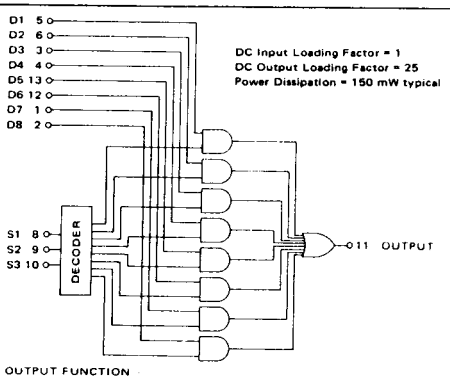
8 CHANNEL
DATA SELECTOR

MC1038
MC1238



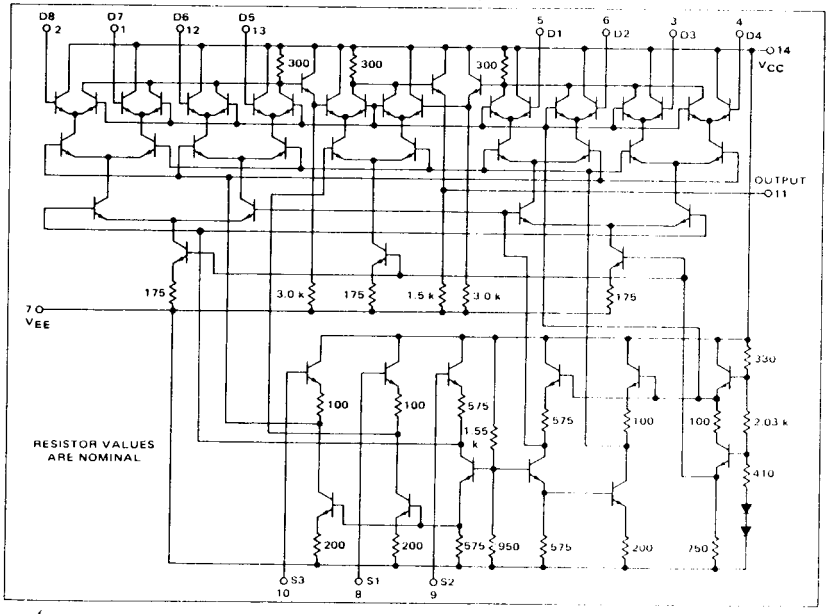
An electronic single-pole, 8-position switch by which any one of eight data input lines may be selected by a binary coded select input.

Input Select	Data Line Selected
$\overline{S1}$ $\overline{S2}$ $\overline{S3}$	D1
$\overline{S1}$ $\overline{S2}$ S3	D2
$\overline{S1}$ S2 $\overline{S3}$	D3
$\overline{S1}$ S2 S3	D4
S1 $\overline{S2}$ $\overline{S3}$	D5
S1 $\overline{S2}$ S3	D6
S1 S2 $\overline{S3}$	D7
S1 S2 S3	D8

OUTPUT FUNCTION

$\overline{S1}\ \overline{S2}\ \overline{S3}\ D1 + \overline{S1}\ \overline{S2}\ S3\ D2 + \overline{S1}\ S2\ \overline{S3}\ D3 + \overline{S1}\ S2\ S3\ D4 + S1\ \overline{S2}\ \overline{S3}\ D5 + S1\ \overline{S2}\ S3\ D6 + S1\ S2\ \overline{S3}\ D7 + S1\ S2\ S3\ D8$

CIRCUIT SCHEMATIC



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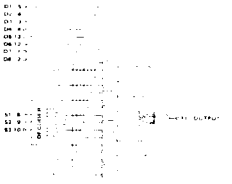
ELECTRICAL CHARACTERISTICS



	@ Test Temperature	TEST CURRENT VOLTAGE VALUES Vdc ± 1% V_{IL}	V_{IH}	$V_{IH\ max}$	V_{EE}	mAdc I_L
MC1238	−55°C	-1.580	-0.990	-	-5.2	-2.5
	+25°C	-1.500	-0.850	-0.700	-5.2	-2.5
	+125°C	-1.380	-0.700	-	-5.2	-2.5
MC1038	0°C	-1.525	-0.895	-	-5.2	-2.5
	+25°C	-1.500	-0.850	-0.700	-5.2	-2.5
	+75°C	-1.435	-0.775	-	-5.2	-2.5

