitance	C _{OE}	V _{IN} = 0 V, f = 1.0 MHz	30	pF
\overline{WE}_{1-4} capacitance COFP G1U	C _{WE}	V _{IN} = 0 V, f = 1.0 MHz	12	pF
\overline{CS}_{1-4} capacitance	C _{CS}	V _{IN} = 0 V, f = 1.0 MHz	12	pF
Data I/O capacitance	C _{I/O}	V _{I/O} = 0 V, f = 1.0 MHz	12	pF
Address input capacitance	C _{AD}	V _{IN} = 0 V, f = 1.0 MHz	12	pF

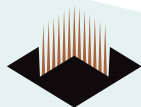
This parameter is guaranteed by design but not tested.

DC CHARACTERISTICS

(V_{CC} = 5.0V, V_{SS} = 0V, T_A = -55°C to +125°C)

Parameter	Symbol	Conditions	Units		
			Min	Max	
Input Leakage Current	I _{LI}	V _{CC} = 5.5, V _{IN} = GND to V _{CC}		10	μA
Output Leakage Current	I _{LO}	\overline{CS} = V _{IH} , \overline{OE} = V _{IH} , V _{OUT} = GND to V _{CC}		10	μA
Operating Supply Current x 32 Mode	I _{CC x 32}	\overline{CS} = V _{IL} , \overline{OE} = V _{IH} , f = 5MHz, V _{CC} = 5.5		540	mA
Standby Current	I _{SB}	\overline{CS} = V _{IH} , \overline{OE} = V _{IH} , f = 5MHz, V _{CC} = 5.5		80	mA
Output Low Voltage	V _{OL}	I _{OL} = 8mA		0.4	V
Output High Voltage	V _{OH}	I _{OH} = -4.0mA	2.4		V

NOTE: DC test conditions: V_{IH} = V_{CC} - 0.3V, V_{IL} = 0.3V



AC CHARACTERISTICS

(VCC = 5.0V, VSS = 0V, TA = -55°C to +125°C)

Parameter	Symbol	-15*		-17		-20		-25		-35		-45		-55		Units
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
Read Cycle Time	t _{RC}	15		17		20		25		35		45		55		ns
Address Access Time	t _{AA}		15		17		20		25		35		45		55	ns
Output Hold from Address Change	t _{OH}	0		0		0		0		0		0		0		ns
Chip Select Access Time	t _{ACS}		15		17		20		25		35		45		55	ns
Output Enable to Output Valid	t _{OE}		8		9		10		12		25		25		25	ns
Chip Select to Output in Low Z	t _{CLZ} ¹	2		2		2		2		4		4		4		ns
Output Enable to Output in Low Z	t _{OLZ} ¹	0		0		0		0		0		0		0		ns
Chip Disable to Output in High Z	t _{CHZ} ¹		12		12		12		12		15		20		20	ns
Output Disable to Output in High Z	t _{OHZ} ¹		12		12		12		12		15		20		20	ns

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AC CHARACTERISTICS

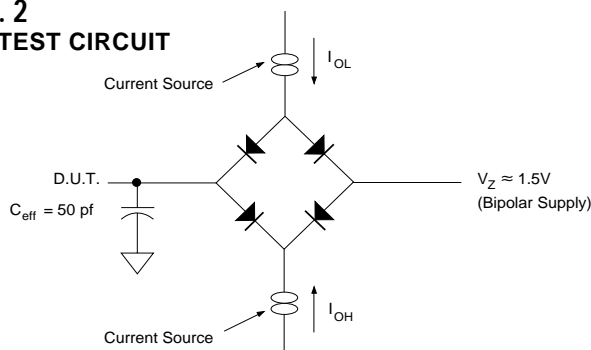
(VCC = 5.0V, VSS = 0V, TA = -55°C to +125°C)

Parameter	Symbol	-15*		-17		-20		-25		-35		-45		-55		Units
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
Write Cycle Time	t _{WC}	15		17		20		25		35		45		55		ns
Chip Select to End of Write	t _{CW}	13		15		15		17		25		35		50		ns
Address Valid to End of Write	t _{AW}	13		15		15		17		25		35		50		ns
Data Valid to End of Write	t _{DW}	10		11		12		13		20		25		25		ns
Write Pulse Width	t _{WP}	13		15		15		17		25		35		40		ns
Address Setup Time	t _{AS}	2		2		2		2		2		2		2		ns
Address Hold Time	t _{AH}	0		0		0		0		0		5		5		ns
Output Active from End of Write	t _{OW} ¹	2		2		3		4		4		5		5		ns
Write Enable to Output in High Z	t _{WHZ} ¹		8		9		11		13		15		20		20	ns
Data Hold Time	t _{DH}	0		0		0		0		0		0		0		ns

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

FIG. 2
AC TEST CIRCUIT



AC TEST CONDITIONS

Parameter	Typ	Unit
Input Pulse Levels	V _{IL} = 0, V _{IH} = 3.0	V
Input Rise and Fall	5	ns
Input and Output Reference Level	1.5	V
Output Timing Reference Level	1.5	V

NOTES:

V_Z is programmable from -2V to +7V.
 I_{OL} & I_{OH} programmable from 0 to 16mA.
 Tester Impedance Z₀ = 75 Ω.
 V_Z is typically the midpoint of V_{OH} and V_{OL}.
 I_{OL} & I_{OH} are adjusted to simulate a typical resistive load circuit.
 ATE tester includes jig capacitance.



