

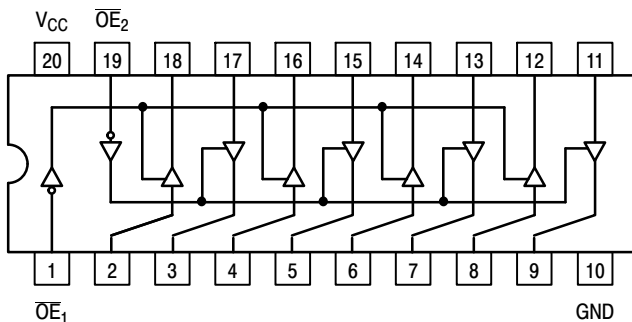
# Octal Buffer/Line Driver with 3-State Outputs

## MC74AC244, MC74ACT244

The MC74AC244/74ACT244 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus oriented transmitter/receiver which provides improved PC board density.

### Features

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Outputs Source/Sink 24 mA
- 'ACT244 Has TTL Compatible Inputs
- These are Pb-Free Devices



Pinout: 20-Lead Packages Conductors (Top View)

### TRUTH TABLE

| Inputs            |   | Outputs               |
|-------------------|---|-----------------------|
| $\overline{OE}_1$ | D | (Pins 12, 14, 16, 18) |
| L                 | L | L                     |
| L                 | H | H                     |
| H                 | X | Z                     |

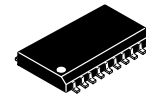
NOTE: H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Immaterial  
Z = High Impedance

### TRUTH TABLE

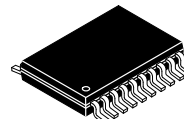
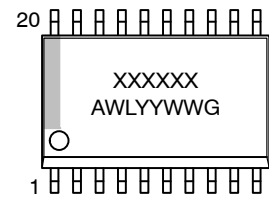
| Inputs            |   | Outputs           |
|-------------------|---|-------------------|
| $\overline{OE}_2$ | D | (Pins 3, 5, 7, 9) |
| L                 | L | L                 |
| L                 | H | H                 |
| H                 | X | Z                 |

NOTE: H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Immaterial  
Z = High Impedance

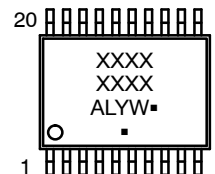
### MARKING DIAGRAMS



1  
SOIC-20W  
DW SUFFIX  
CASE 751D



1  
TSSOP-20  
DT SUFFIX  
CASE 948E



XXXXXX = Specific Device Code  
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 in the package dimensions section on page 5 of this data sheet.

# MC74AC244, MC74ACT244

## MAXIMUM RATINGS

| Symbol               | Parameter                                                                           | Value                        | Unit |
|----------------------|-------------------------------------------------------------------------------------|------------------------------|------|
| V <sub>CC</sub>      | DC Supply Voltage (Referenced to GND)                                               | –0.5 to +6.5                 | V    |
| V <sub>IN</sub>      | DC Input Voltage (Referenced to GND)                                                | –0.5 to V <sub>CC</sub> +0.5 | V    |
| V <sub>OUT</sub>     | DC Output Voltage (Referenced to GND) (Note 1)                                      | –0.5 to V <sub>CC</sub> +0.5 | V    |
| I <sub>IK</sub>      | DC Input Diode Current                                                              | ±20                          | mA   |
| I <sub>OK</sub>      | DC Output Diode Current                                                             | ±50                          | mA   |
| I <sub>OUT</sub>     | DC Output Sink/Source Current                                                       | ±50                          | mA   |
| I <sub>CC</sub>      | DC Supply Current, per Output Pin                                                   | ±50                          | mA   |
| I <sub>GND</sub>     | DC Ground Current, per Output Pin                                                   | ±100                         | mA   |
| T <sub>STG</sub>     | Storage Temperature Range                                                           | – 65 to + 150                | °C   |
| T <sub>L</sub>       | Lead temperature, 1 mm from Case for 10 Seconds                                     | 260                          | °C   |
| T <sub>J</sub>       | Junction Temperature Under Bias                                                     | 140                          | °C   |
| θ <sub>JA</sub>      | Thermal Resistance (Note 2)<br>SOIC<br>TSSOP                                        | 96<br>150                    | °C/W |
| MSL                  | Moisture Sensitivity                                                                | Level 1                      |      |
| F <sub>R</sub>       | Flammability Rating<br>Oxygen Index: 30% – 35%                                      | UL 94 V–0 @ 0.125 in         |      |
| V <sub>ESD</sub>     | ESD Withstand Voltage<br>Human Body Model (Note 3)<br>Charged Device Model (Note 4) | > 2000<br>> 1000             | V    |
| I <sub>Latchup</sub> | Latchup Performance<br>Above V <sub>CC</sub> and Below GND at 85°C (Note 5)         | ±100                         | mA   |

