

# Low-Voltage Octal Buffer/Line Driver with 5 V Tolerant Inputs and Outputs

## 74LCX541

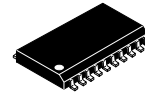
The LCX541 is an octal buffer/line driver designed to be employed as memory and address drivers, clock drivers and bus oriented transmitter/receivers. The LCX541 is a non-inverting option of the LCX540.

This device is similar in function to the LCX244 while providing flow-through architecture (inputs on opposite side from outputs). This pinout arrangement makes this device especially useful as an output port for microprocessors, allowing ease of layout and greater PC board density.

The LCX541 is designed for low voltage applications with capability of interfacing to a 5 V signal environment. The LCX541 is fabricated with an advanced CMOS technology to achieve high speed operation while maintaining CMOS low power dissipation.

### Features

- 5 V Tolerant Input and Outputs
- 1.65 V–5.5 V  $V_{CC}$  Specifications Provided
- 6.5 ns  $t_{PD}$  Max. ( $V_{CC} = 3.3$  V), 10  $\mu$ A  $I_{CC}$  Max.
- Power-down High Impedance Inputs and Outputs
- Supports Live Insertion/Withdrawal
- $\pm 24$  mA Output Drive ( $V_{CC} = 3.0$  V)
- Implements Proprietary Noise/ EMI Reduction Circuitry
- Latch-up Performance Exceeds JEDEC 78 Conditions
- ESD Performance
  - ◆ Human Body Model > 2000 V
- Pb-Free DQFN Package
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

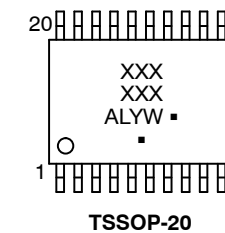
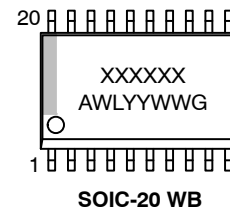


SOIC-20 WB  
DW SUFFIX  
CASE 751D



TSSOP-20  
DT SUFFIX  
CASE 948E

### MARKING DIAGRAM



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

(Note: Microdot may be in either location)

### ORDERING INFORMATION

See detailed ordering and shipping information on page 7 of this data sheet.

## Connection Diagrams

Pin Assignments for  
SOIC, SOP, SSOP, TSSOP

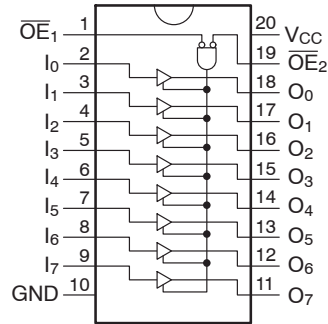


Figure 1.

## Logic Symbol

IEEE/IEC

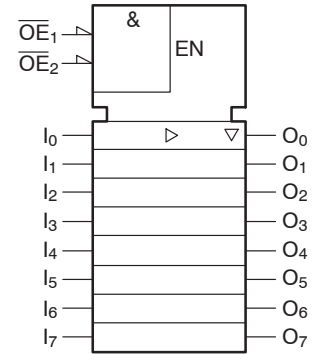
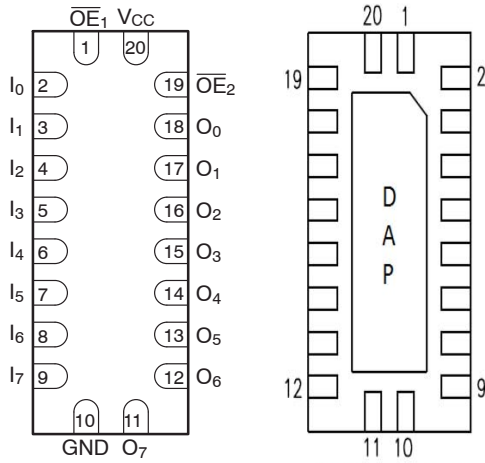


Figure 2.

Pad Assignment for DQFN



(Top View)

(Bottom View)

Figure 3.

