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Jameco Part Number 832739

SN54ALS157A, SN54ALS158 SN74ALS157A, SN74ALS158, SN74AS157, SN74AS158 QUADRUPLE 1-OF-2 DATA SELECTORS/MULTIPLEXERS

SDAS081C – APRIL 1982 – REVISED DECEMBER 1994

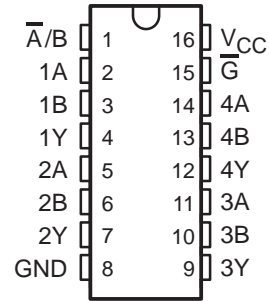
- Buffered Inputs and Outputs
- Package Options Include Plastic Small-Outline (D) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

description

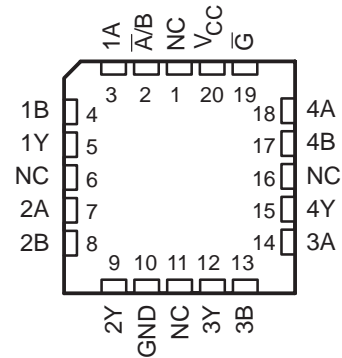
These data selectors/multiplexers contain inverters and drivers to supply full data selection to the four output gates. A separate strobe (\overline{G}) input is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The 'ALS157A and SN74AS157 present true data. The 'ALS158 and SN74AS158 present inverted data to minimize propagation delay time.

The SN54ALS157A and SN54ALS158 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS157A, SN74ALS158, SN74AS157, and SN74AS158 are characterized for operation from 0°C to 70°C .

SN54ALS157A, SN54ALS158 . . . J PACKAGE
SN74ALS157A, SN74ALS158,
SN74AS157, SN74AS158 . . . D OR N PACKAGE
(TOP VIEW)



SN54ALS157A, SN54ALS158 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

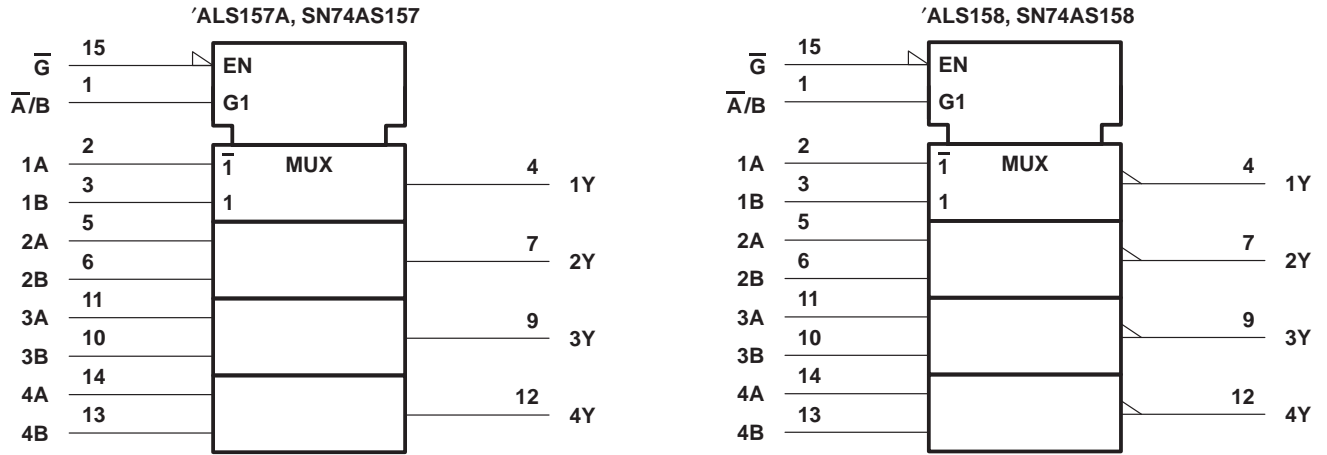
FUNCTION TABLE

| INPUTS | | OUTPUT Y | | | |
|----------------|------------------|----------|---|-----------------------|----------------------|
| \overline{G} | $\overline{A/B}$ | DATA | | 'ALS157A SN74AS157 | 'ALS158 SN74AS158 |
| | | A | B | | |
| H | X | X | X | L | H |
| L | L | L | X | L | H |
| L | L | H | X | H | L |
| L | H | X | L | L | H |
| L | H | X | H | H | L |

