

SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244 SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

SDLS144C – APRIL 1985 – REVISED MAY 2010

查询"SN54LS240-SP"供应商

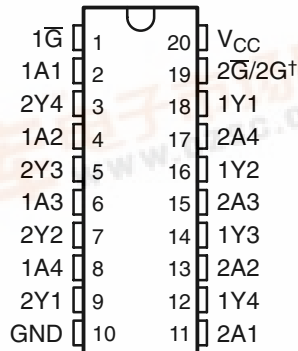
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- PNP Inputs Reduce DC Loading
- Hysteresis at Inputs Improves Noise Margins

description

These octal buffers and line drivers are designed specifically to improve both the performance and density of three-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. The designer has a choice of selected combinations of inverting and noninverting outputs, symmetrical, active-low output-control (\overline{G}) inputs, and complementary output-control (G and \overline{G}) inputs. These devices feature high fan-out, improved fan-in, and 400-mV noise margin. The SN74LS' and SN74S' devices can be used to drive terminated lines down to 133 Ω .

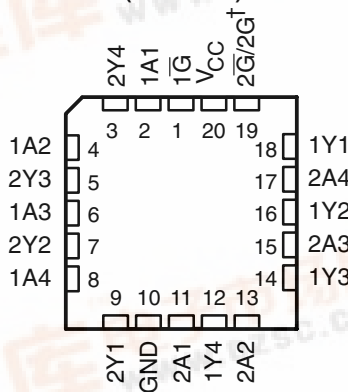
SN54LS', SN54S' ... J OR W PACKAGE
SN74LS240, SN74LS244 ... DB, DW, N, OR NS PACKAGE
SN74LS241 ... DW, N, OR NS PACKAGE
SN74S' ... DW OR N PACKAGE

(TOP VIEW)



† 2G for 'LS241 and 'S241 or $2\overline{G}$ for all other drivers.

SN54LS', SN54S' ... FK PACKAGE
(TOP VIEW)



† 2G for 'LS241 and 'S241 or $2\overline{G}$ for all other drivers.



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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.



**SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244
 SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244
 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS**

SDL5446, SN54LS240, SN74LS240, SN54S240, SN74S240
 資料 SN54LS240, SN74LS240, SN54S240, SN74S240

ORDERING INFORMATION†

| T _A | PACKAGE‡ | | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|----------------|-----------|---------------|-----------------------|------------------|
| 0°C to 70°C | PDIP – N | Tube | SN74LS240N | SN74LS240N |
| | | | SN74LS241N | SN74LS241N |
| | | | SN74LS244N | SN74LS244N |
| | | | SN74S240N | SN74S240N |
| | | | SN74S241N | SN74S241N |
| | | | SN74S244N | SN74S244N |
| | SOIC – DW | Tube | SN74LS240DW | LS240 |
| | | Tape and reel | SN74LS240DWR | |
| | | Tube | SN74LS241DW | LS241 |
| | | Tape and reel | SN74LS241DWR | |
| | | Tube | SN74LS244DW | LS244 |
| | | Tape and reel | SN74LS244DWR | |
| | | Tube | SN74S240DW | S240 |
| | | Tape and reel | SN74S240DWR | |
| | | Tube | SN74S241DW | S241 |
| | | Tape and reel | SN74S241DWR | |
| | | Tube | SN74S244DW | S244 |
| | | Tape and reel | SN74S244DWR | |
| | SOP – NS | Tape and reel | SN74LS240NSR | 74LS240 |
| | | | SN74LS241NSR | 74LS241 |
| | | | SN74LS244NSR | 74LS244 |
| | SSOP – DB | Tape and reel | SN74LS240DBR | LS240 |
| | | | SN74LS244DBR | LS244 |

† For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.

‡ Package drawings, thermal data, and symbolization are available at www.ti.com/packaging.



**SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244
SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244
OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS**

[查询"SN54LS240-SP"供应商](#)

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ORDERING INFORMATION† (CONTINUED)

| T _A | PACKAGE‡ | | ORDERABLE PART NUMBER | TOP-SIDE MARKING |
|----------------|-----------|------|-----------------------|------------------|
| -55°C to 125°C | CDIP – J | Tube | SN54LS240J | SN54LS240J |
| | | | SNJ54LS240J | SNJ54LS240J |
| | | | SN54LS241J | SN54LS241J |
| | | | SNJ54LS241J | SNJ54LS241J |
| | | | SN54LS244J | SN54LS244J |
| | | | SNJ54LS244J | SNJ54LS244J |
| | | | SN54S240J | SN54S240J |
| | | | SNJ54S240J | SNJ54S240J |
| | | | SN54S241J | SN54S241J |
| | | | SNJ54S241J | SNJ54S241J |
| | | | SN54S244J | SN54S244J |
| | | | SNJ54S244J | SNJ54S244J |
| | CFP – W | Tube | SNJ54LS240W | SNJ54LS240W |
| | | | SNJ54LS241W | SNJ54LS241W |
| | | | SNJ54LS244W | SNJ54LS244W |
| | | | SNJ54S240W | SNJ54S240W |
| | | | SNJ54S241W | SNJ54S241W |
| | | | SNJ54S244W | SNJ54S244W |
| | LCCC – FK | Tube | SNJ54LS240FK | SNJ54LS240FK |
| | | | SNJ54LS241FK | SNJ54LS241FK |
| | | | SNJ54LS244FK | SNJ54LS244FK |
| | | | SNJ54S240FK | SNJ54S240FK |
| | | | SNJ54S241FK | SNJ54S241FK |
| | | | SNJ54S244FK | SNJ54S244FK |

† For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI web site at www.ti.com.

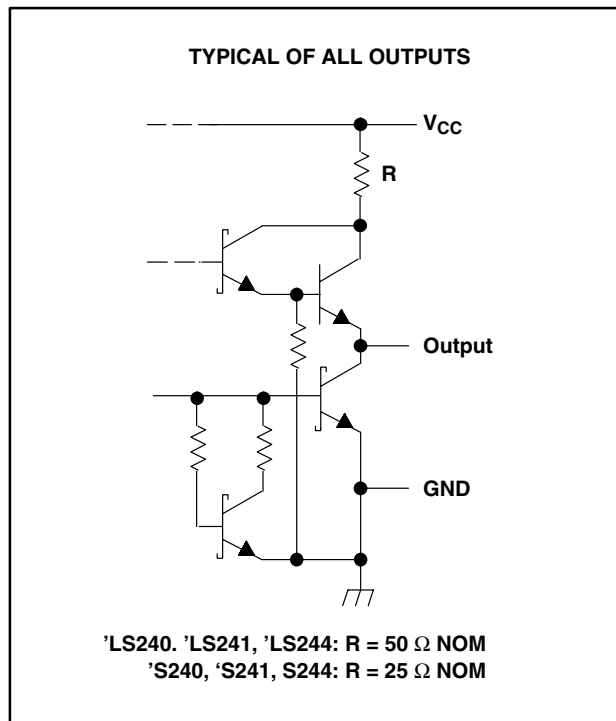
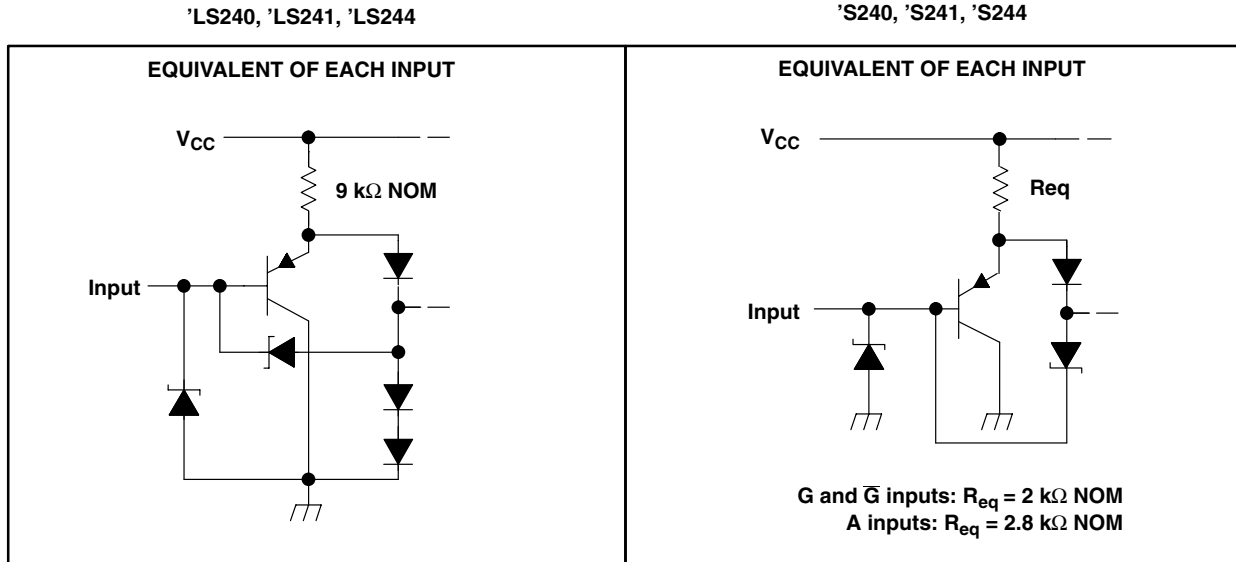
‡ Package drawings, thermal data, and symbolization are available at www.ti.com/packaging.



**SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244
 SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244
 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS**

SDL 5446, SN54LS240, SN74LS240, SN54S240, SN74S240, SN54LS241, SN74LS241, SN54S241, SN74S241, SN54LS244, SN74LS244, SN54S244, SN74S244

schematics of inputs and outputs

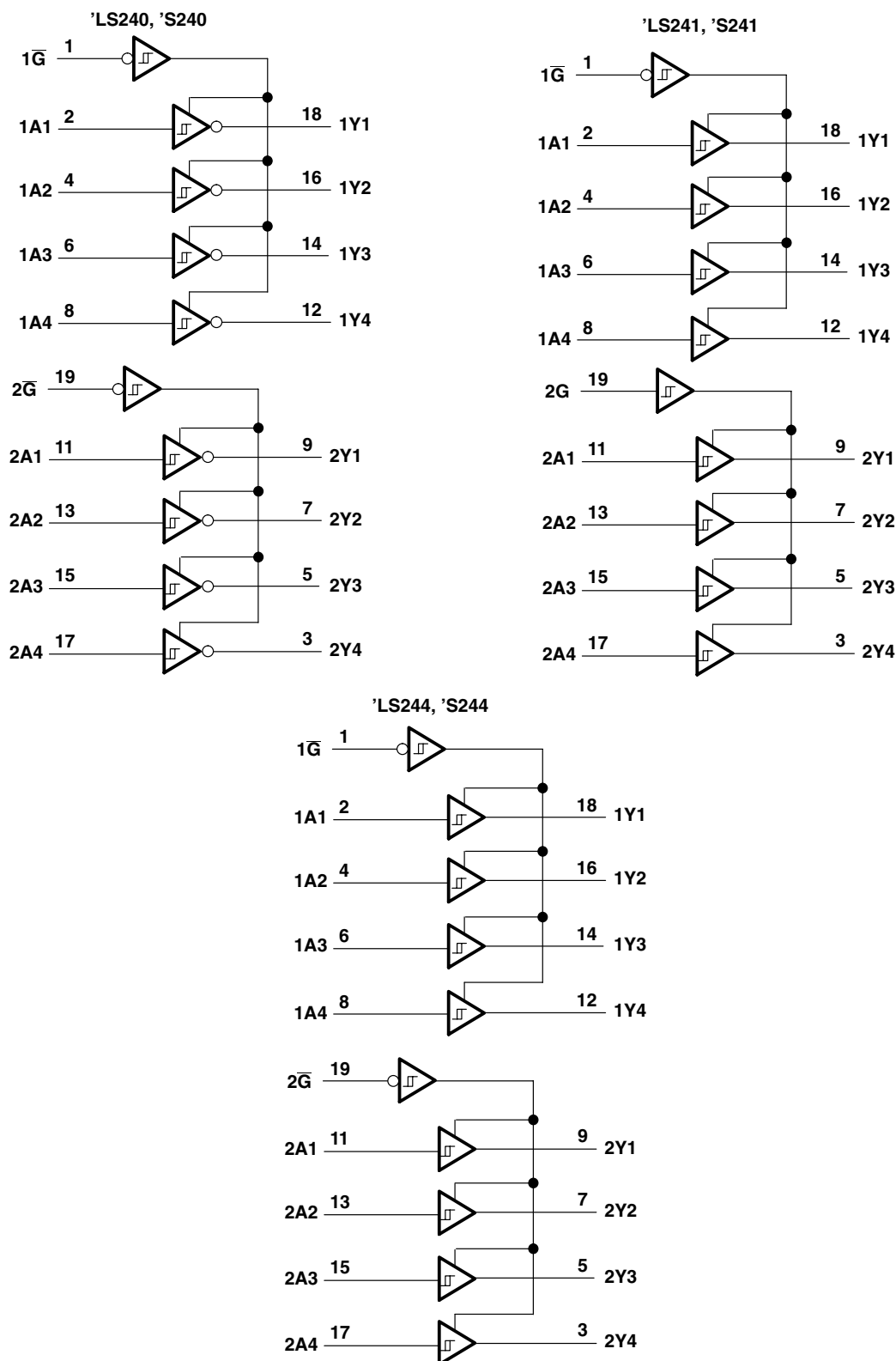


SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244
 SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244
 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

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logic diagram



Pin numbers shown are for DB, DW, J, N, NS, and W packages.



**SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244
SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244
OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS**

SDL5446, SN54LS240, SN74LS240, SN54LS241, SN74LS241, SN54LS244, SN74LS244, SN54S240, SN74S240, SN54S241, SN74S241, SN54S244, SN74S244

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

| | |
|---|----------------|
| Supply voltage, V_{CC} (see Note 1) | 7 V |
| Input voltage, V_I : 'LS | 7 V |
| 'S | 5.5 V |
| Off-state output voltage | 5.5 V |
| Package thermal impedance, θ_{JA} (see Note 2): DB package | 70°C/W |
| DW package | 58°C/W |
| N package | 69°C/W |
| NS package | 60°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. Voltage values are with respect to network ground terminal.
2. The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions

| | SN54LS' | | | SN74LS' | | | UNIT |
|--------------------------------------|---------|-----|-----|---------|-----|------|------|
| | MIN | NOM | MAX | MIN | NOM | MAX | |
| V_{CC} Supply voltage (see Note 1) | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | 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 | | | -12 | | | -15 | mA |
| I_{OL} Low-level output current | | | 12 | | | 24 | mA |
| T_A Operating free-air temperature | -55 | | 125 | 0 | | 70 | °C |

NOTE 1: Voltage values are with respect to network ground terminal.



**SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244
SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244
OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS**

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

| PARAMETER | TEST CONDITIONS† | | SN54LS' | | SN74LS' | | UNIT |
|-------------------------------------|---|--------------------------|----------------------------|------|---------|---------------|---------------|
| | | | MIN | TYP‡ | MAX | MIN | |
| V_{IK} | $V_{CC} = \text{MIN}$, | $I_I = -18 \text{ mA}$ | | | -1.5 | | V |
| Hysteresis ($V_{T+} - V_{T-}$) | $V_{CC} = \text{MIN}$ | | 0.2 | 0.4 | 0.2 | 0.4 | V |
| V_{OH} | $V_{CC} = \text{MIN}$, $I_{OH} = -3 \text{ mA}$ | $V_{IH} = 2 \text{ V}$, | $V_{IL} = \text{MAX}$, | | 2.4 | 3.4 | V |
| | $V_{CC} = \text{MIN}$, $I_{OH} = \text{MAX}$ | $V_{IH} = 2 \text{ V}$, | $V_{IL} = 0.5 \text{ V}$, | | 2 | 2 | |
| V_{OL} | $V_{CC} = \text{MIN}$, $V_{IL} = \text{MAX}$ | $V_{IH} = 2 \text{ V}$, | $I_{OL} = 12 \text{ mA}$ | | 0.4 | | V |
| | | | $I_{OL} = 24 \text{ mA}$ | | 0.5 | | |
| I_{OZH} | $V_{CC} = \text{MAX}$, $V_{IL} = \text{MAX}$ | $V_{IH} = 2 \text{ V}$, | $V_O = 2.7 \text{ V}$ | | 20 | | μA |
| I_{OZL} | $V_{CC} = \text{MAX}$, $V_{IL} = \text{MAX}$ | $V_{IH} = 2 \text{ V}$, | $V_O = 0.4 \text{ V}$ | | -20 | | μA |
| I_I | $V_{CC} = \text{MAX}$, | $V_I = 7 \text{ V}$ | | 0.1 | | mA | |
| I_{IH} | $V_{CC} = \text{MAX}$, | $V_I = 2.7 \text{ V}$ | | 20 | | μA | |
| I_{IL} | $V_{CC} = \text{MAX}$, | $V_{IL} = 0.4 \text{ V}$ | | -0.2 | | mA | |
| $I_{OS}§$ | $V_{CC} = \text{MAX}$, | | -40 | -225 | -40 | -225 | mA |
| I_{CC} | $V_{CC} = \text{MAX}$, Output open | Outputs high | All | | 17 | 27 | mA |
| | | Outputs low | 'LS240 | | 26 | 44 | |
| | | | 'LS241, 'LS244 | | 27 | 46 | |
| | | Outputs disabled | 'LS240 | | 29 | 50 | |
| 'LS241, 'LS244 | | | 32 | 54 | | | |

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

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

§ Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$ (see Figure 1)

| PARAMETER | TEST CONDITIONS | | 'LS240 | | 'LS241, 'LS244 | | UNIT |
|-----------|----------------------|-----------------------|--------|-----|----------------|-----|------|
| | | | MIN | TYP | MAX | MIN | |
| t_{PLH} | $R_L = 667 \Omega$, | $C_L = 45 \text{ pF}$ | 9 | 14 | 12 | 18 | ns |
| t_{PHL} | | | 12 | 18 | 12 | 18 | |
| t_{PZL} | $R_L = 667 \Omega$, | $C_L = 45 \text{ pF}$ | 20 | 30 | 20 | 30 | ns |
| t_{PZH} | | | 15 | 23 | 15 | 23 | |
| t_{PLZ} | $R_L = 667 \Omega$, | $C_L = 5 \text{ pF}$ | 10 | 20 | 10 | 20 | ns |
| t_{PHZ} | | | 15 | 25 | 15 | 25 | |



SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244 SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

SDLS240, SN54LS240, SN74LS240, SN54S240, SN74S240

recommended operating conditions

| | | SN54S' | | | SN74S' | | | UNIT |
|-----------------|---|--------|-----|-----|--------|-----|------|------|
| | | MIN | NOM | MAX | MIN | NOM | MAX | |
| V _{CC} | Supply voltage (see Note 1) | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | V |
| V _{IH} | High-level input voltage | 2 | | | 2 | | | V |
| V _{IL} | Low-level input voltage | | | 0.8 | | | 0.8 | V |
| I _{OH} | High-level output current | | | -12 | | | -15 | mA |
| I _{OL} | Low-level output current | | | 48 | | | 64 | mA |
| | External resistance between any input and V _{CC} or ground | | | 40 | | | 40 | kΩ |
| T _A | Operating free-air temperature (see Note 3) | -55 | | 125 | 0 | | 70 | °C |

NOTES: 1. Voltage values are with respect to network ground terminal.
3. An SN54S241J operating at free-air temperature above 116°C requires a heat sink that provides a thermal resistance from case to free air, R_{θCA}, of not more than 40°C/W.

