

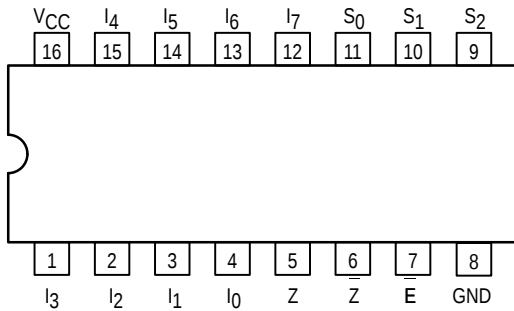


MC74AC151 MC74ACT151

1-of-8 Decoder/Demultiplexer

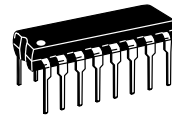
The MC74AC151/74ACT151 is a high-speed 8-input digital multiplexer. It provides, in one package, the ability to select one line of data from up to eight sources. The MC74AC151/74ACT151 can be used as a universal function generator to generate any logic function of four variables. Both true and complementary outputs are provided.

- Outputs Source/Sink 24 mA
- 'ACT151 Has TTL Compatible Inputs

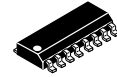


PIN NAMES

I ₀ –I ₇	Data Inputs
S ₀ –S ₂	Select Inputs
E	Enable Input
Z	Data Output
Z	Inverted Data Output



N SUFFIX
CASE 648-08
PLASTIC



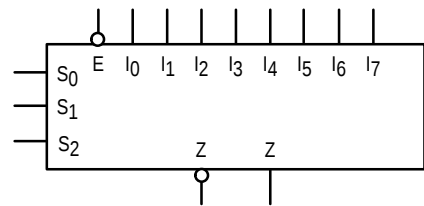
D SUFFIX
CASE 751B-05
PLASTIC

TRUTH TABLE

Inputs				Outputs	
E	S ₂	S ₁	S ₀	Z	Z
H	X	X	X	H	L
L	L	L	L	I ₀	I ₀
L	L	L	H	I ₁	I ₁
L	L	H	L	I ₂	I ₂
L	L	H	H	I ₃	I ₃
L	H	L	L	I ₄	I ₄
L	H	L	H	I ₅	I ₅
L	H	H	L	I ₆	I ₆
L	H	H	H	I ₇	I ₇

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

LOGIC SYMBOL



MC74AC151 MC74ACT151

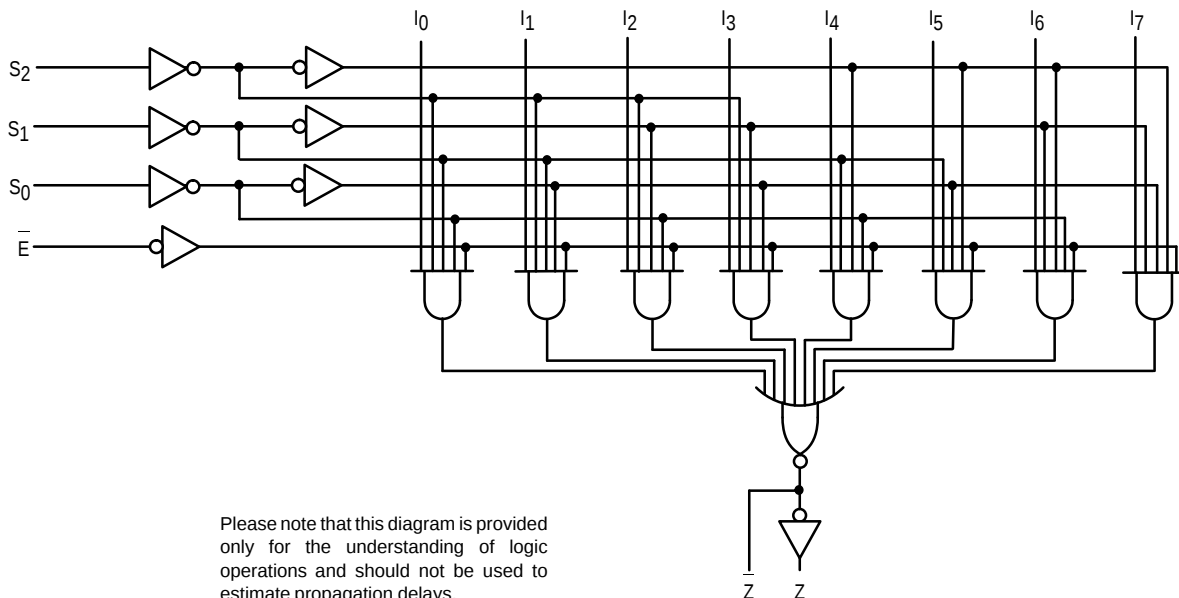
FUNCTIONAL DESCRIPTION

The MC74AC151/74ACT151 is a logic implementation of a single pole, 8-position switch with the switch position controlled by the state of three Select inputs, S_0 , S_1 , S_2 . Both true and complementary outputs are provided. The Enable input ($\bar{E}$) is active LOW. When it is not activated, the complementary output is HIGH and the true output is LOW regardless of all other inputs. The logic function provided at the output is:

$$Z = \bar{E} \cdot (I_0 \cdot \bar{S}_0 \cdot \bar{S}_1 \cdot \bar{S}_2 + I_1 \cdot \bar{S}_0 \cdot \bar{S}_1 \cdot S_2 + I_2 \cdot \bar{S}_0 \cdot S_1 \cdot \bar{S}_2 + I_3 \cdot \bar{S}_0 \cdot S_1 \cdot S_2 + I_4 \cdot S_0 \cdot \bar{S}_1 \cdot \bar{S}_2 + I_5 \cdot S_0 \cdot \bar{S}_1 \cdot S_2 + I_6 \cdot S_0 \cdot S_1 \cdot \bar{S}_2 + I_7 \cdot S_0 \cdot S_1 \cdot S_2)$$

The MC74AC151/74ACT151 provides the ability, in one package, to select from eight sources of data or control information. By proper manipulation of the inputs, the MC74AC151/74ACT151 can provide any logic function of four variables and its complement.

LOGIC DIAGRAM



MAXIMUM RATINGS*

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	-0.5 to +7.0	V
V_{in}	DC Input Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
V_{out}	DC Output Voltage (Referenced to GND)	-0.5 to $V_{CC} + 0.5$	V
I_{in}	DC Input Current, per Pin	± 20	mA
I_{out}	DC Output Sink/Source Current, per Pin	± 50	mA
I_{CC}	DC V_{CC} or GND Current per Output Pin	± 50	mA
T_{stg}	Storage Temperature	-65 to +150	$^{\circ}\text{C}$

* Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

MC74AC151 MC74ACT151

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Typ	Max	Unit
V _{CC}	Supply Voltage	'AC	2.0	5.0	V
		'ACT	4.5	5.0	
V _{in} , V _{out}	DC Input Voltage, Output Voltage (Ref. to GND)	0		V _{CC}	V
t _r , t _f	Input Rise and Fall Time (Note 1) 'AC Devices except Schmitt Inputs	V _{CC} @ 3.0 V	150		ns/V
		V _{CC} @ 4.5 V	40		
		V _{CC} @ 5.5 V	25		
t _r , t _f	Input Rise and Fall Time (Note 2) 'ACT Devices except Schmitt Inputs	V _{CC} @ 4.5 V	10		ns/V
		V _{CC} @ 5.5 V	8.0		
T _J	Junction Temperature (PDIP)			140	°C
T _A	Operating Ambient Temperature Range	−40	25	85	°C
I _{OH}	Output Current — High			−24	mA
I _{OL}	Output Current — Low			24	mA

1. V_{in} from 30% to 70% V_{CC}; see individual Data Sheets for devices that differ from the typical input rise and fall times.

2. V_{in} from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

DC CHARACTERISTICS

Symbol	Parameter	V _{CC} (V)	74AC		74AC		Unit	Conditions
			T _A = +25°C		T _A = −40°C to +85°C			
			Typ	Guaranteed Limits				
V _{IH}	Minimum High Level Input Voltage	3.0	1.5	2.1	2.1	V	V _{OUT} = 0.1 V or V _{CC} − 0.1 V	
		4.5	2.25	3.15	3.15			
		5.5	2.75	3.85	3.85			
V _{IL}	Maximum Low Level Input Voltage	3.0	1.5	0.9	0.9	V	V _{OUT} = 0.1 V or V _{CC} − 0.1 V	
		4.5	2.25	1.35	1.35			
		5.5	2.75	1.65	1.65			
V _{OH}	Minimum High Level Output Voltage	3.0	2.99	2.9	2.9	V	I _{OUT} = −50 μA	
		4.5	4.49	4.4	4.4			
		5.5	5.49	5.4	5.4			
		3.0		2.56	2.46	V	*V _{IN} = V _{IL} or V _{IH} −12 mA I _{OH} −24 mA −24 mA	
		4.5		3.86	3.76			
5.5			4.86	4.76				
V _{OL}	Maximum Low Level Output Voltage	3.0	0.002	0.1	0.1	V	I _{OUT} = 50 μA	
		4.5	0.001	0.1	0.1			
		5.5	0.001	0.1	0.1			
		3.0		0.36	0.44	V	*V _{IN} = V _{IL} or V _{IH} 12 mA I _{OL} 24 mA 24 mA	
		4.5		0.36	0.44			
5.5			0.36	0.44				
I _{IN}	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	V _I = V _{CC} , GND	
I _{OLD}	†Minimum Dynamic Output Current	5.5			75	mA	V _{OLD} = 1.65 V Max	
I _{OHD}		5.5			−75	mA	V _{OHD} = 3.85 V Min	
I _{CC}	Maximum Quiescent Supply Current	5.5		8.0	80	μA	V _{IN} = V _{CC} or GND	

* All outputs loaded; thresholds on input associated with output under test.

