

65,536 WORD x 1 BIT CMOS STATIC RAM

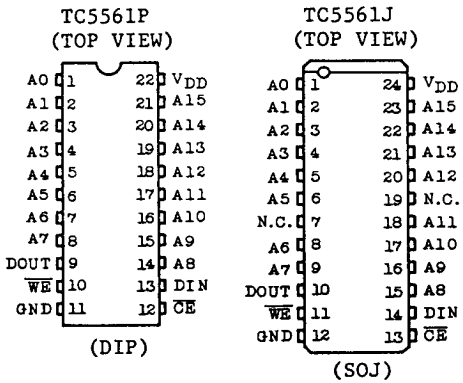
DESCRIPTION

The TC5561P/J is a 65,536 bit high speed static random access memory organized as 65,536 words by 1 bit using CMOS technology, and operates from a single 5-volt supply. Toshiba's high performance device technology provides both high speed and low power features with a maximum access time of 45ns/55ns/70ns and maximum operating current of 100mA at minimum cycle time. The TC5561P/J also features an automatic stand-by mode. When deselected by Chip Enable (\overline{CE}), the operating current is reduced from 100mA to 2mA. The TC5561P/J is suitable for use in main memory of high speed computer and pattern memory, where high speed/low power/high density are required. The TC5561P is offered in a 22 pin plastic DIP with 300 mil width for high density assembly and the TC5561J is offered in a 24 pin plastic SOJ with 300 mil width for high density surface assembly. The TC5561P/J is fabricated with ion implanted CMOS silicon gate MOS technology for high performance and high reliability.

FEATURES

- Fast access time: TC5561P/J-45 45ns(MAX.)
TC5561P/J-55 55ns(MAX.)
TC5561P/J-70 70ns(MAX.)
- Low power dissipation: Operation 100mA(MAX.)
Standby 2mA(MAX.)
- 5V single power supply
- Fully static operation
- Directly TTL compatible:
All Inputs and Output
- I/O separate
- Package: 22 Pin plastic 300 mil DIP : TC5561P
24 Pin plastic 300 mil SOJ : TC5561J

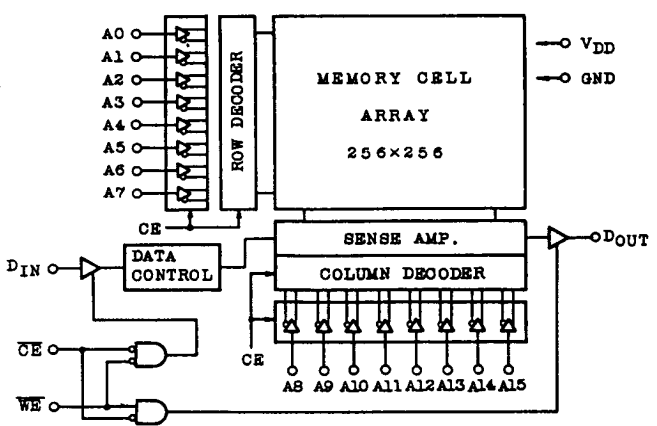
PIN CONNECTION



PIN NAMES

A0 ~ A15	Address Inputs
DIN	Data Input
DOUT	Data Output
\overline{CE}	Chip Enable Input
\overline{WE}	Write Enable Input
VDD	Power (+5V)
GND	Ground
N.C.	No Connection

BLOCK DIAGRAM



TC5561P/J-45, TC5561P/J-55 TC5561P/J-70

MAXIMUM RATINGS

SYMBOL	ITEM	RATING	UNIT
V _{DD}	Power Supply Voltage	-0.3 ~ 7.0	V
V _{IN}	Input Voltage	-2.0 ~ 7.0	V
V _{OUT}	Output Voltage	-0.5 ~ V _{DD} +0.5	V
P _D	Power Dissipation	650	mW
T _{solder}	Soldering Temperature	260 . 10	°C . sec
T _{stg}	Storage Temperature	-65 ~ 150	°C
T _{opr}	Operating Temperature	0 ~ 70	°C

D.C. RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V _{DD}	Power 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	-0.3	-	0.8	V
V _{DH}	Data Retention Supply Voltage	2.0	-	5.5	V

