

MM54C154/MM74C154 4-Line to 16-Line Decoder/Demultiplexer

General Description

The MM54C154/MM74C154 one of sixteen decoder is a monolithic complementary MOS (CMOS) integrated circuit constructed with N- and P-channel enhancement transistors. The device is provided with two strobe inputs, both of which must be in the logical "0" state for normal operation. If either strobe input is in the logical "1" state, all 16 outputs will go to the logical "1" state.

To use the product as a demultiplexer, one of the strobe inputs serves as a data input terminal, while the other strobe input must be maintained in the logical "0" state. The information will then be transmitted to the selected output as determined by the 4-line input address.

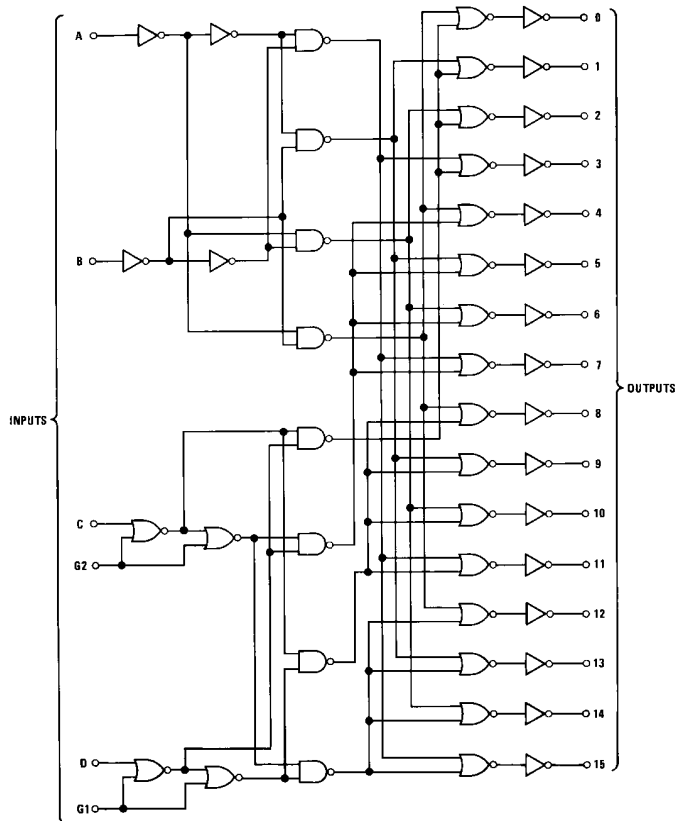
Features

- Supply voltage range 3V to 15V
- Tenth power TTL compatible Drive 2 LPTTL loads
- High noise margin 1V guaranteed
- High noise immunity 0.45 V_{CC} (typ.)

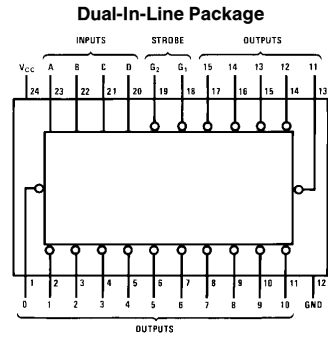
Applications

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

Logic & Connection Diagrams



TL/F/5893-1



TL/F/5893-2

Top View
Order Number MM54C154 or MM74C154

MM54C154/MM74C154 4-Line to 16-Line Decoder/Demultiplexer

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please 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	-55°C to +125°C
MM54C154	-40°C to +85°C
MM74C154	

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 seconds)	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	$V_{CC} = 5.0V$ $V_{CC} = 10V$	3.5 8.0			V
$V_{IN(0)}$	Logical "0" Input Voltage	$V_{CC} = 5.0V$ $V_{CC} = 10V$			1.5 2.0	V
$V_{OUT(1)}$	Logical "1" Output Voltage	$V_{CC} = 5.0V, I_O = -10\mu A$ $V_{CC} = 10V, I_O = -10\mu A$	4.5 9.0			V
$V_{OUT(0)}$	Logical "0" Output Voltage	$V_{CC} = 5.0V, I_O = 10\mu A$ $V_{CC} = 10V, I_O = 10\mu A$			0.5 1.0	V
$I_{IN(1)}$	Logical "1" Input Current	$V_{CC} = 15V, V_{IN} = 15V$		0.005	1.0	μA
$I_{IN(0)}$	Logical "0" Input Current	$V_{CC} = 15V, V_{IN} = 0V$	-1.0	-0.005		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
$V_{IN(0)}$	Logical "0" Input Voltage	54C $V_{CC} = 4.5V$ 74C $V_{CC} = 4.75V$			0.8 0.8	V
$V_{OUT(1)}$	Logical "1" Output Voltage	54C $V_{CC} = 4.5V, I_O = -100\mu A$ 74C $V_{CC} = 4.75V, I_O = -100\mu A$	2.4 2.4			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
OUTPUT DRIVE (See 54C/74C Family Characteristics Data Sheet) (Short Circuit Current)						
I_{SOURCE}	Output Source Current	$V_{CC} = 5.0V, V_{IN(0)} = 0V$ $T_A = 25^\circ C, V_{OUT} = 0V$	-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	$V_{CC} = 5.0V, V_{IN(1)} = 5.0V$ $T_A = 25^\circ C, V_{OUT} = V_{CC}$	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

