

June 1989

54154/DM54154/DM74154 4-Line to 16-Line Decoders/Demultiplexers

General Description

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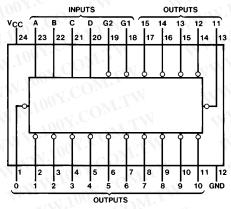
Each or these 4-line-to-16-line decoders utilizes TTL circuitry to decode four binary-coded inputs into one of sixteen mutually exclusive outputs when both the strobe inputs, G1 and G2, are low. The demultiplexing function is performed by using the 4 input lines to address the output line, passing data from one of the strobe inputs with the other strobe input low. When either strobe input is high, all outputs are high. These demultiplexers are ideally suited for implementing high-performance memory decoders. All inputs are buffered and input clamping diodes are provided to minimize transmission-line effects and thereby simplify system design.

Features

- Decodes 4 binary-coded inputs into one of 16 mutually exclusive outputs
- Performs the demultiplexing function by distributing data from one input line to any one of 16 outputs
- Input clamping diodes simplify system design
- High fan-out, low-impedance, totem-pole outputs
- Typical propagation delay 3 levels of logic 19 ns Strobe 18 ns
- Typical power dissipation 170 mW
- Alternate Military/Aerospace device (54154) is available. Contact a National Semiconductor Sales Office/ Distributor for specifications.

Connection Diagram

Dual-In-Line Package



TL/F/6548-1

Order Number 54154DMQB, 54154FMQB, DM54154J or DM74154N See NS Package Number J24A, N24A or W24C

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Absolute Maximum Ratings (Note)

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

Supply Voltage Input Voltage 5.5V Operating Free Air Temperature Range

DM54 and 54 -55°C to +125°C DM74 0°C to +70°C

-65°C to +150°C Storage Temperature Range

Note: 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.

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Recommended Operating Conditions

	THE PARTY OF THE P	DM54154 DM74154									
Symbol	Parameter	N	DM54154	10	0 7.	Units					
	COM	Min	Nom	Max	Min	Nom	Max	TAN TAN			
V _{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V			
V _{IH}	High Level Input Voltage	2		M	2		TW	V			
V _{IL}	Low Level Input Voltage			0.8	.10	$CO_{D_{2}}$	0.8	V			
Іон	High Level Output Current	17.11		-0.8	1700	701	-0.8	mA			
loL	Low Level Output Current	TVI.		16	400	V.Co	16	mA			
T _A	Free Air Operating Temperature	-55	- 4	125	0	-1 CO	70	°C			

Electrical Characteristics over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conc	ditions	Min	Typ (Note 1)	Max	Units
VI	Input Clamp Voltage	V _{CC} = Min, I _I =	= -12 mA	-stW	N.Jo	-1.5	٧
V _{OH}	High Level Output Voltage	$V_{CC} = Min, I_{OH}$ $V_{IL} = Max, V_{IH}$		2.4	3.2	$_{I.COM}$	V
V _{OL}	Low Level Output Voltage	$V_{CC} = Min, I_{OL}$ $V_{IH} = Min, V_{IL}$			0.25	0.4	٧
lı	Input Current @ Max Input Voltage	$V_{CC} = Max, V_I$	= 5.5V		MM·In	VICC	mA
I _{IH}	High Level Input Current	$V_{CC} = Max, V_I$	= 2.4V		TANNA.I	40	μΑ
I _{IL}	Low Level Input Current	$V_{CC} = Max, V_I$	= 0.4V		N T	-1.6	mA
los	Short Circuit	V _{CC} = Max	DM54	<u>√</u> –20	MIN	-55	mA
	Output Current	(Note 2)	DM74	-18	VIX	-57	
Icc	Supply Current	V _{CC} = Max	DM54		34	49	mA
		(Note 3)	DM74	-KN	34	56	J CC

Note 1: All typicals are at $V_{CC} = 5V$, $T_A = 25^{\circ}C$.

Note 2: Not more than one output should be shorted at a time.

Note 3: $I_{\mbox{\footnotesize CC}}$ is measured with all outputs open and all inputs grounded.

