DPS128M8A

HIGH SPEED CERAMIC
128K X 8 CMOS SRAM MONOLITHIC

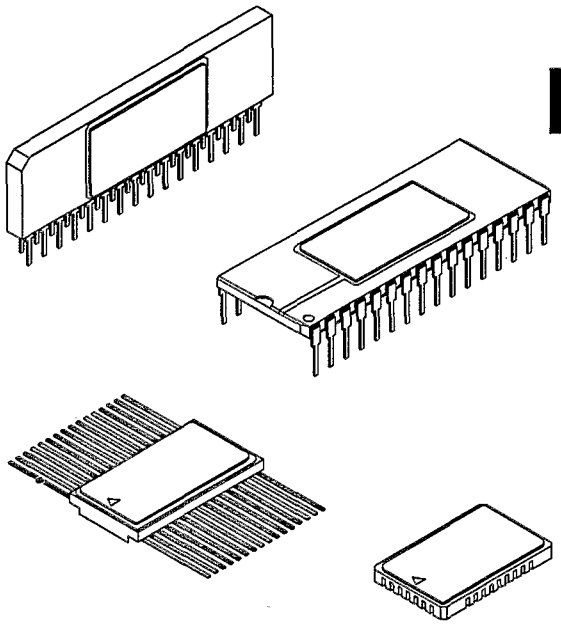
ADVANCED INFORMATION

DESCRIPTION:

The DPS128M8A is a high speed monolithic 128K X 8 Static Random Access Memory (SRAM) fabricated using CMOS technology. It is designed for use in high density, high speed, low power applications. All pins are TTL compatible and a single +5 Volt power supply is required.

The DPS128M8A has extremely low standby power dissipation making it suitable for battery backup.

The 600-mil wide, 32-pin ceramic, Dual-In-Line Package (DIP), conforms to the JEDEC standard. Dense-Pac also offers a 32-pin ceramic FLATPACK, a 32-Pad Leadless Chip Carrier (LCC), and a space saving 32-pin Zig-Zag-In-Line Package (ZIP).



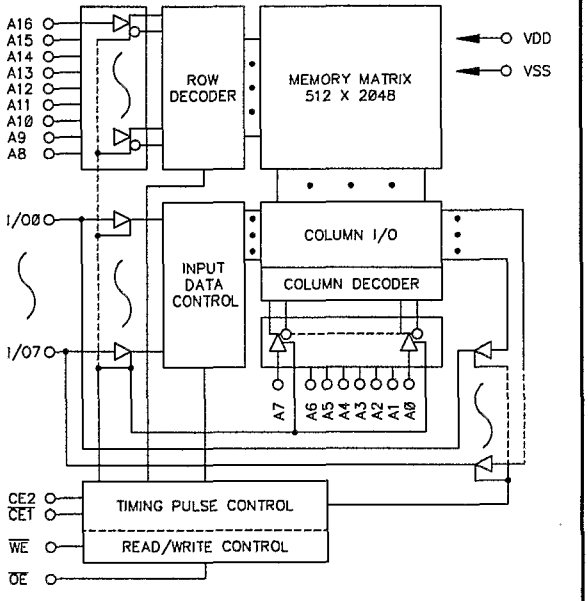
FEATURES:

- 131,072 by 8-Bits Organization
- Access Times: 35*, 45, 55, 70ns (max.)
- Low Power: 50µW (typ.) Standby
  300mW (typ.) Operating
- Fully Static Operation; No Clock or Refresh Required
- TTL Compatible Input and Output
- Common Data Input and Output
- Single +5V Power Supply, ±10% Tolerance
- Two Chip Enables
- Output Enable Functions
- Faster Access Speeds Available Upon Request
- Package Types:
  32-Pin Ceramic Side Brazed DIP
  32-Pin Ceramic FLATPACK
  32-Pin Ceramic ZIP
  32-Pad Ceramic LCC

