- ● Choice of Open-Collector, Open-Emitter, or 3-State Outputs
- ● High-Impedance Output State for Party-Line Applications
- ● Single-Ended or Differential AND/NAND Outputs
- ● Single 5-V Supply
- ● Dual Channel Operation
- ● Compatible With TTL
- ● Short-Circuit Protection
- ● High-Current Outputs
- ● Common and Individual Output Controls
- ● Clamp Diodes at Inputs and Outputs
- ● Easily Adaptable to SN55114 and SN75114 Applications
- ● Designed for Use With SN55115 and SN75115

**SN55113 . . . J OR W PACKAGE**
**SN75113 . . . N PACKAGE**
**(TOP VIEW)**

| | | | |
|---|---|---|---|
| 1ZP | 1 | 16 | $V_{CC}$ |
| 1ZS | 2 | 15 | 2ZP |
| 1YS | 3 | 14 | 2ZS |
| 1YP | 4 | 13 | 2YS |
| 1A | 5 | 12 | 2YP |
| 1B | 6 | 11 | 2A |
| 1C | 7 | 10 | 2C |
| GND | 8 | 9 | CC |

**SN55113 . . . FK PACKAGE**
**(TOP VIEW)**

Top pins: 1ZS (3), 1ZP (2), NC (1), $V_{CC}$ (20), 2ZP (19)

| | | | |
|---|---|---|---|
| 1YS | 4 | 18 | 2ZS |
| 1YP | 5 | 17 | 2YS |
| NC | 6 | 16 | NC |
| 1A | 7 | 15 | 2YP |
| 1B | 8 | 14 | 2A |

Bottom pins: 1C (9), GND (10), NC (11), CC (12), 2C (13)
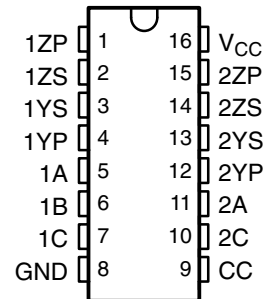
NC – No internal connection

## description

The SN55113 and SN75113 dual differential line drivers with 3-state outputs are designed to provide all the features of the SN55114 and SN75114 line drivers with the added feature of driver output controls. Individual controls are provided for each output pair, as well as a common control for both output pairs. If any output is low, the associated output is in a high-impedance state and the output can neither drive nor load the bus. This permits many devices to be connected together on the same transmission line for party-line applications.
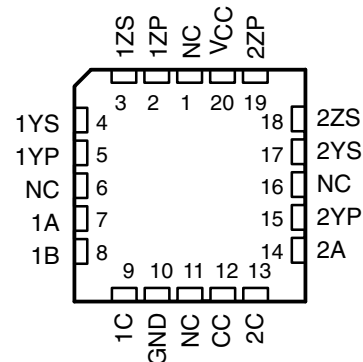
The output stages are similar to TTL totem-pole outputs, but with the sink outputs, YS and ZS, and the corresponding active pullup terminals, YP and ZP, available on adjacent package pins.

The SN55113 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN75113 is characterized for operation over the temperature range of 0°C to 70°C.

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**TEXAS INSTRUMENTS**

POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

**FUNCTION TABLE**

| INPUTS | | | | OUTPUTS | |
|---|---|---|---|---|---|
| OUTPUT C | CONTROL CC | DATA | | AND Y | NAND Z |
| | | A | B[†] | | |
| L | X | X | X | Z | Z |
| X | L | X | X | Z | Z |
| H | H | L | X | L | H |
| H | H | X | L | L | H |
| H | H | H | H | H | L |

H = high level, L = low level, X = irrelevant,

Z = high impedance (off)

[†] B input and 4th line of function table are applicable only to driver number 1.

## logic symbol‡
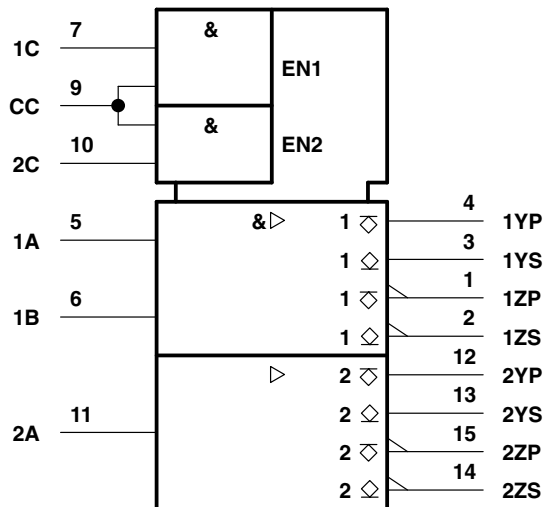


## logic diagram (positive logic)



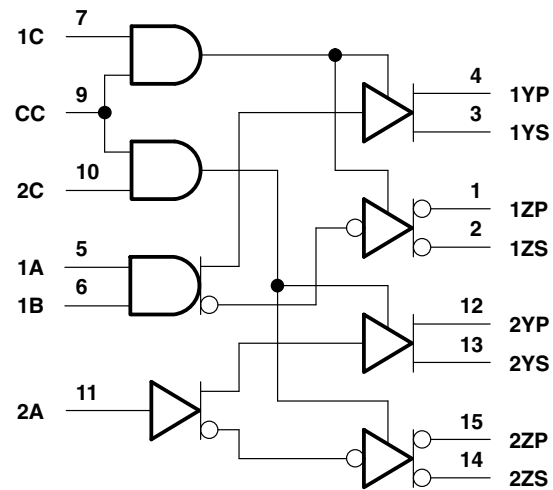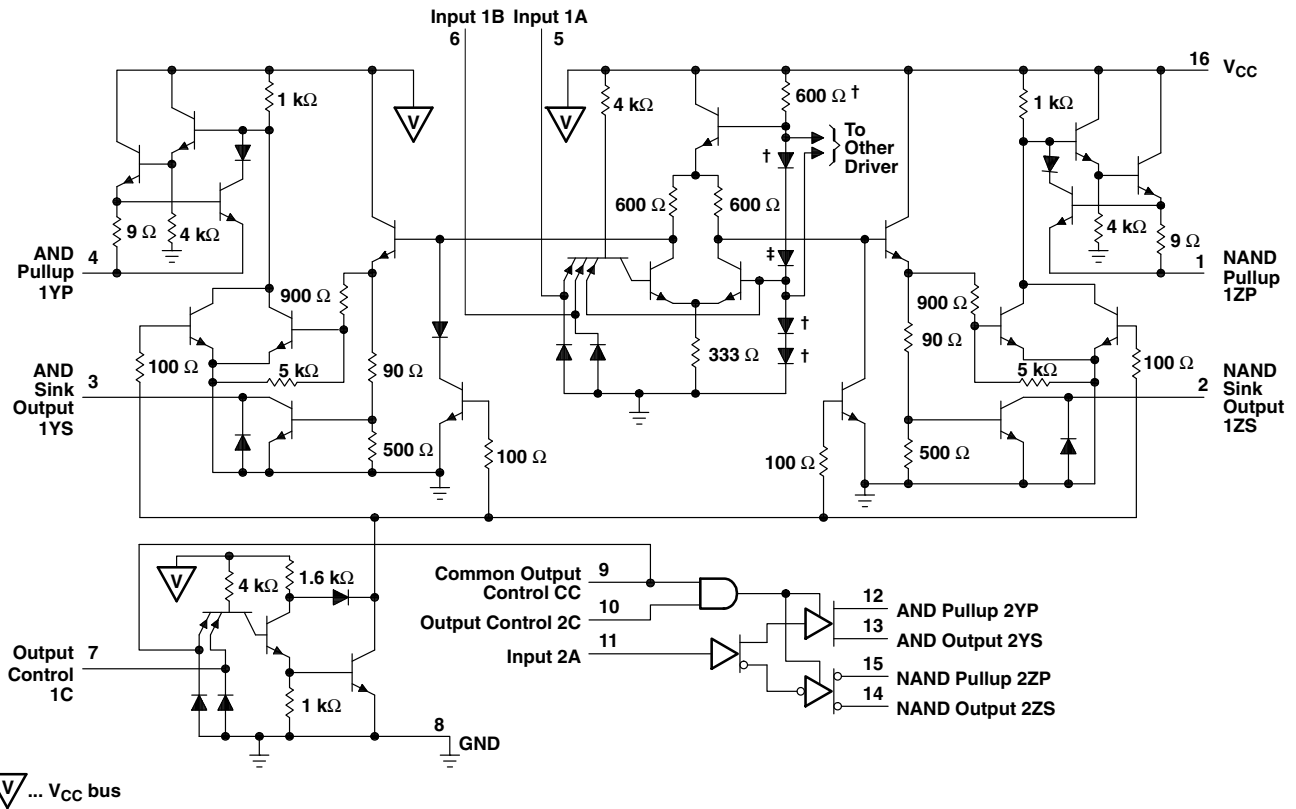‡ This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