Switching Characteristics at V_{CC} = 5V and T_A = 25°C (See Section 1 for Test Waveforms and Output Load)

Symbol	Parameter	From (Input)	$R_L = 400\Omega$,	Units		
Cymbo.	rarameter	To (Output)	CO Min	Max	- Contra	
t _{PLH}	Propagation Delay Time Low to High Level Output	Data to Output	V.COM.	36	ns	
t _{PHL}	Propagation Delay Time High to Low Level Output	Data to Output	ON.COM.	33	ns	
t _{PLH}	Propagation Delay Time Low to High Level Output	Strobe to Output	ON.COM	30	ns	
t _{PHL}	Propagation Delay Time High to Low Level Output	Strobe to Output	TOON COM	27	ns	

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Function Table

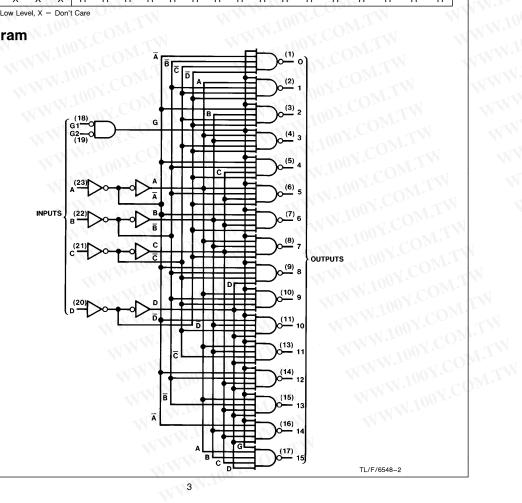
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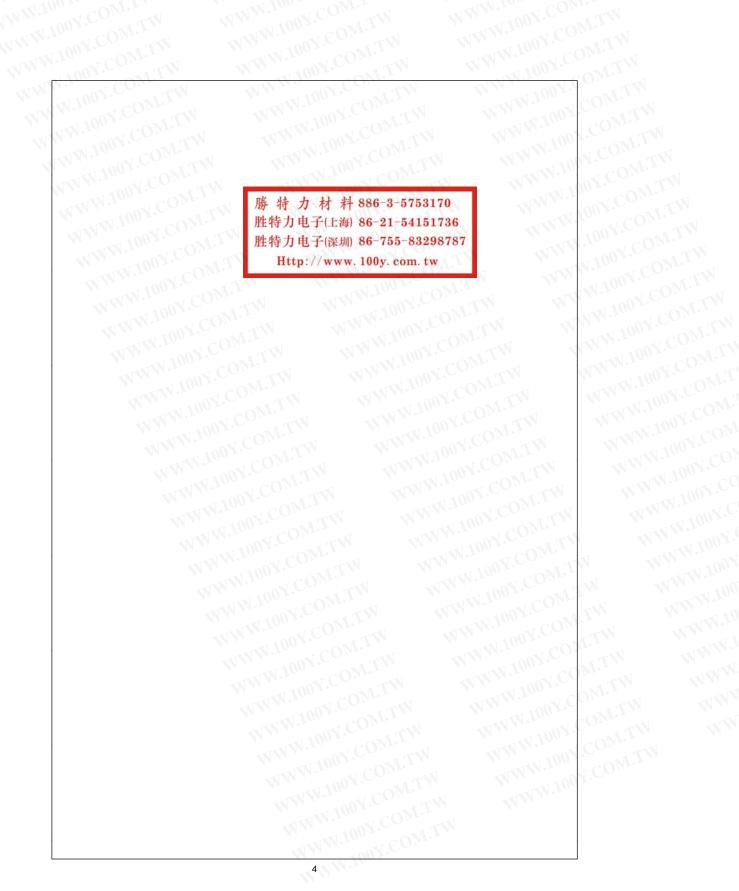
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- 40	Inputs			N		Outputs										W 1001				7.	
G1	G2	D	С	В	Α	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
L.	I.d.	L	L	L.	L	L	Н	Н	Н	H	Н	Н	CH)	Н	Н	πН	Н	Н	Н	Н	Н
L	امار	L	L	L	Н	Н	L	Н	Н	Η.	H	H	Н	Н	Н	Н	Н	Н	Н	H	Н
L	· F	L,	L	Н	L	Н	Н	L	Н	Н	Н	Н	H.	Н	Н	H	Н	H	H	Н	Н
L	_ L	L	L	Н	H	Н	Н	Н	L	Н	H	H	Н	Н	Н	Н	Н	Н	Н	Н	Н
L	L	L	- H	L	L	Н	Н	Н	H	L	Н	Н	H	Н	Н	Н	Н	Н	H	Н	Н
L	L ₁	L	Н	L.	Н	Н	Н	Н	Н	Н	L	H	Н	Н	H	H	Н	Н	Н	Н	H
L	L	L	Н	Н	L	Н	(H	Н	H	H	Н	L	H	Н	Н	Н	H	Н	H	Н	Н
L	L	1) H	Н	H	Н	Н	Н	Н	Н	H	H	L	H.	H	• H	Н	Н	Н	Н	H
L	L	H	L	L	D.F.	H	H	Н	Н	H	Н	Н	H		Н	Н	H	Н	H	Н	Н
L	L	H	L	L	H	Н	H	Н	Н	Н	H	H	H	Н	~ F)	Н	Н	Н	Н	Н	H
L	L	Н	L	H	L	Η,	H	Н	Н	H	Н	H	H	H	H	L	H	Н	Н	Н	Н
L	` L ,	H	L	Н	H	H.	H	Н	Н	Н	Н	Н	Н	Н	Н	Н	ĨL,	H	Н	Н	Н
L	L	Н	Н	L		Н	H	Н	Н	H	H	Н	Н	H	Н	Н	H	L	Н	Н	Н
L	L	H	Н	L	H	H	H	Н	Н	Н	Н	Н	Н	Н	Н	H	Н	Н	L	H	Н
L	L	Н	Н	Н	Y	Н	Н	Н	Н	Н	H	Н	Н	H	Н	Н	Н	Н	Н	L	Н
L	Ĺ	Н	H	Н	Н	H	Н	Н	Т	Н	Н	Н	H	Н	Н	H	Н	Н	Н	Н	L
L	Н	X	Χ	X	X	Н	Н	H	Н	Н	Н	Н	Н	H	H	Н	Н	Н	Н	Н	Н
Н	L	X	X	X	X	H	Н	Н	Н	Н	Н	Н	Н	Н	Н	H	Н	Н	H	Н	Н
Н	Н	X	X	X	X	Н	Н	H	Н	Н	Н	Н	Н	H	H	Н	Н	Н	H	Н	Н