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.

1. I<sub>OUT</sub> absolute maximum rating must be observed.
2. The package thermal impedance is calculated in accordance with JESD 51–7.
3. Tested to EIA/JESD22–A114–A.
4. Tested to JESD22–C101–A.
5. Tested to EIA/JESD78.

## RECOMMENDED OPERATING CONDITIONS

| Symbol                             | Parameter                                                               | Min                     | Typ | Max             | Unit |
|------------------------------------|-------------------------------------------------------------------------|-------------------------|-----|-----------------|------|
| V <sub>CC</sub>                    | Supply Voltage                                                          | 'AC                     | 2.0 | 5.0             | V    |
|                                    |                                                                         | 'ACT                    | 4.5 | 5.0             |      |
| V <sub>IN</sub> , V <sub>OUT</sub> | DC Input Voltage, Output Voltage (Ref. to GND)                          | 0                       | –   | V <sub>CC</sub> | V    |
| t <sub>r</sub> , t <sub>f</sub>    | Input Rise and Fall Time (Note 6)<br>'AC Devices except Schmitt Inputs  | V <sub>CC</sub> @ 3.0 V | –   | 150             | ns/V |
|                                    |                                                                         | V <sub>CC</sub> @ 4.5 V | –   | 40              |      |
|                                    |                                                                         | V <sub>CC</sub> @ 5.5 V | –   | 25              |      |
| t <sub>r</sub> , t <sub>f</sub>    | Input Rise and Fall Time (Note 7)<br>'ACT Devices except Schmitt Inputs | V <sub>CC</sub> @ 4.5 V | –   | 10              | ns/V |
|                                    |                                                                         | V <sub>CC</sub> @ 5.5 V | –   | 8.0             |      |
| T <sub>A</sub>                     | Operating Ambient Temperature Range                                     | –40                     | 25  | 85              | °C   |
| I <sub>OH</sub>                    | Output Current – High                                                   | –                       | –   | –24             | mA   |
| I <sub>OL</sub>                    | Output Current – Low                                                    | –                       | –   | 24              | mA   |

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.

6. V<sub>IN</sub> from 30% to 70% V<sub>CC</sub>; see individual Data Sheets for devices that differ from the typical input rise and fall times.
7. V<sub>IN</sub> from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

