

# NCP300, NCP301

## Voltage Detector Series

The NCP300 and NCP301 series are second generation ultra-low current voltage detectors. These devices are specifically designed for use as reset controllers in portable microprocessor based systems where extended battery life is paramount.

Each series features a highly accurate under voltage detector with hysteresis which prevents erratic system reset operation as the comparator threshold is crossed.

The NCP300 series consists of complementary output devices that are available with either an active high or active low reset output. The NCP301 series has an open drain N-channel output with either an active high or active low reset output.

The NCP300 and NCP301 device series are available in the Thin SOT-23-5 package with seven standard under voltage thresholds. Additional thresholds that range from 0.9 V to 4.9 V in 100 mV steps can be manufactured.

### Features

- Quiescent Current of 0.5  $\mu$ A Typical
- High Accuracy Under Voltage Threshold of 2.0%
- Wide Operating Voltage Range of 0.8 V to 10 V
- Complementary or Open Drain Reset Output
- Active Low or Active High Reset Output

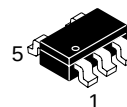
### Typical Applications

- Microprocessor Reset Controller
- Low Battery Detection
- Power Fail Indicator
- Battery Backup Detection



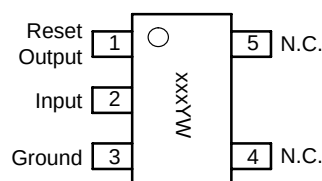
ON Semiconductor™

<http://onsemi.com>



THIN SOT-23-5  
SN SUFFIX  
CASE 483

### PIN CONNECTIONS AND MARKING DIAGRAM



xxx = 300 or 301

Y = Year

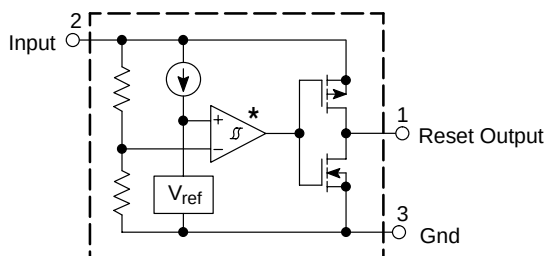
W = Work Week

(Top View)

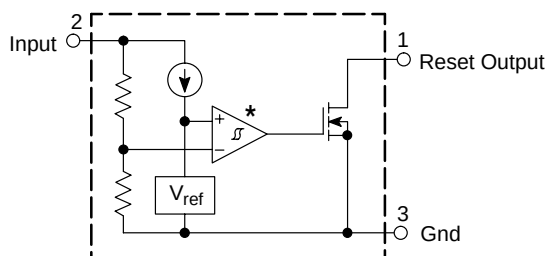
### ORDERING INFORMATION

See detailed ordering and shipping information in the ordering information section on page 23 of this data sheet.

NCP300xSNxxT1  
Complementary Output Configuration



NCP301xSNxxT1  
Open Drain Output Configuration



\* The representative block diagrams depict active low reset output 'L' suffix devices. The comparator inputs are interchanged for the active high output 'H' suffix devices.

This device contains 25 active transistors.

Figure 1. Representative Block Diagrams

# NCP300, NCP301

## MAXIMUM RATINGS

| Rating                                                                          | Symbol          | Value                                | Unit |
|---------------------------------------------------------------------------------|-----------------|--------------------------------------|------|
| Input Power Supply Voltage (Pin 2)                                              | $V_{in}$        | 12                                   | V    |
| Output Voltage (Pin 1)<br>Complementary, NCP300<br>N-Channel Open Drain, NCP301 | $V_{OUT}$       | -0.3 to $V_{in} + 0.3$<br>-0.3 to 12 | V    |
| Output Current (Pin 1) (Note 2)                                                 | $I_{OUT}$       | 70                                   | mA   |
| Thermal Resistance Junction to Air                                              | $R_{\theta JA}$ | 250                                  | °C/W |
| Operating Junction Temperature Range                                            | $T_J$           | -40 to +125                          | °C   |
| Storage Temperature Range                                                       | $T_{stg}$       | -55 to +150                          | °C   |
| Latch-up Performance<br>Positive<br>Negative                                    | $I_{LATCH-UP}$  | 200<br>200                           | mA   |

- This device series contains ESD protection and exceeds the following tests:  
Human Body Model 2000 V per MIL-STD-883, Method 3015.  
Machine Model Method 200 V.
- The maximum package power dissipation limit must not be exceeded.

$$P_D = \frac{T_{J(max)} - T_A}{R_{\theta JA}}$$

## ELECTRICAL CHARACTERISTICS (For all values $T_A = 25^\circ\text{C}$ , unless otherwise noted.)

| Characteristic                                                                                                                                                                                                                                                                                                  | Symbol                                           | Min                    | Typ                 | Max                  | Unit          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------|---------------------|----------------------|---------------|
| <b>NCP300/1 - 0.9</b>                                                                                                                                                                                                                                                                                           |                                                  |                        |                     |                      |               |
| Detector Threshold (Pin 2, $V_{in}$ Decreasing)                                                                                                                                                                                                                                                                 | $V_{DET-}$                                       | 0.882                  | 0.900               | 0.918                | V             |
| Detector Threshold Hysteresis (Pin 2, $V_{in}$ Increasing)                                                                                                                                                                                                                                                      | $V_{HYS}$                                        | 0.027                  | 0.045               | 0.063                | V             |
| Supply Current (Pin 2)<br>( $V_{in} = 0.8\text{ V}$ )<br>( $V_{in} = 2.9\text{ V}$ )                                                                                                                                                                                                                            | $I_{in}$                                         | -<br>-                 | 0.20<br>0.45        | 0.6<br>1.2           | $\mu\text{A}$ |
| Maximum Operating Voltage (Pin 2)                                                                                                                                                                                                                                                                               | $V_{in(max)}$                                    | -                      | -                   | 10                   | V             |
| Minimum Operating Voltage (Pin 2)<br>( $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ )                                                                                                                                                                                                                        | $V_{in(min)}$                                    | -<br>-                 | 0.55<br>0.65        | 0.70<br>0.80         | V             |
| Reset Output Current (Pin 1, Active Low 'L' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.05\text{ V}$ , $V_{in} = 0.70\text{ V}$ )<br>( $V_{OUT} = 0.50\text{ V}$ , $V_{in} = 0.85\text{ V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 2.4\text{ V}$ , $V_{in} = 4.5\text{ V}$ ) | $I_{OUT}$                                        | 0.01<br>0.05<br>1.0    | 0.05<br>0.50<br>2.0 | -<br>-<br>-          | mA            |
| Reset Output Current (Pin 1, Active High 'H' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.5\text{ V}$ , $V_{in} = 1.5\text{ V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 0.4\text{ V}$ , $V_{in} = 0.7\text{ V}$ )<br>( $V_{OUT} = \text{GND}$ , $V_{in} = 0.8\text{ V}$ )      | $I_{OUT}$                                        | 1.05<br>0.011<br>0.014 | 2.5<br>0.04<br>0.08 | -<br>-<br>-          | mA            |
| Propagation Delay Input to Output (Figure 2)<br>Complementary Output NCP300 Series<br>Output Transition, High to Low<br>Output Transition, Low to High<br>N-Channel Open Drain NCP301 Series<br>Output Transition, High to Low<br>Output Transition, Low to High                                                | $t_{pHL}$<br>$t_{pLH}$<br>$t_{pHL}$<br>$t_{pLH}$ | -<br>-<br>-<br>-       | 97<br>77<br>97<br>- | -<br>300<br>-<br>300 | $\mu\text{s}$ |

# NCP300, NCP301

## ELECTRICAL CHARACTERISTICS (For all values $T_A = 25^\circ\text{C}$ , unless otherwise noted.)

| Characteristic                                                                                                                                                                                                                                                                                             | Symbol                                           | Min                   | Typ                 | Max                  | Unit          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------|---------------------|----------------------|---------------|
| <b>NCP300/1 - 1.8</b>                                                                                                                                                                                                                                                                                      |                                                  |                       |                     |                      |               |
| Detector Threshold (Pin 2, $V_{in}$ Decreasing)                                                                                                                                                                                                                                                            | $V_{DET-}$                                       | 1.764                 | 1.80                | 1.836                | V             |
| Detector Threshold Hysteresis (Pin 2, $V_{in}$ Increasing)                                                                                                                                                                                                                                                 | $V_{HYS}$                                        | 0.054                 | 0.090               | 0.126                | V             |
| Supply Current (Pin 2)<br>( $V_{in} = 1.7\text{ V}$ )<br>( $V_{in} = 3.8\text{ V}$ )                                                                                                                                                                                                                       | $I_{in}$                                         | -<br>-                | 0.23<br>0.48        | 0.7<br>1.3           | $\mu\text{A}$ |
| Maximum Operating Voltage (Pin 2)                                                                                                                                                                                                                                                                          | $V_{in(max)}$                                    | -                     | -                   | 10                   | V             |
| Minimum Operating Voltage (Pin 2)<br>( $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ )                                                                                                                                                                                                                   | $V_{in(min)}$                                    | -<br>-                | 0.55<br>0.65        | 0.70<br>0.80         | V             |
| Reset Output Current (Pin 1, Active Low 'L' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.05\text{V}$ , $V_{in} = 0.70\text{V}$ )<br>( $V_{OUT} = 0.50\text{V}$ , $V_{in} = 1.5\text{V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 2.4\text{V}$ , $V_{in} = 4.5\text{V}$ )   | $I_{OUT}$                                        | 0.01<br>1.0<br>1.0    | 0.05<br>2.0<br>2.0  | -<br>-<br>-          | mA            |
| Reset Output Current (Pin 1, Active High 'H' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.5\text{ V}$ , $V_{in} = 5.0\text{ V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 0.4\text{ V}$ , $V_{in} = 0.7\text{ V}$ )<br>( $V_{OUT} = \text{GND}$ , $V_{in} = 1.5\text{ V}$ ) | $I_{OUT}$                                        | 6.3<br>0.011<br>0.525 | 11<br>0.04<br>0.6   | -<br>-<br>-          | mA            |
| Propagation Delay Input to Output (Figure 2)<br>Complementary Output NCP300 Series<br>Output Transition, High to Low<br>Output Transition, Low to High<br>N-Channel Open Drain NCP301 Series<br>Output Transition, High to Low<br>Output Transition, Low to High                                           | $t_{pHL}$<br>$t_{pLH}$<br>$t_{pHL}$<br>$t_{pLH}$ | -<br>-<br>-<br>-      | 73<br>94<br>73<br>- | -<br>300<br>-<br>300 | $\mu\text{s}$ |

# NCP300, NCP301

## ELECTRICAL CHARACTERISTICS (For all values $T_A = 25^\circ\text{C}$ , unless otherwise noted.)

| Characteristic                                                                                                                                                                                                                                                                                             | Symbol                                           | Min                   | Typ                  | Max                  | Unit          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------|----------------------|----------------------|---------------|
| <b>NCP300/1 - 2.0</b>                                                                                                                                                                                                                                                                                      |                                                  |                       |                      |                      |               |
| Detector Threshold (Pin 2, $V_{in}$ Decreasing)                                                                                                                                                                                                                                                            | $V_{DET-}$                                       | 1.960                 | 2.00                 | 2.040                | V             |
| Detector Threshold Hysteresis (Pin 2, $V_{in}$ Increasing)                                                                                                                                                                                                                                                 | $V_{HYS}$                                        | 0.06                  | 0.10                 | 0.14                 | V             |
| Supply Current (Pin 2)<br>( $V_{in} = 1.9\text{ V}$ )<br>( $V_{in} = 4.0\text{ V}$ )                                                                                                                                                                                                                       | $I_{in}$                                         | -<br>-                | 0.23<br>0.48         | 0.8<br>1.3           | $\mu\text{A}$ |
| Maximum Operating Voltage (Pin 2)                                                                                                                                                                                                                                                                          | $V_{in(max)}$                                    | -                     | -                    | 10                   | V             |
| Minimum Operating Voltage (Pin 2)<br>( $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ )                                                                                                                                                                                                                   | $V_{in(min)}$                                    | -<br>-                | 0.55<br>0.65         | 0.70<br>0.80         | V             |
| Reset Output Current (Pin 1, Active Low 'L' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.05\text{V}$ , $V_{in} = 0.70\text{V}$ )<br>( $V_{OUT} = 0.50\text{V}$ , $V_{in} = 1.5\text{V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 2.4\text{V}$ , $V_{in} = 4.5\text{V}$ )   | $I_{OUT}$                                        | 0.01<br>1.0<br>1.0    | 0.05<br>2.0<br>2.0   | -<br>-<br>-          | mA            |
| Reset Output Current (Pin 1, Active High 'H' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.5\text{ V}$ , $V_{in} = 5.0\text{ V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 0.4\text{ V}$ , $V_{in} = 0.7\text{ V}$ )<br>( $V_{OUT} = \text{GND}$ , $V_{in} = 1.5\text{ V}$ ) | $I_{OUT}$                                        | 6.3<br>0.011<br>0.525 | 11<br>0.04<br>0.6    | -<br>-<br>-          | mA            |
| Propagation Delay Input to Output (Figure 2)<br>Complementary Output NCP300 Series<br>Output Transition, High to Low<br>Output Transition, Low to High<br>N-Channel Open Drain NCP301 Series<br>Output Transition, High to Low<br>Output Transition, Low to High                                           | $t_{pHL}$<br>$t_{pLH}$<br>$t_{pHL}$<br>$t_{pLH}$ | -<br>-<br>-<br>-      | 55<br>108<br>55<br>- | -<br>300<br>-<br>300 | $\mu\text{s}$ |