## PIN DESCRIPTION

| Pin                                   | Description                  |
|---------------------------------------|------------------------------|
| $\overline{OE}_1$ , $\overline{OE}_2$ | 3-STATE Output Enable Inputs |
| $I_0$ – $I_7$                         | Inputs                       |
| $O_0$ – $O_7$                         | Outputs                      |
| DAP                                   | No Connect                   |

## TRUTH TABLE

| Inputs            |                   |       | Outputs |
|-------------------|-------------------|-------|---------|
| $\overline{OE}_1$ | $\overline{OE}_2$ | $I_n$ | $O_n$   |
| L                 | L                 | H     | H       |
| L                 | X                 | X     | Z       |
| X                 | H                 | X     | Z       |
| L                 | L                 | L     | L       |

H = High Voltage Level  
L = Low Voltage Level  
X = Immaterial  
Z = High Impedance State

# 74LCX541

## MAXIMUM RATINGS

| Symbol                | Parameter                                                                                                            | Value                                                | Unit |
|-----------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------|
| $V_{CC}$              | DC Supply Voltage                                                                                                    | -0.5 to +6.5                                         | V    |
| $V_I$                 | DC Input Voltage (Note 1)                                                                                            | -0.5 to +6.5                                         | V    |
| $V_O$                 | DC Output Voltage (Note 1)<br>Active-Mode (High or Low State)<br>Tri-State Mode<br>Power-Down Mode ( $V_{CC} = 0$ V) | -0.5 to $V_{CC}+0.5$<br>-0.5 to +6.5<br>-0.5 to +6.5 | V    |
| $I_{IK}$              | DC Input Diode Current<br>$V_{IN} < GND$                                                                             | -50                                                  | mA   |
| $I_{OK}$              | DC Output Diode Current<br>$V_{OUT} < GND$                                                                           | -50                                                  | mA   |
| $I_O$                 | DC Output Source/Sink Current                                                                                        | $\pm 50$                                             | mA   |
| $I_{CC}$ or $I_{GND}$ | DC Supply Current per Supply Pin or Ground Pin                                                                       | $\pm 100$                                            | mA   |
| $T_{STG}$             | Storage Temperature Range                                                                                            | -65 to +150                                          | °C   |
| $T_L$                 | Lead Temperature, 1 mm from Case for 10 secs                                                                         | 260                                                  | °C   |
| $T_J$                 | Junction Temperature Under Bias                                                                                      | +150                                                 | °C   |
| $\theta_{JA}$         | Thermal Resistance (Note 2)<br>SOIC-20W<br>WQFN20<br>TSSOP-20                                                        | 96<br>99<br>150                                      | °C/W |
| $P_D$                 | Power Dissipation in Still Air<br>SOIC-20W<br>WQFN20<br>TSSOP-20                                                     | 1302<br>1256<br>833                                  | mW   |
| MSL                   | Moisture Sensitivity<br>SOIC-20W<br>All Other Packages                                                               | Level 3<br>Level 1                                   | -    |
| $F_R$                 | Flammability Rating<br>Oxygen Index: 28 to 34                                                                        | UL 94 V-0 @ 0.125 in                                 | -    |
| $V_{ESD}$             | ESD Withstand Voltage (Note 3)<br>Human Body Model<br>Charged Device Model                                           | 2000<br>N/A                                          | 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.

1.  $I_O$  absolute maximum rating must be observed.
2. 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.
3. HBM tested to EIA / JESD22-A114-A. CDM tested to JESD22-C101-A.

## RECOMMENDED OPERATING CONDITIONS (Note 4)

| Symbol     | Parameter                                                                                                                                                          | Min              | Max                    | Unit |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------|------|
| $V_{CC}$   | Supply Voltage<br>Operating<br>Data Retention Only                                                                                                                 | 1.65<br>1.5      | 5.5<br>5.5             | V    |
| $V_I$      | Digital Input Voltage                                                                                                                                              | 0                | 5.5                    | V    |
| $V_O$      | Output Voltage<br>Active Mode (High or Low State)<br>Tri-State Mode<br>Power Down Mode ( $V_{CC} = 0$ V)                                                           | 0<br>0<br>0      | $V_{CC}$<br>5.5<br>5.5 | V    |
| $T_A$      | Operating Free-Air Temperature                                                                                                                                     | -40              | +125                   | °C   |
| $t_r, t_f$ | Input Rise or Fall Rate<br>$V_{CC} = 1.65$ V to 1.95 V<br>$V_{CC} = 2.3$ V to 2.7 V<br>$V_{IN}$ from 0.8 V to 2.0 V, $V_{CC} = 3.0$ V<br>$V_{CC} = 4.5$ V to 5.5 V | 0<br>0<br>0<br>0 | 20<br>20<br>10<br>5    | nS/V |

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.

4. Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or  $V_{CC}$ ). Unused outputs must be left open.

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## DC ELECTRICAL CHARACTERISTICS

| Symbol           | Parameter                             | Conditions                                                                             | V <sub>CC</sub> (V) | T <sub>A</sub> = -40°C to +85°C |                        | T <sub>A</sub> = -40°C to +125°C |                        | Unit |
|------------------|---------------------------------------|----------------------------------------------------------------------------------------|---------------------|---------------------------------|------------------------|----------------------------------|------------------------|------|
|                  |                                       |                                                                                        |                     | Min                             | Max                    | Min                              | Max                    |      |
| V <sub>IH</sub>  | High-Level Input Voltage              |                                                                                        | 1.65 to 1.95        | 0.65 x V <sub>CC</sub>          |                        | 0.65 x V <sub>CC</sub>           |                        | V    |
|                  |                                       |                                                                                        | 2.3 to 2.7          | 1.7                             |                        | 1.7                              |                        |      |
|                  |                                       |                                                                                        | 2.7 to 3.6          | 2.0                             |                        | 2.0                              |                        |      |
|                  |                                       |                                                                                        | 4.5 to 5.5          | 0.7 x V <sub>CC</sub>           |                        | 0.7 x V <sub>CC</sub>            |                        |      |
| V <sub>IL</sub>  | Low-Level Input Voltage               |                                                                                        | 1.65 to 1.95        |                                 | 0.35 x V <sub>CC</sub> |                                  | 0.35 x V <sub>CC</sub> | V    |
|                  |                                       |                                                                                        | 2.3 to 2.7          |                                 | 0.7                    |                                  | 0.7                    |      |
|                  |                                       |                                                                                        | 2.7 to 3.6          |                                 | 0.8                    |                                  | 0.8                    |      |
|                  |                                       |                                                                                        | 4.5 to 5.5          |                                 | 0.3 x V <sub>CC</sub>  |                                  | 0.3 x V <sub>CC</sub>  |      |
| V <sub>OH</sub>  | High-Level Output Voltage             | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                    |                     |                                 |                        |                                  |                        | V    |
|                  |                                       | I <sub>OH</sub> = -100 μA                                                              | 1.65 to 5.5         | V <sub>CC</sub> - 0.1           | -                      | V <sub>CC</sub> - 0.1            | -                      |      |
|                  |                                       | I <sub>OH</sub> = -4 mA                                                                | 1.65                | 1.2                             | -                      | 1.2                              | -                      |      |
|                  |                                       | I <sub>OH</sub> = -8 mA                                                                | 2.3                 | 1.8                             | -                      | 1.8                              | -                      |      |
|                  |                                       | I <sub>OH</sub> = -12 mA                                                               | 2.7                 | 2.2                             | -                      | 2.2                              | -                      |      |
|                  |                                       | I <sub>OH</sub> = -16 mA                                                               | 3.0                 | 2.4                             | -                      | 2.4                              | -                      |      |
|                  |                                       | I <sub>OH</sub> = -24 mA                                                               | 3.0                 | 2.2                             | -                      | 2.2                              | -                      |      |
|                  |                                       | I <sub>OH</sub> = -32 mA                                                               | 4.5                 | 3.8                             |                        | 3.8                              |                        |      |
| V <sub>OL</sub>  | Low-Level Output Voltage              | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                    |                     |                                 |                        |                                  |                        | V    |
|                  |                                       | I <sub>OL</sub> = 100 μA                                                               | 1.65 to 5.5         | -                               | 0.1                    | -                                | 0.1                    |      |
|                  |                                       | I <sub>OL</sub> = 4 mA                                                                 | 1.65                | -                               | 0.45                   | -                                | 0.45                   |      |
|                  |                                       | I <sub>OL</sub> = 8 mA                                                                 | 2.3                 | -                               | 0.6                    | -                                | 0.6                    |      |
|                  |                                       | I <sub>OL</sub> = 12 mA                                                                | 2.7                 | -                               | 0.4                    | -                                | 0.4                    |      |
|                  |                                       | I <sub>OL</sub> = 16 mA                                                                | 3.0                 | -                               | 0.4                    | -                                | 0.4                    |      |
|                  |                                       | I <sub>OL</sub> = 24 mA                                                                | 3.0                 | -                               | 0.55                   | -                                | 0.55                   |      |
|                  |                                       | I <sub>OL</sub> = 32 mA                                                                | 4.5                 |                                 | 0.6                    |                                  | 0.6                    |      |
| I <sub>I</sub>   | Input Leakage Current                 | V <sub>I</sub> = 0 to 5.5 V                                                            | 3.6                 | -                               | ±5.0                   | -                                | ±5.0                   | μA   |
| I <sub>OZ</sub>  | 3-State Output Leakage Current        | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ,<br>V <sub>O</sub> = 0 V to 5.5 V | 3.6                 | -                               | ±5.0                   | -                                | ±5.0                   | μA   |
| I <sub>OFF</sub> | Power Off Leakage Current             | V <sub>I</sub> = 5.5 V or<br>V <sub>O</sub> = 5.5 V                                    | 0                   | -                               | 10                     | -                                | 10                     | μA   |
| I <sub>CC</sub>  | Quiescent Supply Current              | V <sub>I</sub> = 5.5 V or GND                                                          | 2.3 to 3.6          | -                               | 10                     | -                                | 10                     | μA   |
|                  |                                       | 3.6 V ≤ V <sub>I</sub> , V <sub>O</sub> ≤ 5.5 V (Note 5)                               |                     |                                 | ±10.0                  |                                  | ±10.0                  |      |
| ΔI <sub>CC</sub> | Increase in I <sub>CC</sub> per Input | V <sub>IH</sub> = V <sub>CC</sub> - 0.6 V                                              | 2.3 to 3.6          | -                               | 500                    | -                                | 500                    | μA   |