## schematic



$\nabla$ ... V_CC bus

† These components are common to both drivers. Resistor values shown are nominal and in ohms.

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

Supply voltage, $V_{CC}$ (see Note 1) ......................................................... 7 V
Input voltage, $V_I$ .......................................................... 5.5 V
Off-state voltage applied to open-collector outputs ........................................... 12 V
Continuous total power dissipation (see Note 2) ......................... See Dissipation Rating Table
Operating free-air temperature range, $T_A$: SN55113 .................................... −55°C to 125°C
　　　　　　　　　　　　　　　　　　　SN75113 ..................................... 0°C to 70°C
Storage temperature range, $T_{stg}$ .......................................................... −65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: N package ...................... 260°C
Case temperature for 60 seconds: FK package ............................................ 260°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J or W package ................ 300°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.

**DISSIPATION RATING TABLE**

| PACKAGE | $T_A \leq 25°C$ POWER RATING | DERATING FACTOR ABOVE $T_A = 25°C$ | $T_A = 70°C$ POWER RATING | $T_A = 125°C$ POWER RATING |
|---|---|---|---|---|
| FK | 1375 mW | 11.0 mW/°C | 880 mW | 275 mW |
| J | 1375 mW | 11.0 mW/°C | 880 mW | 275 mW |
| N | 1150 mW | 9.2 mW/°C | 736 mW | N/A |
| W | 1000 mW | 8.0 mW/°C | 640 mW | 200 mW |

### TEXAS INSTRUMENTS

## recommended operating conditions

| | SN55113 | | | SN75113 | | | UNIT |
|---|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX | |
| Supply voltage, $V_{CC}$ | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | V |
| High-level input voltage, $V_{IH}$ | 2 | | | 2 | | | V |
| Low-level input voltage, $V_{IL}$ | | | 0.8 | | | 0.8 | V |
| High-level output current, $I_{OH}$ | | | − 40 | | | − 40 | mA |
| Low-level output current, $I_{OL}$ | | | 40 | | | 40 | mA |
| Operating free-air temperature, $T_A$ | − 55 | | 125 | 0 | | 70 | °C |

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

| PARAMETER | | | TEST CONDITIONS† | | | SN55113 | | | SN75113 | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | MIN | TYP‡ | MAX | MIN | TYP‡ | MAX | |
| $V_{IK}$ | Input clamp voltage | | $V_{CC}$ = MIN, | $I_I$ = − 12 mA | | | −0.9 | −1.5 | | −0.9 | −1.5 | V |
| $V_{OH}$ | High-level output voltage | | $V_{CC}$ = MIN, $V_{IL}$ = 0.8 V | $V_{IH}$ = 2 V, | $I_{OH}$ = −10 mA | 2.4 | 3.4 | | 2.4 | 3.4 | | V |
| | | | | | $I_{OH}$ = − 40 mA | 2 | 3.0 | | 2 | 3.0 | | |
| $V_{OL}$ | Low-level output voltage | | $V_{CC}$ = MIN, $I_{OL}$ = 40 mA | $V_{IH}$ = 2 V, | $V_{IL}$ = 0.8 V, | | 0.23 | 0.4 | | 0.23 | 0.4 | V |
| $V_{OK}$ | Output clamp voltage | | $V_{CC}$ = MAX, | $I_O$ = − 40 mA | | | −1.1 | −1.5 | | −1.1 | −1.5 | V |
| $I_{O(off)}$ | Off-state open-collector output current | | $V_{CC}$ = MAX | $V_{OH}$ = 12 V | $T_A$ = 25°C | | 1 | 10 | | | | μA |
| | | | | | $T_A$ = 125°C | | | 200 | | | | |
| | | | | $V_{OH}$ = 5.25 V | $T_A$ = 25°C | | | | | 1 | 10 | |
| | | | | | $T_A$ = 70°C | | | | | | 20 | |
| $I_{OZ}$ | Off-state (high-impedance-state) output current | | $V_{CC}$ = MAX, Output controls at 0.8 V | $T_A$ = 25°C, | $V_O$ = 0 to $V_{CC}$ | | | ±10 | | | ±10 | μA |
| | | | | $T_A$ = MAX | $V_O$ = 0 | | | −150 | | | −20 | |
| | | | | | $V_O$ = 0.4 V | | | ±80 | | | ±20 | |
| | | | | | $V_O$ = 2.4 V | | | ±80 | | | ±20 | |
| | | | | | $V_O$ = $V_{CC}$ | | | 80 | | | 20 | |
| $I_I$ | Input current at maximum input voltage | A, B, C | $V_{CC}$ = MAX, | $V_I$ = 5.5 V | | | | 1 | | | 1 | mA |
| | | CC | | | | | | 2 | | | 2 | |
| $I_{IH}$ | High-level input current | A, B, C | $V_{CC}$ = MAX, | $V_I$ = 2.4 V | | | | 40 | | | 40 | μA |
| | | CC | | | | | | 80 | | | 80 | |
| $I_{IL}$ | Low-level input current | A, B, C | $V_{CC}$ = MAX, | $V_I$ = 0.4 V | | | | −1.6 | | | −1.6 | mA |
| | | CC | | | | | | −3.2 | | | −3.2 | |
| $I_{OS}$ | Short-circuit output current§ | | $V_{CC}$ = MAX, | $V_O$ = 0, | $T_A$ = 25°C | −40 | −90 | −120 | −40 | −90 | −120 | mA |
| $I_{CC}$ | Supply current (both drivers) | | All inputs at 0 V, No load, $T_A$ = 25°C | $V_{CC}$ = MAX | | | 47 | 65 | | 47 | 65 | mA |
| | | | | $V_{CC}$ = 7 V | | | 65 | 85 | | 65 | 85 | |

† All parameters with the exception of off-state open-collector output current are measured with the active pullup connected to the sink output. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at $T_A$ = 25°C and $V_{CC}$ = 5 V, with the exception of $V_{CC}$ at 7 V.

