

SN54132, SN54LS132, SN54S132, SN74132, SN74LS132, SN74S132 QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS

SDLS047 - DECEMBER 1983 - REVISED MARCH 1988

- Operation from Very Slow Edges
- Improved Line-Receiving Characteristics
- High Noise Immunity

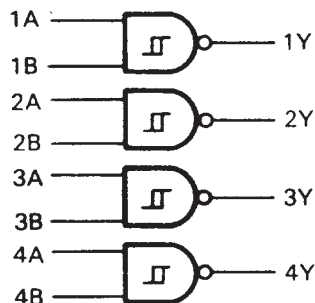
description

Each circuit functions as a 2-input NAND gate, but because of the Schmitt action, it has different input threshold levels for positive (V_{T+}) and for negative going (V_{T-}) signals.

These circuits are temperature-compensated and can be triggered from the slowest of input ramps and still give clear, jitter-free output signals.

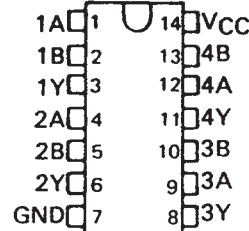
The SN54132, SN54LS132, and SN54S132 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74132, SN74LS132, and SN74S132 are characterized for operation from 0°C to 70°C .

logic diagram (positive logic)



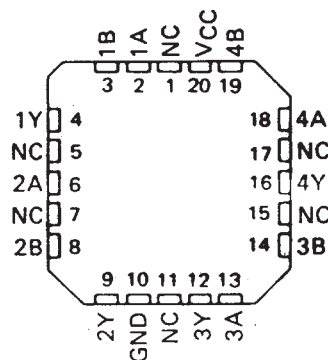
SN54132, SN54LS132, SN54S132 . . . J OR W PACKAGE
SN74132 . . . N PACKAGE
SN74LS132, SN74S132 . . . D OR N PACKAGE

(TOP VIEW)



SN54LS132, SN54S132 . . . FK PACKAGE

(TOP VIEW)



NC-No internal connection

logic symbol†



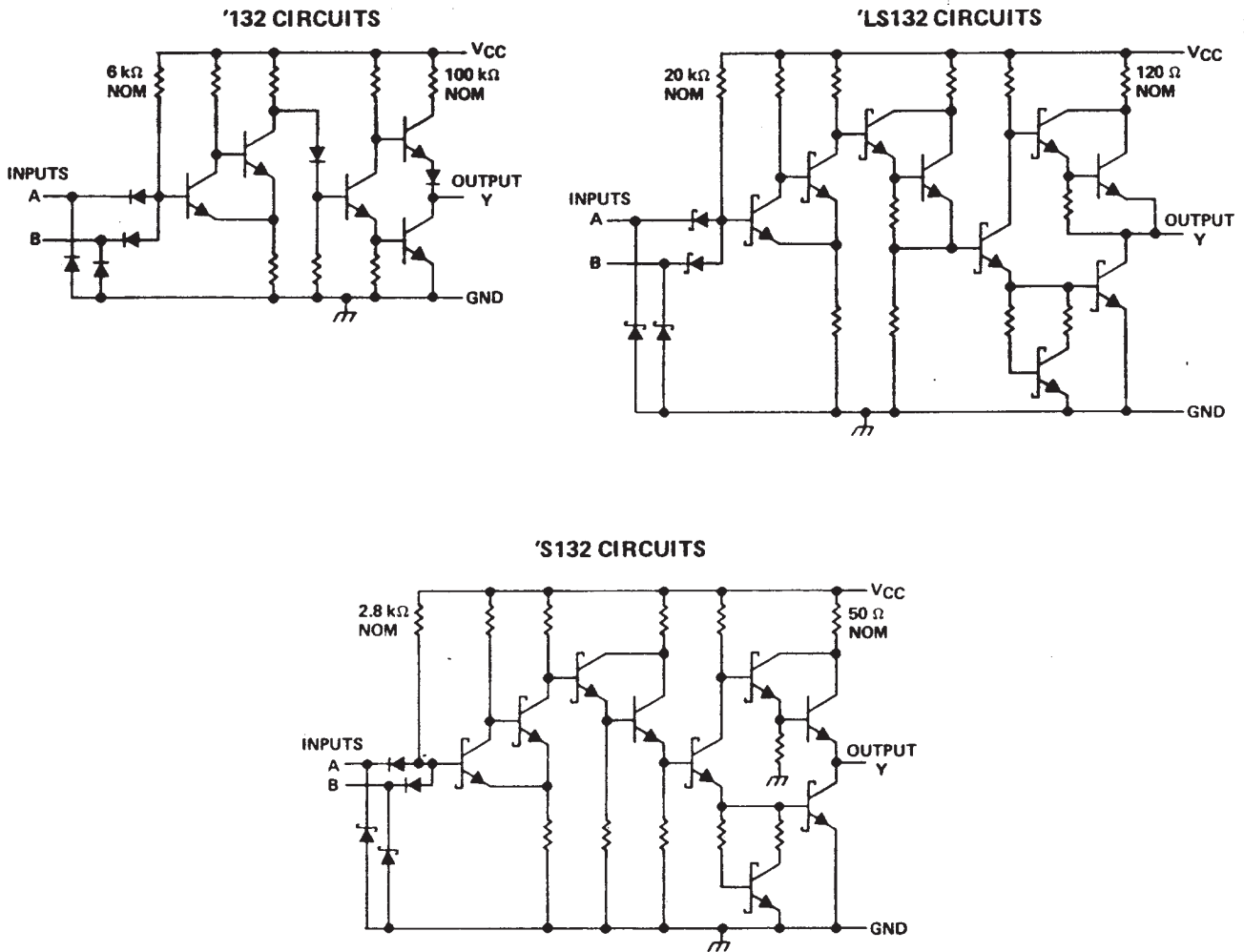
positive logic: $Y = \overline{AB}$ or $Y = \overline{A} + \overline{B}$