# MC74AC244, MC74ACT244

## DC CHARACTERISTICS

| Symbol           | Parameter                         | V <sub>CC</sub><br>(V) | 74AC                    |                      | 74AC                               |    | Unit                                                                                                                                        | Conditions |
|------------------|-----------------------------------|------------------------|-------------------------|----------------------|------------------------------------|----|---------------------------------------------------------------------------------------------------------------------------------------------|------------|
|                  |                                   |                        | T <sub>A</sub> = +25°C  |                      | T <sub>A</sub> =<br>-40°C to +85°C |    |                                                                                                                                             |            |
|                  |                                   |                        | Typ                     | Guaranteed Limits    |                                    |    |                                                                                                                                             |            |
| V <sub>IH</sub>  | Minimum High Level Input Voltage  | 3.0<br>4.5<br>5.5      | 1.5<br>2.25<br>2.75     | 2.1<br>3.15<br>3.85  | 2.1<br>3.15<br>3.85                | V  | V <sub>OUT</sub> = 0.1 V<br>or V <sub>CC</sub> - 0.1 V                                                                                      |            |
| V <sub>IL</sub>  | Maximum Low Level Input Voltage   | 3.0<br>4.5<br>5.5      | 1.5<br>2.25<br>2.75     | 0.9<br>1.35<br>1.65  | 0.9<br>1.35<br>1.65                | V  | V <sub>OUT</sub> = 0.1 V<br>or V <sub>CC</sub> - 0.1 V                                                                                      |            |
| V <sub>OH</sub>  | Minimum High Level Output Voltage | 3.0<br>4.5<br>5.5      | 2.99<br>4.49<br>5.49    | 2.9<br>4.4<br>5.4    | 2.9<br>4.4<br>5.4                  | V  | I <sub>OUT</sub> = -50 μA                                                                                                                   |            |
|                  |                                   | 3.0<br>4.5<br>5.5      | -<br>-<br>-             | 2.56<br>3.86<br>4.86 | 2.46<br>3.76<br>4.76               | V  | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>-12 mA<br>I <sub>OH</sub> -24 mA<br>-24 mA                                         |            |
| V <sub>OL</sub>  | Maximum Low Level Output Voltage  | 3.0<br>4.5<br>5.5      | 0.002<br>0.001<br>0.001 | 0.1<br>0.1<br>0.1    | 0.1<br>0.1<br>0.1                  | V  | I <sub>OUT</sub> = 50 μA                                                                                                                    |            |
|                  |                                   | 3.0<br>4.5<br>5.5      | -<br>-<br>-             | 0.36<br>0.36<br>0.36 | 0.44<br>0.44<br>0.44               | V  | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>12 mA<br>I <sub>OL</sub> 24 mA<br>24 mA                                            |            |
| I <sub>IN</sub>  | Maximum Input Leakage Current     | 5.5                    | -                       | ±0.1                 | ±1.0                               | μA | V <sub>I</sub> = V <sub>CC</sub> , GND                                                                                                      |            |
| I <sub>OZ</sub>  | Maximum 3-State Current           | 5.5                    | -                       | ±0.5                 | ±5.0                               | μA | V <sub>I</sub> (OE) = V <sub>IL</sub> , V <sub>IH</sub><br>V <sub>I</sub> = V <sub>CC</sub> , GND<br>V <sub>O</sub> = V <sub>CC</sub> , GND |            |
| I <sub>OLD</sub> | †Minimum Dynamic Output Current   | 5.5                    | -                       | -                    | 75                                 | mA | V <sub>OLD</sub> = 1.65 V Max                                                                                                               |            |
| I <sub>OHD</sub> |                                   | 5.5                    | -                       | -                    | -75                                | mA | V <sub>OHD</sub> = 3.85 V Min                                                                                                               |            |
| I <sub>CC</sub>  | Maximum Quiescent Supply Current  | 5.5                    | -                       | 8.0                  | 80                                 | μA | V <sub>IN</sub> = V <sub>CC</sub> 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<sub>IN</sub> and I<sub>CC</sub> @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V<sub>CC</sub>.