# NCP300, NCP301

## ELECTRICAL CHARACTERISTICS (For all values $T_A = 25^\circ\text{C}$ , unless otherwise noted.)

| Characteristic                                                                                                                                                                                                                                                                                             | Symbol                                           | Min                   | Typ                  | Max                  | Unit          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------|----------------------|----------------------|---------------|
| <b>NCP300/1- 2.7</b>                                                                                                                                                                                                                                                                                       |                                                  |                       |                      |                      |               |
| Detector Threshold (Pin 2, $V_{in}$ Decreasing)                                                                                                                                                                                                                                                            | $V_{DET-}$                                       | 2.646                 | 2.700                | 2.754                | V             |
| Detector Threshold Hysteresis (Pin 2, $V_{in}$ Increasing)                                                                                                                                                                                                                                                 | $V_{HYS}$                                        | 0.081                 | 0.135                | 0.189                | V             |
| Supply Current (Pin 2)<br>( $V_{in} = 2.6\text{ V}$ )<br>( $V_{in} = 4.7\text{ V}$ )                                                                                                                                                                                                                       | $I_{in}$                                         | -<br>-                | 0.26<br>0.46         | 0.8<br>1.3           | $\mu\text{A}$ |
| Maximum Operating Voltage (Pin 2)                                                                                                                                                                                                                                                                          | $V_{in(max)}$                                    | -                     | -                    | 10                   | V             |
| Minimum Operating Voltage (Pin 2)<br>( $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ )                                                                                                                                                                                                                   | $V_{in(min)}$                                    | -<br>-                | 0.55<br>0.65         | 0.70<br>0.80         | V             |
| Reset Output Current (Pin 1, Active Low 'L' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.05\text{V}$ , $V_{in} = 0.70\text{V}$ )<br>( $V_{OUT} = 0.50\text{V}$ , $V_{in} = 1.5\text{V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 2.4\text{V}$ , $V_{in} = 4.5\text{V}$ )   | $I_{OUT}$                                        | 0.01<br>1.0<br>1.0    | 0.05<br>2.0<br>2.0   | -<br>-<br>-          | mA            |
| Reset Output Current (Pin 1, Active High 'H' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.5\text{ V}$ , $V_{in} = 5.0\text{ V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 0.4\text{ V}$ , $V_{in} = 0.7\text{ V}$ )<br>( $V_{OUT} = \text{GND}$ , $V_{in} = 1.5\text{ V}$ ) | $I_{OUT}$                                        | 6.3<br>0.011<br>0.525 | 11<br>0.04<br>0.6    | -<br>-<br>-          | mA            |
| Propagation Delay Input to Output (Figure 2)<br>Complementary Output NCP300 Series<br>Output Transition, High to Low<br>Output Transition, Low to High<br>N-Channel Open Drain NCP301 Series<br>Output Transition, High to Low<br>Output Transition, Low to High                                           | $t_{pHL}$<br>$t_{pLH}$<br>$t_{pHL}$<br>$t_{pLH}$ | -<br>-<br>-<br>-      | 55<br>115<br>55<br>- | -<br>300<br>-<br>300 | $\mu\text{s}$ |

# NCP300, NCP301

## ELECTRICAL CHARACTERISTICS (For all values $T_A = 25^\circ\text{C}$ , unless otherwise noted.)

| Characteristic                                                                                                                                                                                                                                                                                             | Symbol                                           | Min                   | Typ                  | Max                  | Unit          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------|----------------------|----------------------|---------------|
| <b>NCP300/1 - 3.0</b>                                                                                                                                                                                                                                                                                      |                                                  |                       |                      |                      |               |
| Detector Threshold (Pin 2, $V_{in}$ Decreasing)                                                                                                                                                                                                                                                            | $V_{DET-}$                                       | 2.94                  | 3.00                 | 3.06                 | V             |
| Detector Threshold Hysteresis (Pin 2, $V_{in}$ Increasing)                                                                                                                                                                                                                                                 | $V_{HYS}$                                        | 0.09                  | 0.15                 | 0.21                 | V             |
| Supply Current (Pin 2)<br>( $V_{in} = 2.87\text{ V}$ )<br>( $V_{in} = 5.0\text{ V}$ )                                                                                                                                                                                                                      | $I_{in}$                                         | -<br>-                | 0.27<br>0.47         | 0.9<br>1.3           | $\mu\text{A}$ |
| Maximum Operating Voltage (Pin 2)                                                                                                                                                                                                                                                                          | $V_{in(max)}$                                    | -                     | -                    | 10                   | V             |
| Minimum Operating Voltage (Pin 2)<br>( $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ )                                                                                                                                                                                                                   | $V_{in(min)}$                                    | -<br>-                | 0.55<br>0.65         | 0.70<br>0.80         | V             |
| Reset Output Current (Pin 1, Active Low 'L' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.05\text{V}$ , $V_{in} = 0.70\text{V}$ )<br>( $V_{OUT} = 0.50\text{V}$ , $V_{in} = 1.5\text{V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 2.4\text{V}$ , $V_{in} = 4.5\text{V}$ )   | $I_{OUT}$                                        | 0.01<br>1.0<br>1.0    | 0.05<br>2.0<br>2.0   | -<br>-<br>-          | mA            |
| Reset Output Current (Pin 1, Active High 'H' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.5\text{ V}$ , $V_{in} = 5.0\text{ V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 0.4\text{ V}$ , $V_{in} = 0.7\text{ V}$ )<br>( $V_{OUT} = \text{GND}$ , $V_{in} = 1.5\text{ V}$ ) | $I_{OUT}$                                        | 6.3<br>0.011<br>0.525 | 11<br>0.04<br>0.6    | -<br>-<br>-          | mA            |
| Propagation Delay Input to Output (Figure 2)<br>Complementary Output NCP300 Series<br>Output Transition, High to Low<br>Output Transition, Low to High<br>N-Channel Open Drain NCP301 Series<br>Output Transition, High to Low<br>Output Transition, Low to High                                           | $t_{pHL}$<br>$t_{pLH}$<br>$t_{pHL}$<br>$t_{pLH}$ | -<br>-<br>-<br>-      | 49<br>115<br>49<br>- | -<br>300<br>-<br>300 | $\mu\text{s}$ |

# NCP300, NCP301

## ELECTRICAL CHARACTERISTICS (For all values $T_A = 25^\circ\text{C}$ , unless otherwise noted.)

| Characteristic                                                                                                                                                                                                                                                                                             | Symbol                                           | Min                   | Typ                  | Max                  | Unit          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------|----------------------|----------------------|---------------|
| <b>NCP300/1 - 4.5</b>                                                                                                                                                                                                                                                                                      |                                                  |                       |                      |                      |               |
| Detector Threshold (Pin 2, $V_{in}$ Decreasing)                                                                                                                                                                                                                                                            | $V_{DET-}$                                       | 4.410                 | 4.500                | 4.590                | V             |
| Detector Threshold Hysteresis (Pin 2, $V_{in}$ Increasing)                                                                                                                                                                                                                                                 | $V_{HYS}$                                        | 0.135                 | 0.225                | 0.315                | V             |
| Supply Current (Pin 2)<br>( $V_{in} = 4.34\text{ V}$ )<br>( $V_{in} = 6.5\text{ V}$ )                                                                                                                                                                                                                      | $I_{in}$                                         | -<br>-                | 0.33<br>0.52         | 1.0<br>1.4           | $\mu\text{A}$ |
| Maximum Operating Voltage (Pin 2)                                                                                                                                                                                                                                                                          | $V_{in(max)}$                                    | -                     | -                    | 10                   | V             |
| Minimum Operating Voltage (Pin 2)<br>( $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ )                                                                                                                                                                                                                   | $V_{in(min)}$                                    | -<br>-                | 0.55<br>0.65         | 0.70<br>0.80         | V             |
| Reset Output Current (Pin 1, Active Low 'L' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.05\text{V}$ , $V_{in} = 0.70\text{V}$ )<br>( $V_{OUT} = 0.50\text{V}$ , $V_{in} = 1.5\text{V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 5.9\text{V}$ , $V_{in} = 8.0\text{V}$ )   | $I_{OUT}$                                        | 0.01<br>1.0<br>1.5    | 0.05<br>2.0<br>3.0   | -<br>-<br>-          | mA            |
| Reset Output Current (Pin 1, Active High 'H' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.5\text{ V}$ , $V_{in} = 5.0\text{ V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 0.4\text{ V}$ , $V_{in} = 0.7\text{ V}$ )<br>( $V_{OUT} = \text{GND}$ , $V_{in} = 1.5\text{ V}$ ) | $I_{OUT}$                                        | 6.3<br>0.011<br>0.525 | 11<br>0.04<br>0.6    | -<br>-<br>-          | mA            |
| Propagation Delay Input to Output (Figure 2)<br>Complementary Output NCP300 Series<br>Output Transition, High to Low<br>Output Transition, Low to High<br>N-Channel Open Drain NCP301 Series<br>Output Transition, High to Low<br>Output Transition, Low to High                                           | $t_{pHL}$<br>$t_{pLH}$<br>$t_{pHL}$<br>$t_{pLH}$ | -<br>-<br>-<br>-      | 49<br>130<br>49<br>- | -<br>300<br>-<br>300 | $\mu\text{s}$ |