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

| PARAMETER | TEST CONDITIONS† | | SN54S' | | | SN74S' | | | UNIT |
|---|--|---|--------------|------|------|--------|------|------|------|
| | | | MIN | TYP‡ | MAX | MIN | TYP‡ | MAX | |
| V _{IK} | V _{CC} = MIN, | I _I = -18 mA | | | -1.2 | | | -1.2 | V |
| Hysteresis (V _{T+} - V _{T-}) | V _{CC} = MIN | | 0.2 | 0.4 | | 0.2 | 0.4 | | V |
| V _{OH} | V _{CC} = MIN, I _{OH} = -1 mA | V _{IH} = 2 V, V _{IL} = 0.8 V, | | | | 2.7 | | | V |
| | V _{CC} = MIN, I _{OH} = -3 mA | V _{IH} = 2 V, V _{IL} = 0.8 V, | 2.4 | 3.4 | | 2.4 | 3.4 | | |
| | V _{CC} = MIN, I _{OH} = MAX | V _{IH} = 2 V, V _{IL} = 0.5 V, | 2 | | | 2 | | | |
| V _{OL} | V _{CC} = MIN, I _{OL} = MAX | V _{IH} = 2 V, V _{IL} = 0.8 V, | | | 0.55 | | | 0.55 | V |
| I _{OZH} | V _{CC} = MAX, V _{IL} = 0.8 V | V _{IH} = 2 V, V _O = 2.4 V | | | 50 | | | 50 | μA |
| I _{OZL} | V _{CC} = MAX, V _{IL} = 0.8 V | V _{IH} = 2 V, V _O = 0.5 V | | | -50 | | | -50 | μA |
| I _I | V _{CC} = MAX, V _I = 5.5 V | | | | 1 | | | 1 | mA |
| I _{IH} | V _{CC} = MAX, V _I = 2.7 V | | | | 50 | | | 50 | μA |
| I _{IL} | V _{CC} = MAX, V _I = 0.5 V | Any A | | | -400 | | | -400 | μA |
| | | Any G | | | -2 | | | -2 | mA |
| I _{OS} § | V _{CC} = MAX | | | | -50 | | | -225 | mA |
| I _{CC} | V _{CC} = MAX, Output open | Outputs high | 'S240 | 80 | 123 | 80 | 135 | mA | |
| | | | 'S241, 'S244 | 95 | 147 | 95 | 160 | | |
| | | Outputs low | 'S240 | 100 | 145 | 100 | 150 | | |
| | | | 'S241, 'S244 | 120 | 170 | 120 | 180 | | |
| | | Outputs disabled | 'S240 | 100 | 145 | 100 | 150 | | |
| | | | 'S241, 'S244 | 120 | 170 | 120 | 180 | | |

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

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

§ Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.



**SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244
 SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244
 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS**

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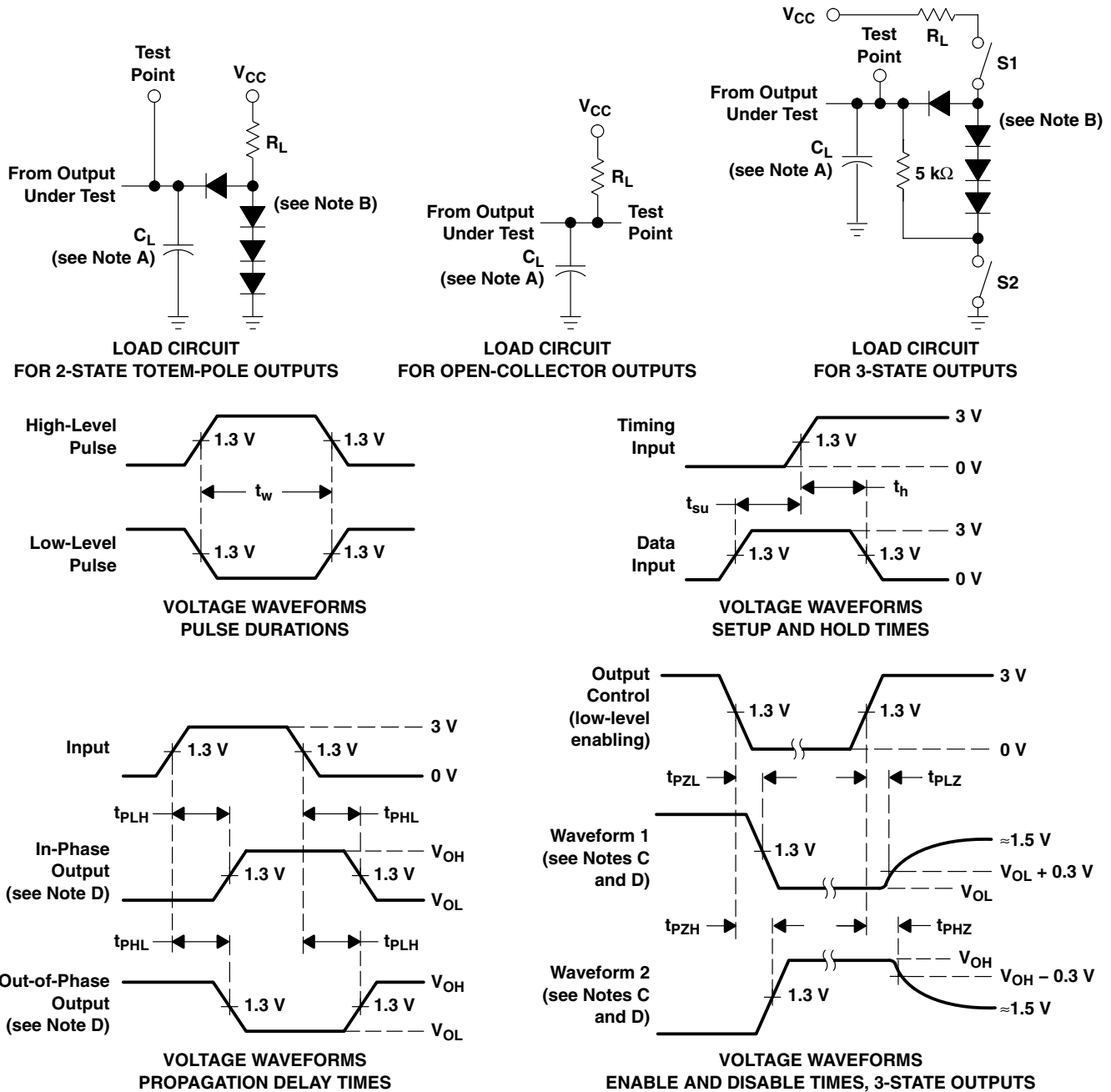
switching characteristics, $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$ (see Figure 2)

| PARAMETER | TEST CONDITIONS | 'S240 | | | 'S241, 'S244 | | | UNIT |
|-----------|--|-------|-----|-----|--------------|-----|-----|------|
| | | MIN | TYP | MAX | MIN | TYP | MAX | |
| t_{PLH} | $R_L = 90\ \Omega$, $C_L = 50\ \text{pF}$ | 4.5 | 7 | | 6 | 9 | ns | |
| t_{PHL} | | 4.5 | 7 | | 6 | 9 | | |
| t_{PZL} | $R_L = 90\ \Omega$, $C_L = 50\ \text{pF}$ | 10 | 15 | | 10 | 15 | ns | |
| t_{PZH} | | 6.5 | 10 | | 8 | 12 | | |
| t_{PLZ} | $R_L = 90\ \Omega$, $C_L = 5\ \text{pF}$ | 10 | 15 | | 10 | 15 | ns | |
| t_{PHZ} | | 6 | 9 | | 6 | 9 | | |

SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244 SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