SN54ALS157A, SN54ALS158
SN74ALS157A, SN74ALS158, SN74AS157, SN74AS158
QUAD 1-OF-2 DATA SELECTORS/MULTIPLEXERS

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logic symbols†

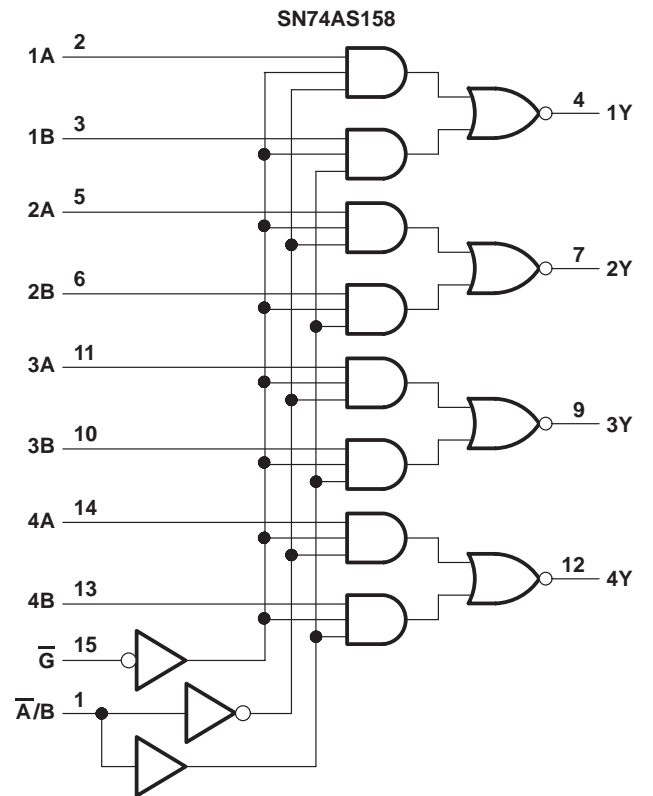
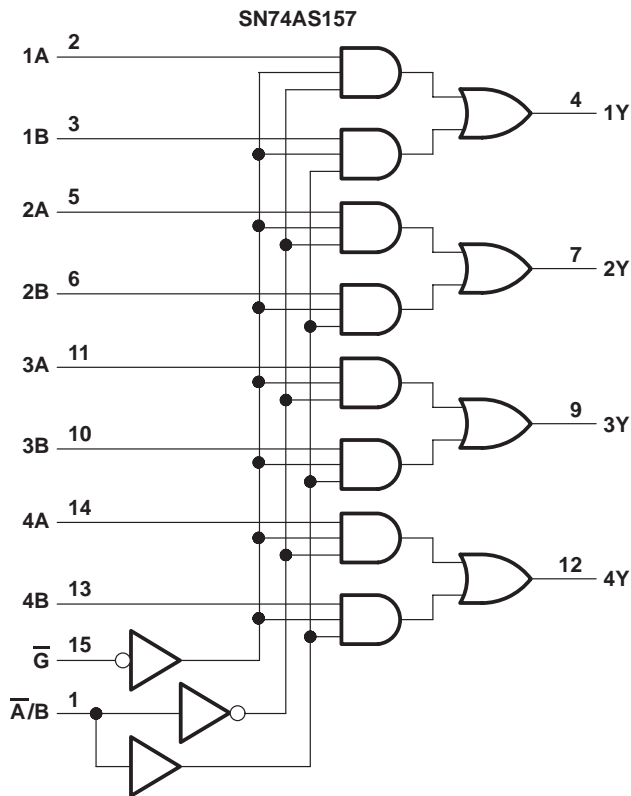
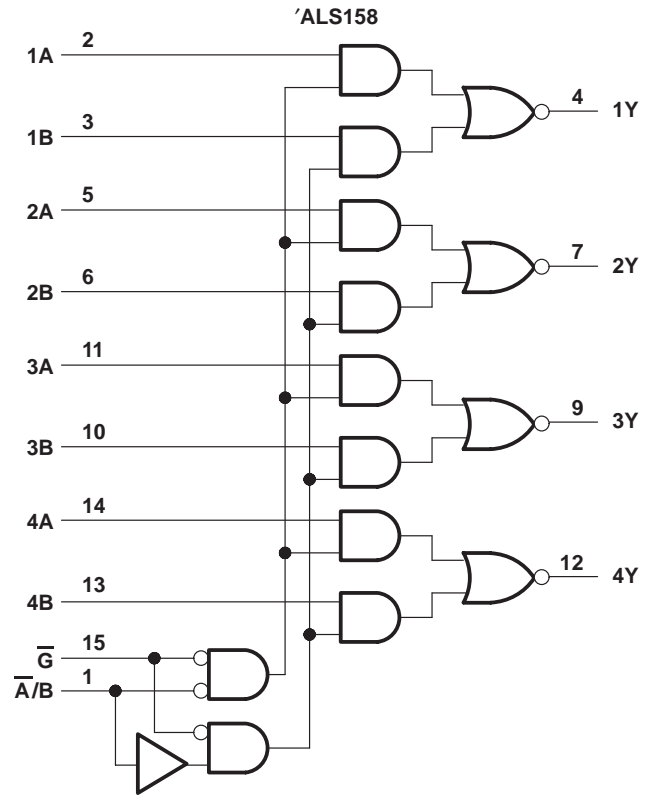
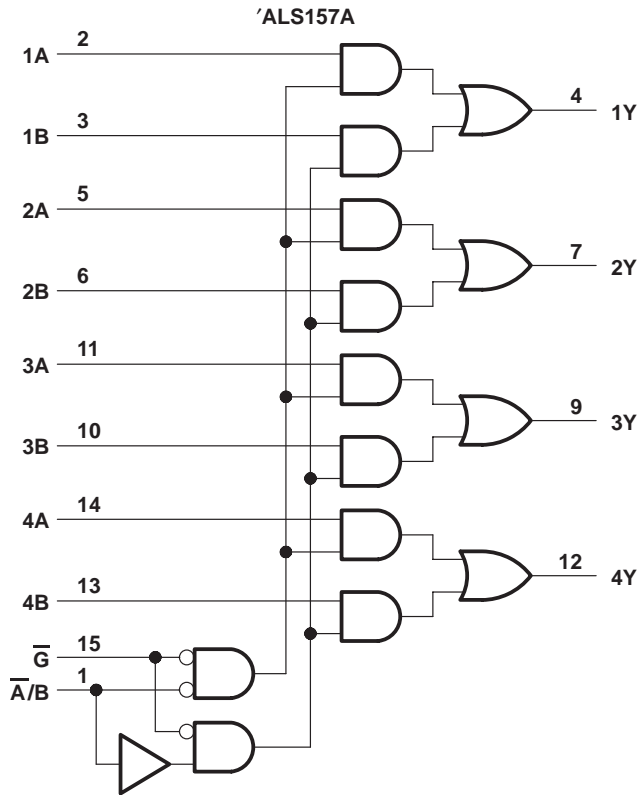


† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12. Pin numbers shown are for the D, J, and N packages.

SN54ALS157A, SN54ALS158
SN74ALS157A, SN74ALS158, SN74AS157, SN74AS158
QUAD 1-OF-2 DATA SELECTORS/MULTIPLEXERS

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logic diagrams (positive logic)



Pin numbers shown are for the D, J, and N packages.

SN54ALS157A, SN54ALS158
SN74ALS157A, SN74ALS158, SN74AS157, SN74AS158
QUAD 1-OF-2 DATA SELECTORS/MULTIPLEXERS

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

| | |
|---|----------------|
| Supply voltage, V_{CC} | 7 V |
| Input voltage, V_I | 7 V |
| Operating free-air temperature range, T_A : SN54ALS157A, SN54ALS158 | -55°C to 125°C |
| SN74ALS157A, SN74ALS158 | 0°C to 70°C |
| Storage temperature range | -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.

recommended operating conditions

| | | SN54ALS157A SN54ALS158 | | | SN74ALS157A SN74ALS158 | | | UNIT |
|----------|--------------------------------|---------------------------|-----|------|---------------------------|-----|------|------|
| | | MIN | NOM | MAX | MIN | NOM | MAX | |
| V_{CC} | Supply voltage | 4.5 | 5 | 5.5 | 4.5 | 5 | 5.5 | V |
| V_{IH} | High-level input voltage | 2 | | | 2 | | | V |
| V_{IL} | Low-level input voltage | | | 0.7 | | | 0.8 | V |
| I_{OH} | High-level output current | | | -0.4 | | | -0.4 | mA |
| I_{OL} | Low-level output current | | | 4 | | | 8 | mA |
| T_A | Operating free-air temperature | -55 | | 125 | 0 | | 70 | °C |

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

| PARAMETER | TEST CONDITIONS | SN54ALS157A SN54ALS158 | | | SN74ALS157A SN74ALS158 | | | UNIT |
|------------|---|----------------------------------|------|------|---------------------------|------|------|------|
| | | MIN | TYP‡ | MAX | MIN | TYP‡ | MAX | |
| V_{IK} | $V_{CC} = 4.5 V$, $I_I = -18 mA$ | | | -1.2 | | | -1.2 | V |
| V_{OH} | $V_{CC} = 4.5 V$ to $5.5 V$, $I_{OH} = -0.4 mA$ | $V_{CC} - 2$ | | | $V_{CC} - 2$ | | | V |
| V_{OL} | $V_{CC} = 4.5 V$ | | 0.25 | 0.4 | | 0.25 | 0.4 | V |
| | | $I_{OL} = 4 mA$ | | | | 0.35 | 0.5 | |
| I_I | $V_{CC} = 5.5 V$, $V_I = 7 V$ | | | 0.1 | | | 0.1 | mA |
| I_{IH} | $V_{CC} = 5.5 V$, $V_I = 2.7 V$ | | | 20 | | | 20 | μA |
| I_{IL} | $V_{CC} = 5.5 V$, $V_I = 0.4 V$ | | | -0.1 | | | -0.1 | mA |
| I_O^{\S} | $V_{CC} = 5.5 V$, $V_O = 2.25 V$ | -20 | | -112 | -30 | | -112 | mA |
| I_{CC} | 'ALS157A | $V_{CC} = 5.5 V$, See Note 1 | 6 | 11 | 6 | 11 | mA | |
| | 'ALS158 | | 5 | 10 | 5 | 10 | | |

‡ All typical values are at $V_{CC} = 5 V$, $T_A = 25^\circ C$.

§ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

NOTE 1: I_{CC} is measured with 4.5 V applied to all inputs and all outputs open.



SN54ALS157A, SN54ALS158
SN74ALS157A, SN74ALS158, SN74ALS157, SN74ALS158
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switching characteristics (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC} = 5\text{ V}$, $C_L = 50\text{ pF}$, $R_L = 500\ \Omega$, $T_A = 25^\circ\text{C}$ | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $C_L = 50\text{ pF}$, $R_L = 500\ \Omega$, $T_A = \text{MIN to MAX}^\dagger$ | | | | UNIT |
|-----------|--------------|-------------|--|---|-----|-------------|-----|------|
| | | | 'ALS157A | SN54ALS157A | | SN74ALS157A | | |
| | | | TYP | MIN | MAX | MIN | MAX | |
| t_{PLH} | A or B | Y | 9 | 4 | 17 | 4 | 14 | ns |
| t_{PHL} | | | 6 | 2 | 15 | 2 | 12 | |
| t_{PLH} | \bar{A}/B | Y | 15 | 7 | 28 | 7 | 24 | ns |
| t_{PHL} | | | 9 | 4 | 20 | 4 | 17 | |
| t_{PLH} | \bar{G} | Y | 14 | 7 | 25 | 7 | 20 | ns |
| t_{PHL} | | | 10 | 4 | 18 | 4 | 13 | |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