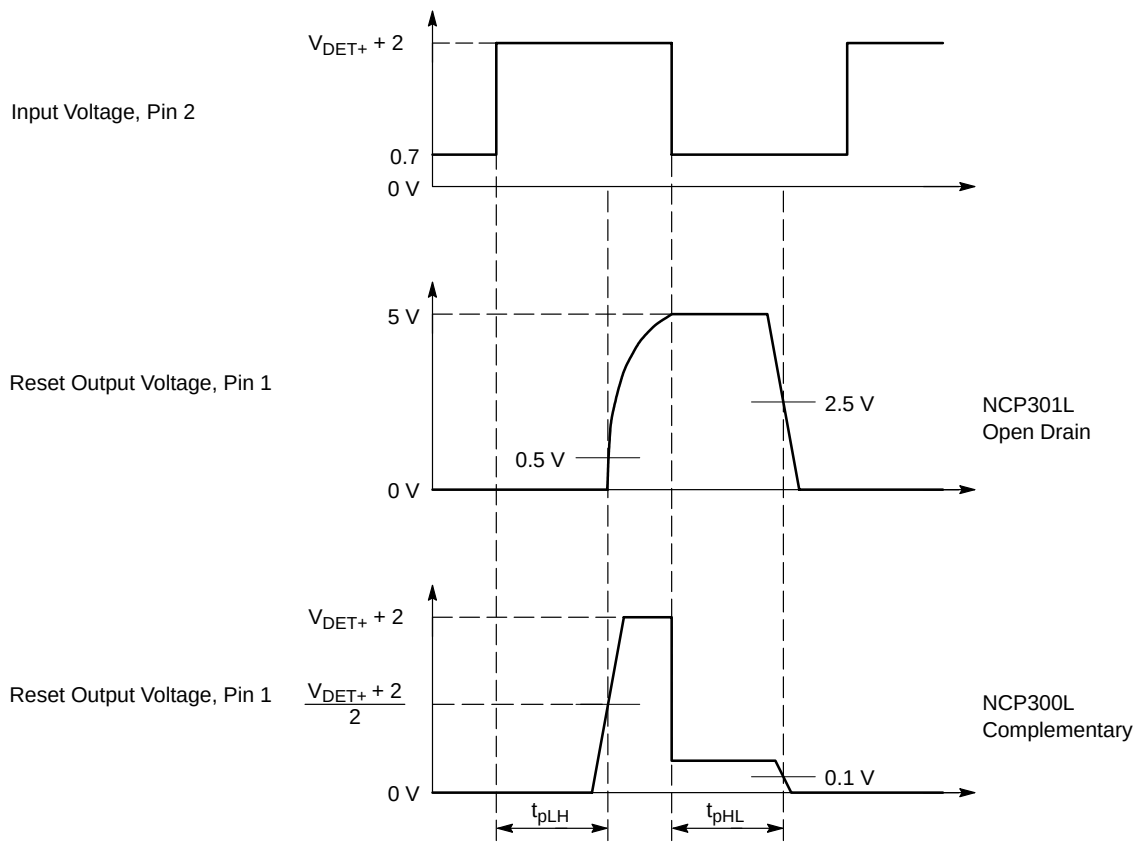
# NCP300, NCP301

## ELECTRICAL CHARACTERISTICS (For all values $T_A = 25^\circ\text{C}$ , unless otherwise noted.)

| Characteristic                                                                                                                                                                                                                                                                                             | Symbol                                           | Min                   | Typ                  | Max                  | Unit          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------|----------------------|----------------------|---------------|
| <b>NCP300/1 - 4.7</b>                                                                                                                                                                                                                                                                                      |                                                  |                       |                      |                      |               |
| Detector Threshold (Pin 2, $V_{in}$ Decreasing)                                                                                                                                                                                                                                                            | $V_{DET-}$                                       | 4.606                 | 4.70                 | 4.794                | V             |
| Detector Threshold Hysteresis (Pin 2, $V_{in}$ Increasing)                                                                                                                                                                                                                                                 | $V_{HYS}$                                        | 0.141                 | 0.235                | 0.329                | V             |
| Supply Current (Pin 2)<br>( $V_{in} = 4.54\text{ V}$ )<br>( $V_{in} = 6.7\text{ V}$ )                                                                                                                                                                                                                      | $I_{in}$                                         | -<br>-                | 0.34<br>0.53         | 1.0<br>1.4           | $\mu\text{A}$ |
| Maximum Operating Voltage (Pin 2)                                                                                                                                                                                                                                                                          | $V_{in(max)}$                                    | -                     | -                    | 10                   | V             |
| Minimum Operating Voltage (Pin 2)<br>( $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ )                                                                                                                                                                                                                   | $V_{in(min)}$                                    | -<br>-                | 0.55<br>0.65         | 0.70<br>0.80         | V             |
| Reset Output Current (Pin 1, Active Low 'L' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.05\text{V}$ , $V_{in} = 0.70\text{V}$ )<br>( $V_{OUT} = 0.50\text{V}$ , $V_{in} = 1.5\text{V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 5.9\text{V}$ , $V_{in} = 8.0\text{V}$ )   | $I_{OUT}$                                        | 0.01<br>1.0<br>1.5    | 0.05<br>2.0<br>3.0   | -<br>-<br>-          | mA            |
| Reset Output Current (Pin 1, Active High 'H' Suffix Devices)<br>Nch Sink Current, NCP300, NCP301<br>( $V_{OUT} = 0.5\text{ V}$ , $V_{in} = 5.0\text{ V}$ )<br>Pch Source Current, NCP300<br>( $V_{OUT} = 0.4\text{ V}$ , $V_{in} = 0.7\text{ V}$ )<br>( $V_{OUT} = \text{GND}$ , $V_{in} = 1.5\text{ V}$ ) | $I_{OUT}$                                        | 6.3<br>0.011<br>0.525 | 11<br>0.04<br>0.6    | -<br>-<br>-          | mA            |
| Propagation Delay Input to Output (Figure 2)<br>Complementary Output NCP300 Series<br>Output Transition, High to Low<br>Output Transition, Low to High<br>N-Channel Open Drain NCP301 Series<br>Output Transition, High to Low<br>Output Transition, Low to High                                           | $t_{pHL}$<br>$t_{pLH}$<br>$t_{pHL}$<br>$t_{pLH}$ | -<br>-<br>-<br>-      | 45<br>130<br>45<br>- | -<br>300<br>-<br>300 | $\mu\text{s}$ |



## NCP300, NCP301



NCP300 and NCP301 series are measured with a 10 pF capacitive load. NCP301 has an additional 470 k pullup resistor connected from the reset output to +5.0 V. The reset output voltage waveforms are shown for the active low 'L' devices. The upper detector threshold,  $V_{DET+}$  is the sum of the lower detector threshold,  $V_{DET-}$  plus the input hysteresis,  $V_{HYS}$ .

**Figure 2. Propagation Delay Measurement Conditions**

# NCP300, NCP301

**Table 1. ELECTRICAL CHARACTERISTIC TABLE FOR 0.9 - 4.9 V**

| NCP300 Series | Detector Threshold    |     |       | Detector Threshold Hysteresis |       |       | Supply Current                      |                                     | Nch Sink Current                     |                                      | Pch Source Current                   |
|---------------|-----------------------|-----|-------|-------------------------------|-------|-------|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|               |                       |     |       |                               |       |       | V <sub>in</sub> Low                 | V <sub>in</sub> High                | V <sub>in</sub> Low                  | V <sub>in</sub> High                 |                                      |
| Part Number   | V <sub>DET-</sub> (V) |     |       | V <sub>HYS</sub> (V)          |       |       | I <sub>in</sub> (μA) <sup>(1)</sup> | I <sub>in</sub> (μA) <sup>(2)</sup> | I <sub>OUT</sub> (mA) <sup>(3)</sup> | I <sub>OUT</sub> (mA) <sup>(4)</sup> | I <sub>OUT</sub> (mA) <sup>(5)</sup> |
|               | Min                   | Typ | Max   | Min                           | Typ   | Max   | Typ                                 | Typ                                 | Typ                                  | Typ                                  | Typ                                  |
| NCP300LSN09T1 | 0.882                 | 0.9 | 0.918 | 0.027                         | 0.045 | 0.063 | 0.3                                 | 0.5                                 | 0.05                                 | 0.5                                  | 2.0                                  |
| NCP300LSN10T1 | 0.980                 | 1.0 | 1.020 | 0.030                         | 0.050 | 0.070 |                                     |                                     |                                      | 1.0                                  |                                      |
| NCP300LSN11T1 | 1.078                 | 1.1 | 1.122 | 0.033                         | 0.055 | 0.077 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN12T1 | 1.176                 | 1.2 | 1.224 | 0.036                         | 0.060 | 0.084 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN13T1 | 1.274                 | 1.3 | 1.326 | 0.039                         | 0.065 | 0.091 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN14T1 | 1.372                 | 1.4 | 1.428 | 0.042                         | 0.070 | 0.098 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN15T1 | 1.470                 | 1.5 | 1.530 | 0.045                         | 0.075 | 0.105 |                                     |                                     |                                      | 2.0                                  |                                      |
| NCP300LSN16T1 | 1.568                 | 1.6 | 1.632 | 0.048                         | 0.080 | 0.112 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN17T1 | 1.666                 | 1.7 | 1.734 | 0.051                         | 0.085 | 0.119 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN18T1 | 1.764                 | 1.8 | 1.836 | 0.054                         | 0.090 | 0.126 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN19T1 | 1.862                 | 1.9 | 1.938 | 0.057                         | 0.095 | 0.133 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN20T1 | 1.960                 | 2.0 | 2.040 | 0.060                         | 0.100 | 0.140 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN21T1 | 2.058                 | 2.1 | 2.142 | 0.063                         | 0.105 | 0.147 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN22T1 | 2.156                 | 2.2 | 2.244 | 0.066                         | 0.110 | 0.154 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN23T1 | 2.254                 | 2.3 | 2.346 | 0.069                         | 0.115 | 0.161 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN24T1 | 2.352                 | 2.4 | 2.448 | 0.072                         | 0.120 | 0.168 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN25T1 | 2.450                 | 2.5 | 2.550 | 0.075                         | 0.125 | 0.175 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN26T1 | 2.548                 | 2.6 | 2.652 | 0.078                         | 0.130 | 0.182 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN27T1 | 2.646                 | 2.7 | 2.754 | 0.081                         | 0.135 | 0.189 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN28T1 | 2.744                 | 2.8 | 2.856 | 0.084                         | 0.140 | 0.196 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN29T1 | 2.842                 | 2.9 | 2.958 | 0.087                         | 0.145 | 0.203 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN30T1 | 2.940                 | 3.0 | 3.060 | 0.090                         | 0.150 | 0.210 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN31T1 | 3.038                 | 3.1 | 3.162 | 0.093                         | 0.155 | 0.217 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN32T1 | 3.136                 | 3.2 | 3.264 | 0.096                         | 0.160 | 0.224 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN33T1 | 3.234                 | 3.3 | 3.366 | 0.099                         | 0.165 | 0.231 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN34T1 | 3.332                 | 3.4 | 3.468 | 0.102                         | 0.170 | 0.238 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN35T1 | 3.430                 | 3.5 | 3.570 | 0.105                         | 0.175 | 0.245 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN36T1 | 3.528                 | 3.6 | 3.672 | 0.108                         | 0.180 | 0.252 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN37T1 | 3.626                 | 3.7 | 3.774 | 0.111                         | 0.185 | 0.259 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN38T1 | 3.724                 | 3.8 | 3.876 | 0.114                         | 0.190 | 0.266 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN39T1 | 3.822                 | 3.9 | 3.978 | 0.117                         | 0.195 | 0.273 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN40T1 | 3.920                 | 4.0 | 4.080 | 0.120                         | 0.200 | 0.280 | 0.4                                 | 0.6                                 |                                      | 3.0                                  |                                      |
| NCP300LSN41T1 | 4.018                 | 4.1 | 4.182 | 0.123                         | 0.205 | 0.287 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN42T1 | 4.116                 | 4.2 | 4.284 | 0.126                         | 0.210 | 0.294 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN43T1 | 4.214                 | 4.3 | 4.386 | 0.129                         | 0.215 | 0.301 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN44T1 | 4.312                 | 4.4 | 4.488 | 0.132                         | 0.220 | 0.308 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN45T1 | 4.410                 | 4.5 | 4.590 | 0.135                         | 0.225 | 0.315 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN46T1 | 4.508                 | 4.6 | 4.692 | 0.138                         | 0.230 | 0.322 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN47T1 | 4.606                 | 4.7 | 4.794 | 0.141                         | 0.235 | 0.329 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN48T1 | 4.704                 | 4.8 | 4.896 | 0.144                         | 0.240 | 0.336 |                                     |                                     |                                      |                                      |                                      |
| NCP300LSN49T1 | 4.802                 | 4.9 | 4.998 | 0.147                         | 0.245 | 0.343 |                                     |                                     |                                      |                                      |                                      |

- Condition 1: 0.9 — 2.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.10 V; 3.0 — 3.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.13 V; 4.0 — 4.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.16 V
- Condition 2: 0.9 — 4.9 V, V<sub>in</sub> = V<sub>DET-</sub> + 2.0 V
- Condition 3: 0.9 — 4.9 V, V<sub>in</sub> = 0.7 V, V<sub>OUT</sub> = 0.05 V, Active Low 'L' Suffix Devices
- Condition 4: 0.9 — 1.0 V, V<sub>in</sub> = 0.85 V, V<sub>OUT</sub> = 0.5 V; 1.1 — 1.5 V, V<sub>in</sub> = 1.0 V, V<sub>OUT</sub> = 0.5 V; 1.6 — 4.9 V, V<sub>in</sub> = 1.5 V, V<sub>OUT</sub> = 0.5 V, Active Low 'L' Suffix Devices
- Condition 5: 0.9 — 3.9 V, V<sub>in</sub> = 4.5 V, V<sub>OUT</sub> = 2.4 V; 4.0 — 4.9 V, V<sub>in</sub> = 8.0 V, V<sub>OUT</sub> = 5.9 V, Active Low 'L' Suffix Devices

# NCP300, NCP301

**Table 2. ELECTRICAL CHARACTERISTIC TABLE FOR 0.9 - 4.9 V**

| NCP300 Series | Detector Threshold    |     |       | Detector Threshold Hysteresis |       |       | Supply Current                      |                                     | Nch Sink Current                     | Pch Source Current                   |                                      |  |  |  |  |  |
|---------------|-----------------------|-----|-------|-------------------------------|-------|-------|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--|--|--|--|--|
|               |                       |     |       |                               |       |       | V <sub>in</sub> Low                 | V <sub>in</sub> High                |                                      | V <sub>in</sub> Low                  | V <sub>in</sub> High                 |  |  |  |  |  |
| Part Number   | V <sub>DET-</sub> (V) |     |       | V <sub>HYS</sub> (V)          |       |       | I <sub>in</sub> (μA) <sup>(1)</sup> | I <sub>in</sub> (μA) <sup>(2)</sup> | I <sub>OUT</sub> (mA) <sup>(3)</sup> | I <sub>OUT</sub> (mA) <sup>(4)</sup> | I <sub>OUT</sub> (mA) <sup>(5)</sup> |  |  |  |  |  |
|               | Min                   | Typ | Max   | Min                           | Typ   | Max   | Typ                                 | Typ                                 | Typ                                  | Typ                                  | Typ                                  |  |  |  |  |  |
| NCP300HSN09T1 | 0.882                 | 0.9 | 0.918 | 0.027                         | 0.045 | 0.063 | 0.3                                 | 0.5                                 | 2.5                                  | 0.04                                 | 0.08                                 |  |  |  |  |  |
| NCP300HSN10T1 | 0.980                 | 1.0 | 1.020 | 0.030                         | 0.050 | 0.070 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN11T1 | 1.078                 | 1.1 | 1.122 | 0.033                         | 0.055 | 0.077 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN12T1 | 1.176                 | 1.2 | 1.224 | 0.036                         | 0.060 | 0.084 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN13T1 | 1.274                 | 1.3 | 1.326 | 0.039                         | 0.065 | 0.091 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN14T1 | 1.372                 | 1.4 | 1.428 | 0.042                         | 0.070 | 0.098 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN15T1 | 1.470                 | 1.5 | 1.530 | 0.045                         | 0.075 | 0.105 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN16T1 | 1.568                 | 1.6 | 1.632 | 0.048                         | 0.080 | 0.112 |                                     |                                     | 11                                   |                                      | 0.6                                  |  |  |  |  |  |
| NCP300HSN17T1 | 1.666                 | 1.7 | 1.734 | 0.051                         | 0.085 | 0.119 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN18T1 | 1.764                 | 1.8 | 1.836 | 0.054                         | 0.090 | 0.126 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN19T1 | 1.862                 | 1.9 | 1.938 | 0.057                         | 0.095 | 0.133 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN20T1 | 1.960                 | 2.0 | 2.040 | 0.060                         | 0.100 | 0.140 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN21T1 | 2.058                 | 2.1 | 2.142 | 0.063                         | 0.105 | 0.147 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN22T1 | 2.156                 | 2.2 | 2.244 | 0.066                         | 0.110 | 0.154 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN23T1 | 2.254                 | 2.3 | 2.346 | 0.069                         | 0.115 | 0.161 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN24T1 | 2.352                 | 2.4 | 2.448 | 0.072                         | 0.120 | 0.168 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN25T1 | 2.450                 | 2.5 | 2.550 | 0.075                         | 0.125 | 0.175 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN26T1 | 2.548                 | 2.6 | 2.652 | 0.078                         | 0.130 | 0.182 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN27T1 | 2.646                 | 2.7 | 2.754 | 0.081                         | 0.135 | 0.189 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN28T1 | 2.744                 | 2.8 | 2.856 | 0.084                         | 0.140 | 0.196 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN29T1 | 2.842                 | 2.9 | 2.958 | 0.087                         | 0.145 | 0.203 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN30T1 | 2.940                 | 3.0 | 3.060 | 0.090                         | 0.150 | 0.210 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN31T1 | 3.038                 | 3.1 | 3.162 | 0.093                         | 0.155 | 0.217 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN32T1 | 3.136                 | 3.2 | 3.264 | 0.096                         | 0.160 | 0.224 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN33T1 | 3.234                 | 3.3 | 3.366 | 0.099                         | 0.165 | 0.231 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN34T1 | 3.332                 | 3.4 | 3.468 | 0.102                         | 0.170 | 0.238 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN35T1 | 3.430                 | 3.5 | 3.570 | 0.105                         | 0.175 | 0.245 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN36T1 | 3.528                 | 3.6 | 3.672 | 0.108                         | 0.180 | 0.252 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN37T1 | 3.626                 | 3.7 | 3.774 | 0.111                         | 0.185 | 0.259 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN38T1 | 3.724                 | 3.8 | 3.876 | 0.114                         | 0.190 | 0.266 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN39T1 | 3.822                 | 3.9 | 3.978 | 0.117                         | 0.195 | 0.273 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN40T1 | 3.920                 | 4.0 | 4.080 | 0.120                         | 0.200 | 0.280 | 0.4                                 | 0.6                                 |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN41T1 | 4.018                 | 4.1 | 4.182 | 0.123                         | 0.205 | 0.287 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN42T1 | 4.116                 | 4.2 | 4.284 | 0.126                         | 0.210 | 0.294 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN43T1 | 4.214                 | 4.3 | 4.386 | 0.129                         | 0.215 | 0.301 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN44T1 | 4.312                 | 4.4 | 4.488 | 0.132                         | 0.220 | 0.308 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN45T1 | 4.410                 | 4.5 | 4.590 | 0.135                         | 0.225 | 0.315 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN46T1 | 4.508                 | 4.6 | 4.692 | 0.138                         | 0.230 | 0.322 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN47T1 | 4.606                 | 4.7 | 4.794 | 0.141                         | 0.235 | 0.329 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN48T1 | 4.704                 | 4.8 | 4.896 | 0.144                         | 0.240 | 0.336 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |
| NCP300HSN49T1 | 4.802                 | 4.9 | 4.998 | 0.147                         | 0.245 | 0.343 |                                     |                                     |                                      |                                      |                                      |  |  |  |  |  |