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.

5. Outputs disabled or 3-STATE only.

## AC ELECTRICAL CHARACTERISTICS

| Symbol                                | Parameter                                 | Test Condition      | V <sub>CC</sub> (V) | T <sub>A</sub> = -40°C to +85°C |      | T <sub>A</sub> = -40°C to +125°C |      | Unit |
|---------------------------------------|-------------------------------------------|---------------------|---------------------|---------------------------------|------|----------------------------------|------|------|
|                                       |                                           |                     |                     | Min                             | Max  | Min                              | Max  |      |
| t <sub>PLH</sub> , t <sub>PHL</sub>   | Propagation Delay, D to O                 | See Figures 4 and 5 | 1.65 to 1.95        | –                               | 10.3 | –                                | 10.3 | ns   |
|                                       |                                           |                     | 2.3 to 2.7          | –                               | 7.8  | –                                | 7.8  |      |
|                                       |                                           |                     | 2.7                 | –                               | 7.5  | –                                | 7.5  |      |
|                                       |                                           |                     | 3.0 to 3.6          | –                               | 6.5  | –                                | 6.5  |      |
|                                       |                                           |                     | 4.5 to 5.5          | –                               | 5.9  | –                                | 5.9  |      |
| t <sub>PZH</sub> , t <sub>PZL</sub>   | Output Enable Time, $\overline{OE}$ to O  | See Figures 4 and 5 | 1.65 to 1.95        | –                               | 13.0 | –                                | 13.0 | ns   |
|                                       |                                           |                     | 2.3 to 2.7          | –                               | 10.5 | –                                | 10.5 |      |
|                                       |                                           |                     | 2.7                 | –                               | 9.5  | –                                | 9.5  |      |
|                                       |                                           |                     | 3.0 to 3.6          | –                               | 8.5  | –                                | 8.5  |      |
|                                       |                                           |                     | 4.5 to 5.5          | –                               | 7.3  | –                                | 7.3  |      |
| t <sub>PHZ</sub> , t <sub>PLZ</sub>   | Output Disable Time, $\overline{OE}$ to O | See Figures 4 and 5 | 1.65 to 1.95        | –                               | 11.0 | –                                | 11.0 | ns   |
|                                       |                                           |                     | 2.3 to 2.7          | –                               | 9.0  | –                                | 9.0  |      |
|                                       |                                           |                     | 2.7                 | –                               | 8.5  | –                                | 8.5  |      |
|                                       |                                           |                     | 3.0 to 3.6          | –                               | 7.5  | –                                | 7.5  |      |
|                                       |                                           |                     | 4.5 to 5.5          | –                               | 6.5  | –                                | 6.5  |      |
| t <sub>OSHL</sub> , t <sub>OSLH</sub> | Output to Output Skew (Note 6)            |                     | 1.65 to 1.95        | –                               | –    | –                                | –    | ns   |
|                                       |                                           |                     | 2.3 to 2.7          | –                               | –    | –                                | –    |      |
|                                       |                                           |                     | 2.7                 | –                               | –    | –                                | –    |      |
|                                       |                                           |                     | 3.0 to 3.6          | –                               | 1.0  | –                                | 1.0  |      |

6. C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the dynamic operating current consumption without load. Average operating current can be obtained by the equation  $I_{CC(OPR)} = C_{PD} \times V_{CC} \times f_{in} + I_{CC}$ . C<sub>PD</sub> is used to determine the no-load dynamic power consumption:  $P_D = C_{PD} \times V_{CC}^2 \times f_{in} + I_{CC} \times V_{CC}$ .