D.C. and OPERATING CHARACTERISTICS (Ta=0 ~ 70°C, V_{DD}=5V±10%)

SYMBOL	PARAMETER	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
I _{IL}	Input Leakage Current	V _{IN} =0 ~ V _{DD}	-	-	±1.0	μA
I _{OH}	Output High Current	V _{OH} =2.4V	-8	-	-	mA
I _{OL}	Output Low Current	V _{OL} =0.4V	8	-	-	mA
I _{LO}	Output Leakage Current	CE=V _{IH} or WE=V _{IL} V _{OUT} =0 ~ V _{DD}	-	-	±1.0	μA
I _{DDO}	Operating Current	V _{DD} =5.5V, t _{cyc} I _e =Min cycle CE=V _{IL} Other Input=V _{IH} /V _{IL}	-	-	100	mA
I _{DD} S1	Standby Current	CE=V _{IH}	-	-	2	mA
I _{DD} S2		CE=V _{DD} -0.2V	-	-	100	μA

CAPACITANCE (Ta=25°C)

SYMBOL	PARAMETER	TEST CONDITION	MAX.	UNIT
C _{IN}	Input Capacitance	V _{IN} =GND	10	pF
C _{OUT}	Output Capacitance	V _{OUT} =GND	10	pF

Note: This parameter is periodically sampled and is not 100% tested.

A.C. CHARACTERISTICS (Ta=0 ~ 70°C, VDD=5V±10%)

Read cycle

SYMBOL	PARAMETER	TC5561P-45 TC5561J-45		TC5561P-55 TC5561J-55		TC5561P-70 TC5561J-70		UNIT
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
t _{RC}	Read Cycle Time	45	-	55	-	70	-	ns
t _{ACC}	Address Access Time	-	45	-	55	-	70	ns
t _{CO}	Chip Enable Access Time	-	45	-	55	-	70	ns
t _{COE}	Chip Enable to Output in Low-Z	5	-	5	-	5	-	ns
t _{COD}	Chip Enable to Output in High-Z	-	15	-	15	-	15	ns
t _{OH}	Output Data Hold Time	5	-	5	-	5	-	ns

Write cycle

SYMBOL	PARAMETER	TC5561P-45 TC5561J-45		TC5561P-55 TC5561J-55		TC5561P-70 TC5561J-70		UNIT
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	
t _{WC}	Write Cycle Time	45	-	55	-	70	-	ns
t _{WP}	Write Pulse Width	30	-	35	-	35	-	ns
t _{CW}	Chip Enable to End of Write	30	-	35	-	35	-	ns
t _{AW}	Address Set up Time	0	-	0	-	0	-	ns
t _{WR}	Write Recovery Time	0	-	0	-	0	-	ns
t _{ODW}	\overline{WE} to Output High-Z	-	15	-	15	-	15	ns
t _{OEW}	\overline{WE} to Output Low-Z	0	-	0	-	0	-	ns
t _{DS}	Data Set up Time	25	-	25	-	30	-	ns
t _{DH}	Data Hold Time	0	-	0	-	0	-	ns

A.C. TEST CONDITIONS

Input Pulse Levels	0.6V, 2.4V
Input Rise and Fall Time	5ns
Input and Output Timing Reference Levels	1.5V
Output Load	See Fig. 1

