

SNx4AHC157 Quadruple 2-Line To 1-Line Data Selectors/Multiplexers

1 Features

- Operating range 2V to 5.5V
- Latch-up performance exceeds 250mA per JESD 17
- ESD Protection Exceeds JESD 22:
 - 2000V Human-Body Model (A114-A)
 - 200V Machine Model (A115-A)
 - 1000V Charged-Device Model (C101)

2 Description

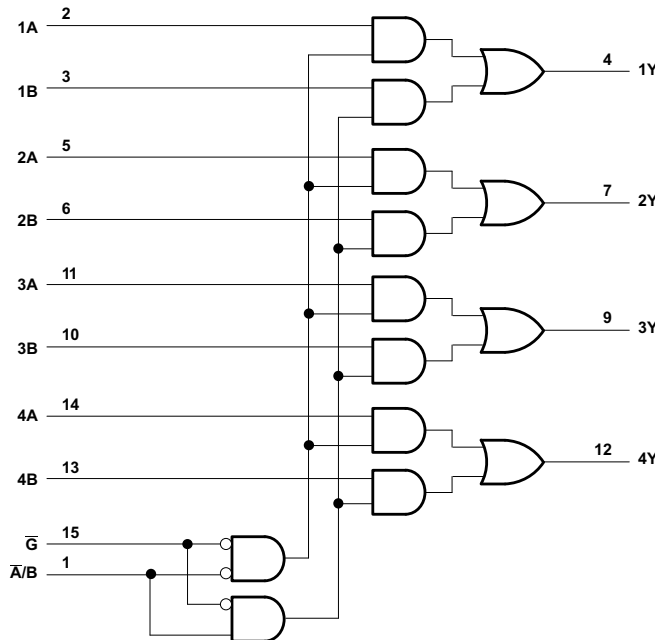
These quadruple 2-line to 1-line data selectors/multiplexers are designed for 2V to 5.5V V_{CC} operation.

The SNx4AHC157 devices feature a common strobe (\bar{G}) input. When the strobe is high, all outputs are low. When the strobe is low, a 4-bit word is selected from one of two sources and is routed to the four outputs. The devices provide true data.

Device Information

| PART NUMBER | PACKAGE ⁽¹⁾ | PACKAGE SIZE ⁽²⁾ | BODY SIZE ⁽³⁾ |
|-------------|------------------------|-----------------------------|--------------------------|
| SNx4AHC157 | D (SOIC, 16) | 9.90mm × 6mm | 9.90mm × 3.90mm |
| | DB (SSOP, 16) | 6.20mm × 7.8mm | 6.20mm × 5.30mm |
| | N (PDIP, 16) | 19.31mm × 9.4mm | 19.31mm × 6.35mm |
| | NS (SOP, 16) | 5mm × 6.4mm | 5mm × 4.4mm |
| | PW (TSSOP, 16) | 5.00mm × 6.4mm | 5.00mm × 4.40mm |
| | DGV (TVSOP, 16) | 3.6mm × 6.4mm | 3.6mm × 4.4mm |
| | RGY (VQFN, 16) | 4mm × 3.5mm | 4mm × 3.5mm |

- (1) For more information, see [Section 10](#).
- (2) The package size (length × width) is a nominal value and includes pins, where applicable.
- (3) The body size (length × width) is a nominal value and does not include pins.



Pin numbers shown are for the D, DB, DGV, J, N, NS, PW, RGY, and W packages.

Logic Diagram (Positive Logic)



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3 Pin Configuration and Functions

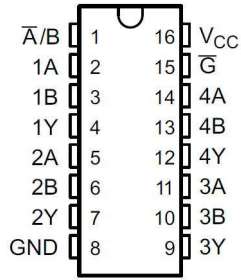


Figure 3-1. SN54AHC157 J or W Package, SN74AHC157 D, DB, DGV, N, NS, or, PW Package (Top View)

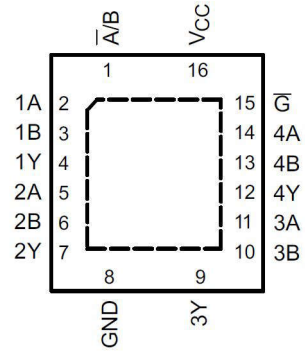
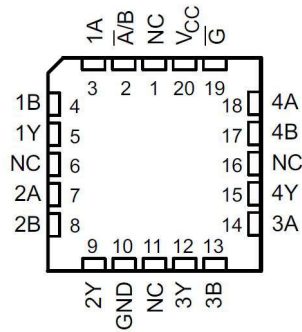


Figure 3-2. SN74AHC157 RGY Package, (Top View)



NC – No internal connection

Figure 3-3. SN54AHC157 FK Package, (Top View)

Table 3-1. Pin Functions

| PIN | | TYPE ⁽¹⁾ | DESCRIPTION |
|----------------------------|-----|---------------------|---|
| NAME | NO. | | |
| \bar{A}/B | 1 | I | Address select |
| 1A | 2 | I | Channel 1, data input A |
| 1B | 3 | I | Channel 1, data input B |
| 1Y | 4 | O | Channel 1, data output |
| 2A | 5 | I | Channel 2, data input A |
| 2B | 6 | I | Channel 2, data input B |
| 2Y | 7 | O | Channel 2, data output |
| GND | 8 | G | Ground |
| 3Y | 9 | O | Channel 3, data output |
| 3B | 10 | I | Channel 3, data input B |
| 3A | 11 | I | Channel 3, data input A |
| 4Y | 12 | O | Channel 4, data output |
| 4B | 13 | I | Channel 4, data input B |
| 4A | 14 | I | Channel 4, data input A |
| \bar{G} | 15 | I | Output strobe, active low |
| V _{CC} | 16 | P | Positive supply |
| Thermal pad ⁽²⁾ | | — | The thermal pad can be connected to GND or left floating. Do not connect to any other signal or supply. |

(1) Signal Types: I = Input, O = Output, I/O = Input or Output, P = Power, G = Ground.

(2) WBQB package only.

