

SN54ABT162601, SN74ABT162601 18-BIT UNIVERSAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS247G – AUGUST 1992 – REVISED JULY 1998

- **Members of the Texas Instruments Widebus™ Family**
- **B-Port Outputs Have Equivalent 25-Ω Series Resistors, So No External Resistors Are Required**
- **State-of-the-Art EPIC-II B™ BiCMOS Design Significantly Reduces Power Dissipation**
- **UBT™ (Universal Bus Transceiver) Combines D-Type Latches and D-Type Flip-Flops for Operation in Transparent, Latched, Clocked, or Clock-Enabled Mode**
- **Latch-Up Performance Exceeds 500 mA Per JESD 17**
- **Typical V_{OLP} (Output Ground Bounce) < 0.8 V at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$**
- **High-Impedance State During Power Up and Power Down**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Package Options Include Plastic 300-mil Shrink Small-Outline (DL) and Thin Shrink Small-Outline (DGG) Packages and 380-mil Fine-Pitch Ceramic Flat (WD) Package Using 25-mil Center-to-Center Spacings**

description

These 18-bit universal bus transceivers combine D-type latches and D-type flip-flops to allow data flow in transparent, latched, and clocked modes.

Data flow in each direction is controlled by output-enable (\overline{OEAB} and \overline{OEBA}), latch-enable (\overline{LEAB} and \overline{LEBA}), and clock (\overline{CLKAB} and \overline{CLKBA}) inputs. The clock can be controlled by the clock-enable ($\overline{CLKENAB}$ and $\overline{CLKENBA}$) inputs.

For A-to-B data flow, the device operates in the transparent mode when \overline{LEAB} is high. When \overline{LEAB} is low, the A data is latched if \overline{CLKAB} is held at a high or low logic level. If \overline{LEAB} is low, the A data is stored in the latch/flip-flop on the low-to-high transition of \overline{CLKAB} . Output-enable \overline{OEAB} is active-low. When \overline{OEAB} is low, the outputs are active. When \overline{OEAB} is high, the outputs are in the high-impedance state. Data flow for B to A is similar to that of A to B but uses \overline{OEBA} , \overline{LEBA} , \overline{CLKBA} , and $\overline{CLKENBA}$.

The B-port outputs, which are designed to source or sink up to 12 mA, include equivalent 25-Ω series resistors to reduce overshoot and undershoot.

When V_{CC} is between 0 and 2.1 V, the device is in the high-impedance state during power up or power down. However, to ensure the high-impedance state above 2.1 V, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

SN54ABT162601 . . . WD PACKAGE
SN74ABT162601 . . . DGG OR DL PACKAGE
(TOP VIEW)

| | | | |
|-------------------|----|----|----------------------|
| \overline{OEAB} | 1 | 56 | $\overline{CLKENAB}$ |
| \overline{LEAB} | 2 | 55 | \overline{CLKAB} |
| A1 | 3 | 54 | B1 |
| GND | 4 | 53 | GND |
| A2 | 5 | 52 | B2 |
| A3 | 6 | 51 | B3 |
| V_{CC} | 7 | 50 | V_{CC} |
| A4 | 8 | 49 | B4 |
| A5 | 9 | 48 | B5 |
| A6 | 10 | 47 | B6 |
| GND | 11 | 46 | GND |
| A7 | 12 | 45 | B7 |
| A8 | 13 | 44 | B8 |
| A9 | 14 | 43 | B9 |
| A10 | 15 | 42 | B10 |
| A11 | 16 | 41 | B11 |
| A12 | 17 | 40 | B12 |
| GND | 18 | 39 | GND |
| A13 | 19 | 38 | B13 |
| A14 | 20 | 37 | B14 |
| A15 | 21 | 36 | B15 |
| V_{CC} | 22 | 35 | V_{CC} |
| A16 | 23 | 34 | B16 |
| A17 | 24 | 33 | B17 |
| GND | 25 | 32 | GND |
| A18 | 26 | 31 | B18 |
| \overline{OEBA} | 27 | 30 | \overline{CLKBA} |
| \overline{LEBA} | 28 | 29 | $\overline{CLKENBA}$ |