†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for D, J, N, and W packages.

SN54132, SN54LS132, SN54S132, SN74132, SN74LS132, SN74S132 QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS

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schematics



Resistor values shown are nominal.

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

| | |
|--|--|
| Supply voltage, V_{CC} (see Note 1)..... | 7 V |
| Input voltage: '132, 'S132..... | 5.5 V |
| 'LS132..... | 7 V |
| Operating free-air temperature: SN54'..... | -55°C to 125°C |
| SN74'..... | 0°C to 70°C |
| Storage temperature range..... | -65°C to 150°C |

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



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SN54132, SN74132

QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS

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recommended operating conditions

| | SN54132 | | | SN74132 | | | UNIT |
|---|---------|-----|------|---------|-----|------|------|
| | MIN | NOM | MAX | MIN | NOM | MAX | |
| V _{CC} Supply voltage | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | V |
| I _{OH} High-level output current | | | -0.8 | | | -0.8 | mA |
| I _{OL} Low-level output current | | | 16 | | | 16 | 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† | MIN | TYP‡ | MAX | UNIT |
|--|--|-------|------|------|------|
| V _{T+} | V _{CC} = 5 V | 1.5 | 1.7 | 2 | V |
| V _{T-} | V _{CC} = 5 V | 0.6 | 0.9 | 1.1 | V |
| V _{hys} (V _{T+} - V _{T-}) | V _{CC} = 5 V | 0.4 | 0.8 | | V |
| V _{IK} | V _{CC} = MIN, I _I = -12 mA | | | -1.5 | V |
| V _{OH} | V _{CC} = MIN, V _I = 0.6 V, I _{OH} = -0.8 mA | 2.4 | 3.4 | | V |
| V _{OL} | V _{CC} = MIN, V _I = 2 V, I _{OL} = 16 mA | | 0.2 | 0.4 | V |
| I _{T+} | V _{CC} = 5 V, V _I = V _{T+} | -0.43 | | | mA |
| I _{T-} | V _{CC} = 5 V, V _I = V _{T-} | -0.56 | | | mA |
| I _I | V _{CC} = MAX, V _I = 5.5 V | | | 1 | mA |
| I _{IH} | V _{CC} = MAX, V _I = 2.4 V | | | 40 | μA |
| I _{IL} | V _{CC} = MAX, V _{IL} = 0.4 V | -0.8 | | -1.2 | mA |
| I _{OS} § | V _{CC} = MAX | -18 | | -55 | mA |
| I _{CCH} | V _{CC} = MAX | | 15 | 24 | mA |
| I _{CCL} | V _{CC} = MAX | | 26 | 40 | mA |

† 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.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------|-----------------|----------------|--|-----|-----|-----|------|
| t _{PLH} | Any | Y | R _L = 400 Ω, C _L = 15 pF | | 15 | 22 | ns |
| t _{PHL} | | | | | 15 | 22 | ns |



SN54LS132, SN74LS132 QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS

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recommended operating conditions

| | SN54LS132 | | | SN74LS132 | | | UNIT |
|---|-----------|-----|------|-----------|-----|------|------|
| | MIN | NOM | MAX | MIN | NOM | MAX | |
| V _{CC} Supply voltage | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | 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† | SN54LS132 | | | SN74LS132 | | | UNIT |
|--|--|------------------------|------|------|-----------|------|------|------|
| | | MIN | TYP‡ | MAX | MIN | TYP‡ | MAX | |
| V _{T+} | V _{CC} = 5 V | 1.4 | 1.6 | 1.9 | 1.4 | 1.6 | 1.9 | V |
| V _{T-} | V _{CC} = 5 V | 0.5 | 0.8 | 1 | 0.5 | 0.8 | 1 | V |
| V _{hys} (V _{T+} - V _{T-}) | V _{CC} = 5 V | 0.4 | 0.8 | | 0.4 | 0.8 | | V |
| V _{IK} | V _{CC} = MIN, I _I = -18 mA | | | -1.5 | | | -1.5 | V |
| V _{OH} | V _{CC} = MIN, V _I = 0.5 V, I _{OH} = -0.4 mA | 2.5 | 3.4 | | 2.7 | 3.4 | | V |
| V _{OL} | V _{CC} = MIN, V _I = 1.9 V | I _{OL} = 4 mA | | 0.25 | 0.4 | 0.25 | | 0.4 |
| | | I _{OL} = 8 mA | | | | 0.35 | 0.5 | |
| I _{T+} | V _{CC} = 5 V, V _I = V _{T+} | -0.14 | | | -0.14 | | | mA |
| I _{T-} | V _{CC} = 5 V, V _I = V _{T-} | -0.18 | | | -0.18 | | | mA |
| I _I | V _{CC} = MAX, V _I = 7 V | 0.1 | | | 0.1 | | | mA |
| I _{IH} | V _{CC} = MAX, V _I = 2.7 V | 20 | | | 20 | | | μA |
| I _{IL} | V _{CC} = MAX, V _{IL} = 0.4 V | -0.4 | | | -0.4 | | | mA |
| I _{OS} § | V _{CC} = MAX | -20 | | -100 | -20 | | -100 | mA |
| I _{CCH} | V _{CC} = MAX | 5.9 | | 11 | 5.9 | | 11 | mA |
| I _{CCL} | V _{CC} = MAX | 8.2 | | 14 | 8.2 | | 14 | mA |