SDLS240, SN74LS240, SN74S240, SN74LS241, SN74S241, SN74LS244, SN74S244

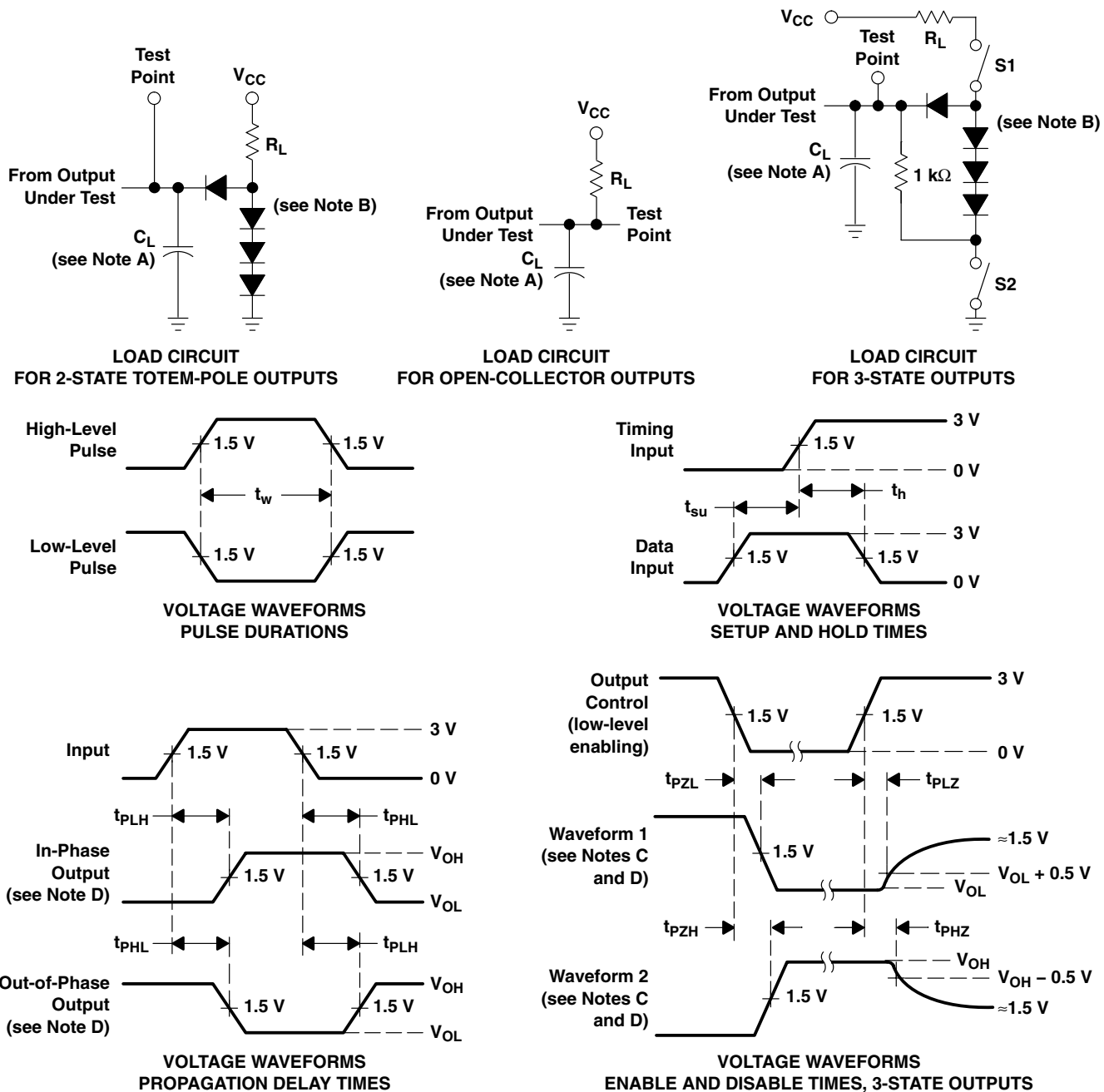
PARAMETER MEASUREMENT INFORMATION SERIES 54LS/74LS DEVICES



- NOTES: A. C_L includes probe and jig capacitance.
 B. All diodes are 1N3064 or equivalent.
 C. 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.
 D. S1 and S2 are closed for t_{PLH} , t_{PHL} , t_{PHZ} , and t_{PLZ} ; S1 is open and S2 is closed for t_{PZH} ; S1 is closed and S2 is open for t_{PZL} .
 E. Phase relationships between inputs and outputs have been chosen arbitrarily for these examples.
 F. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1$ MHz, $Z_O \approx 50 \Omega$, $t_r \leq 15$ ns, $t_f \leq 6$ ns.
 G. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION
 SERIES 54S/74S DEVICES



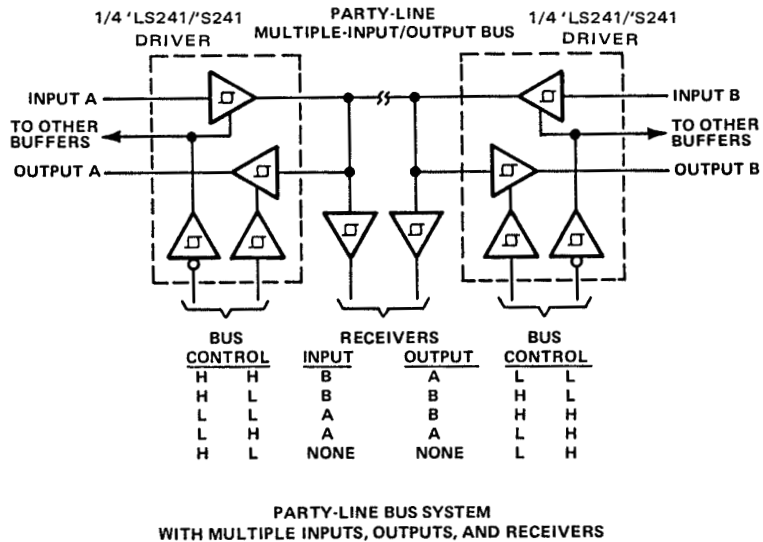
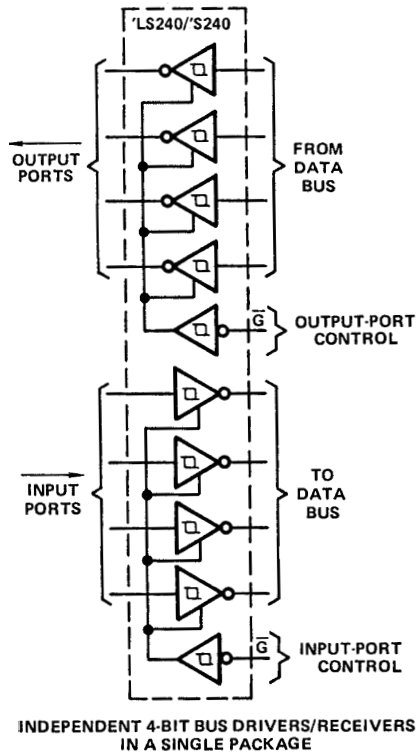
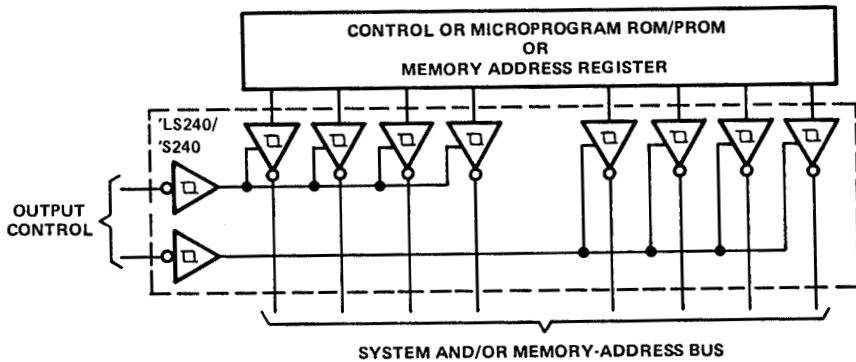
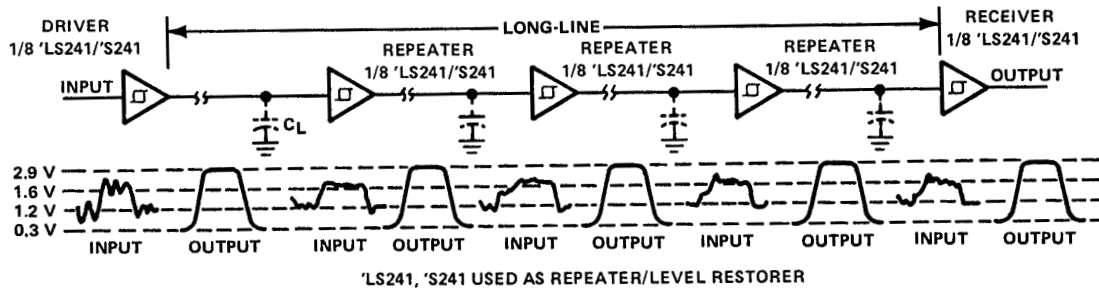
- NOTES: A. C_L includes probe and jig capacitance.
 B. All diodes are 1N3064 or equivalent.
 C. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
 D. S1 and S2 are closed for t_{PLH} , t_{PHL} , t_{PHZ} , and t_{PLZ} ; S1 is open and S2 is closed for t_{PZH} ; S1 is closed and S2 is open for t_{PZL} .
 E. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1$ MHz, $Z_O \approx 50 \Omega$; t_r and $t_f \leq 7$ ns for Series 54/74 devices and t_r and $t_f \leq 2.5$ ns for Series 54S/74S devices.
 F. The outputs are measured one at a time with one input transition per measurement.

Figure 2. Load Circuits and Voltage Waveforms

SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244 SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

SDL 5446 SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244
REVISED MAY 1989