FIG. 3
TIMING WAVEFORM - READ CYCLE

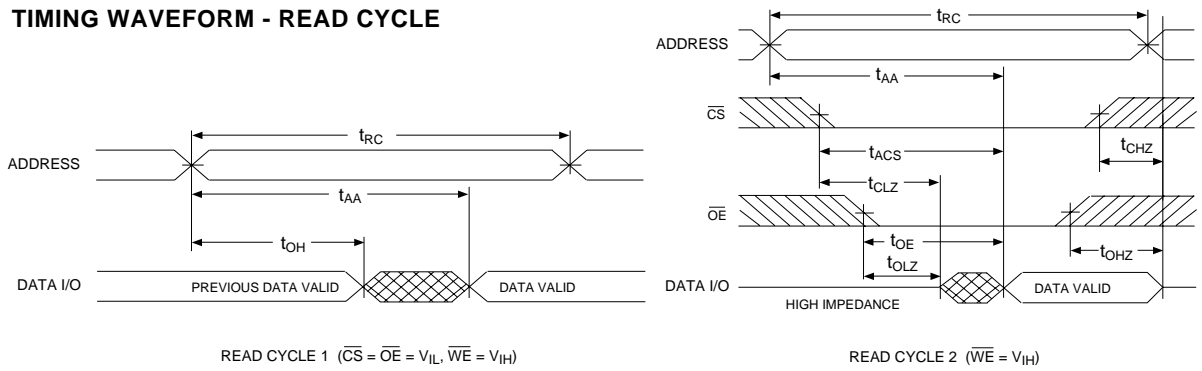


FIG. 4
WRITE CYCLE - \overline{WE} CONTROLLED

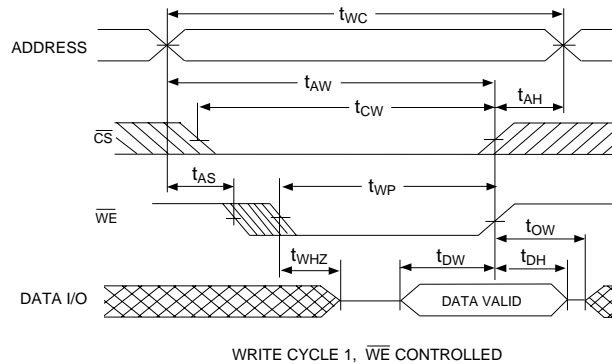
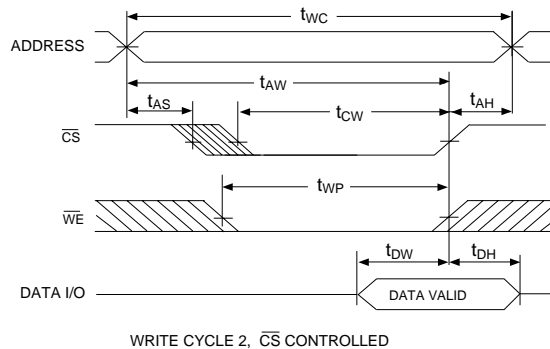
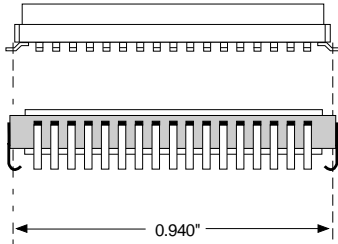
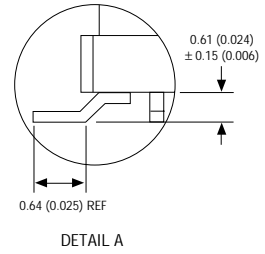
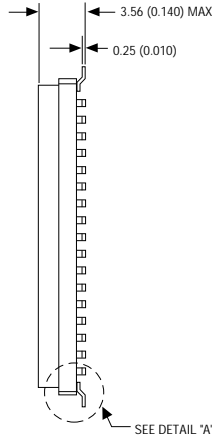
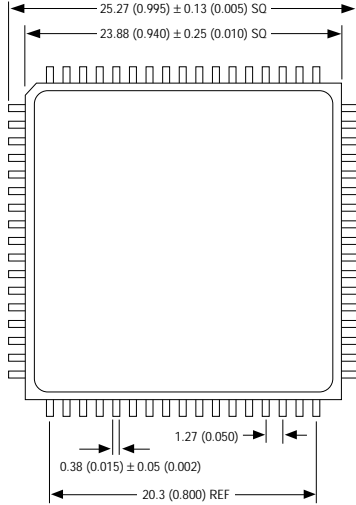


FIG. 5
WRITE CYCLE - \overline{CS} CONTROLLED





PACKAGE DIMENSION: 68 LEAD, LOW PROFILE CERAMIC QUAD FLAT PACK, CQFP



The WEDC 68 lead CQFP fills the same fit and function as the JEDEC 68 lead CQFJ or 68 PLCC. But the CQFP has the TCE and lead inspection advantage of the CQFP form.

ALL LINEAR DIMENSIONS ARE MILLIMETERS AND PARENTHETICALLY IN INCHES



ORDERING INFORMATION

WED 8LM 32513 C - XXX X X X

LEAD FINISH:

Blank = Gold plated leads

A = Solder dip leads

DEVICE GRADE:

MT = MTO -55°C to +125°C

IT = ITO -40°C to +85°C

CT = CTO 0°C to +70°C

PACKAGE TYPE:

E = 23.88mm Ceramic Quad Flat Pack, Low Profile CQFP

ACCESS TIME (ns)

TECHNOLOGY:

C = CMOS Standard Power (5V)

ORGANIZATION, 512Kx32

User configurable as 1Mx16 or 2Mx8

SRAM

WHITE ELECTRONIC DESIGNS CORP.