

54S/74S189
54LS/74LS189 (Preliminary data)

DESCRIPTION

The "189" is a 64-Bit high-speed Read/Write Random Access Memory for use as a "scratch pad" memory with non-destructive read-out. Memory cells are organized in a matrix to provide 16 words of four bits each. Four buffered Address (A_0-A_3) inputs are decoded on the chip to select one of the sixteen memory words for read or write operations. Four buffered Data inputs (D_1-D_4) and four 3-state data outputs are provided for versatile memory expansion. Data at the outputs is inverted from the data which was written into the memory. When the write mode is selected the outputs are in the high impedance "off" state.

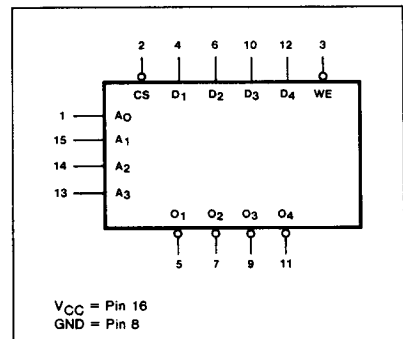
FEATURES

- 16-words by 4-bit memory
- On-chip address decoding
- Inverted data at outputs
- 3-State outputs for easy expansion

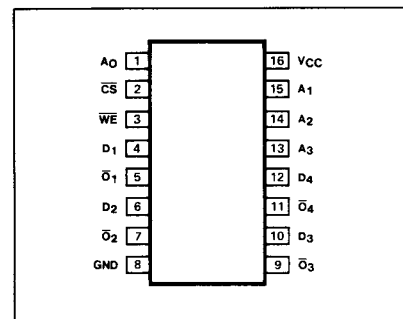
ORDERING CODE (See Section 9 for further Package and Ordering Information)

PACKAGES	COMMERCIAL RANGES		MILITARY RANGES	
	$V_{CC}=5V \pm 5\%$; $T_A=0^\circ C$ to $+70^\circ C$		$V_{CC}=5V \pm 10\%$; $T_A=-55^\circ C$ to $+125^\circ C$	
Plastic DIP	N74S189N	• N74LS189N		
Ceramic DIP	N74S189F	• N74LS189F	S54S189F	• S54LS189F
Flatpak				

LOGIC SYMBOL



PIN CONFIGURATION



INPUT AND OUTPUT LOADING AND FAN-OUT TABLE^(a)

PINS	DESCRIPTION		54/74	54S/74S	54LS/74LS
A_0-A_3	Address inputs	$I_{IH} (\mu A)$ $I_{IL} (\mu A)$		25/10 (a) -150/-100(a)	20 -100
\overline{CS}	Chip Select (active LOW) enable input	$I_{IH} (\mu A)$ $I_{IL} (\mu A)$		25/10 (a) -150/-100(a)	20 -400
\overline{WE}	Write Enable (active LOW) input	$I_{IH} (\mu A)$ $I_{IL} (\mu A)$		25/10 (a) 150/-100(a)	20 -400
D_1-D_4	Data inputs	$I_{IH} (\mu A)$ $I_{IL} (\mu A)$		25/10 (a) -150/-100 (a)	20 -400
$\overline{O}_1-\overline{O}_4$	Data (inverting) outputs	$I_{OH} (\mu A)$ $I_{OL} (mA)$		-2.0 16	-1/-2.6 (a) 12/24(a)

NOTE

a. The slashed numbers indicate different parametric values for Military/Commercial temperature ranges respectively.



FUNCTIONAL DESCRIPTION

The "189" is a high-speed array of 64 memory cells organized as 16 words of four bits each. A one-of-sixteen address decoder selects a single word which is specified by the four Address inputs (A_0-A_3). A READ operation is initiated after the address lines are stable when the Write Enable (\overline{WE}) input is HIGH and the Chip Select-Memory Enable (\overline{CS}) input is LOW. Data is read at the outputs inverted from the data which was written into the memory.

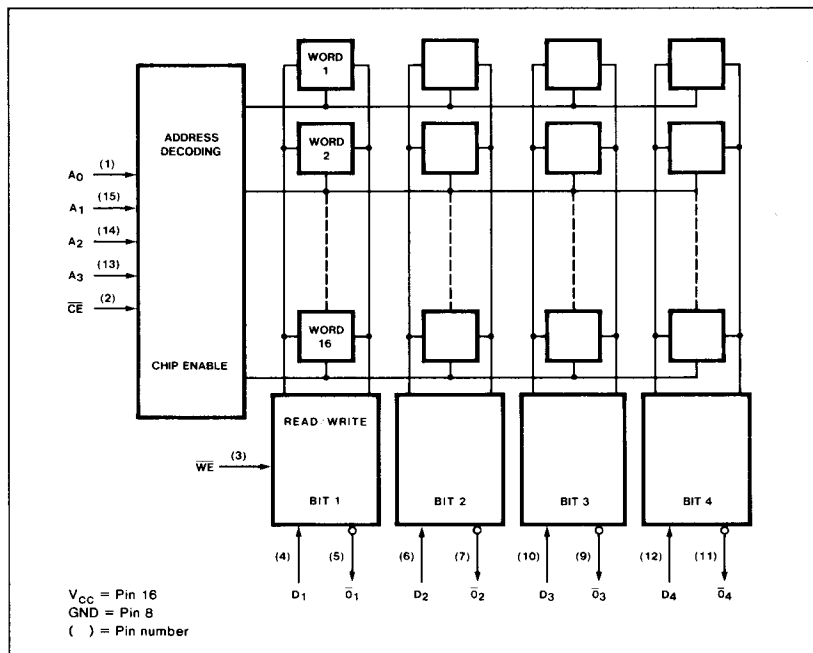
A WRITE operation requires that the \overline{WE} and \overline{CS} inputs be LOW. The address inputs must be stable during the WRITE mode for predictable operation. When the write mode is selected the outputs are in the high impedance "off" state. The selected memory cells are transparent to changes in the data during the WRITE mode. Therefore, data must be stable one setup time before the LOW-to-HIGH transition of \overline{CE} or \overline{WE} .

MODE SELECT—FUNCTION TABLE

OPERATING MODE	INPUTS			OUTPUTS
	\overline{CS}	\overline{WE}	D_n	\overline{O}_n
Write - Disable Outputs	L	L	L	(Z)
	L	L	H	(Z)
Read	L	H	X	$\overline{\text{Data}}$
Store - Disable Outputs	H	X	X	(Z)

H = HIGH voltage level
 L = LOW voltage level
 X = Don't care
 Data = Read complement of data from addressed word location
 (Z) = High impedance "off" state

BLOCK DIAGRAM



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE^(b)

PARAMETER	TEST CONDITIONS	54/74		54S/74S		54LS/74LS		UNIT
		Min	Max	Min	Max	Min	Max	
V _{OL} Output LOW voltage	V _{CC} = Min, I _{OL} = 16mA	Mil			0.5			V
		Com			0.45			V
	V _{CC} = Min	I _{OL} = 12mA					0.4	V
		I _{OL} = 24mA					0.5(c)	V
V _{OH} Output HIGH voltage	V _{CC} = Min I _{OH} = See Fan-Out Table			2.4		2.4		V
I _{CC} Supply current	V _{CC} = Max	Mil			110		45	mA
		Com			110		37	mA

See BIPOLAR & MOS MEMORY DATA MANUAL for 54S/74S189 AC Characteristics

NOTES

- b. For family dc characteristics, see inside front cover for 54/74 and 54H/74H, and see inside back cover for 54S/74S and 54LS/74LS specifications.
- c. This parameter for Commercial Range only.