

# SN65LBC171, SN75LBC171 TRIPLE DIFFERENTIAL TRANSCEIVERS

SLLS460A – NOVEMBER 2000 – REVISED FEBRUARY 2001

- Three Differential Transceivers in One Package
- Signaling Rates<sup>1</sup> Up to 30 Mbps
- Low Power and High Speed
- Designed for TIA/EIA-485, TIA/EIA-422, ISO 8482, and ANSI X3.277 (HVD SCSI Fast-20) Applications
- Common-Mode Bus Voltage Range –7 V to 12 V
- ESD Protection on Bus Terminals Exceeds 12 kV
- Driver Output Current up to  $\pm 60$  mA
- Thermal Shutdown Protection
- Driver Positive and Negative Current Limiting
- Power-Up, Power-Down Glitch-Free Operation
- Pin-Compatible With the SN75ALS171
- Available in Shrink Small-Outline Package

## description

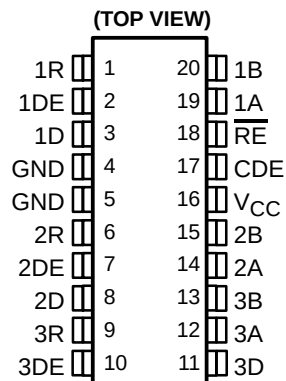
The SN65LBC171 and SN75LBC171 are monolithic integrated circuits designed for bidirectional data communication on multipoint bus-transmission lines. Potential applications include serial or parallel data transmission, cabled peripheral buses with twin axial, ribbon, or twisted-pair cabling. These devices are suitable for FAST-20 SCSI and can transmit or receive data pulses as short as 25 ns, with skew less than 3 ns.

These devices combine three 3-state differential line drivers and three differential input line receivers, all of which operate from a single 5-V power supply.

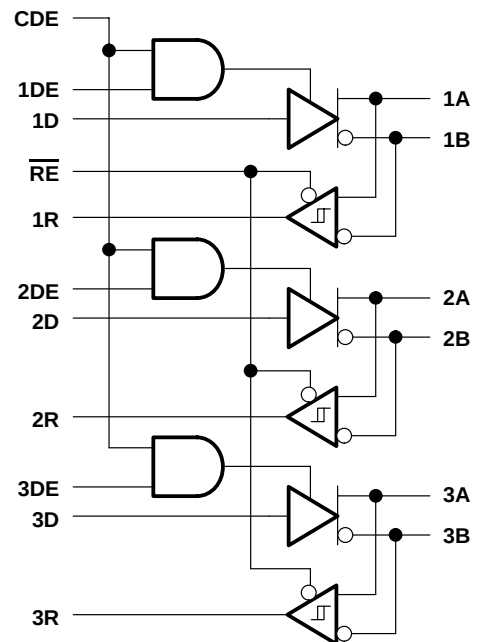
The driver differential outputs and the receiver differential inputs are connected internally to form three differential input/output (I/O) bus ports that are designed to offer minimum loading to the bus whenever the driver is disabled or  $V_{CC} = 0$ . These ports feature a wide common-mode voltage range making the device suitable for party-line applications over long cable runs.

The SN75LBC171 is characterized for operation over the temperature range of 0°C to 70°C. The SN65LBC171 is characterized for operation over the temperature range of –40°C to 85°C.

SN65LBC171DB (Marked as BL171)  
SN75LBC171DB (Marked as LB171)  
SN65LBC171DW (Marked as 65LBC171)  
SN75LBC171DW (Marked as 75LBC171)



## logic diagram



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

<sup>1</sup>The signaling rate of a line is the number of voltage transitions that are made per second expressed in the units bps (bits per second).

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS  
INSTRUMENTS**

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# SN65LBC171, SN75LBC171 TRIPLE DIFFERENTIAL TRANSCIEVERS

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AVAILABLE OPTIONS†

| T <sub>A</sub> | PACKAGE                                 |                                                |
|----------------|-----------------------------------------|------------------------------------------------|
|                | PLASTIC SMALL-OUTLINE<br>(JEDEC MS-013) | PLASTIC SHRINK SMALL-OUTLINE<br>(JEDEC MO-150) |
| 0°C to 70°C    | SN75LBC171DW                            | SN75LBC171DB                                   |
| –40°C to 85°C  | SN65LBC171DW                            | SN65LBC171DB                                   |

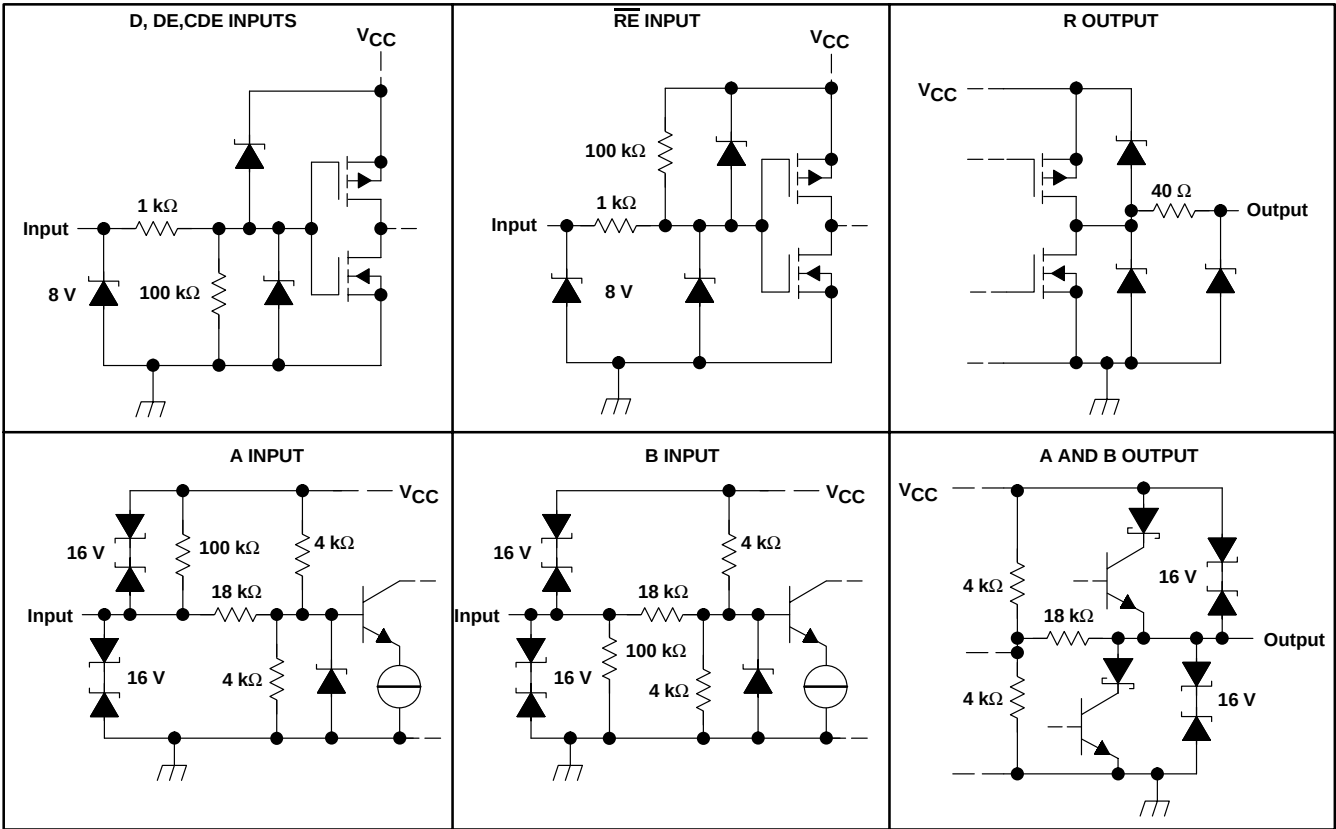
† Add R suffix for taped and reel

Function Tables

| EACH DRIVER |        |      |         |   | EACH RECEIVER                                           |              |             |
|-------------|--------|------|---------|---|---------------------------------------------------------|--------------|-------------|
| INPUT<br>D  | ENABLE |      | OUTPUTS |   | DIFFERENTIAL INPUT<br>(V <sub>A</sub> –V <sub>B</sub> ) | ENABLE<br>RE | OUTPUT<br>R |
|             | DE     | CDE  | A       | B |                                                         |              |             |
| H           | H      | H    | H       | L | V <sub>ID</sub> ≥ 0.2 V                                 | L            | H           |
| L           | H      | H    | L       | H | –0.2 V < V <sub>ID</sub> < 0.2 V                        | L            | ?           |
| OPEN        | H      | H    | L       | H | V <sub>ID</sub> ≤ –0.2 V                                | L            | L           |
| X           | L      | X    | Z       | Z | X                                                       | H            | Z           |
| X           | X      | L    | Z       | Z | OPEN                                                    | L            | H           |
| X           | OPEN   | X    | Z       | Z |                                                         |              |             |
| X           | X      | OPEN | Z       | Z |                                                         |              |             |