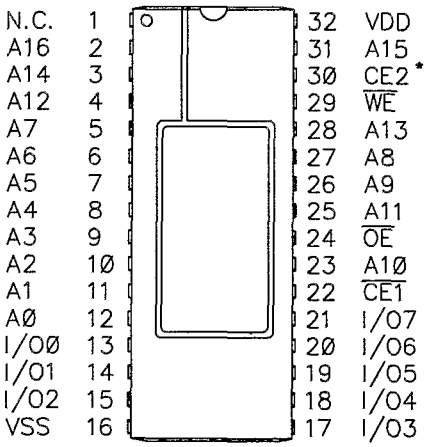
* Commercial Only

PIN NAMES	
A0 - A16	Address Inputs
I/O0 - I/O7	Data In/Out
$\overline{CE1}$, CE2	Chip Enables
$\overline{WE}$	Write Enable
$\overline{OE}$	Output Enable
V_{DD}	Power (+5V)
V_{SS}	Ground
N.C.	No Connect

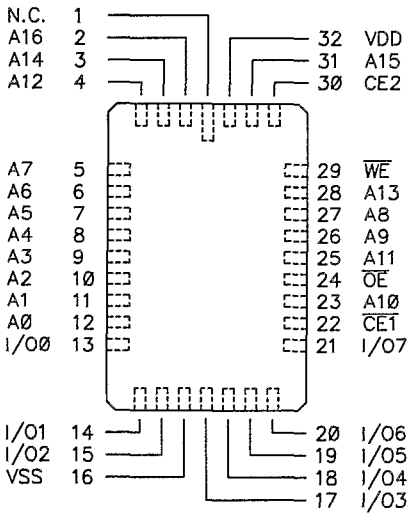
FUNCTIONAL BLOCK DIAGRAM



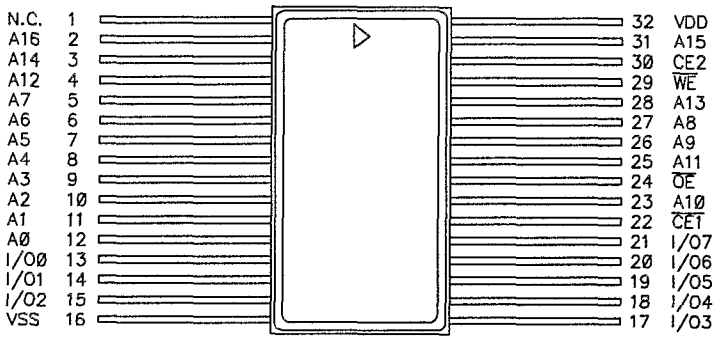
PIN-OUT DIAGRAMS (TOP VIEW)



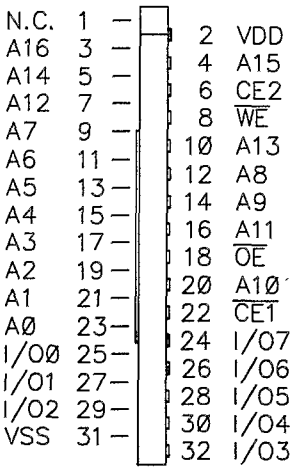
CERDIP



CERAMIC LCC



CERAMIC FLATPACK



CERAMIC ZIP

* Cerdip also available with one Chip Enable (DPS128M8ANS). Pin 30 on this version is a no connect (N.C.) consult factory.