## AC CHARACTERISTICS (For Figures and Waveforms – See AND8277/D at [www.onsemi.com](http://www.onsemi.com))

| Symbol           | Parameter                           | V <sub>CC</sub> *<br>(V) | 74AC                                             |            |             | 74AC                                                      |             | Unit | Figure<br>No. |
|------------------|-------------------------------------|--------------------------|--------------------------------------------------|------------|-------------|-----------------------------------------------------------|-------------|------|---------------|
|                  |                                     |                          | T <sub>A</sub> = +25°C<br>C <sub>L</sub> = 50 pF |            |             | T <sub>A</sub> = −40°C to +85°C<br>C <sub>L</sub> = 50 pF |             |      |               |
|                  |                                     |                          | Min                                              | Typ        | Max         | Min                                                       | Max         |      |               |
| t <sub>PLH</sub> | Propagation Delay<br>Data to Output | 3.3<br>5.0               | 2.0<br>1.5                                       | 6.5<br>5.0 | 9.0<br>7.0  | 1.5<br>1.0                                                | 10.0<br>7.5 | ns   | 3–5           |
| t <sub>PHL</sub> | Propagation Delay<br>Data to Output | 3.3<br>5.0               | 2.0<br>1.5                                       | 6.5<br>5.0 | 9.0<br>7.0  | 2.0<br>1.0                                                | 10.0<br>7.5 | ns   | 3–5           |
| t <sub>PZH</sub> | Output Enable Time                  | 3.3<br>5.0               | 2.0<br>1.5                                       | 6.0<br>5.0 | 10.5<br>7.0 | 1.5<br>1.5                                                | 11.0<br>8.0 | ns   | 3–7           |
| t <sub>PZL</sub> | Output Enable Time                  | 3.3<br>5.0               | 2.5<br>1.5                                       | 7.5<br>5.5 | 10.0<br>8.0 | 2.0<br>1.5                                                | 11.0<br>8.5 | ns   | 3–8           |
| t <sub>PHZ</sub> | Output Disable Time                 | 3.3<br>5.0               | 3.0<br>2.5                                       | 7.0<br>6.5 | 10.0<br>9.0 | 1.5<br>1.0                                                | 10.5<br>9.5 | ns   | 3–7           |
| t <sub>PLZ</sub> | Output Disable Time                 | 3.3<br>5.0               | 2.5<br>2.0                                       | 7.5<br>6.5 | 10.5<br>9.0 | 2.5<br>2.0                                                | 11.5<br>9.5 | ns   | 3–8           |

\*Voltage Range 3.3 V is 3.3 V ±0.3 V.

\*Voltage Range 5.0 V is 5.0 V ±0.5 V.

# MC74AC244, MC74ACT244

## DC CHARACTERISTICS

| Symbol            | Parameter                              | V <sub>CC</sub><br>(V) | 74ACT                  |                   | 74ACT                              | Unit | Conditions                                                                                                                                  |
|-------------------|----------------------------------------|------------------------|------------------------|-------------------|------------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------|
|                   |                                        |                        | T <sub>A</sub> = +25°C |                   | T <sub>A</sub> =<br>–40°C to +85°C |      |                                                                                                                                             |
|                   |                                        |                        | Typ                    | Guaranteed Limits |                                    |      |                                                                                                                                             |
| V <sub>IH</sub>   | Minimum High Level Input Voltage       | 4.5<br>5.5             | 1.5<br>1.5             | 2.0<br>2.0        | 2.0<br>2.0                         | V    | V <sub>OUT</sub> = 0.1 V<br>or V <sub>CC</sub> – 0.1 V                                                                                      |
| V <sub>IL</sub>   | Maximum Low Level Input Voltage        | 4.5<br>5.5             | 1.5<br>1.5             | 0.8<br>0.8        | 0.8<br>0.8                         | V    | V <sub>OUT</sub> = 0.1 V<br>or V <sub>CC</sub> – 0.1 V                                                                                      |
| V <sub>OH</sub>   | Minimum High Level Output Voltage      | 4.5<br>5.5             | 4.49<br>5.49           | 4.4<br>5.4        | 4.4<br>5.4                         | V    | I <sub>OUT</sub> = –50 μA                                                                                                                   |
|                   |                                        | 4.5<br>5.5             | –<br>–                 | 3.86<br>4.86      | 3.76<br>4.76                       | V    | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>–24 mA<br>I <sub>OH</sub> –24 mA                                                   |
| V <sub>OL</sub>   | Maximum Low Level Output Voltage       | 4.5<br>5.5             | 0.001<br>0.001         | 0.1<br>0.1        | 0.1<br>0.1                         | V    | I <sub>OUT</sub> = 50 μA                                                                                                                    |
|                   |                                        | 4.5<br>5.5             | –<br>–                 | 0.36<br>0.36      | 0.44<br>0.44                       | V    | *V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub><br>24 mA<br>I <sub>OL</sub> 24 mA                                                     |
| I <sub>IN</sub>   | Maximum Input Leakage Current          | 5.5                    | –                      | ±0.1              | ±1.0                               | μA   | V <sub>I</sub> = V <sub>CC</sub> , GND                                                                                                      |
| ΔI <sub>CCT</sub> | Additional Max. I <sub>CC</sub> /Input | 5.5                    | 0.6                    | –                 | 1.5                                | mA   | V <sub>I</sub> = V <sub>CC</sub> – 2.1 V                                                                                                    |
| I <sub>OZ</sub>   | Maximum 3–State Current                | 5.5                    | –                      | ±0.5              | ±5.0                               | μA   | V <sub>I</sub> (OE) = V <sub>IL</sub> , V <sub>IH</sub><br>V <sub>I</sub> = V <sub>CC</sub> , GND<br>V <sub>O</sub> = V <sub>CC</sub> , GND |
| I <sub>OLD</sub>  | †Minimum Dynamic Output Current        | 5.5                    | –                      | –                 | 75                                 | mA   | V <sub>OLD</sub> = 1.65 V Max                                                                                                               |
| I <sub>OHD</sub>  |                                        | 5.5                    | –                      | –                 | –75                                | mA   | V <sub>OHD</sub> = 3.85 V Min                                                                                                               |
| I <sub>CC</sub>   | Maximum Quiescent Supply Current       | 5.5                    | –                      | 8.0               | 80                                 | μA   | V <sub>IN</sub> = V <sub>CC</sub> 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.

