

8-Input Data Selector/Multiplexer

MC74HC151A

The MC74HC151A is identical in pinout to the LS151. The device inputs are compatible with standard CMOS outputs; with pullup resistors, they are compatible with LSTTL outputs.

This device selects one of the eight binary Data Inputs, as determined by the Address Inputs. The Strobe pin must be at a low level for the selected data to appear at the outputs. If Strobe is high, the Y output is forced to a low level and the \overline{Y} output is forced to a high level.

The HC151A is similar in function to the HC251 which has 3-state outputs.

Features

- Output Drive Capability: 10 LSTTL Loads
- Outputs Directly Interface to CMOS, NMOS, and TTL
- Operating Voltage Range: 2.0 to 6.0 V
- Low Input Current: 1 μA
- High Noise Immunity Characteristic of CMOS Devices
- In Compliance with the Requirements Defined by JEDEC Standard No. 7A
- Chip Complexity: 328 FETs or 82 Equivalent Gates
- –Q Suffix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q100 Qualified and PPAP Capable
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant





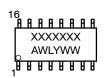


TSSOP-16 DT SUFFIX CASE 948F



QFN16 MN SUFFIX CASE 485AW

MARKING DIAGRAMS







A = Assembly Location

WL, L = Wafer Lot YY, Y = Year WW, W = Work Week G or = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information on page 8 of this data sheet.

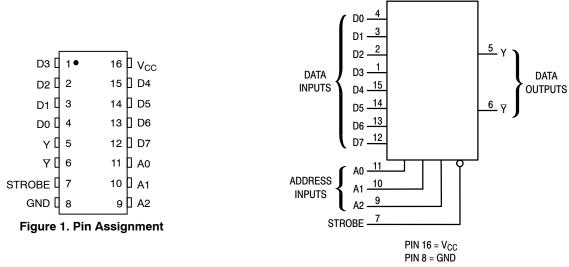


Figure 2. Logic Diagram

FUNCTION TABLE

	Inputs				puts	
A2	A 1	A0	Strobe	Y	Y	
X	Χ	Χ	Н	L	Н	
L	L	L	L	D0	D0	
L	L	Н	L	D1	D1	
L	Н	L	L	D2	D2	
L	Н	Н	L	D3	D3	
Н	L	L	L	D4	D4	
Н	L	Н	L	D5	D5	
Н	Н	L	L	D6	D6	
Н	Н	Н	L	D7	D7	

D0, D1, ..., D7 = the level of the respective D input.

MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC}	DC Supply Voltage	-0.5 to +6.5	V
V _{IN}	DC Input Voltage	-0.5 to V _{CC} + 0.5	V
V _{OUT}	DC Output Voltage	-0.5 to V _{CC} + 0.5	V
I _{IN}	DC Input Current, per Pin	±20	mA
I _{OUT}	DC Output Current, per Pin	±25	mA
I _{CC}	DC Supply Current, V _{CC} and GND Pins	±50	mA
I _{IK}	Input Clamp Current (V _{IN} < 0 or V _{IN} > V _{CC})	±20	mA
lok	Output Clamp Current (V _{OUT} < 0 or V _{OUT} > V _{CC})	±20	mA
T _{STG}	Storage Temperature	-65 to +150	°C
TL	Lead Temperature, 1 mm from Case for 10 Seconds	260	°C
TJ	Junction Temperature Under Bias	±150	°C
θЈА	Thermal Resistance (Note 1) SOIC— QFN TSSOP—	16 118	°C/W
P _D	Power Dissipation in Still Air at 25°C SOIC—QFN TSSOP—	16 1062	mW
MSL	Moisture Sensitivity	Level 1	-
F _R	Flammability Rating Oxygen Index: 28 to 3	34 UL 94 V-0 @ 0.125 in	_
V _{ESD}	ESD Withstand Voltage (Note 2) Human Body Mod Charged Device Mod		V