- Condition 1: 0.9 — 2.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.10 V; 3.0 — 3.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.13 V; 4.0 — 4.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.16 V
- Condition 2: 0.9 — 4.9 V, V<sub>in</sub> = V<sub>DET-</sub> + 2.0 V
- Condition 3: 0.9 — 1.4 V, V<sub>in</sub> = 1.5 V, V<sub>OUT</sub> = 0.5 V; 1.5 — 4.9 V, V<sub>in</sub> = 5.0 V, V<sub>OUT</sub> = 0.5 V, Active High 'H' Suffix Devices
- Condition 4: 0.9 — 4.9 V, V<sub>in</sub> = 0.7 V, V<sub>OUT</sub> = 0.4 V, Active High 'H' Suffix Devices
- Condition 5: 0.9 — 1.0 V, V<sub>in</sub> = 0.8 V, V<sub>OUT</sub> = GND; 1.1 — 1.5 V, V<sub>in</sub> = 1.0 V, V<sub>OUT</sub> = GND; 1.6 — 4.9 V, V<sub>in</sub> = 1.5 V, V<sub>OUT</sub> = GND,

Active High 'H' Suffix Devices

# NCP300, NCP301

Table 3. ELECTRICAL CHARACTERISTIC TABLE FOR 0.9 - 4.9 V

| NCP301 Series | Detector Threshold    |     |       | Detector Threshold Hysteresis |       |       | Supply Current                      |                                     | Nch Sink Current                     |                                      |
|---------------|-----------------------|-----|-------|-------------------------------|-------|-------|-------------------------------------|-------------------------------------|--------------------------------------|--------------------------------------|
|               |                       |     |       |                               |       |       | V <sub>in</sub> Low                 | V <sub>in</sub> High                | V <sub>in</sub> Low                  | V <sub>in</sub> High                 |
| Part Number   | V <sub>DET-</sub> (V) |     |       | V <sub>HYS</sub> (V)          |       |       | I <sub>in</sub> (μA) <sup>(1)</sup> | I <sub>in</sub> (μA) <sup>(2)</sup> | I <sub>OUT</sub> (mA) <sup>(3)</sup> | I <sub>OUT</sub> (mA) <sup>(4)</sup> |
|               | Min                   | Typ | Max   | Min                           | Typ   | Max   | Typ                                 | Typ                                 | Typ                                  | Typ                                  |
| NCP301LSN09T1 | 0.882                 | 0.9 | 0.918 | 0.027                         | 0.045 | 0.063 | 0.3                                 | 0.5                                 | 0.05                                 | 0.5                                  |
| NCP301LSN10T1 | 0.980                 | 1.0 | 1.020 | 0.030                         | 0.050 | 0.070 |                                     |                                     |                                      |                                      |
| NCP301LSN11T1 | 1.078                 | 1.1 | 1.122 | 0.033                         | 0.055 | 0.077 |                                     |                                     |                                      |                                      |
| NCP301LSN12T1 | 1.176                 | 1.2 | 1.224 | 0.036                         | 0.060 | 0.084 |                                     |                                     |                                      |                                      |
| NCP301LSN13T1 | 1.274                 | 1.3 | 1.326 | 0.039                         | 0.065 | 0.091 |                                     |                                     |                                      |                                      |
| NCP301LSN14T1 | 1.372                 | 1.4 | 1.428 | 0.042                         | 0.070 | 0.098 |                                     |                                     |                                      |                                      |
| NCP301LSN15T1 | 1.470                 | 1.5 | 1.530 | 0.045                         | 0.075 | 0.105 |                                     |                                     |                                      |                                      |
| NCP301LSN16T1 | 1.568                 | 1.6 | 1.632 | 0.048                         | 0.080 | 0.112 |                                     |                                     |                                      |                                      |
| NCP301LSN17T1 | 1.666                 | 1.7 | 1.734 | 0.051                         | 0.085 | 0.119 |                                     |                                     |                                      |                                      |
| NCP301LSN18T1 | 1.764                 | 1.8 | 1.836 | 0.054                         | 0.090 | 0.126 |                                     |                                     |                                      |                                      |
| NCP301LSN19T1 | 1.862                 | 1.9 | 1.938 | 0.057                         | 0.095 | 0.133 |                                     |                                     |                                      |                                      |
| NCP301LSN20T1 | 1.960                 | 2.0 | 2.040 | 0.060                         | 0.100 | 0.140 |                                     |                                     |                                      |                                      |
| NCP301LSN21T1 | 2.058                 | 2.1 | 2.142 | 0.063                         | 0.105 | 0.147 |                                     |                                     |                                      |                                      |
| NCP301LSN22T1 | 2.156                 | 2.2 | 2.244 | 0.066                         | 0.110 | 0.154 |                                     |                                     |                                      |                                      |
| NCP301LSN23T1 | 2.254                 | 2.3 | 2.346 | 0.069                         | 0.115 | 0.161 |                                     |                                     |                                      |                                      |
| NCP301LSN24T1 | 2.352                 | 2.4 | 2.448 | 0.072                         | 0.120 | 0.168 |                                     |                                     |                                      |                                      |
| NCP301LSN25T1 | 2.450                 | 2.5 | 2.550 | 0.075                         | 0.125 | 0.175 |                                     |                                     |                                      |                                      |
| NCP301LSN26T1 | 2.548                 | 2.6 | 2.652 | 0.078                         | 0.130 | 0.182 |                                     |                                     |                                      |                                      |
| NCP301LSN27T1 | 2.646                 | 2.7 | 2.754 | 0.081                         | 0.135 | 0.189 |                                     |                                     |                                      |                                      |
| NCP301LSN28T1 | 2.744                 | 2.8 | 2.856 | 0.084                         | 0.140 | 0.196 |                                     |                                     |                                      |                                      |
| NCP301LSN29T1 | 2.842                 | 2.9 | 2.958 | 0.087                         | 0.145 | 0.203 |                                     |                                     |                                      |                                      |
| NCP301LSN30T1 | 2.940                 | 3.0 | 3.060 | 0.090                         | 0.150 | 0.210 |                                     |                                     |                                      |                                      |
| NCP301LSN31T1 | 3.038                 | 3.1 | 3.162 | 0.093                         | 0.155 | 0.217 |                                     |                                     |                                      |                                      |
| NCP301LSN32T1 | 3.136                 | 3.2 | 3.264 | 0.096                         | 0.160 | 0.224 |                                     |                                     |                                      |                                      |
| NCP301LSN33T1 | 3.234                 | 3.3 | 3.366 | 0.099                         | 0.165 | 0.231 |                                     |                                     |                                      |                                      |
| NCP301LSN34T1 | 3.332                 | 3.4 | 3.468 | 0.102                         | 0.170 | 0.238 |                                     |                                     |                                      |                                      |
| NCP301LSN35T1 | 3.430                 | 3.5 | 3.570 | 0.105                         | 0.175 | 0.245 |                                     |                                     |                                      |                                      |
| NCP301LSN36T1 | 3.528                 | 3.6 | 3.672 | 0.108                         | 0.180 | 0.252 |                                     |                                     |                                      |                                      |
| NCP301LSN37T1 | 3.626                 | 3.7 | 3.774 | 0.111                         | 0.185 | 0.259 |                                     |                                     |                                      |                                      |
| NCP301LSN38T1 | 3.724                 | 3.8 | 3.876 | 0.114                         | 0.190 | 0.266 |                                     |                                     |                                      |                                      |
| NCP301LSN39T1 | 3.822                 | 3.9 | 3.978 | 0.117                         | 0.195 | 0.273 |                                     |                                     |                                      |                                      |
| NCP301LSN40T1 | 3.920                 | 4.0 | 4.080 | 0.120                         | 0.200 | 0.280 | 0.4                                 | 0.6                                 |                                      |                                      |
| NCP301LSN41T1 | 4.018                 | 4.1 | 4.182 | 0.123                         | 0.205 | 0.287 |                                     |                                     |                                      |                                      |
| NCP301LSN42T1 | 4.116                 | 4.2 | 4.284 | 0.126                         | 0.210 | 0.294 |                                     |                                     |                                      |                                      |
| NCP301LSN43T1 | 4.214                 | 4.3 | 4.386 | 0.129                         | 0.215 | 0.301 |                                     |                                     |                                      |                                      |
| NCP301LSN44T1 | 4.312                 | 4.4 | 4.488 | 0.132                         | 0.220 | 0.308 |                                     |                                     |                                      |                                      |
| NCP301LSN45T1 | 4.410                 | 4.5 | 4.590 | 0.135                         | 0.225 | 0.315 |                                     |                                     |                                      |                                      |
| NCP301LSN46T1 | 4.508                 | 4.6 | 4.692 | 0.138                         | 0.230 | 0.322 |                                     |                                     |                                      |                                      |
| NCP301LSN47T1 | 4.606                 | 4.7 | 4.794 | 0.141                         | 0.235 | 0.329 |                                     |                                     |                                      |                                      |
| NCP301LSN48T1 | 4.704                 | 4.8 | 4.896 | 0.144                         | 0.240 | 0.336 |                                     |                                     |                                      |                                      |
| NCP301LSN49T1 | 4.802                 | 4.9 | 4.998 | 0.147                         | 0.245 | 0.343 |                                     |                                     |                                      |                                      |

1. Condition 1: 0.9 — 2.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.10 V; 3.0 — 3.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.13 V; 4.0 — 4.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.16 V

2. Condition 2: 0.9 — 4.9 V, V<sub>in</sub> = V<sub>DET-</sub> + 2.0 V

3. Condition 3: 0.9 — 4.9 V, V<sub>in</sub> = 0.7 V, V<sub>OUT</sub> = 0.05 V, Active Low 'L' Suffix Devices

4. Condition 4: 0.9 — 1.0 V, V<sub>in</sub> = 0.85 V, V<sub>OUT</sub> = 0.5 V; 1.1 — 1.5 V, V<sub>in</sub> = 1.0 V, V<sub>OUT</sub> = 0.5 V; 1.6 — 4.9 V, V<sub>in</sub> = 1.5 V, V<sub>OUT</sub> = 0.5 V, Active Low 'L' Suffix Devices