## AC CHARACTERISTICS (For Figures and Waveforms – See AND8277/D at [www.onsemi.com](http://www.onsemi.com))

| Symbol           | Parameter                           | V <sub>CC</sub> *<br>(V) | 74ACT                                            |     |      | 74ACT                                                     |      | Unit | Figure No. |
|------------------|-------------------------------------|--------------------------|--------------------------------------------------|-----|------|-----------------------------------------------------------|------|------|------------|
|                  |                                     |                          | T <sub>A</sub> = +25°C<br>C <sub>L</sub> = 50 pF |     |      | T <sub>A</sub> = −40°C to +85°C<br>C <sub>L</sub> = 50 pF |      |      |            |
|                  |                                     |                          | Min                                              | Typ | Max  | Min                                                       | Max  |      |            |
| t <sub>PLH</sub> | Propagation Delay<br>Data to Output | 5.0                      | 2.0                                              | 6.5 | 9.0  | 1.5                                                       | 10.0 | ns   | 3–5        |
| t <sub>PHL</sub> | Propagation Delay<br>Data to Output | 5.0                      | 2.0                                              | 7.0 | 9.0  | 1.5                                                       | 10.0 | ns   | 3–5        |
| t <sub>PZH</sub> | Output Enable Time                  | 5.0                      | 1.5                                              | 6.0 | 8.5  | 1.0                                                       | 9.5  | ns   | 3–7        |
| t <sub>PZL</sub> | Output Enable Time                  | 5.0                      | 2.0                                              | 7.0 | 9.5  | 1.5                                                       | 10.5 | ns   | 3–8        |
| t <sub>PHZ</sub> | Output Disable Time                 | 5.0                      | 2.0                                              | 7.0 | 9.5  | 1.5                                                       | 10.5 | ns   | 3–7        |
| t <sub>PLZ</sub> | Output Disable Time                 | 5.0                      | 2.0                                              | 7.5 | 10.0 | 2.0                                                       | 10.5 | ns   | 3–8        |

\*Voltage Range 5.0 V is 5.0 V ±0.5 V.

## CAPACITANCE

| Symbol          | Parameter                     | Value Typ | Unit | Test Conditions         |
|-----------------|-------------------------------|-----------|------|-------------------------|
| C <sub>IN</sub> | Input Capacitance             | 4.5       | pF   | V <sub>CC</sub> = 5.0 V |
| C <sub>PD</sub> | Power Dissipation Capacitance | 45        | pF   | V <sub>CC</sub> = 5.0 V |