APPLICATION INFORMATION



PACKAGING INFORMATION

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| 5962-7801201VRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| 5962-7801201VSA | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| 7705701RA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| 7705701SA | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| 78012012A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| 7801201RA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| 7801201SA | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| JM38510/32401B2A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| JM38510/32401BRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| JM38510/32401BSA | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| JM38510/32402B2A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| JM38510/32402BRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| JM38510/32402BSA | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| JM38510/32403B2A | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| JM38510/32403BRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| JM38510/32403BSA | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| JM38510/32403SRA | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| JM38510/32403SSA | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| SN54LS240J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SN54LS241J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SN54LS244J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SN54S240J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SN54S241J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SN54S244J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SN74LS240DW | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS240DWG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS240DWR | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS240DWRE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS240DWRG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS240J | OBSOLETE | CDIP | J | 20 | | TBD | Call TI | Call TI |
| SN74LS240N | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74LS240N3 | OBSOLETE | PDIP | N | 20 | | TBD | Call TI | Call TI |
| SN74LS240NE4 | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74LS240NSR | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS240NSRE4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS240NSRG4 | ACTIVE | SO | NS | 20 | 2000 | 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) | | |
| SN74LS241DW | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS241DWE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS241DWG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS241DWR | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS241DWRE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS241DWRG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS241J | OBSOLETE | CDIP | J | 20 | | TBD | Call TI | Call TI |
| SN74LS241N | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74LS241N3 | OBSOLETE | PDIP | N | 20 | | TBD | Call TI | Call TI |
| SN74LS241NE4 | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74LS241NSR | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS241NSRE4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS241NSRG4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244DBR | ACTIVE | SSOP | DB | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244DBRE4 | ACTIVE | SSOP | DB | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244DBRG4 | ACTIVE | SSOP | DB | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244DW | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244DWE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244DWG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244DWR | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244DWRE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244DWRG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244J | OBSOLETE | CDIP | J | 20 | | TBD | Call TI | Call TI |
| SN74LS244N | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74LS244N3 | OBSOLETE | PDIP | N | 20 | | TBD | Call TI | Call TI |
| SN74LS244NE4 | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74LS244NSR | ACTIVE | SO | NS | 20 | 2000 | 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⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SN74LS244NSRE4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74LS244NSRG4 | ACTIVE | SO | NS | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S240DW | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S240DWE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S240DWG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S240DWR | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S240DWRE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S240DWRG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S240N | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74S240N3 | OBSOLETE | PDIP | N | 20 | | TBD | Call TI | Call TI |
| SN74S240NE4 | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74S241DW | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S241DWE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S241DWG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S241DWR | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S241DWRE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S241DWRG4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S241J | OBSOLETE | CDIP | J | 20 | | TBD | Call TI | Call TI |
| SN74S241N | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74S241N3 | OBSOLETE | PDIP | N | 20 | | TBD | Call TI | Call TI |
| SN74S241NE4 | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74S244DW | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S244DWE4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S244DWG4 | ACTIVE | SOIC | DW | 20 | 25 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S244DWR | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S244DWRE4 | ACTIVE | SOIC | DW | 20 | 2000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-1-260C-UNLIM |
| SN74S244DWRG4 | ACTIVE | SOIC | DW | 20 | 2000 | 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⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SN74S244J | OBSOLETE | CDIP | J | 20 | | TBD | Call TI | Call TI |
| SN74S244N | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SN74S244N3 | OBSOLETE | PDIP | N | 20 | | TBD | Call TI | Call TI |
| SN74S244NE4 | ACTIVE | PDIP | N | 20 | 20 | Pb-Free (RoHS) | CU NIPDAU | N / A for Pkg Type |
| SNJ54LS240FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| SNJ54LS240J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SNJ54LS240W | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| SNJ54LS241FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| SNJ54LS241J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SNJ54LS241W | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| SNJ54LS244FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| SNJ54LS244J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SNJ54LS244W | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| SNJ54S240FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| SNJ54S240J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SNJ54S240W | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| SNJ54S241FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| SNJ54S241J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SNJ54S241W | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | N / A for Pkg Type |
| SNJ54S244FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type |
| SNJ54S244J | ACTIVE | CDIP | J | 20 | 1 | TBD | A42 | N / A for Pkg Type |
| SNJ54S244W | ACTIVE | CFP | W | 20 | 1 | TBD | Call TI | 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)

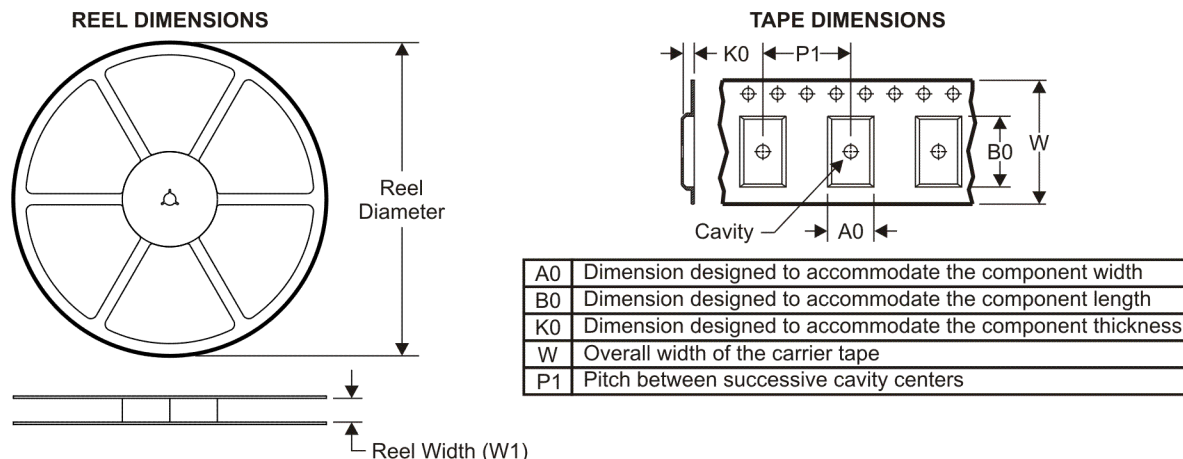
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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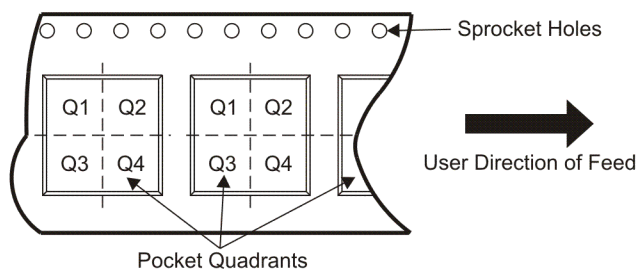
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In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

TAPE AND REEL INFORMATION

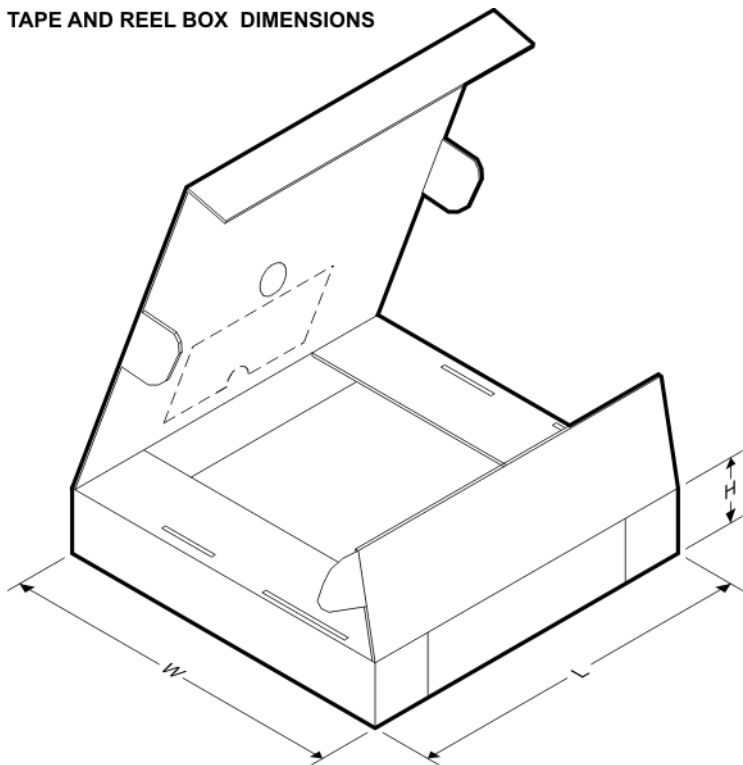


QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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 |
|--------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LS240DWR | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| SN74LS240NSR | SO | NS | 20 | 2000 | 330.0 | 24.4 | 8.2 | 13.0 | 2.5 | 12.0 | 24.0 | Q1 |
| SN74LS241DWR | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| SN74LS241NSR | SO | NS | 20 | 2000 | 330.0 | 24.4 | 8.2 | 13.0 | 2.5 | 12.0 | 24.0 | Q1 |
| SN74LS244DBR | SSOP | DB | 20 | 2000 | 330.0 | 16.4 | 8.2 | 7.5 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74LS244DWR | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| SN74LS244NSR | SO | NS | 20 | 2000 | 330.0 | 24.4 | 8.2 | 13.0 | 2.5 | 12.0 | 24.0 | Q1 |
| SN74S240DWR | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| SN74S241DWR | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |
| SN74S244DWR | SOIC | DW | 20 | 2000 | 330.0 | 24.4 | 10.8 | 13.0 | 2.7 | 12.0 | 24.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS


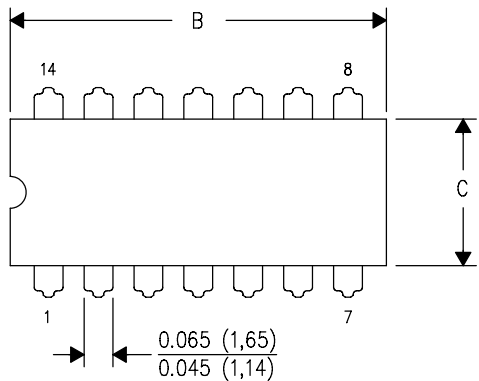
*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|--------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LS240DWR | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| SN74LS240NSR | SO | NS | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| SN74LS241DWR | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| SN74LS241NSR | SO | NS | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| SN74LS244DBR | SSOP | DB | 20 | 2000 | 346.0 | 346.0 | 33.0 |
| SN74LS244DWR | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| SN74LS244NSR | SO | NS | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| SN74S240DWR | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| SN74S241DWR | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |
| SN74S244DWR | SOIC | DW | 20 | 2000 | 346.0 | 346.0 | 41.0 |