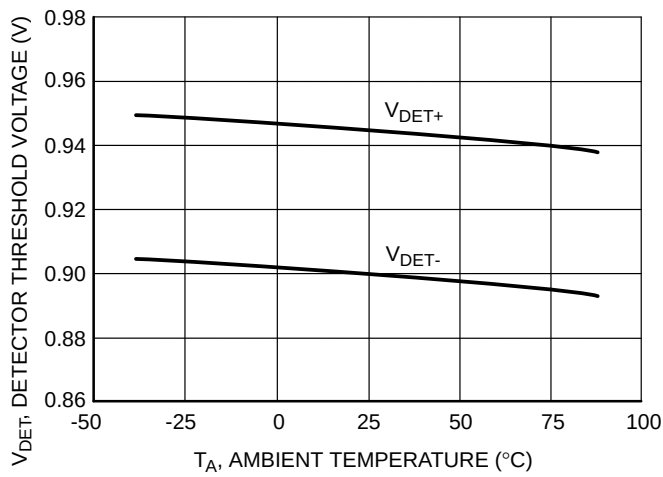
# NCP300, NCP301

**Table 4. ELECTRICAL CHARACTERISTIC TABLE FOR 0.9 - 4.9 V**

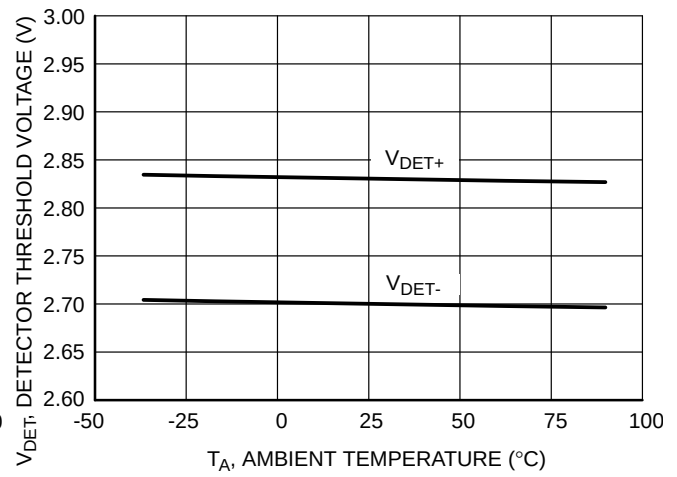
| NCP301 Series | Detector Threshold    |     |       | Detector Threshold Hysteresis |       |       | Supply Current                      |                                     | Nch Sink Current                     |
|---------------|-----------------------|-----|-------|-------------------------------|-------|-------|-------------------------------------|-------------------------------------|--------------------------------------|
|               |                       |     |       |                               |       |       | V <sub>in</sub> Low                 | V <sub>in</sub> High                |                                      |
| Part Number   | V <sub>DET-</sub> (V) |     |       | V <sub>HYS</sub> (V)          |       |       | I <sub>in</sub> (μA) <sup>(1)</sup> | I <sub>in</sub> (μA) <sup>(2)</sup> | I <sub>OUT</sub> (mA) <sup>(3)</sup> |
|               | Min                   | Typ | Max   | Min                           | Typ   | Max   | Typ                                 | Typ                                 | Typ                                  |
| NCP301HSN09T1 | 0.882                 | 0.9 | 0.918 | 0.027                         | 0.045 | 0.063 | 0.3                                 | 0.5                                 | 2.5                                  |
| NCP301HSN10T1 | 0.980                 | 1.0 | 1.020 | 0.030                         | 0.050 | 0.070 |                                     |                                     |                                      |
| NCP301HSN11T1 | 1.078                 | 1.1 | 1.122 | 0.033                         | 0.055 | 0.077 |                                     |                                     |                                      |
| NCP301HSN12T1 | 1.176                 | 1.2 | 1.224 | 0.036                         | 0.060 | 0.084 |                                     |                                     |                                      |
| NCP301HSN13T1 | 1.274                 | 1.3 | 1.326 | 0.039                         | 0.065 | 0.091 |                                     |                                     |                                      |
| NCP301HSN14T1 | 1.372                 | 1.4 | 1.428 | 0.042                         | 0.070 | 0.098 |                                     |                                     |                                      |
| NCP301HSN15T1 | 1.470                 | 1.5 | 1.530 | 0.045                         | 0.075 | 0.105 |                                     |                                     |                                      |
| NCP301HSN16T1 | 1.568                 | 1.6 | 1.632 | 0.048                         | 0.080 | 0.112 |                                     |                                     |                                      |
| NCP301HSN17T1 | 1.666                 | 1.7 | 1.734 | 0.051                         | 0.085 | 0.119 |                                     |                                     |                                      |
| NCP301HSN18T1 | 1.764                 | 1.8 | 1.836 | 0.054                         | 0.090 | 0.126 |                                     |                                     |                                      |
| NCP301HSN19T1 | 1.862                 | 1.9 | 1.938 | 0.057                         | 0.095 | 0.133 |                                     |                                     |                                      |
| NCP301HSN20T1 | 1.960                 | 2.0 | 2.040 | 0.060                         | 0.100 | 0.140 |                                     |                                     | 11                                   |
| NCP301HSN21T1 | 2.058                 | 2.1 | 2.142 | 0.063                         | 0.105 | 0.147 |                                     |                                     |                                      |
| NCP301HSN22T1 | 2.156                 | 2.2 | 2.244 | 0.066                         | 0.110 | 0.154 |                                     |                                     |                                      |
| NCP301HSN23T1 | 2.254                 | 2.3 | 2.346 | 0.069                         | 0.115 | 0.161 |                                     |                                     |                                      |
| NCP301HSN24T1 | 2.352                 | 2.4 | 2.448 | 0.072                         | 0.120 | 0.168 |                                     |                                     |                                      |
| NCP301HSN25T1 | 2.450                 | 2.5 | 2.550 | 0.075                         | 0.125 | 0.175 |                                     |                                     |                                      |
| NCP301HSN26T1 | 2.548                 | 2.6 | 2.652 | 0.078                         | 0.130 | 0.182 |                                     |                                     |                                      |
| NCP301HSN27T1 | 2.646                 | 2.7 | 2.754 | 0.081                         | 0.135 | 0.189 |                                     |                                     |                                      |
| NCP301HSN28T1 | 2.744                 | 2.8 | 2.856 | 0.084                         | 0.140 | 0.196 |                                     |                                     |                                      |
| NCP301HSN29T1 | 2.842                 | 2.9 | 2.958 | 0.087                         | 0.145 | 0.203 |                                     |                                     |                                      |
| NCP301HSN30T1 | 2.940                 | 3.0 | 3.060 | 0.090                         | 0.150 | 0.210 |                                     |                                     |                                      |
| NCP301HSN31T1 | 3.038                 | 3.1 | 3.162 | 0.093                         | 0.155 | 0.217 |                                     |                                     |                                      |
| NCP301HSN32T1 | 3.136                 | 3.2 | 3.264 | 0.096                         | 0.160 | 0.224 |                                     |                                     |                                      |
| NCP301HSN33T1 | 3.234                 | 3.3 | 3.366 | 0.099                         | 0.165 | 0.231 |                                     |                                     |                                      |
| NCP301HSN34T1 | 3.332                 | 3.4 | 3.468 | 0.102                         | 0.170 | 0.238 |                                     |                                     |                                      |
| NCP301HSN35T1 | 3.430                 | 3.5 | 3.570 | 0.105                         | 0.175 | 0.245 |                                     |                                     |                                      |
| NCP301HSN36T1 | 3.528                 | 3.6 | 3.672 | 0.108                         | 0.180 | 0.252 |                                     |                                     |                                      |
| NCP301HSN37T1 | 3.626                 | 3.7 | 3.774 | 0.111                         | 0.185 | 0.259 |                                     |                                     |                                      |
| NCP301HSN38T1 | 3.724                 | 3.8 | 3.876 | 0.114                         | 0.190 | 0.266 |                                     |                                     |                                      |
| NCP301HSN39T1 | 3.822                 | 3.9 | 3.978 | 0.117                         | 0.195 | 0.273 |                                     |                                     |                                      |
| NCP301HSN40T1 | 3.920                 | 4.0 | 4.080 | 0.120                         | 0.200 | 0.280 | 0.4                                 | 0.6                                 |                                      |
| NCP301HSN41T1 | 4.018                 | 4.1 | 4.182 | 0.123                         | 0.205 | 0.287 |                                     |                                     |                                      |
| NCP301HSN42T1 | 4.116                 | 4.2 | 4.284 | 0.126                         | 0.210 | 0.294 |                                     |                                     |                                      |
| NCP301HSN43T1 | 4.214                 | 4.3 | 4.386 | 0.129                         | 0.215 | 0.301 |                                     |                                     |                                      |
| NCP301HSN44T1 | 4.312                 | 4.4 | 4.488 | 0.132                         | 0.220 | 0.308 |                                     |                                     |                                      |
| NCP301HSN45T1 | 4.410                 | 4.5 | 4.590 | 0.135                         | 0.225 | 0.315 |                                     |                                     |                                      |
| NCP301HSN46T1 | 4.508                 | 4.6 | 4.692 | 0.138                         | 0.230 | 0.322 |                                     |                                     |                                      |
| NCP301HSN47T1 | 4.606                 | 4.7 | 4.794 | 0.141                         | 0.235 | 0.329 |                                     |                                     |                                      |
| NCP301HSN48T1 | 4.704                 | 4.8 | 4.896 | 0.144                         | 0.240 | 0.336 |                                     |                                     |                                      |
| NCP301HSN49T1 | 4.802                 | 4.9 | 4.998 | 0.147                         | 0.245 | 0.343 |                                     |                                     |                                      |

- Condition 1: 0.9 — 2.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.10 V; 3.0 — 3.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.13 V; 4.0 — 4.9 V, V<sub>in</sub> = V<sub>DET-</sub> - 0.16 V
- Condition 2: 0.9 — 4.9 V, V<sub>in</sub> = V<sub>DET-</sub> + 2.0 V
- Condition 3: 0.9 — 1.4 V, V<sub>in</sub> = 1.5 V, V<sub>OUT</sub> = 0.5 V; 1.5 — 4.9 V, V<sub>in</sub> = 5.0 V, V<sub>OUT</sub> = 0.5 V, Active High 'H' Suffix Devices

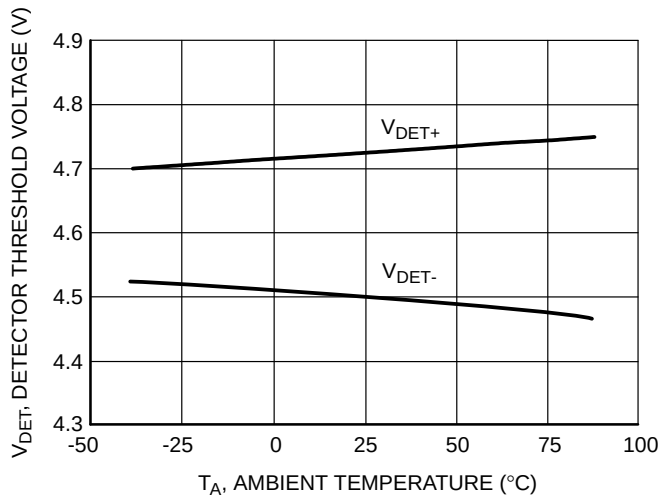
# NCP300, NCP301



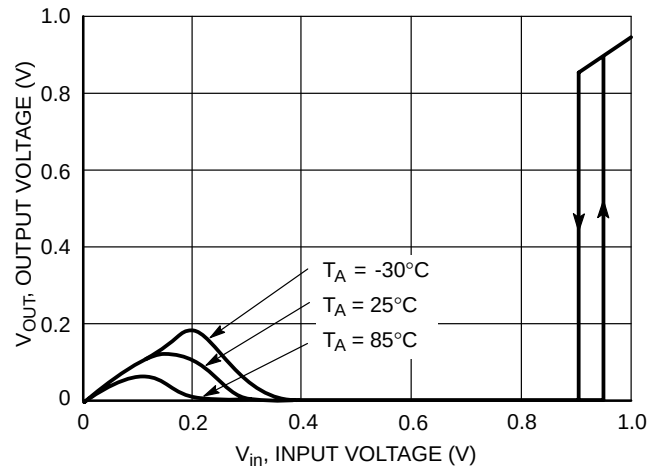
**Figure 3. NCP300/1 Series 0.9 V**  
Detector Threshold Voltage versus Temperature



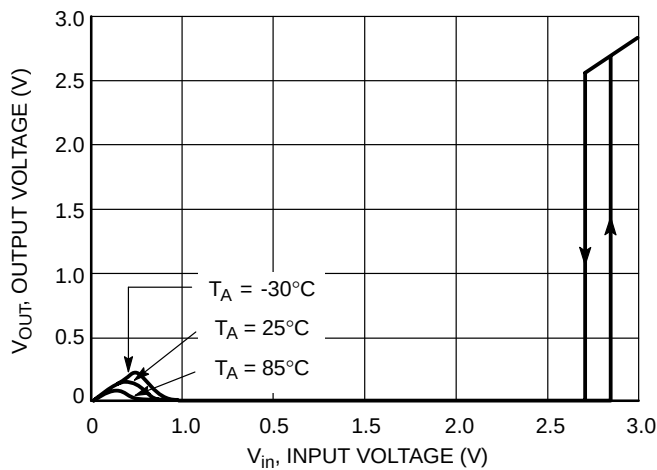
**Figure 4. NCP300/1 Series 2.7 V**  
Detector Threshold Voltage versus Temperature



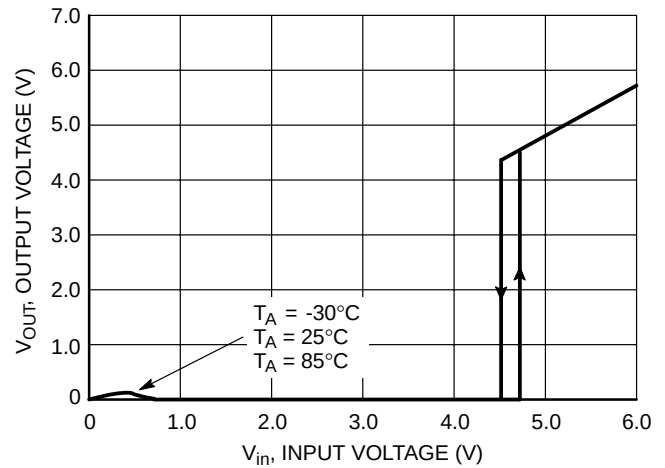
**Figure 5. NCP300/1 Series 4.5 V**  
Detector Threshold Voltage versus Temperature



