



MM54C151/MM74C151 8-Channel Digital Multiplexer

General Description

The MM54C151/MM74C151 multiplexer is a monolithic complementary MOS (CMOS) integrated circuit constructed with N- and P-channel enhancement transistors.

This data selector/multiplexer contains on-chip binary decoding. Two outputs provide true (output Y) and complement (output W) data. A logical "1" on the strobe input forces W to a logical "1" and Y to a logical "0".

All inputs are protected against electrostatic effects.

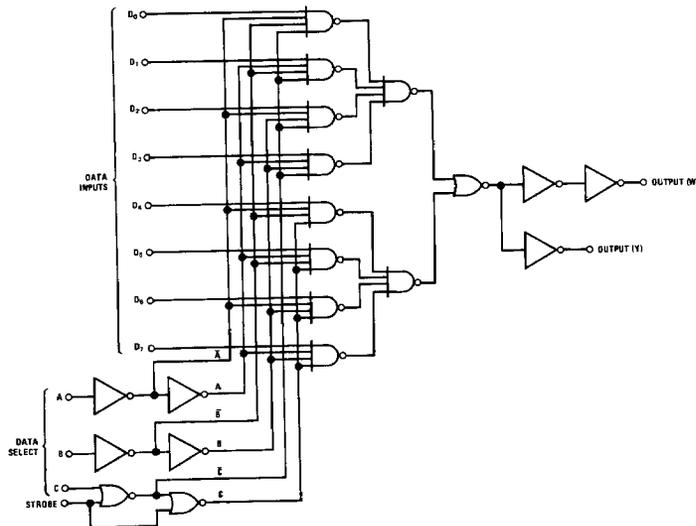
Features

- Supply voltage range 3V to 15V
- Tenth power TTL compatible drive 2 LPTTL loads
- High noise immunity 0.45 V_{CC} (typ.)
- Low power 50 nW (typ.)

Applications

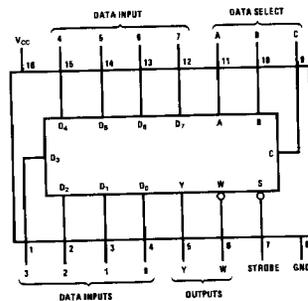
- Automotive
- Data terminals
- Instrumentation
- Medical electronics
- Alarm systems
- Industrial electronics
- Remote metering
- Computers

Logic & Connection Diagrams



TL/F/5892-1

Dual-In-Line Package



TL/F/5892-2

Top View

Order Number MM54C151* or MM74C151*

*Please look into Section 8, Appendix D for availability of various package types.

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Voltage at any Pin	-0.3V to $V_{CC} + 0.3V$
Operating Temperature Range	
MM54C151	-55°C to +125°C
MM74C151	-40°C to +85°C

Storage Temperature Range	-65°C to +150°C
Maximum V_{CC} Voltage	18V
Power Dissipation	
Dual-In-Line	700 mW
Small Outline	500 mW
Operating V_{CC} Range	3V to 15V
Lead Temperature (Soldering, 10 sec.)	260°C

DC Electrical Characteristics Min/Max limits apply across temperature range unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
CMOS TO CMOS						
$V_{IN(1)}$	Logical "1" Input Voltage	$V_{CC} = 5V$ $V_{CC} = 10V$	3.5 8.0			V V
$V_{IN(0)}$	Logical "0" Input Voltage	$V_{CC} = 5V$ $V_{CC} = 10V$			1.5 2.0	V V
$V_{OUT(1)}$	Logical "1" Output Voltage	$V_{CC} = 5V, I_O = -10 \mu A$ $V_{CC} = 10V, I_O = -10 \mu A$	4.5 9.0			V V
$V_{OUT(0)}$	Logical "0" Output Voltage	$V_{CC} = 5V, I_O = 10 \mu A$ $V_{CC} = 10V, I_O = 10 \mu A$			0.5 1.0	V V
$I_{IN(1)}$	Logical "1" Input Current	$V_{CC} = 15V, V_{IN} = 15V$			1.0	μA
$I_{IN(0)}$	Logical "0" Input Current	$V_{CC} = 15V, V_{IN} = 0V$	-1.0			μA
I_{CC}	Supply Current	$V_{CC} = 15V$		0.05	300	μA
CMOS TO LPTTL INTERFACE						
$V_{IN(1)}$	Logical "1" Input Voltage	54C $V_{CC} = 4.5V$ 74C $V_{CC} = 4.75V$	$V_{CC} - 1.5$ $V_{CC} - 1.5$			V mA
$V_{IN(0)}$	Logical "0" Input Voltage	54C $V_{CC} = 4.5V$ 74C $V_{CC} = 4.75V$			0.8 0.8	V V
$V_{OUT(1)}$	Logical "1" Output Voltage	54C $V_{CC} = 4.5V, I_O = -360 \mu A$ 74C $V_{CC} = 4.75V, I_O = -360 \mu A$	2.4 2.4			V V
$V_{OUT(0)}$	Logical "0" Output Voltage	54C $V_{CC} = 4.5V, I_O = 360 \mu A$ 74C $V_{CC} = 4.75V, I_O = 360 \mu A$			0.4 0.4	V V
OUTPUT DRIVE (See 54C/74C Family Characteristics Data Sheet) (Short Circuit Current)						
I_{SOURCE}	Output Source Current	$V_{CC} = 5V, V_{IN(0)} = 0V$ $T_A = 25^\circ C, V_{OUT} = 0V$	-1.75			mA
I_{SOURCE}	Output Source Current	$V_{CC} = 10V, V_{IN(0)} = 0V$ $T_A = 25^\circ C, V_{OUT} = 0V$	-8.0			mA
I_{SINK}	Output Sink Current	$V_{CC} = 5V, V_{IN(1)} = 5V$ $T_A = 25^\circ C, V_{OUT} = V_{CC}$	1.75			mA
I_{SINK}	Output Sink Current	$V_{CC} = 10V, V_{IN(1)} = 10V$ $T_A = 25^\circ C, V_{OUT} = V_{CC}$	8.0			mA