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

TEXAS
INSTRUMENTS

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

## switching characteristics, $V_{CC}$ = 5 V, $C_L$ = 30 pF, $T_A$ = 25°C

| PARAMETER | | TEST CONDITIONS | SN55113 | | | SN75113 | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | MIN | TYP | MAX | |
| $t_{PLH}$ | Propagation delay time, low-to-high level output | See Figure 1 | | 13 | 20 | | 13 | 30 | ns |
| $t_{PHL}$ | Propagation delay time, high-to-low-level output | | | 12 | 20 | | 12 | 30 | ns |
| $t_{PZH}$ | Output enable time to high level | $R_L$ = 180 Ω, See Figure 2 | | 7 | 15 | | 7 | 20 | ns |
| $t_{PZL}$ | Output enable time to low level | $R_L$ = 250 Ω, See Figure 3 | | 14 | 30 | | 14 | 40 | ns |
| $t_{PHZ}$ | Output disable time from high level | $R_L$ = 180 Ω, See Figure 2 | | 10 | 20 | | 10 | 30 | ns |
| $t_{PLZ}$ | Output disable time from low level | $R_L$ = 250 Ω, See Figure 3 | | 17 | 35 | | 17 | 35 | ns |

# PARAMETER MEASUREMENT INFORMATION
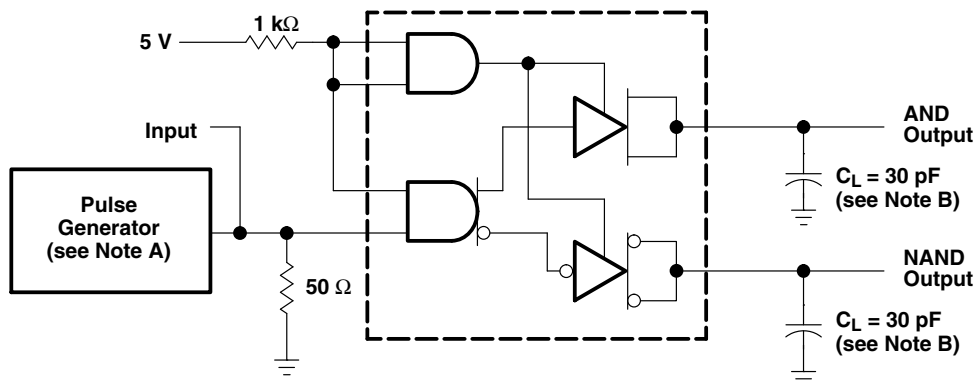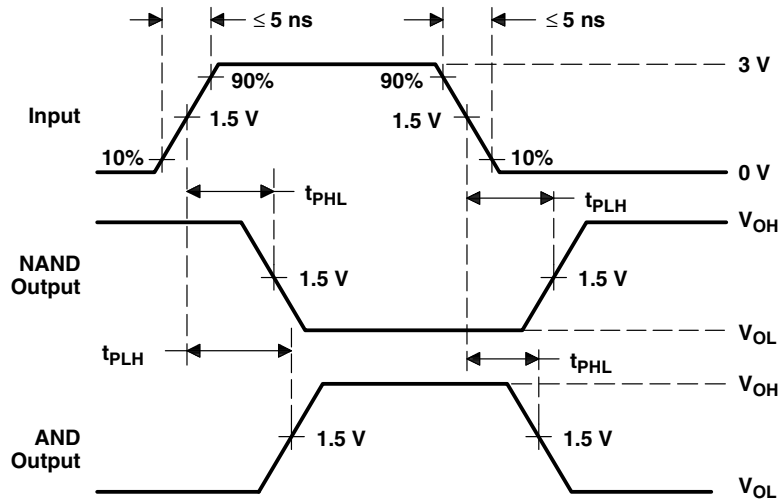


**TEST CIRCUIT**



**VOLTAGE WAVEFORMS**

NOTES: A. The pulse generator has the following characteristics: $Z_O$ = 50 Ω, PRR ≤ 500 kHz, $t_w$ = 100 ns.
B. $C_L$ includes probe and jig capacitance.

**Figure 1. Test Circuit and Voltage Waveforms $t_{PLH}$ and $t_{PHL}$**

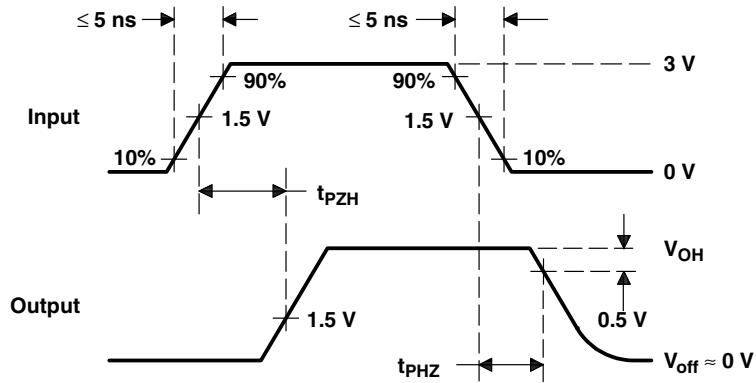# PARAMETER MEASUREMENT INFORMATION

**TEST CIRCUIT**

**VOLTAGE WAVEFORMS**
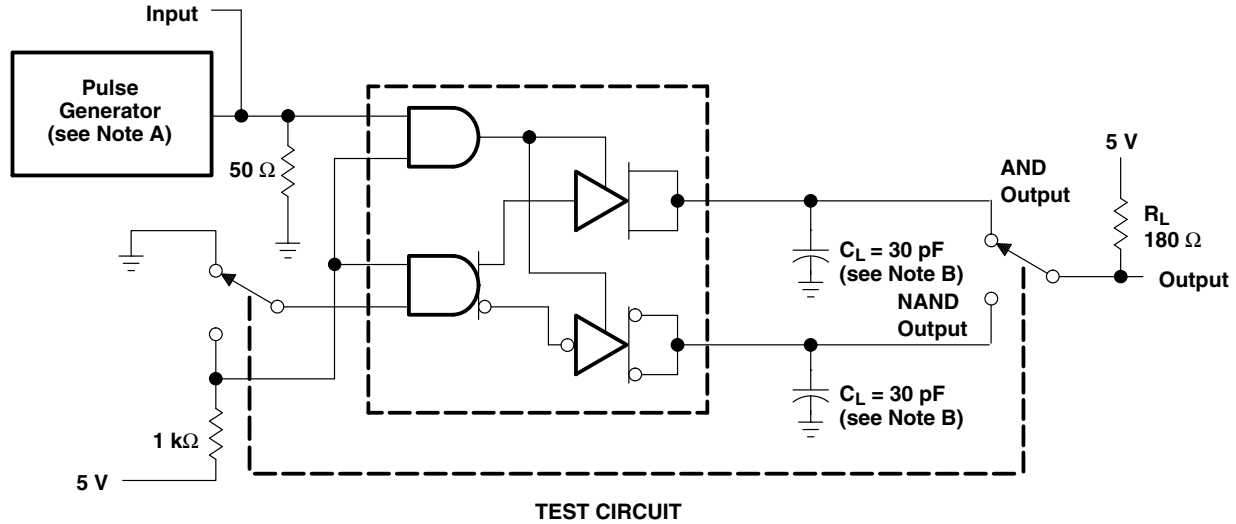
NOTES: A. The pulse generator has the following characteristics: $Z_O$ = 50 $\Omega$, PRR $\leq$ 500 kHz, $t_w$ = 100 ns.
        B. $C_L$ includes probe and jig capacitance.