H = high level, L = low level, X = irrelevant,  
Z = high impedance (off), ? = indeterminate

## equivalent input and output schematic diagrams



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## absolute maximum ratings<sup>†</sup>

|                                                                                      |                                    |
|--------------------------------------------------------------------------------------|------------------------------------|
| Supply voltage, $V_{CC}$ (see Note 1)                                                | –0.3 V to 6 V                      |
| Voltage range at any bus I/O terminal (steady state)                                 | –10 V to 15 V                      |
| Voltage input range, A and B, (transient pulse through 100 $\Omega$ , see Figure 12) | –30 V to 30 V                      |
| Voltage range at any DE, $\overline{RE}$ , or CDE terminal                           | –0.5 V to $V_{CC} + 0.5$ V         |
| Electrostatic discharge: Human body model (A, B, GND) (see Note 2)                   | 12 kV                              |
| All pins                                                                             | 5 kV                               |
| Charged-device model (all pins) (see Note 3)                                         | 1 kV                               |
| Continuous total power dissipation                                                   | See Power Dissipation Rating Table |
| Storage temperature range, $T_{stg}$                                                 | –65°C to 150°C                     |
| Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds                         | 260°C                              |

<sup>†</sup> Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- NOTES: 1. All voltage values, except differential I/O bus voltages, are with respect to network ground terminal.  
2. Tested in accordance with JEDEC Standard 22, Test Method A114–A.  
3. Tested in accordance with JEDEC Standard 22, Test Method C101.

POWER DISSIPATION RATING TABLE

| PACKAGE | $T_A \leq 25^\circ\text{C}$<br>POWER RATING | DERATING FACTOR <sup>‡</sup><br>ABOVE $T_A = 25^\circ\text{C}$ | $T_A = 70^\circ\text{C}$<br>POWER RATING | $T_A = 85^\circ\text{C}$<br>POWER RATING |
|---------|---------------------------------------------|----------------------------------------------------------------|------------------------------------------|------------------------------------------|
| DB      | 995 mW                                      | 8.0 mW/°C                                                      | 635 mW                                   | 515 mW                                   |
| DW      | 1480 mW                                     | 11.8 mW/°C                                                     | 950 mW                                   | 770 mW                                   |

<sup>‡</sup> This is the inverse of the junction-to-ambient thermal resistance when board-mounted and with no air flow.

## recommended operating conditions

|                                       |                     | MIN  | NOM      | MAX  | UNIT |
|---------------------------------------|---------------------|------|----------|------|------|
| Supply voltage, $V_{CC}$              |                     | 4.75 | 5        | 5.25 | V    |
| Voltage at any bus I/O terminal       | A, B                | –7   |          | 12   | V    |
| High-level input voltage, $V_{IH}$    | DE, CDE, RE         | 2    | $V_{CC}$ |      | V    |
| Low-level input voltage, $V_{IL}$     |                     | 0    | 0.8      |      |      |
| Differential input voltage, $V_{ID}$  | A with respect to B | –12  |          | 12   | V    |
| Output current                        | Driver              | –60  |          | 60   | mA   |
|                                       | Receiver            | –8   |          | 8    |      |
| Operating free-air temperature, $T_A$ | SN75LBC171          | 0    |          | 70   | °C   |
|                                       | SN65LBC171          | –40  |          | 85   |      |



# SN65LBC171, SN75LBC171

## TRIPLE DIFFERENTIAL TRANSCEIVERS

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### DRIVER SECTION

#### electrical characteristics over recommended operating conditions

| PARAMETER            |                                                                                              |            | TEST CONDITIONS                                      |                                                       | MIN  | TYP <sup>†</sup> | MAX             | UNIT |   |
|----------------------|----------------------------------------------------------------------------------------------|------------|------------------------------------------------------|-------------------------------------------------------|------|------------------|-----------------|------|---|
| V <sub>IK</sub>      | Input clamp voltage                                                                          | D, DE, CDE | I <sub>I</sub> = 18 mA                               |                                                       | −1.5 | −0.7             |                 | V    |   |
| V <sub>O</sub>       | Open-circuit output voltage (single-ended)                                                   |            | A or B, No load                                      |                                                       | 0    |                  | V <sub>CC</sub> | V    |   |
| V <sub>OD(SS)</sub>  | Steady-state differential output voltage magnitude <sup>‡</sup>                              |            | No load                                              |                                                       | 3.8  | 4.3              | V <sub>CC</sub> | V    |   |
|                      |                                                                                              |            | R <sub>L</sub> = 54 Ω,                               | See Figure 1                                          |      | 1                | 1.6             | 2.4  | V |
|                      |                                                                                              |            | With common-mode loading, See Figure 2               |                                                       | 1    | 1.6              | 2.4             | V    |   |
| ΔV <sub>OD</sub>     | Change in differential output voltage magnitude,  V <sub>OD(H)</sub>   −  V <sub>OD(L)</sub> |            | R <sub>L</sub> = 54 Ω,<br>C <sub>L</sub> = 50 pF     | See Figure 1                                          | −0.2 |                  | 0.2             | V    |   |
| V <sub>OC(SS)</sub>  | Steady-state common-mode output voltage                                                      |            |                                                      |                                                       | 2    | 2.4              | 2.8             | V    |   |
| ΔV <sub>OC(SS)</sub> | Change in steady-state common-mode output voltage (V <sub>OC(H)</sub> − V <sub>OC(L)</sub> ) |            |                                                      |                                                       | −0.2 |                  | 0.2             | V    |   |
| I <sub>I</sub>       | Input current                                                                                |            | D, DE, CDE                                           |                                                       | −100 |                  | 100             | μA   |   |
| I <sub>O</sub>       | Output current with power off                                                                |            | V <sub>CC</sub> = 0 V, V <sub>O</sub> = −7 V to 12 V |                                                       | −700 |                  | 900             | μA   |   |
| I <sub>OS</sub>      | Short-circuit output current                                                                 |            | V <sub>O</sub> = −7 V to 12 V, See Figure 7          |                                                       | −250 |                  | 250             | mA   |   |
| I <sub>CC</sub>      | Supply current (driver enabled)                                                              |            | D at 0 V or V <sub>CC</sub> ,                        | CDE, DE, $\overline{RE}$ at V <sub>CC</sub> , No load |      | 14               | 20              | mA   |   |

<sup>†</sup> All typical values are at V<sub>CC</sub> = 5 V and T<sub>A</sub> = 25°C.

<sup>‡</sup> The minimum V<sub>OD</sub> may not fully comply with TIA/EIA-485-A at operating temperatures below 0°C. System designers should take the possibly lower output signal into account in determining the maximum signal-transmission distance.