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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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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

SN54ABT162601, SN74ABT162601

18-BIT UNIVERSAL BUS TRANSCEIVERS

WITH 3-STATE OUTPUTS

SCBS247G – AUGUST 1992 – REVISED JULY 1998

description (continued)

The SN54ABT162601 is characterized for operation over the full military temperature range of -55°C to 125°C .
The SN74ABT162601 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE†

| INPUTS | | | | | OUTPUT |
|---------|------|------|------------|---|------------------|
| CLKENAB | OEAB | LEAB | CLKAB | A | B |
| X | H | X | X | X | Z |
| X | L | H | X | L | L |
| X | L | H | X | H | H |
| H | L | L | X | X | B_0^{\ddagger} |
| H | L | L | X | X | B_0^{\ddagger} |
| L | L | L | \uparrow | L | L |
| L | L | L | \uparrow | H | H |
| L | L | L | L | X | B_0^{\ddagger} |
| L | L | L | H | X | B_0^{\S} |

† A-to-B data flow is shown: B-to-A flow is similar but uses OEBA, LEBA, CLKBA, and CLKENBA.

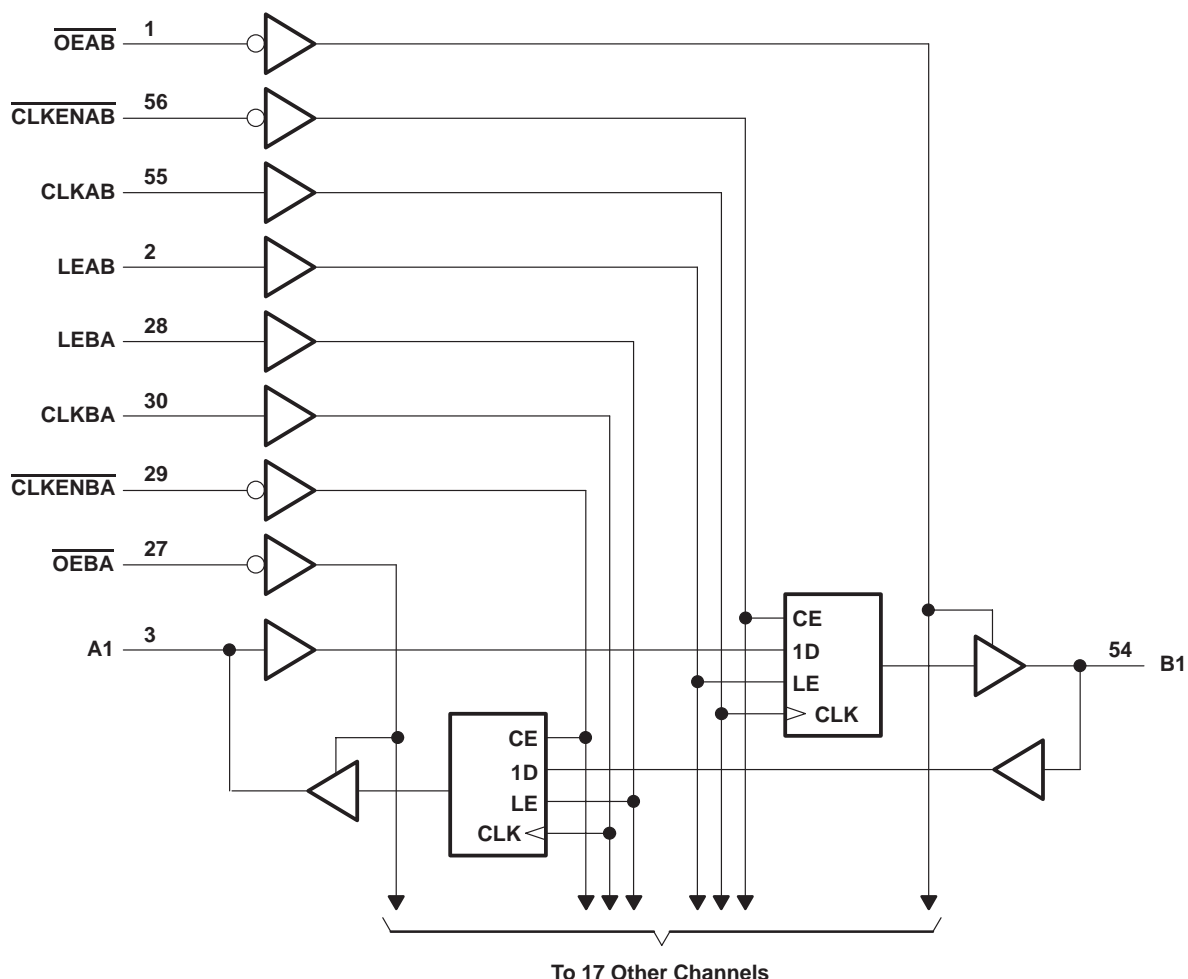
\ddagger Output level before the indicated steady-state input conditions were established