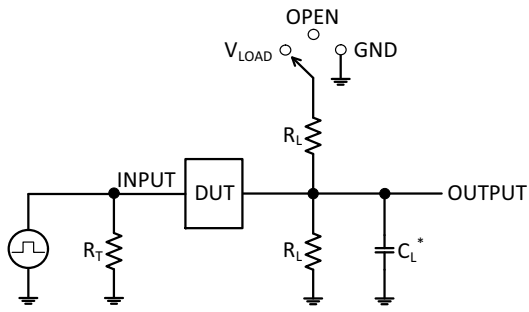
## DYNAMIC SWITCHING CHARACTERISTICS

| Symbol           | Parameter                                   | V <sub>CC</sub> (V) | Conditions                                                             | T <sub>A</sub> = 25°C | Unit |
|------------------|---------------------------------------------|---------------------|------------------------------------------------------------------------|-----------------------|------|
|                  |                                             |                     |                                                                        | Typ                   |      |
| V <sub>OLP</sub> | Quiet Output Dynamic Peak V <sub>OL</sub>   | 3.3                 | C <sub>L</sub> = 50 pF, V <sub>IH</sub> = 3.3 V, V <sub>IL</sub> = 0 V | 0.8                   | V    |
|                  |                                             | 2.5                 | C <sub>L</sub> = 30 pF, V <sub>IH</sub> = 2.5 V, V <sub>IL</sub> = 0 V | 0.6                   |      |
| V <sub>OLV</sub> | Quiet Output Dynamic Valley V <sub>OL</sub> | 3.3                 | C <sub>L</sub> = 50 pF, V <sub>IH</sub> = 3.3 V, V <sub>IL</sub> = 0 V | –0.8                  | V    |
|                  |                                             | 2.5                 | C <sub>L</sub> = 30 pF, V <sub>IH</sub> = 2.5 V, V <sub>IL</sub> = 0 V | –0.6                  |      |

## CAPACITANCE

| Symbol           | Parameter                     | Conditions                                                                    | Typ  | Unit |
|------------------|-------------------------------|-------------------------------------------------------------------------------|------|------|
| C <sub>IN</sub>  | Input Capacitance             | V <sub>CC</sub> = Open, V <sub>I</sub> = 0 V or V <sub>CC</sub>               | 7.0  | pF   |
| C <sub>OUT</sub> | Output Capacitance            | V <sub>CC</sub> = 3.3 V, V <sub>I</sub> = 0 V or V <sub>CC</sub>              | 8.0  | pF   |
| C <sub>PD</sub>  | Power Dissipation Capacitance | V <sub>CC</sub> = 3.3 V, V <sub>I</sub> = 0 V or V <sub>CC</sub> , f = 10 MHz | 25.0 | pF   |