RECOMMENDED OPERATING RANGE[1]					
Symbol	Characteristic	Min.	Typ.	Max.	Unit
V_{DD}	Supply Voltage	4.5	5.0	5.5	V
V_{IH}	Input HIGH Voltage	2.2		V_{DD}+0.3	V
V_{IL}	Input LOW Voltage	-0.5[2]		0.8	V

ABSOLUTE MAXIMUM RATINGS[3]			
Symbol	Parameter	Value	Unit
T_{STC}	Storage Temperature	-65 to + 150	°C
T_{BIAS}	Temperature Under Bias	-55 to + 125	°C
V_{DD}	Supply Voltage[1]	-0.5 to + 7.0	V
$V_{I/O}$	Input/Output Voltage[1]	-0.5 to V_{DD}+0.5	V

3

TRUTH TABLE						
Mode	$\overline{CE1}$	CE2	$\overline{OE}$	$\overline{WE}$	I/O Pin	Supply Current
Not Selected	H	X	X	X	HIGH-Z	Standby
Not Selected	X	L	X	X	HIGH-Z	Standby
D_{OUT} Disable	L	H	H	H	HIGH-Z	Active
Read	L	H	L	H	D_{OUT}	Active
Write	L	H	X	L	D_{IN}	Active

L = LOW H = HIGH X = Don't Care

CAPACITANCE [4]: T_A = 25°C, F = 1.0MHz				
Symbol	Parameter	Max.	Unit	Condition
C_{CE}	Chip Enable	8	pF	V_{IN} = 0V
C_{ADR}	Address Input	8		
C_{WE}	Write Enable	8		
C_{OE}	Output Enable	8		
$C_{I/O}$	Data Input/Output	10		

DC OPERATING CHARACTERISTICS: Over operating ranges										
Symbol	Characteristics	Test Conditions	TYP. (*)	C		I		M/B		Unit
				Min.	Max.	Min.	Max.	Min.	Max.	
I_{IN}	Input Leakage Current	V_{IN} = 0V to V_{DD}	-	-2	2	-2	2	-2	2	µA
I_{OUT}	Output Leakage Current	$V_{I/O}$ = 0V to V_{DD}, $\overline{CE}$ or $\overline{OE}$ = V_{IH}, or $\overline{WE}$ = V_{IL}	-	-2	2	-2	2	-2	2	µA
I_{CC1}	Active Supply Current	$\overline{CE}$ = V_{IL}, V_{IN} = V_{IH} or V_{IL}, I_{OUT} = 0mA	40		70		80		80	mA
I_{CC2}	Operating Supply Current	Cycle = min., Duty = 100% I_{OUT} = 0mA	70		110		120		120	mA
I_{SB1}	Full Standby Supply Current (CMOS)	$\overline{CE}$ ≥ V_{DD} -0.2V	0.01		1		2		3	mA
I_{SB2}	Standby Supply (TTL)	$\overline{CE}$ = V_{IH}	6		10		15		15	mA
I_{DR3}	Data Retention Supply Current (3V)	V_{DR} = 3V, $\overline{CE1}$ ≥ V_{DR} -0.2V, CE2 ≥ V_{DR} -0.2V or CE2 ≤ 0.2V	10		120		200		700	µA
I_{DR2}	Data Retention Supply Current (2V)	V_{DR} = 2V, $\overline{CE1}$ ≥ V_{DR} -0.2V, CE2 ≥ V_{DR} -0.2V or CE2 ≤ 0.2V	5		100		170		500	µA
V_{OL}	Output Low Voltage	I_{OUT} = 2.1mA	-		0.4		0.4		0.4	V
V_{OH}	Output High Voltage	I_{OUT} = -1.0mA	-	2.4		2.4		2.4		V

* Typical Values at +25°C and +5V.

ADVANCED INFORMATION

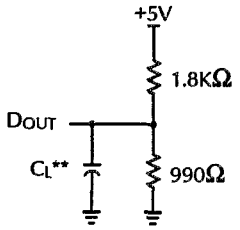
AC TEST CONDITIONS	
Input Pulse Levels	0V to 3.0V
Input Pulse Rise and Fall Times	5ns*
Input and Output Timing Reference Levels	1.5V

* Transition between 0.8V and 2.2V.