#### switching characteristics over recommended operating conditions

| PARAMETER           |                                                     | TEST CONDITIONS                                                   | MIN | TYP | MAX | UNIT |
|---------------------|-----------------------------------------------------|-------------------------------------------------------------------|-----|-----|-----|------|
| t <sub>PLH</sub>    | Differential output propagation delay, low-to-high  | R <sub>L</sub> = 54 Ω,<br>C <sub>L</sub> = 50 pF,<br>See Figure 3 | 4   | 8.5 | 12  | ns   |
| t <sub>PHL</sub>    | Differential output propagation delay, high-to-low  |                                                                   | 4   | 8.5 | 11  |      |
| t <sub>r</sub>      | Differential output rise time                       |                                                                   | 3   | 7.5 | 11  |      |
| t <sub>f</sub>      | Differential output fall time                       |                                                                   | 3   | 7.5 | 11  |      |
| t <sub>sk(p)</sub>  | Pulse skew   (t <sub>PLH</sub> - t <sub>PHL</sub> ) |                                                                   |     |     | 2   |      |
| t <sub>sk(o)</sub>  | Output skew <sup>§</sup>                            |                                                                   |     |     | 1.5 |      |
| t <sub>sk(pp)</sub> | Part-to-part skew <sup>¶</sup>                      |                                                                   |     |     | 2   |      |
| t <sub>PLH</sub>    | Differential output propagation delay, low-to-high  | See Figure 4,<br>(HVD SCSI double-terminated load)                | 3   | 7   | 10  | ns   |
| t <sub>PHL</sub>    | Differential output propagation delay, high-to-low  |                                                                   | 3   | 7.5 | 10  |      |
| t <sub>r</sub>      | Differential output rise time                       |                                                                   | 3   | 7.5 | 12  |      |
| t <sub>f</sub>      | Differential output fall time                       |                                                                   | 3   | 7.5 | 12  |      |
| t <sub>sk(p)</sub>  | Pulse skew   (t <sub>PLH</sub> - t <sub>PHL</sub> ) |                                                                   |     |     | 3   |      |
| t <sub>sk(o)</sub>  | Output skew <sup>§</sup>                            |                                                                   |     |     | 1.5 |      |
| t <sub>sk(pp)</sub> | Part-to-part skew <sup>¶</sup>                      |                                                                   |     |     | 2.5 |      |
| t <sub>PZH</sub>    | Output enable time to high level                    | See Figure 5                                                      |     | 15  | 25  | ns   |
| t <sub>PHZ</sub>    | Output disable time from high level                 |                                                                   |     | 18  | 25  |      |
| t <sub>PZL</sub>    | Output enable time to low level                     | See Figure 6                                                      |     | 10  | 25  | ns   |
| t <sub>PLZ</sub>    | Output disable time from low level                  |                                                                   |     | 17  | 25  |      |

<sup>§</sup> Output skew (t<sub>sk(o)</sub>) is the magnitude of the time delay difference between the outputs of a single device with all of the inputs connected together.

<sup>¶</sup> Part-to-part skew (t<sub>sk(pp)</sub>) is the magnitude of the difference in propagation delay times between any specified terminals of two devices when both devices operate with the same input signals, the same supply voltages, at the same temperature, and have identical packages and test circuits.



## RECEIVER SECTION

### electrical characteristics over recommended operating conditions

| PARAMETER        |                                                           | TEST CONDITIONS                                                   |                       | MIN  | TYP <sup>†</sup> | MAX             | UNIT          |
|------------------|-----------------------------------------------------------|-------------------------------------------------------------------|-----------------------|------|------------------|-----------------|---------------|
| V <sub>IT+</sub> | Positive-going differential input voltage threshold       |                                                                   |                       |      | 0.2              |                 | V             |
| V <sub>IT-</sub> | Negative-going differential input voltage threshold       |                                                                   |                       | -0.2 |                  |                 |               |
| V <sub>hys</sub> | Hysteresis voltage (V <sub>IT+</sub> - V <sub>IT-</sub> ) |                                                                   |                       |      | 40               |                 | mV            |
| V <sub>OH</sub>  | High-level output voltage                                 | V <sub>ID</sub> = 200 mV, I <sub>OH</sub> = -8 mA, see Figure 10  |                       | 4    | 4.7              | V <sub>CC</sub> | V             |
| V <sub>OL</sub>  | Low-level output voltage                                  | V <sub>ID</sub> = -200 mV, I <sub>OL</sub> = -8 mA, see Figure 10 |                       | 0    | 0.2              | 0.4             |               |
| I <sub>I</sub>   | Line input current                                        | Other input = 0 V                                                 | V <sub>I</sub> = 12 V |      |                  | 0.9             | mA            |
|                  |                                                           |                                                                   | V <sub>I</sub> = -7 V | -0.7 |                  |                 |               |
| I <sub>I</sub>   | Input current                                             | $\overline{\text{RE}}$                                            |                       | -100 |                  | 100             | $\mu\text{A}$ |
| R <sub>I</sub>   | Input resistance                                          | A, B                                                              |                       | 12   |                  |                 | k $\Omega$    |
| I <sub>CC</sub>  | Supply current (receiver enabled)                         | A, B, D open, $\overline{\text{RE}}$ , DE, and CDE at 0 V         |                       |      |                  | 16              | mA            |

<sup>†</sup> All typical values are at V<sub>CC</sub> = 5 V and T<sub>A</sub> = 25°C.

### switching characteristics over recommended operating conditions

| PARAMETER           |                                                      | TEST CONDITIONS                             |  | MIN | TYP | MAX | UNIT |
|---------------------|------------------------------------------------------|---------------------------------------------|--|-----|-----|-----|------|
| t <sub>PLH</sub>    | Propagation delay time, low-to-high level output     | V <sub>ID</sub> = -3 V to 3 V, See Figure 9 |  | 7   |     | 16  | ns   |
| t <sub>PHL</sub>    | Propagation delay time, high-to-low level output     |                                             |  | 7   |     | 16  | ns   |
| t <sub>r</sub>      | Receiver output rise time                            |                                             |  |     | 1.3 | 3   | ns   |
| t <sub>f</sub>      | Receiver output fall time                            |                                             |  |     | 1.3 | 3   | ns   |
| t <sub>PZH</sub>    | Receiver output enable time to high level            | See Figure 10                               |  |     | 26  | 40  | ns   |
| t <sub>PHZ</sub>    | Receiver output disable time from high level         |                                             |  |     |     | 40  |      |
| t <sub>PZL</sub>    | Receiver output enable time to low level             | See Figure 11                               |  |     | 29  | 40  | ns   |
| t <sub>PLZ</sub>    | Receiver output enable time to high level            |                                             |  |     |     | 40  |      |
| t <sub>sk(p)</sub>  | Pulse skew (  t <sub>PLH</sub> - t <sub>PHL</sub>  ) |                                             |  |     |     | 2   | ns   |
| t <sub>sk(o)</sub>  | Output skew <sup>‡</sup>                             |                                             |  |     |     | 1.5 | ns   |
| t <sub>sk(pp)</sub> | Part-to-part skew <sup>§</sup>                       |                                             |  |     |     | 3   | ns   |

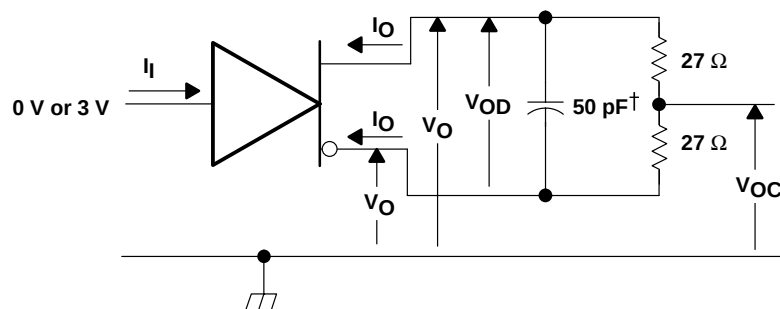
<sup>‡</sup> Output skew (t<sub>sk(o)</sub>) is the magnitude of the time delay difference between the outputs of a single device with all of the inputs connected together.

<sup>§</sup> Part-to-part skew (t<sub>sk(pp)</sub>) is the magnitude of the difference in propagation delay times between any specified terminals of two devices when both devices operate with the same input signals, the same supply voltages, at the same temperature, and have identical packages and test circuits.

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## PARAMETER MEASUREMENT INFORMATION



† Includes probe and jig capacitance

Figure 1. Driver Test Circuit,  $V_{OD}$  and  $V_{OC}$  Without Common-Mode Loading

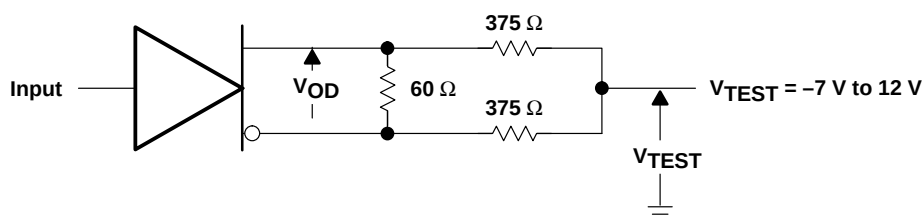
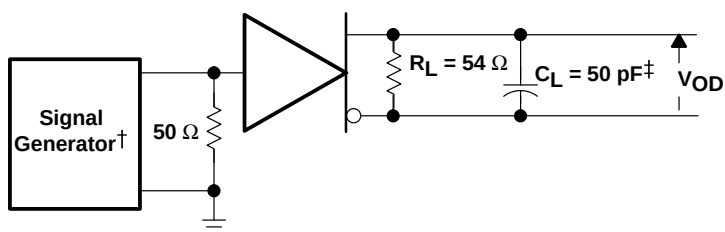