\S Output level before the indicated steady-state input conditions were established, provided that CLKAB was low before LEAB went low

SN54ABT162601, SN74ABT162601 18-BIT UNIVERSAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

SCBS247G – AUGUST 1992 – REVISED JULY 1998

logic diagram (positive logic)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

| | |
|---|-----------------|
| Supply voltage range, V_{CC} | –0.5 V to 7 V |
| Input voltage range, V_I (except I/O ports) (see Note 1) | –0.5 V to 7 V |
| Voltage range applied to any output in the high or power-off state, V_O | –0.5 V to 5.5 V |
| Current into any output in the low state, I_O : SN54ABT162601 (A port) | 96 mA |
| SN74ABT162601 (A port) | 128 mA |
| B port | 30 mA |
| Input clamp current, I_{IK} ($V_I < 0$) | –18 mA |
| Output clamp current, I_{OK} ($V_O < 0$) | –50 mA |
| Package thermal impedance, θ_{JA} (see Note 2): DGG package | 81°C/W |
| DL package | 74°C/W |
| Storage temperature range, T_{stg} | –65°C to 150°C |

[†] 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. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. The package thermal impedance is calculated in accordance with JESD 51.

SN54ABT162601, SN74ABT162601

18-BIT UNIVERSAL BUS TRANSCEIVERS

WITH 3-STATE OUTPUTS

SCBS247G – AUGUST 1992 – REVISED JULY 1998

recommended operating conditions (see Note 3)

| | | | SN54ABT162601 | | SN74ABT162601 | | UNIT |
|--------------------------|------------------------------------|-----------------|---------------|----------|---------------|----------|-----------|
| | | | MIN | MAX | MIN | MAX | |
| V_{CC} | Supply voltage | | 4.5 | 5.5 | 4.5 | 5.5 | V |
| V_{IH} | High-level input voltage | | 2 | | 2 | | V |
| V_{IL} | Low-level input voltage | | | 0.8 | | 0.8 | V |
| V_I | Input voltage | | 0 | V_{CC} | 0 | V_{CC} | V |
| I_{OH} | High-level output current | A port | | –24 | | –32 | mA |
| | | B port | | –12 | | –12 | |
| I_{OL} | Low-level output current | A port | | 48 | | 64 | mA |
| | | B port | | 12 | | 12 | |
| $\Delta t/\Delta v$ | Input transition rise or fall rate | Outputs enabled | | 10 | | 10 | ns/V |
| $\Delta t/\Delta V_{CC}$ | Power-up ramp rate | | 200 | | 200 | | $\mu s/V$ |
| T_A | Operating free-air temperature | | –55 | 125 | –40 | 85 | °C |

NOTE 3: All unused inputs of the devices must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application note, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.