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

- Measured with minimum pad spacing on an FR4 board, using 76 mm-by-114 mm, 2-ounce copper trace no air flow per JESD51-7.
 HBM tested to EIA / JESD22-A114-A. CDM tested to JESD22-C101-A. JEDEC recommends that ESD qualification to EIA/JESD22-A115A (Machine Model) be discontinued.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage	2.0	6.0	V
V _{IN} , V _{OUT}	DC Input Voltage, Output Voltage (Note 3)	0	V _{CC}	V
T _A	Operating Free-Air Temperature	– 55	+125	°C
t _r , t _f	Input Rise or Fall Time $ \begin{array}{c} V_{CC} = 2.0 \ V \\ V_{CC} = 4.5 \ V \\ V_{CC} = 6.0 \ V \\ \end{array} $	0 0 0	1000 500 400	ns

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

3. Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or VCC). Unused outputs must be left open.

DC ELECTRICAL CHARACTERISTICS

				Guaranteed Limit			
Symbol	Parameter	Test Conditions	V _{CC} V	–55 to 25°C	≤ 85°C	≤ 125°C	Unit
V _{IH}	Minimum High-Level Input Voltage	$V_{OUT} = 0.1 \text{ V or } V_{CC} - 0.1 \text{ V}$ $ I_{OUT} \le 20 \mu\text{A}$	2.0 3.0 4.5 6.0	1.5 2.1 3.15 4.2	1.5 2.1 3.15 4.2	1.5 2.1 3.15 4.2	V
V _{IL}	Maximum Low-Level Input Voltage	V_{OUT} = 0.1 V or V_{CC} – 0.1 V $ I_{OUT} \le 20 \mu A$	2.0 3.0 4.5 6.0	0.5 0.9 1.35 1.8	0.5 0.9 1.35 1.8	0.5 0.9 1.35 1.8	V
V _{OH}	Minimum High-Level Output	V _{IN} = V _{IH} or V _{IL}					V
	Voltage	I _{OUT} ≤ 20 μA	2.0 4.5 6.0	1.9 4.4 5.9	1.9 4.4 5.9	1.9 4.4 5.9	
		$ I_{OUT} \le 2.4 \text{ mA}$ $ I_{OUT} \le 4.0 \text{ mA}$ $ I_{OUT} \le 5.2 \text{ mA}$	3.0 4.5 6.0	2.48 3.98 5.48	2.34 3.84 5.34	2.2 3.7 5.2	
V _{OL}	Minimum Low-Level Output	V _{IN} = V _{IH} or V _{IL}					V
	Voltage	I _{OUT} ≤ 20 μA	2.0 4.5 6.0	0.1 0.1 0.1	0.1 0.1 0.1	0.1 0.1 0.1	
		$ I_{OUT} \le 2.4 \text{ mA}$ $ I_{OUT} \le 4.0 \text{ mA}$ $ I_{OUT} \le 5.2 \text{ mA}$	3.0 4.5 6.0	0.26 0.26 0.26	0.33 0.33 0.33	0.4 0.4 0.4	
I _{IN}	Maximum Input Leakage Current	V _{IN} = V _{CC} or GND	6.0	±0.1	±1.0	±1.0	μΑ
I _{CC}	Maximum Quiescent Supply Current (per Package)	V _{IN} = V _{CC} or GND	6.0	8.0	80	160	μА

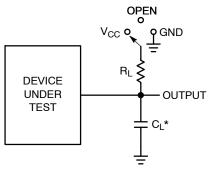
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