OUTPUT LOAD		
Load	**C_L**	**Parameters Measured**
1	100 pF	except t_{CLZ}, t_{CHZ}, t_{OHZ}, t_{OLZ}, t_{WLZ} and t_{WHZ}
2	5 pF	t_{CLZ}, t_{CHZ}, t_{OHZ}, t_{OLZ}, t_{WLZ} and t_{WHZ}

Figure 1. Output Load

** Including Probe and Jig Capacitance.



AC OPERATING CONDITIONS AND CHARACTERISTICS - READ CYCLE: Over operating ranges										
No.	**Symbol**	**Parameter**	**-35†**		**-45**		**-55**		**-70**		**Unit**
			Min.	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	
1	t_{RC}	Read Cycle Time	35		45		55		70		ns
2	t_{AA}	Address Access Time		35		45		55		70	ns
3	t_{CO1}	Chip Enable ($\overline{CE1}$) to Output Valid		35		45		55		70	ns
4	t_{CO2}	Chip Enable (CE2) to Output Valid		35		45		55		70	ns
5	t_{OE}	Output Enable to Output Valid		20		25		30		40	ns
6	t_{LZ1}	Chip Enable ($\overline{CE1}$) to Output in LOW-Z [4, 5]	5		5		5		5		ns
7	t_{LZ2}	Chip Enable (CE2) to Output in LOW-Z [4, 5]	5		5		5		5		ns
8	t_{OLZ}	Output Enable to Output in LOW-Z [4, 5]	0		0		0		0		ns
9	t_{HZ1}	Chip Enable ($\overline{CE1}$) to Output in HIGH-Z [4, 5]		15		20		25		30	ns
10	t_{HZ2}	Chip Enable (CE2) to Output in HIGH-Z [4, 5]		15		20		25		30	ns
11	t_{OHZ}	Output Enable to Output in HIGH-Z [4, 5]		15		20		25		30	ns
12	t_{OH}	Output Hold from Address Change	5		5		5		10		ns

AC OPERATING CONDITIONS AND CHARACTERISTICS - WRITE CYCLE [6,7]: Over operating ranges										
No.	**Symbol**	**Parameter**	**-35†**		**-45**		**-55**		**-70**		**Unit**
			Min.	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	
13	t_{WC}	Write Cycle Time	35		45		55		70		ns
14	t_{AW}	Address Valid to End of Write	30		40		45		65		ns
15	t_{CW}	Chip Enable to End of Write	30		40		45		65		ns
16	t_{AS}	Address Set-up Time***	0		0		0		0		ns
17	t_{WP}	Write Pulse Width	30		35		40		55		ns
18	t_{WR}	Write Recovery Time	5		5		5		5		ns
19	t_{WHZ}	Write Enable to Output in HIGH-Z [4, 5]		15		20		25		30	ns
20	t_{DW}	Data to Write Time Overlap	18		20		25		35		ns
21	t_{DH}	Data Hold from Write Time	0		0		0		0		ns
22	t_{OW}	Output Active from End of Write	5		5		5		5		ns

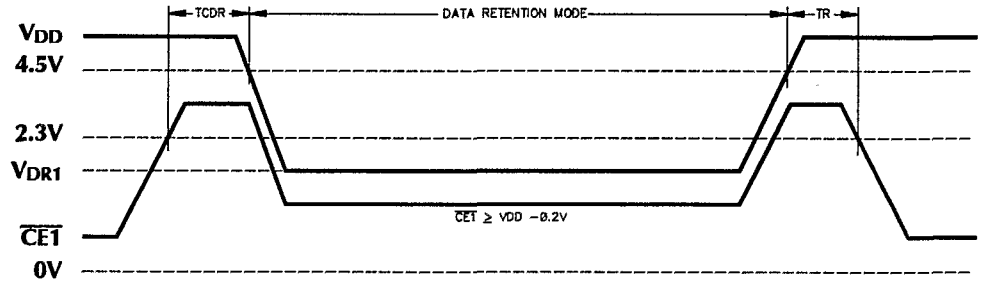
*** Valid for both Read and Write Cycles.