† Maximum test duration 2.0 ms, one output loaded at a time.

Note: I_{IN} and I_{CC} @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V_{CC}.

MC74AC151 MC74ACT151

AC CHARACTERISTICS (For Figures and Waveforms — See Section 3)

Symbol	Parameter	V _{CC} * (V)	74AC			74AC		Unit	Fig. No.
			T _A = +25°C C _L = 50 pF			T _A = –40°C to +85°C C _L = 50 pF			
			Min	Typ	Max	Min	Max		
t _{PLH}	Propagation Delay S _n to Z or Z	3.3 5.0	3.0 2.5	11.5 8.5	18.0 13.0	3.0 2.0	20.0 15.0	ns	3-6
t _{PHL}	Propagation Delay S _n to Z or Z	3.3 5.0	2.5 2.0	12 8.5	18.0 13.0	2.5 1.5	20.0 15.0	ns	3-6
t _{PLH}	Propagation Delay E to Z or Z	3.3 5.0	2.5 2.0	8.0 6.0	13.0 10.0	2.0 1.5	14.0 11.0	ns	3-6
t _{PHL}	Propagation Delay E to Z or Z	3.3 5.0	1.5 1.5	8.5 6.5	13.0 10.0	1.5 1.5	14.0 11.0	ns	3-6
t _{PLH}	Propagation Delay I _n to Z or Z	3.3 5.0	2.5 1.5	9.5 7.0	14.0 10.5	2.0 1.5	15.5 11.0	ns	3-5
t _{PHL}	Propagation Delay I _n to Z or Z	3.3 5.0	2.5 1.5	9.5 7.0	15.0 11.0	2.0 1.5	16.0 12.0	ns	3-5

* Voltage Range 3.3 V is 3.3 V ± 0.3 V

Voltage Range 5.0 V is 5.0 V ± 0.5 V

DC CHARACTERISTICS

Symbol	Parameter	V _{CC} (V)	74ACT		74ACT		Unit	Conditions
			T _A = +25°C		T _A = –40°C to +85°C			
			Typ	Guaranteed Limits				
V _{IH}	Minimum High Level Input Voltage	4.5 5.5	1.5 1.5	2.0 2.0	2.0 2.0	V	V _{OUT} = 0.1 V or V _{CC} – 0.1 V	
V _{IL}	Maximum Low Level Input Voltage	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V	V _{OUT} = 0.1 V or V _{CC} – 0.1 V	
V _{OH}	Minimum High Level Output Voltage	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	V	I _{OUT} = –50 μA	
		4.5 5.5		3.86 4.86	3.76 4.76	V	*V _{IN} = V _{IL} or V _{IH} I _{OH} –24 mA –24 mA	
V _{OL}	Maximum Low Level Output Voltage	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	V	I _{OUT} = 50 μA	
		4.5 5.5		0.36 0.36	0.44 0.44	V	*V _{IN} = V _{IL} or V _{IH} I _{OL} 24 mA 24 mA	
I _{IN}	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	V _I = V _{CC} , GND	
ΔI _{CCT}	Additional Max. I _{CC} /Input	5.5	0.6		1.5	mA	V _I = V _{CC} – 2.1 V	
I _{OLD}	†Minimum Dynamic Output Current	5.5			75	mA	V _{OLD} = 1.65 V Max	
I _{OHD}		5.5			–75	mA	V _{OHD} = 3.85 V Min	
I _{CC}	Maximum Quiescent Supply Current	5.5		8.0	80	μA	V _{IN} = V _{CC} or GND	

* All outputs loaded; thresholds on input associated with output under test.

† Maximum test duration 2.0 ms, one output loaded at a time.