AC ELECTRICAL CHARACTERISTICS

			Gu	Guaranteed Limit			
Symbol	Parameter	V _{CC}	–55 to 25°C	≤ 85°C	≤ 125°C	Unit	
t _{PLH} ,	Maximum Propagation Delay, D to Y	2.0	170	215	255	ns	
t _{PHL}	(Figures 3 and 4)	3.0	TBD	TBD	TBD		
		4.5	34	43	51		
		6.0	29	37	43		
t _{PLH} ,	Maximum Propagation Delay, D to \overline{Y}	2.0	185	230	280	ns	
t_{PHL}	(Figures 3 and 4)	3.0	TBD	TBD	TBD		
		4.5	37	46	56		
		6.0	31	39	48		
t _{PLH} ,	Maximum Propagation Delay, A to Y	2.0	185	230	280	ns	
t _{PHL}	(Figures 3 and 4)	3.0	TBD	TBD	TBD		
		4.5	37	46	56		
		6.0	31	39	48		
t _{PLH} ,	Maximum Propagation Delay, A to \overline{Y}	2.0	205	255	310	ns	
t _{PHL}	(Figures 3 and 4)	3.0	TBD	TBD	TBD		
		4.5	41	51	62		
		6.0	35	43	53		
t _{PLH} ,	Maximum Propagation Delay, STROBE to Y or \overline{Y}	2.0	125	155	190	ns	
t _{PHL}	(Figures 3 and 4)	3.0	TBD	TBD	TBD		
		4.5	25	31	38		
		6.0	21	26	32		
t _{TLH} ,	Maximum Output Transition Time, Any Output	2.0	75	95	110	ns	
t _{THL}	(Figures 3 and 4)	3.0	30	40	55		
		4.5	15	19	22		
		6.0	13	16	19		
C _{IN}	Maximum Input Capacitance	-	10	10	10	pF	

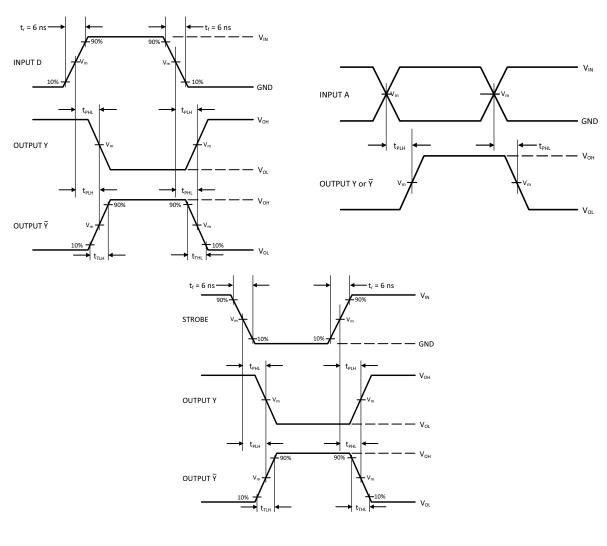
			Typical @ 25°C	
C_{PD}	Power Dissipation Capacitance (Per Enabled Output) (Note 4)	5.0	36	pF

^{4.} Used to determine the no–load dynamic power consumption: $P_D = C_{PD} \times V_{CC}^2 \times f + I_{CC} \times V_{CC}$.



Test	Switch Position	CL	R_{L}
t _{PLH} / t _{PHL}	Open	50 pF	1 kΩ
t _{PLZ} / t _{PZL}	V _{CC}		
t _{PHZ} / t _{PZH}	GND		

Figure 3. Test Circuit



Device	V _{IN} , V	V _m , V
MC74HC151A	V _{CC}	50% x V _{CC}

Figure 4. Switching Waveforms

 $^{^*\!}C_L$ Includes probe and jig capacitance

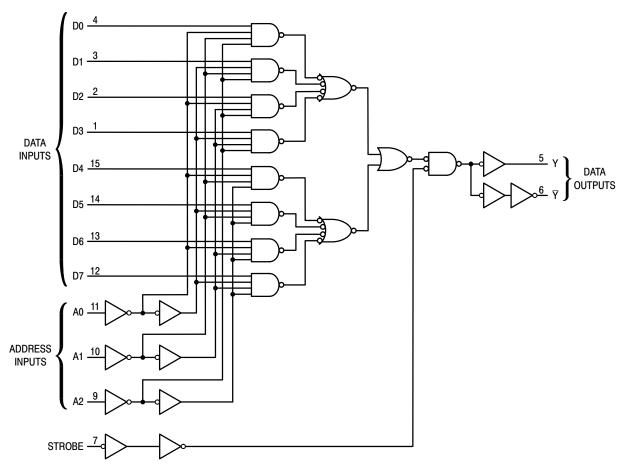


Figure 5. Expanded Logic Diagram

PIN DESCRIPTIONS

INPUTS

D0, D1, ... , D7 (Pins 4, 3, 2, 1, 15, 14, 13, 12)

Data inputs. Data on any one of these eight binary inputs may be selected to appear on the output.