† 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.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see figure 1)

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------|--------------|-------------|---|-----|-----|-----|------|
| t _{PLH} | Any | Y | R _L = 2 kΩ, C _L = 15 pF | | 15 | 22 | ns |
| t _{PHL} | | | | | 15 | 22 | ns |



SN54S132, SN74S132

QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS

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recommended operating conditions

| | SN54S132 | | | SN74S132 | | | UNIT |
|--------------------------------------|----------|-----|-----|----------|-----|------|------|
| | MIN | NOM | MAX | MIN | NOM | MAX | |
| V_{CC} Supply voltage | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | V |
| I_{OH} High-level output current | | | -1 | | | -1 | mA |
| I_{OL} Low-level output current | | | 20 | | | 20 | 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† | SN54S132 | | | SN74S132 | | | UNIT |
|------------------------------------|--|----------|------|------|----------|------|------|------|
| | | MIN | TYP‡ | MAX | MIN | TYP‡ | MAX | |
| V_{T+} | $V_{CC} = 5\text{ V}$ | 1.6 | 1.77 | 1.9 | 1.6 | 1.77 | 1.9 | V |
| V_{T-} | $V_{CC} = 5\text{ V}$ | 1.1 | 1.22 | 1.4 | 1.1 | 1.22 | 1.4 | V |
| V_{hys} ($V_{T+} - V_{T-}$) | $V_{CC} = 5\text{ V}$ | 0.2 | 0.55 | | 0.2 | 0.55 | | V |
| V_{IK} | $V_{CC} = \text{MIN}$, $I_I = -18\text{ mA}$ | | | -1.2 | | | -1.2 | V |
| V_{OH} | $V_{CC} = \text{MIN}$, $V_I = 1.1\text{ V}$, $I_{OH} = -1\text{ mA}$ | 2.5 | 3.4 | | 2.7 | 3.4 | | V |
| V_{OL} | $V_{CC} = \text{MIN}$, $V_I = 1.9\text{ V}$, $I_{OL} = 20\text{ mA}$ | | | 0.5 | | | 0.5 | V |
| I_{T+} | $V_{CC} = 5\text{ V}$, $V_I = V_{T+}$ | | -0.9 | | | -0.9 | | mA |
| I_{T-} | $V_{CC} = 5\text{ V}$, $V_I = V_{T-}$ | | -1.1 | | | -1.1 | | mA |
| I_I | $V_{CC} = \text{MAX}$, $V_I = 5.5\text{ V}$ | | | 1 | | | 1 | mA |
| I_{IH} | $V_{CC} = \text{MAX}$, $V_I = 2.7\text{ V}$ | | | 50 | | | 50 | μA |
| I_{IL} | $V_{CC} = \text{MAX}$, $V_{IL} = 0.5\text{ V}$ | | | -2 | | | -2 | mA |
| $I_{OS}§$ | $V_{CC} = \text{MAX}$ | -40 | | -100 | -40 | | -100 | mA |
| I_{CCH} | $V_{CC} = \text{MAX}$ | | 28 | 44 | | 28 | 44 | mA |
| I_{CCL} | $V_{CC} = \text{MAX}$ | | 44 | 68 | | 44 | 68 | mA |

† 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)

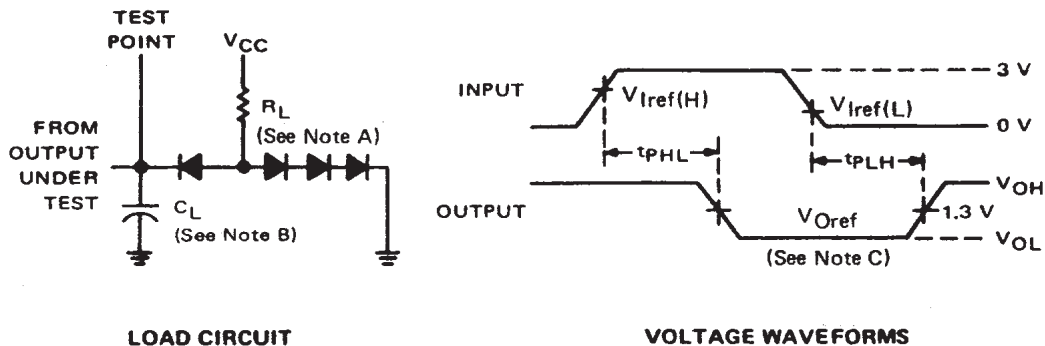
| PARAMETER | FROM (INPUT) | TO (OUTPUT) | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|-----------|-----------------|----------------|--|-----|-----|------|------|
| t_{PLH} | A or B | Y | $R_L = 280\ \Omega$, $C_L = 15\text{ pF}$ | | 7 | 10.5 | ns |
| t_{PHL} | | | | 8.5 | 13 | ns | |