**Figure 2. Test Circuit and Voltage Waveforms $t_{PZH}$ and $t_{PHZ}$**
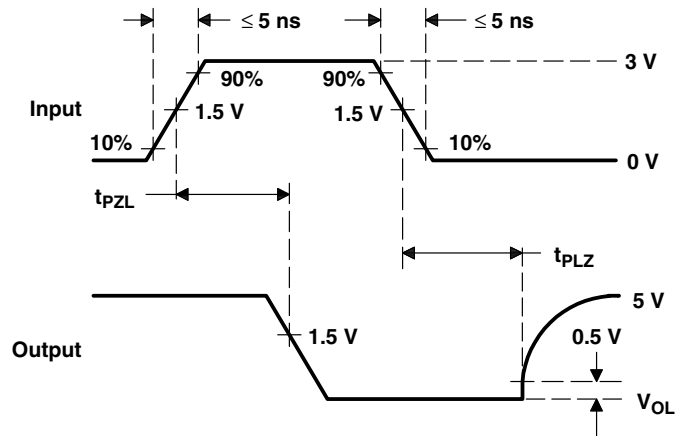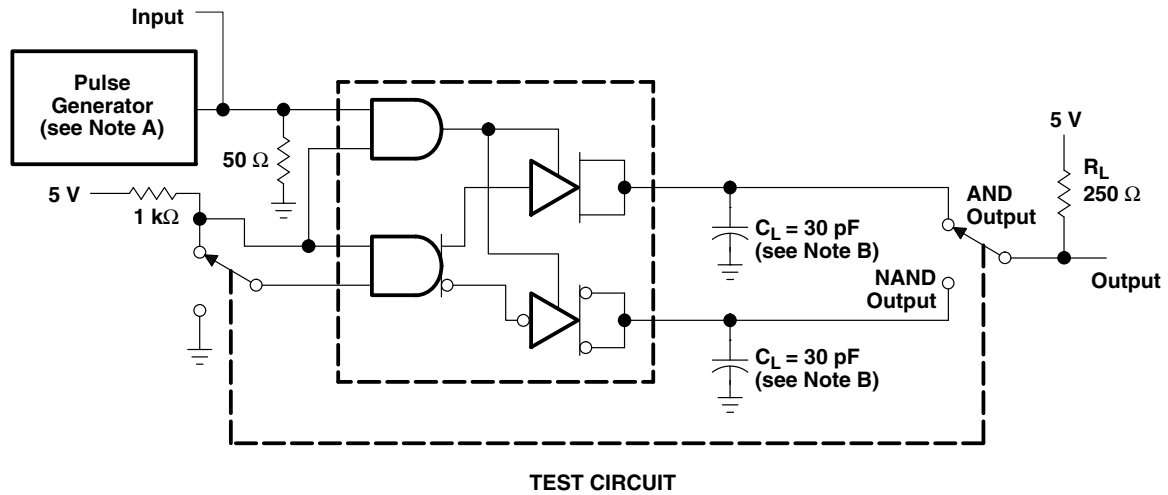
## PARAMETER MEASUREMENT INFORMATION



**TEST CIRCUIT**



**VOLTAGE WAVEFORMS**

NOTES: A. The pulse generator has the following characteristics: $Z_O = 50\ \Omega$, PRR ≤ 500 kHz, $t_w = 100$ ns.
B. $C_L$ includes probe and jig capacitance.

**Figure 3. Test Circuit and Voltage Waveforms, $t_{PZL}$ and $t_{PLZ}$**

# SN55113, SN75113
# DUAL DIFFERENTIAL LINE DRIVERS

SLLS070C – SEPTEMBER 1973 – REVISED MARCH 1997

## TYPICAL CHARACTERISTICS†

OUTPUT VOLTAGE
vs
DATA INPUT VOLTAGE

Figure 4
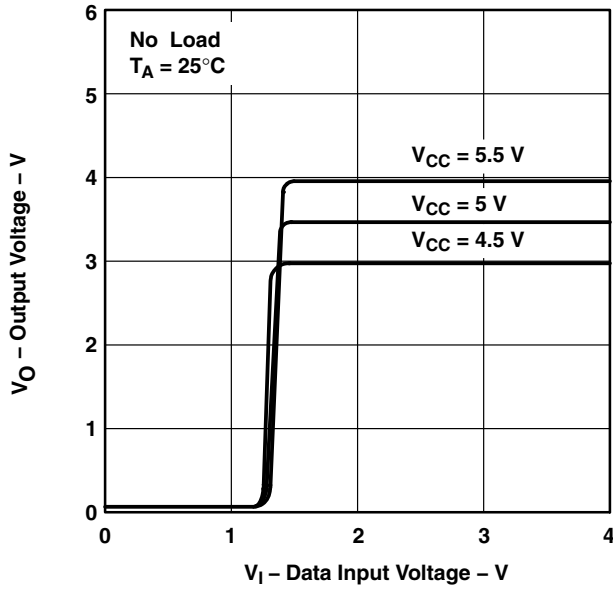
OUTPUT VOLTAGE
vs
DATA INPUT VOLTAGE
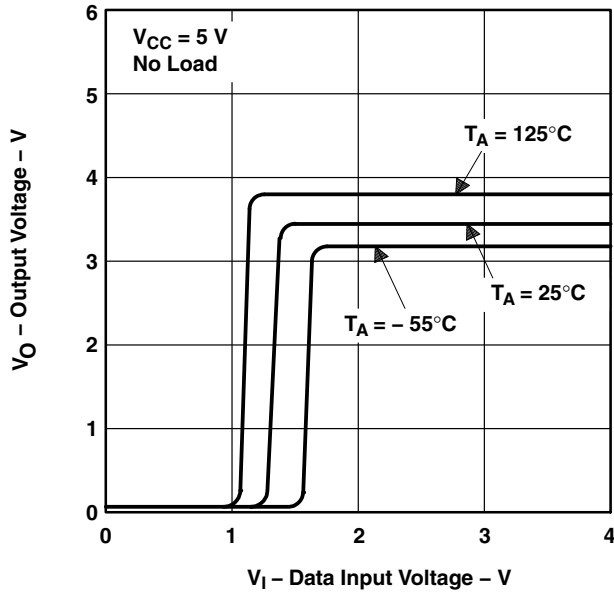
Figure 5