4 Specifications

4.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

| | | MIN | MAX | UNIT | |
|----------------------|--|--------------------------------------|----------------|----------|----|
| V_{CC} | Supply voltage range | -0.5 | 7 | V | |
| V_I ⁽²⁾ | Input voltage range | -0.5 | 7 | V | |
| V_O ⁽²⁾ | Output voltage range | -0.5 | $V_{CC} + 0.5$ | V | |
| I_{IK} | Input clamp current | $(V_I < 0)$ | | -20 | mA |
| I_{OK} | Output clamp current | $(V_O < 0 \text{ or } V_O > V_{CC})$ | | ± 20 | mA |
| I_O | Continuous output current | $(V_O = 0 \text{ to } V_{CC})$ | | ± 25 | mA |
| | Continuous current through V_{CC} or GND | | | ± 50 | mA |
| T_{stg} | Storage temperature range | -65 | 150 | °C | |

- (1) 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.
- (2) The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

4.2 ESD Ratings

| | | VALUE | UNIT | |
|-------------|-------------------------|---|------------|---|
| $V_{(ESD)}$ | Electrostatic discharge | Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001 | ± 2000 | V |
| | | Charged device model (CDM), per JEDEC specification JESD22-C101 | ± 1000 | |

4.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

| | | SN54AHC157 | | SN74AHC157 | | UNIT |
|---------------------|------------------------------------|--|----------|------------|----------|---------------|
| | | MIN | MAX | MIN | MAX | |
| V_{CC} | Supply voltage | 2 | 5.5 | 2 | 5.5 | V |
| V_{IH} | High-level input voltage | $V_{CC} = 2 \text{ V}$ | | 1.5 | | V |
| | | $V_{CC} = 3 \text{ V}$ | | 2.1 | | |
| | | $V_{CC} = 5.5 \text{ V}$ | | 3.85 | | |
| V_{IL} | Low-level Input voltage | $V_{CC} = 2 \text{ V}$ | | 0.5 | | V |
| | | $V_{CC} = 3 \text{ V}$ | | 0.9 | | |
| | | $V_{CC} = 5.5 \text{ V}$ | | 1.65 | | |
| V_I | Input voltage | 0 | 5.5 | 0 | 5.5 | V |
| V_O | Output voltage | 0 | V_{CC} | 0 | V_{CC} | V |
| I_{OH} | High-level output current | $V_{CC} = 2 \text{ V}$ | | -0.05 | | μA |
| | | $V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$ | | -4 | | |
| | | $V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$ | | -8 | | |
| I_{OL} | Low-level output current | $V_{CC} = 2 \text{ V}$ | | 0.05 | | μA |
| | | $V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$ | | 4 | | |
| | | $V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$ | | 8 | | |
| $\Delta t/\Delta v$ | Input Transition rise or fall rate | $V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$ | | 100 | | ns/V |
| | | $V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$ | | 20 | | |
| T_A | Operating free-air temperature | -55 | 125 | -40 | 125 | °C |

- (1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number [SCBA004](#).

4.4 Thermal Information

| THERMAL METRIC ⁽¹⁾ | | SNx4AHC157 | | | | | | | UNIT |
|-------------------------------|--|------------|----|-----|----|----|-------|------|------|
| | | D | DB | DGV | N | NS | PW | RGY | |
| | | 16 | | | | | | | |
| R _{θJA} | Junction-to-ambient thermal resistance | 93.8 | 82 | 120 | 67 | 64 | 135.9 | 52.9 | °C/W |

(1) For more information about traditional and new thermal metrics, see the [Semiconductor and IC package thermal metrics](#) application report.

4.5 Electrical Characteristics

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

| PARAMETER | TEST CONDITIONS | V _{CC} | T _A = 25°C | | | T _A = -55°C TO 125°C | | T _A = -40°C TO 85°C | | T _A = -40°C TO 125°C | | UNIT |
|-----------------|---|-----------------|-----------------------|-----|------|---------------------------------|-------------------|--------------------------------|------|---------------------------------|-----|------|
| | | | | | | SN54AHC157 | | SN74AHC157 | | Recommended | | |
| | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| V _{OH} | I _{OH} = -50 μA | 2 V | 1.9 | 2 | 1.9 | | 1.9 | | 1.9 | | V | |
| | | 3 V | 2.9 | 3 | 2.9 | | 2.9 | | 2.9 | | | |
| | | 4.5 V | 4.4 | 4.5 | 4.4 | | 4.4 | | 4.4 | | | |
| | I _{OH} = -4 mA | 3 V | 2.58 | | 2.48 | | 2.48 | | 2.48 | | | |
| | I _{OH} = -8 mA | 4.5 V | 3.94 | | 3.8 | | 3.8 | | 3.8 | | | |
| V _{OL} | I _{OL} = 50 μA | 2 V | | | 0.1 | | 0.1 | | 0.1 | | V | |
| | | 3 V | | | 0.1 | | 0.1 | | 0.1 | | | |
| | | 4.5 V | | | 0.1 | | 0.1 | | 0.1 | | | |
| | I _{OH} = 4 mA | 3 V | | | 0.36 | | 0.5 | | 0.44 | | | |
| | I _{OH} = 8 mA | 4.5 V | | | 0.36 | | 0.5 | | 0.44 | | | |
| I _I | V _I = 5.5 V or GND | 0 V to 5.5 V | | | ±0.1 | | ±1 ⁽¹⁾ | | ±1 | | μA | |
| I _{CC} | V _I = V _{CC} or GND, I _O = 0 | 5.5 V | | | 4 | | 40 | | 40 | | μA | |
| C _i | V _I = V _{CC} or GND | 5 V | | | 2 | 10 | | 10 | | | pF | |

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested at V_{CC} = 0 V.

4.6 Switching Characteristics, V_{CC} = 3.3V ± 0.3V

over recommended operating free-air temperature range, V_{CC} = 3.3V ± 0.3V (unless otherwise noted) (see [Load Circuit And Voltage Waveforms](#))

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | LOAD CAPACITANCE | T _A = 25°C | | T _A = -55°C TO 125°C | | T _A = -40°C TO 85°C | | T _A = -40°C TO 125°C | | UNIT |
|------------------|--------------|-------------|-----------------------|-----------------------|---------------------|---------------------------------|---------------------|--------------------------------|------|---------------------------------|------|------|
| | | | | | | SN54AHC157 | | SN74AHC157 | | Recommended | | |
| | | | | TYP | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| t _{PLH} | A or B | Y | C _L = 15pF | 6.2 ⁽¹⁾ | 9.7 ⁽¹⁾ | 1 ⁽¹⁾ | 11.5 ⁽¹⁾ | 1 | 11.5 | 1 | 11.5 | ns |
| t _{PHL} | | | | 6.2 ⁽¹⁾ | 9.7 ⁽¹⁾ | 1 ⁽¹⁾ | 11.5 ⁽¹⁾ | 1 | 11.5 | 1 | 11.5 | |
| t _{PLH} | A̅ / B̅ | Y | C _L = 15pF | 8.4 ⁽¹⁾ | 13.2 ⁽¹⁾ | 1 ⁽¹⁾ | 15.5 ⁽¹⁾ | 1 | 15.5 | 1 | 15.5 | ns |
| t _{PHL} | | | | 8.4 ⁽¹⁾ | 13.2 ⁽¹⁾ | 1 ⁽¹⁾ | 15.5 ⁽¹⁾ | 1 | 15.5 | 1 | 15.5 | |
| t _{PLH} | G̅ | Y | C _L = 15pF | 8.7 ⁽¹⁾ | 13.6 ⁽¹⁾ | 1 ⁽¹⁾ | 16 ⁽¹⁾ | 1 | 16 | 1 | 16 | ns |
| t _{PHL} | | | | 8.7 ⁽¹⁾ | 13.6 ⁽¹⁾ | 1 ⁽¹⁾ | 16 ⁽¹⁾ | 1 | 16 | 1 | 16 | |
| t _{PLH} | A or B | Y | C _L = 50pF | 8.7 | 13.2 | 1 | 15 | 1 | 15 | 1 | 15 | ns |
| t _{PHL} | | | | 8.7 | 13.2 | 1 | 15 | 1 | 15 | 1 | 15 | |
| t _{PLH} | A̅ / B̅ | Y | C _L = 50pF | 10.9 | 16.7 | 1 | 19 | 1 | 19 | 1 | 19 | ns |
| t _{PHL} | | | | 10.9 | 16.7 | 1 | 19 | 1 | 19 | 1 | 19 | |

over recommended operating free-air temperature range, $V_{CC} = 3.3V \pm 0.3V$ (unless otherwise noted) (see [Load Circuit And Voltage Waveforms](#))