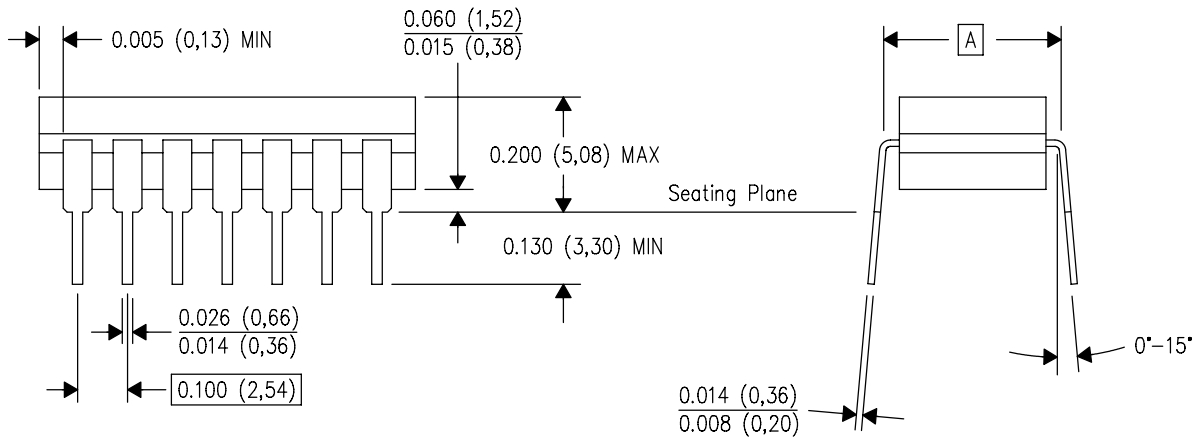
J (R-GDIP-T**)

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) |



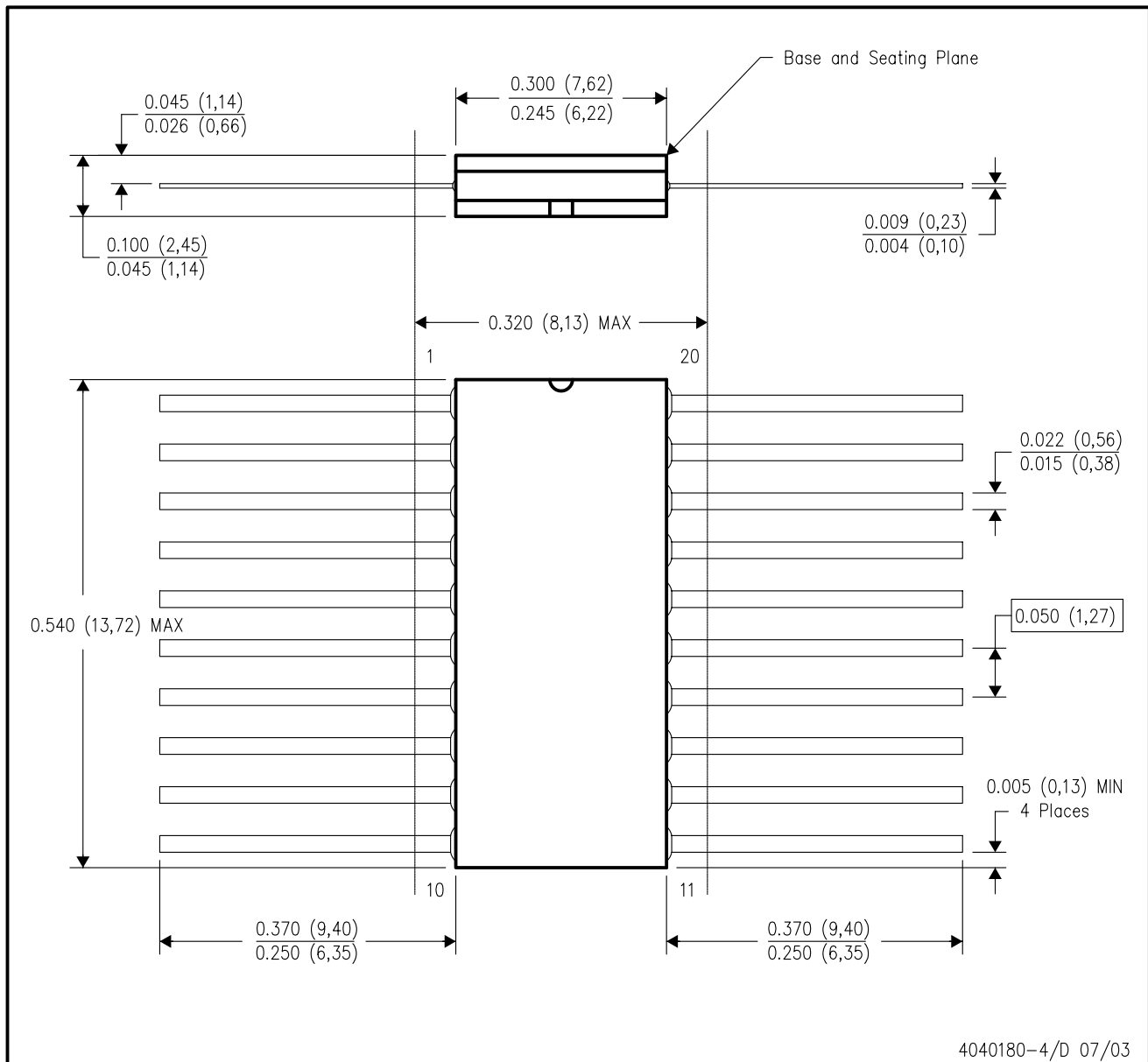
4040083/F 03/03

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

[查询"SN54LS240-SP"供应商](#)

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK

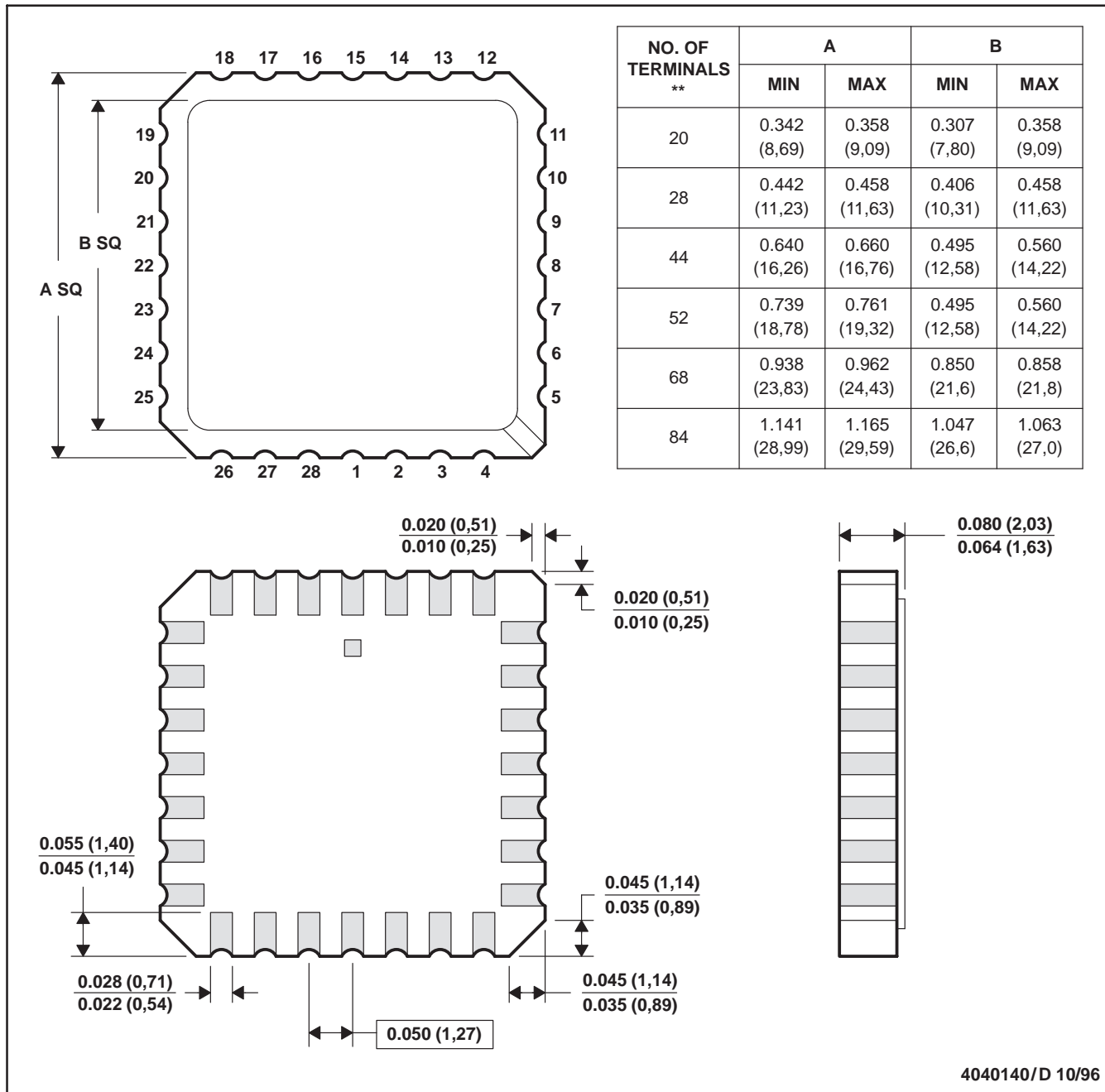


- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package can be hermetically sealed with a ceramic lid using glass frit.
 - Index point is provided on cap for terminal identification only.
 - Falls within Mil-Std 1835 GDFP2-F20