OUTPUT VOLTAGE
vs
INPUT VOLTAGE (OUTPUT CONTROL)
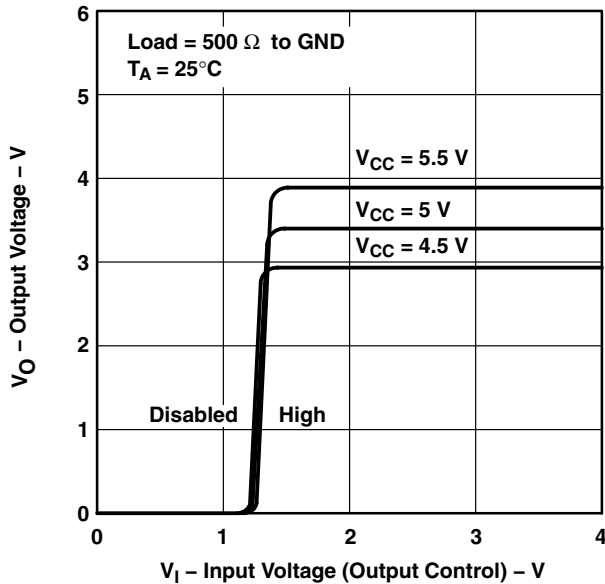
Figure 6

OUTPUT VOLTAGE
vs
INPUT VOLTAGE (OUTPUT CONTROL)

Figure 7

† Data for temperatures below 0°C and above 70°C and for supply voltages below 4.75 V and above 5.25 V are applicable to SN55113 circuits only. These parameters were measured with the active pullup connected to the sink output.

## TYPICAL CHARACTERISTICS[†]

**OUTPUT VOLTAGE**
**vs**
**INPUT VOLTAGE (OUTPUT CONTROL)**



**Figure 8**

**OUTPUT VOLTAGE**
**vs**
**INPUT VOLTAGE (OUTPUT CONTROL)**



**Figure 9**

**OUTPUT VOLTAGE**
**vs**
**FREE-AIR TEMPERATURE**



**Figure 10**

**HIGH-LEVEL OUTPUT VOLTAGE**
**vs**
**OUTPUT CURRENT**
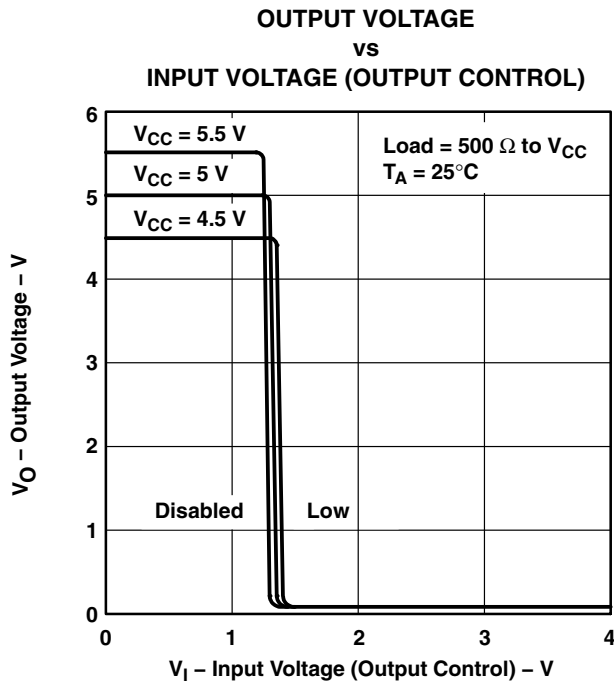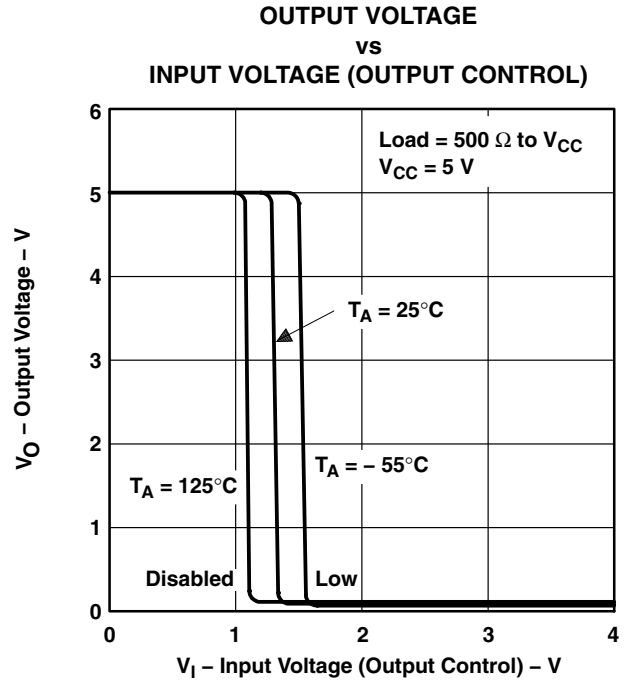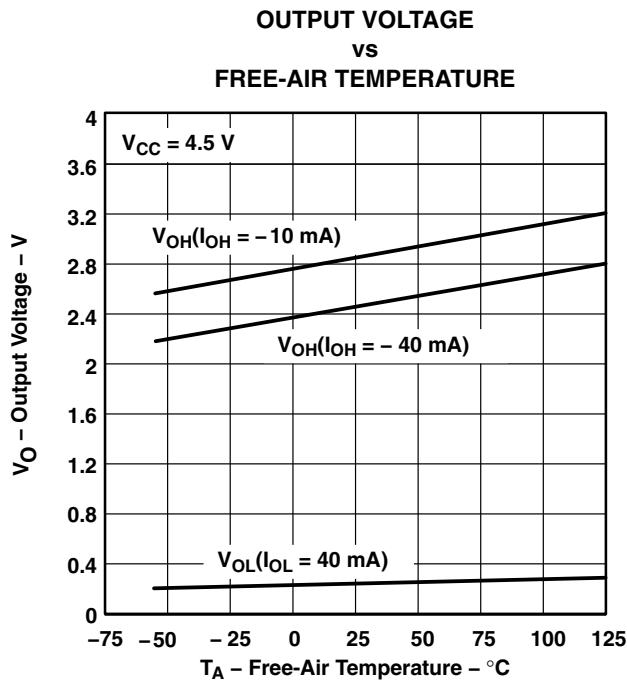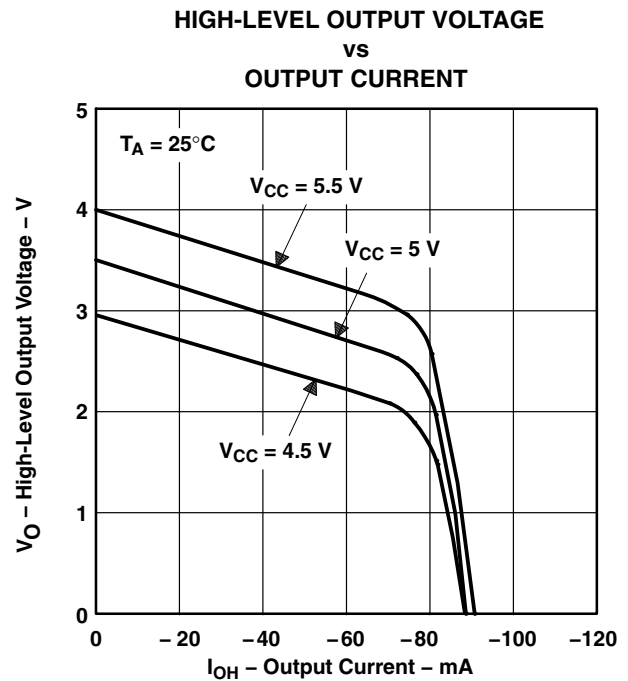