switching characteristics (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC} = 5\text{ V}$, $C_L = 50\text{ pF}$, $R_L = 500\ \Omega$, $T_A = 25^\circ\text{C}$ | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $C_L = 50\text{ pF}$, $R_L = 500\ \Omega$, $T_A = \text{MIN to MAX}^\dagger$ | | | | UNIT |
|-----------|--------------|-------------|--|---|-----|------------|-----|------|
| | | | 'ALS158 | SN54ALS158 | | SN74ALS158 | | |
| | | | TYP | MIN | MAX | MIN | MAX | |
| t_{PLH} | A or B | Y | 9 | 4 | 18 | 4 | 15 | ns |
| t_{PHL} | | | 5 | 2 | 12 | 2 | 8 | |
| t_{PLH} | \bar{A}/B | Y | 13 | 5 | 22 | 5 | 18 | ns |
| t_{PHL} | | | 13 | 5 | 22 | 5 | 18 | |
| t_{PLH} | \bar{G} | Y | 13 | 5 | 22 | 5 | 18 | ns |
| t_{PHL} | | | 13 | 5 | 22 | 5 | 18 | |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

SN54ALS157A, SN54ALS158
SN74ALS157A, SN74ALS158, SN74AS157, SN74AS158
QUAD 1-OF-2 DATA SELECTORS/MULTIPLEXERS

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

| | |
|--|----------------|
| Supply voltage, V_{CC} | 7 V |
| Input voltage, V_I | 7 V |
| Operating free-air temperature range, T_A : SN74AS157, SN74AS158 | 0°C to 70°C |
| Storage temperature range | -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.

recommended operating conditions

| | | SN74AS157 SN74AS158 | | | UNIT |
|----------|--------------------------------|------------------------|-----|-----|------|
| | | MIN | NOM | MAX | |
| V_{CC} | Supply voltage | 4.5 | 5 | 5.5 | V |
| V_{IH} | High-level input voltage | 2 | | | V |
| V_{IL} | Low-level input voltage | | | 0.8 | V |
| I_{OH} | High-level output current | | | -2 | mA |
| I_{OL} | Low-level output current | | | 20 | mA |
| T_A | Operating free-air temperature | 0 | | 70 | °C |

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

| PARAMETER | TEST CONDITIONS | SN74AS157 SN74AS158 | | | UNIT |
|-----------|--|-------------------------------|------|------|---------|
| | | MIN | TYP‡ | MAX | |
| V_{IK} | $V_{CC} = 4.5 V, I_I = -18 mA$ | | | -1.2 | V |
| V_{OH} | $V_{CC} = 4.5 V \text{ to } 5.5 V, I_{OH} = -2 mA$ | $V_{CC} - 2$ | | | V |
| V_{OL} | $V_{CC} = 4.5 V, I_{OL} = 20 mA$ | | 0.35 | 0.5 | V |
| I_I | \bar{A}/B | $V_{CC} = 5.5 V, V_I = 7 V$ | | 0.2 | mA |
| | A, B, or \bar{G} | | | 0.1 | |
| I_{IH} | \bar{A}/B | $V_{CC} = 5.5 V, V_I = 2.7 V$ | | 40 | μA |
| | A, B, or \bar{G} | | | 20 | |
| I_{IL} | \bar{A}/B | $V_{CC} = 5.5 V, V_I = 0.4 V$ | | -1 | mA |
| | A, B, or \bar{G} | | | -0.5 | |
| $I_{O\S}$ | $V_{CC} = 5.5 V, V_O = 2.25 V$ | -30 | | -112 | mA |
| I_{CC} | SN74AS157 | $V_{CC} = 5.5 V$ | | 17.5 | mA |
| | SN74AS158 | | | 15.6 | |

‡ All typical values are at $V_{CC} = 5 V, T_A = 25^\circ C$.

§ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .



SN54ALS157A, SN54ALS158
SN74ALS157A, SN74ALS158, SN74AS157, SN74AS158
QUAD 1-OF-2 DATA SELECTORS/MULTIPLEXERS

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switching characteristics (see Figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 500 Ω, T _A = MIN to MAX† | | UNIT |
|------------------|-----------------|----------------|---|------|------|
| | | | SN74AS157 | | |
| | | | MIN | MAX | |
| t _{PLH} | A or B | Y | 1 | 6 | ns |
| t _{PHL} | | | 1 | 5.5 | |
| t _{PLH} | \bar{A}/B | Y | 2 | 11 | ns |
| t _{PHL} | | | 2 | 10 | |
| t _{PLH} | \bar{G} | Y | 2 | 10.5 | ns |
| t _{PHL} | | | 2 | 7.5 | |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

switching characteristics (see Figure 1)