SN54ABT162601, SN74ABT162601

18-BIT UNIVERSAL BUS TRANSCEIVERS

WITH 3-STATE OUTPUTS

SCBS247G – AUGUST 1992 – REVISED JULY 1998

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

| PARAMETER | | TEST CONDITIONS | | T _A = 25°C | | | SN54ABT162601 | | SN74ABT162601 | | UNIT | |
|--------------------|-------------------------|--|--------------------------|-----------------------|------|------|---------------|------|---------------|------|------|----|
| | | | | MIN | TYP† | MAX | MIN | MAX | MIN | MAX | | |
| V _{IK} | | V _{CC} = 4.5 V, I _I = -18 mA | | -1.2 | | | -1.2 | | -1.2 | | V | |
| V _{OH} | A port | V _{CC} = 4.5 V, I _{OH} = -3 mA | | 2.5 | | | 2.5 | | 2.5 | | V | |
| | | V _{CC} = 5 V, I _{OH} = -3 mA | | 3 | | | 3 | | 3 | | | |
| | | V _{CC} = 4.5 V | I _{OH} = -24 mA | | 2 | | | 2 | | | | |
| | | | I _{OH} = -32 mA | | 2* | | | | | 2 | | |
| | B port | V _{CC} = 4.5 V, I _{OH} = -1 mA | | 3.35 | | | 3.3 | | 3.35 | | | |
| | | V _{CC} = 5 V, I _{OH} = -1 mA | | 3.85 | | | 3.8 | | 3.85 | | | |
| | | V _{CC} = 4.5 V | I _{OH} = -3 mA | | 3.1 | | | 3 | | 3.1 | | |
| | | | I _{OH} = -12 mA | | 2.6 | | | | | 2.6 | | |
| V _{OL} | A port | V _{CC} = 4.5 V | I _{OL} = 48 mA | | 0.55 | | | 0.55 | | V | | |
| | I _{OL} = 64 mA | | 0.55* | | | 0.55 | | | | | | |
| | B port | V _{CC} = 4.5 V, I _{OL} = 12 mA | | 0.8 | | | 0.8 | | 0.8 | | | |
| V _{hys} | | | | 100 | | | | | | | mV | |
| I _I | Control inputs | V _{CC} = 0 to 5.5 V, V _I = V _{CC} or GND | | ±1 | | | ±1 | | ±1 | | μA | |
| | A or B ports | V _{CC} = 2.1 V to 5.5 V, V _I = V _{CC} or GND | | ±20 | | | ±20 | | ±20 | | | |
| I _{OZPU} | | V _{CC} = 0 to 2.1 V, V _O = 0.5 V to 2.7 V, \overline{OE} = X | | ±50 | | | ±50** | | ±50 | | μA | |
| I _{OZPD} | | V _{CC} = 2.1 V to 0, V _O = 0.5 V to 2.7 V, \overline{OE} = X | | ±50 | | | ±50** | | ±50 | | μA | |
| I _{OZH} ‡ | | V _{CC} = 2.1 V to 5.5 V, V _O = 2.7 V, \overline{OE} ≥ 2 V | | 10 | | | 10 | | 10 | | μA | |
| I _{OZL} ‡ | | V _{CC} = 2.1 V to 5.5 V, V _O = 0.5 V, \overline{OE} ≥ 2 V | | -10 | | | -10 | | -10 | | μA | |
| I _{off} | | V _{CC} = 0, V _I or V _O ≤ 4.5 V | | ±100* | | | | | ±100 | | μA | |
| I _{CEX} | | V _{CC} = 5.5 V, V _O = 5.5 V | Outputs high | 50 | | | 50 | | 50 | | μA | |
| I _O § | A port | V _{CC} = 5.5 V, V _O = 2.5 V | | -50 | -100 | -180 | -50 | -180 | -50 | -180 | mA | |
| | B port | | | -25 | -55 | -100 | -25 | -100 | -25 | -100 | | |
| I _{CC} | A or B ports | V _{CC} = 5.5 V, I _O = 0, V _I = V _{CC} or GND | Outputs high | | 3 | | | 3 | | 3 | | mA |
| | | | Outputs low | | 36 | | | 36 | | 36 | | |
| | | | Outputs disabled | | 3 | | | 3 | | 3 | | |
| ΔI _{CC} ¶ | | V _{CC} = 5.5 V, One input at 3.4 V, Other inputs at V _{CC} or GND | | 50 | | | 50 | | 50 | | μA | |
| C _i | Control inputs | V _I = 2.5 V or 0.5 V | | 3 | | | | | | | pF | |
| C _{io} | A or B ports | V _O = 2.5 V or 0.5 V | | 9 | | | | | | | pF | |

