National Semiconductor

DM54AS153/DM74AS153 Dual 4-Line to 1-Line Data Selector/Multiplexer

General Description

This Data Selector/Multiplexer contains full on-chip decoding to select one-of-four data sources as a result of a unique two-bit binary code at the Select inputs. Each of the two Data Selector/Multiplexer circuits have their own separate Select, Data, and Strobe inputs and a non-inverting output buffer. The Strobe inputs, when at the high level, disable their associated data inputs and force the corresponding output to the low state. The Select input buffers incorporate internal overlap features to ensure that select input changes do not cause invalid output transients.

Features

- Advanced Oxide-Isolated, Ion-Implanted Schottky TTL process.
- Switching Performance is Guaranteed Over Full Temperature and V_{CC} Supply Range.
- Pin and Functional Compatible with LS and Schottky Family Counterpart.
- Improved Output Transient Handling Capability.

Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	
DM54AS153	−55°C to 125°C
DM74AS153	0°C to 70°C
Storage Temperature Range	−65°C to 150°C
Lead Temperature (Soldering, 10 seconds)	+300°C

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device can not be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

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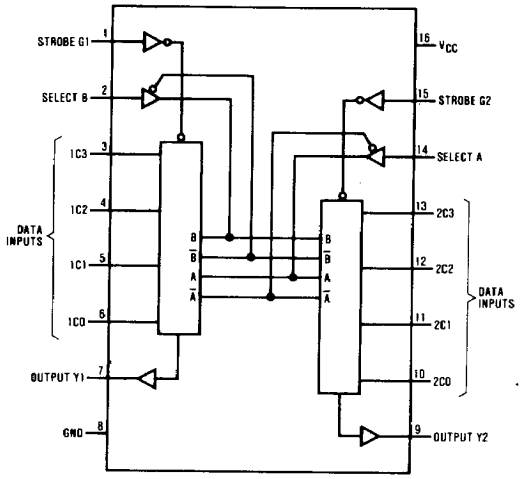
Connection Diagram

Dual-In-Line Package



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54AS153 (J) **74AS153 (J,N)**

Function Table

Select Inputs		Data Inputs				Strobe	Output
B	A	C0	C1	C2	C3	G	Y
X	X	X	X	X	X	H	L
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

Select inputs A and B are common to both sections
H = High Level L = Low Level X = Don't Care

Recommended Operating Conditions

Parameter	DM54AS153			DM74AS153			Unit
	Min	Nom	Max	Min	Nom	Max	
Supply Voltage, V_{CC}	4.5	5	5.5	4.5	5	5.5	V
High Level Input Voltage, V_{IH}	2			2			V
Low Level Input Voltage, V_{IL}			0.8			0.8	V
High Level Output Current, I_{OH}			−12			−15	mA
Low Level Output Current, I_{OL}			32			48	mA

Electrical Characteristics over recommended operating free air temperature range.

All typical values are measured at $V_{CC} = 5V$, $T_A = 25°C$.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{IK}	Input Clamp Voltage	V_{CC} = 4.5V, I_{IN} = −18mA				−1.2	V
V_{OH}	High Level Output Voltage	V_{CC} = 4.5V, I_{OH} = MAX		2.4	3.2		V
		I_{OH} = −2mA, V_{CC} = 4.5V to 5.5V		V_{CC}−2			V
V_{OL}	Low Level Output Voltage	V_{CC} = 4.5V I_{OL} = MAX			0.35	0.5	V
I_I	Input Current at Max Input Voltage	V_{CC} = 5.5V, V_{IN} = 7V	A, B			0.2	mA
			G			0.1	
I_{IH}	High Level Input Current	V_{CC} = 5.5V, V_{IN} = 2.7V	A, B			40	μA
			G			20	
I_{IL}	Low Level Input Current	V_{CC} = 5.5V V_{IN} = 0.4V	A, B			−1	mA
			G			−0.5	
I_O	Output Drive Current	V_{CC} = 5.5V, V_{OUT} = 2.25V		−30		−112	mA
I_{CC}	Supply Current	V_{CC} = 5.5V	Outputs high		16	26	mA
			Outputs low		21	33	

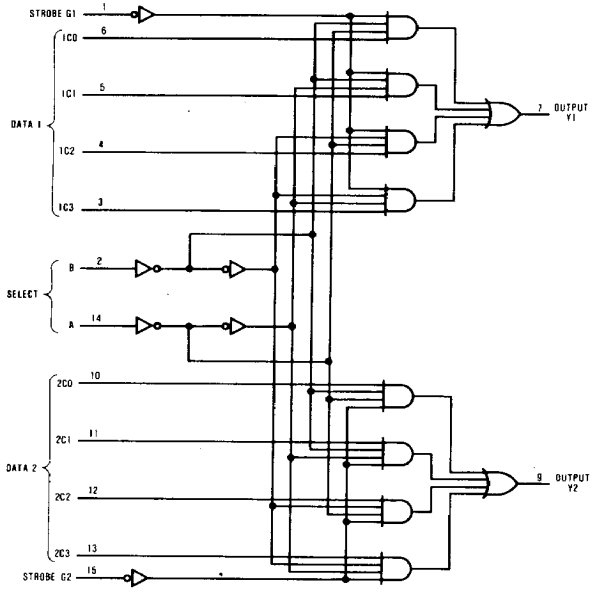
Switching Characteristics over recommended operating free air temperature range (Note 1).

All typical values are measured at $V_{CC} = 5V$, $T_A = 25°C$.

Parameter	From	To	Conditions	DM54AS153			DM74AS153			Unit
				Min	Typ	Max	Min	Typ	Max	
t_{PLH}, Low to high Level Output	Select	Y	V_{CC} = 4.5 to 5.5V, C_L = 50 pF, R_L = 500 Ω	3		14	3		12.5	ns
t_{PHL}, High to low Level Output				3		12.5	3		11	ns
t_{PLH}, Low to high Level Output	Data	Y		2		8	2		7	ns
t_{PHL}, High to low Level Output				2		8.5	2		8	ns
t_{PLH}, Low to high Level Output	Strobe	Y		3		13	3		11.5	ns
t_{PHL}, High to low Level Output				2		10	2		9	ns

Note 1: See Section 1 for test waveforms and output load.

Logic Diagram



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