**SN54132, SN54LS132, SN54S132,
SN74132, SN74LS132, SN74S132
QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS**

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PARAMETER MEASUREMENT INFORMATION



- NOTES: A. All diodes are 1N3064 or equivalent.
 B. C_L includes probe and jig capacitance.
 C. Generator characteristics and reference voltages are:

| | Generator Characteristics | | | | Reference Voltages | | |
|-----------------|---------------------------|-------|--------|--------|--------------------|-----------------|--------------|
| | Z_{out} | PRR | t_r | t_f | $V_{I\ ref(H)}$ | $V_{I\ ref(L)}$ | $V_{O\ ref}$ |
| SN54'/SN74' | 50 | 1 MHz | 10 ns | 10 ns | 1.7 V | 0.9 V | 1.5 V |
| SN54LS'/SN74LS' | 50 | 1 MHz | 15 ns | 6 ns | 1.6 V | 0.8 V | 1.3 V |
| 'S132 | 50 | 1 MHz | 2.5 ns | 2.5 ns | 1.8 V | 1.2 V | 1.5 V |

FIGURE 1

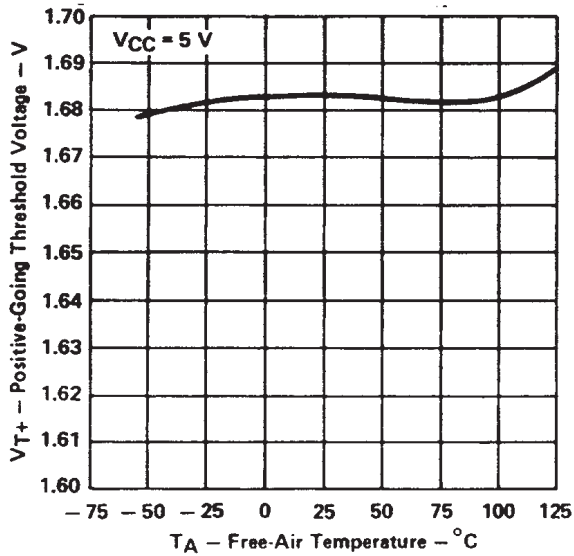
SN54132, SN74132

QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS

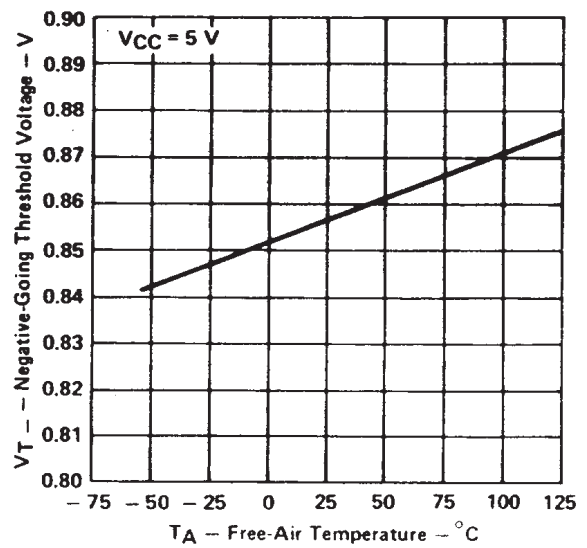
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TYPICAL CHARACTERISTICS OF '132 CIRCUITS