* On products compliant to MIL-PRF-38535, this parameter does not apply.

** On products compliant to MIL-PRF-38535, this parameter is not production tested.

† All typical values are at V_{CC} = 5 V.

‡ The parameters I_{OZH} and I_{OZL} include the input leakage current.

§ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

¶ This is the increase in supply current for each input that is at the specified TTL voltage level rather than V_{CC} or GND.



SN54ABT162601, SN74ABT162601

18-BIT UNIVERSAL BUS TRANSCEIVERS

WITH 3-STATE OUTPUTS

SCBS247G – AUGUST 1992 – REVISED JULY 1998

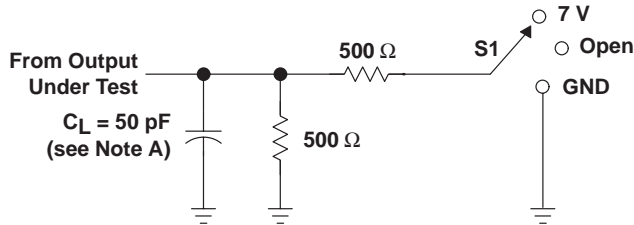
timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)(see Figure 1)

| | | | | SN54ABT162601 | | SN74ABT162601 | | UNIT |
|--------------------|-----------------|------------------------------------|----------|---------------|-----|---------------|-----|------|
| | | | | MIN | MAX | MIN | MAX | |
| f _{clock} | Clock frequency | | | 0 | 150 | 0 | 150 | MHz |
| t _w | Pulse duration | LEAB or LEBA high | | 2.5 | | 2.5 | | ns |
| | | CLKAB or CLKBA high or low | | 3.3 | | 3 | | |
| t _{su} | Setup time | A before CLKAB↑ or B before CLKBA↑ | | 4.8 | | 4.3 | | ns |
| | | A before LEAB↓ or B before LEBA↓ | CLK high | 2.5 | | 2.5 | | |
| | | | CLK low | 1.2 | | 1 | | |
| | | CLKEN before CLK↑ | | 2.7 | | 2.7 | | |
| t _h | Hold time | A after CLKAB↑ or B after CLKBA↑ | | 0.5 | | 0 | | ns |
| | | A after LEAB↓ or B after LEBA↓ | | 2 | | 0.5 | | |
| | | CLKEN after CLK↑ | | 0.5 | | 0 | | |