**Figure 6. NCP300L/1L Series 0.9 V**  
Reset Output Voltage versus Input Voltage

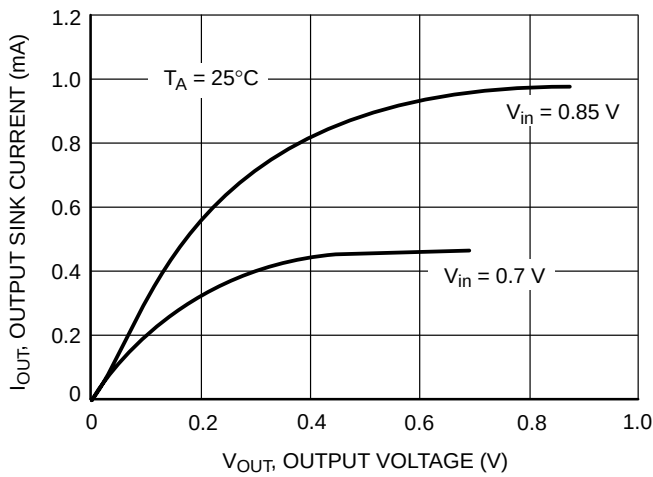


**Figure 7. NCP300L/1L Series 2.7 V**  
Reset Output Voltage versus Input Voltage

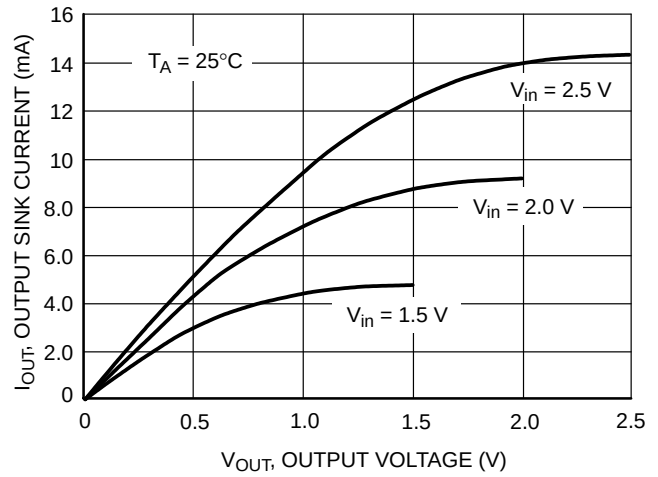


**Figure 8. NCP300L/1L Series 4.5 V**  
Reset Output Voltage versus Input Voltage

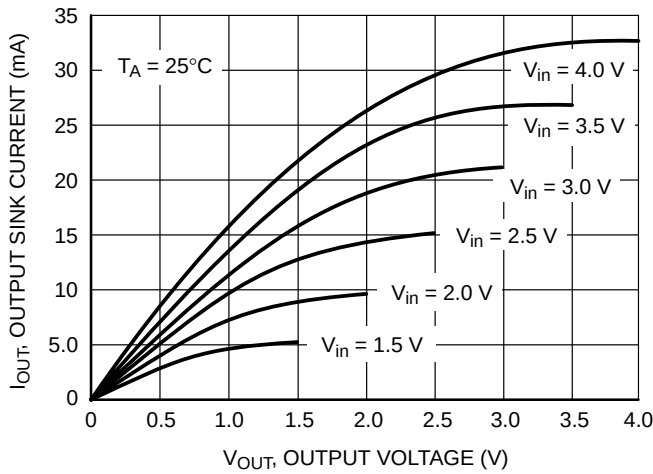
# NCP300, NCP301



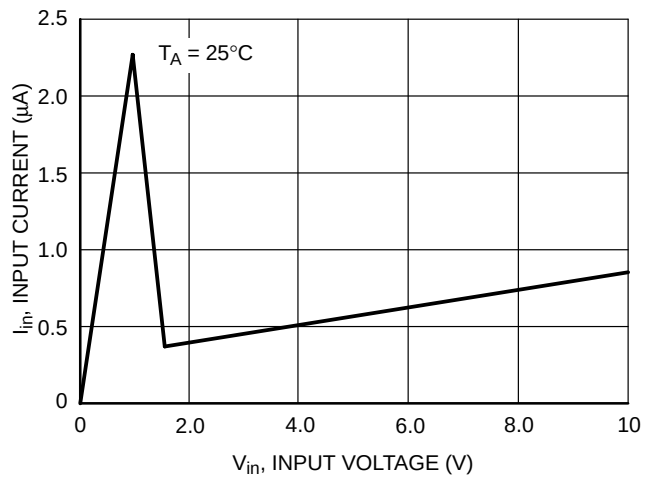
**Figure 9. NCP300H/1L Series 0.9 V**  
Reset Output Sink Current versus Output Voltage



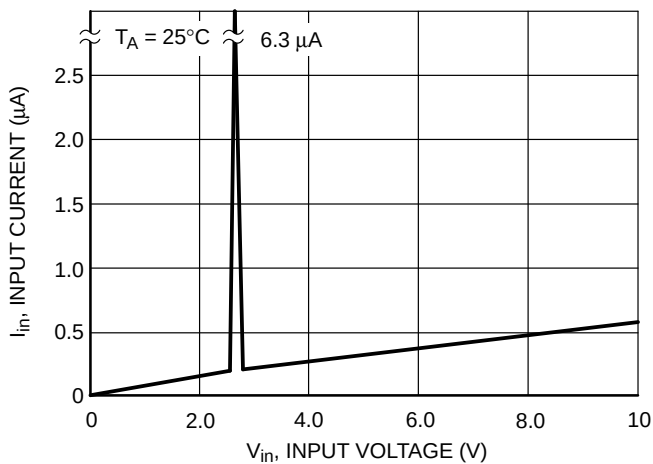
**Figure 10. NCP300H/1L Series 2.7 V**  
Reset Output Sink Current versus Output Voltage



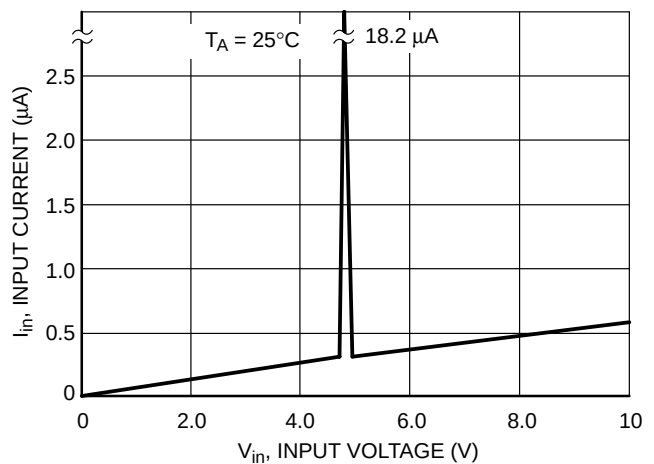
**Figure 11. NCP300H/1L Series 4.5 V**  
Reset Output Sink Current versus Output Voltage



**Figure 12. NCP300/1 Series 0.9 V**  
Input Current versus Input Voltage

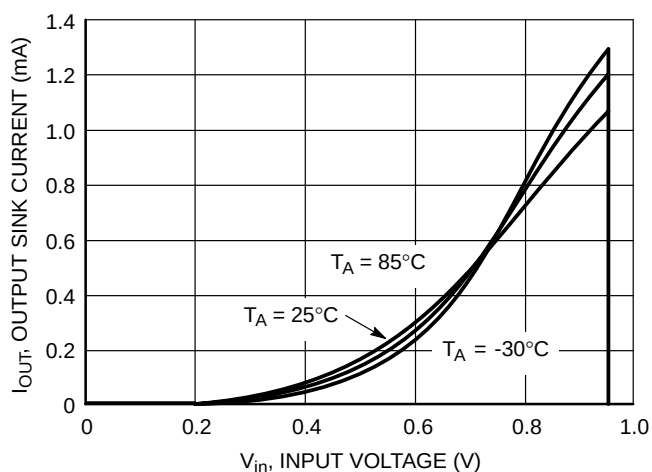


**Figure 13. NCP300/1 Series 2.7 V**  
Input Current versus Input Voltage

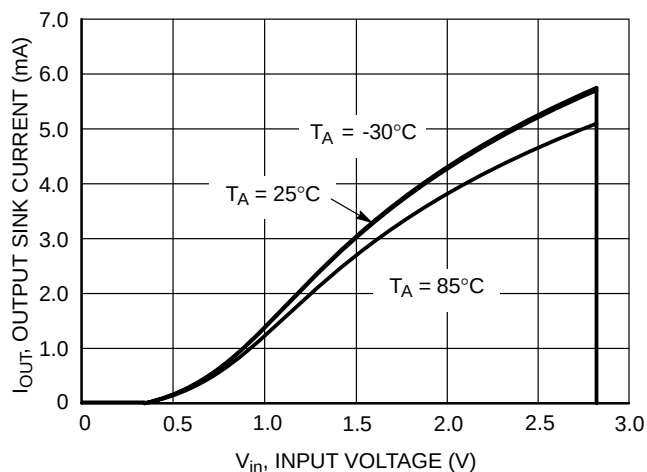


**Figure 14. NCP300/1 Series 4.5 V**  
Input Current versus Input Voltage

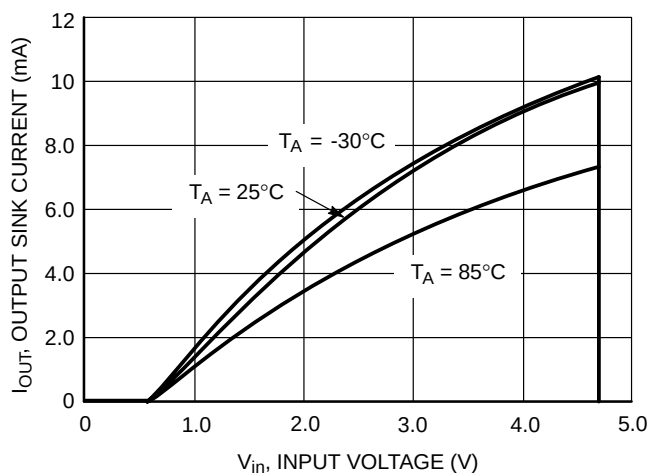
# NCP300, NCP301



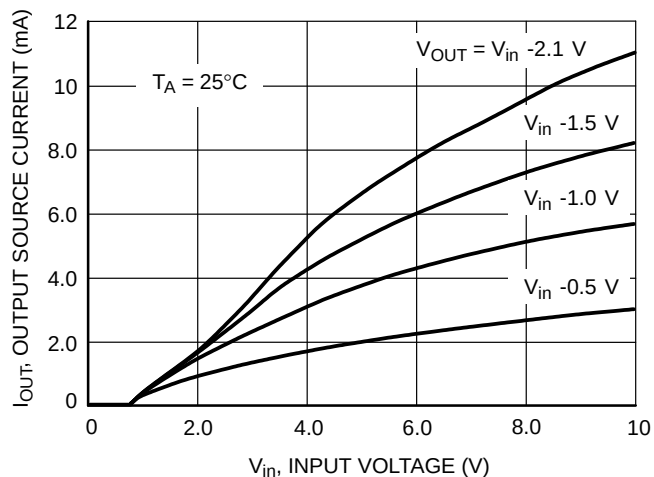
**Figure 15. NCP300H/1L Series 0.9 V**  
Reset Output Sink Current versus Input Voltage



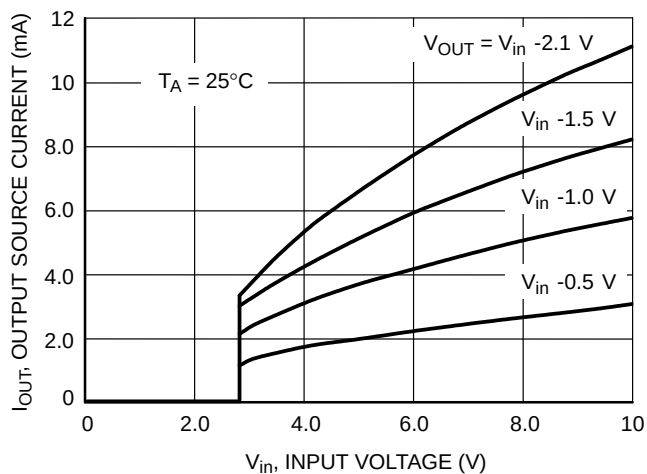
**Figure 16. NCP300H/1L Series 2.7 V**  
Reset Output Sink Current versus Input Voltage



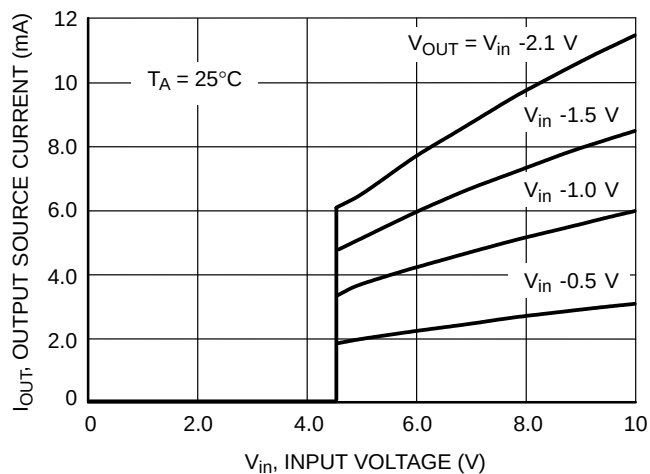
**Figure 17. NCP300H/1L Series 4.5 V**  
Reset Output Sink Current versus Input Voltage



**Figure 18. NCP300H Series 0.9 V**  
Reset Output Source Current versus Input Voltage



**Figure 19. NCP300H Series 2.7 V**  
Reset Output Source Current versus Input Voltage



**Figure 20. NCP300H Series 4.5 V**  
Reset Output Source Current versus Input Voltage



## OPERATING DESCRIPTION

The NCP300 and NCP301 series devices are second generation ultra-low current voltage detectors. Figures 21 and 22 show a timing diagram and a typical application. Initially consider that input voltage  $V_{in}$  is at a nominal level and it is greater than the voltage detector upper threshold ( $V_{DET+}$ ), and the reset output (Pin 1) will be in the high state for active low devices, or in the low state for active high devices. If there is a power interruption and  $V_{in}$  becomes significantly deficient, it will fall below the lower detector threshold ( $V_{DET-}$ ). This sequence of events causes the Reset output to be in the low state for active low devices, or in the

high state for active high devices. After completion of the power interruption,  $V_{in}$  will again return to its nominal level and become greater than the  $V_{DET+}$ . The voltage detector has built-in hysteresis to prevent erratic reset operation as the comparator threshold is crossed.