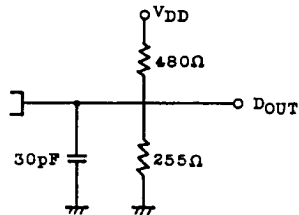
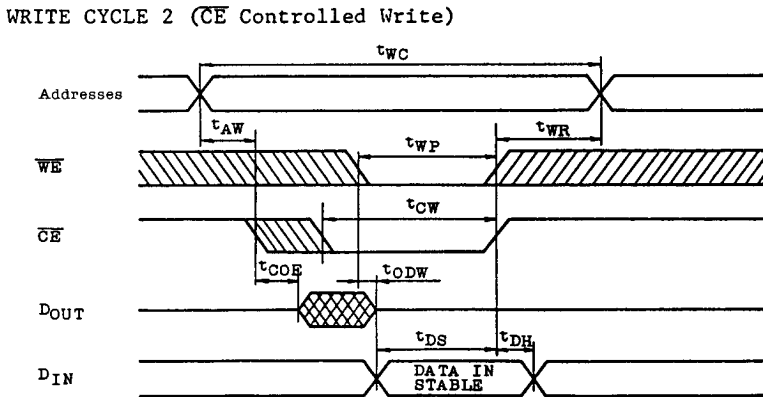
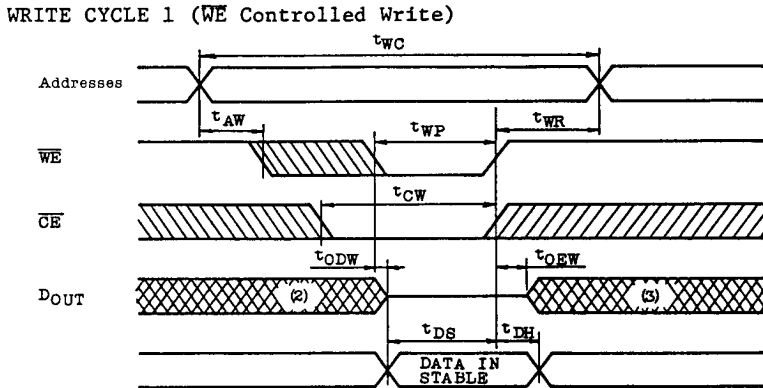
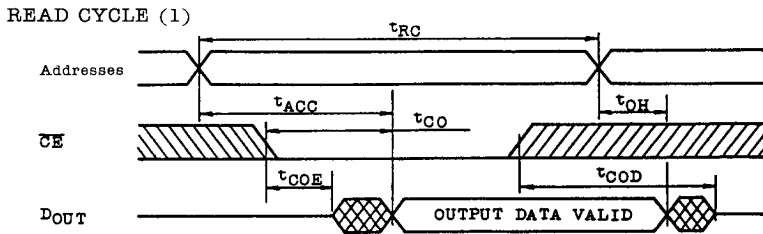


Fig.1 Output Load

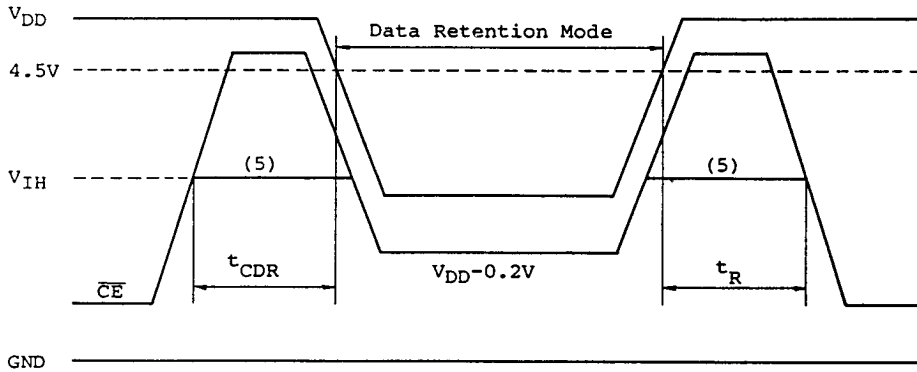
TIMING WAVEFORMS



- Note: 1. R/W is High for Read Cycle.
 2. Assuming that \overline{CE} Low transition occurs coincidentally or after \overline{WE} Low transition, outputs remain in a high impedance state.
 3. Assuming that \overline{CE} High transition occurs coincidentally or prior to \overline{WE} High transition, outputs remain in a high impedance state.
 4. The operating temperature (T_a) is guaranteed with transverse air flow exceeding 400 linear feet per minute.

