

TMS320C54x External SRAM Memory Solution

Features

DSP Memory Solution

- Texas Instruments TMS320C54x

3.3V Operating Supply Voltage

Access Times of 10, 12 and 15ns

Single Write Control and Output Enable Lines

One Chip Enable Line per Memory Bank

50% Space Savings vs. Monolithic TSOPs

Upgrade Path Available in Same Footprint

Multiple VCC and VSS Pins

Reduced Inductance and Capacitance

74 pin BGA, JEDEC MO-151

The EDI8L21664VxxBC is a 3.3V, 2x64Kx16 SRAM constructed with two 64Kx16 die mounted on a multi-layer laminate substrate. The device is packaged in a 74 lead, 15mm by 15mm, BGA.

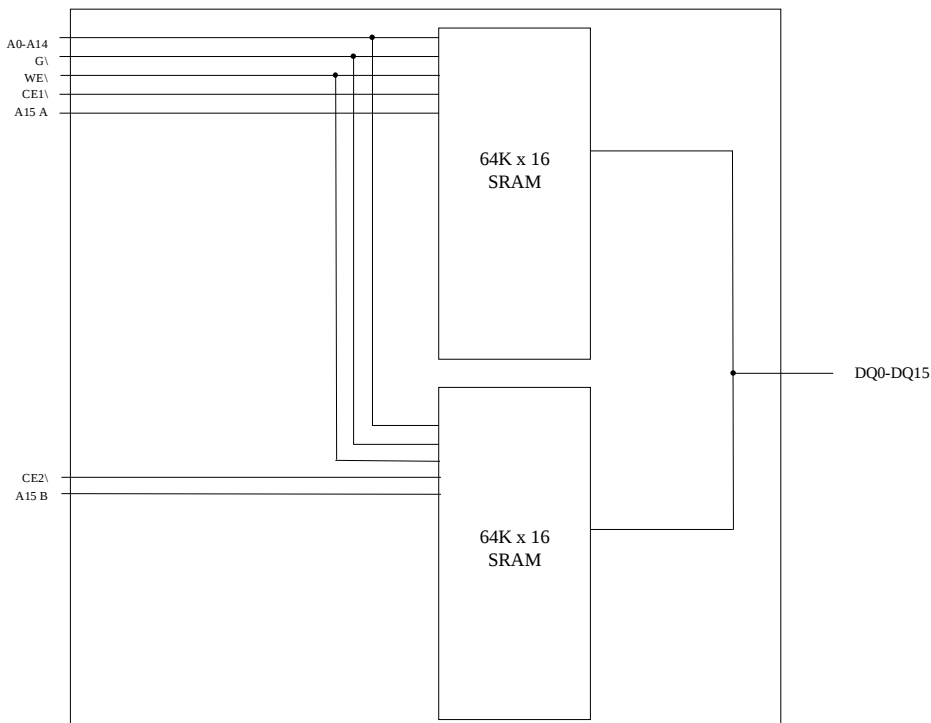
Operating with a 3.3V power supply and with access times as fast as 10ns, the device allows the user to develop a fast external memory for Texas Instruments' TMS320C54x DSP.

The device consists of two separate banks of 64Kx16 of memory. Each bank has a separate Chip Enable pin and higher order address select pin. Bank 'A' is controlled using CE1\ and A15A. Bank 'B' is controlled using CE2\ and A15B. The two banks have common I/Os (DQ0-15) and control lines (WE\ and G\).