POSITIVE-GOING THRESHOLD VOLTAGE
vs
FREE-AIR TEMPERATURE



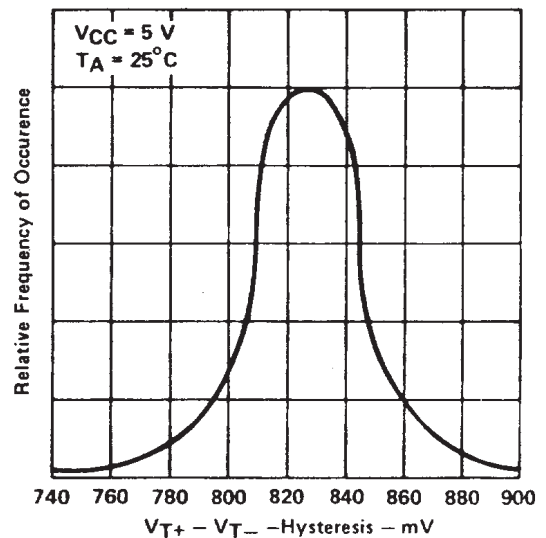
NEGATIVE-GOING THRESHOLD VOLTAGE
vs
FREE-AIR TEMPERATURE



HYSTERESIS
vs
FREE-AIR TEMPERATURE



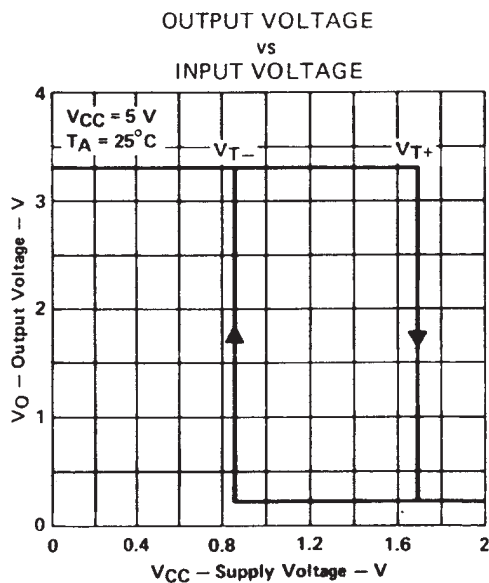
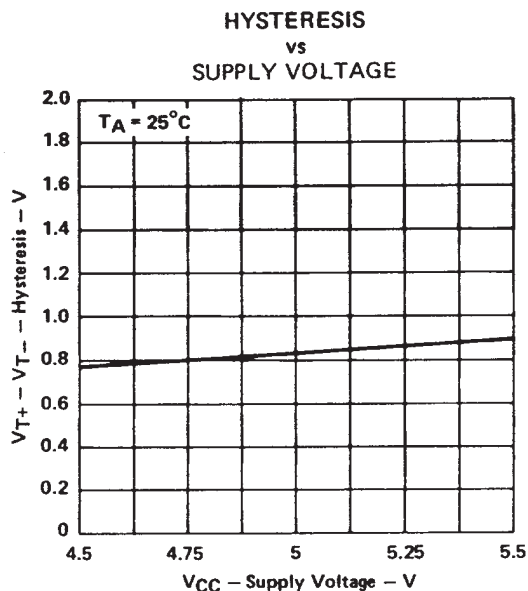
DISTRIBUTION OF UNITS
FOR HYSTERESIS



SN54132, SN74132 QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS

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TYPICAL CHARACTERISTICS OF '132 CIRCUITS



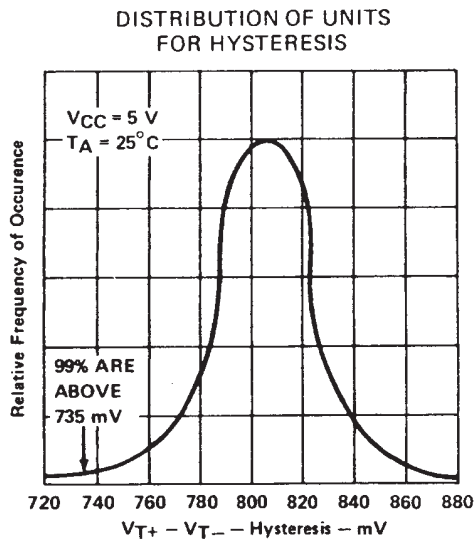
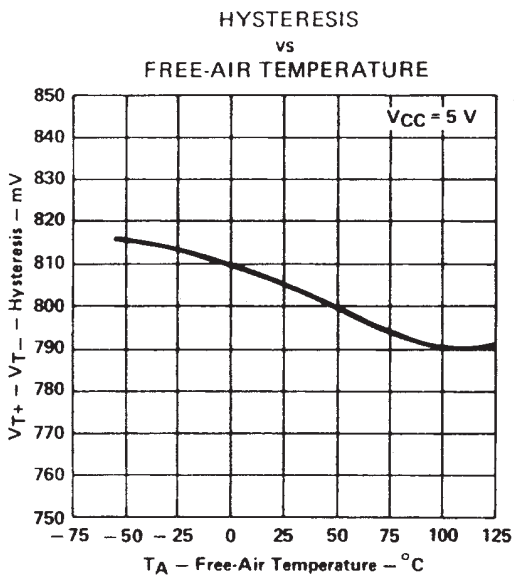
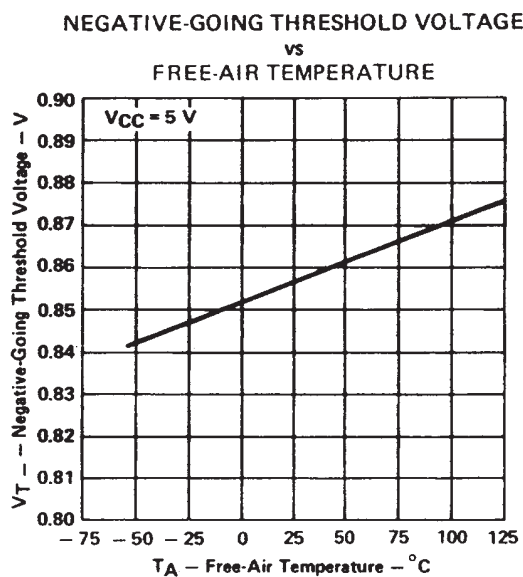
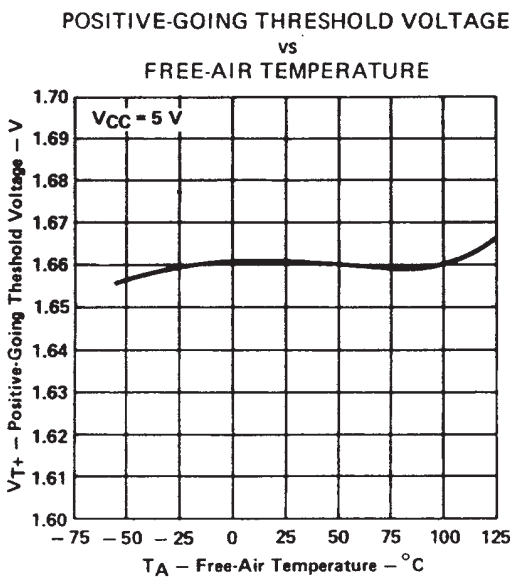
† Data for temperatures below 0°C and 70°C and supply below 4.75 V and above 5.25 V are applicable for SN54132 only.