† Commercial only.

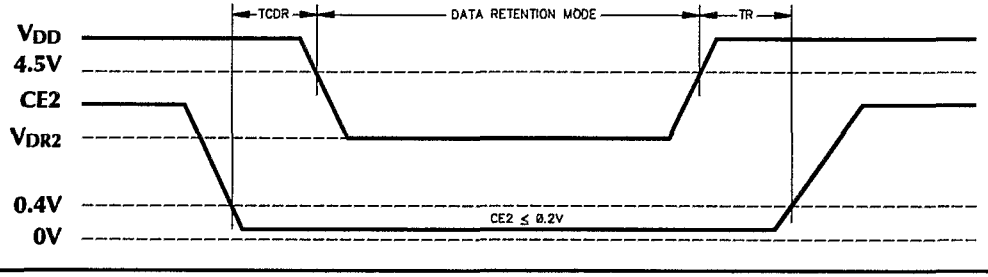
Data Retention AC Characteristics						
Symbol	**Parameter**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
V_{DR}	V_{DD} for Data Retention	$\overline{CE1} \geq V_{DD}$ -0.2V, CE2 $\geq V_{DD}$ -0.2V or CE2 $\leq V_{DD}$ 0.2V	2.0	-	-	V
t_{CDR}	Chip Disable to Data Retention Time	See Retention Waveform	0	-	-	ns
t_R	Operation Recovery Time	See Retention Waveform	5	-	-	ms

ADVANCED INFORMATION

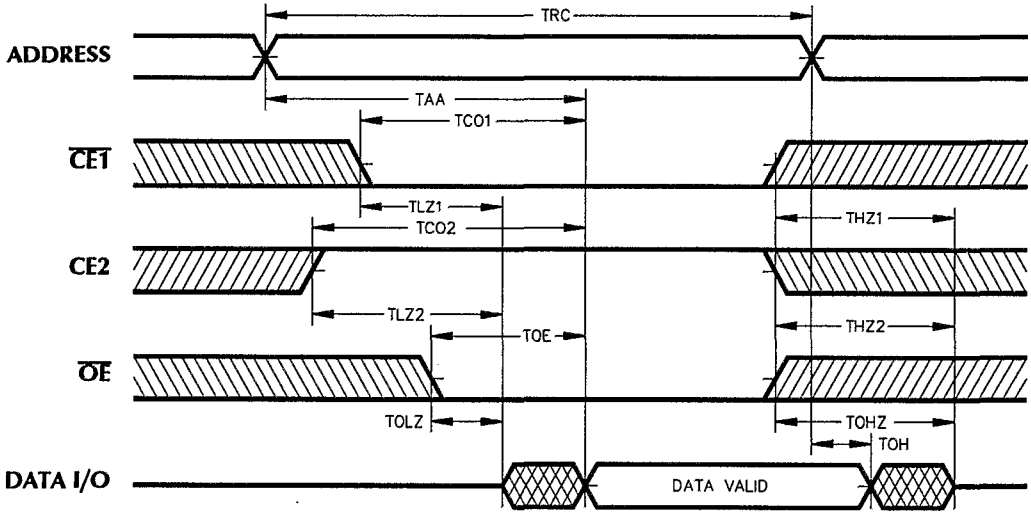
DATA RETENTION WAVEFORM: $\overline{CE1}$ Controlled.