Pin Configurations

	1	2	3	4	5	6	7	8	9	10	11	
A	VSS	VCC	VCC	DQ15	DQ14	VCC	DQ13	DQ11	DQ9	DQ8	N/C	A
B	VSS	VCC	VCC	VSS	VSS	VCC	DQ12	DQ10	DQ4	VCC	VCC	B
C	VSS	VSS				VCC				VSS	VCC	C
D	VSS	VSS								VSS	VCC	D
E	VSS	VSS								VSS	VCC	E
F	A15A	CE1\								DQ3	DQ7	F
G	N/C	WE\								DQ5	DQ0	G
H	VSS	CE2\								DQ6	DQ1	H
J	VSS	A14				VCC				DQ2	N/C	J
K	VSS	A12	VCC	A10	A8	VSS	A6	A4	A2	A0	G\	K
L	A15B	A13	VCC	A11	A9	VSS	A7	VSS	A5	A3	A1	L
	1	2	3	4	5	6	7	8	9	10	11	

Block Diagram



Pin Descriptions

Pin	Symbol	Type	Description
	A0-A14	Input	Addresses
	A15A	Input	Addresses: A15 on Bank 'A' of memory
	A15B	Input	Addresses: A15 on Bank 'B' of memory
	WE\	Input	Write Enable: This active LOW input allows a full 16-bit WRITE to occur.
	CE1\	Input	Chip Enable: This active LOW input is used to enable the 'A' Bank of the device.
	CE2\	Input	Chip Enable: This active LOW input is used to enable the 'B' Bank of the device.
	G\	Input	Output Enable: This active LOW asynchronous input enables the data output drivers.
Various	DQ0-15	Input/Output	Data Inputs/Outputs
Various	Vcc	Supply	Core power supply: +3.3V -5%/+10%
Various	Vss	Ground	Ground

Absolute Maximum Ratings*

Voltage on Vcc Supply Relative to Vss	-0.5V to 4.6V
V _{IN}	-0.5V to V _{CC} +0.5V
Storage Temperature	-55°C to +125°C
Junction Temperature	+125°C
Power Dissipation	3 Watts
Short Circuit Output Current (per I/O)	50 mA

*Stress greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions greater than those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Capacitance

(f=1.0MHz, V_{IN}=V_{CC} or V_{SS})

Parameter	Sym	Max	Unit
Address Lines	CA	8	pF
Data Lines	CD/Q	17	pF
Control Lines	CC	15	pF

Recommended DC Operating Conditions

Description	Sym	Min	Max	Units
Input High Voltage	V _{IH}	2.2	V _{CC} +0.5	V
Input Low Voltage	V _{IL}	-0.3	0.8	V
Supply Voltage	V _{CC}	3.0	3.6	V

AC Test Conditions

Input Pulse Levels	V _{SS} to 3.0V
Input Rise and Fall Times (Max)	1.5ns
Input and Output Timing Levels	1.5V
Output Load	See Figure 1

Figure 1

DC Electrical Characteristics

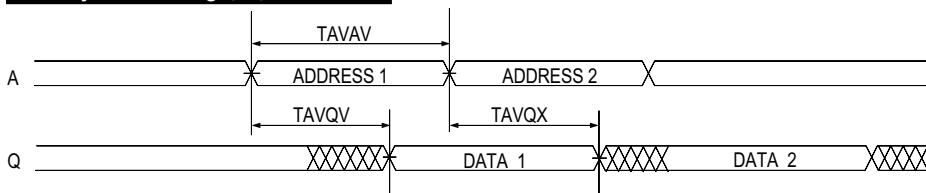
(f=1.0MHz, V_{IN}=V_{CC} or V_{SS})

Parameter	Sym	Conditions	Min	Max	Units
Power Supply Current: Operating	ICC1	Device Selected; all inputs ≤V _{IL} or ≥V _{IH} ; cycle time ≥t _{KC} MIN; V _{CC} =MAX; outputs open	-10ns -12ns -15ns	380 360 260	mA
CMOS Standby	ISB2	Device deselected; V _{CC} =MAX; all inputs ≤ V _{SS} +0.2 or ≥ V _{CC} -0.2; all inputs static; CLK frequency = 0		60	mA
TTL Standby	ISB3	Device deselected; all inputs ≤V _{IL} or ≥V _{IH} ; all inputs static; V _{CC} =MAX; CLK frequency = 0		120	mA
Input Leakage Current	ILI	0V ≤ V _{IN} ≤ V _{CC}	-5	5	μA
Output Leakage Current	ILO	Output(s) disabled, 0V ≤ V _{OUT} ≤ V _{CC}	-5	5	μA
Output High Voltage	VOH	I _{OH} = -4.0mA	2.4		V
Output Low Voltage	VOL	I _{OL} = 8.0mA		0.4	V