Figure 2. Driver Test Circuit,  $V_{OD}$  With Common-Mode Loading



† PRR = 1 MHz, 50% Duty Cycle,  $t_r < 6$  ns,  $t_f < 6$  ns,  $Z_0 = 50 \Omega$

‡ Includes Probe and Jig Capacitance

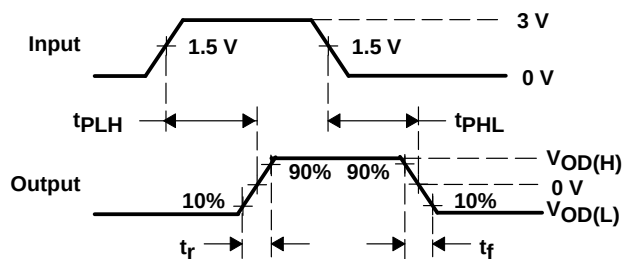


Figure 3. Driver Switching Test Circuit and Waveforms, 485-Loading

PARAMETER MEASUREMENT INFORMATION

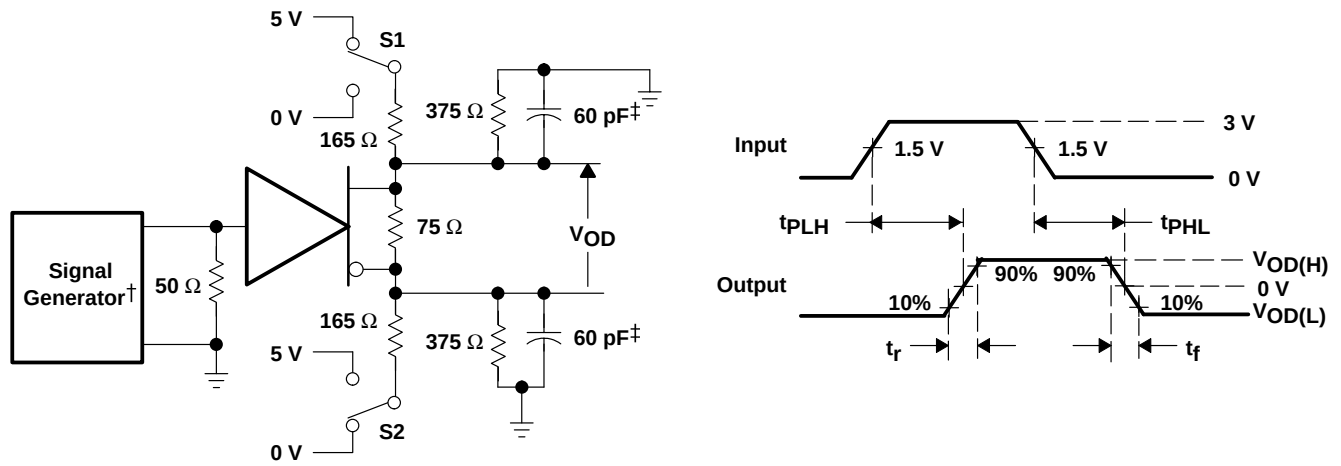


Figure 4. Driver Switching Test Circuit and Waveforms, HVD SCSI-Loading (double terminated)

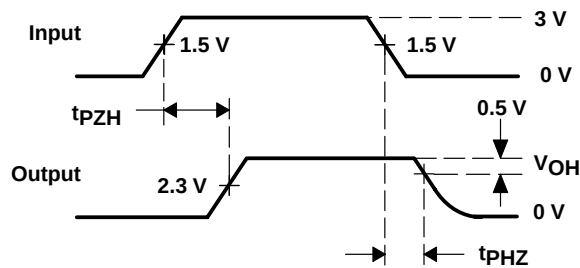
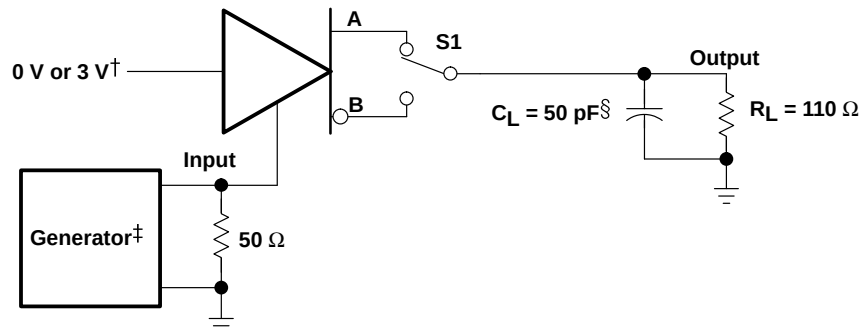
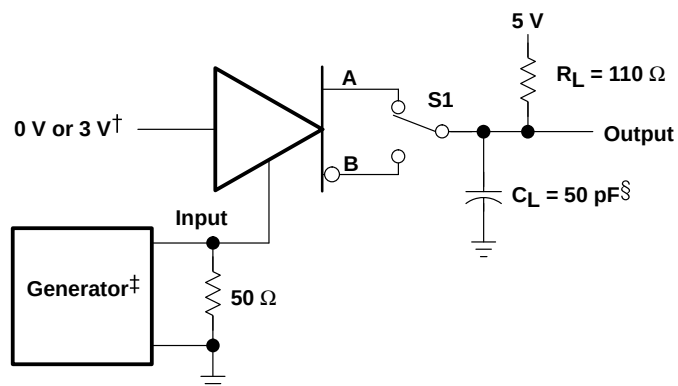


Figure 5. Driver Enable/Disable Test, High Output

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## PARAMETER MEASUREMENT INFORMATION



† 0 V if testing A output, 3 V if testing B output

‡ PRR = 1 MHz, 50% Duty Cycle,  $t_r < 6$  ns,  $t_f < 6$  ns,  $Z_0 = 50 \Omega$

§ Includes Probe and Jig Capacitance

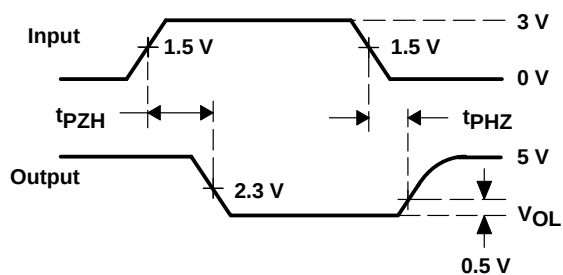


Figure 6. Driver Enable/Disable Test, Low Output

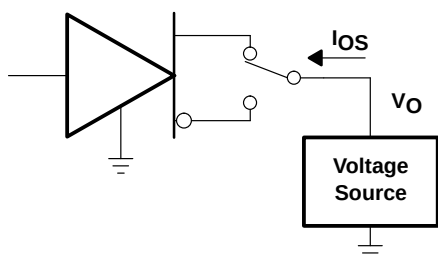


Figure 7. Driver Short-Circuit Test

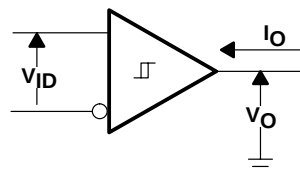
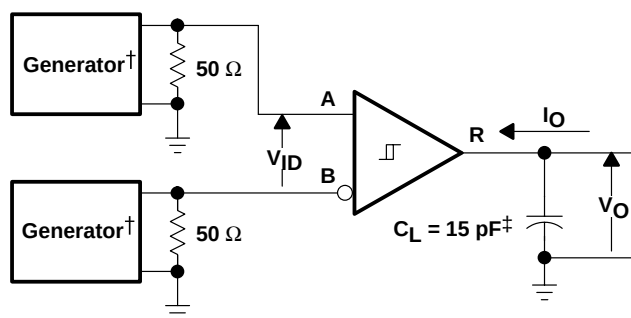


Figure 8. Receiver DC Parameters



† PRR = 1 MHz, 50% Duty Cycle,  $t_r < 6$  ns,  $t_f < 6$  ns,  $Z_0 = 50 \Omega$

