Compact, High Speed, 50 ns, Low Voltage, Rail-to-Rail

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 mV to V_{DD} + 200 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
-

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

Table 3. ABSOLUTE MAXIMUM RATINGS (Note 2)

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

Table 6. ELECTRICAL CHARACTERISTICS AT 5 V SUPPLY

Typical values are referenced to T_A = 25°C, V_{DD} = 5 V, V_{SS} = 0 V, V_{CM} = mid−supply, C_L = 50 pF, unless otherp8m Tw[s8r2)Tj/TT.27.2252

GRAPHS (continued)

Typical performance at T_A = 25°C, unless otherwise noted.

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

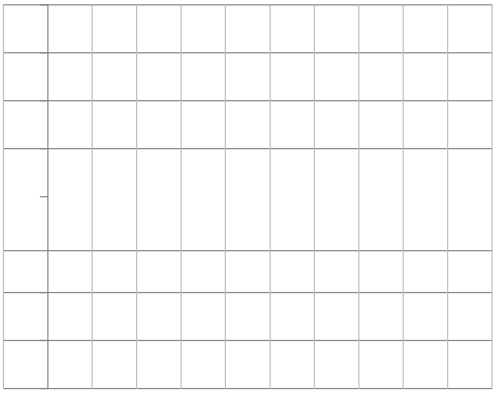


Figure 8. Output Low−to−High Propagation Delay vs. Load Capacitance

GRAPHS (continued)

Typical performance at T_A = 25°C, unless otherwise noted.

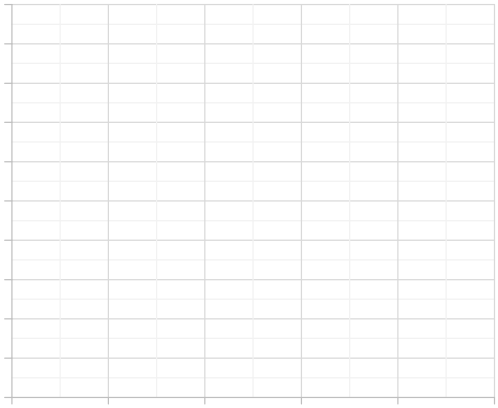


Figure 13. Output Voltage High (Relative to V_{DD}) vs. Output Current

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

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+.

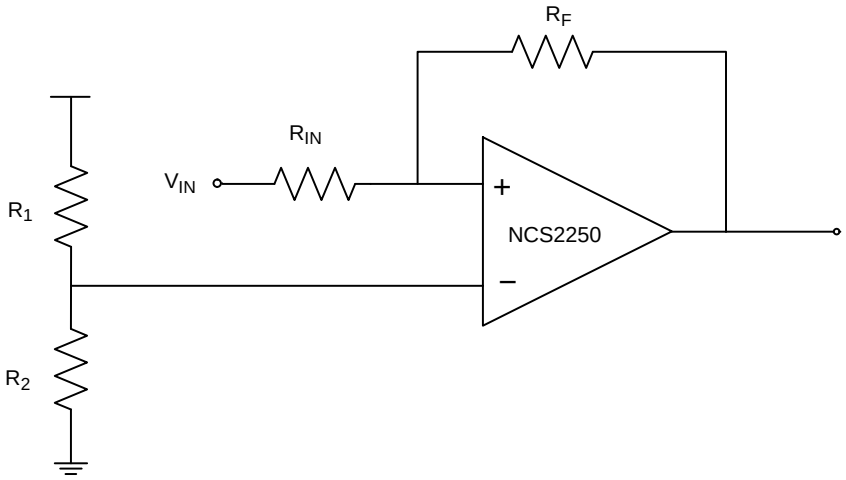
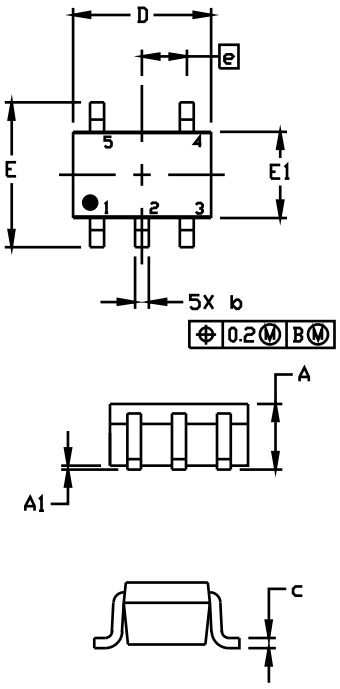


Figure 18. Comparator with Hysteresis, Non−Inverting Configuration

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 NO
PROTRUSIONS, OR GATE BUR

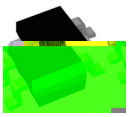
A3

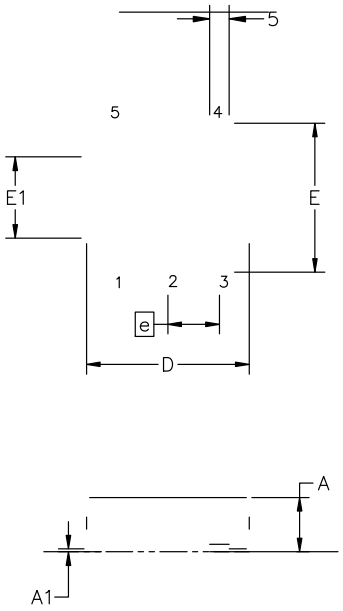
1.80

e

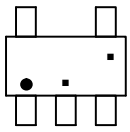
STYLE 1:

TSOP−5 3.00x1.50x0.95, 0.95P

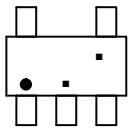




GENERIC
MARKING DIAGRAM*



Analog



Discrete/Logic