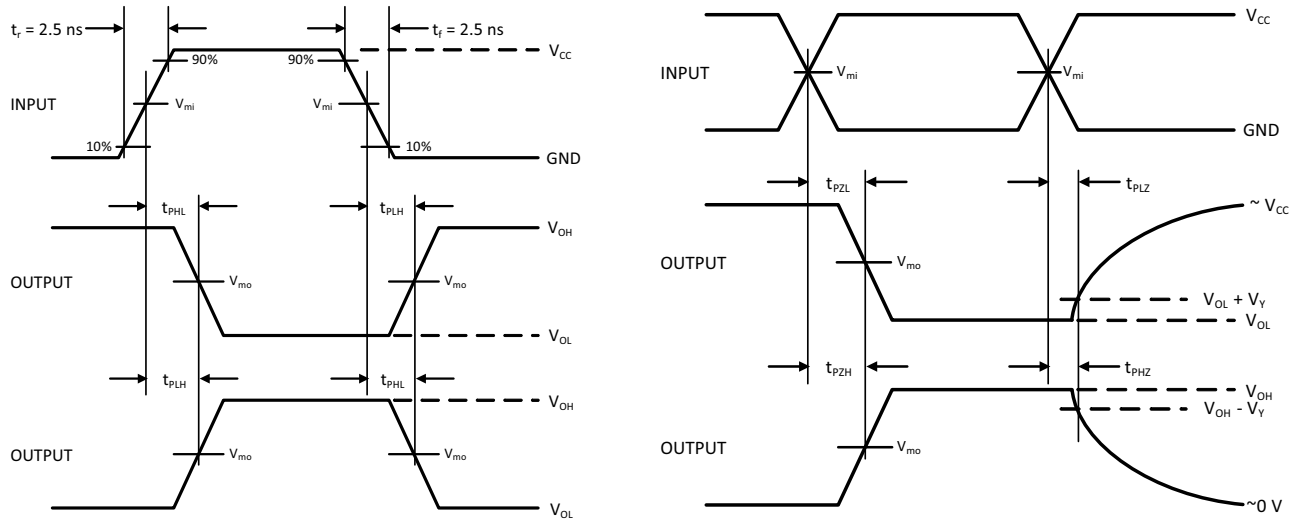
## 74LCX541



\* $C_L$  includes probe and jig capacitance  
 $R_T$  is  $Z_{OUT}$  of pulse generator (typically 50  $\Omega$ )  
 $f = 1$  MHz

| Test                | Switch Position |
|---------------------|-----------------|
| $t_{PLH} / t_{PHL}$ | Open            |
| $t_{PLZ} / t_{PZL}$ | $V_{LOAD}$      |
| $t_{PHZ} / t_{PZH}$ | GND             |