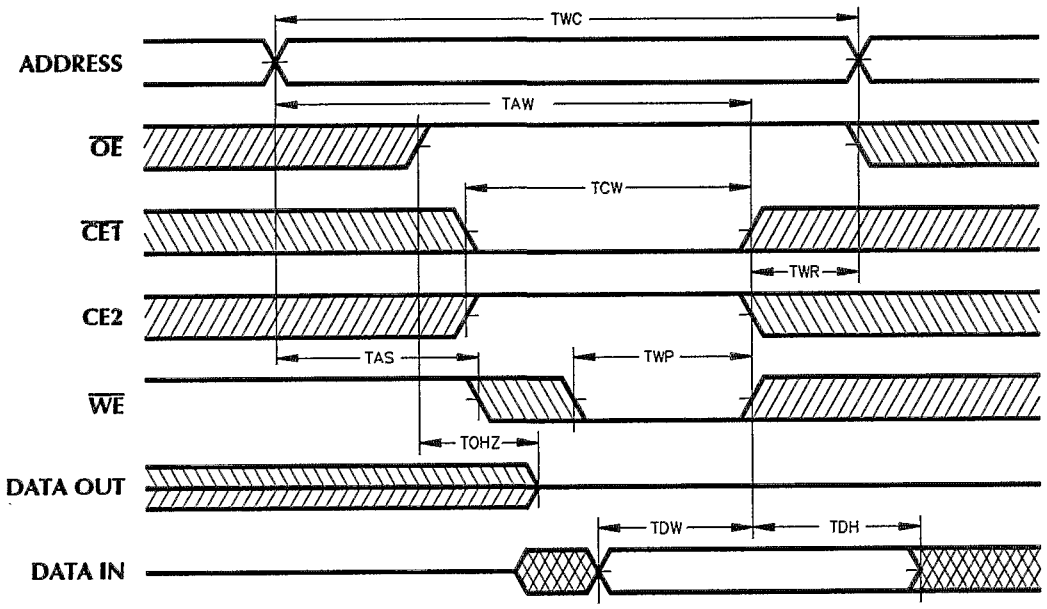
DATA RETENTION WAVEFORM: [8] CE2 Controlled.



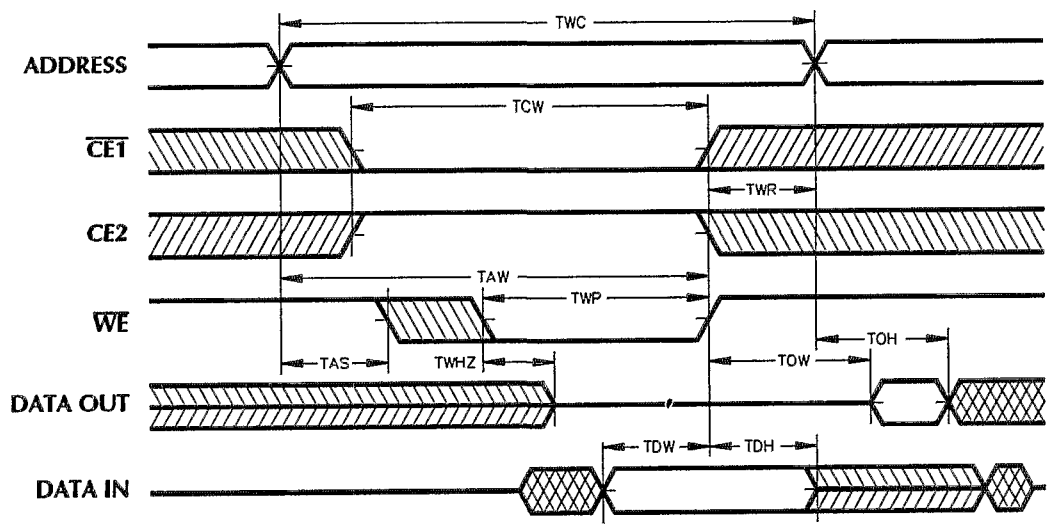
READ CYCLE



WRITE CYCLE 1: $\overline{WE}$ Controlled. $\overline{OE}$ Clocked.



WRITE CYCLE 2: $\overline{CE}$ Controlled. $\overline{OE}$ is LOW.



