

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

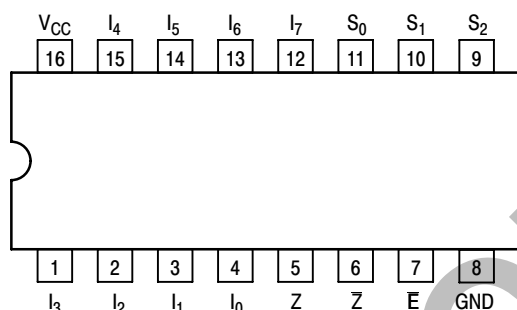


Figure 1. Pinout: 16-Lead Packages Conductors
(Top View)

PIN ASSIGNMENT

PIN	FUNCTION
I ₀ –I ₇	Data Inputs
S ₀ –S ₂	Select Inputs
$\bar{E}$	Enable Input
Z	Data Output
$\bar{Z}$	Inverted Data Output

TRUTH TABLE

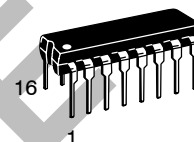
Inputs				Outputs	
E	S ₂	S ₁	S ₀	Z	$\bar{Z}$
H	X	X	X	H	L
L	L	L	L	I ₀	I ₀
L	L	L	H	I ₁	I ₁
L	L	H	L	I ₂	I ₂
L	L	H	H	I ₃	I ₃
L	H	L	L	I ₄	I ₄
L	H	L	H	I ₅	I ₅
L	H	H	L	I ₆	I ₆
L	H	H	H	I ₇	I ₇

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

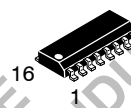


ON Semiconductor™

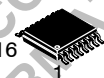
<http://onsemi.com>



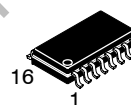
DIP-16
N SUFFIX
CASE 648



SO-16
D SUFFIX
CASE 751B



TSSOP-16
DT SUFFIX
CASE 948F



EIAJ-16
M SUFFIX
CASE 966

ORDERING INFORMATION

Device	Package	Shipping
MC74AC151N	PDIP-16	25 Units/Rail
MC74ACT151N	PDIP-16	25 Units/Rail
MC74AC151D	SOIC-16	48 Units/Rail
MC74ACT151D	SOIC-16	48 Units/Rail
MC74AC151DR2	SOIC-16	2500 Tape & Reel
MC74ACT151DR2	SOIC-16	2500 Tape & Reel
MC74AC151DT	TSSOP-16	96 Units/Rail
MC74ACT151DT	TSSOP-16	96 Units/Rail
MC74AC151DTR2	TSSOP-16	2500 Tape & Reel
MC74ACT151DTR2	TSSOP-16	2500 Tape & Reel
MC74AC151M	EIAJ-16	50 Units/Rail
MC74ACT151M	EIAJ-16	50 Units/Rail

DEVICE MARKING INFORMATION

See general marking information in the device marking section on page 7 of this data sheet.

MC74AC151, MC74ACT151

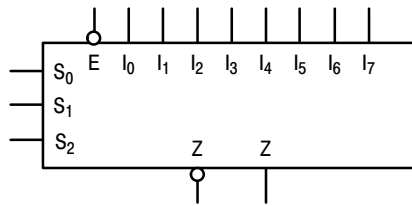


Figure 2. Logic Symbol

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:

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

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.