CONTROL INPUTS

A0, A1, A2 (Pins 11, 10, 9)

Address inputs. The data on these pins are the binary address of the selected input (see the Function Table).

Strobe (Pin 7)

Strobe. This input pin must be at a low level for the selected data to appear at the outputs. If the Strobe pin is high, the Y output is forced to a low level and the \overline{Y} output is forced to a high level.

OUTPUTS

Y, ₹ (Pins 5, 6)

Data outputs. The selected data is presented at these pins in both true (Y output) and complemented (\overline{Y} output) forms.

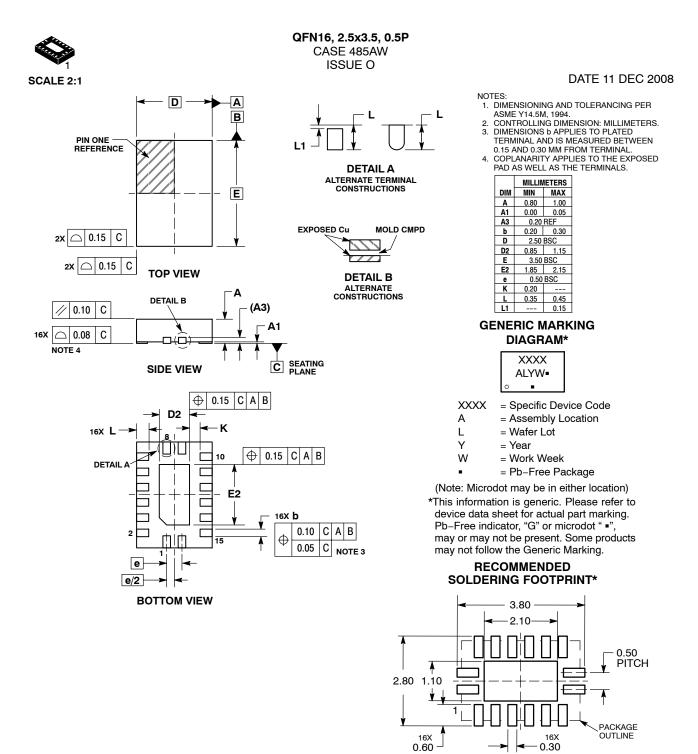
ORDERING INFORMATION

Device	Package	Marking	Shipping [†]
MC74HC151ADR2G	SOIC-16	HC151AG	1000 / Tape & Reel
MC74HC151ADR2G-Q*	SOIC-16	HC151AG	1000 / Tape & Reel
MC74HC151ADTG	TSSOP-16	HC 151A	75 Units / Rail
MC74HC151ADTR2G	TSSOP-16	HC 151A	2500 / Tape & Reel
MC74HC151ADTR2G-Q*	TSSOP-16	HC 151A	2500 / Tape & Reel

[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*-Q Suffix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.

PACKAGE DIMENSIONS



*For additional information on our Pb–Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

DIMENSIONS: MILLIMETERS



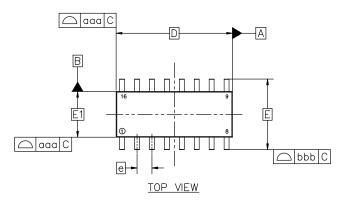


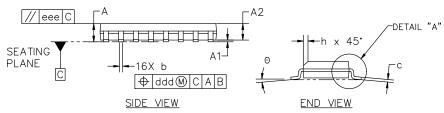
SOIC-16 9.90x3.90x1.50 1.27P CASE 751B ISSUE L

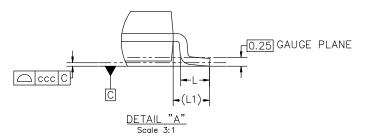
DATE 29 MAY 2024

NOTES:

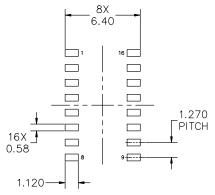
- 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
- 2. DIMENSION IN MILLIMETERS. ANGLE IN DEGREES.
- 3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD PROTRUSION.
- 4. MAXIMUM MOLD PROTRUSION 0.15mm PER SIDE.
- 5. DIMENSION 6 DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127mm TOTAL IN EXCESS OF THE 6 DIMENSION AT MAXIMUM MATERIAL CONDITION.