Although these device series are specifically designed for use as reset controllers in portable microprocessor based systems, they offer a cost-effective solution in numerous applications where precise voltage monitoring is required. Figure 22 through Figure 29 shows various application examples.

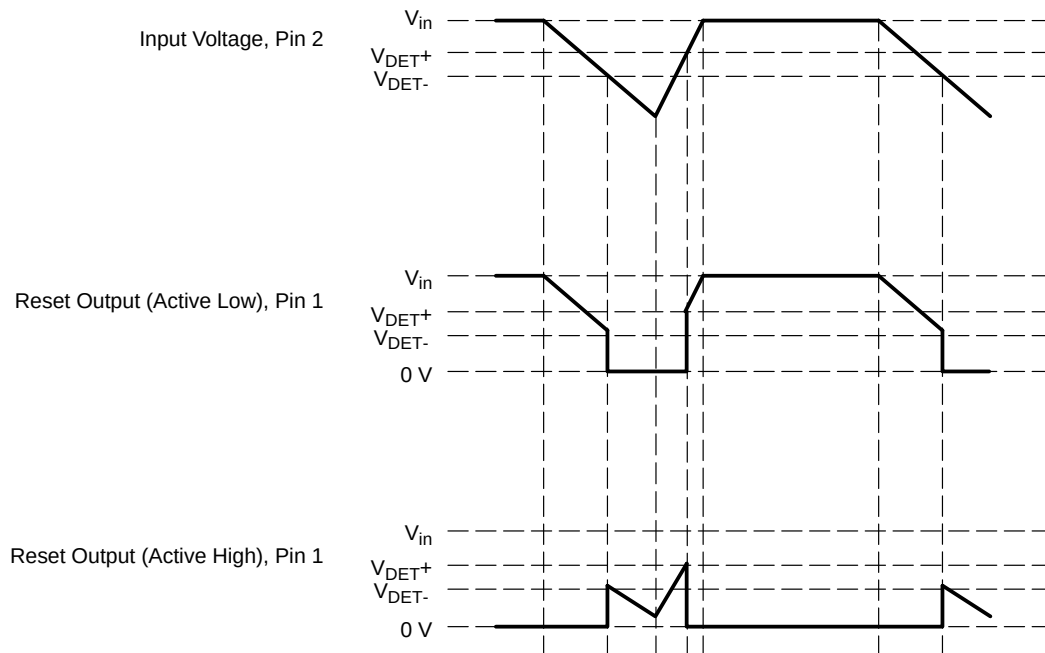


Figure 21. Timing Waveforms

# NCP300, NCP301

## APPLICATION CIRCUIT INFORMATION

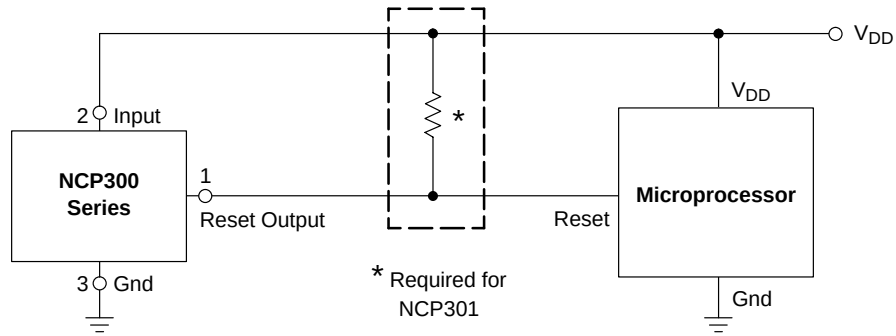


Figure 22. Microprocessor Reset Circuit

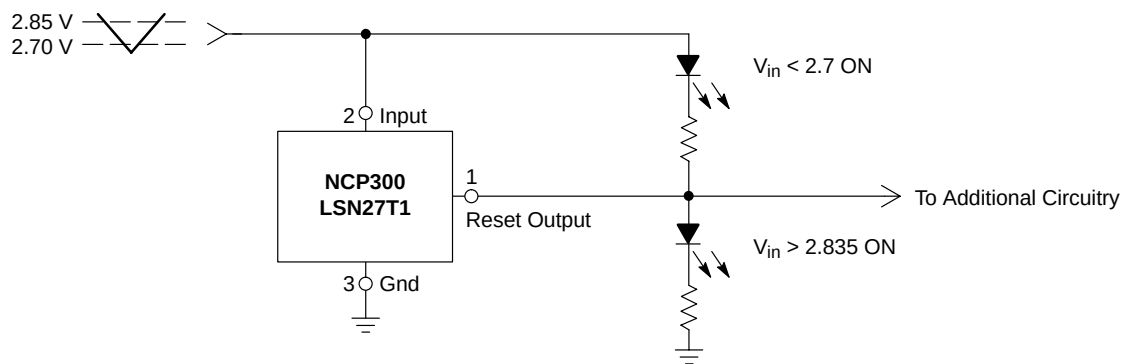


Figure 23. Battery Charge Indicator

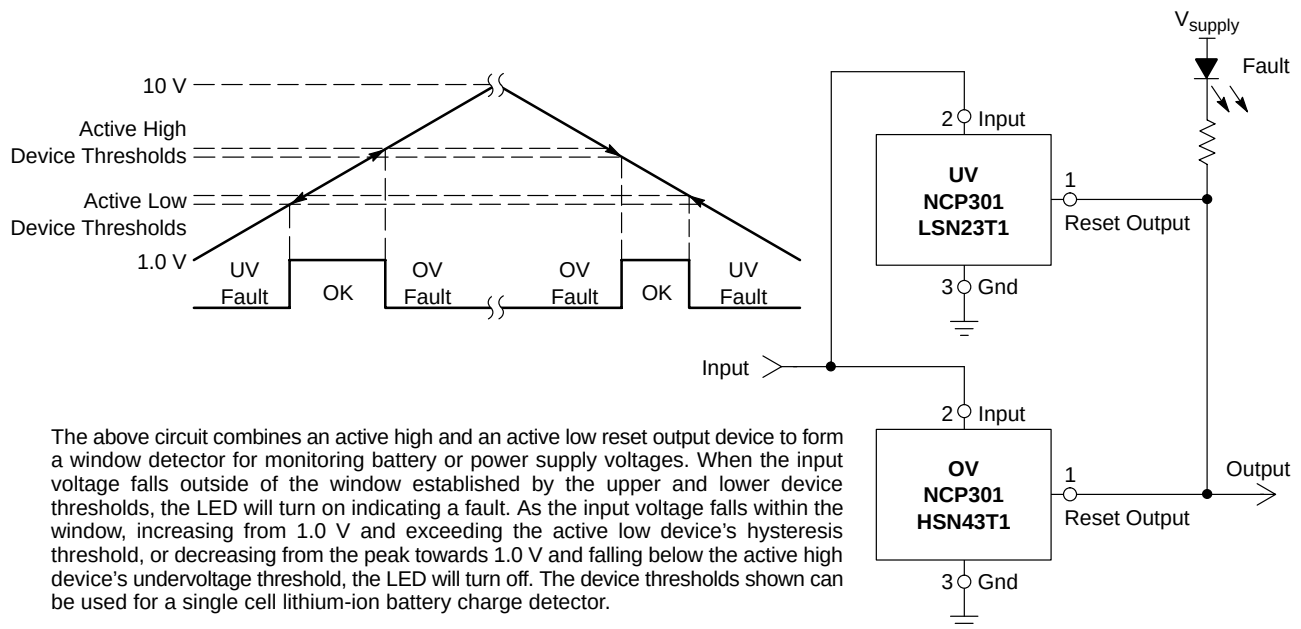


Figure 24. Window Voltage Detector

# NCP300, NCP301

## APPLICATION CIRCUIT INFORMATION

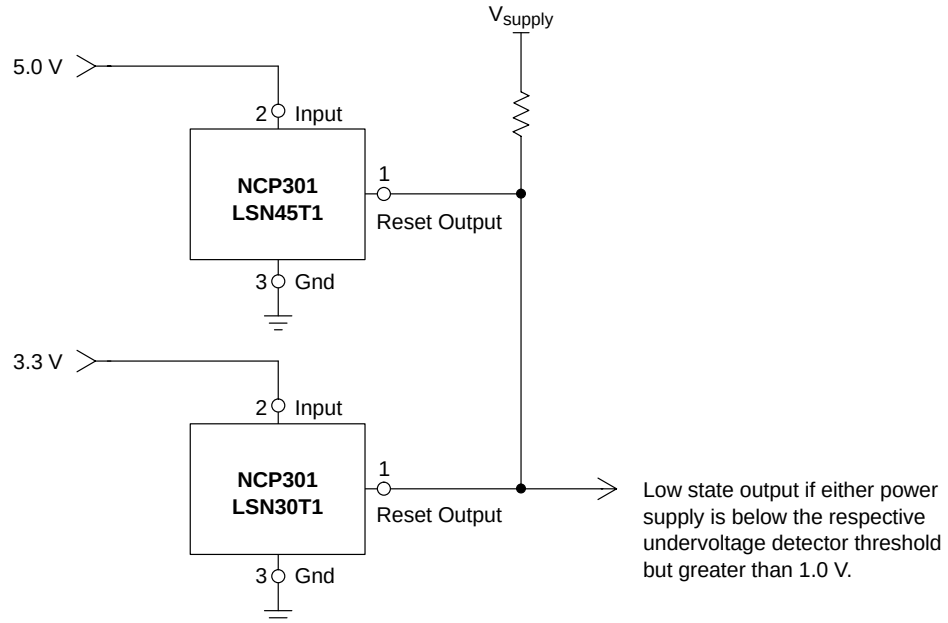


Figure 25. Dual Power Supply Undervoltage Supervision

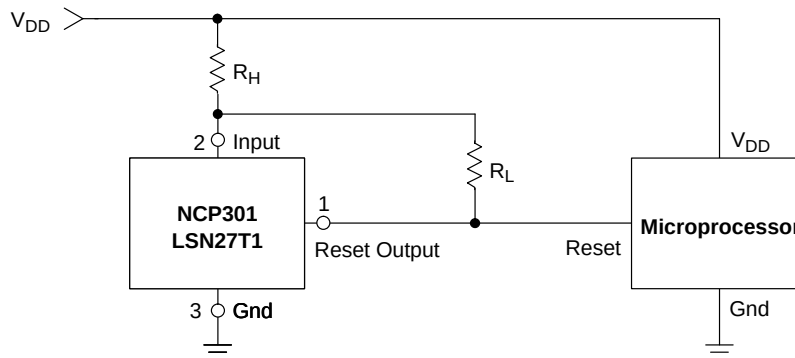


Figure 26. Microprocessor Reset Circuit with Additional Hysteresis

Comparator hysteresis can be increased with the addition of resistor  $R_H$ . The hysteresis equations have been simplified and do not account for the change of input current  $I_{in}$  as  $V_{in}$  crosses the comparator threshold. The internal resistance,  $R_{in}$  is simply calculated using  $I_{in} = 0.26 \mu A$  at 2.6 V.