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | LOAD CAPACITANCE | $T_A = 25^\circ\text{C}$ | | $T_A = -55^\circ\text{C TO } 125^\circ\text{C}$ | | $T_A = -40^\circ\text{C TO } 85^\circ\text{C}$ | | $T_A = -40^\circ\text{C TO } 125^\circ\text{C}$ | | UNIT |
|-----------|--------------|-------------|---------------------|--------------------------|------|---|------|--|------|---|------|------|
| | | | | | | SN54AHC157 | | SN74AHC157 | | SN74AHC157 | | |
| | | | | TYP | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| t_{PLH} | \bar{G} | Y | $C_L = 50\text{pF}$ | 11.2 | 17.1 | 1 | 19.5 | 1 | 19.5 | 1 | 19.5 | ns |
| t_{PHL} | | | | 11.2 | 17.1 | 1 | 19.5 | 1 | 19.5 | 1 | 19.5 | |

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

4.7 Switching Characteristics, $V_{CC} = 5V \pm 0.5V$

over recommended operating free-air temperature range, $V_{CC} = 5V \pm 0.5V$ (unless otherwise noted) (see [Load Circuit And Voltage Waveforms](#))

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | LOAD CAPACITANCE | $T_A = 25^\circ\text{C}$ | | $T_A = -55^\circ\text{C TO } 125^\circ\text{C}$ | | $T_A = -40^\circ\text{C TO } 85^\circ\text{C}$ | | $T_A = -40^\circ\text{C TO } 125^\circ\text{C}$ | | UNIT |
|-----------|-------------------|-------------|---------------------|--------------------------|---------------------|---|---------------------|--|------|---|------|------|
| | | | | | | SN54AHC157 | | SN74AHC157 | | SN74AHC157 | | |
| | | | | TYP | MAX | MIN | MAX | MIN | MAX | MIN | MAX | |
| t_{PLH} | A or B | Y | $C_L = 15\text{pF}$ | 4.1 ⁽¹⁾ | 6.4 ⁽¹⁾ | 1 ⁽¹⁾ | 7.5 ⁽¹⁾ | 1 | 7.5 | 1 | 7.5 | ns |
| t_{PHL} | | | | 4.1 ⁽¹⁾ | 6.4 ⁽¹⁾ | 1 ⁽¹⁾ | 7.5 ⁽¹⁾ | 1 | 7.5 | 1 | 7.5 | |
| t_{PLH} | \bar{A}/\bar{B} | Y | $C_L = 15\text{pF}$ | 5.3 ⁽¹⁾ | 8.1 ⁽¹⁾ | 1 ⁽¹⁾ | 9.5 ⁽¹⁾ | 1 | 9.5 | 1 | 9.5 | ns |
| t_{PHL} | | | | 5.3 ⁽¹⁾ | 8.1 ⁽¹⁾ | 1 ⁽¹⁾ | 9.5 ⁽¹⁾ | 1 | 9.5 | 1 | 9.5 | |
| t_{PLH} | \bar{G} | Y | $C_L = 15\text{pF}$ | 5.6 ⁽¹⁾ | 8.6 ⁽¹⁾ | 1 ⁽¹⁾ | 10 ⁽¹⁾ | 1 | 10 | 1 | 10 | ns |
| t_{PHL} | | | | 5.6 ⁽¹⁾ | 8.6 ⁽¹⁾ | 1 ⁽¹⁾ | 10 ⁽¹⁾ | 1 | 10 | 1 | 10 | |
| t_{PLH} | A or B | Y | $C_L = 50\text{pF}$ | 5.6 ⁽¹⁾ | 8.4 ⁽¹⁾ | 1 ⁽¹⁾ | 9.5 ⁽¹⁾ | 1 | 9.5 | 1 | 9.5 | ns |
| t_{PHL} | | | | 5.6 ⁽¹⁾ | 8.4 ⁽¹⁾ | 1 ⁽¹⁾ | 9.5 ⁽¹⁾ | 1 | 9.5 | 1 | 9.5 | |
| t_{PLH} | \bar{A}/\bar{B} | Y | $C_L = 50\text{pF}$ | 6.8 ⁽¹⁾ | 10.1 ⁽¹⁾ | 1 ⁽¹⁾ | 11.5 ⁽¹⁾ | 1 | 11.5 | 1 | 11.5 | ns |
| t_{PHL} | | | | 6.8 ⁽¹⁾ | 10.1 ⁽¹⁾ | 1 ⁽¹⁾ | 11.5 ⁽¹⁾ | 1 | 11.5 | 1 | 11.5 | |
| t_{PLH} | \bar{G} | Y | $C_L = 50\text{pF}$ | 7.1 ⁽¹⁾ | 10.6 ⁽¹⁾ | 1 ⁽¹⁾ | 12 ⁽¹⁾ | 1 | 12 | 1 | 12 | ns |
| t_{PHL} | | | | 7.1 ⁽¹⁾ | 10.6 ⁽¹⁾ | 1 ⁽¹⁾ | 12 ⁽¹⁾ | 1 | 12 | 1 | 12 | |

4.8 Noise Characteristics

$V_{CC} = 5V$, $C_L = 50\text{pF}$, $T_A = 25^\circ\text{C}$ ⁽¹⁾

| PARAMETER | | SN74AHC157 | | | UNIT |
|-------------|--|------------|------|-----|------|
| | | MIN | TYP | MAX | |
| $V_{OL(P)}$ | Quiet output, maximum dynamic V_{OL} | | 0.8 | | V |
| $V_{OL(V)}$ | Quiet output, minimum dynamic V_{OL} | | -0.8 | | V |
| $V_{OH(V)}$ | Quiet output, minimum dynamic V_{OH} | | 4.8 | | V |
| $V_{IH(D)}$ | High-level dynamic input voltage | | 3.5 | | V |
| $V_{IL(D)}$ | Low-level dynamic input voltage | | | 1.5 | V |

(1) Characteristics are for surface-mount packages only.

