128KX8 MONOLITHIC SRAM, SMD 5962-89598

FEATURES

- Access Times of 70, 85, 100ns
- Available with Single Chip Selects (EDI88128) or Dual Chip Selects (EDI88130)
- 2V Data Retention (LP Versions)
- $\overline{CS}$ and $\overline{OE}$ Functions for Bus Control
- TTL Compatible Inputs and Outputs
- Fully Static, No Clocks
- Organized as 128Kx8
- Industrial, Military and Commercial Temperature Ranges
- Thru-hole and Surface Mount Packages JEDEC Pinout
  - 32 pin Ceramic DIP, 0.6 mils wide (Package 9)
  - 32 lead Ceramic SOJ (Package 140)
- Single +5V (±10%) Supply Operation

The EDI88128C is a high speed, high performance, Monolithic CMOS Static RAM organized as 128Kx8.

The device is also available as EDI88130C with an additional chip select line (CS2) which will automatically power down the device when proper logic levels are applied.

The second chip select line (CS2) can be used to provide system memory security during power down in non-battery backed up systems and simplifiy decoding schemes in memory banking where large multiple pages of memory are required.

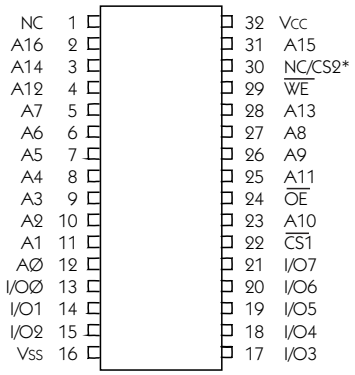
The EDI88128C and the EDI88130C have eight bi-directional input-output lines to provide simultaneous access to all bits in a word. An automatic power down feature permits the on-chip circuitry to enter a very low standby mode and be brought back into operation at a speed equal to the address access time.

Low power versions, EDI88128LP and EDI88130LP, offer a 2V data retention function for battery back-up opperation. Military product is available compliant to Appendix A of MIL-PRF-38535.

FIG. 1 PIN CONFIGURATION

32 DIP
32 SOJ

TOP VIEW

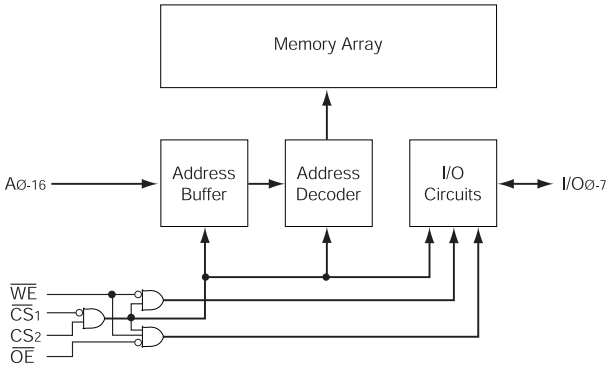


** Pin 30 is NC for 88128 or CS2 for 88130.*

PIN DESCRIPTION

I/O_{0-7}	Data Inputs/Outputs
A_{0-16}	Address Inputs
$\overline{WE}$	Write Enable
$\overline{CS_1}$, CS_2	Chip Selects
$\overline{OE}$	Output Enable
V_{CC}	Power (+5V ±10%)
V_{SS}	Ground
NC	Not Connected

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Parameter		Unit
Voltage on any pin relative to Vss	-0.5 to 7.0	V
Operating Temperature T_A (Ambient)		
Commercial	0 to +70	°C
Industrial	-40 to +85	°C
Military	-55 to +125	°C
Storage Temperature, Plastic	-65 to +150	°C
Power Dissipation	1	W
Output Current	20	mA
Junction Temperature, T_J	175	°C

NOTE:
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.