SN54LS132, SN74LS132

QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS

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TYPICAL CHARACTERISTICS OF 'LS132 CIRCUITS

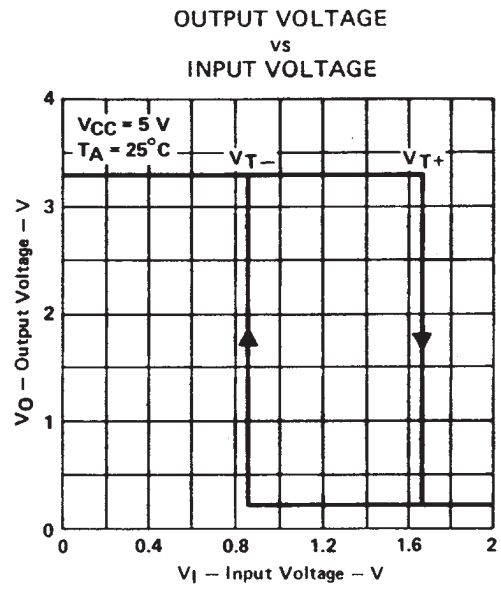


Data for temperatures below 0°C and above 70°C and supply voltages below 4.75 V and above 5.25 V are applicable for SN54LS132 only.

SN54LS132, SN74LS132 QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS

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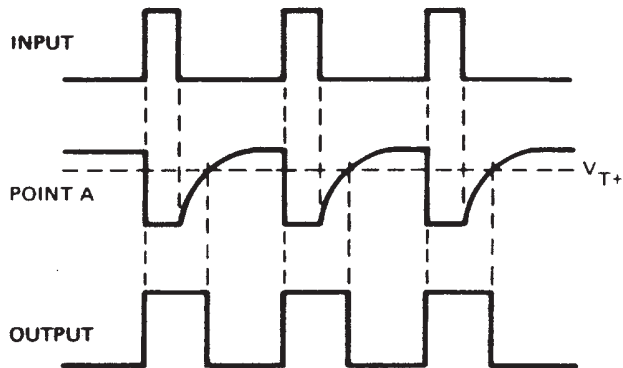
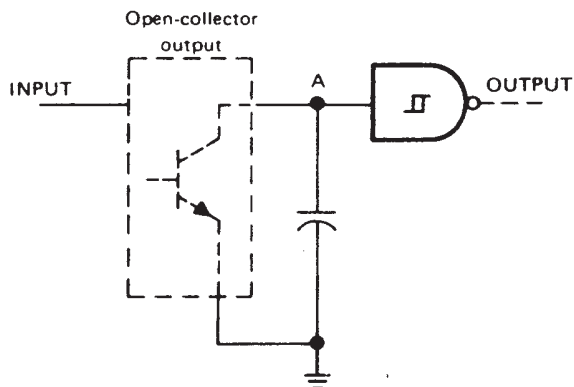
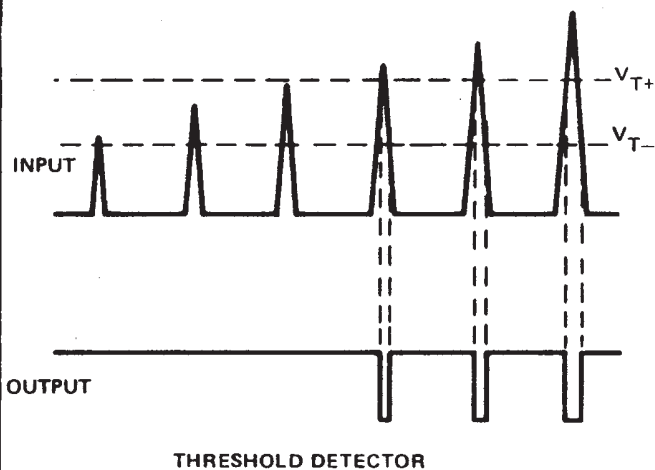
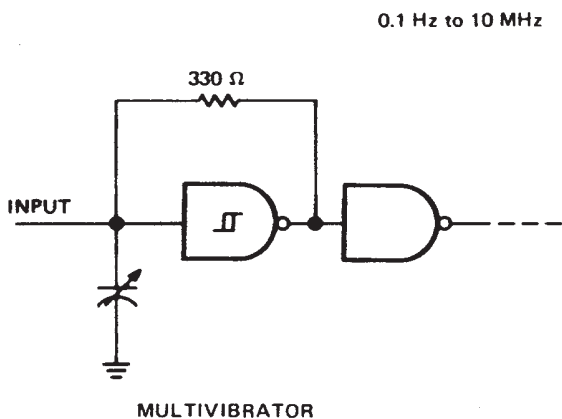
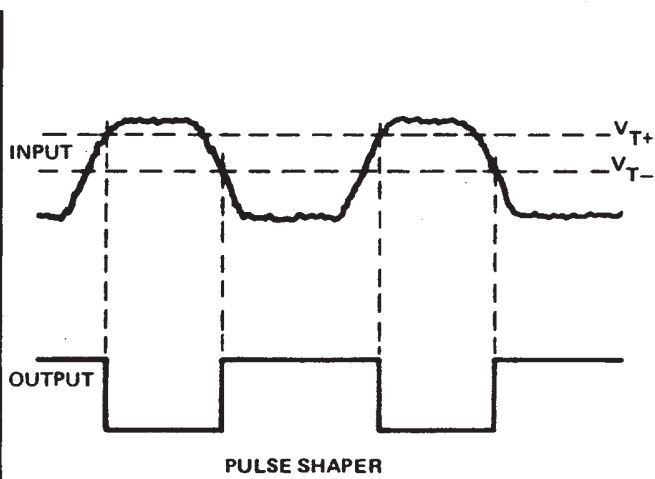
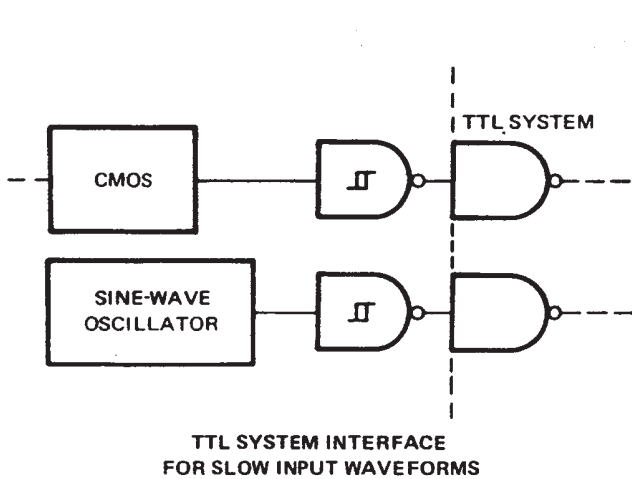
TYPICAL CHARACTERISTICS OF 'LS132 CIRCUITS



† Data for temperatures below 0°C and above 70°C and supply voltages below 4.75 V and above 5.25 V are applicable for SN54LS132 only.

SN54132, SN54LS132, SN54S132,
 SN74132, SN74LS132, SN74S132
QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT TRIGGERS
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TYPICAL APPLICATION DATA



PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead finish/ Ball material (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|----------------------------|--------------------------------------|----------------------|--------------|--------------------------|-------------------------|
| 7600401CA | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | 7600401CA SNJ54LS132J | Samples |
| 7600401DA | ACTIVE | CFP | W | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | 7600401DA SNJ54LS132W | Samples |