Characteristic	Symbol	Pin Under Test	MC1238 Test Limits −55°C Min	−55°C Max	+25°C Min	+25°C Max	+125°C Min	+125°C Max	Unit	MC1038 Test Limits 0°C Min	0°C Max	+25°C Min	+25°C Max	+75°C Min	+75°C Max	Unit	TEST CURRENT VOLTAGE APPLIED TO PINS LISTED BELOW. V_{IL}	V_{IH}	$V_{IH\ max}$	V_{EE}	I_L	Gnd
Power Supply Drain Current	I_E	7	-	-	-	37	-	-	mAdc	-	-	-	37	-	-	mAdc	8,9,10	-	-	1,2,3,4,5,6,7,12,13	-	14
Input Current	I_{in}	1	-	-	-	100	-	-	μAdc	-	-	-	100	-	-	μAdc	10	8,9	1	2,3,4,5,6,7,12,13	-	14
		2	-	-	-	↑	-	-	↑	-	-	-	↑	-	-	↑	-	8,9,10	2	1,3,4,5,6,7,12,13	-	↑
		3	-	-	-	↑	-	-	↑	-	-	-	↑	-	-	↑	8,10	9	3	1,2,4,5,6,7,12,13	-	↑
		4	-	-	-	↑	-	-	↑	-	-	-	↑	-	-	↑	8	9,10	4	1,2,3,5,6,7,12,13	-	↑
		5	-	-	-	↑	-	-	↑	-	-	-	↑	-	-	↑	8,9,10	-	5	1,2,3,4,6,7,12,13	-	↑
		6	-	-	-	↑	-	-	↑	-	-	-	↑	-	-	↑	8,9	10	6	1,2,3,4,5,7,12,13	-	↑
		12	-	-	-	↑	-	-	↑	-	-	-	↑	-	-	↑	9	8,10	12	1,2,3,4,5,6,7,13	-	↑
		13	-	-	-	↑	-	-	↑	-	-	-	↑	-	-	↑	9,10	8	13	1,2,3,4,5,6,7,12	-	↑
		8	-	-	-	↑	-	-	↑	-	-	-	↑	-	-	↑	9,10	-	8	1,2,3,4,5,6,7,12,13	-	↑
		9	-	-	-	↑	-	-	↑	-	-	-	↑	-	-	↑	8,10	-	9	1,2,3,4,5,6,7,12,13	-	↑
		10	-	-	-	↓	-	-	↓	-	-	-	↓	-	-	↓	8,9	-	10	1,2,3,4,5,6,7,12,13	-	↓
Input Leakage Current	I_R	1	-	-	-	0.2	-	1.0	μAdc	-	-	-	0.2	-	1.0	μAdc	8,9,10	-	-	1,2,3,4,5,6,7,12,13	-	14
		2	-	-	-	↑	-	↑	↑	-	-	-	↑	-	↑	↑	↑	-	-	↑	-	↑
		3	-	-	-	↑	-	↑	↑	-	-	-	↑	-	↑	↑	↑	-	-	↑	-	↑
		4	-	-	-	↑	-	↑	↑	-	-	-	↑	-	↑	↑	↑	-	-	↑	-	↑
		5	-	-	-	↑	-	↑	↑	-	-	-	↑	-	↑	↑	↑	-	-	↑	-	↑
		6	-	-	-	↑	-	↑	↑	-	-	-	↑	-	↑	↑	↑	-	-	↑	-	↑
		12	-	-	-	↑	-	↑	↑	-	-	-	↑	-	↑	↑	↑	-	-	↑	-	↑
		13	-	-	-	↑	-	↑	↑	-	-	-	↑	-	↑	↑	↑	-	-	↑	-	↑
		8	-	-	-	↑	-	↑	↑	-	-	-	↑	-	↑	↑	9,10	-	-	1,2,3,4,5,6,7,8,12,13	-	↑
		9	-	-	-	↑	-	↑	↑	-	-	-	↑	-	↑	↑	8,10	-	-	1,2,3,4,5,6,7,9,12,13	-	↑
		10	-	-	-	↓	-	↓	↓	-	-	-	↓	-	↓	↓	8,9	-	-	1,2,3,4,5,6,7,10,12,13	-	↓
Logical "1" Output Voltage	V_{OH}*	11	-0.990	-0.825	-0.850	-0.700	-0.700	-0.530	Vdc	-0.895	-0.740	-0.850	-0.700	-0.775	-0.615	Vdc	8,9,10	5	-	1,2,3,4,6,7,12,13	11	14
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	8,9	6,10	-	1,2,3,4,5,7,12,13	↓	↓
																	8,10	3,9	-	1,2,4,5,6,7,12,13		
																	8	4,9,10	-	1,2,3,5,6,7,12,13		
																	9,10	8,13	-	1,2,3,4,5,6,7,12		
																	9	8,10,12	-	1,2,3,4,5,6,7,13		
																	10	1,8,9	-	2,3,4,5,6,7,12,13		
																	-	2,8,9,10	-	1,3,4,5,6,7,12,13		
Logical "0" Output Voltage	V_{OL}	11	-1.890	-1.580	-1.800	-1.500	-1.720	-1.380	Vdc	-1.830	-1.525	-1.800	-1.500	-1.760	-1.435	Vdc	5,8,9,10	-	-	1,2,3,4,6,7,12,13	-	14
		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	6,8,9	10	-	1,2,3,4,5,7,12,13	↓	↓
																	3,8,10	9	-	1,2,4,5,6,7,12,13		
																	4,8	9,10	-	1,2,3,5,6,7,12,13		
																	9,10,13	8	-	1,2,3,4,5,6,7,12		
																	9,12	8,10	-	1,2,3,4,5,6,7,13		
																	1,10	8,9	-	2,3,4,5,6,7,12,13		
																	2	8,9,10	-	1,3,4,5,6,7,12,13		