ADVANCED INFORMATION

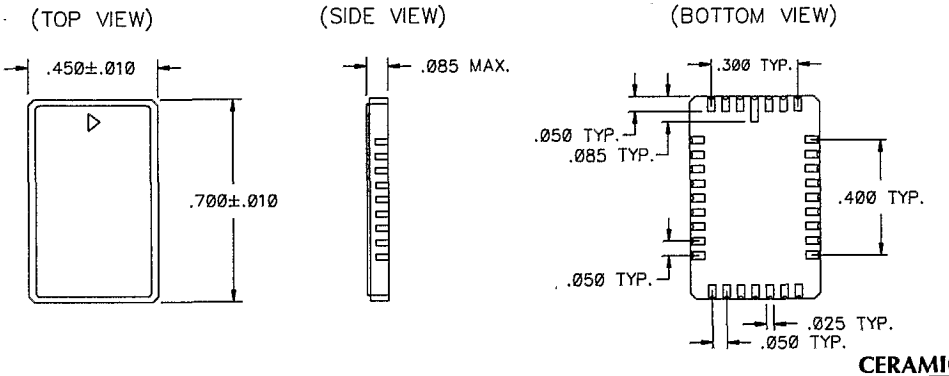
ORDERING INFORMATION

DP (PREFIX) S128M8A (DEVICE TYPE) X (PACKAGE) X (DESIGN UNIQUENESS) – XX (SPEED) X (GRADE)

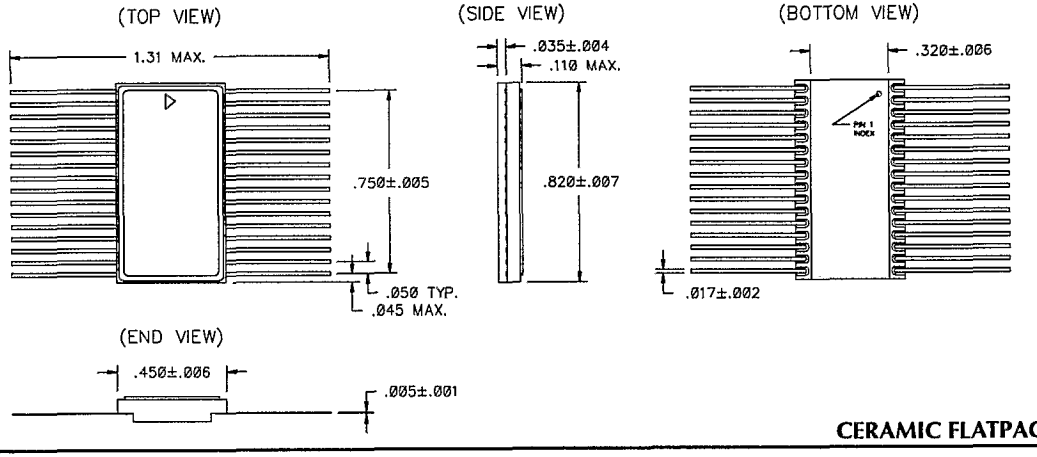
DENSE–PAC

C	COMMERCIAL	0°C to +70°C
I	INDUSTRIAL	–40°C to +85°C
M	MILITARY	–55°C to +125°C
B	MIL–PROCESSED	–55°C to +125°C
35	35ns (COMMERCIAL ONLY)	
45	45ns	
55	55ns	
70	70ns	
BLANK	TWO CHIP ENABLES	
S	SINGLE CHIP ENABLE ("N" PACKAGE ONLY)	
F	32–PIN CERAMIC FLATPACK	
G	32–PAD CERAMIC LCC	
K	32–PIN CERAMIC ZIP	
N	32–PIN CERAMIC SIDE BRAZED DIP	
	HIGH SPEED CMOS SRAM 128KX8 MONOLITHIC	