TRUTH TABLE

$\overline{OE}$	$\overline{CS_1}$	$\overline{CS_2}$	$\overline{WE}$	Mode	Output	Power
X	H	X	X	Standby	High Z	I_{CC2}, I_{CC3}
X	X	L	X	Standby	High Z	I_{CC2}, I_{CC3}
X	X	L	X	Output Deselect	High Z	I_{CC1}
H	L	H	H	Output Deselect	High Z	I_{CC1}
L	L	H	H	Read	Data Out	I_{CC1}
X	L	H	L	Write	Data In	I_{CC1}

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	4.5	5.0	5.5	V
Supply Voltage	V_{SS}	0	0	0	V
Input High Voltage	V_{IH}	2.2	—	Vcc +0.5	V
Input Low Voltage	V_{IL}	-0.3	—	+0.8	V

CAPACITANCE
(TA = +25°C)

Parameter	Symbol	Condition	Max	Unit
Address Lines	C_I	V_{IN} = Vcc or Vss, f = 1.0MHz	12	pF
Input/Output Lines	C_O	V_{OUT} = Vcc or Vss, f = 1.0MHz	14	pF

These parameters are sampled, not 100% tested.

DC CHARACTERISTICS
(V_{CC} = 5V, T_A = -55°C TO +125°C)

Parameter	Symbol	Conditions		Min	Typ	Max	Units
Input Leakage Current	I_{LI}	V_{IN} = 0V to V_{CC}		-5	—	+5	µA
Output Leakage Current	I_{LO}	$V_{I/O}$ = 0V to V_{CC}, $\overline{CS_1} \geq V_{IH}$ and/or $\overline{CS_2} \leq V_{IL}$		-10	—	+10	µA
Operating Power Supply Current	I_{CC1}	$\overline{WE}$, $\overline{CS_1}$ = V_{IL}, $I_{I/O}$ = 0mA, Min Cycle	(70-85ns)	—		120	mA
		$\overline{CS_2}$ = V_{IH}	(100ns)	—		110	mA
Standby (TTL) Power Supply Current	I_{CC2}	$\overline{CS_1} \geq V_{IH}$ and/or $\overline{CS_2} \leq V_{IL}$, $V_{IN} \geq V_{IH}$ or $\leq V_{IL}$		—		10	mA
Full Standby Power Supply Current	I_{CC3}	$\overline{CS_1} \geq V_{CC}$ -0.2V and/or $\overline{CS_2} \leq V_{CC}$ +0.2V	C	—	1	5	mA
		$V_{IN} \geq V_{CC}$ -0.2V or $V_{IN} \leq 0.2V$	LP	—	—	1	mA
Output Low Voltage	V_{OL}	I_{OL} = 2.1mA		—	—	0.4	V
Output High Voltage	V_{OH}	I_{OH} = -1.0mA		2.4	—	—	V

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

AC CHARACTERISTICS – READ CYCLE
(V_{CC} = 5.0V, V_{SS} = 0V, T_A = -55°C TO +125°C)

Parameter	Symbol JEDEC	Symbol Alt.	70ns Min	70ns Max	85ns Min	85ns Max	100ns Min	100ns Max	Units
Read Cycle Time	tAVAV	tRC	70		85		100		ns
Address Access Time	tAVQV	tAA		70		85		100	ns
Chip Select Access Time	tELQV tSHQV	tACS tACS		70 70		85 85		100 100	ns ns
Chip Select to Output in Low Z (1)	tELQX tSHQX	tCLZ tCLZ	3 3		3 3		3 3		ns ns
Chip Disable to Output in High Z (1)	tEHQZ tSLQZ	tCHZ tCHZ	0 0	30 30	0 0	30 30	0 0	30 30	ns ns
Output Hold from Address Change	tAVQX	tOH	3		3		3		ns
Output Enable to Output Valid	tGLQV	tOE		25		30		50	ns
Output Enable to Output in Low Z (1)	tGLQX	tOLZ	0		0		0		ns
Output Disable to Output in High Z (1)	tGHQZ	tOHZ	0	30	0	30	0	30	ns