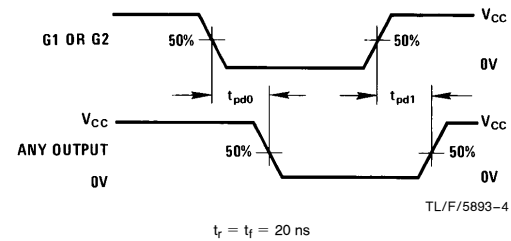
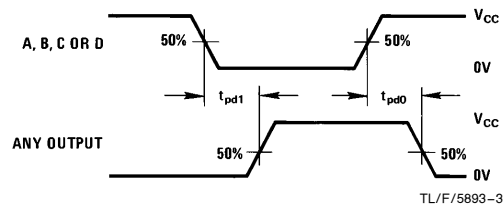
Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{pd0}	Propagation Delay to a Logical "0" from Any Input to Any Output	$V_{CC} = 5.0\text{V}$		275	400	ns
		$V_{CC} = 10\text{V}$		100	200	ns
t_{pd0}	Propagation Delay to a Logical "0" from G1 or G2 to Any Output	$V_{CC} = 5.0\text{V}$		275	400	ns
		$V_{CC} = 10\text{V}$		100	200	ns
t_{pd0}	Propagation Delay to a Logical "0" from Any Input to Any Output	$V_{CC} = 5.0\text{V}$		265	400	ns
		$V_{CC} = 10\text{V}$		100	200	ns
t_{pd1}	Propagation Delay to a Logical "1" from G1 or G2 to Any Output	$V_{CC} = 5.0\text{V}$		265	400	ns
		$V_{CC} = 10\text{V}$		100	200	ns
C_{IN}	Input Capacitance	(Note 2)		5.0		pF
C_{PD}	Power Dissipation Capacitance	(Note 3)		60		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

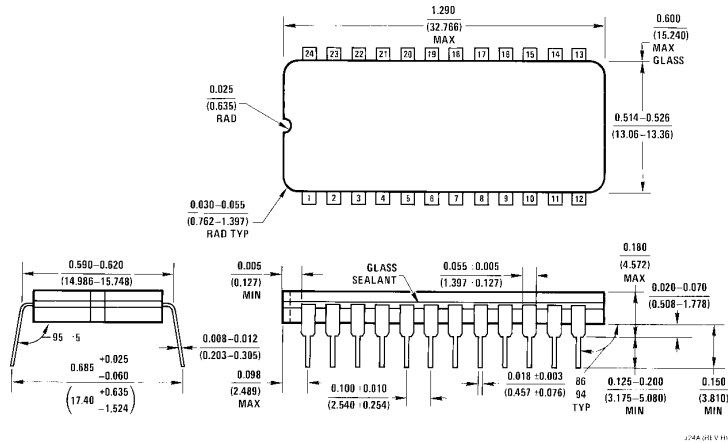


Truth Table

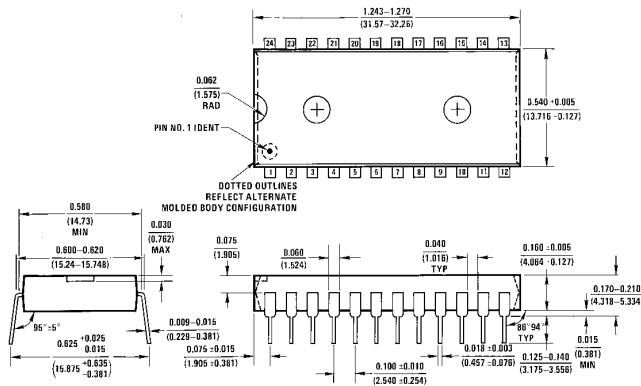
Inputs					Outputs																	
G1	G2	D	C	B	A	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	H	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	H	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H
L	L	L	H	H	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H
L	L	L	H	L	L	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H
L	L	L	H	L	H	L	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H
L	L	L	H	H	L	L	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H
L	L	L	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H
L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L
L	H	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	L	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	H	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H

X = "Don't Care" Condition

Physical Dimensions inches (millimeters)



Ceramic Dual-In-Line Package (J)
Order Number MM54C154J or MM74C154J
NS Package Number J24A



Molded Dual-In-Line Package (N)
Order Number MM54C154N or MM74C154N
NS Package Number N24A

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