‡ Includes Probe and Jig Capacitance

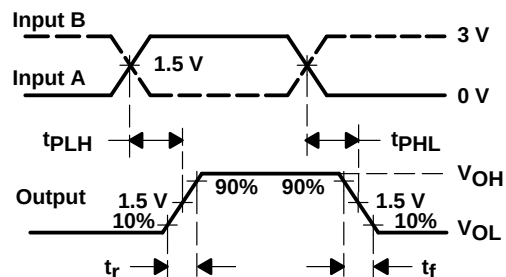
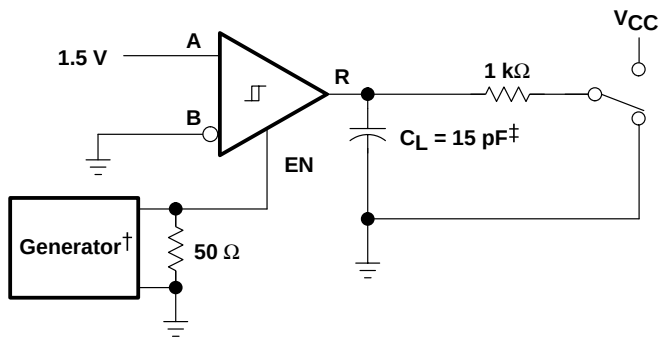


Figure 9. Receiver Switching Test Circuit and Waveforms

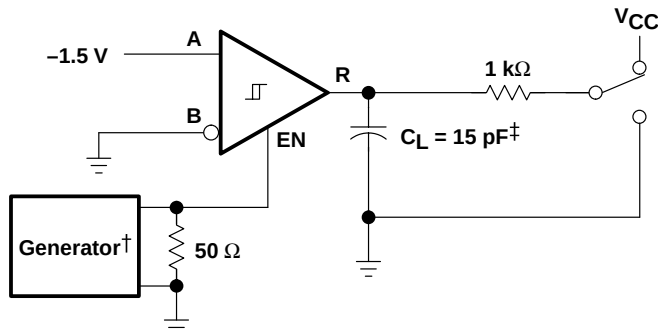
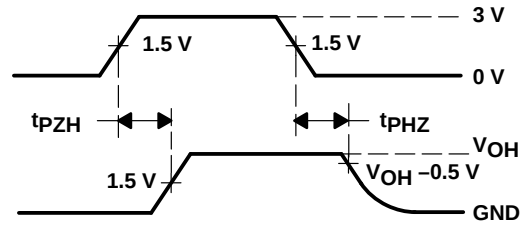


## PARAMETER MEASUREMENT INFORMATION



† PRR = 1 MHz, 50% Duty Cycle,  $t_r < 6$  ns,  $t_f < 6$  ns,  $Z_0 = 50 \Omega$   
‡ Includes Probe and Jig Capacitance

Figure 10. Receiver Enable/Disable Test, High Output



† PRR = 1 MHz, 50% Duty Cycle,  $t_r < 6$  ns,  $t_f < 6$  ns,  $Z_0 = 50 \Omega$   
‡ Includes Probe and Jig Capacitance

Figure 11. Receiver Enable/Disable Test, Low Output

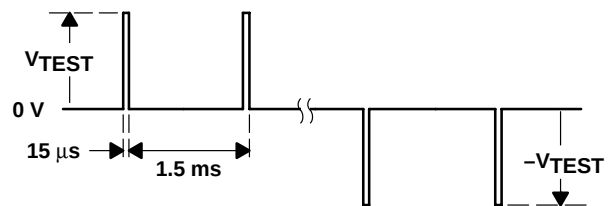
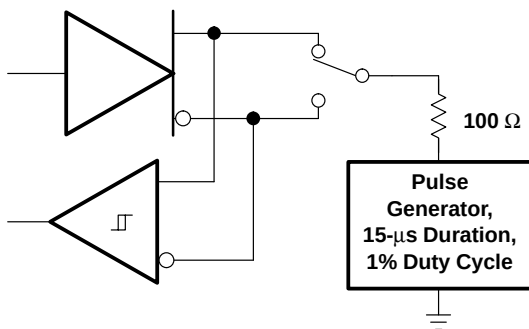
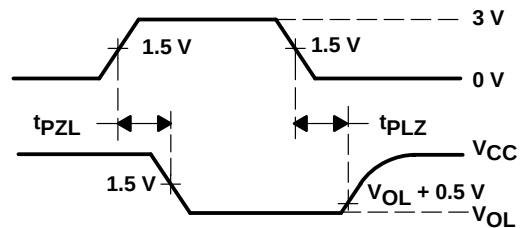


