

50 ns, Rail-to-Rail, Single Channel, High Speed, Single Supply, Rail-to-Rail Input and Output, 1.8 V to 5.5 V Supply, 150 µA Typical Supply Current, Push-Pull or Open Drain Output, TSOP-5 (SOT23-5) and SC-88A (SC70-5) Packages, Automotive Qualified, Pb-free, Halogen Free/BFR Free and are RoHS Compliant

NCS2250, NCV2250, NCS2252, NCV2252

The NCS2250 and NCS2252 low voltage comparators feature fast response time and rail-to-rail input and output. The extended common mode input voltage range allows input signals 200 mV above and below the rails, allowing voltage detection at ground or the supply. A propagation delay of 50 ns with a 100 mV overdrive makes this comparator suitable for applications requiring faster response times.

These single channel devices are available with a complementary push-pull output in the NCS2250 or with an open drain output in the NCS2252. Both options are offered in TSOP-5 (SOT23-5) and SC-88A (SC70-5) packages. Automotive qualified devices are also available, denoted by the NCV prefix.

Features

- Propagation Delay: 50 ns with 100 mV Overdrive
- Rail-to-rail Input: $V_{SS} - 200\text{ mV}$ to $V_{DD} + 200\text{ mV}$
- Supply Voltage: 1.8 V to 5.5 V
- Supply Current: 150 µA Typical at 5 V Supply
- Available with Push-pull or Open Drain Output
- Packages: TSOP-5 (SOT23-5) and SC-88A (SC70-5)
- NCV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- These Devices are Pb-free, Halogen Free/BFR Free and are RoHS Compliant

Applications

- Voltage Threshold Detector
- Zero-crossing Detectors
- High-speed Sampling Circuits
- Logic Level Shifting / Translation
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Table 1. ORDERING INFORMATION

Automotive	Output	Device (Note 1)	Package	Marking	Shipping †
No	Push-Pull	NCS2250SQ2T2G	SC-88A (SC70-5)	5C	3000 / Tape & Reel
		NCS2250SN2T1G	TSOP-5 (SOT23-5)	5A	3000 / Tape & Reel
	Open Drain	NCS2252SQ2T2G	SC-88A (SC70-5)	5F	3000 / Tape & Reel
		NCS2252SN2T1G	TSOP-5 (SOT23-5)	5D	3000 / Tape & Reel

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Table 3. ABSOLUTE MAXIMUM RATINGS (Note 2)

Rating	Symbol	Value	Units
Supply Voltage Range ($V_{DD} - V_{SS}$)			

NCS2250, NCV2250, NCS2252, NCV2252

Table 6. ELECTRICAL CHARACTERISTICS AT 5 V SUPPLY

Typical values are referenced to $T_A = 25^\circ\text{C}$, $V_{DD} = 5\text{ V}$, $V_{SS} = 0\text{ V}$, $V_{CM} = \text{mid-supply}$, $C_L = 50\text{ pF}$, unless otherwise specified.

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GRAPHS (continued)

Typical performance at $T_A = 25^\circ\text{C}$, unless otherwise noted.

Figure 7. Output High-to-Low Propagation Delay vs. Load Capacitance

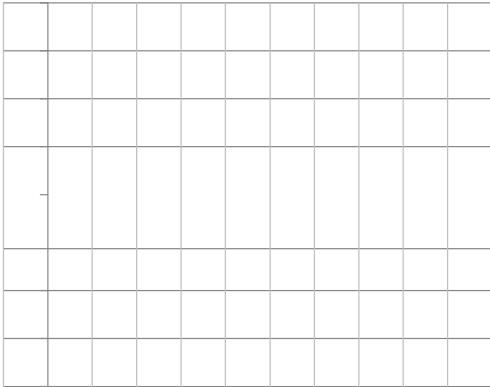


Figure 8. Output Low-to-High Propagation Delay vs. Load Capacitance

NCS2250, NCV2250, NCS2252, NCV2252

GRAPHS (continued)

Typical performance at $T_A = 25^\circ\text{C}$, unless otherwise noted.