MC74AC151 MC74ACT151

AC CHARACTERISTICS (For Figures and Waveforms — See Section 3)

Symbol	Parameter	V _{CC} * (V)	74ACT			74ACT		Unit	Fig. No.
			T _A = +25°C C _L = 50 pF			T _A = -40°C to +85°C C _L = 50 pF			
			Min	Typ	Max	Min	Max		
t _{PLH}	Propagation Delay S _n to Z	5.0	3.5		15.5	3.0	17.0	ns	3-6
t _{PHL}	Propagation Delay S _n to Z	5.0	3.5		15.5	3.0	16.5	ns	3-6
t _{PLH}	Propagation Delay S _n to Z	5.0	3.5		15	3.0	16.5	ns	3-6
t _{PHL}	Propagation Delay S _n to Z	5.0	4.0		16.5	3.5	18.5	ns	3-6
t _{PLH}	Propagation Delay E to Z	5.0	2.5		9.5	2.5	10.0	ns	3-6
t _{PHL}	Propagation Delay E to Z	5.0	2.5		9.0	2.5	10.0	ns	3-6
t _{PLH}	Propagation Delay E to Z	5.0	2.5		8.5	2.5	9.5	ns	3-6
t _{PHL}	Propagation Delay E to Z	5.0	3.0		10.0	2.5	10.5	ns	3-6
t _{PLH}	Propagation Delay I _n to Z	5.0	3.5		11.5	3.0	12.5	ns	3-6
t _{PHL}	Propagation Delay I _n to Z	5.0	3.5		12.0	3.0	13.5	ns	3-6
t _{PLH}	Propagation Delay I _n to Z	5.0	3.5		12.0	3.0	13.0	ns	3-6
t _{PHL}	Propagation Delay I _n to Z	5.0	4.0		12.5	3.0	14.0	ns	3-6

* Voltage Range 5.0 V is 5.0 V ± 0.5 V

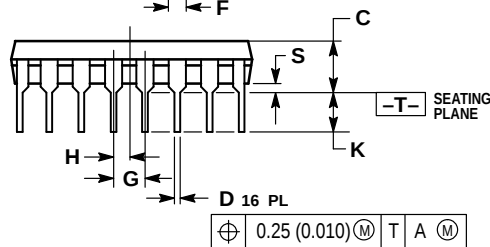
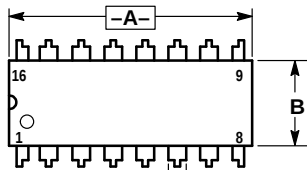
CAPACITANCE

Symbol	Parameter	Value Typ	Unit	Test Conditions
C _{IN}	Input Capacitance	4.5	pF	V _{CC} = 5.0 V
C _{PD}	Power Dissipation Capacitance	70	pF	V _{CC} = 5.0 V

MC74AC151 MC74ACT151

OUTLINE DIMENSIONS

N SUFFIX PLASTIC DIP PACKAGE CASE 648-08 ISSUE R

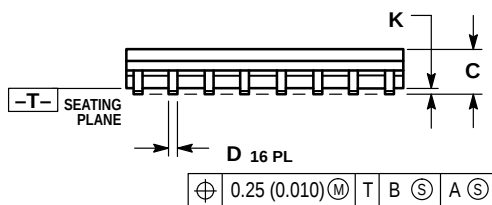
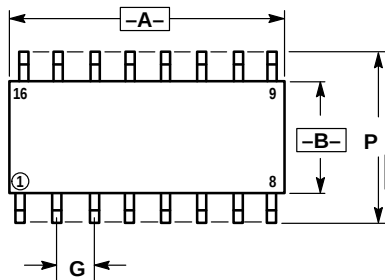


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.740	0.770	18.80	19.55
B	0.250	0.270	6.35	6.85
C	0.145	0.175	3.69	4.44
D	0.015	0.021	0.39	0.53
F	0.040	0.70	1.02	1.77
G	0.100 BSC		2.54 BSC	
H	0.050 BSC		1.27 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.130	2.80	3.30
L	0.295	0.305	7.50	7.74
M	0°	10°	0°	10°
S	0.020	0.040	0.51	1.01

D SUFFIX PLASTIC SOIC PACKAGE CASE 751B-05 ISSUE J



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	9.80	10.00	0.386	0.393
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G		1.27 BSC		0.050 BSC
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters can and do vary in different applications. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and  are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

How to reach us:

USA/EUROPE: Motorola Literature Distribution;
P.O. Box 20912; Phoenix, Arizona 85036. 1-800-441-2447

JAPAN: Nippon Motorola Ltd.; Tatsumi-SPD-JLDC, Toshikatsu Otsuka,
6F Seibu-Butsuryu-Center, 3-14-2 Tatsumi Koto-Ku, Tokyo 135, Japan. 03-3521-8315

MFAX: RMFA00@email.sps.mot.com -TOUCHTONE (602) 244-6609
INTERNET: <http://Design-NET.com>

HONG KONG: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park,
51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298



MC74AC151/D