4.9 Operating Characteristics

$V_{CC} = 5V$, $T_A = 25^\circ\text{C}$

| PARAMETER | TEST CONDITIONS | TYP | UNIT |
|-----------|-------------------------------|-----|------|
| C_{pd} | Power dissipation capacitance | 11 | pF |

4.10 Typical Characteristics

$T_A = 25^\circ\text{C}$ (unless otherwise noted)

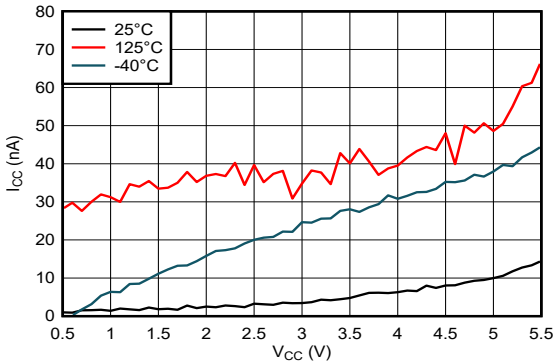


Figure 4-1. Supply Current Across Supply Voltage

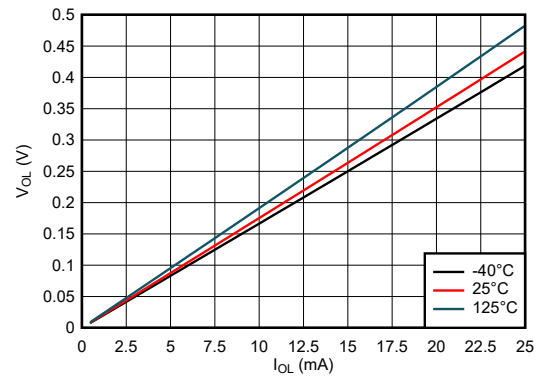


Figure 4-2. Output Voltage vs Current in LOW State; 5V Supply

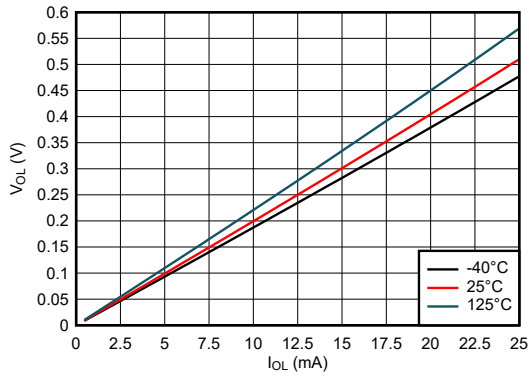


Figure 4-3. Output Voltage vs Current in LOW State; 3.3V Supply

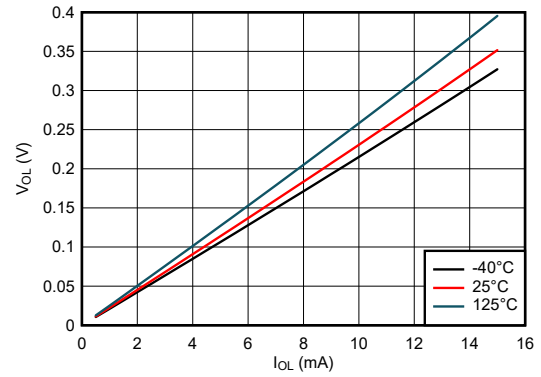
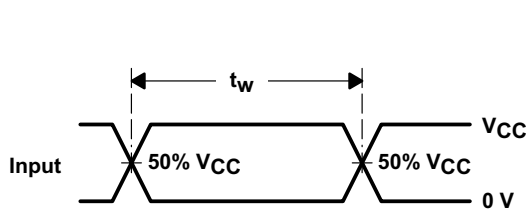
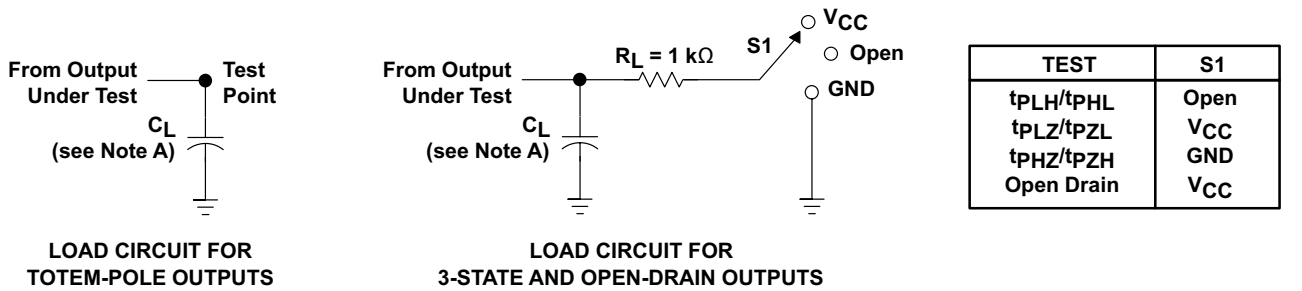
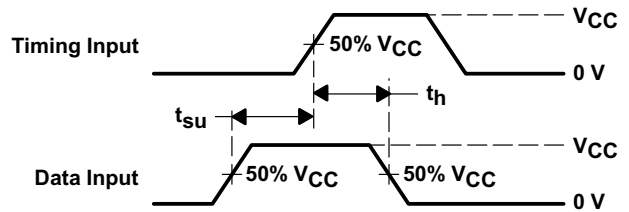


Figure 4-4. Output Voltage vs Current in LOW State; 2.5V Supply

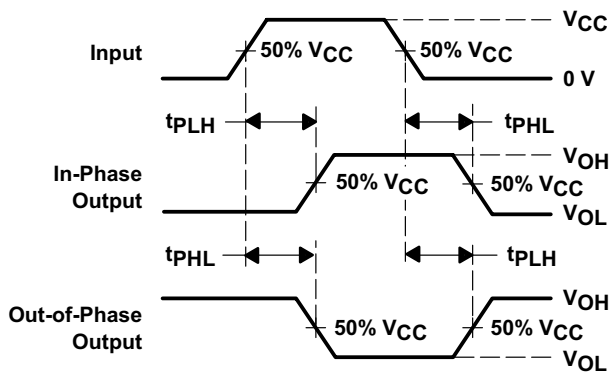
5 Parameter Measurement Information



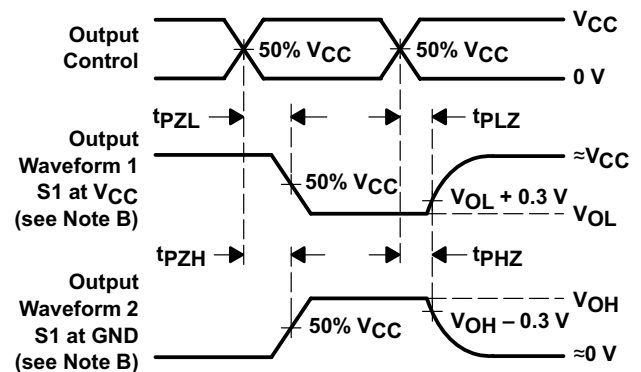
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS



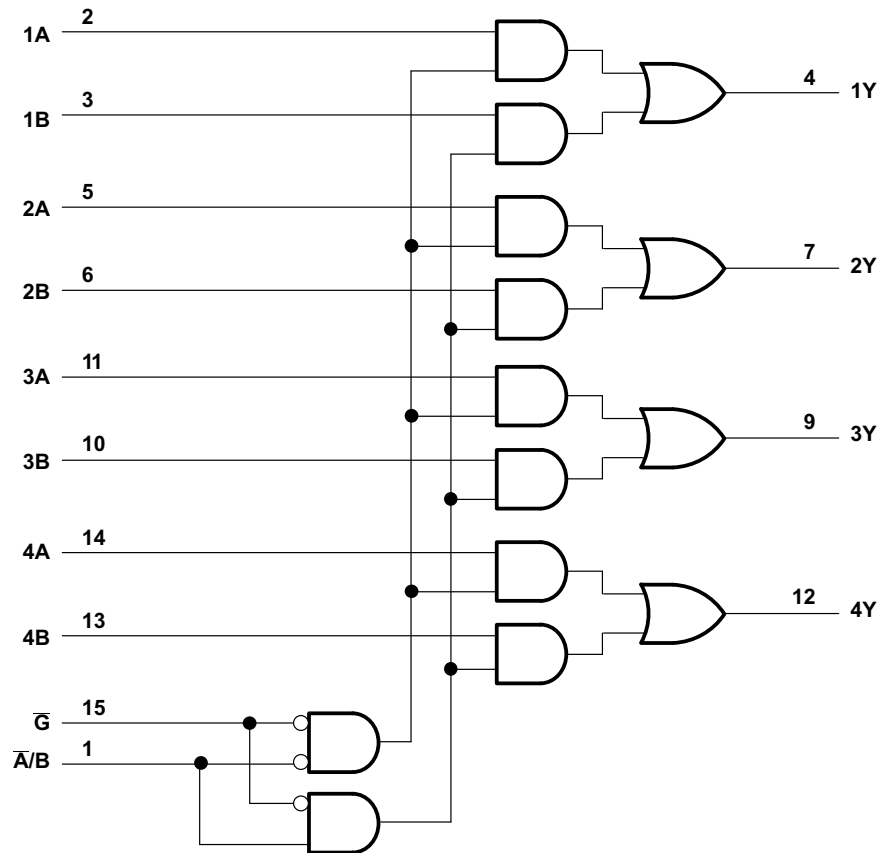
VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

- C_L includes probe and jig capacitance.
- 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.
- All input pulses are supplied by generators having the following characteristics: $PRR \leq 1\text{ MHz}$, $Z_O = 50\ \Omega$, $t_r \leq 3\text{ ns}$, $t_f \leq 3\text{ ns}$.
- The outputs are measured one at a time with one input transition per measurement.
- All parameters and waveforms are not applicable to all devices.

Figure 5-1. Load Circuit And Voltage Waveforms

6 Detailed Description

6.1 Functional Block Diagram



Pin numbers shown are for the D, DB, DGV, J, N, NS, PW, RGY, and W packages.

Figure 6-1. Logic Diagram (Positive Logic)

6.2 Device Functional Modes

Table 6-1. Function Table

| INPUTS | | | | OUTPUT |
|-----------|-------------|---|---|--------|
| \bar{G} | \bar{A}/B | A | B | Y |
| H | X | X | X | L |
| L | L | L | X | L |
| L | L | H | X | H |
| L | H | X | L | L |
| L | H | X | H | H |

7 Application and Implementation

Note

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes, as well as validating and testing their design implementation to confirm system functionality.

7.1 Power Supply Recommendations

The power supply can be any voltage between the MIN and MAX supply voltage rating located in the [Section 4.3](#) table.

Each V_{CC} pin should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, 0.1 μ F is recommended; if there are multiple V_{CC} pins, then 0.01 μ F or 0.022 μ F is recommended for each power pin. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. A 0.1 μ F and a 1 μ F are commonly used in parallel. The bypass capacitor should be installed as close to the power pin as possible for best results.

7.2 Layout

7.2.1 Layout Guidelines

When using multiple bit logic devices, inputs should not float. In many cases, functions or parts of functions of digital logic devices are unused. Some examples are when only two inputs of a triple-input AND gate are used, or when only 3 of the 4-buffer gates are used. Such input pins should not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. Specified in Layout Diagram are rules that must be observed under all circumstances. All unused inputs of digital logic devices must be connected to a high or low bias to prevent them from floating. The logic level that should be applied to any particular unused input depends on the function of the device. Generally they will be tied to GND or V_{CC} , whichever makes more sense or is more convenient. It is acceptable to float outputs unless the part is a transceiver. If the transceiver has an output enable pin, it will disable the outputs section of the part when asserted. This will not disable the input section of the I/Os so they also cannot float when disabled.

7.2.2 Layout Example

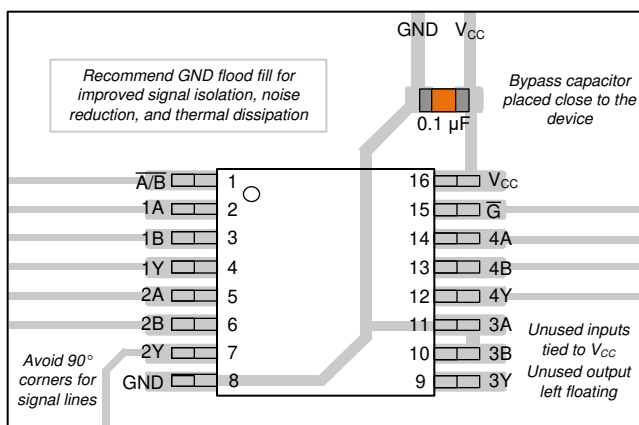


Figure 7-1. Example Layout for the SNx4AHC157

8 Device and Documentation Support

8.1 Documentation Support (Analog)

8.1.1 Related Links

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

Table 8-1. Related Links

| PARTS | PRODUCT FOLDER | SAMPLE & BUY | TECHNICAL DOCUMENTS | TOOLS & SOFTWARE | SUPPORT & COMMUNITY |
|------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| SN54AHC157 | Click here | Click here | Click here | Click here | Click here |
| SN74AHC157 | Click here | Click here | Click here | Click here | Click here |

8.2 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

8.3 Support Resources

[TI E2E™ support forums](#) are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

Linked content is provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's [Terms of Use](#).

8.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

All trademarks are the property of their respective owners.