Figure 13. Output Voltage High (Relative to V_{DD}) vs. Output Current

Figure 14. Output Voltage Low (Relative to V_{SS}) vs. Output Current

APPLICATION INFORMATION

Input Stage

The NCS2250 and NCS2252 have rail-to-rail inputs. The input common mode voltage range of these comparators extend 200 mV beors

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Figure 18 shows the non-inverting configuration. For the non-inverting configuration, the threshold V_{th} set by R_1 and R_2 is fixed. The output adjusts the input signal on IN+.

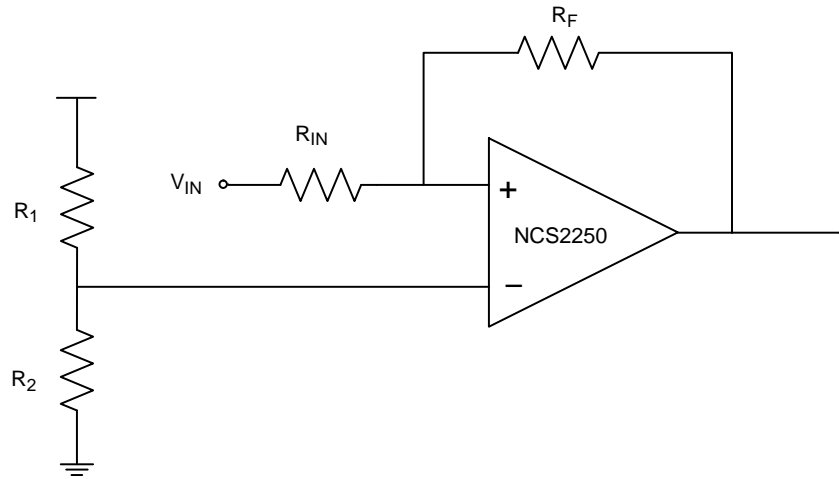
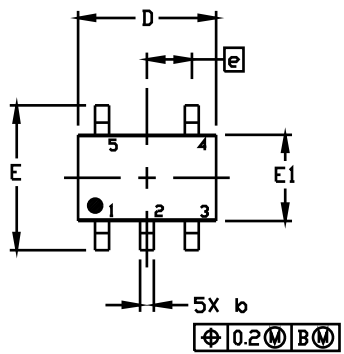


Figure 18. Comparator with Hysteresis, Non-Inverting Configuration

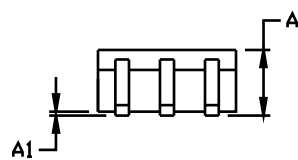
The value of the high-level input voltage which triggers the output to switch from low to high is given by the following equation:

$$V_{IN_high} = \frac{V_{th} \times (R_{IN} + R_F)}{R_F}$$

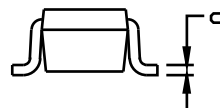


NOTES:

2. CONTROLLING DIMENSION: MIL
3. 419A-01 OBSOLETE. NEW STA
4. DIMENSIONS D AND E1 DO NOT INCLUDE PROTRUSIONS, OR GATE BUR



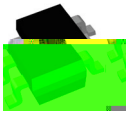
A3



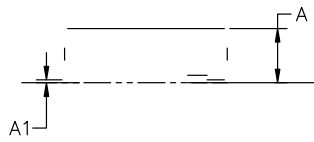
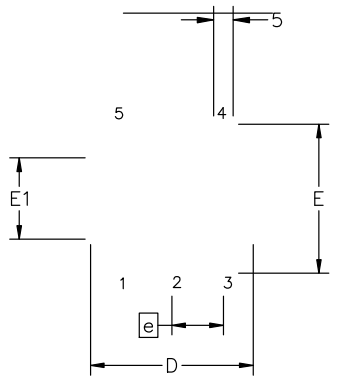
1.80

e

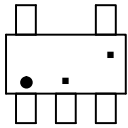
STYLE 1:



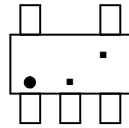
TSOP-5 3.00x1.50x0.95, 0.95P



GENERIC MARKING DIAGRAM*



Analog



Discrete/Logic



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