MILLIMETERS						
DIM	MIN	NOM	MAX			
А	1.35	1.55	1.75			
A1	0.00	0.05	0.10			
A2	1.35	1.50	1.65			
b	0.35	0.42	0.49			
С	0.19	0.22	0.25			
D	9.90 BSC					
Е	6.00 BSC					
E1	3.90 BSC					
е		1.27 BSC				
h	0.25		0.50			
L	0.40	0.83	1.25			
L1		1.05 REF				
Θ	0.		7°			
TOLERAN	CE OF FO	ORM AND	POSITION			
aaa		0.10				
bbb		0.20				
ссс		0.10				
ddd		0.25	· · ·			
eee		0.10				



RECOMMENDED MOUNTING FOOTPRINT

*FOR ADDITIONAL INFORMATION ON OUR
PB-FREE STRATEGY AND SOLDERING DETAILS,
PLEASE DOWNLOAD THE onsemi SOLDERING
AND MOUNTING TECHNIQUES REFERENCE
MANUAL, SOLDERRM/D

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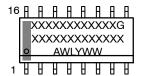
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SOIC-16 9.90x3.90x1.50 1.27P

CASE 751B ISSUE L

DATE 29 MAY 2024

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code A = Assembly Location

WL = Wafer Lot
 Y = Year
 WW = Work Week
 G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

