

DM74S253 Dual 3-STATE 1 of 4 Line Data Selectors/Multiplexers

General Description

Each of these Schottky-clamped data selectors/multiplexers contains inverters and drivers to supply fully complementary, on-chip, binary decoding data selection to the AND-OR gates. Separate output control inputs are provided for each of the two four-line sections.

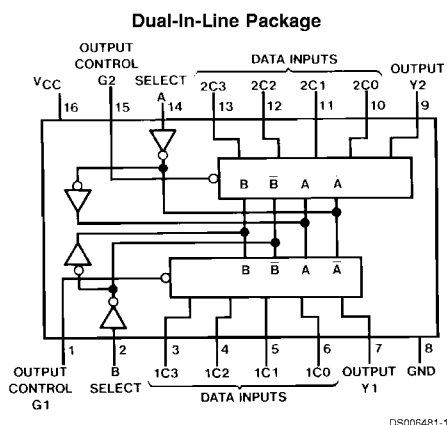
The 3-STATE outputs can interface directly with data lines of bus-organized systems. With all but one of the common outputs disabled (at a high impedance state), the low impedance of the single enable output will drive the bus line to a high or low logic level.

- Schottky-diode-clamped transistors
- Permits multiplexing from N lines to 1 line
- Performs parallel-T-serial conversion
- Strobe/output control
- High fan-out totem-pole outputs
- Typical propagation delay
 - From data to output 6 ns
 - From select to output 12 ns
- Typical power dissipation 275 mW

Features

- 3-STATE version of S153 with same pin-out

Connection Diagram



Order Number DM54S253J, DM54S253W or DM74S253N
Package Number J16A, N16E or W16A

Function Table

Select Inputs		Data Inputs				Output Control	Output
B	A	C0	C1	C2	C3	G	Y
X	X	X	X	X	X	H	Z
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

Address inputs A and B are common to both sections.
H = High Level, L = Low Level, X = Don't Care, Z = High Impedance

Absolute Maximum Ratings (Note 1)	DM54S	-55°C to +125°C
Supply Voltage	7V	DM74S
Input Voltage	5.5V	Storage Temperature Range
Operating Free Air Temperature Range		-65°C to +150°C

Recommended Operating Conditions

Symbol	Parameter	DM54S253			DM74S253			Units
		Min	Nom	Max	Min	Nom	Max	
V _{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH}	High Level Input Voltage	2			2			V
V _{IL}	Low Level Input Voltage			0.8			0.8	V
I _{OH}	High Level Output Current			-2			-6.5	mA
I _{OL}	Low Level Output Current			20			20	mA
T _A	Free Air Operating Temperature	-55		125	0		70	°C

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot 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.

Electrical Characteristics

over recommended operating free air temperature (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V _I	Input Clamp Voltage	V _{CC} = Min, I _I = -18 mA			-1.2	V
V _{OH}	High Level Output Voltage	V _{CC} = Min, I _{OH} = Max V _{IL} = Max, V _{IH} = Min	DM54	2.4	3.4	V
			DM74	2.4	3.2	
V _{OL}	Low Level Output Voltage	V _{CC} = Min, I _{OL} = Max V _{IH} = Min, V _{IL} = Max			0.5	V
I _I	Input Current @ Max Input Voltage	V _{CC} = Max, V _I = 5.5V			1	mA
I _{IH}	High Level Input Current	V _{CC} = Max, V _I = 2.7V			50	μA
I _{IL}	Low Level Input Current	V _{CC} = Max, V _I = 0.5V			-2	mA
I _{OZH}	Off-State Output Current with High Level Output Voltage Applied	V _{CC} = Max, V _O = 2.4V V _{IH} = Min, V _{IL} = Max			50	μA
I _{OZL}	Off-State Output Current with Low Level Output Voltage Applied	V _{CC} = Max, V _O = 0.5V V _{IH} = Min, V _{IL} = Max			-50	μA
I _{OS}	Short Circuit Output Current	V _{CC} = Max (Note 3)	DM54	-40	-100	mA
			DM74	-40	-100	
I _{CC}	Supply Current	V _{CC} = Max (Note 4)		55	70	mA

Note 2: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 3: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 4: I_{CC} is measured with all outputs open.