**Figure 11**

[†] Data for temperatures below 0°C and above 70°C and for supply voltages below 4.75 V and above 5.25 V are applicable to SN55113 circuits only. These parameters were measured with the active pullup connected to the sink output.

**TEXAS INSTRUMENTS**

## TYPICAL CHARACTERISTICS†

**LOW-LEVEL OUTPUT VOLTAGE**
**vs**
**OUTPUT CURRENT**
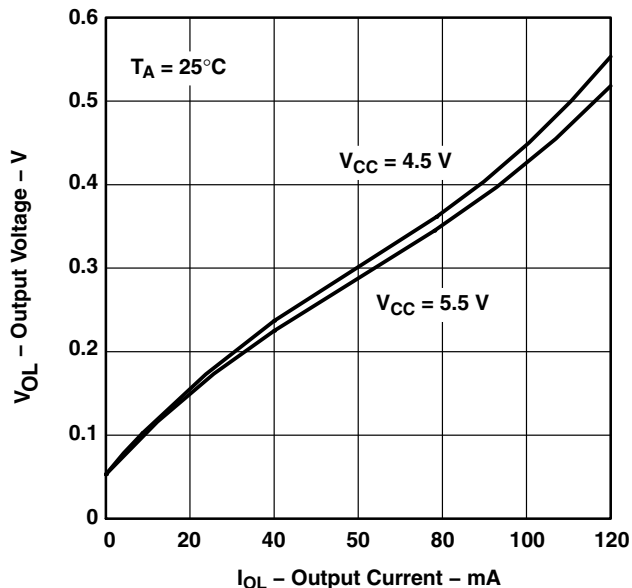


Figure 12

**SUPPLY CURRENT**
**(BOTH DRIVERS)**
**vs**
**SUPPLY VOLTAGE**
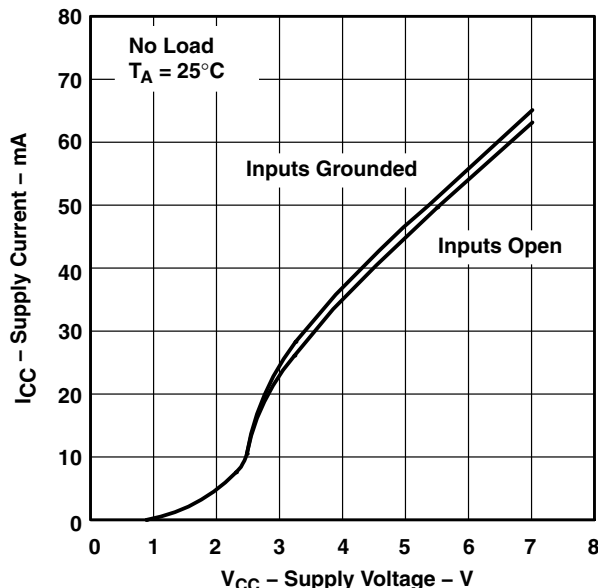


Figure 13

**SUPPLY CURRENT**
**(BOTH DRIVERS)**
**vs**
**OUTPUT CURRENT**
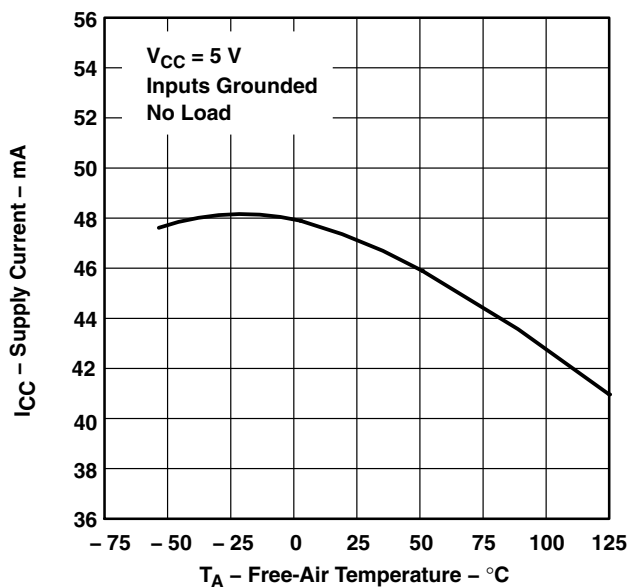


Figure 14

**SUPPLY CURRENT**
**(BOTH DRIVERS)**
**vs**
**SUPPLY VOLTAGE**
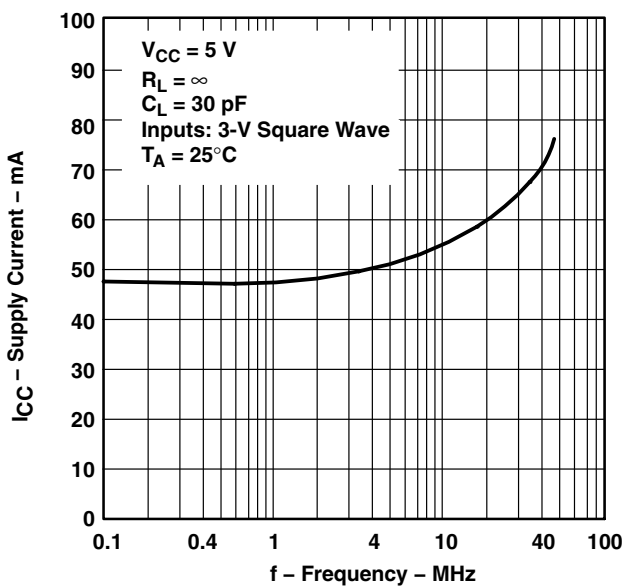


Figure 15

† Data for temperatures below 0°C and above 70°C and for supply voltages below 4.75 V and above 5.25 V are applicable to SN55113 circuits only. These parameters were measured with the active pullup connected to the sink output.

