

HS-C²MOS™ INTEGRATED CIRCUITS

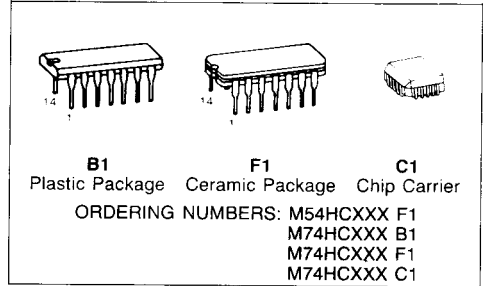
M54/74HC125
M54/74HC126

PRELIMINARY DATA

QUAD BUS BUFFERS (3-STATE)

DESCRIPTION

The M54/74HC125 and the M54/74HC126 are high speed CMOS QUAD BUS BUFFERS (3-STATE) fabricated in silicon gate C²MOS technology. They have the same high speed performance of LSTTL combined with true CMOS low power consumption. These devices require the 3-STATE control input C to be taken high to put the output into the high impedance condition. All inputs are equipped with protection circuits against static discharge or transient excess voltage.



FEATURES

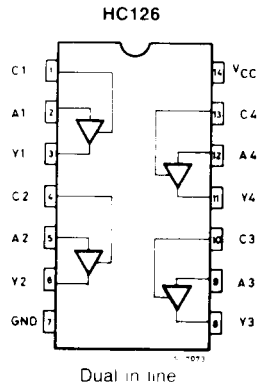
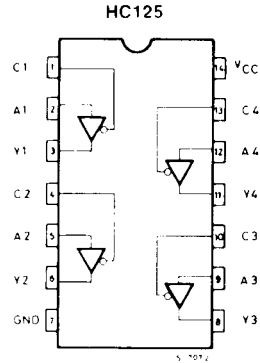
- High Speed
 $t_{PD} = 13 \text{ ns (Typ.) at } V_{CC} = 5 \text{ V}$
- Low Power Dissipation
 $I_{CC} = 4 \mu\text{A (Max.) at } T_A = 25^\circ\text{C}$
- High Noise Immunity
 $V_{NIH} = V_{NIL} = 28\% V_{CC} \text{ (Min.)}$
- Output Drive Capability
15 LSTTL Loads
- Symmetrical Output Impedance
 $|I_{OH}| = I_{OL} = 6 \text{ mA (Min.)}$
- Balanced Propagation Delays
 $t_{PLH} = t_{PHL}$
- Wide Operating Voltage Range
 $V_{CC} \text{ (opr)} = 2 \text{ V to } 6 \text{ V}$
- Pin and Function compatible
with 54/74LS125/126

TRUTH TABLES

HC 125		
Inputs		Output
A	C	Y
H	L	H
L	L	L
X	H	Z

HC126		
Inputs		Output
A	C	Y
H	H	H
L	H	L
X	L	Z

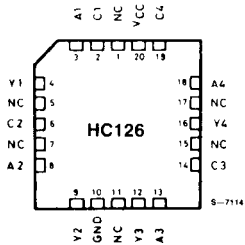
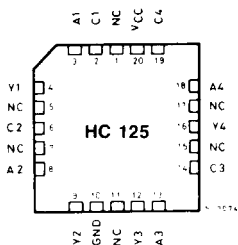
PIN CONNECTIONS (top view)



M54/74HC125

M54/74HC126

CHIP CARRIER



NC = No Internal Connection

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	- 0.5 to 7	V
V _I	DC Input Voltage	- 0.5 to V _{CC} + 0.5	V
V _O	DC Output Voltage	- 0.5 to V _{CC} + 0.5	V
I _{IK}	DC Input Diode Current	± 20	mA
I _{OK}	DC Output Diode Current	± 20	mA
I _O	DC Output Source Sink Current Per Output Pin	± 35	mA
I _{CC} or I _{GND}	DC V _{CC} or Ground Current	± 70	mA
P _D	Power Dissipation	500 (*)	mW
T _{stg}	Storage Temperature	- 65 to 150	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

