57C4500-40/50/65/80

High Density First-in First-out (FIFO)
256x9 CMOS Memory

Advance Information

DISTINCTIVE CHARACTERISTICS

- **RAM based FIFO**
- **256x9 organization**
- **Cycle times of 50/65/80/100 nanoseconds**
- **Asynchronous and simultaneous writes and reads**
- **Low power consumption – 80 mA maximum**
- **Status flags – full, half-full, empty**
- **Retransmit capability**
- **Expandable in both width and depth**
- **Increased noise immunity for $\overline{XI}$ - CMOS threshold**
- **Functional and pin compatible with industry standard devices**

GENERAL DESCRIPTION

The 57C4500 is a RAM-based CMOS FIFO that is 256 words deep with 9-bit wide words. It is expandable to any width and/or depth to create much larger FIFOs.

This FIFO can accept data and output data asynchronously and simultaneously at data rates from 0 to 20 MHz. Status flags are provided to signify empty, full, and half-full conditions. The capability also exists to retransmit data from the FIFO.

High Density FIFOs such as the 57C4500 are useful in a wide range of applications. The ability to buffer large transfers of data and the rate adaption capabilities make the 57C4500 useful in communication, image processing, mass storage, DSP, and printing systems.

BLOCK DIAGRAM

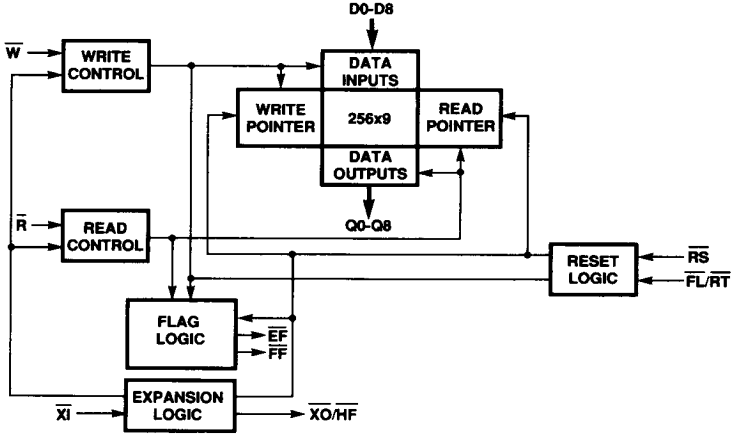
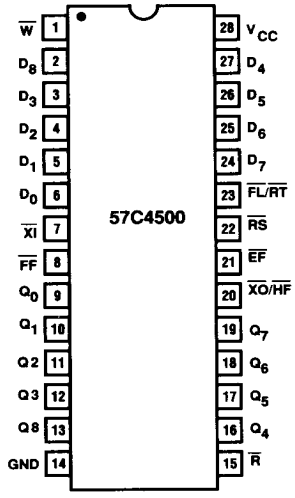


Figure 1.

Publication # 10907 Rev. A Amendment /0
Issue Date: June 1988

CONNECTION DIAGRAMS

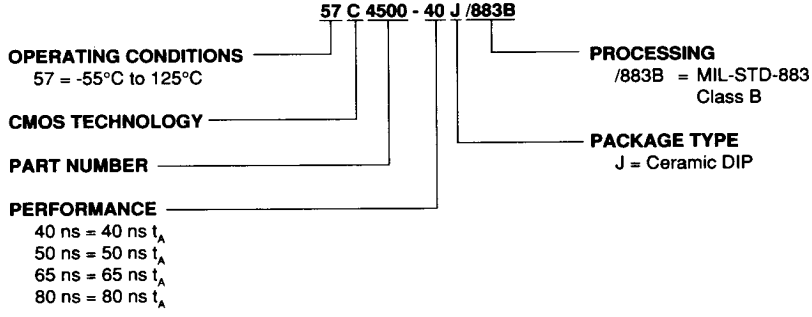
DIP



Pin Designations:

- $\overline{W}$ = Write
- $\overline{R}$ = Read
- $\overline{RS}$ = Reset
- $\overline{FL}/\overline{RT}$ = First Load/Retransmit
- D_X = Data In
- Q_Y = Data Out
- $\overline{XI}$ = Expansion In
- $\overline{XO}/\overline{HF}$ = Expansion Out/Half-Full Flag
- $\overline{FF}$ = Full Flag
- $\overline{EF}$ = Empty Flag
- V_{CC} = Supply Voltage
- GND = Ground

ORDERING INFORMATION



ORDERING INFORMATION

Part Number	Description	Package	Temp
57C4500-40	256-word by 9-bit FIFO	J	Mil
57C4500-50			
57C4500-65			
57C4500-80			

ABSOLUTE MAXIMUM RATINGS

Supply voltage, V_{CC} ..... -0.5 V to +7.0 V
Input voltage ..... -0.5 V to V_{CC} +0.5 V
Operating temperature ..... -55°C to +125°C
Storage temperature ..... -65°C to +150°C
Power dissipation ..... 2.0 W
DC output current ..... 50 mA

Stresses above those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent device failure. Functionality at or above these limits is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability.