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



4040140/D 10/96

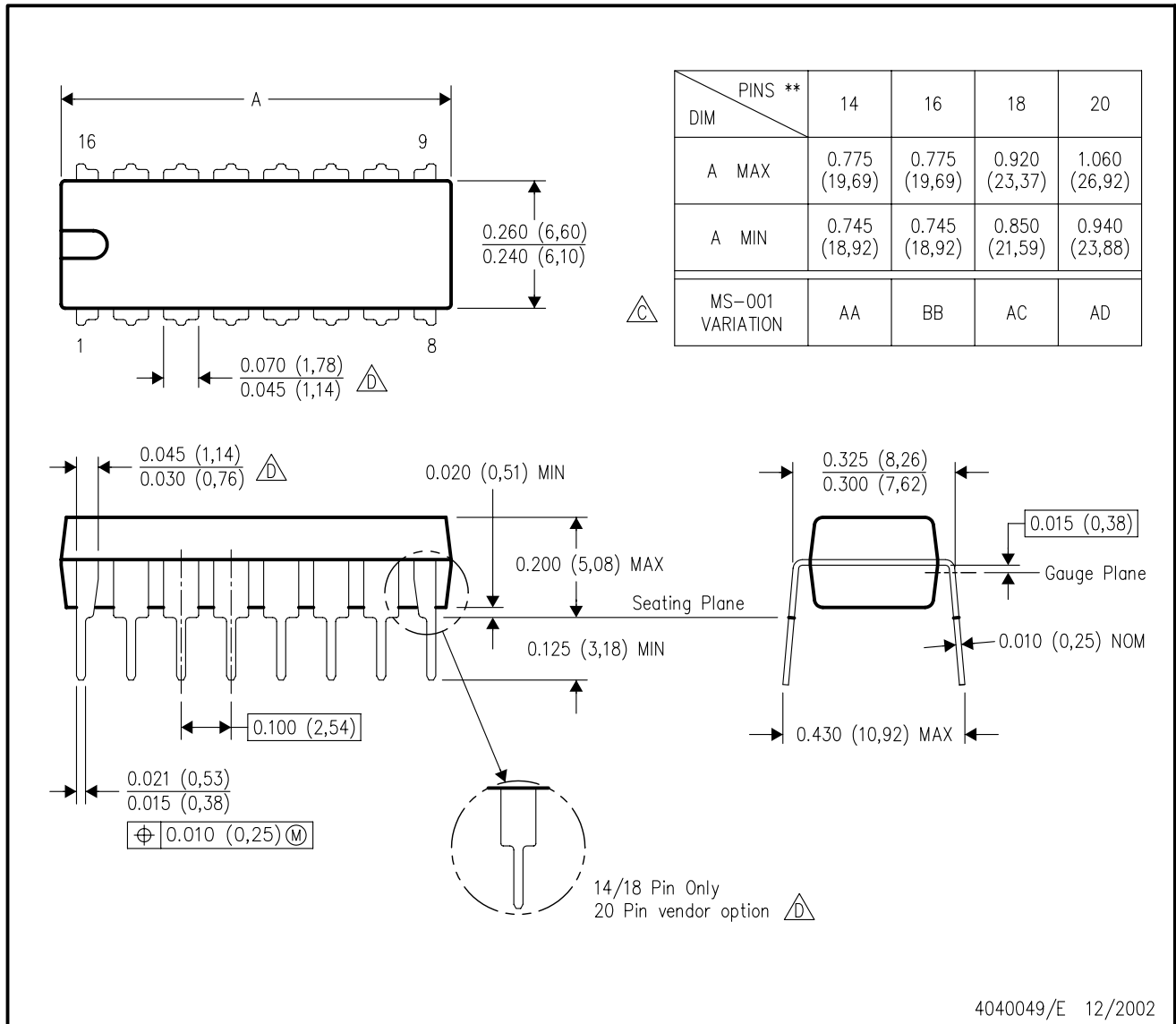
- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a metal lid.
 - D. The terminals are gold plated.
 - E. Falls within JEDEC MS-004

[查询"SN54LS240-SP"供应商](#)

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

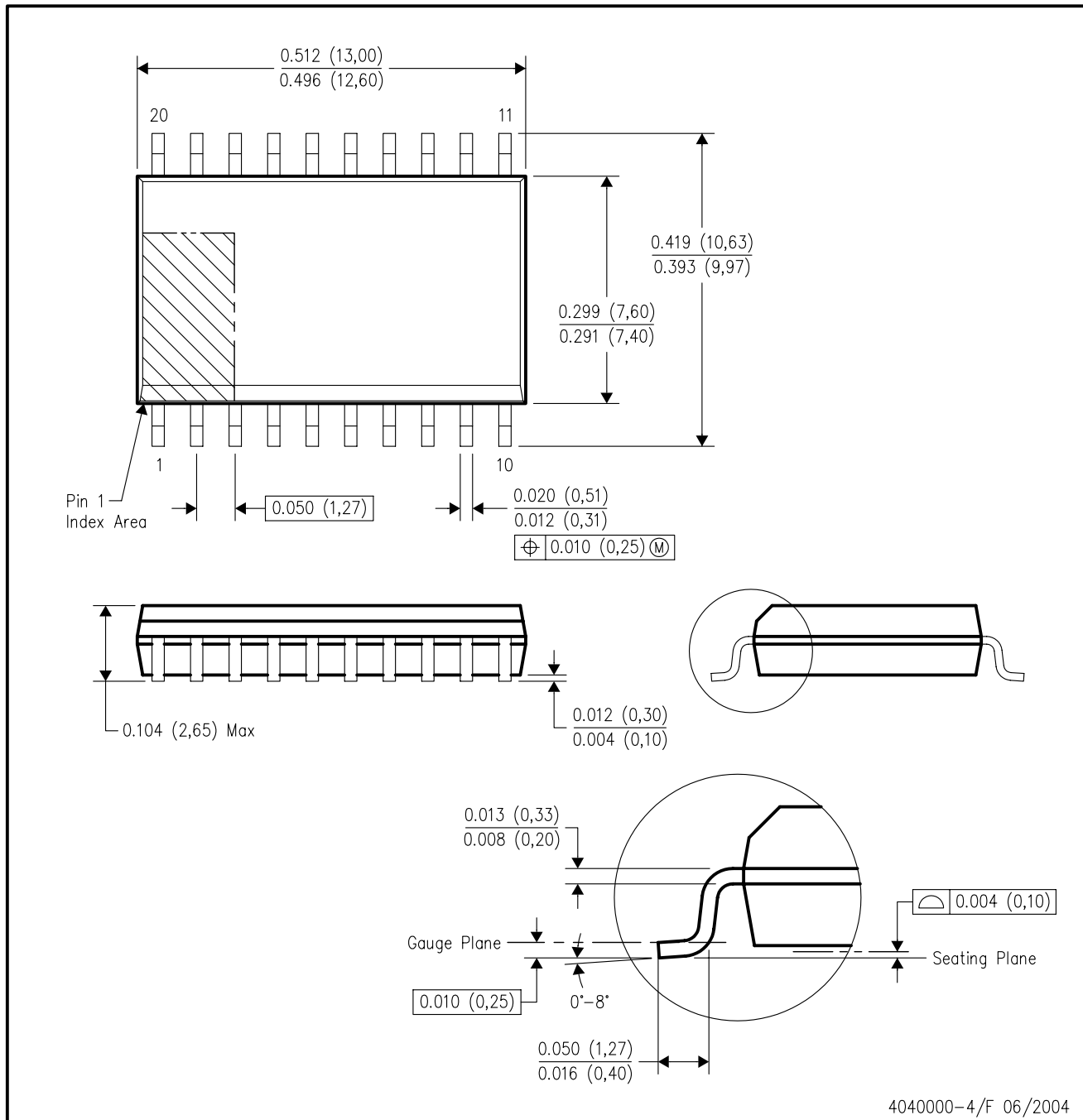
16 PINS SHOWN



- 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.

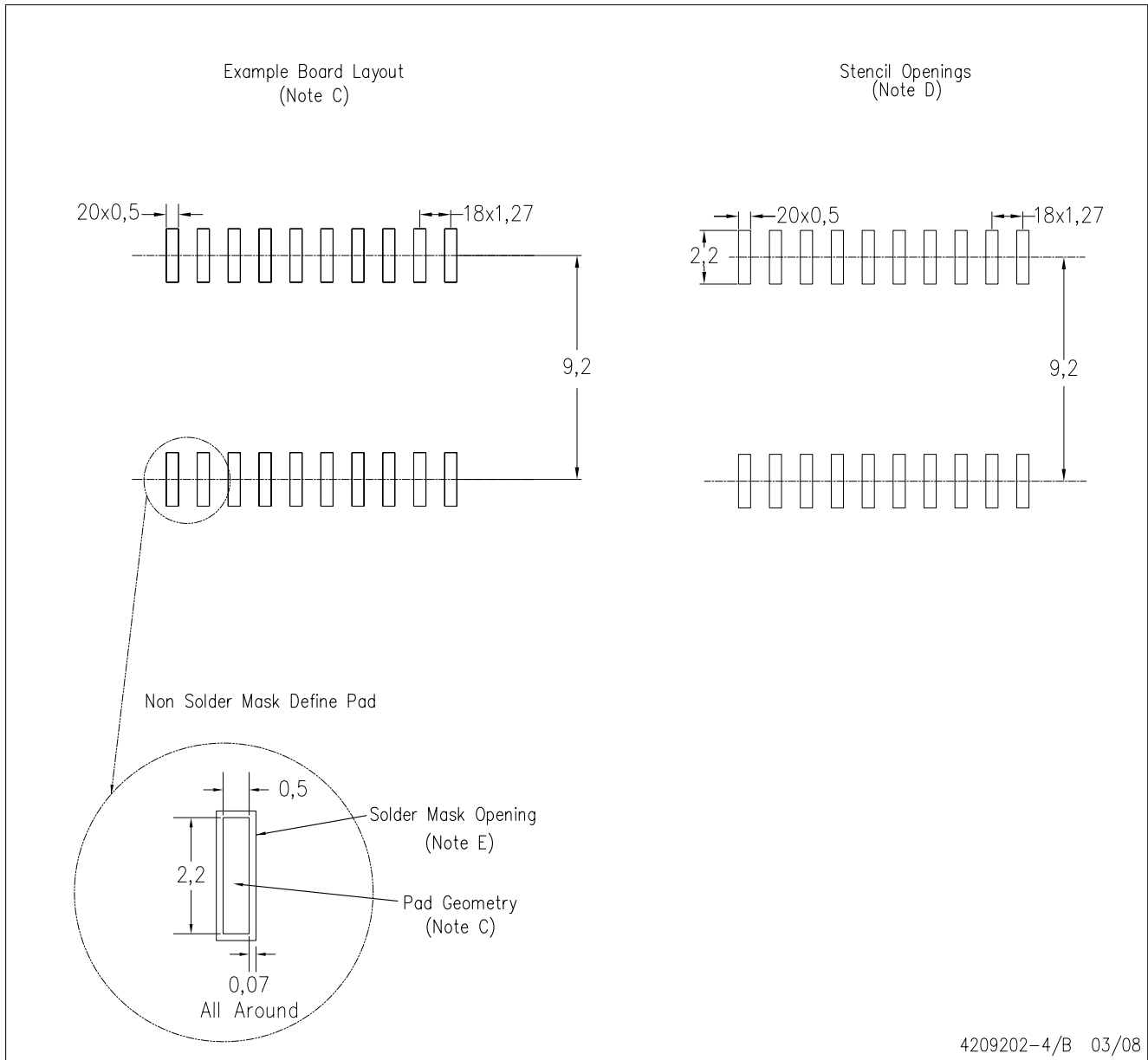
DW (R-PDSO-G20)