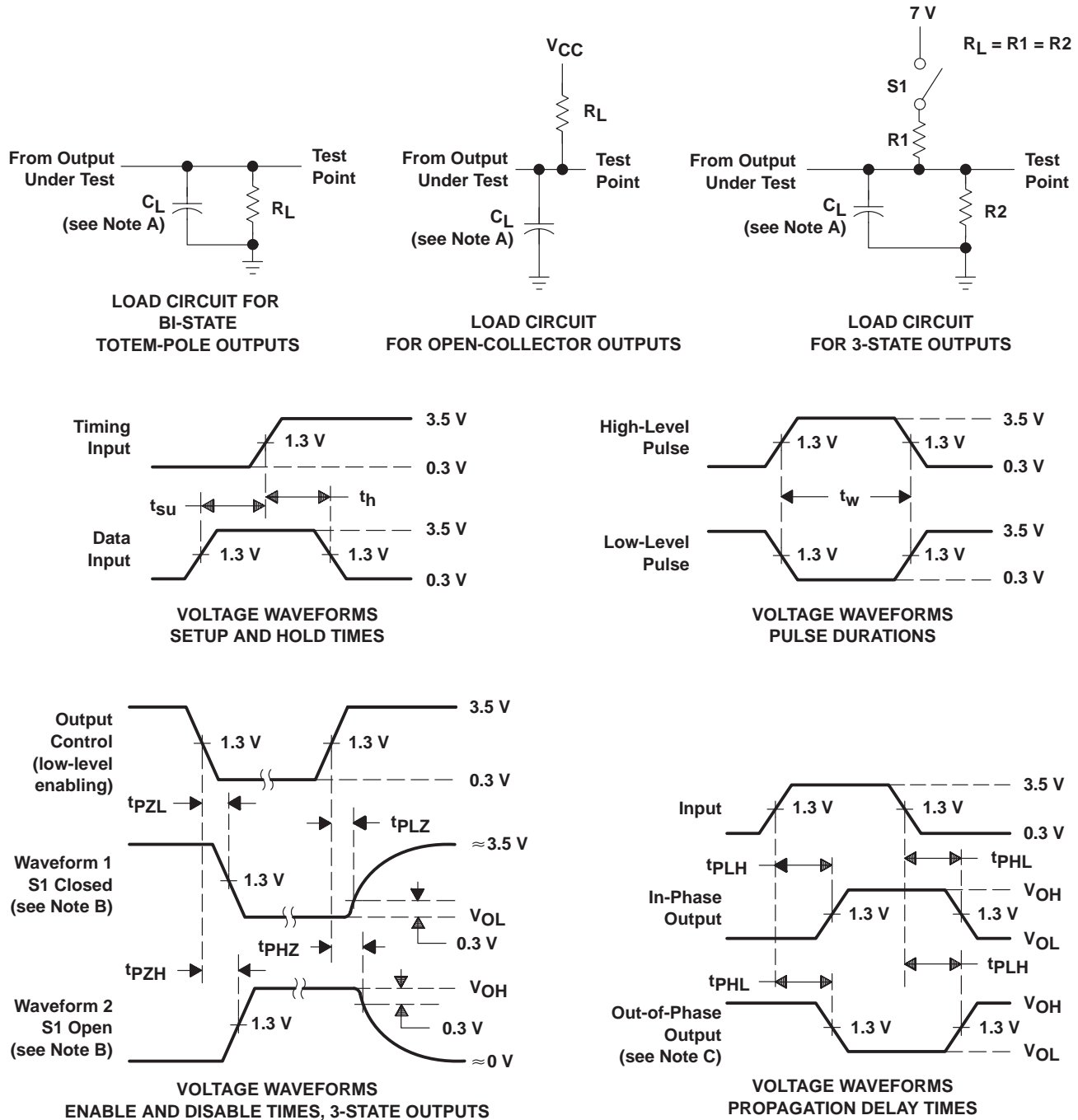
| PARAMETER | FROM (INPUT) | TO (OUTPUT) | V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 500 Ω, T _A = MIN to MAX† | | UNIT |
|------------------|-----------------|----------------|---|------|------|
| | | | SN74AS158 | | |
| | | | MIN | MAX | |
| t _{PLH} | A or B | Y | 1 | 5 | ns |
| t _{PHL} | | | 1 | 4.5 | |
| t _{PLH} | \bar{A}/B | Y | 2 | 9.5 | ns |
| t _{PHL} | | | 2 | 10.5 | |
| t _{PLH} | \bar{G} | Y | 2 | 6.5 | ns |
| t _{PHL} | | | 2 | 10 | |