*V_{OH} limits apply from no load (0 mA) to full load (-2.5 mA).

ELECTRICAL CHARACTERISTICS (continued)

Characteristic	Symbol	Pin Under Test	MC1238 Test Limits −55°C Min	−55°C Typ	−55°C Max	+25°C Min	+25°C Typ	+25°C Max	+125°C Min	+125°C Typ	+125°C Max	Unit
Switching Times												
Data Inputs												
Propagation Delay	t_{1-11-}	11		6.5	9.0		7.0	10		9.0	12	ns
	t_{4-11-}			8.0	10		9.0	11		10	13	
Rise Time	t_{11-}			3.5	7.0		3.5	7.0		5.0	9.0	
Fall Time	t_{11-}	↓		5.0	8.5		5.5	9.0		7.5	11	↓
Select Inputs												
Propagation Delay	t_{8-11-}	11		5.5	9.0		6.0	9.0		7.0	10	ns
	t_{8-11-}			5.5	9.0		6.0	9.0		7.0	10	
	t_{9-11-}			17	21		18	22		21	25	
	t_{9-11-}			17	21		18	22		21	25	
	t_{10-11+}			9.0	13		10	14		13	17	
	t_{10-11-}	↓		9.0	13		10	14		13	17	↓

@ Test Temperature	MC1038 Test Limits 0°C Typ	0°C Max	+25°C Typ	+25°C Max	+75°C Typ	+75°C Max	Unit
	6.5	9.0	7.0	10	8.5	11	ns
	8.5	11	9.0	11	9.5	12	
	3.5	7.0	3.5	7.0	5.0	8.0	
	5.5	9.0	5.5	9.0	6.0	10	↓
	5.5	9.0	6.0	9.0	6.5	10	ns
	5.5	9.0	6.0	9.0	6.5	10	
	18	22	18	22	19	23	
	18	22	18	22	19	23	
	9.5	14	10	14	11	15	
	9.5	14	10	14	11	15	↓

@ Test Temperature	TEST CURRENT VOLTAGE VALUES Vdc ± 1% V_{IL}	V_{IH}	$V_{IH\,max}$	V_{EE}	mAdc I_L
−55°C	-1.560	-0.990	-	-5.2	-2.5
MC1238 +25°C	-1.500	-0.850	-0.700	-5.2	-2.5
+125°C	-1.360	-0.700	-	-5.2	-2.5
0°C	-1.525	-0.895	-	-5.2	-2.5
MC1038 +25°C	-1.500	-0.850	-0.700	-5.2	-2.5
+75°C	-1.435	-0.775	-	-5.2	-2.5

TEST CURRENT VOLTAGE APPLIED TO PINS LISTED BELOW: V_{IL} + 1.2 Vdc	V_{IH} + 1.2 Vdc	Pulse In	V_{EE} = −4.0 Vdc	Pulse Out (+1.2 Vdc)
10	8,9	1	2,3,4,5,6,7,12,13	11 14
5,9,10	13	8	2,3,4,6,7,12	11 14
5,8,10	13	8		
5,8,10	3	9	2,4,6,7,12,13	
5,8,10	3	9		
5,8,9	3	9	2,3,4,7,12,13	
5,8,9	6	10		
5,8,9	6	10		