$V_{in}$  Decreasing:

$$V_{th} = \left( \frac{R_H}{R_{in}} + 1 \right) (V_{DET-})$$

$V_{in}$  Increasing:

$$V_{th} = \left( \frac{R_H}{R_{in} \parallel R_L} + 1 \right) (V_{DET-} + V_{HYS})$$

$$V_{HYS} = V_{in} \text{ Increasing} - V_{in} \text{ Decreasing}$$

| Test Data                |                          |                |                    |                     |
|--------------------------|--------------------------|----------------|--------------------|---------------------|
| $V_{th}$ Decreasing (mV) | $V_{th}$ Increasing (mV) | $V_{HYS}$ (mV) | $R_H$ ( $\Omega$ ) | $R_L$ (k $\Omega$ ) |
| 2.70                     | 2.84                     | 0.135          | 0                  | -                   |
| 2.70                     | 2.87                     | 0.17           | 100                | 10                  |
| 2.70                     | 2.88                     | 0.19           | 100                | 6.8                 |
| 2.70                     | 2.91                     | 0.21           | 100                | 4.3                 |
| 2.70                     | 2.90                     | 0.20           | 220                | 10                  |
| 2.70                     | 2.94                     | 0.24           | 220                | 6.8                 |
| 2.70                     | 2.98                     | 0.28           | 220                | 4.3                 |
| 2.70                     | 2.70                     | 0.27           | 470                | 10                  |
| 2.70                     | 3.04                     | 0.34           | 470                | 6.8                 |
| 2.70                     | 3.15                     | 0.35           | 470                | 4.3                 |

## NCP300, NCP301

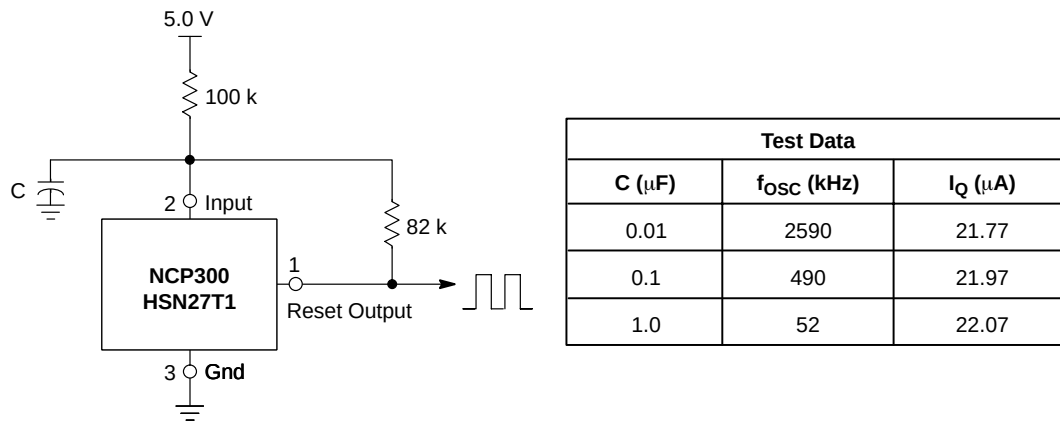


Figure 27. Simple Clock Oscillator

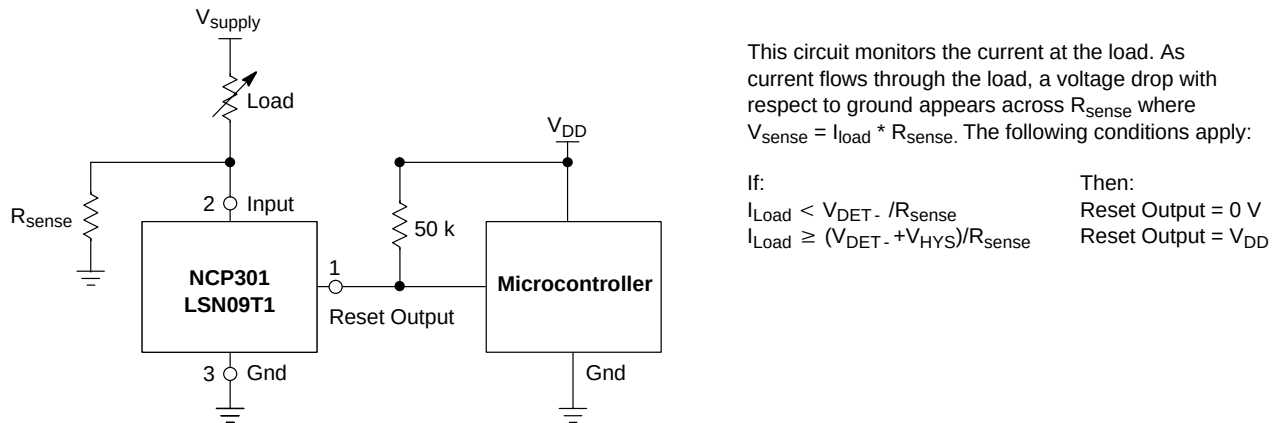
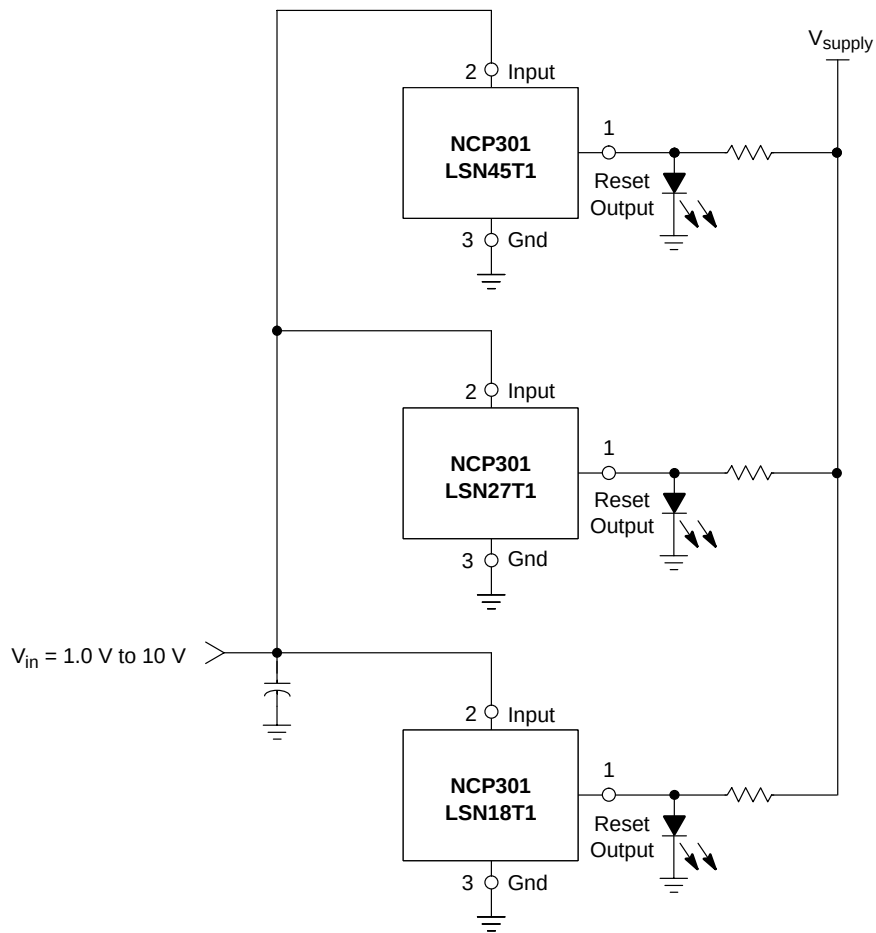


Figure 28. Microcontroller System Load Sensing

## NCP300, NCP301



A simple voltage monitor can be constructed by connecting several voltage detectors as shown above. Each LED will sequentially turn on when the respective voltage detector threshold ( $V_{DET-} + V_{HYS}$ ) is exceeded. Note that detector thresholds ( $V_{DET-}$ ) that range from 0.9 V to 4.9 V in 100 mV steps can be manufactured.

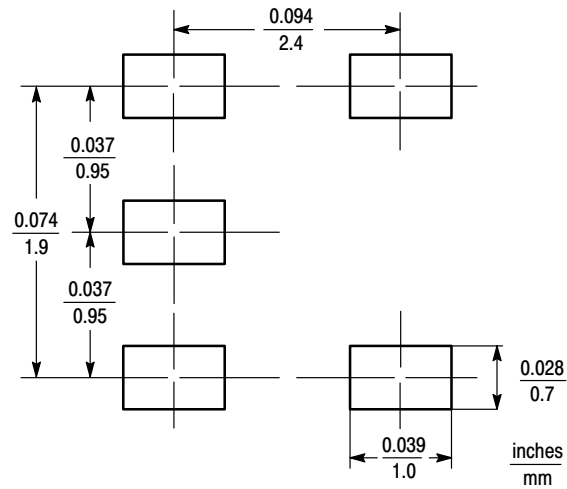
**Figure 29. LED Bar Graph Voltage Monitor**

## NCP300, NCP301

### MINIMUM RECOMMENDED FOOTPRINT FOR SURFACE MOUNTED APPLICATIONS

Surface mount board layout is a critical portion of the total design. The footprint for the semiconductor packages must be the correct size to insure proper solder connection

interface between the board and the package. With the correct pad geometry, the packages will self align when subjected to a solder reflow process.



THIN SOT-23-5

# NCP300, NCP301

## ORDERING INFORMATION

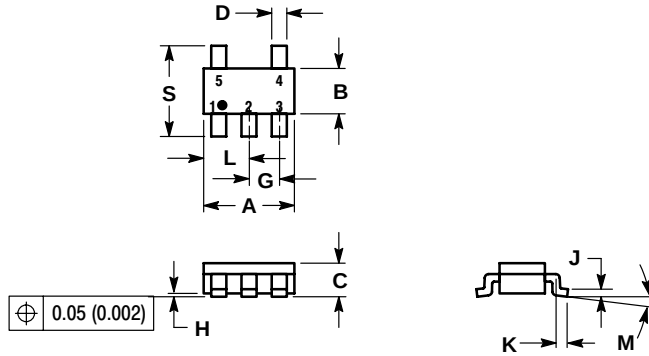
| Device        | Threshold Voltage | Output Type | Reset       | Marking | Package (Qty/Reel)        |
|---------------|-------------------|-------------|-------------|---------|---------------------------|
| NCP300LSN09T1 | 0.9               | CMOS        | Active Low  | SEJ     | 3000 Units on 7 inch Reel |
| NCP300LSN18T1 | 1.8               |             |             | SFK     |                           |
| NCP300LSN20T1 | 2.0               |             |             | SHE     |                           |
| NCP300LSN27T1 | 2.7               |             |             | SEE     |                           |
| NCP300LSN28T1 | 2.8               |             |             | SED     |                           |
| NCP300LSN30T1 | 3.0               |             |             | SEC     |                           |
| NCP300LSN33T1 | 3.3               |             |             | SKV     |                           |
| NCP300LSN34T1 | 3.4               |             |             | SKU     |                           |
| NCP300LSN44T1 | 4.4               |             |             | SKK     |                           |
| NCP300LSN45T1 | 4.5               |             |             | SEA     |                           |
| NCP300LSN47T1 | 4.7               |             |             | SDZ     |                           |
| NCP300HSN09T1 | 0.9               |             | Active High | SDY     |                           |
| NCP300HSN18T1 | 1.8               |             |             | SFJ     |                           |
| NCP300HSN27T1 | 2.7               |             |             | SDU     |                           |
| NCP300HSN30T1 | 3.0               |             |             | SDS     |                           |
| NCP300HSN45T1 | 4.5               |             |             | SDQ     |                           |
| NCP300HSN47T1 | 4.7               |             |             | SDP     |                           |
| NCP301LSN09T1 | 0.9               | Open Drain  | Active Low  | SFF     |                           |
| NCP301LSN12T1 | 1.2               |             |             | SNN     |                           |
| NCP301LSN18T1 | 1.8               |             |             | SFN     |                           |
| NCP301LSN20T1 | 2.0               |             |             | SFD     |                           |
| NCP301LSN22T1 | 2.2               |             |             | SNG     |                           |
| NCP301LSN25T1 | 2.5               |             |             | SNF     |                           |
| NCP301LSN27T1 | 2.7               |             |             | SFA     |                           |
| NCP301LSN28T1 | 2.8               |             |             | SEZ     |                           |
| NCP301LSN30T1 | 3.0               |             |             | SEY     |                           |
| NCP301LSN33T1 | 3.3               |             |             | SNB     |                           |
| NCP301LSN40T1 | 4.0               |             |             | SMU     |                           |
| NCP301LSN45T1 | 4.5               |             |             | SEV     |                           |
| NCP301LSN47T1 | 4.7               |             |             | SEU     |                           |
| NCP301HSN09T1 | 0.9               |             | Active High | SET     |                           |
| NCP301HSN18T1 | 1.8               |             |             | SFM     |                           |
| NCP301HSN27T1 | 2.7               |             |             | SEP     |                           |
| NCP301HSN30T1 | 3.0               |             |             | SEN     |                           |
| NCP301HSN45T1 | 4.5               |             |             | SEL     |                           |

NOTE: The ordering information lists seven standard under voltage thresholds with active low outputs. Additional active low threshold devices, ranging from 0.9 V to 4.9 V in 100 mV increments and NCP300/NCP301 active high output devices, ranging from 0.9 V to 4.9 V in 100 mV increments can be manufactured. Contact your ON Semiconductor representative for availability. The electrical characteristics of these additional devices are shown in Tables 1 and 2.

# NCP300, NCP301

## PACKAGE DIMENSIONS

THIN SOT-23-5  
SN SUFFIX  
PLASTIC PACKAGE  
CASE 483-01  
ISSUE B



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

| DIM | MILLIMETERS |       | INCHES |        |
|-----|-------------|-------|--------|--------|
|     | MIN         | MAX   | MIN    | MAX    |
| A   | 2.90        | 3.10  | 0.1142 | 0.1220 |
| B   | 1.30        | 1.70  | 0.0512 | 0.0669 |
| C   | 0.90        | 1.10  | 0.0354 | 0.0433 |
| D   | 0.25        | 0.50  | 0.0098 | 0.0197 |
| G   | 0.85        | 1.05  | 0.0335 | 0.0413 |
| H   | 0.013       | 0.100 | 0.0005 | 0.0040 |
| J   | 0.10        | 0.26  | 0.0040 | 0.0102 |
| K   | 0.20        | 0.60  | 0.0079 | 0.0236 |
| L   | 1.25        | 1.55  | 0.0493 | 0.0610 |
| M   | 0°          | 10°   | 0°     | 10°    |
| S   | 2.50        | 3.00  | 0.0985 | 0.1181 |

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