8.5 Electrostatic Discharge Caution



This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.6 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

9 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision K (April 2024) to Revision L (July 2024) Page

- Updated thermal values for RθJA: D = 73 to 93.8, RGY = 39 to 52.9, all values in °C/W6

Changes from Revision J (June 2013) to Revision K (April 2024) Page

- Added *Device Information* table, *Pin Functions* table, *ESD Ratings* table, *Thermal Information* table, *Typical Characteristics*, *Device Functional Modes*, Application and Implementation section, *Device and Documentation Support* section, and *Mechanical, Packaging, and Orderable Information* section 1
- Changed I_{OH} maximums from -50 mA to -0.05 μA5
- Changed mA (milliamps) to μA (microamps) for I_{OH} and I_{OL} on *Recommended Operating Conditions* table....5
- Changed I_{OL} maximums from 50 mA to 0.05 μA5

-
- Updated thermal values for PW package from R θ JA = 108 to 135.9, all values in °C/W.....6
-

10 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGING INFORMATION

| Orderable part number | Status (1) | Material type (2) | Package Pins | Package qty Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|-----------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|--|
| 5962-9764201Q2A | Active | Production | LCCC (FK) 20 | 55 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962- 9764201Q2A SNJ54AHC 157FK |
| 5962-9764201QEA | Active | Production | CDIP (J) 16 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9764201QE A SNJ54AHC157J |
| 5962-9764201QFA | Active | Production | CFP (W) 16 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9764201QF A SNJ54AHC157W |
| SN74AHC157D | Obsolete | Production | SOIC (D) 16 | - | - | Call TI | Call TI | -40 to 125 | AHC157 |
| SN74AHC157DBR | Active | Production | SSOP (DB) 16 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HA157 |
| SN74AHC157DBR.A | Active | Production | SSOP (DB) 16 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HA157 |
| SN74AHC157DGVR | Active | Production | TVSOP (DGV) 16 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HA157 |
| SN74AHC157DGVR.A | Active | Production | TVSOP (DGV) 16 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HA157 |
| SN74AHC157DR | Active | Production | SOIC (D) 16 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | AHC157 |
| SN74AHC157DR.A | Active | Production | SOIC (D) 16 | 2500 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | AHC157 |
| SN74AHC157N | Active | Production | PDIP (N) 16 | 25 TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 125 | SN74AHC157N |
| SN74AHC157N.A | Active | Production | PDIP (N) 16 | 25 TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 125 | SN74AHC157N |
| SN74AHC157NSR | Active | Production | SOP (NS) 16 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | AHC157 |
| SN74AHC157NSR.A | Active | Production | SOP (NS) 16 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | AHC157 |
| SN74AHC157PW | Obsolete | Production | TSSOP (PW) 16 | - | - | Call TI | Call TI | -40 to 125 | HA157 |
| SN74AHC157PWR | Active | Production | TSSOP (PW) 16 | 2000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | HA157 |
| SN74AHC157PWR.A | Active | Production | TSSOP (PW) 16 | 2000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HA157 |
| SN74AHC157PWRG3 | Active | Production | TSSOP (PW) 16 | 2000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | HA157 |
| SN74AHC157PWRG3.A | Active | Production | TSSOP (PW) 16 | 2000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | HA157 |
| SN74AHC157RGYR | Active | Production | VQFN (RGY) 16 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HA157 |
| SN74AHC157RGYR.A | Active | Production | VQFN (RGY) 16 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | HA157 |
| SNJ54AHC157FK | Active | Production | LCCC (FK) 20 | 55 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962- 9764201Q2A SNJ54AHC 157FK |

| Orderable part number | Status (1) | Material type (2) | Package Pins | Package qty Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|------------------------------|---------------|----------------------|----------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|--------------------------------------|
| SNJ54AHC157FK.A | Active | Production | LCCC (FK) 20 | 55 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9764201Q2A SNJ54AHC 157FK |
| SNJ54AHC157J | Active | Production | CDIP (J) 16 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9764201QE A SNJ54AHC157J |
| SNJ54AHC157J.A | Active | Production | CDIP (J) 16 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9764201QE A SNJ54AHC157J |
| SNJ54AHC157W | Active | Production | CFP (W) 16 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9764201QF A SNJ54AHC157W |
| SNJ54AHC157W.A | Active | Production | CFP (W) 16 | 25 TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 5962-9764201QF A SNJ54AHC157W |

(1) **Status:** For more details on status, see our [product life cycle](#).

(2) **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "-" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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OTHER QUALIFIED VERSIONS OF SN54AHC157, SN74AHC157 :

- Catalog : [SN74AHC157](#)
- Automotive : [SN74AHC157-Q1](#), [SN74AHC157-Q1](#)
- Military : [SN54AHC157](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Military - QML certified for Military and Defense Applications

TAPE AND REEL INFORMATION

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*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 |
|-----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74AHC157DBR | SSOP | DB | 16 | 2000 | 330.0 | 16.4 | 8.35 | 6.6 | 2.4 | 12.0 | 16.0 | Q1 |
| SN74AHC157DGVR | TVSOP | DGV | 16 | 2000 | 330.0 | 12.4 | 6.8 | 4.0 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74AHC157DR | SOIC | D | 16 | 2500 | 330.0 | 12.4 | 3.75 | 3.75 | 1.15 | 8.0 | 12.0 | Q1 |
| SN74AHC157DR | SOIC | D | 16 | 2500 | 330.0 | 16.4 | 6.5 | 10.3 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74AHC157NSR | SOP | NS | 16 | 2000 | 330.0 | 16.4 | 8.1 | 10.4 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74AHC157PWR | TSSOP | PW | 16 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74AHC157PWRG3 | TSSOP | PW | 16 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74AHC157RGYR | VQFN | RGY | 16 | 3000 | 330.0 | 12.4 | 3.8 | 4.3 | 1.5 | 8.0 | 12.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74AHC157DBR | SSOP | DB | 16 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74AHC157DGVR | TVSOP | DGV | 16 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74AHC157DR | SOIC | D | 16 | 2500 | 340.5 | 336.1 | 32.0 |
| SN74AHC157DR | SOIC | D | 16 | 2500 | 353.0 | 353.0 | 32.0 |
| SN74AHC157NSR | SOP | NS | 16 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74AHC157PWR | TSSOP | PW | 16 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74AHC157PWG3 | TSSOP | PW | 16 | 2000 | 364.0 | 364.0 | 27.0 |
| SN74AHC157RGYR | VQFN | RGY | 16 | 3000 | 360.0 | 360.0 | 36.0 |

TUBE


*All dimensions are nominal

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|-----------------|--------------|--------------|------|-----|--------|--------|--------|--------|
| 5962-9764201Q2A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| 5962-9764201QFA | W | CFP | 16 | 25 | 506.98 | 26.16 | 6220 | NA |
| SN74AHC157N | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74AHC157N | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74AHC157N.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74AHC157N.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SNJ54AHC157FK | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| SNJ54AHC157FK.A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| SNJ54AHC157W | W | CFP | 16 | 25 | 506.98 | 26.16 | 6220 | NA |
| SNJ54AHC157W.A | W | CFP | 16 | 25 | 506.98 | 26.16 | 6220 | NA |



PACKAGE OUTLINE

NS0016A

SOP - 2.00 mm max height

SOP



4220735/A 12/2021

NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm, per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm, per side.

EXAMPLE BOARD LAYOUT

NS0016A

SOP - 2.00 mm max height

SOP



4220735/A 12/2021

NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.

6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

NS0016A

SOP - 2.00 mm max height

SOP



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:7X

4220735/A 12/2021

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
 - D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
 - E. Reference JEDEC MS-012 variation AC.

DB0016A



PACKAGE OUTLINE

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



4220763/A 05/2022

NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. Reference JEDEC registration MO-150.