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

SN54ALS157A, SN54ALS158
 SN74ALS157A, SN74ALS158, SN74AS157, SN74AS158
 QUAD 1-OF-2 DATA SELECTORS/MULTIPLEXERS

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PARAMETER MEASUREMENT INFORMATION
 SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- 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. When measuring propagation delay items of 3-state outputs, switch S1 is open.
 D. All input pulses have the following characteristics: PRR \leq 1 MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.
 E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits 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⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-86869012A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| 5962-8686901EA | ACTIVE | CDIP | J | 16 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| 5962-8686901FA | ACTIVE | CFP | W | 16 | 1 | TBD | A42 | N / A for Pkg Type |
| 5962-88625012A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| 5962-8862501EA | ACTIVE | CDIP | J | 16 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| 5962-8862501FA | ACTIVE | CFP | W | 16 | 1 | TBD | A42 | N / A for Pkg Type |
| SN54ALS157AJ | ACTIVE | CDIP | J | 16 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| SN54ALS158J | ACTIVE | CDIP | J | 16 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| SN74ALS157AD | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS157ADE4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS157ADR | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS157ADRE4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS157AN | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74ALS157AN3 | OBSOLETE | PDIP | N | 16 | | TBD | Call TI | Call TI |
| SN74ALS157ANE4 | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74ALS157ANSR | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS157ANSRE4 | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS158D | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS158DE4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS158DR | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS158DRE4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS158N | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74ALS158NE4 | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74ALS158NSR | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74ALS158NSRE4 | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS157D | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS157DE4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS157DR | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS157DRE4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| | | | | | | no Sb/Br) | | |
| SN74AS157N | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74AS157N3 | OBSOLETE | PDIP | N | 16 | | TBD | Call TI | Call TI |
| SN74AS157NE4 | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74AS157NSR | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS157NSRE4 | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS158D | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS158DE4 | ACTIVE | SOIC | D | 16 | 40 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS158DR | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS158DRE4 | ACTIVE | SOIC | D | 16 | 2500 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS158N | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74AS158NE4 | ACTIVE | PDIP | N | 16 | 25 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74AS158NSR | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74AS158NSRE4 | ACTIVE | SO | NS | 16 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SNJ54ALS157AFK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| SNJ54ALS157AJ | ACTIVE | CDIP | J | 16 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| SNJ54ALS157AW | ACTIVE | CFP | W | 16 | 1 | TBD | A42 | N / A for Pkg Type |
| SNJ54ALS158FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| SNJ54ALS158J | ACTIVE | CDIP | J | 16 | 1 | TBD | A42 SNPB | N / A for Pkg Type |
| SNJ54ALS158W | ACTIVE | CFP | W | 16 | 1 | TBD | A42 | N / A for Pkg Type |

⁽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.

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J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



| DIM \ PINS ** | 14 | 16 | 18 | 20 |
|---------------|------------------------|------------------------|------------------------|------------------------|
| A | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC |
| B MAX | 0.785 (19,94) | .840 (21,34) | 0.960 (24,38) | 1.060 (26,92) |
| B MIN | — | — | — | — |
| C MAX | 0.300 (7,62) | 0.300 (7,62) | 0.310 (7,87) | 0.300 (7,62) |
| C MIN | 0.245 (6,22) | 0.245 (6,22) | 0.220 (5,59) | 0.245 (6,22) |



4040083/F 03/03

- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package is hermetically sealed with a ceramic lid using glass frit.
 - Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
 - Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

W (R-GDFP-F16)

CERAMIC DUAL FLATPACK



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only.
 - E. Falls within MIL STD 1835 GDFP1-F16 and JEDEC MO-092AC