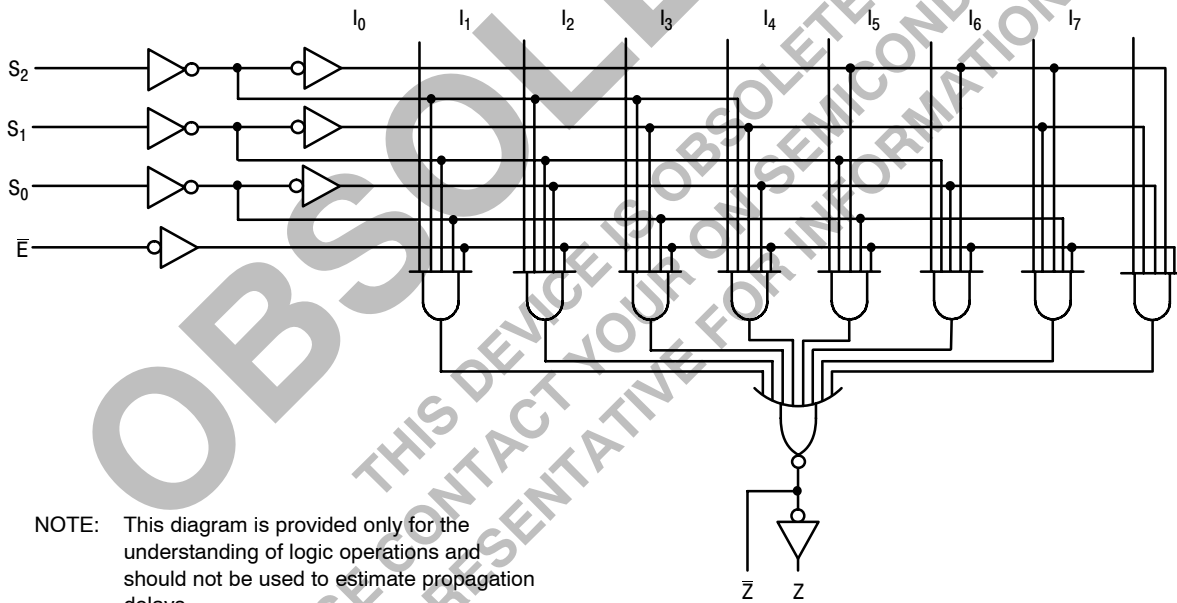


Figure 3. Logic Diagram

MC74AC151, MC74ACT151

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	°C

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

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	$V_{CC} @ 3.0\text{ V}$	-	150	ns/V
		$V_{CC} @ 4.5\text{ V}$	-	40	
		$V_{CC} @ 5.5\text{ V}$	-	25	
t_r, t_f	Input Rise and Fall Time (Note 2) 'ACT Devices except Schmitt Inputs	$V_{CC} @ 4.5\text{ V}$	-	10	ns/V
		$V_{CC} @ 5.5\text{ V}$	-	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.

MC74AC151, MC74ACT151

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 of the ON Semiconductor FACT Data Book, DL138/D)

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 $\bar{Z}$	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 $\bar{Z}$	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 $\bar{E}$ to Z or $\bar{Z}$	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 $\bar{E}$ to Z or $\bar{Z}$	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 $\bar{Z}$	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 $\bar{Z}$	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 of the ON Semiconductor FACT Data Book, DL138/D)

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 $\bar{Z}$	5.0	3.5	–	15	3.0	16.5	ns	3–6
t _{PHL}	Propagation Delay S _n to $\bar{Z}$	5.0	4.0	–	16.5	3.5	18.5	ns	3–6
t _{PLH}	Propagation Delay $\bar{E}$ to Z	5.0	2.5	–	9.5	2.5	10.0	ns	3–6
t _{PHL}	Propagation Delay $\bar{E}$ to Z	5.0	2.5	–	9.0	2.5	10.0	ns	3–6
t _{PLH}	Propagation Delay $\bar{E}$ to $\bar{Z}$	5.0	2.5	–	8.5	2.5	9.5	ns	3–6
t _{PHL}	Propagation Delay $\bar{E}$ to $\bar{Z}$	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 $\bar{Z}$	5.0	3.5	–	12.0	3.0	13.0	ns	3–6
t _{PHL}	Propagation Delay I _n to $\bar{Z}$	5.0	4.0	–	12.5	3.0	14.0	ns	3–6