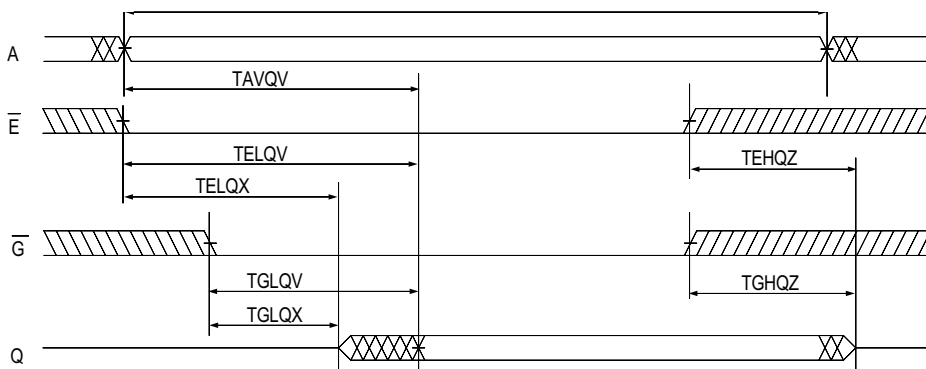
AC Characteristics Read Cycle

Read Cycle	Symbol	10ns		12ns		15ns		Units
		Min	Max	Min	Max	Min	Max	
Read Cycle Time	tAVAV	10		12		15		ns
Address Access Time	tAVQV		10		12		15	ns
Chip Enable Access	tELQV		10		12		15	ns
Output Hold from Address Change	tAVQX	3		4		4		ns
Chip Enable to Output in Low-Z	tELQX	3		4		4		ns
Chip Disable to Output in High-Z	tEHQZ		5		6		7	ns
Output Enable access time	tGLQV		5		6		7	ns
Output Enable to Output in Low-Z	tGLQX	0		0		0		ns
Output Disable to Output in High-Z	tGHQZ		5		6		7	ns
Write Cycle								
Write Cycle Time	tAVAV	10		12		15		ns
Chip Enable to End of Write	tELWH	8		8		9		ns
Address valid to End of Write, with G _I HIGH	tAVGHWH	8		8		9		ns
Address Setup Time	tAVVWH	0		0		0		ns
Address Hold from End of Write	tAVVWH	0		0		0		ns
Write Pulse Width	tWLWH	10		10		11		ns
Write Pulse Width, with G _I HIGH	tWLGHW	8		8		9		ns
Data Setup Time	tDVWH	6		6		7		ns
Data Hold Time	tWHDX	0		0		0		ns
Write Disable to Output in Low-Z	tWHQX	3		4		5		ns
Write Enable to Output in High-Z	tWLQZ		5		6		7	ns