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

AC TEST CONDITIONS

Figure 1

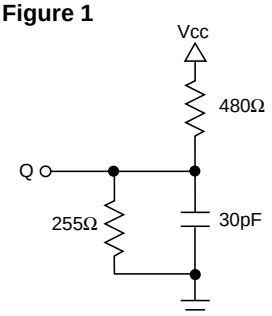
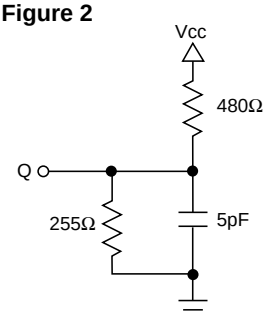


Figure 2



Input Pulse Levels	Vss to 3.0V
Input Rise and Fall Times	5ns
Input and Output Timing Levels	1.5V
Output Load	Figure 1

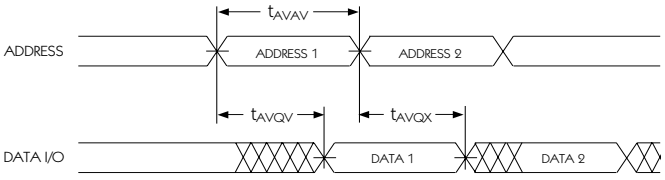
NOTE: For tEHQZ, tGHQZ and tWLQZ, CL = 5pF Figure 2)

AC CHARACTERISTICS – WRITE CYCLE
(V_{CC} = 5.0V, V_{SS} = 0V, T_A = -55°C TO +125°C)

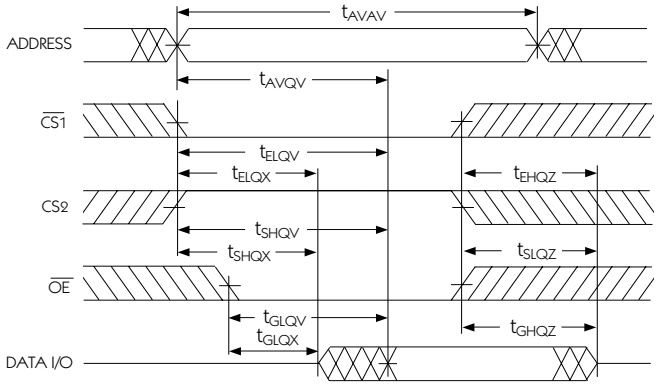
Parameter	Symbol JEDEC	Symbol Alt.	70ns Min	70ns Max	85ns Min	85ns Max	100ns Min	100ns Max	Units
Write Cycle Time	tAVAV	tWC	70		85		100		ns
Chip Select to End of Write	tELWH tELEH tSHWH tSHSL	tCW tCW tCW tCW	60 60 60 60		75 75 75 75		85 85 85 85		ns ns ns ns
Address Setup Time	tAVWL tAVEL tAVSH	tAS tAS tAS	0 0 0		0 0 0		0 0 0		ns ns ns
Address Valid to End of Write	tAVWH	tAW	60		75		85		ns
Write Pulse Width	tWLWH tWLEH tWLSL	tWP tWP tWP	35 35 35		70 70 70		80 80 80		ns ns ns
Write Recovery Time	tWHAX tEHAX tSLAX	tWR tWR tWR	5 5 5		5 5 5		5 5 5		ns ns ns
Data Hold Time	tWHDX tEHDX tSLDX	tDH tDH tDH	0 0 0		0 0 0		0 0 0		ns ns ns
Write to Output in High Z (1)	tWLQZ	tWHZ	0	30	0	35	0	40	ns
Data to Write Time	tDVWH tDVEH tDVSL	tDW tDW tDW	35 35 35		40 40 40		40 40 40		ns ns ns
Output Active from End of Write (1)	tWHQX	tWLZ	5		5		5		ns