Figure 12. Test Circuit and Waveform, Transient Over Voltage Test

# SN65LBC171, SN75LBC171 TRIPLE DIFFERENTIAL TRANSCEIVERS

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## TYPICAL CHARACTERISTICS

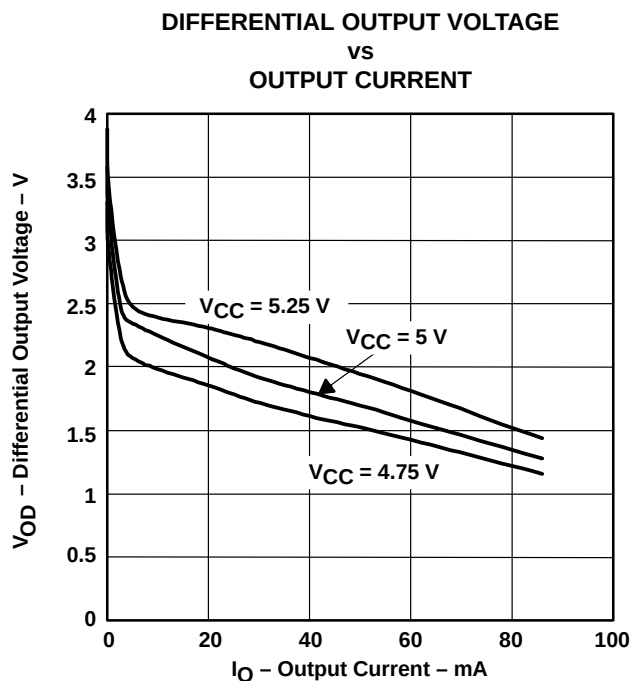


Figure 13

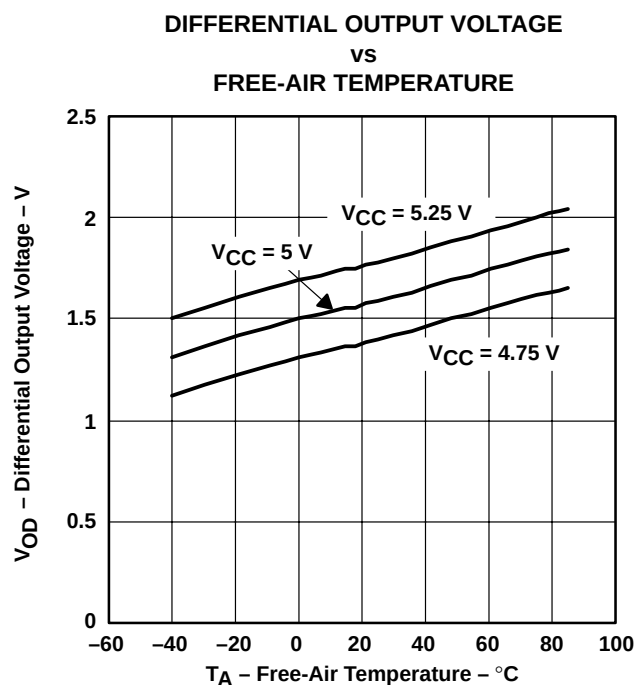


Figure 14

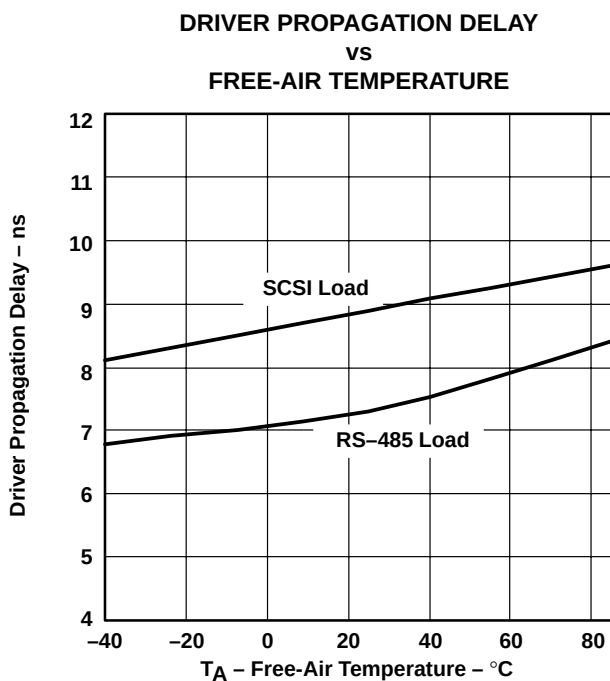


Figure 15

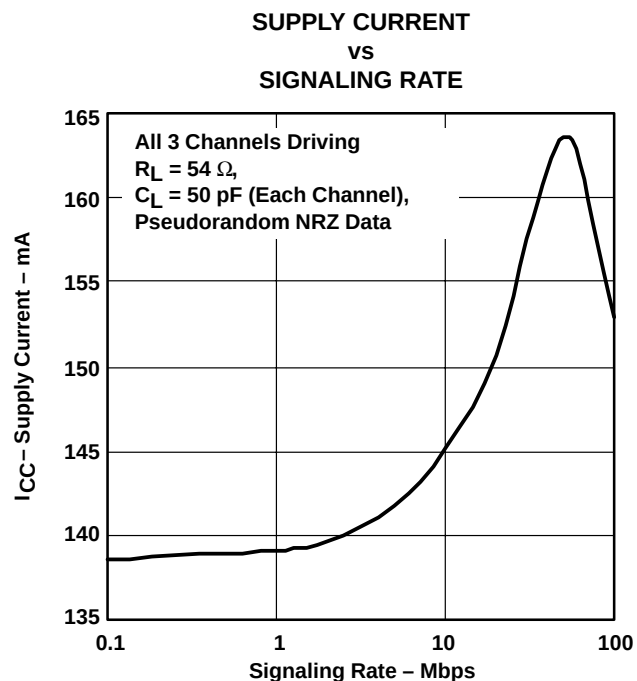


Figure 16

## TYPICAL CHARACTERISTICS

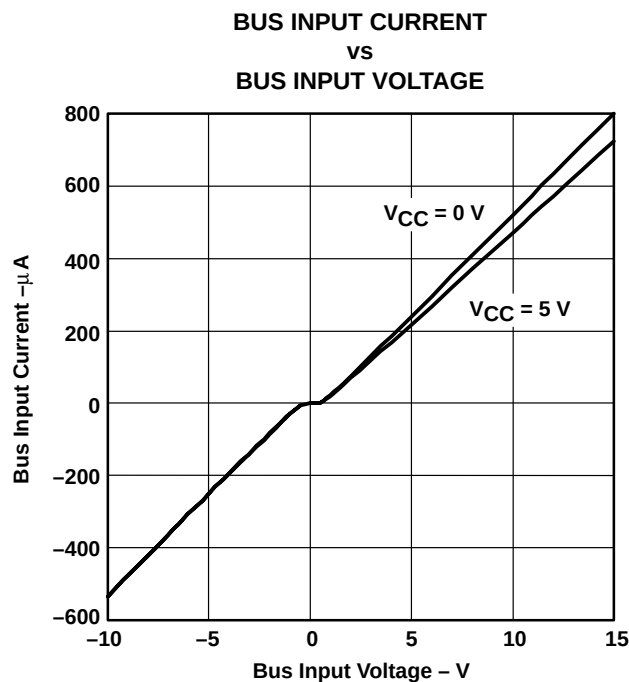


Figure 17

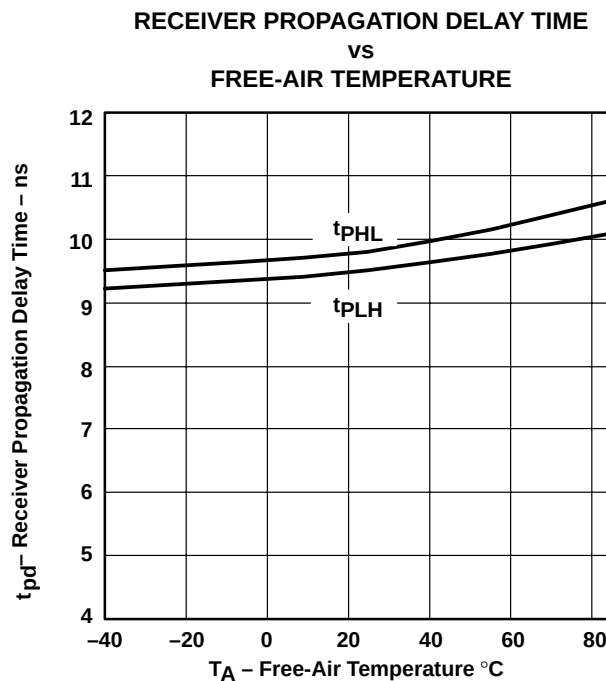


Figure 18

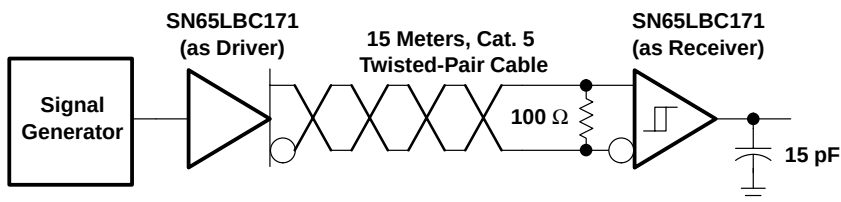


Figure 19. Circuit Diagram for Signaling Characteristics

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## TYPICAL CHARACTERISTICS

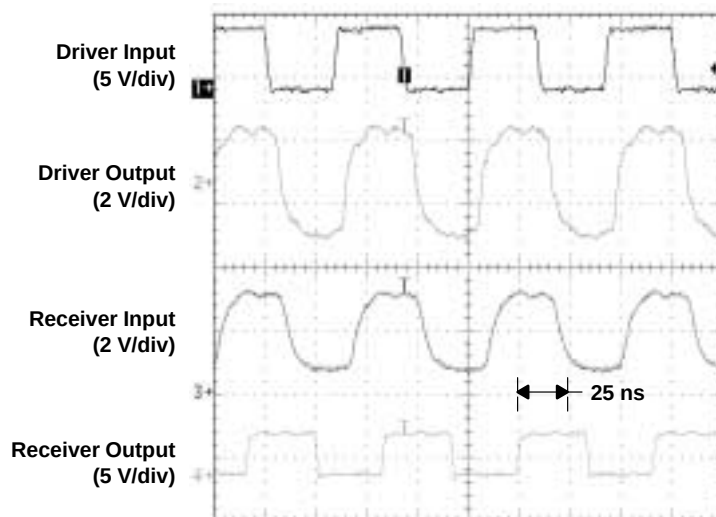


Figure 20. Signal Waveforms at 30 Mbps