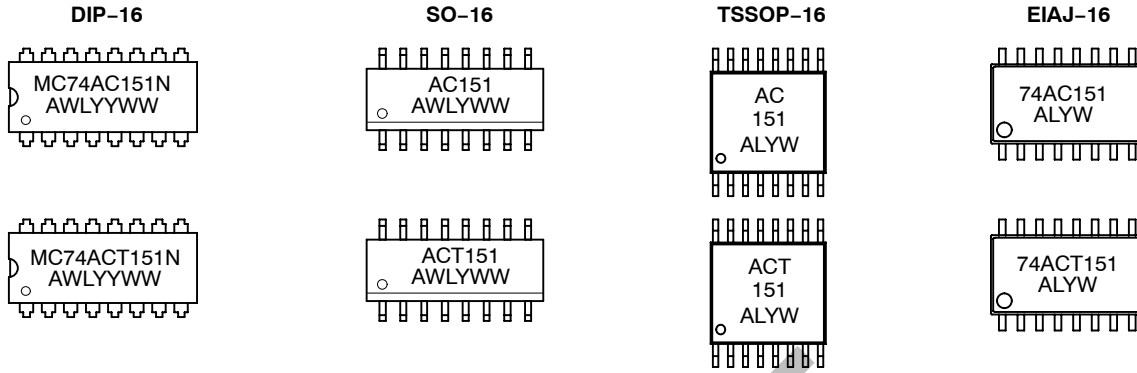
*Voltage Range 5.0 V is 5.0 V ± 0.5 V

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

MARKING DIAGRAMS



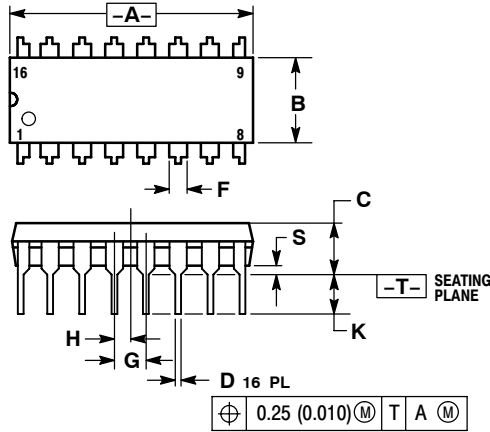
A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week

OBSOLETE
THIS DEVICE IS OBSOLETE
PLEASE CONTACT YOUR ON SEMICONDUCTOR
REPRESENTATIVE FOR INFORMATION

MC74AC151, MC74ACT151

PACKAGE DIMENSIONS

PDIP-16 N SUFFIX 16 PIN PLASTIC DIP PACKAGE CASE 648-08 ISSUE R

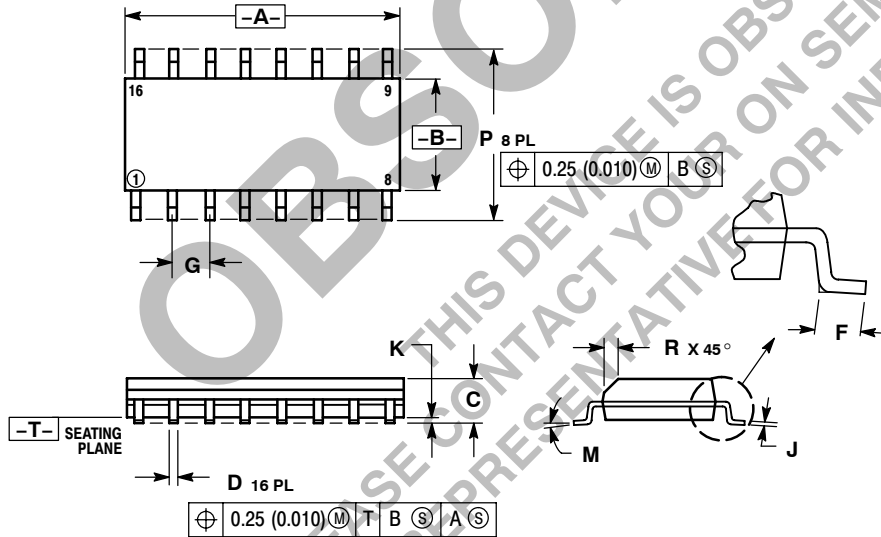


NOTES:

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

SO-16 D SUFFIX 16 PIN PLASTIC SOIC PACKAGE CASE 751B-05 ISSUE J



NOTES:

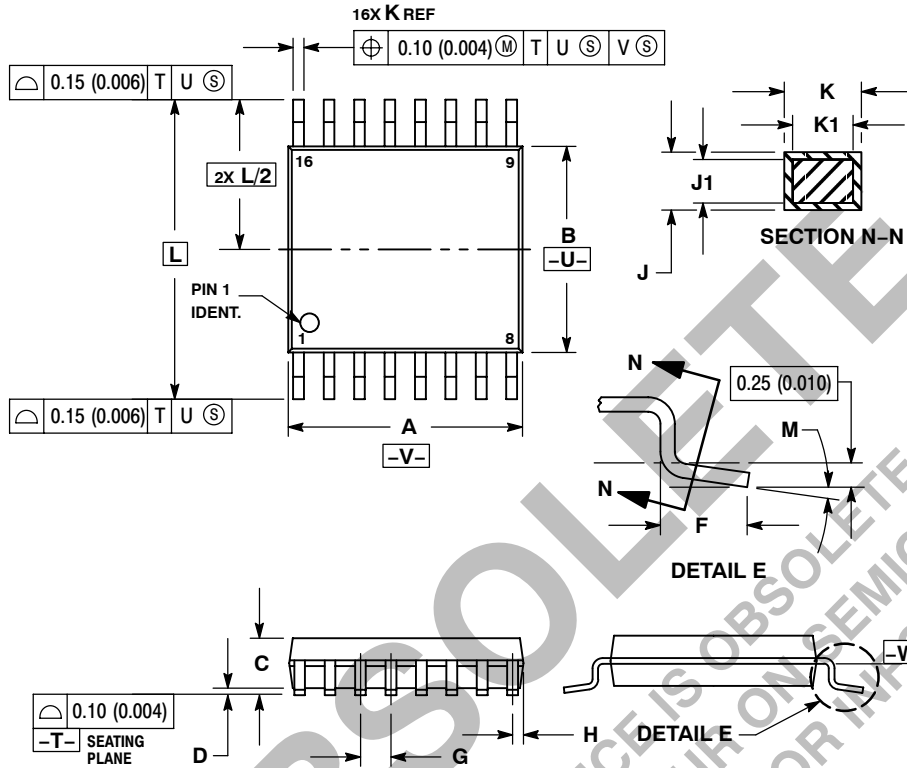
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL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

MC74AC151, MC74ACT151

PACKAGE DIMENSIONS

TSSOP-16
DT SUFFIX
 16 PIN PLASTIC TSSOP PACKAGE
 CASE948F-01
 ISSUE O

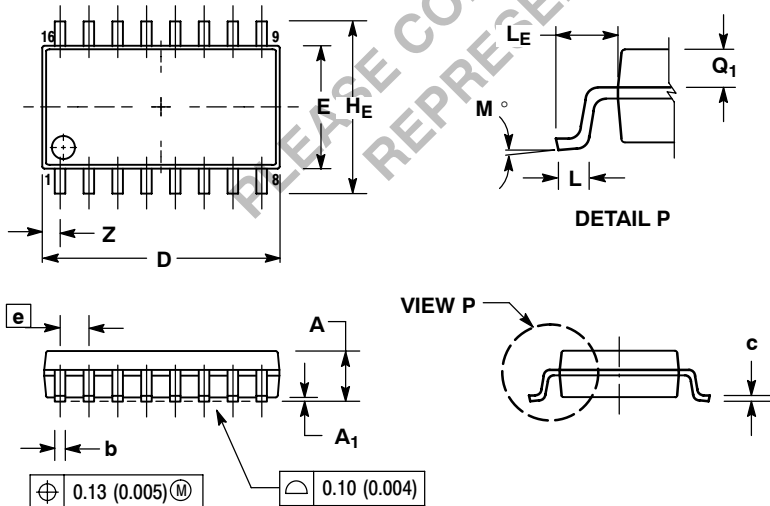


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.90	5.10	0.193	0.200
B	4.30	4.50	0.169	0.177
C	---	1.20	---	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.18	0.28	0.007	0.011
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0°	8°	0°	8°

EIAJ-16
M SUFFIX
 16 PIN PLASTIC EIAJ PACKAGE
 CASE966-01
 ISSUE O



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	---	2.05	---	0.081
A ₁	0.05	0.20	0.002	0.008
b	0.35	0.50	0.014	0.020
c	0.18	0.27	0.007	0.011
D	9.90	10.50	0.390	0.413
E	5.10	5.45	0.201	0.215
e	1.27 BSC		0.050 BSC	
H _E	7.40	8.20	0.291	0.323
L	0.50	0.85	0.020	0.033
L _E	1.10	1.50	0.043	0.059
M	0°	10°	0°	10°
Q ₁	0.70	0.90	0.028	0.035
Z	---	0.78	---	0.031

OBSOLETE
THIS DEVICE IS OBSOLETE
PLEASE CONTACT YOUR ON SEMICONDUCTOR
REPRESENTATIVE FOR INFORMATION

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC 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 special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC 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 SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC 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 SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:

Literature Distribution Center for ON Semiconductor
P.O. Box 5163, Denver, Colorado 80217 USA
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800-282-9855 Toll Free
USA/Canada

Europe, Middle East and Africa Technical Support:
Phone: 421 33 790 2910

Japan Customer Focus Center
Phone: 81-3-5773-3850

ON Semiconductor Website: www.onsemi.com

Order Literature: <http://www.onsemi.com/orderlit>

For additional information, please contact your local
Sales Representative