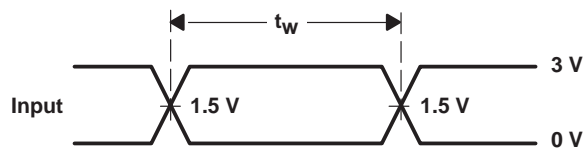
switching characteristics over recommended ranges of supply voltage and operating free-air temperature, $C_L = 50$ pF (unless otherwise noted) (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$ | | | SN54ABT162601 | | SN74ABT162601 | | UNIT |
|------------------|--------------------------|-------------|---|-----|-----|---------------|-----|---------------|-----|------|
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| f_{max} | | | 150 | | | 150 | | 150 | | MHz |
| t_{PLH} | A | B | 1.5 | 2.8 | 4 | 1.5 | 5.1 | 1.5 | 4.8 | ns |
| t_{PHL} | | | 2 | 3.7 | 5.2 | 2 | 6.1 | 2 | 5.7 | |
| t_{PLH} | B | A | 1 | 2.5 | 3.6 | 1 | 4.5 | 1 | 4 | ns |
| t_{PHL} | | | 2 | 3.3 | 4.5 | 2 | 5.1 | 2 | 4.9 | |
| t_{PLH} | LEBA | A | 2 | 3.3 | 4.5 | 2 | 5.6 | 2 | 5 | ns |
| t_{PHL} | | | 2 | 3.6 | 4.7 | 2 | 5.4 | 2 | 5 | |
| t_{PLH} | LEAB | B | 2 | 3.4 | 4.8 | 2 | 6.1 | 2 | 5.6 | ns |
| t_{PHL} | | | 2 | 3.8 | 5.2 | 2 | 6.4 | 2 | 5.9 | |
| t_{PLH} | CLKBA | A | 1.5 | 3.1 | 4.7 | 1.5 | 5.4 | 1.5 | 5.3 | ns |
| t_{PHL} | | | 1.5 | 3.1 | 4.3 | 1.5 | 5.2 | 1.5 | 5 | |
| t_{PLH} | CLKAB | B | 1.5 | 3.3 | 4.7 | 1.5 | 6 | 1.5 | 5.5 | ns |
| t_{PHL} | | | 1.5 | 3.5 | 4.8 | 1.5 | 5.8 | 1.5 | 5.3 | |
| t_{PZH} | $\overline{\text{OEBA}}$ | A | 2 | 3.5 | 4.6 | 2 | 5.5 | 2 | 5.1 | ns |
| t_{PZL} | | | 2 | 3.7 | 4.7 | 2 | 5.8 | 2 | 5.4 | |
| t_{PZH} | $\overline{\text{OEAB}}$ | B | 2 | 3.8 | 5.3 | 1.5 | 6.6 | 2 | 6.1 | ns |
| t_{PZL} | | | 2 | 3.6 | 5.1 | 2 | 6.2 | 2 | 5.7 | |
| t_{PHZ} | $\overline{\text{OEBA}}$ | A | 2 | 3.6 | 5.4 | 1.4 | 6.6 | 2 | 6.2 | ns |
| t_{PLZ} | | | 1.5 | 3.2 | 4.7 | 1.5 | 5.8 | 1.5 | 5.4 | |
| t_{PHZ} | $\overline{\text{OEAB}}$ | B | 2 | 3.4 | 4.8 | 1.4 | 5.6 | 2 | 5.4 | ns |
| t_{PLZ} | | | 1.5 | 3.2 | 4.5 | 1.5 | 5.7 | 1.5 | 5.2 | |