| 7600401DA | ACTIVE | CFP | W | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | 7600401DA SNJ54LS132W | Samples |
| JM38510/31303BCA | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | JM38510/ 31303BCA | Samples |
| JM38510/31303BCA | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | JM38510/ 31303BCA | Samples |
| M38510/31303BCA | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | JM38510/ 31303BCA | Samples |
| M38510/31303BCA | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | JM38510/ 31303BCA | Samples |
| SN54LS132J | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | SN54LS132J | Samples |
| SN54LS132J | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | SN54LS132J | Samples |
| SN54S132J | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | SN54S132J | Samples |
| SN54S132J | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | SN54S132J | Samples |
| SN74LS132D | ACTIVE | SOIC | D | 14 | 50 | Green (RoHS & no Sb/Br) | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | LS132 | Samples |
| SN74LS132D | ACTIVE | SOIC | D | 14 | 50 | Green (RoHS & no Sb/Br) | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | LS132 | Samples |
| SN74LS132DR | ACTIVE | SOIC | D | 14 | 2500 | Green (RoHS & no Sb/Br) | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | LS132 | Samples |
| SN74LS132DR | ACTIVE | SOIC | D | 14 | 2500 | Green (RoHS & no Sb/Br) | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | LS132 | Samples |
| SN74LS132N | ACTIVE | PDIP | N | 14 | 25 | Green (RoHS & no Sb/Br) | NIPDAU | N / A for Pkg Type | 0 to 70 | SN74LS132N | Samples |
| SN74LS132N | ACTIVE | PDIP | N | 14 | 25 | Green (RoHS & no Sb/Br) | NIPDAU | N / A for Pkg Type | 0 to 70 | SN74LS132N | Samples |