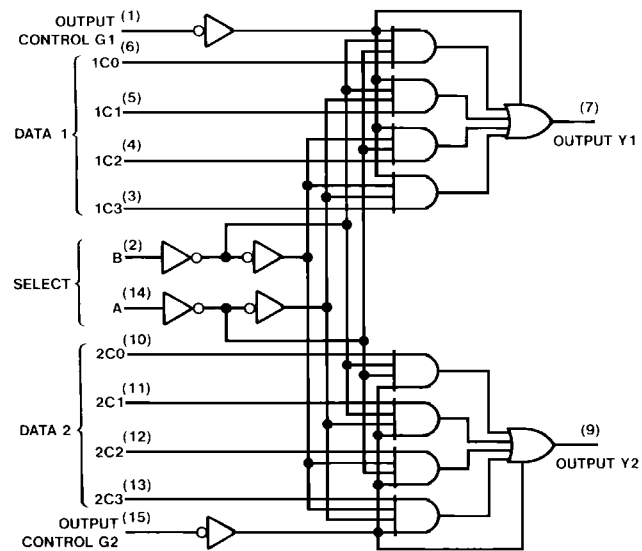
Switching Characteristics

at $V_{CC} = 5V$ and $T_A = 25^\circ C$

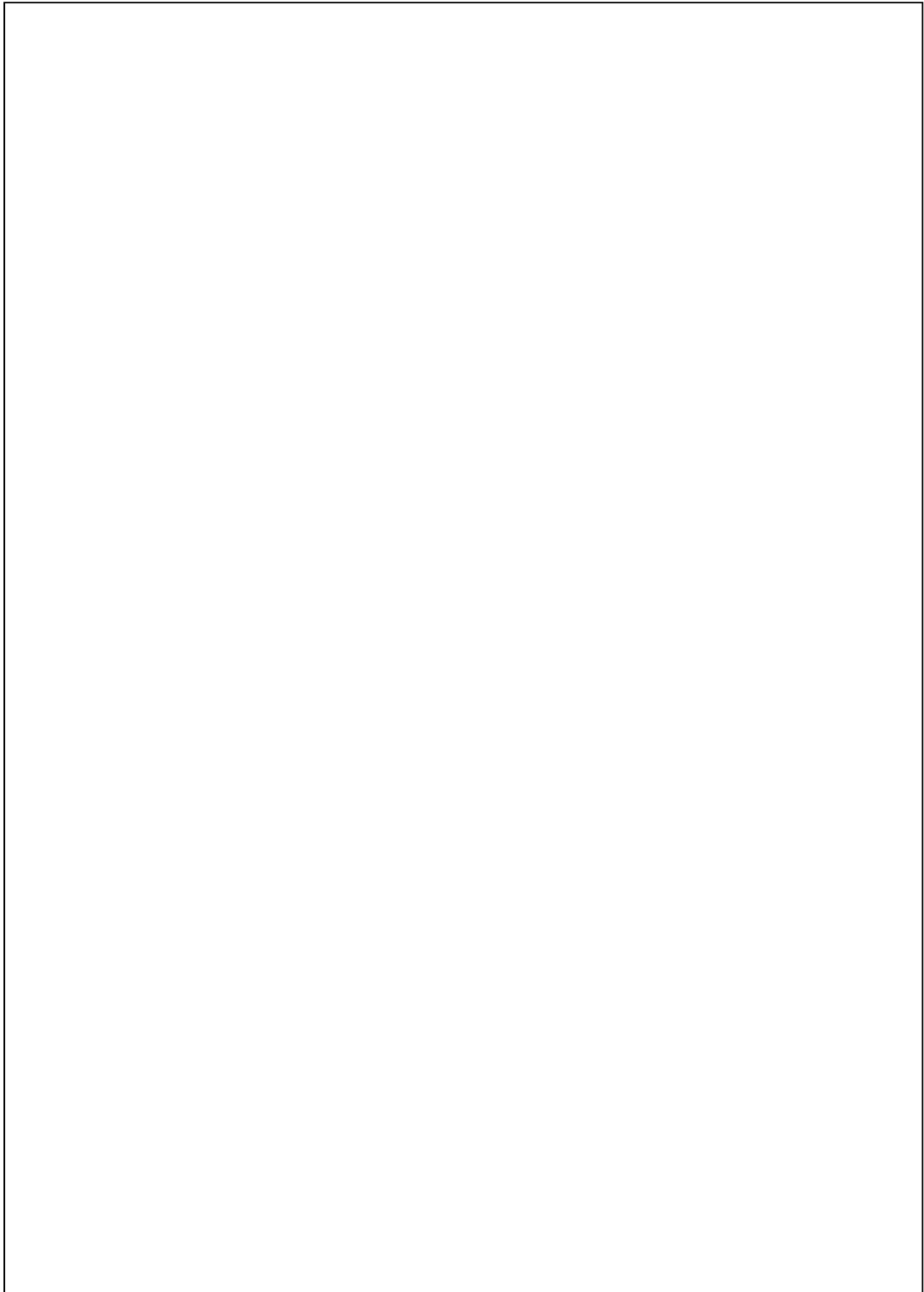
Symbol	Parameter	From (Input) To (Output)	$R_L = 280\Omega$				Units
			$C_L = 15\text{ pF}$		$C_L = 50\text{ pF}$		
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output	Data to Y		9		12	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Data to Y		9		12	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	Select to Y		18		21	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	Select to Y		18		21	ns
t_{PZH}	Output Enable Time to High Level Output	Output Control to Y		16.5		19.5	ns
t_{PZL}	Output Enable Time to Low Level Output	Output Control to Y		18		21	ns
t_{PHZ}	Output Disable Time to High Level Output (Note 5)	Output Control to Y		9.5			ns
t_{PLZ}	Output Disable Time to Low Level Output (Note 5)	Output Control to Y		15			ns