## TEXAS
## INSTRUMENTS

# TYPICAL CHARACTERISTICS†

**PROPAGATION DELAY TIMES**
**FROM DATA INPUTS**
**vs**
**FREE-AIR TEMPERATURE**



**Figure 16**

**OUTPUT ENABLE AND DISABLE TIMES**
**vs**
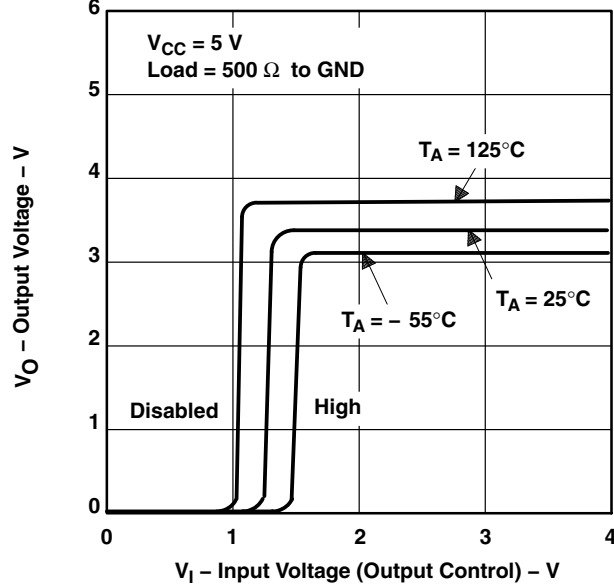**FREE-AIR TEMPERATURE**



**Figure 17**

† Data for temperatures below 0°C and above 70°C and for supply voltages below 4.75 V and above 5.25 V are applicable to SN55113 circuits only. These parameters were measured with the active pullup connected to the sink output.

# APPLICATION INFORMATION



‡ $R_T = Z_O$. A capacitor may be connected in series with $R_T$ to reduce power dissipation.

**Figure 18. Basic Party-Line or Data-Bus Differential Data Transmission**

## PACKAGING INFORMATION

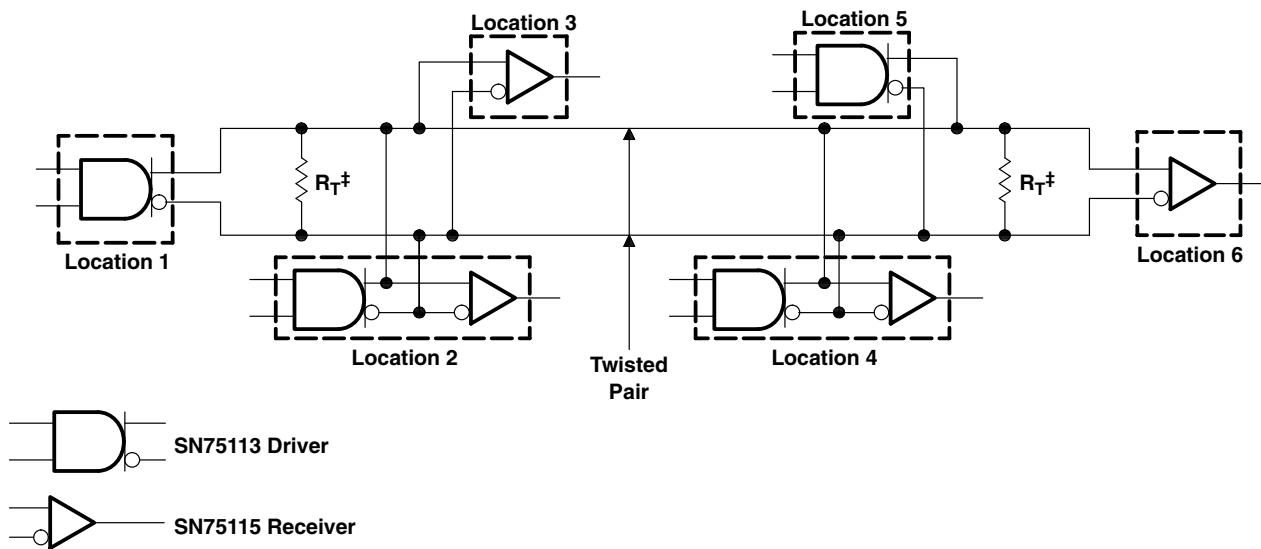| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead finish/ Ball material (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5962-88744012A | ACTIVE | LCCC | FK | 20 | 1 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | 5962-88744012A SNJ55 113FK | Samples |
| 5962-8874401EA | ACTIVE | CDIP | J | 16 | 1 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | 5962-8874401EA SNJ55113J | Samples |
| 5962-8874401FA | ACTIVE | CFP | W | 16 | 1 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | 5962-8874401FA SNJ55113W | Samples |
| JM38510/10405BEA | ACTIVE | CDIP | J | 16 | 1 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | JM38510 /10405BEA | Samples |
| M38510/10405BEA | ACTIVE | CDIP | J | 16 | 1 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | JM38510 /10405BEA | Samples |
| SN55113J | ACTIVE | CDIP | J | 16 | 1 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | SN55113J | Samples |
| SN75113N | ACTIVE | PDIP | N | 16 | 25 | RoHS & Green | NIPDAU | N / A for Pkg Type | 0 to 70 | SN75113N | Samples |
| SN75113NE4 | ACTIVE | PDIP | N | 16 | 25 | RoHS & Green | NIPDAU | N / A for Pkg Type | 0 to 70 | SN75113N | Samples |
| SN75113NSR | ACTIVE | SO | NS | 16 | 2000 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | SN75113 | Samples |
| SNJ55113FK | ACTIVE | LCCC | FK | 20 | 1 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | 5962-88744012A SNJ55 113FK | Samples |
| SNJ55113J | ACTIVE | CDIP | J | 16 | 1 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | 5962-8874401EA SNJ55113J | Samples |
| SNJ55113W | ACTIVE | CFP | W | 16 | 1 | Non-RoHS & Green | SNPB | N / A for Pkg Type | -55 to 125 | 5962-8874401FA SNJ55113W | Samples |

(1) The marketing status values are defined as follows:
**ACTIVE:** Product device recommended for new designs.
**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.
**OBSOLETE:** TI has discontinued the production of the device.

**(2) 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 <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm 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 SN55113, SN75113 :**

● Catalog : SN75113

● Military : SN55113

NOTE: Qualified Version Definitions:

   ● Catalog - TI's standard catalog product

   ● Military - QML certified for Military and Defense Applications

![Texas Instruments logo]

# PACKAGE MATERIALS INFORMATION

## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**



Reel Diameter

Reel Width (W1)

**TAPE DIMENSIONS**



Cavity

| 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 |

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**



Sprocket Holes

User Direction of Feed

Pocket Quadrants

*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 |
|--------|--------------|-----------------|------|-----|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| SN75113NSR | SO | NS | 16 | 2000 | 330.0 | 16.4 | 8.2 | 10.5 | 2.5 | 12.0 | 16.0 | Q1 |

# PACKAGE MATERIALS INFORMATION

**TAPE AND REEL BOX DIMENSIONS**



*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| SN75113NSR | SO | NS | 16 | 2000 | 853.0 | 449.0 | 35.0 |

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) |

$\frac{0.020\ (0,51)}{0.010\ (0,25)}$

$\frac{0.020\ (0,51)}{0.010\ (0,25)}$

$\frac{0.080\ (2,03)}{0.064\ (1,63)}$

$\frac{0.055\ (1,40)}{0.045\ (1,14)}$

$\frac{0.045\ (1,14)}{0.035\ (0,89)}$

$\frac{0.028\ (0,71)}{0.022\ (0,54)}$

0.050 (1,27)

$\frac{0.045\ (1,14)}{0.035\ (0,89)}$

4040140/D 01/11

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.  Falls within JEDEC MS−004

# MECHANICAL DATA

## NS (R-PDSO-G**)

## PLASTIC SMALL-OUTLINE PACKAGE

**14-PINS SHOWN**



| DIM \ PINS ** | 14 | 16 | 20 | 24 |
|---|---|---|---|---|
| A  MAX | 10,50 | 10,50 | 12,90 | 15,30 |
| A  MIN | 9,90 | 9,90 | 12,30 | 14,70 |

4040062/C 03/03

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.