SWITCHING TIME TEST CIRCUIT AND WAVEFORMS @ 25°C

*Load corresponds to a Fan-out = 3

Pin 14 (V_{CC}) = +1.2 Vdc
Pin 7 (V_{EE}) = −4.0 Vdc

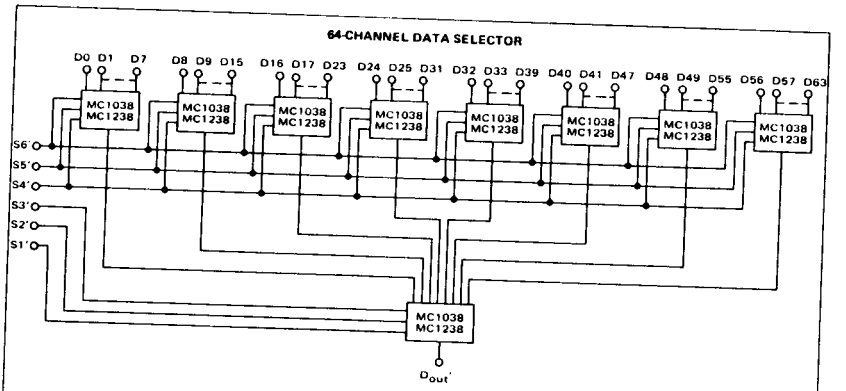
The test circuit shows the method for measurement from S inputs to output. To measure from D inputs to output, apply the input signal to the D input to be tested, and dc voltage levels to the S inputs in accordance with the truth table.

Input Pulse t_r and t_f = 5.0 ± 0.5 ns

APPLICATIONS INFORMATION

The MC1038/1238 "8" channel data selector is essentially a single-pole eight-position switch. The data applied to the input pins 1, 2, 3, 4, 5, 6, 12, and 13 will be transferred to the output on pin 11 according to the binary select coding applied to pins 8, 9, 10.

The application shown is an example of the manner in which the "8" channel data selector may be used. Nine MC1038/1238 "8" channel data selectors are used to form a 64-bit multiplexer. The typical propagation delay in this application from the 64-bit input to the "8" channel data selector output is 14 ns.



TRUTH TABLE

S1'	S2'	S3'	S4'	S5'	S6'	D_{out}'
0	0	0	0	0	0	0
0	0	0	0	0	1	1
0	0	0	0	1	0	2
0	0	0	0	1	1	3
0	0	0	1	0	0	4
0	0	0	1	0	1	5
0	0	0	1	1	0	6
0	0	0	1	1	1	7
0	0	1	0	0	0	8
0	0	1	0	0	1	9
0	0	1	0	1	0	10
0	0	1	0	1	1	11
0	0	1	1	0	0	12
0	0	1	1	0	1	13
0	0	1	1	1	0	14
0	0	1	1	1	1	15
0	1	0	0	0	0	16
0	1	0	0	0	1	17
0	1	0	0	1	0	18
0	1	0	0	1	1	19
0	1	0	1	0	0	20
0	1	0	1	0	1	21

S1'	S2'	S3'	S4'	S5'	S6'	D_{out}'
0	1	0	1	1	0	22
0	1	0	1	1	1	23
0	1	1	0	0	0	24
0	1	1	0	0	1	25
0	1	1	0	1	0	26
0	1	1	0	1	1	27
0	1	1	1	0	0	28
0	1	1	1	0	1	29
0	1	1	1	1	0	30
0	1	1	1	1	1	31
1	0	0	0	0	0	32
1	0	0	0	0	1	33
1	0	0	0	1	0	34
1	0	0	0	1	1	35
1	0	0	1	0	0	36
1	0	0	1	0	1	37
1	0	0	1	1	0	38
1	0	0	1	1	1	39
1	0	1	0	0	0	40
1	0	1	0	0	1	41
1	0	1	0	1	0	42

S1'	S2'	S3'	S4'	S5'	S6'	D_{out}'
1	0	1	0	1	1	43
1	0	1	1	0	0	44
1	0	1	1	0	1	45
1	0	1	1	1	0	46
1	0	1	1	1	1	47
1	1	0	0	0	0	48
1	1	0	0	0	1	49
1	1	0	0	1	0	50
1	1	0	0	1	1	51
1	1	0	1	0	0	52
1	1	0	1	0	1	53
1	1	0	1	1	0	54
1	1	0	1	1	1	55
1	1	1	0	0	0	56
1	1	1	0	0	1	57
1	1	1	0	1	0	58
1	1	1	0	1	1	59
1	1	1	1	0	0	60
1	1	1	1	0	1	61
1	1	1	1	1	0	62
1	1	1	1	1	1	63