(*) 500 mW: ≅ 65°C derate to 300 mW by 10 mW/°C: 65°C to 85°C.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Limit	Unit
V _{CC}	Supply Voltage	2 to 6	V
V _I	Input Voltage	0 to V _{CC}	V
V _O	Output Voltage	0 to V _{CC}	V
T _A	Operating Temperature 74HC Series 54HC Series	- 40 to 85 - 55 to 125	°C
t _r , t _f	Input Rise and Fall Time	V _{CC} { 2 V 0 to 1000 4.5V 0 to 500 6 V 0 to 400	ns

DC SPECIFICATIONS

Symbol	Parameter	V _{CC}	Test Condition	T _A = 25°C 54HC and 74HC			- 40 to 85°C 74HC		- 55 to 125°C 54HC		Unit	
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.		
V _{IH}	High Level Input Voltage	2.0 4.5 6.0		1.5 3.15 4.2	— — —	— — —	1.5 3.15 4.2	— — —	1.5 3.15 4.2	— — —	V	
V _{IL}	Low Level Input Voltage	2.0 4.5 6.0		— — —	— — —	0.5 1.35 1.8	— — —	0.5 1.35 1.8	— — —	0.5 1.35 1.8	V	
V _{OH}	High Level Output Voltage	2.0 4.5 6.0 4.5 6.0	V _I	I _O - 20 μA - 6.0 mA - 7.8 mA	1.9	2.0	—	1.9	—	1.9	—	V
			V _{IH} or V _{IL}		4.4	4.5	—	4.4	—	4.4	—	
					5.9	6.0	—	5.9	—	5.9	—	
					4.18	4.31	—	4.13	—	4.10	—	
				5.68	5.8	—	5.63	—	5.60	—		
V _{OL}	Low Level Output Voltage	2.0 4.5 6.0 4.5 6.0	V _{IH} or V _{IL}	20 μA 6.0 mA 7.8 mA	—	0	0.1	—	0.1	—	0.1	V
					—	0	0.1	—	0.1	—	0.1	
					—	0	0.1	—	0.1	—	0.1	
					—	0.17	0.26	—	0.33	—	0.40	
				—	0.18	0.26	—	0.33	—	0.40		
I _I	Input Leakage Current	6.0	V _I = V _{CC} or GND	—	—	±0.1	—	±1	—	±1	μA	
I _{OZ}	3-State Output Off-State Current	6.0	V _I = V _{IH} or V _{IL} V _O = V _{CC} or GND	—	—	±0.5	—	±5.0	—	±10	μA	
I _{CC}	Quiescent Supply Current	6.0	V _I = V _{CC} or GND I _O = 0	—	—	4	—	40	—	80	μA	

AC ELECTRICAL CHARACTERISTICS (V_{CC} = 5V, T_A = 25°C, Input t_r = t_f = 6ns)

Symbol	Parameter	CL (pF)	54HC and 74HC			Unit
			MIN.	TYP.	MAX.	
t _{TLH} t _{THL}	Output Transition Time	50		7	11	ns
t _{PLH} t _{PHL}	Propagation Delay Time A-Y	50		12	20	ns
t _{PLZ} t _{PHZ}	3-State Output Disable Time	5		11	18	ns
t _{PZL} t _{PZH}	3-State Output Enable Time	50		12	20	ns



M54/74HC125

M54/74HC126

AC ELECTRICAL CHARACTERISTICS ($C_L = 50\text{pF}$, Input $t_r = t_f = 6\text{ns}$)

Symbol	Parameter	V _{CC}	Test Condition	T _A = 25°C 54HC and 74HC			-40 to 85°C 74HC		-55 to 125°C 54HC		Unit
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t _{TLH} t _{THL}	Output Transition Time	2.0 4.5 6.0		— — —	22 7 6	60 12 10	— — —	75 15 13			ns
t _{PLH} t _{PHL}	Propagation Delay Time	2.0 4.5 6.0		— — —	37 13 11	105 21 18	— — —	130 26 23			ns
t _{PZL} t _{PHZ}	3-State Output Enable Time	2.0 4.5 6.0		— — —	35 11 10	90 18 16	— — —	110 22 19			ns
t _{PLZ} t _{PHZ}	3-State Output Disable Time	2.0 4.5 6.0		— — —	30 17 16	96 24 22	— — —	116 28 25			ns
C _{IN}	Input Capacitance			—	5	10	—	10			pF
C _{PD} (*)	Power Dissipation Capacitance			—	34	—	—	—			

Note (*) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the following equation.

$$I_{CC(oper)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/4 \text{ (per Circuit).}$$