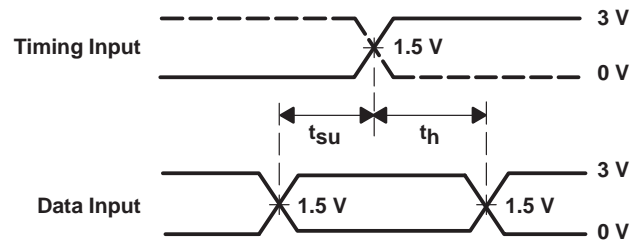
PARAMETER MEASUREMENT INFORMATION



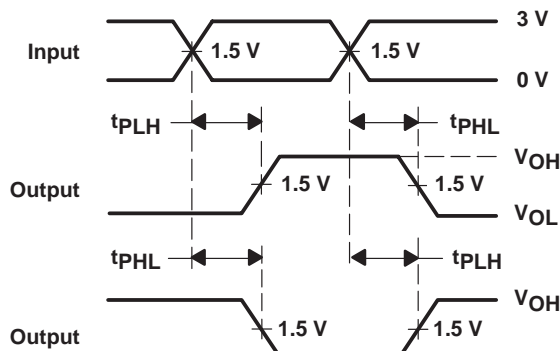
LOAD CIRCUIT



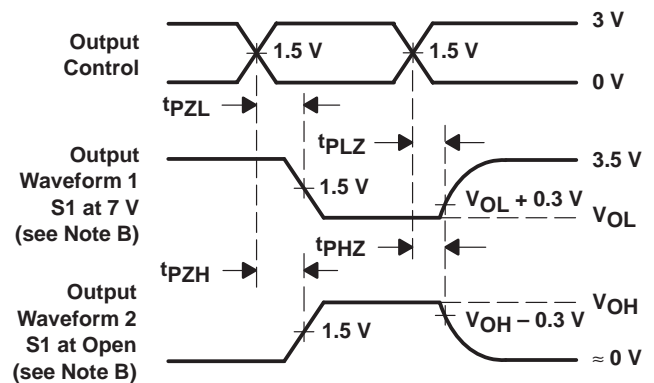
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

- NOTES: A. C_L includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
C. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.
D. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|-------------------|---------------|--------------|--------------------|------|----------------|----------------------------|------------------|----------------------|--------------|---|-------------------------|
| 5962-9859301QXA | ACTIVE | CFP | WD | 56 | 1 | TBD | A42 | N / A for Pkg Type | -55 to 125 | 5962-9859301QX A SNJ54ABT162601 WD | Samples |
| 74ABT162601DGGRE4 | ACTIVE | TSSOP | DGG | 56 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | ABT162601 | Samples |
| 74ABT162601DGGRG4 | ACTIVE | TSSOP | DGG | 56 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | ABT162601 | Samples |
| 74ABT162601DLRG4 | ACTIVE | SSOP | DL | 56 | 1000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | ABT162601 | Samples |
| SN74ABT162601DGGR | ACTIVE | TSSOP | DGG | 56 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | ABT162601 | Samples |
| SN74ABT162601DLG4 | ACTIVE | SSOP | DL | 56 | | TBD | Call TI | Call TI | -40 to 85 | ABT162601 | Samples |
| SN74ABT162601DLR | ACTIVE | SSOP | DL | 56 | 1000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM | -40 to 85 | ABT162601 | Samples |
| SNJ54ABT162601WD | ACTIVE | CFP | WD | 56 | 1 | TBD | A42 | N / A for Pkg Type | -55 to 125 | 5962-9859301QX A SNJ54ABT162601 WD | Samples |

(1) 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.

(2) 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)

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

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

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OTHER QUALIFIED VERSIONS OF SN54ABT162601, SN74ABT162601 :

- Catalog: [SN74ABT162601](#)
- Military: [SN54ABT162601](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

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 |
|-------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74ABT162601DGGR | TSSOP | DGG | 56 | 2000 | 330.0 | 24.4 | 8.6 | 15.6 | 1.8 | 12.0 | 24.0 | Q1 |
| SN74ABT162601DLR | SSOP | DL | 56 | 1000 | 330.0 | 32.4 | 11.35 | 18.67 | 3.1 | 16.0 | 32.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS

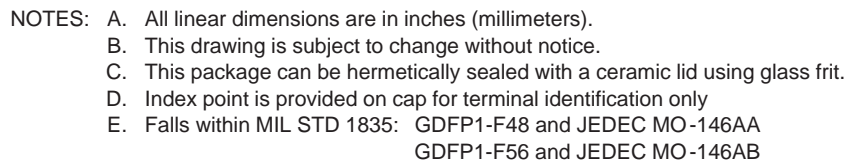


*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|-------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74ABT162601DGGR | TSSOP | DGG | 56 | 2000 | 367.0 | 367.0 | 45.0 |
| SN74ABT162601DLR | SSOP | DL | 56 | 1000 | 367.0 | 367.0 | 55.0 |