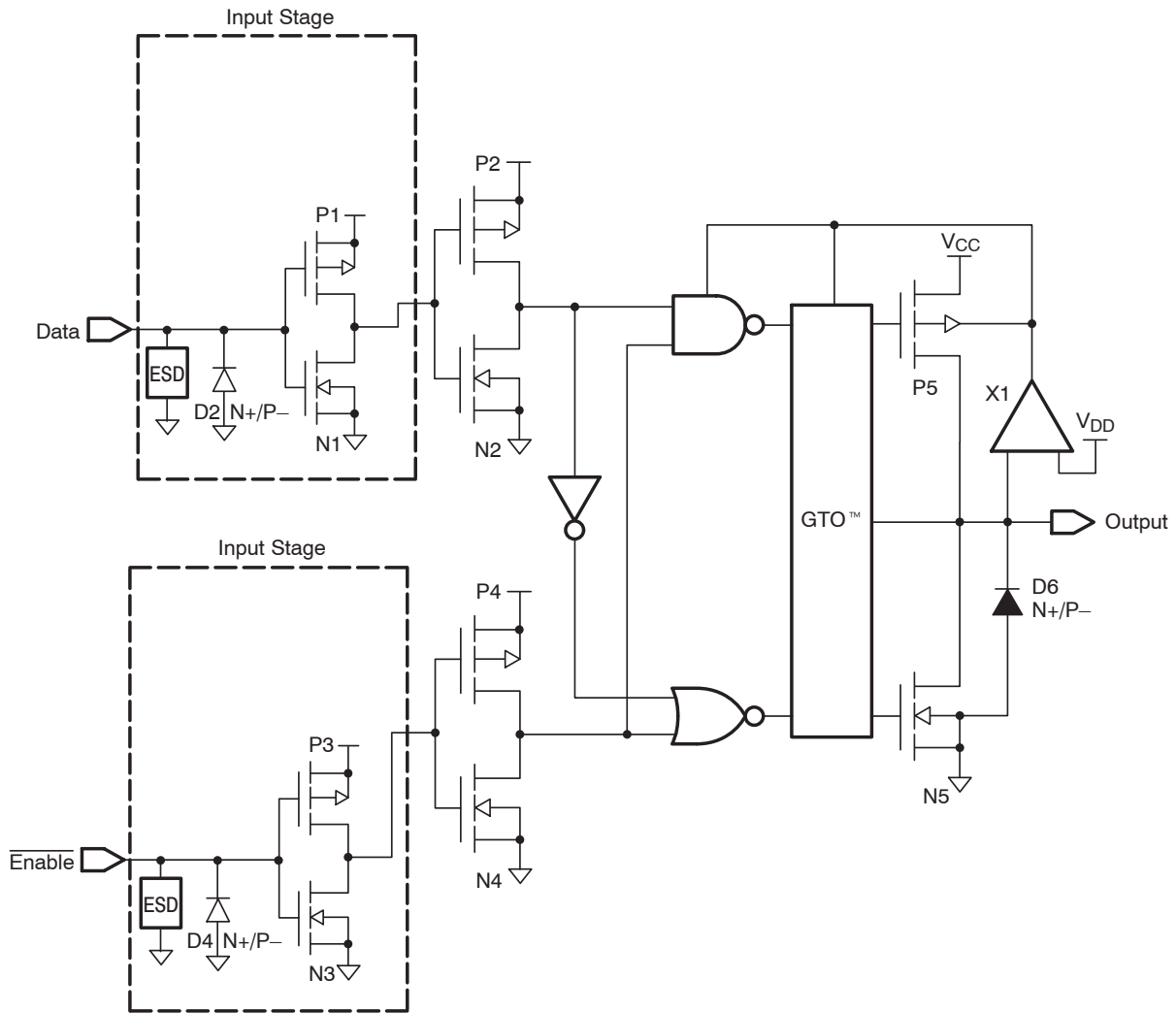
Figure 4. Test Circuit



| $V_{CC}$ , V | $R_L$ , $\Omega$ | $C_L$ , pF | $V_{LOAD}$        | $V_{mi}$ , V | $V_{mo}$ , V | $V_Y$ , V |
|--------------|------------------|------------|-------------------|--------------|--------------|-----------|
| 1.65 to 1.95 | 500              | 30         | $2 \times V_{CC}$ | $V_{CC}/2$   | $V_{CC}/2$   | 0.15      |
| 2.3 to 2.7   | 500              | 30         | $2 \times V_{CC}$ | $V_{CC}/2$   | $V_{CC}/2$   | 0.15      |
| 2.7          | 500              | 50         | 6 V               | 1.5          | $V_{CC}/2$   | 0.3       |
| 3.0 to 3.6   | 500              | 50         | 6 V               | 1.5          | $V_{CC}/2$   | 0.3       |
| 4.5 to 4.5   | 500              | 50         | $2 \times V_{CC}$ | $V_{CC}/2$   | $V_{CC}/2$   | 0.3       |

Figure 5. Switching Waveforms

# 74LCX541

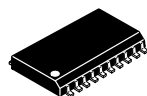


**Figure 6. Schematic Diagram  
(Generic for LCX Family)**

## ORDERING INFORMATION

| Device       | Marking    | Package    | Shipping†          |
|--------------|------------|------------|--------------------|
| 74LCX541WMX  | LCX541     | SOIC-20 WB | 1000 / Tape & Reel |
| 74LCX541MTC  | LCX<br>541 | TSSOP-20   | 75 Units / Tube    |
| 74LCX541MTCX | LCX<br>541 | TSSOP-20   | 2500 / Tape & Reel |

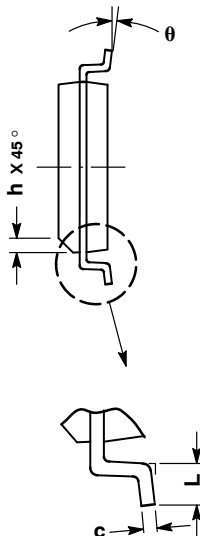
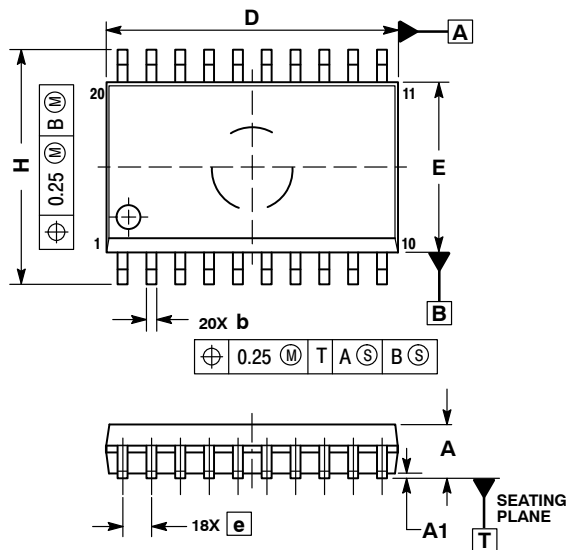
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, [BRD8011/D](#).