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead finish/ Ball material (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|--------------------------------------|----------------------|--------------|--------------------------|-------------------------|
| SN74LS132NSR | ACTIVE | SO | NS | 14 | 2000 | Green (RoHS & no Sb/Br) | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 74LS132 | Samples |
| SN74LS132NSR | ACTIVE | SO | NS | 14 | 2000 | Green (RoHS & no Sb/Br) | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 74LS132 | Samples |
| SNJ54LS132FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type | -55 to 125 | SNJ54LS132FK | Samples |
| SNJ54LS132FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type | -55 to 125 | SNJ54LS132FK | Samples |
| SNJ54LS132J | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | 7600401CA SNJ54LS132J | Samples |
| SNJ54LS132J | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | 7600401CA SNJ54LS132J | Samples |
| SNJ54LS132W | ACTIVE | CFP | W | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | 7600401DA SNJ54LS132W | Samples |
| SNJ54LS132W | ACTIVE | CFP | W | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | 7600401DA SNJ54LS132W | Samples |
| SNJ54S132FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type | -55 to 125 | SNJ54S132FK | Samples |
| SNJ54S132FK | ACTIVE | LCCC | FK | 20 | 1 | TBD | POST-PLATE | N / A for Pkg Type | -55 to 125 | SNJ54S132FK | Samples |
| SNJ54S132J | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | SNJ54S132J | Samples |
| SNJ54S132J | ACTIVE | CDIP | J | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | SNJ54S132J | Samples |
| SNJ54S132W | ACTIVE | CFP | W | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | SNJ54S132W | Samples |
| SNJ54S132W | ACTIVE | CFP | W | 14 | 1 | TBD | SNPB | N / A for Pkg Type | -55 to 125 | SNJ54S132W | Samples |

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

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

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

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

OBSELETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of ≤ 1000 ppm threshold. Antimony trioxide based flame retardants must also meet the ≤ 1000 ppm threshold requirement.

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

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

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

(6) Lead finish/Ball material - Orderable Devices 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.

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OTHER QUALIFIED VERSIONS OF SN54LS132, SN74LS132 :

● Catalog: [SN74LS132](#)

● Military: [SN54LS132](#)

NOTE: Qualified Version Definitions:

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

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



| | |
|----|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

TAPE AND REEL INFORMATION

*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|--------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN74LS132DR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74LS132NSR | SO | NS | 14 | 2000 | 330.0 | 16.4 | 8.2 | 10.5 | 2.5 | 12.0 | 16.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|--------------|--------------|-----------------|------|------|-------------|------------|-------------|
| SN74LS132DR | SOIC | D | 14 | 2500 | 367.0 | 367.0 | 38.0 |
| SN74LS132NSR | SO | NS | 14 | 2000 | 367.0 | 367.0 | 38.0 |

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



| NO. OF TERMINALS ** | A | | B | |
|---------------------|------------------|------------------|------------------|------------------|
| | MIN | MAX | MIN | MAX |
| 20 | 0.342 (8,69) | 0.358 (9,09) | 0.307 (7,80) | 0.358 (9,09) |
| 28 | 0.442 (11,23) | 0.458 (11,63) | 0.406 (10,31) | 0.458 (11,63) |
| 44 | 0.640 (16,26) | 0.660 (16,76) | 0.495 (12,58) | 0.560 (14,22) |
| 52 | 0.740 (18,78) | 0.761 (19,32) | 0.495 (12,58) | 0.560 (14,22) |
| 68 | 0.938 (23,83) | 0.962 (24,43) | 0.850 (21,6) | 0.858 (21,8) |
| 84 | 1.141 (28,99) | 1.165 (29,59) | 1.047 (26,6) | 1.063 (27,0) |



4040140/D 01/11

- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package can be hermetically sealed with a metal lid.
 - Falls within JEDEC MS-004

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.

W (R-GDFP-F14)

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-F14

J 14

GENERIC PACKAGE VIEW
CDIP - 5.08 mm max height
CERAMIC DUAL IN LINE PACKAGE



Images above are just a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.

4040083-5/G

J0014A



PACKAGE OUTLINE

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



4214771/A 05/2017

NOTES:

1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermetically sealed with a ceramic lid using glass frit.
4. Index point is provided on cap for terminal identification only and on press ceramic glass frit seal only.
5. Falls within MIL-STD-1835 and GDIP1-T14.

EXAMPLE BOARD LAYOUT

J0014A

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



LAND PATTERN EXAMPLE
NON-SOLDER MASK DEFINED
SCALE: 5X



4214771/A 05/2017

D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 -  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.
 -  Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
 - E. Reference JEDEC MS-012 variation AB.

D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



4211283-3/E 08/12

- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Publication IPC-7351 is recommended for alternate designs.
 - 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 for other stencil recommendations.
 - Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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.
 - $\triangle C$ Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - $\triangle D$ The 20 pin end lead shoulder width is a vendor option, either half or full width.

4040049/E 12/2002

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