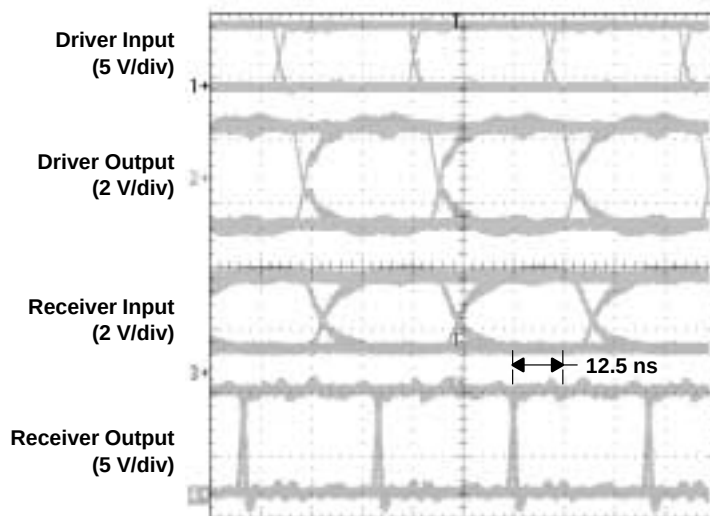


Figure 21. Eye Patterns, Pseudorandom Data at 30 Mbps

## TYPICAL CHARACTERISTICS

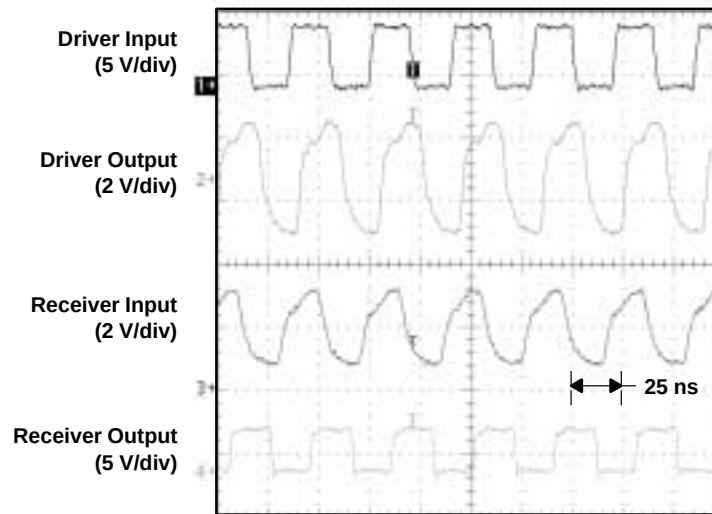


Figure 22. Signal Waveforms at 50 Mbps

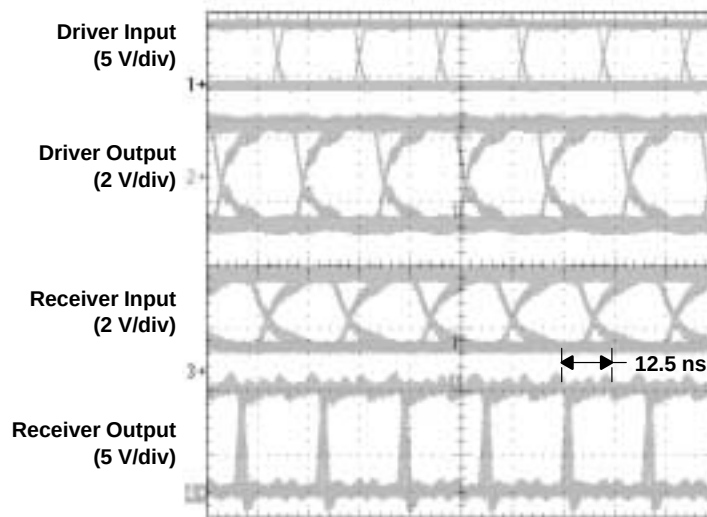


Figure 23. Eye Patterns, Pseudorandom Data at 50 Mbps

# SN65LBC171, SN75LBC171 TRIPLE DIFFERENTIAL TRANSCEIVERS

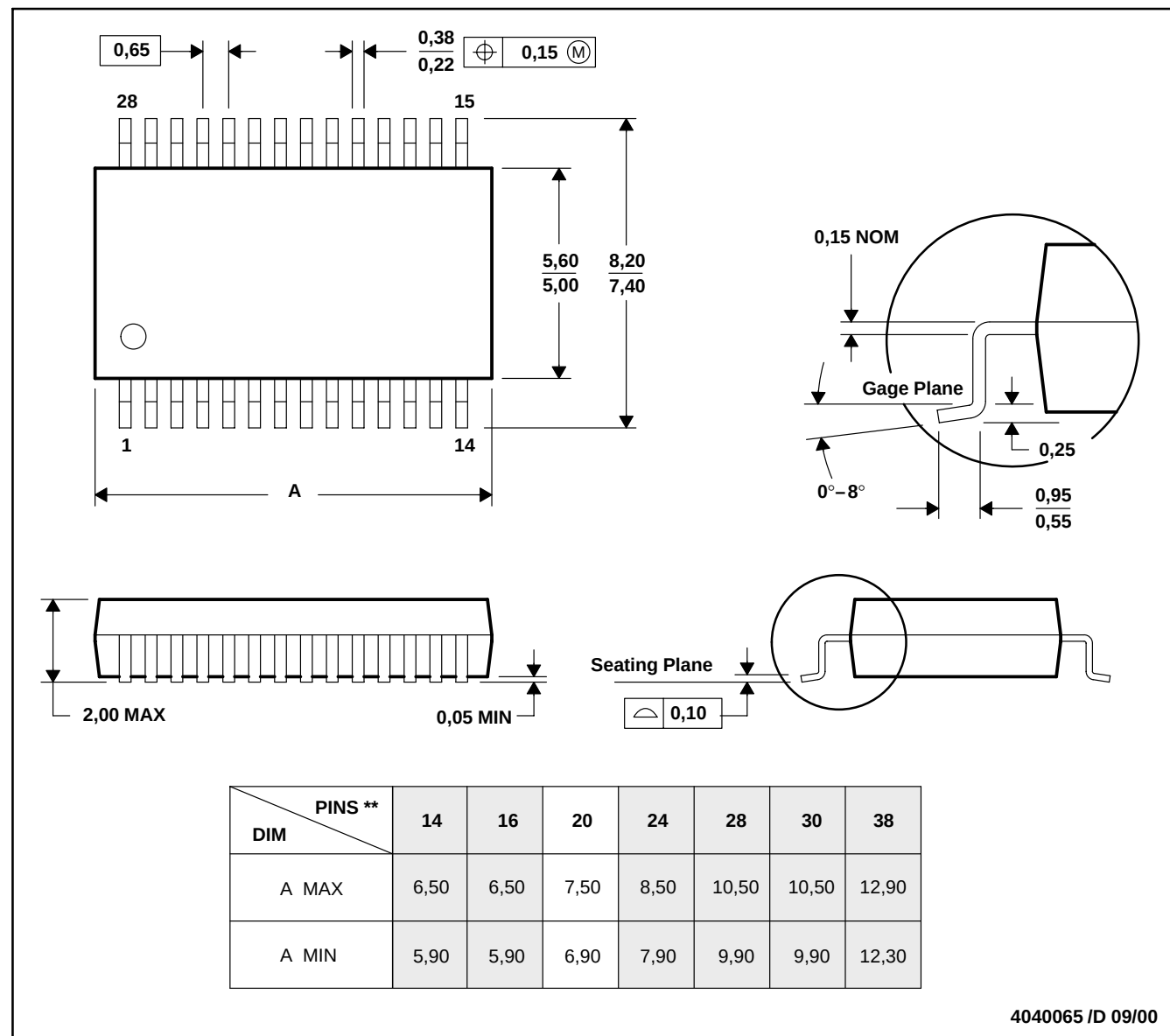
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## MECHANICAL DATA

DB (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN



- NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.  
 D. Falls within JEDEC MO-150

# SN65LBC171, SN75LBC171 TRIPLE DIFFERENTIAL TRANSCEIVERS

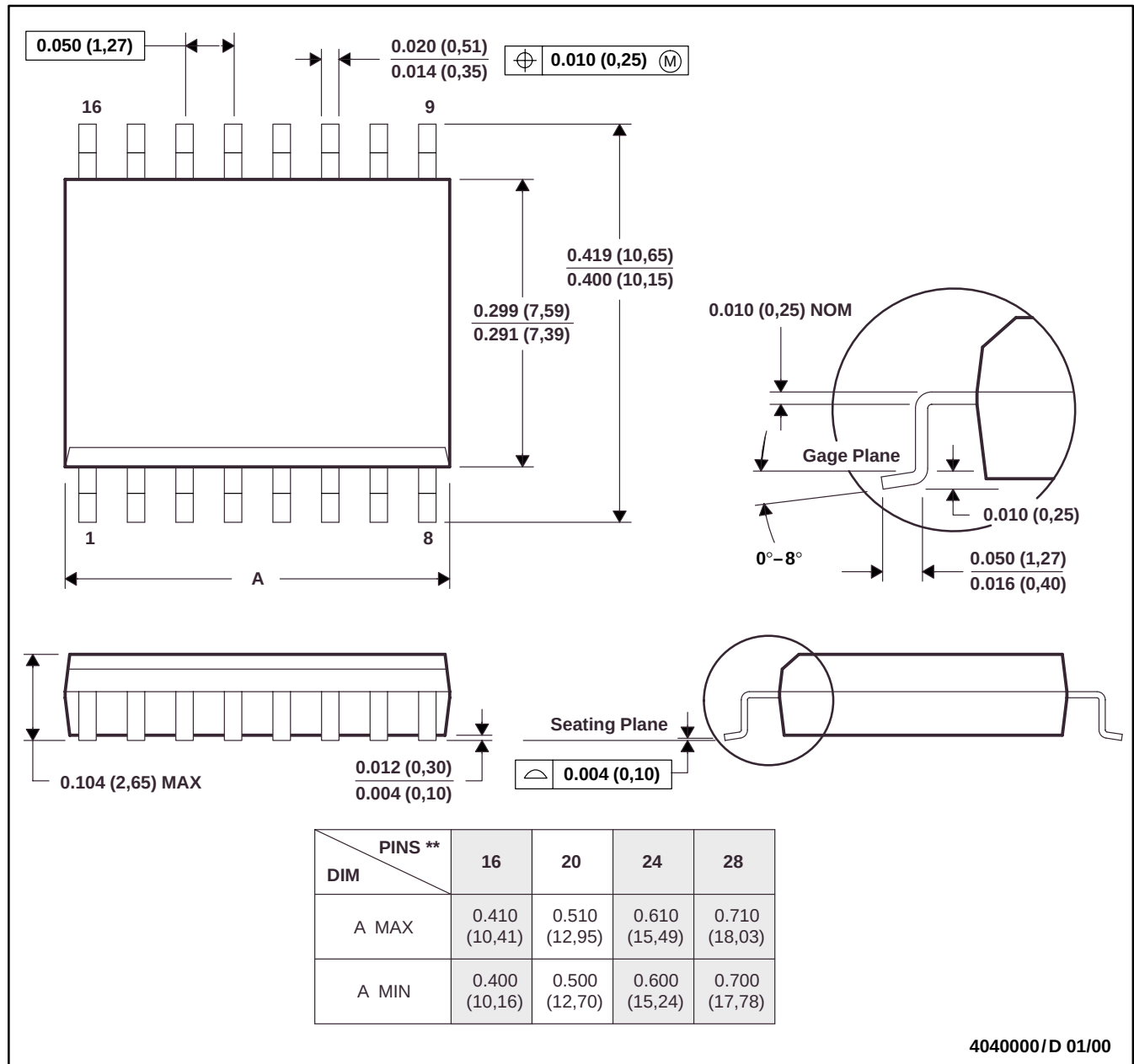
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## MECHANICAL DATA