DC CHARACTERISTICS Military: V_{CC} = 5 V ±10%, T_A = -55°C to +125°C

Parameter Symbol	Parameter Description	57C4500-40 T_A = 40 ns Min.	Max.	57C4500-50 T_A = 50 ns Min.	Max.	57C4500-65 T_A = 65 ns Min.	Max.	57C4500-80 T_A = 80 ns Min.	Max.	Unit
I_{IL}	Input Leakage Current (any input) (Note 1)	-1	1	-1	1	-1	1	-1	1	µA
I_{IO}	Output Leakage Current (data outputs) (Note 2)	-10	10	-10	10	-10	10	-10	10	µA
V_{IH}	Input High Voltage (all inputs except $\overline{XI}$) (Note 3)	2.0	–	2.0	–	2.0	–	2.0	–	V
V_{IL}	Input Low Voltage (all inputs except $\overline{XI}$) (Note 3)	–	0.8	–	0.8	–	0.8	–	0.8	V
V_{IHXI}	Input High Voltage, $\overline{XI}$ (Note 3)	3.5	–	3.5	–	3.5	–	3.5	–	V
V_{ILXI}	Input Low Voltage, $\overline{XI}$ (Note 3)	–	1.5	–	1.5	–	1.5	–	1.5	V
V_{OH}	Output Logic "1" Voltage I_{OH} = -2 mA	2.4	–	2.4	–	2.4	–	2.4	–	V
V_{OL}	Output Logic "0" voltage I_{OL} = 8 mA	–	0.4	–	0.4	–	0.4	–	0.4	V
I_{CC1}	Average V_{CC} Power Supply Current (Note 4)	–	80	–	80	–	80	–	80	mA
I_{CC2}	Average Standby Current ($\overline{R}$ = $\overline{W}$ = $\overline{RS}$ = $\overline{FL}$/$\overline{RT}$ = V_{IH}) (Note 4)	–	25	–	25	–	25	–	25	mA
I_{CC3}	Power Down Current (all inputs = V_{CC} -0.2 V) (Note 4)	–	10	–	10	–	10	–	10	mA

Notes:
1. Measurements with GND ≤ V_{IN} ≤ V_{CC}.
2. $\overline{R}$ ≥ V_{IH}, GND ≤ V_{OUT} ≤ V_{CC}.
3. These are absolute voltage levels with respect to the ground pins on the device and include all overshoots due to system or tester noise. Do not attempt to test these values without suitable equipment.
4. I_{CC} measurements are made with outputs open.

AC CHARACTERISTICS V_{CC} = 5 V ±10%, T_A = -55°C to +125°C

Parameter Symbol	Parameter Description	57C4500-40 Min.	57C4500-40 Max.	57C4500-50 Min.	57C4500-50 Max.	57C4500-65 Min.	57C4500-65 Max.	57C4500-80 Min.	57C4500-80 Max.	Unit
Write and Flag Timing										
t_{WC}	Write Cycle Time	50		65		80		100		ns
t_{WPW}	Write Pulse Width	40		50		65		80		ns
t_{WR}	Write Recovery Time	10		15		15		20		ns
t_{DS}	Data Setup Time	25		30		30		40		ns
t_{DH}	Data Hold Time	0		5		10		10		ns
t_{WFF}	Write LOW to Full Flag LOW		35		45		60		60	ns
t_{WHF}	Write LOW to Half-Full Flag LOW		50		65		80		100	ns
t_{WEF}	Write HIGH to Empty Flag HIGH		35		45		60		60	ns
t_{WLZ}	Write pulse HIGH to data bus at LOW Z (Note 1)	10		15		15		20		ns
Read and Flag Timing										
t_{RC}	Read Cycle Time	50		65		80		100		ns
t_A	Access Time		40		50		65		80	ns
t_{RR}	Read Recovery Time	10		15		15		20		ns
t_{RPW}	Read Pulse Width	40		50		65		80		ns
t_{RLZ}	Read pulse LOW to data bus at LOW Z (Note 1)	5		10		10		10		ns
t_{DV}	Data Valid from read pulse HIGH	5		5		5		5		ns
t_{RHZ}	Read pulse HIGH to data bus at HIGH Z (Note 1)		25		30		30		30	ns
t_{RFF}	Read HIGH to Full Flag HIGH		35		45		60		60	ns
t_{RHF}	Read HIGH to Half Full-Flag HIGH		50		65		80		100	ns
t_{REF}	Read LOW to Empty Flag LOW		35		45		60		60	ns
Reset Timing										
t_{RSC}	Reset Cycle Time	50		65		80		100		ns
t_{RS}	Reset Pulse Width	40		50		65		80		ns
t_{RSS}	Reset Setup Time	40		50		65		80		ns
t_{RSR}	Reset Recovery Time	10		15		15		20		ns
t_{EFL}	Reset to Empty Flag LOW		50		65		80		100	ns
t_{HFH}	Reset to Half-Full Flag High		50		65		80		100	ns
t_{FFH}	Reset to Full Flag HIGH		50		65		80		100	ns
Retransmit Timing										
t_{RTC}	Retransmit Cycle Time	50		65		80		100		ns
t_{RT}	Retransmit Pulse Width	40		50		65		80		ns
t_{RTR}	Retransmit Recovery Time	10		15		15		20		ns

Note: 1. Characterized parameters.