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-013 variation AC.

DW (R-PDSO-G20)



4209202-4/B 03/08

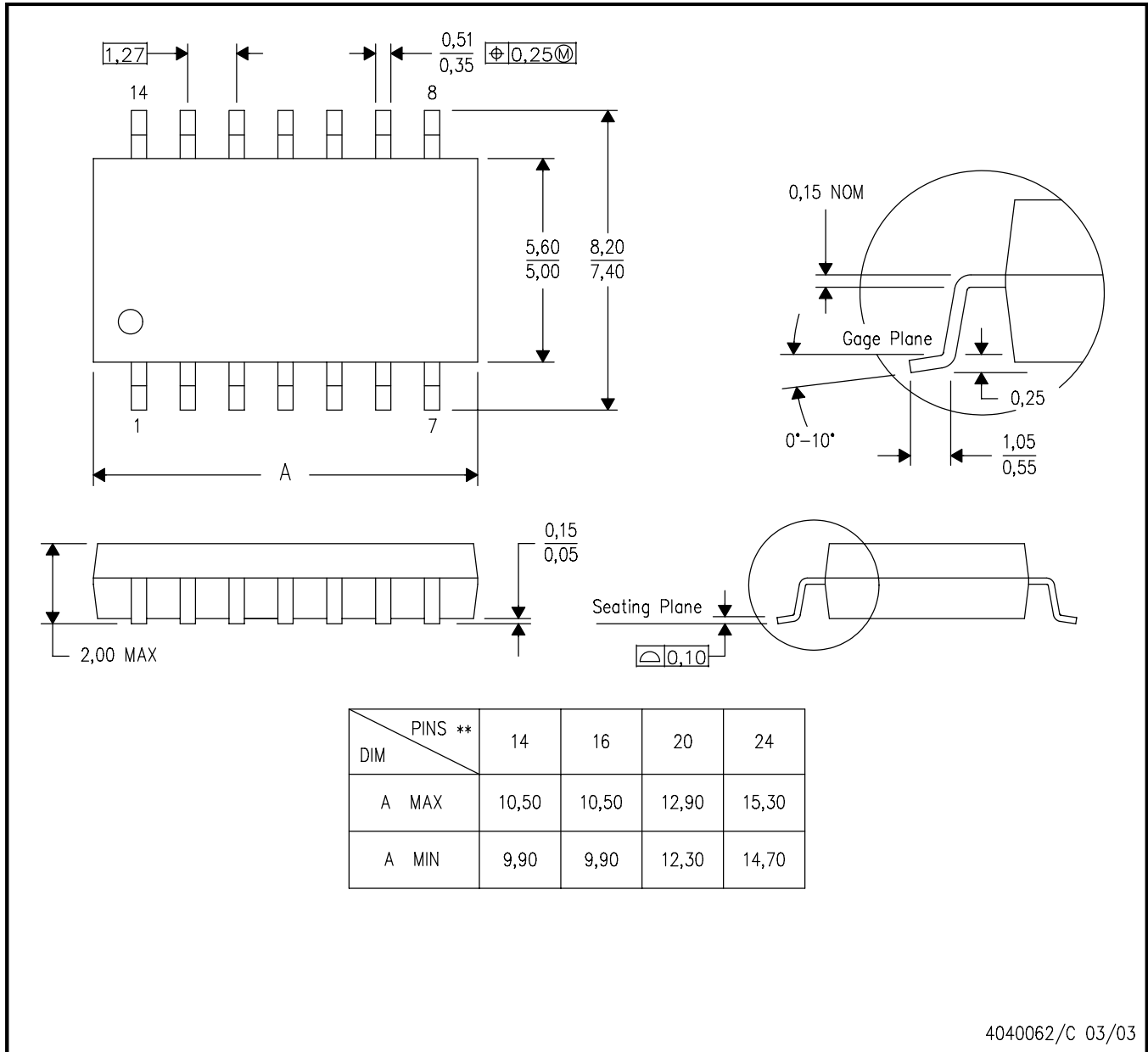
- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
 - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525
 - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN

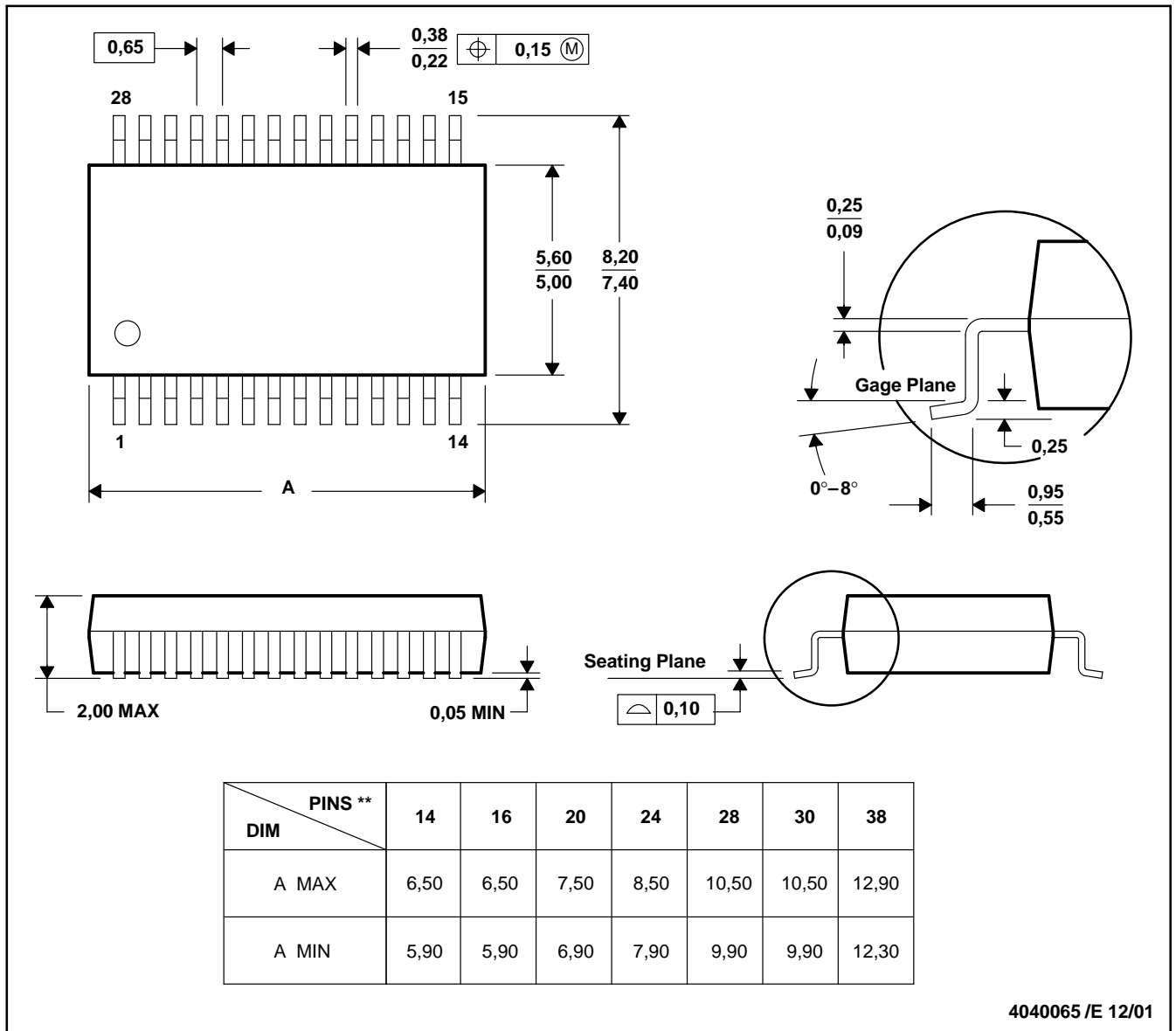


- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

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

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