DW (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

16 PINS SHOWN



- NOTES: A. All linear dimensions are in inches (millimeters).  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).  
 D. Falls within JEDEC MS-013

**PACKAGING INFORMATION**

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SN65LBC171DB     | ACTIVE                | SSOP         | DB              | 20   | 70          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN65LBC171DBG4   | ACTIVE                | SSOP         | DB              | 20   | 70          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN65LBC171DBR    | ACTIVE                | SSOP         | DB              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN65LBC171DBRG4  | ACTIVE                | SSOP         | DB              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN65LBC171DW     | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN65LBC171DWG4   | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN65LBC171DWR    | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN65LBC171DWRG4  | ACTIVE                | SOIC         | DW              | 20   | 2000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75LBC171DB     | ACTIVE                | SSOP         | DB              | 20   | 70          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75LBC171DBG4   | ACTIVE                | SSOP         | DB              | 20   | 70          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75LBC171DW     | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| SN75LBC171DWG4   | ACTIVE                | SOIC         | DW              | 20   | 25          | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

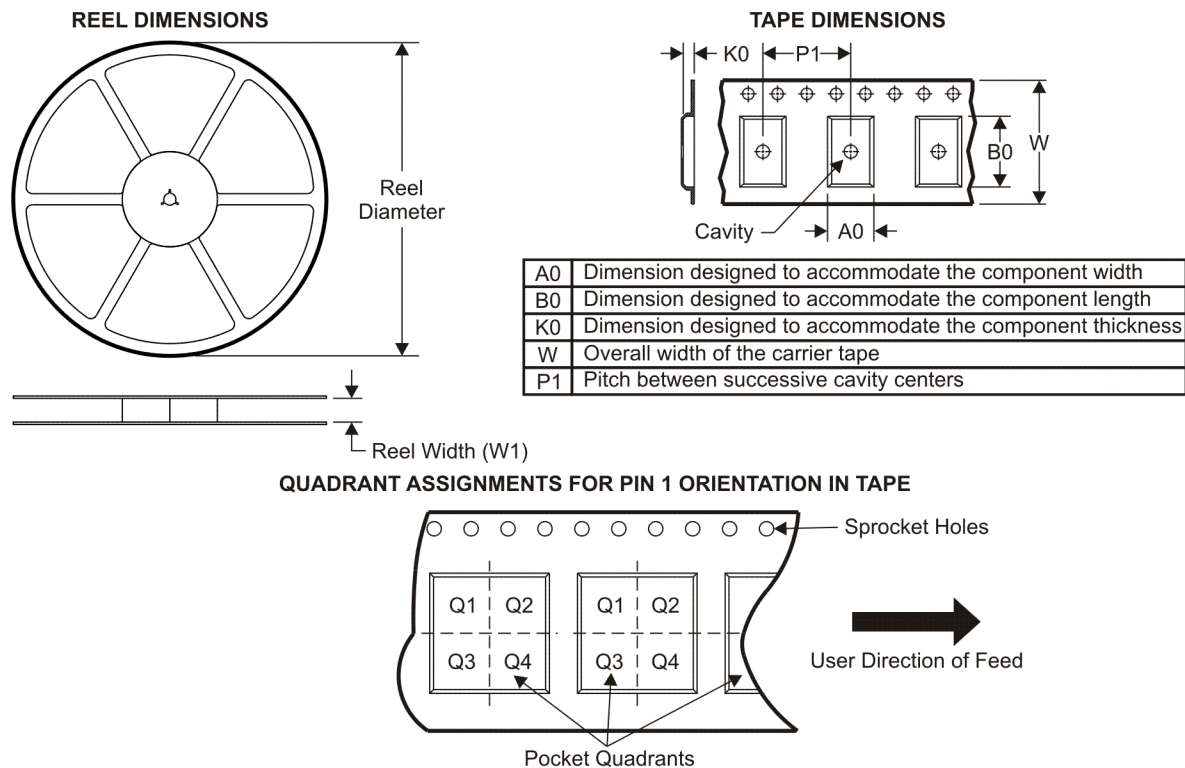
**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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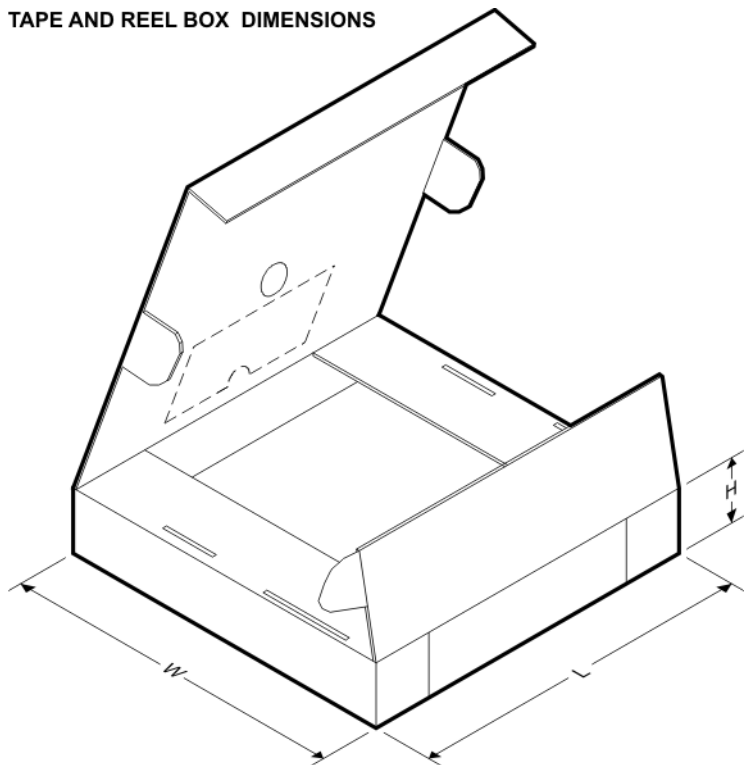
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**TAPE AND REEL INFORMATION**


\*All dimensions are nominal

| Device        | Package Type | Package Drawing | Pins | SPQ  | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|---------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN65LBC171DBR | SSOP         | DB              | 20   | 2000 | 330.0              | 16.4               | 8.2     | 7.5     | 2.5     | 12.0    | 16.0   | Q1            |
| SN65LBC171DWR | SOIC         | DW              | 20   | 2000 | 330.0              | 24.4               | 10.8    | 13.0    | 2.7     | 12.0    | 24.0   | Q1            |

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

| Device        | Package Type | Package Drawing | Pins | SPQ  | Length (mm) | Width (mm) | Height (mm) |
|---------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN65LBC171DBR | SSOP         | DB              | 20   | 2000 | 346.0       | 346.0      | 33.0        |
| SN65LBC171DWR | SOIC         | DW              | 20   | 2000 | 346.0       | 346.0      | 41.0        |

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