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

AC Electrical Characteristics* $T_A = 25^\circ\text{C}$, $C_L = 50\text{ pF}$, unless otherwise noted

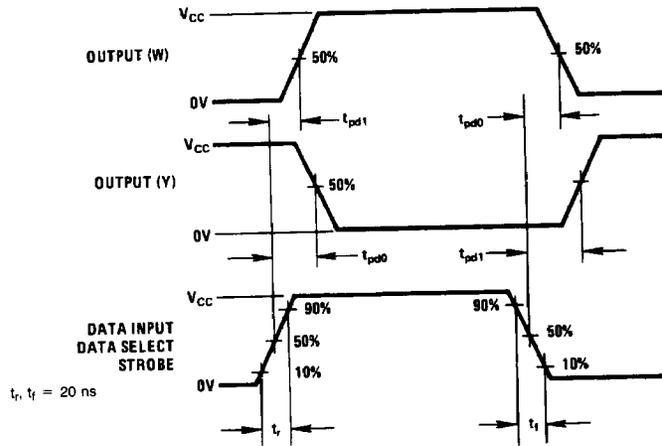
Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{pd0} , t_{pd1}	Propagation Delay Time to a Logical "0" or Logical "1" from Data to Y	$V_{CC} = 5\text{V}$, $V_{CC} = 10\text{V}$		170 80	270 130	ns ns
t_{pd0} , t_{pd1}	Propagation Delay Time to a Logical "0" or Logical "1" from Data to W	$V_{CC} = 5\text{V}$, $V_{CC} = 10\text{V}$		200 90	300 140	ns ns
t_{pd0} , t_{pd1}	Propagation Delay Time to a Logical "0" or Logical "1" from Strobe or Data Select to Y	$V_{CC} = 5\text{V}$, $V_{CC} = 10\text{V}$		240 110	360 170	ns ns
C_{IN}	Input Capacitance	(Note 2)		5		pF
C_{PD}	Power Dissipation Capacitance	(Note 3)		50		pF

*AC Parameters are guaranteed by DC correlated testing.

Note 2: Capacitance is guaranteed by periodic testing.

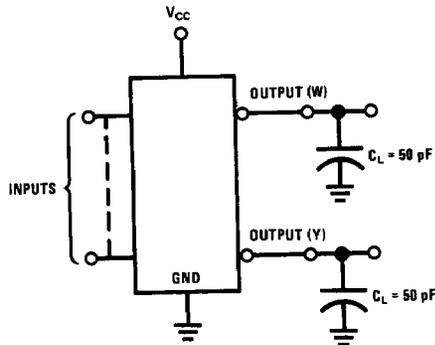
Note 3: C_{PD} determines the no load AC power consumption of any CMOS device. For complete explanation see 54C/74C Family Characteristics Application Note AN-90.

Switching Time Waveforms



TL/F/5892-3

AC Test Circuit



TL/F/5892-4

Truth Table

Inputs													Outputs	
C	B	A	Strobe	D ₀	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	Y	W	
X	X	X	1	X	X	X	X	X	X	X	X	0	1	
0	0	0	0	0	X	X	X	X	X	X	X	0	1	
0	0	0	0	1	X	X	X	X	X	X	X	1	0	
0	0	1	0	X	0	X	X	X	X	X	X	0	1	
0	0	1	0	X	1	X	X	X	X	X	X	1	0	
0	1	0	0	X	X	0	X	X	X	X	X	0	1	
0	1	0	0	X	X	1	X	X	X	X	X	1	0	
0	1	1	0	X	X	X	0	X	X	X	X	0	1	
0	1	1	0	X	X	X	1	X	X	X	X	1	0	
1	0	0	0	X	X	X	X	0	X	X	X	0	1	
1	0	0	0	X	X	X	X	1	X	X	X	1	0	
1	0	1	0	X	X	X	X	X	0	X	X	0	1	
1	0	1	0	X	X	X	X	X	1	X	X	1	0	
1	1	0	0	X	X	X	X	X	X	0	X	0	1	
1	1	0	0	X	X	X	X	X	X	1	X	1	0	
1	1	1	0	X	X	X	X	X	X	X	0	0	1	
1	1	1	0	X	X	X	X	X	X	X	1	1	0	