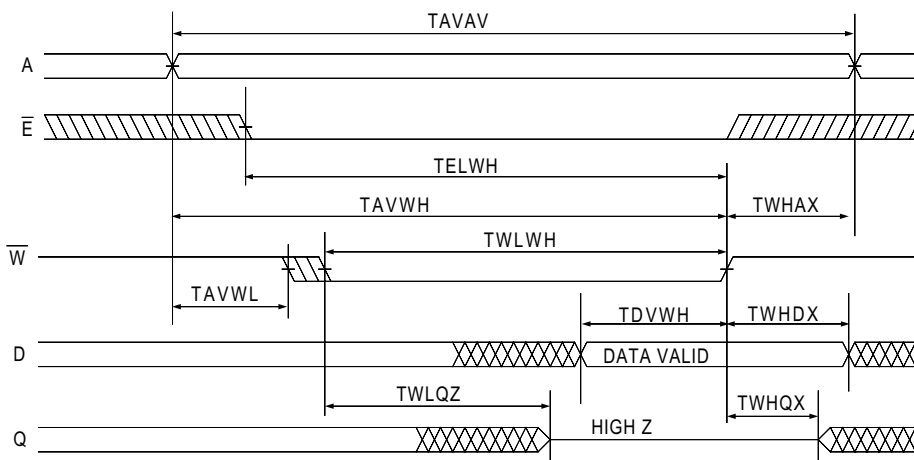
Read Cycle 1 - W High, $\bar{G}$, $\bar{E}$ Low



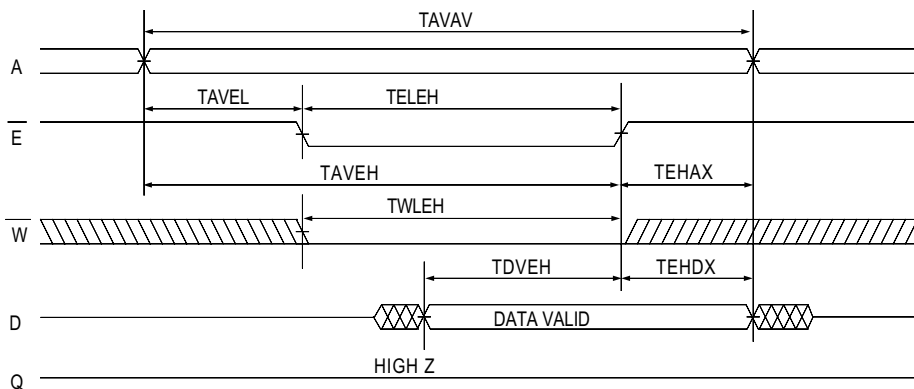
Read Cycle 2 - W High



Write Cycle 1 - $\overline{W}$ Controlled



Write Cycle 2 - $\overline{E}$ Controlled



Ordering Information

Commercial Temperature Range (0°C to +70°C)

Part Number	Speed (ns)	Package No.
EDI8L21664V10BC	10	
EDI8L21664V12BC	12	
EDI8L21664V15BC	15	

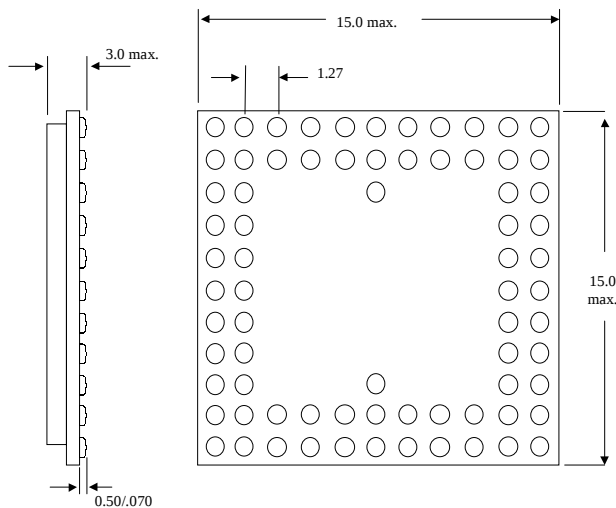
Industrial Temperature Range (-40°C to +85°C)

Part Number	Speed (ns)	Package No.
EDI8L21664V15BI	15	

Package Description

74 Pin BGA

JEDEC MO-151



Electronic Designs Incorporated

• One Research Drive • Westborough, MA 01581USA • 508-366-5151 • FAX 508-836-4850 •

<http://www.electronic-designs.com>

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