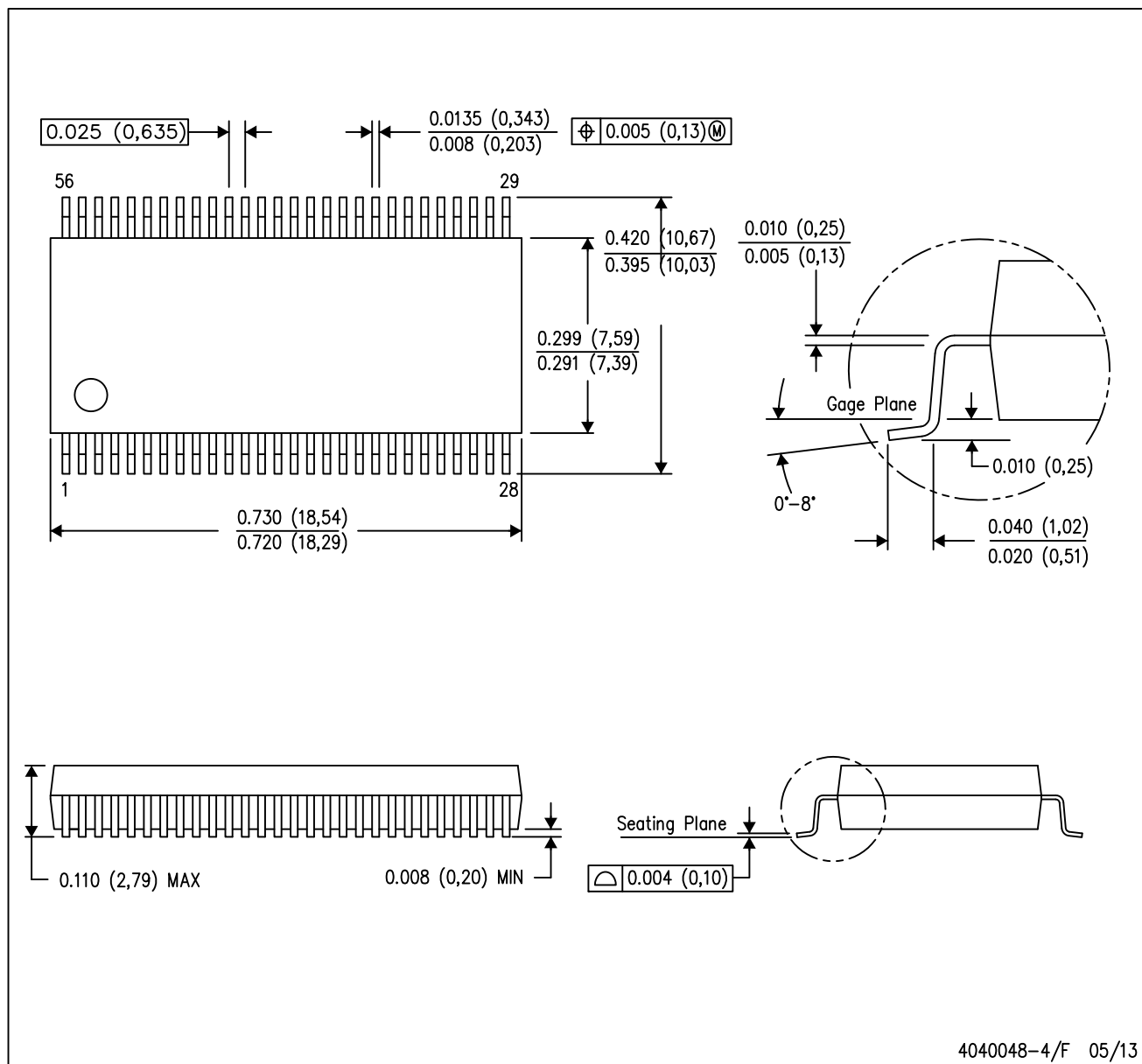
CERAMIC DUAL FLATPACK

48 LEADS SHOWN



DL (R-PDSO-G56)

PLASTIC SMALL-OUTLINE PACKAGE



- 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 MO-118

DGG (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

48 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 protrusion not to exceed 0,15.
 D. Falls within JEDEC MO-153

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