EXAMPLE BOARD LAYOUT

DB0016A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



4220763/A 05/2022

NOTES: (continued)

- 5. Publication IPC-7351 may have alternate designs.
- 6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DB0016A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

4220763/A 05/2022

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

DGV (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

24 PINS SHOWN



4073251/E 08/00

- 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 per side.
 D. Falls within JEDEC: 24/48 Pins – MO-153
 14/16/20/56 Pins – MO-194

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 GDFP2-F16

GENERIC PACKAGE VIEW

FK 20

LCCC - 2.03 mm max height

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.



4229370VA\

J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE

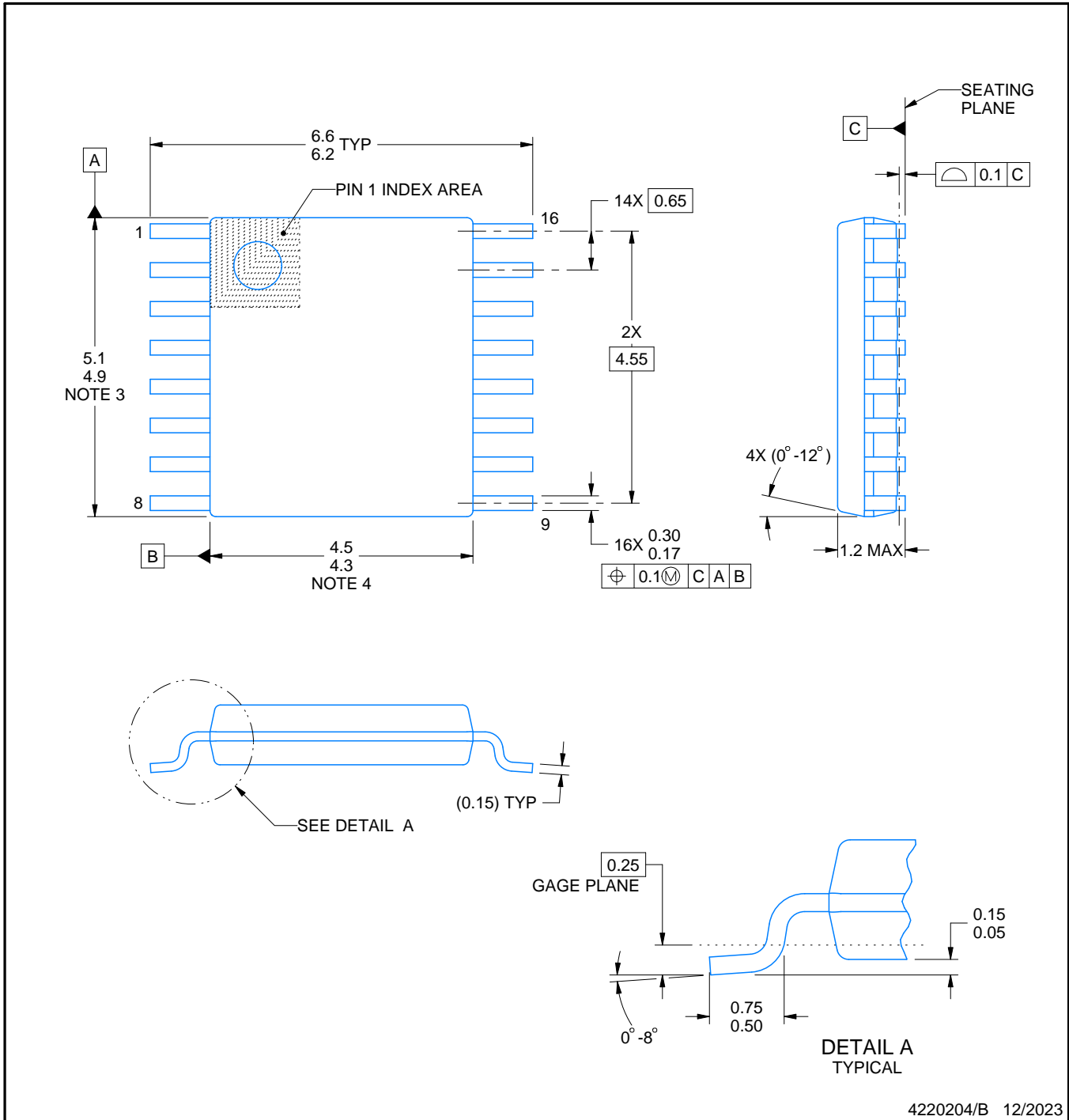
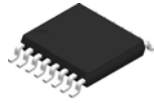


| DIM \ PINS ** | 14 | 16 | 18 | 20 |
|---------------|------------------------|------------------------|------------------------|------------------------|
| A | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC | 0.300 (7,62) BSC |
| B MAX | 0.785 (19,94) | .840 (21,34) | 0.960 (24,38) | 1.060 (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.



4220204/B 12/2023

NOTES:

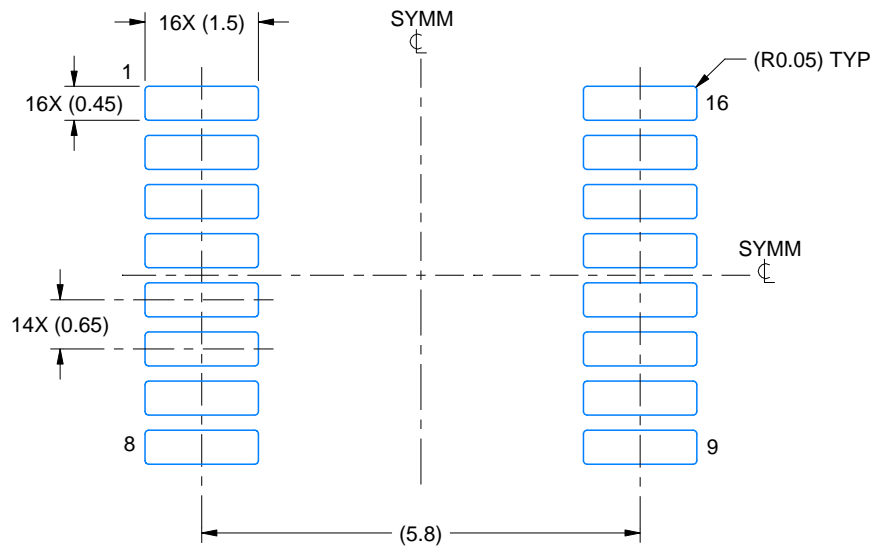
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-153.