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

FIG. 2 TIMING WAVEFORM – READ CYCLE

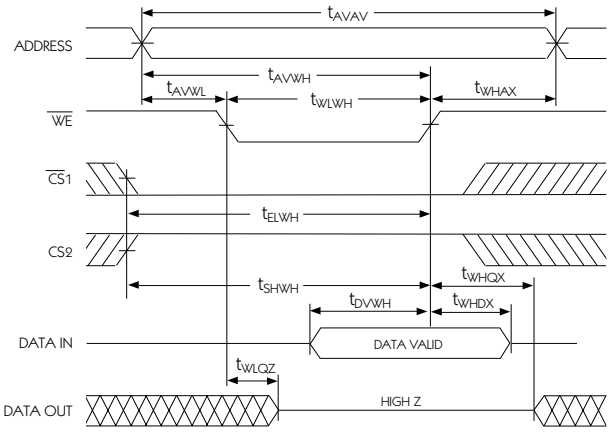


READ CYCLE 1 ($\overline{WE}$ HIGH; $\overline{OE}$, $\overline{CS}$ LOW)



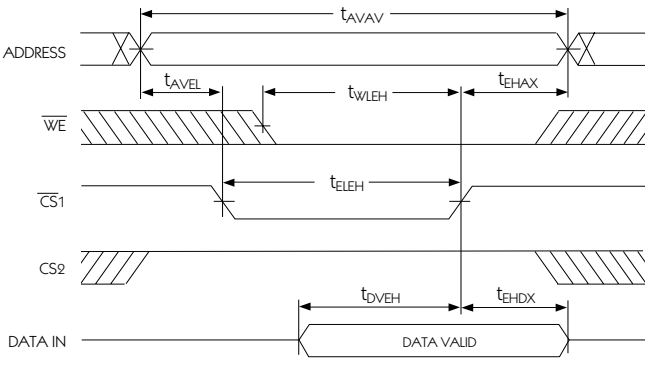
READ CYCLE 2 ($\overline{WE}$ HIGH)

FIG. 3 WRITE CYCLE 1



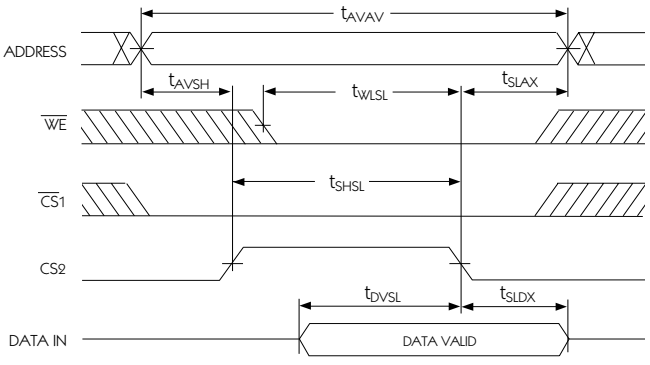
WRITE CYCLE 1 - LATE WRITE, $\overline{WE}$ CONTROLLED

FIG. 4 WRITE CYCLE 2



WRITE CYCLE 2 - EARLY WRITE, $\overline{CS1}$ CONTROLLED

WRITE CYCLE 3



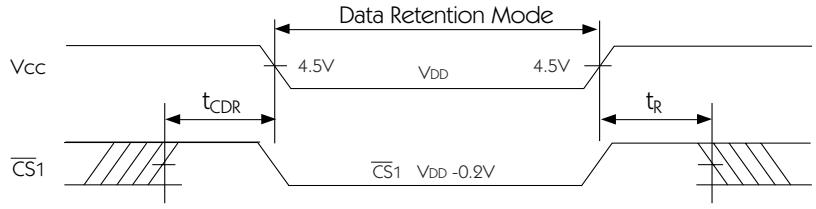
WRITE CYCLE 3 - EARLY WRITE, CS2 CONTROLLED

DATA RETENTION CHARACTERISTICS (EDI88128LP & EDI88130LP ONLY)
(TA = -55°C TO +125°C)

Characteristic Low Power Version only	Sym	Conditions	Min	Typ	Max	Units
Data Retention Voltage	V_{DD}	V_{DD} = 2.0V	2	–	–	V
Data Retention Quiescent Current	I_{CCDR}	$\overline{CS1} \geq V_{DD}$ -0.2V	–	–	400	µA
Chip Disable to Data Retention Time (1)	T_{CDR}	$V_{IN} \geq V_{DD}$ -0.2V	0	–	–	ns
Operation Recovery Time (1)	T_R	or $V_{IN} \leq$ 0.2V	T_{AVAV}*	–	–	ns