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a metal lid.
 - D. The terminals are gold plated.
 - E. Falls within JEDEC MS-004

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

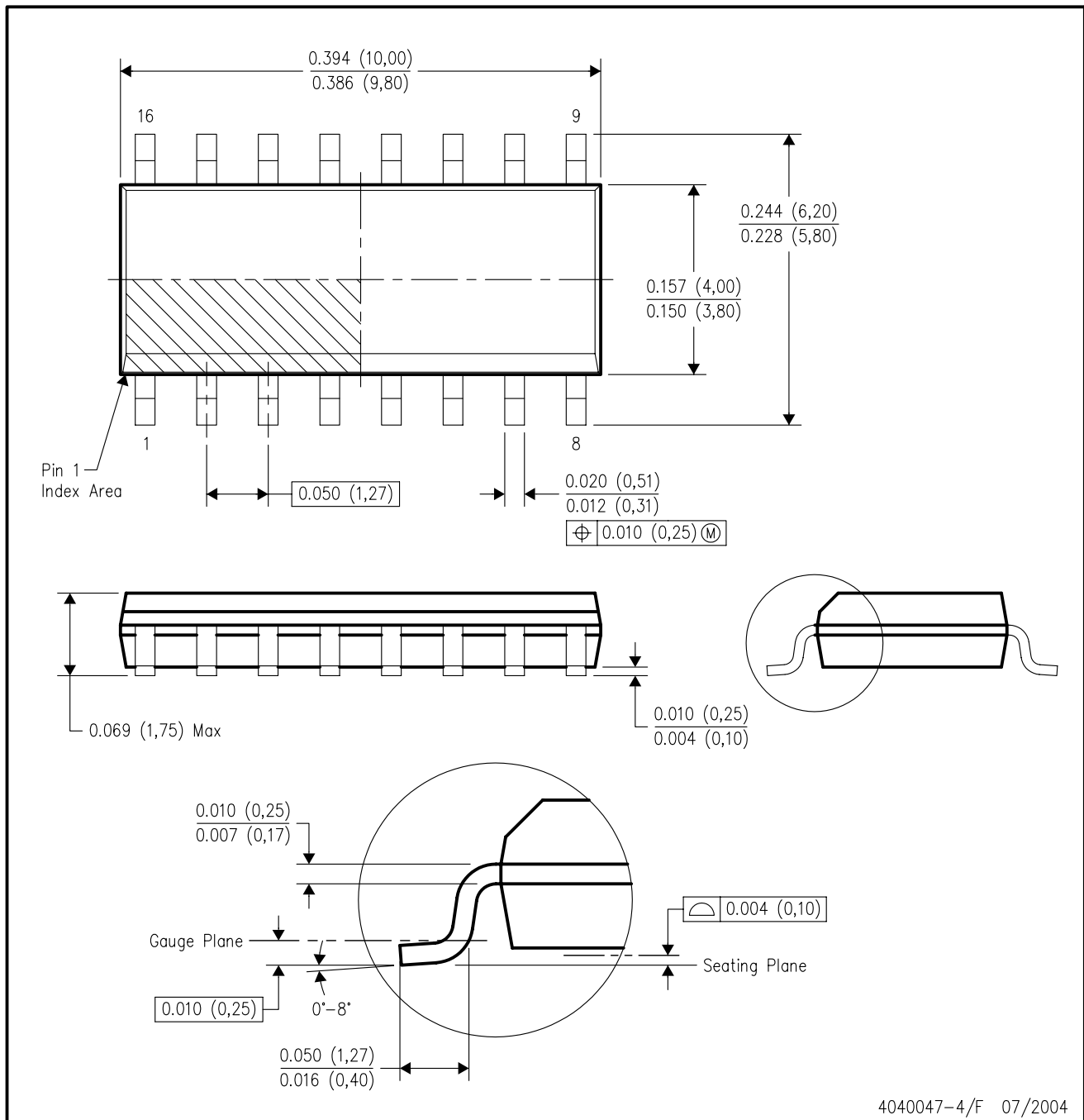
16 PINS SHOWN



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - The 20 pin end lead shoulder width is a vendor option, either half or full width.

D (R-PDSO-G16)

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 MS-012 variation AC.

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