EXAMPLE BOARD LAYOUT

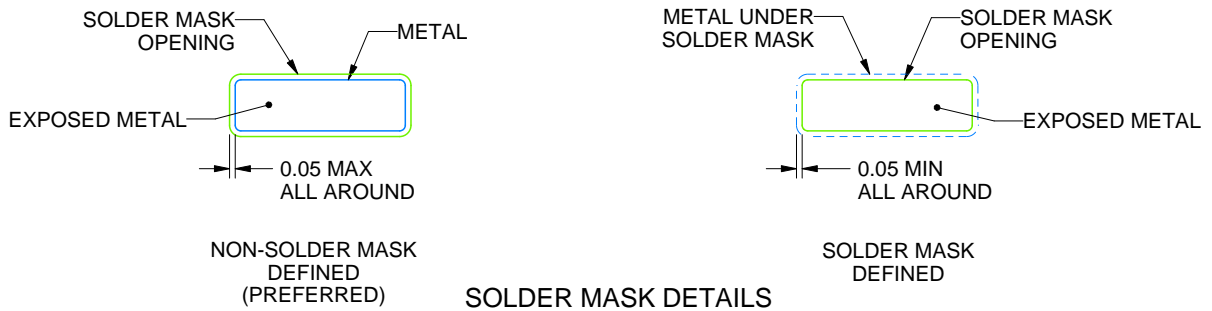
PW0016A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



SOLDER MASK DETAILS

4220204/B 12/2023

NOTES: (continued)

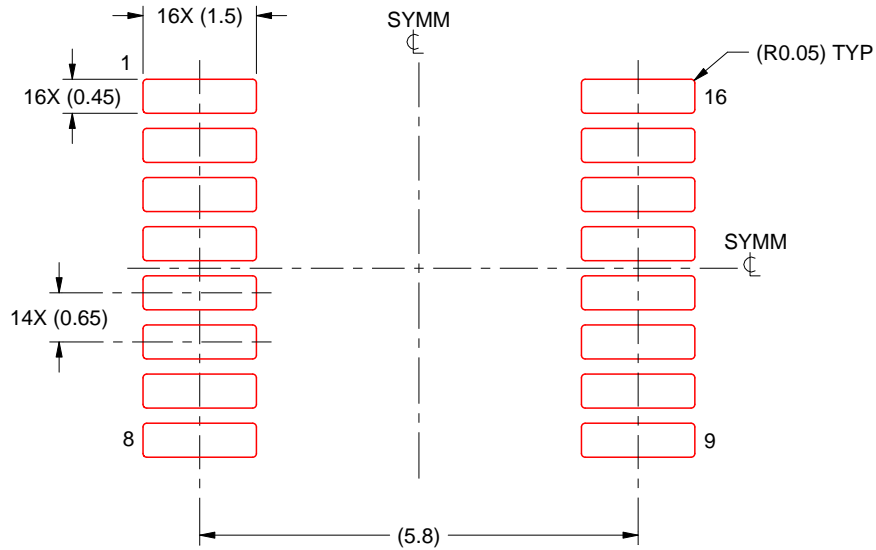
- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

PW0016A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

4220204/B 12/2023

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

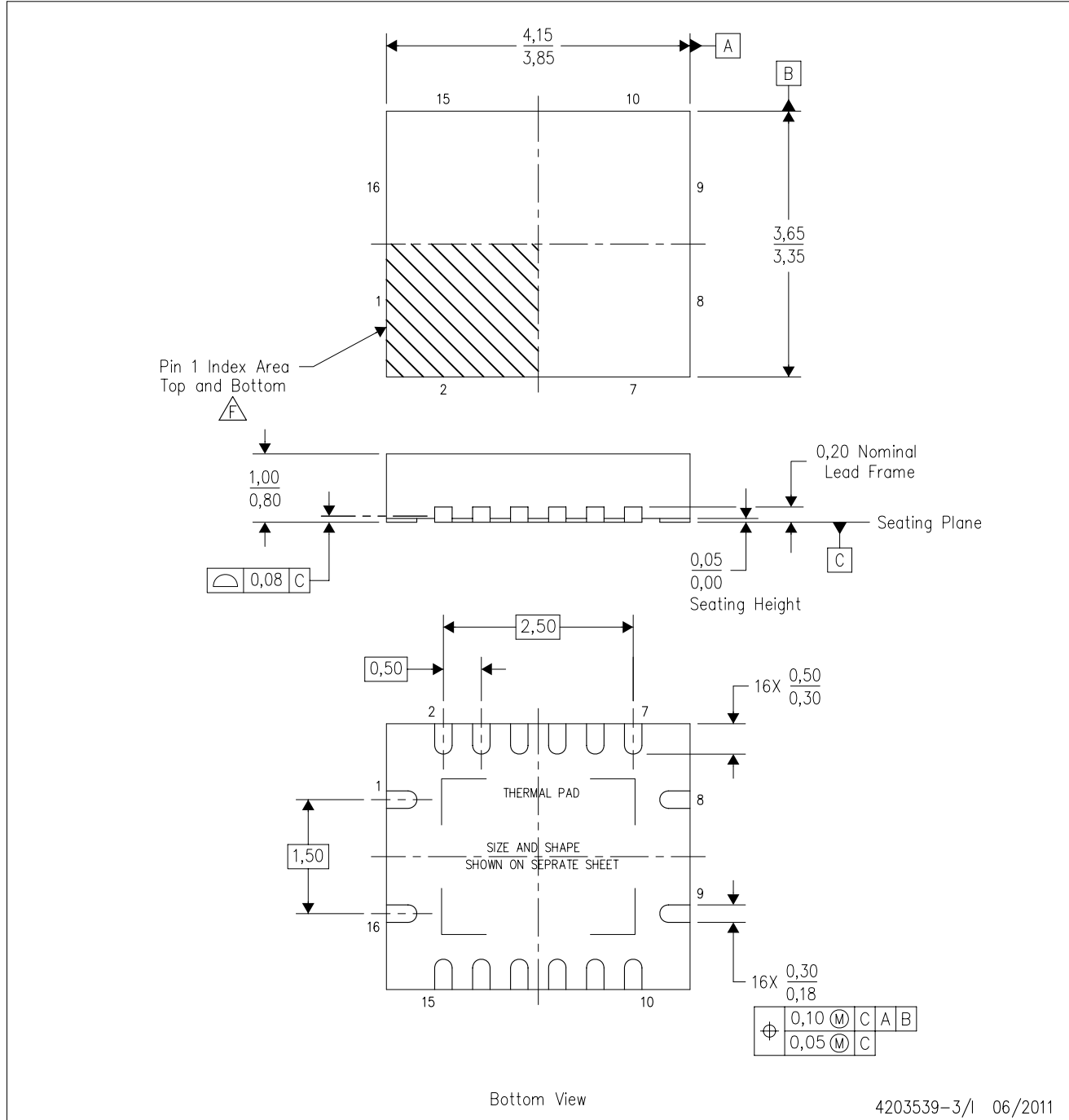
16 PINS SHOWN



- 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.

RGY (R-PVQFN-N16)

PLASTIC QUAD FLATPACK NO-LEAD



4203539-3/1 06/2011

- NOTES:
- All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
 - This drawing is subject to change without notice.
 - QFN (Quad Flatpack No-Lead) package configuration.
 - The package thermal pad must be soldered to the board for thermal and mechanical performance.
 - See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
 - Pin 1 identifiers are located on both top and bottom of the package and within the zone indicated. The Pin 1 identifiers are either a molded, marked, or metal feature.
 - Package complies to JEDEC MO-241 variation BA.

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