Note 5: $C_L = 5\text{ pF}$.

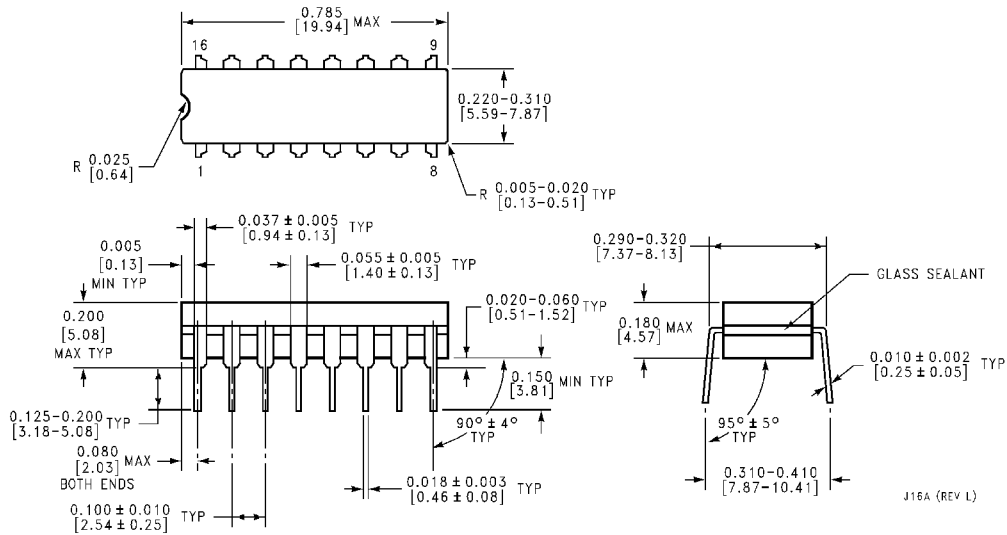
Logic Diagram



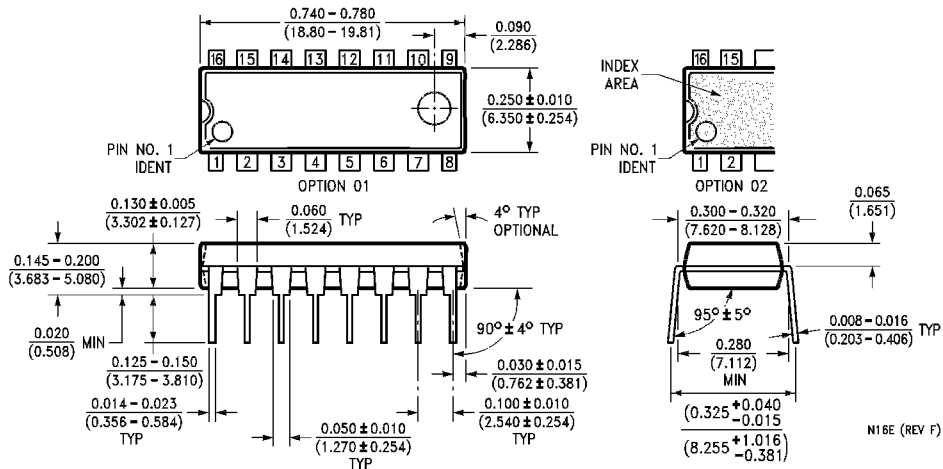
DS006481-2



Physical Dimensions inches (millimeters) unless otherwise noted

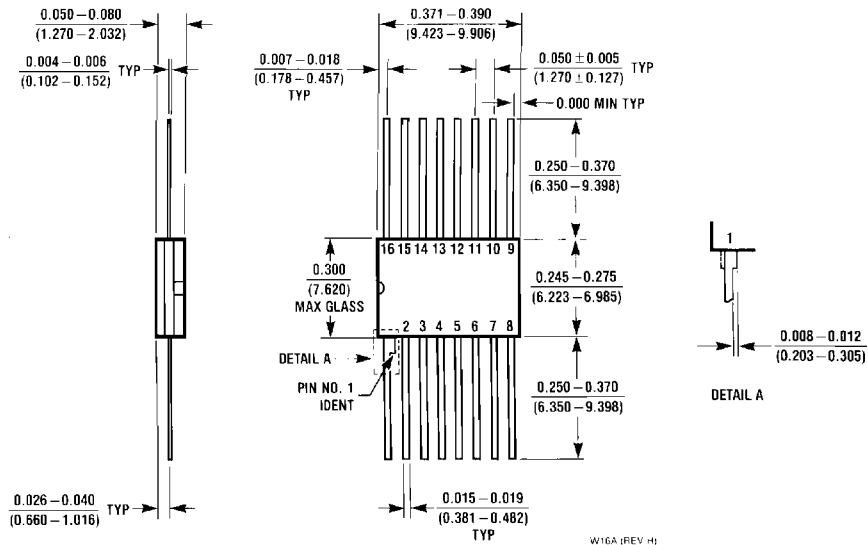


16-Lead Ceramic Dual-In-Line Package (J)
Order Number DM54S253J
Package Number J16A



16-Lead Molded Dual-In-Line Package (N)
Order Number DM74S253N
Package Number N16E

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



16-Lead Ceramic Flat Package (W)
Order Number DM54S253W
Package Number W16A

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Fairchild Semiconductor Corporation Americas
 Customer Response Center
 Tel: 1-888-522-5372

Fairchild Semiconductor Europe
 Fax: +49 (0) 1 80-530 85 86
 Email: europe.support@nsc.com
 Deutsch Tel: +49 (0) 8 141-35-0
 English Tel: +44 (0) 1 793-85-68-56
 Italy Tel: +39 (0) 2 57 5631

Fairchild Semiconductor Hong Kong Ltd.
 13th Floor, Straight Block,
 Ocean Centre, 5 Canton Rd.
 Tsimshatsui, Kowloon
 Hong Kong
 Tel: +852 2737-7200
 Fax: +852 2314-0061

National Semiconductor Japan Ltd.
 Tel: 81-3-5620-6175
 Fax: 81-3-5620-6179

www.fairchildsemi.com