**N (R−PDIP−T**)**
16 PINS SHOWN

**PLASTIC DUAL−IN−LINE PACKAGE**

| PINS ** DIM | 14 | 16 | 18 | 20 |
|---|---|---|---|---|
| A    MAX | 0.775 (19,69) | 0.775 (19,69) | 0.920 (23,37) | 1.060 (26,92) |
| A    MIN | 0.745 (18,92) | 0.745 (18,92) | 0.850 (21,59) | 0.940 (23,88) |
| MS−001 VARIATION | AA | BB | AC | AD |

0.260 (6,60) / 0.240 (6,10)

0.070 (1,78) / 0.045 (1,14) /D\

0.045 (1,14) / 0.030 (0,76) /D\

0.020 (0,51) MIN

0.200 (5,08) MAX

Seating Plane

0.125 (3,18) MIN

0.100 (2,54)

0.021 (0,53) / 0.015 (0,38)

⊕ 0.010 (0,25) Ⓜ

14/18 Pin Only
20 Pin vendor option /D\

0.325 (8,26) / 0.300 (7,62)

0.015 (0,38)

Gauge Plane

0.010 (0,25) NOM
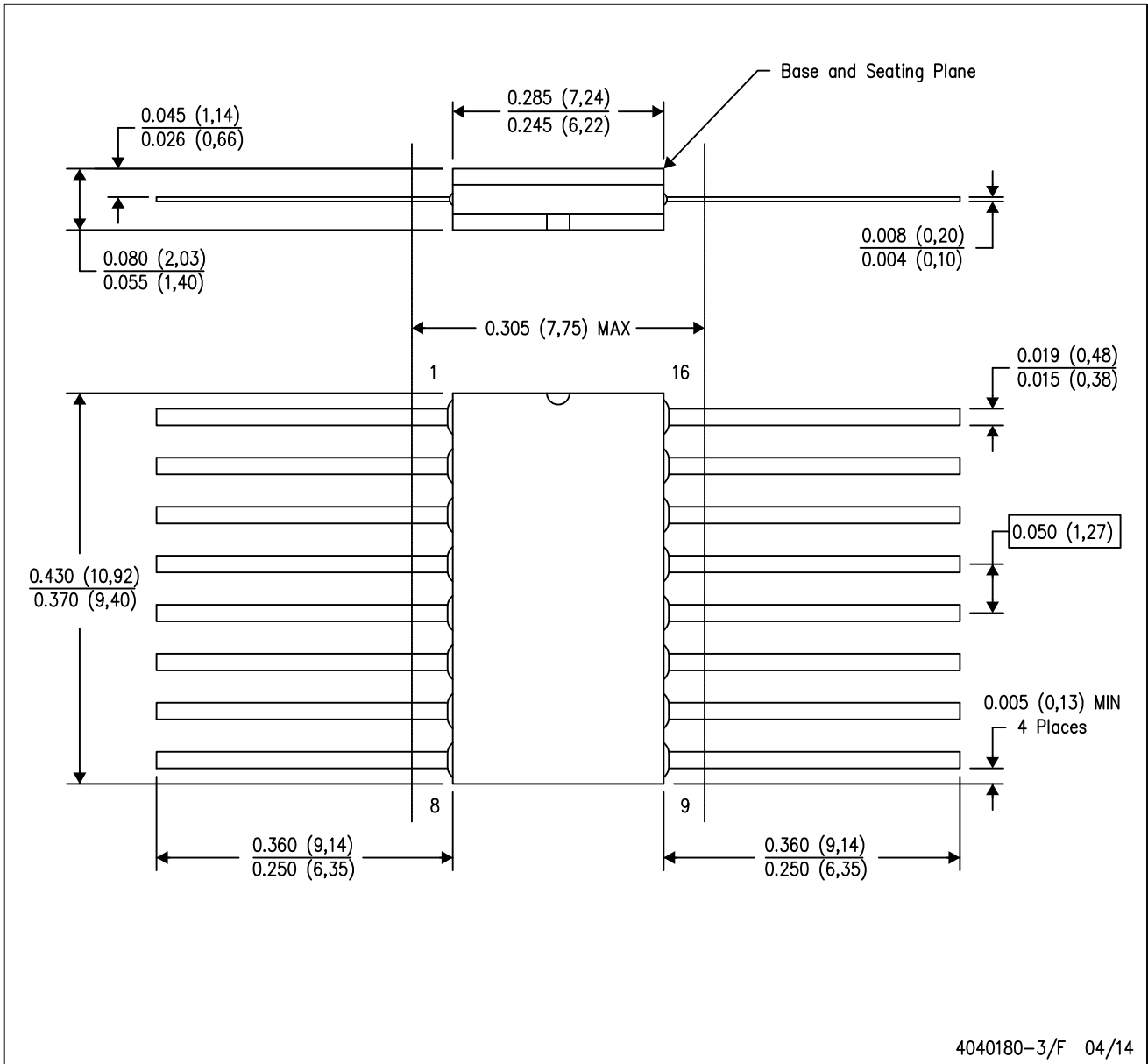
0.430 (10,92) MAX

4040049/E   12/2002

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

W (R−GDFP−F16)                                        CERAMIC DUAL FLATPACK

Base and Seating Plane

$\frac{0.285\ (7,24)}{0.245\ (6,22)}$

$\frac{0.045\ (1,14)}{0.026\ (0,66)}$

$\frac{0.080\ (2,03)}{0.055\ (1,40)}$

$\frac{0.008\ (0,20)}{0.004\ (0,10)}$

0.305 (7,75) MAX

1                    16

$\frac{0.019\ (0,48)}{0.015\ (0,38)}$

$\frac{0.430\ (10,92)}{0.370\ (9,40)}$

0.050 (1,27)

0.005 (0,13) MIN
4 Places

8                    9

$\frac{0.360\ (9,14)}{0.250\ (6,35)}$                    $\frac{0.360\ (9,14)}{0.250\ (6,35)}$

4040180−3/F   04/14

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

| 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) |

B

14          8

1          7

0.065 (1,65)
0.045 (1,14)

0.005 (0,13) MIN

0.060 (1,52)
0.015 (0,38)

0.200 (5,08) MAX

Seating Plane

0.130 (3,30) MIN

0.026 (0,66)
0.014 (0,36)

0.100 (2,54)

A

0°−15°

0.014 (0,36)
0.008 (0,20)

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.

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