MECHANICAL DIAGRAMS

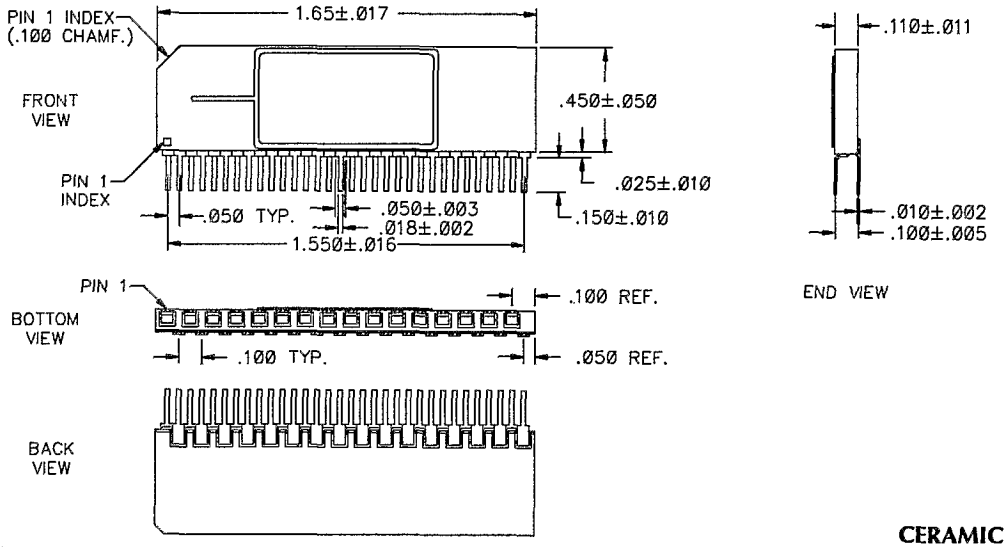


CERAMIC LCC

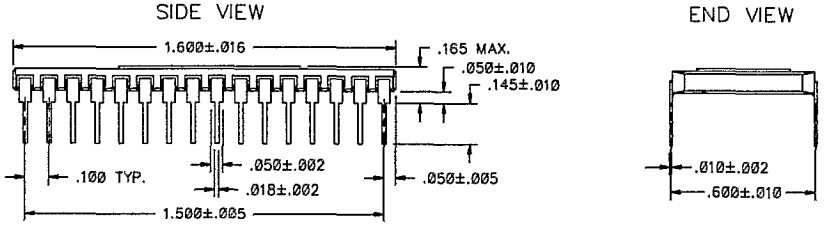


CERAMIC FLATPACK

MECHANICAL DIAGRAMS (Continued)



CERAMIC ZIP



CERAMIC SIDE BRAZED DIP

NOTES:

1. All voltages are with respect to V_{SS}.
2. *-2.0V min. for pulse width less than 20ns (V_{IL} min. = -0.5V at DC level).*
3. Stresses greater than those 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 above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.
4. This parameter is guaranteed and not 100% tested.
5. *Transition is measured at the point of ± 500mV from steady state voltage.*
6. When $\overline{OE}$ and $\overline{CE}$ are LOW and $\overline{WE}$ is HIGH, I/O pins are in the output state; and input signals of opposite phase to the outputs must not be applied.
7. The outputs are in a high impedance state when $\overline{WE}$ is LOW.
8. CE2 controls address buffer, $\overline{WE}$ buffer, $\overline{CE1}$ buffer and $\overline{OE}$ buffer and D_{IN} buffer. If CE2 controls Data Retention Mode, V_{IN} levels (Address, $\overline{WE}$, $\overline{OE}$, $\overline{CS1}$, I/O) can be in the high impedance state. If $\overline{CE1}$ controls Data Retention Mode, CE2 must be CE2 ≥ V_{DD} -0.2V or 0V ≤ CE2 ≤ 0.2V. The other input levels (Address, $\overline{WE}$, $\overline{OE}$, I/O) can be in the High Impedance State.

Dense-Pac Microsystems, Inc.

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