H = High Level, L = Low Level, X = Don't Care

Logic Diagram





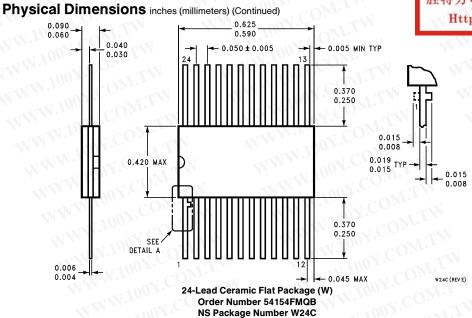
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WWW.100Y.COM.TW Http://www. 100y. com. tw Physical Dimensions inches (millimeters) 1.290 0.600 (32.766) W.100Y.COM.TW (15.240) MAX 24 23 22 21 20 19 18 17 16 15 14 13 GLASS 0.025 (0.635)0.514-0.526 (13.06-13.36) 1 2 3 4 5 6 7 8 9 10 11 12 0.030-0.055 (0.762-1.397) RAD TYP 0.180 0.590-0.620 (4.572) 0.005 0.055 ±0.005 GLASS (14.986-15.748) SEALANT MAX (0.127) (1.397 ± 0.127) 0.020-0.070 (0.508 - 1.778)-95" ±5 0.008-0.012 0.685 +0.025 (0.203-0.305) 0.098 -0.060 0.018 ±0.003 0.125-0.200 0.150 (17.40 +0.635) 0.100 ±0.010 (2.489)(0.457 ±0.076) 94 (3.175-5.080) (3.810) MAX (2.540 + 0.254) -1.524 MIN 24-Lead Ceramic Dual-In-Line Package (J) Order Number 54154DMQB or DM54154J **NS Package Number J24A** 1.243-1.270 (31.57-32.26) 24 23 22 21 20 19 18 17 16 15 14 13 0.062 0.540 ±0.005 (+)(13.716 ±0.127) PIN NO. 1 IDENT DOTTED OUTLINES
REFLECT ALTERNATE
MOLDED BODY CONFIGURATION 0.580 (14.73) MIN 0.030 (0.762) MAX 0.075 0.040 0.160 ±0.005 0.600-0.620 (1.524) (1.905) (1.016) (4.064 ±0.127) (15.24-15.748) 0.170-0.210 (4.318-5.334) 0.009-0.015 86°94 TYP . q5°+5° (0.229-0.381) 0.625 +0.025 -0.015 0.075 ±0.015 (0.457 ±0.076) 0.125-0.140 (0.381) MIN (1.905 ±0.381) (15.875 ^{+0.635}_{-0.381}) 0.100 ±0.010 (2.540 ±0.254) WWW.100Y.COM.TW 24-Lead Molded Dual-In-Line Package (N) WWW.1007 Order Number DM74154N NS Package Number N24A

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