DATA RETENTION CHARACTERISTICS (Ta=0 ~ 70°C)

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V _{DH}	Data Retention Supply Voltage	2.0	-	5.5	V
I _{DD} S2	Standby Supply Current	V _{DD} =3.0V	-	50	μA
		V _{DD} =5.5V	-	100	
t _{CDR}	Chip Deselection to Data Retention Mode	0	-	-	ns
t _R	Recovery Time	TC5561P-45	45	-	ns
		TC5561P-55	55	-	
		TC5561P-70	70	-	



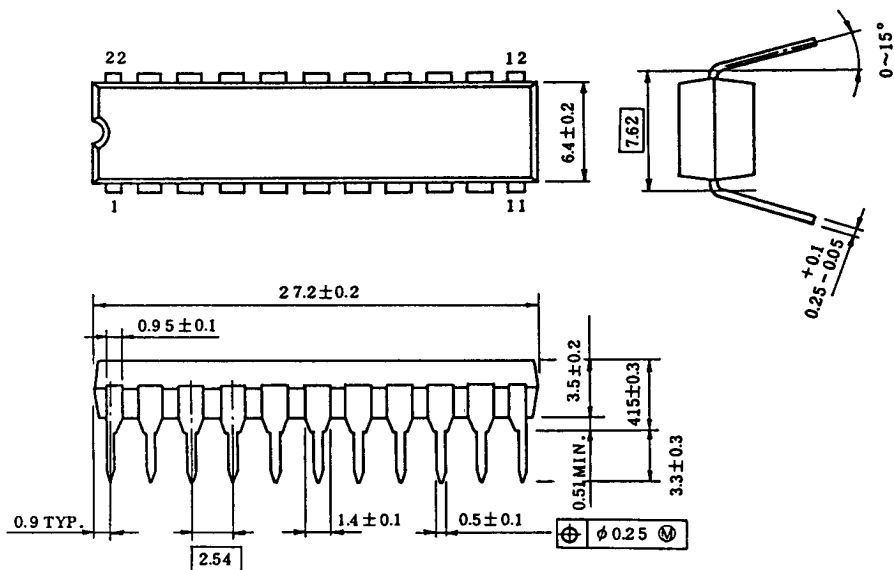
Note: 5. If the V_{IH} of \overline{CE} is 2.2V in active operation, I_{DD}S1 current flows during the period that the V_{DD} voltage is going down from 4.5V to 2.4V.

TC5561P/J-45, TC5561P/J-55 TC5561P/J-70

OUTLINE DRAWINGS

• Plastic DIP (DIP22-P-300)

Unit in mm

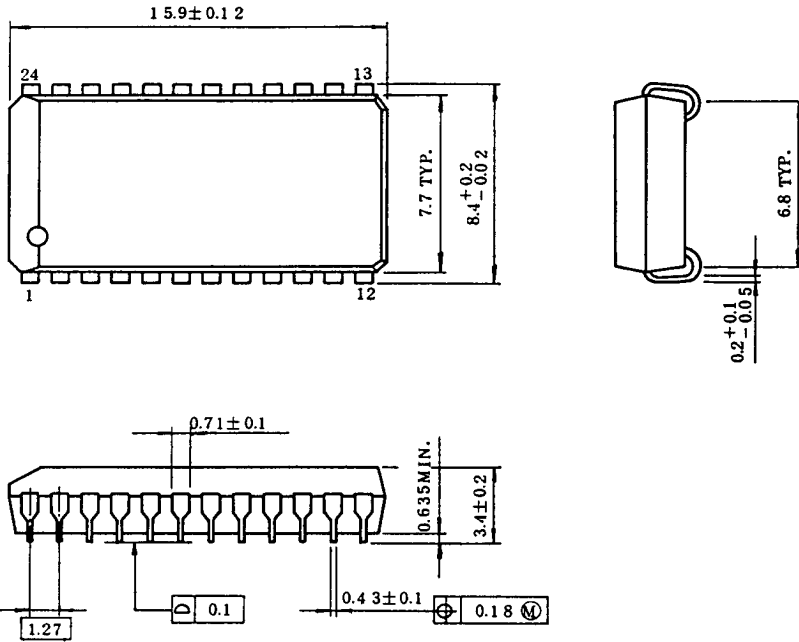


Note: Package width and length do not include mold protrusion, allowable mold protrusion is 0.15mm.

OUTLINE DRAWINGS

• Plastic SOJ (SOJ24-P-300)

Unit in mm



Note: Package width and length do not include mold protrusion, allowable mold protrusion is 0.15mm.