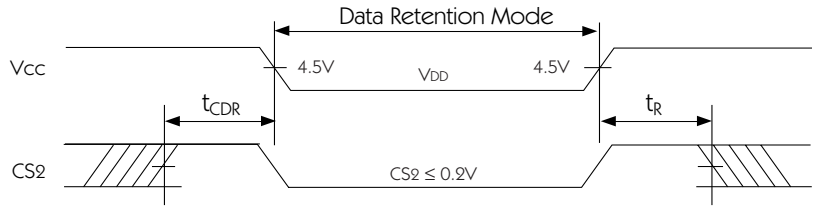
NOTE:
1. Parameter guaranteed by design, but not tested.
** Read Cycle Time*

FIG. 5 DATA RETENTION - $\overline{CS1}$ CONTROLLED



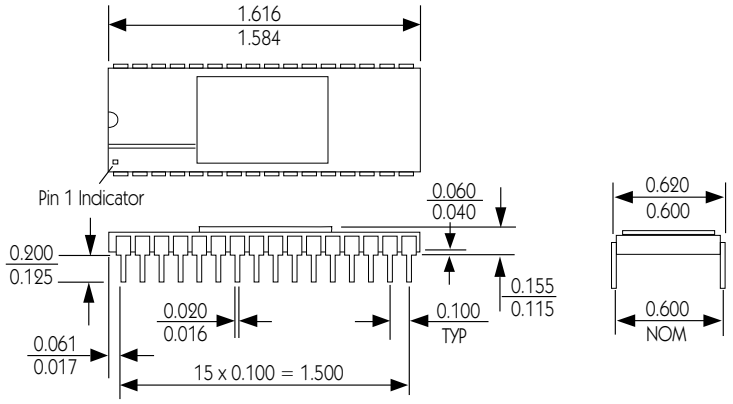
DATA RETENTION, $\overline{CS1}$ CONTROLLED

FIG. 6 DATA RETENTION - CS2 CONTROLLED



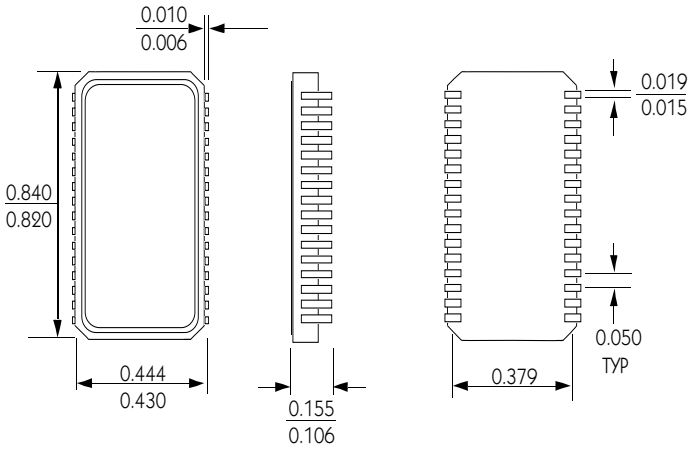
DATA RETENTION, CS2 CONTROLLED

PACKAGE 9: 32 PIN SIDEBRAZED CERAMIC DIP (600MILS WIDE)



ALL Dimensions ARE in inches

PACKAGE 140: 32 LEAD CERAMIC SOJ



ALL Dimensions ARE in inches

ORDERING INFORMATION

EDI 8 8 128 C X X X

WHITE ELECTRONIC DESIGNS

SRAM

ORGANIZATION, 128Kx8
8 130 = Dual Chip Select

TECHNOLOGY:
C = CMOS Standard Power
LP = Low Power

ACCESS TIME (ns)

PACKAGE TYPE:
C = 32 lead Sidebrazed DIP, 600 mil (Package 9)
N = 32 lead Ceramic SOJ (Package 140)

DEVICE GRADE:
B = MIL-STD-883 Compliant
M = Military Screened -55°C to +125°C
I = Industrial -40°C to +85°C
C = Commercial 0°C to +70°C