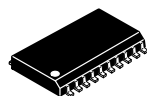
## MC74AC244, MC74ACT244

### ORDERING INFORMATION

| Device             | Marking    | Package  | Shipping <sup>†</sup> |
|--------------------|------------|----------|-----------------------|
| MC74AC244DWG       | AC244      | SOIC-20  | 38 Units / Rail       |
| MC74AC244DWR2G     | AC244      | SOIC-20  | 1000 / Tape & Reel    |
| MC74ACT244DWG      | ACT244     | SOIC-20  | 38 Units / Rail       |
| MC74ACT244DWR2G    | ACT244     | SOIC-20  | 1000 / Tape & Reel    |
| MC74ACT244DWR2G-Q* | ACT244     | SOIC-20  | 1000 / Tape & Reel    |
| MC74AC244DTR2G     | AC<br>244  | TSSOP-20 | 2500 / Tape & Reel    |
| MC74ACT244DTR2G    | ACT<br>244 | TSSOP-20 | 2500 / Tape & Reel    |

<sup>†</sup>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.

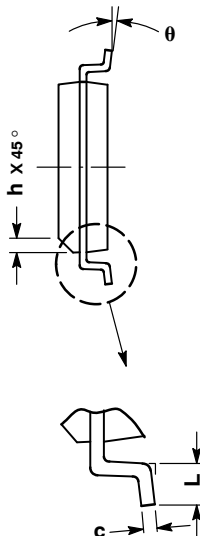
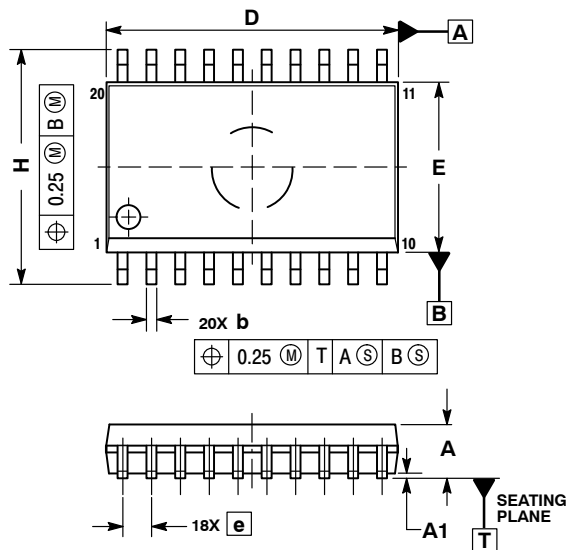
\*-Q Suffix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.



SCALE 1:1

SOIC-20 WB  
CASE 751D-05  
ISSUE H

DATE 22 APR 2015

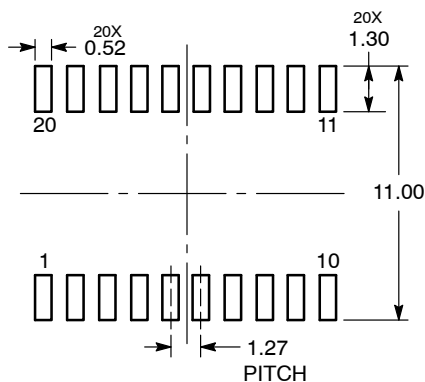


NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS |       |
|-----|-------------|-------|
|     | MIN         | MAX   |
| A   | 2.35        | 2.65  |
| A1  | 0.10        | 0.25  |
| b   | 0.35        | 0.49  |
| c   | 0.23        | 0.32  |
| D   | 12.65       | 12.95 |
| E   | 7.40        | 7.60  |
| e   | 1.27 BSC    |       |
| H   | 10.05       | 10.55 |
| h   | 0.25        | 0.75  |
| L   | 0.50        | 0.90  |
| θ   | 0°          | 7°    |

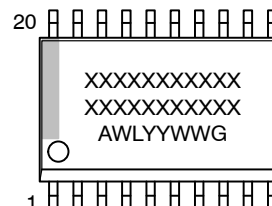
RECOMMENDED  
SOLDERING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

\*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\*



XXXXXX = Specific Device Code  
A = Assembly Location  
WL = Wafer Lot  
YY = 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.

|                  |             |                                                                                                                                                                                     |
|------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | SOIC-20 WB  | PAGE 1 OF 1                                                                                                                                                                         |

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