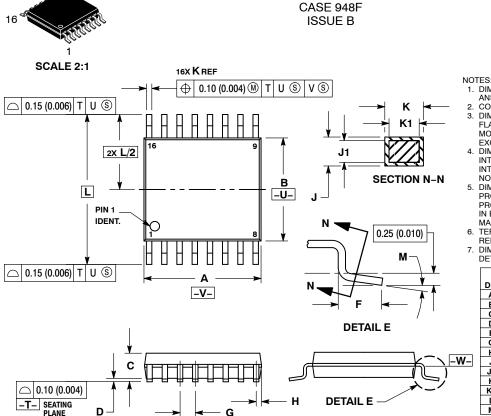
STYLE 1:		STYLE 2:		STYLE 3:	S	TYLE 4:	
	COLLECTOR	PIN 1.	CATHODE	PIN 1.	COLLECTOR, DYE #1	PIN 1.	COLLECTOR, DYE #1
	BASE	2.	ANODE	2.	BASE. #1	2.	
3.	EMITTER	3.	NO CONNECTION	3.	EMITTER. #1	3.	
4.	NO CONNECTION	4.	CATHODE	4.	COLLECTOR, #1	4.	COLLECTOR, #2
5.	EMITTER	5.	CATHODE	5.	COLLECTOR, #2	5.	COLLECTOR, #3
6.	BASE	6.	NO CONNECTION	6.	BASE, #2	6.	COLLECTOR, #3
7.	COLLECTOR	7.	ANODE	7.	EMITTER, #2	7.	COLLECTOR, #4
8.	COLLECTOR	8.	CATHODE	8.	COLLECTOR, #2	8.	COLLECTOR, #4
9.	BASE	9.	CATHODE	9.	COLLECTOR, #3	9.	BASE, #4
10.	EMITTER	10.	ANODE	10.	BASE, #3	10.	EMITTER, #4
11.	NO CONNECTION	11.	NO CONNECTION	11.	EMITTER, #3	11.	
	EMITTER	12.	CATHODE	12.		12.	
13.	BASE	13.		13.	COLLECTOR, #4	13.	BASE, #2
14.	COLLECTOR	14.	NO CONNECTION	14.	BASE, #4	14.	
15.	EMITTER	15.	ANODE	15.	EMITTER, #4	15.	
16.	COLLECTOR	16.	CATHODE	16.	COLLECTOR, #4	16.	EMITTER, #1
STYLE 5:		STYLE 6:		STYLE 7:			
PIN 1.	DRAIN, DYE #1	PIN 1.	CATHODE	PIN 1.	SOURCE N-CH		
2.	DRAIN, #1	2.	CATHODE	2.	COMMON DRAIN (OUTPUT)		
3.	DRAIN, #2	3.	CATHODE	3.	COMMON DRAIN (OUTPUT)		
4.	DRAIN, #2	4.	CATHODE	4.	GATE P-CH		
5.	DRAIN, #3	5.		5.	COMMON DRAIN (OUTPUT)		
6.	DRAIN, #3	6.		6.	COMMON DRAIN (OUTPUT)		
7.	DRAIN, #4	7.	CATHODE	7.	COMMON DRAIN (OUTPUT)		
0							
8.	DRAIN, #4		CATHODE	8.	SOURCE P-CH		
	GATE, #4	9.	ANODE	9.	SOURCE P-CH		
9. 10.	GATE, #4 SOURCE, #4	9. 10.	ANODE ANODE	9. 10.	SOURCE P-CH COMMON DRAIN (OUTPUT)		
9. 10. 11.	GATE, #4 SOURCE, #4 GATE, #3	9. 10. 11.	ANODE ANODE ANODE	9. 10. 11.	SOURCE P-CH COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT)		
9. 10. 11. 12.	GATE, #4 SOURCE, #4 GATE, #3 SOURCE, #3	9. 10. 11. 12.	ANODE ANODE ANODE ANODE	9. 10. 11. 12.	SOURCE P-CH COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT)		
9. 10. 11. 12. 13.	GATE, #4 SOURCE, #4 GATE, #3 SOURCE, #3 GATE, #2	9. 10. 11. 12. 13.	ANODE ANODE ANODE ANODE ANODE	9. 10. 11. 12. 13.	SOURCE P-CH COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT) GATE N-CH		
9. 10. 11. 12. 13. 14.	GATE, #4 SOURCE, #4 GATE, #3 SOURCE, #3 GATE, #2 SOURCE, #2	9. 10. 11. 12. 13. 14.	ANODE ANODE ANODE ANODE ANODE ANODE	9. 10. 11. 12. 13.	SOURCE P-CH COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT) GATE N-CH COMMON DRAIN (OUTPUT)		
9. 10. 11. 12. 13. 14.	GATE, #4 SOURCE, #4 GATE, #3 SOURCE, #3 GATE, #2 SOURCE, #2 GATE, #1	9. 10. 11. 12. 13. 14.	ANODE ANODE ANODE ANODE ANODE ANODE ANODE	9. 10. 11. 12. 13. 14.	SOURCE P-CH COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT) GATE N-CH COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT)		
9. 10. 11. 12. 13. 14.	GATE, #4 SOURCE, #4 GATE, #3 SOURCE, #3 GATE, #2 SOURCE, #2	9. 10. 11. 12. 13. 14.	ANODE ANODE ANODE ANODE ANODE ANODE	9. 10. 11. 12. 13.	SOURCE P-CH COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT) COMMON DRAIN (OUTPUT) GATE N-CH COMMON DRAIN (OUTPUT)		

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DATE 19 OCT 2006



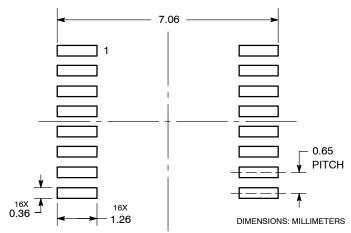


TSSOP-16 WB

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982. CONTROLLING DIMENSION: MILLIMETER.
- 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.
 DIMENSION B DOES NOT INCLUDE
 INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL
- IN TERLEAD FLASH OH PROTHOSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE. 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.
- TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
- DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
Α	4.90	5.10	0.193	0.200
В	4.30	4.50	0.169	0.177
С		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	
Н	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	
М	0 °	8 °	0 °	8 °

RECOMMENDED SOLDERING FOOTPRINT*



^{*}For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code Α = Assembly Location

= Wafer Lot L = Year W = Work Week G or • = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " ■", may or may not be present. Some products may not follow the Generic Marking.

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