SCALE 1:1

SOIC-20 WB  
CASE 751D-05  
ISSUE H

DATE 22 APR 2015

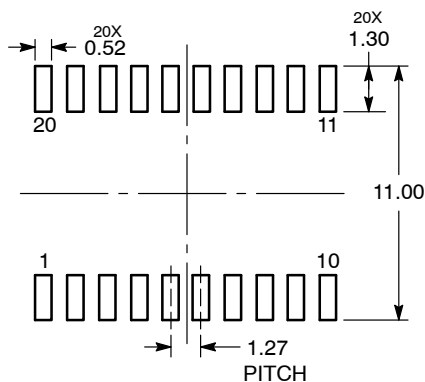


NOTES:

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°    |

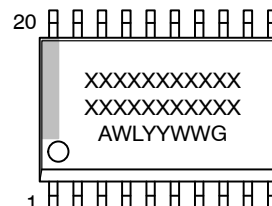
RECOMMENDED  
SOLDERING FOOTPRINT\*



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\*



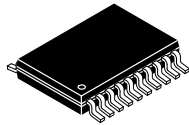
XXXXXX = Specific Device Code  
A = Assembly Location  
WL = Wafer Lot  
YY = Year  
WW = Work Week  
G = Pb-Free Package

\*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.

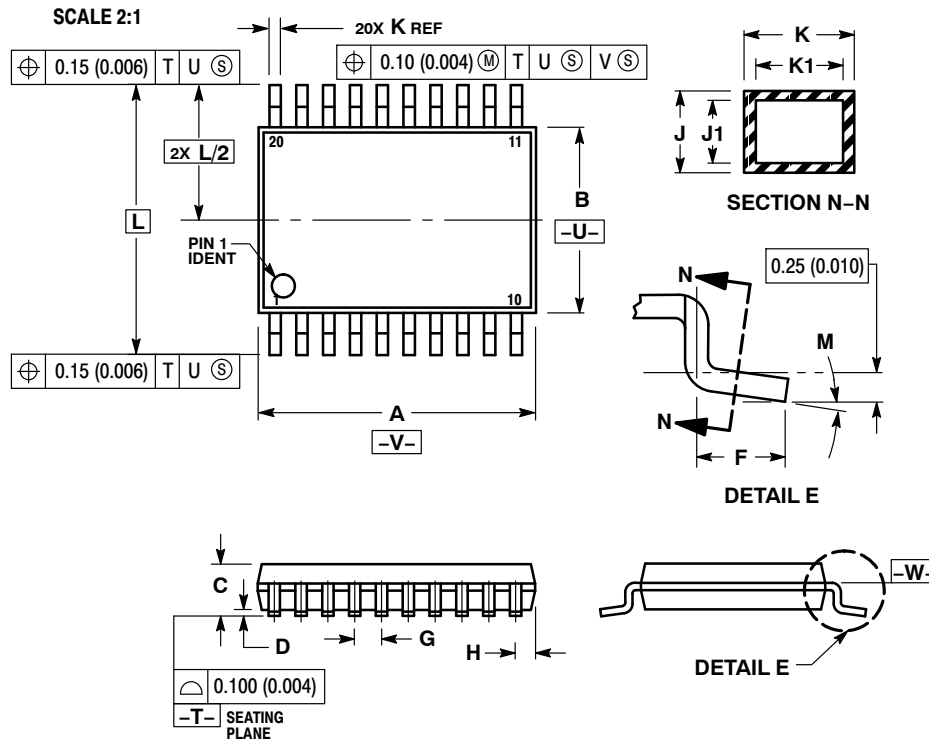
|                  |             |                                                                                                                                                                                     |
|------------------|-------------|-----------------------------------------------------------------------------------------------------------------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

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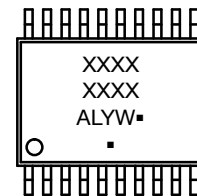

**TSSOP-20 WB**  
**CASE 948E**  
**ISSUE D**

DATE 17 FEB 2016


**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   | 6.40        | 6.60 | 0.252     | 0.260 |
| 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   | 0.27        | 0.37 | 0.011     | 0.015 |
| 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°    |

**GENERIC MARKING DIAGRAM\***


- A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*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.

\*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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| <b>DESCRIPTION:</b>     | <b>TSSOP-20 WB</b> | <b>PAGE 1 OF 1</b>                                                                                                                                                               |

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