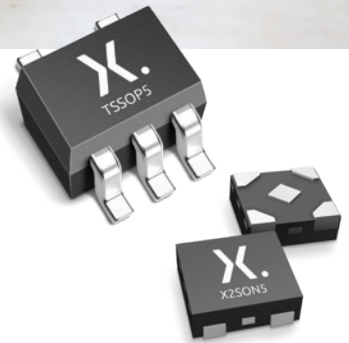


Single supply logic gates with voltage translation



Our 74AUP1Txx logic family provides solutions that integrate voltage level translation with a Boolean function. 74AUP1Txx types are single 2.3 V to 3.6 V supply general-purpose voltage translating devices. Our 74AUP1Txx family is currently composed of ten logic functions including buffers, inverters and gates (AND, OR, NAND, NOR, EXCLUSIVE-OR, EXCLUSIVE-NOR).



Our 74AUP1Txx family achieves single-supply translation through the use of low-threshold and over-voltage protected inputs. The output level is always referenced to V_{cc} which can range from 2.3 V to 3.6 V. For $V_{cc} = 2.5$ V, input logic signals for 1.8 V is valid. For $V_{cc} = 3.3$ V, input logic signals for 1.8 V and above are valid. This wide V_{cc} range allows the interconnection between most logic level signals. 4 mA output drive provides a balance between drive current and reductions in line reflections, overshoot and undershoot.

Key Features

- › 2.3 V to 3.6 V supply voltage range
- › Up and down translation possible
- › I_{OFF} circuitry for partial power-down operation
- › Schmitt-trigger inputs
- › Overvoltage tolerant inputs
- › Up to 50 MHz operation at 3.3 V
- › Low static power use

Applications

- › Portable devices
- › Industrial controllers
- › Servers, PC & Notebooks
- › Automotive

Benefits

- › Partial power down mode support
- › Integration of logic function with translation saves device count and PCB space
- › Footprint-compatible with existing non-translating devices
- › Available in smallest package for use without step-down mask (X2SON5)

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Translation properties

Translation	V _{CC} (V)	Input system supply (V)	Output system supply (V)
Up	2.5	1.8	2.5
	3.3	1.8	3.3
	3.3	2.5	3.3
Down	2.5	3.3	2.5



Available types

Type	
74AUP1T00	2-input single supply translating NAND gate
74AUP1T02	2-input single supply translating NOR gate
74AUP1T04	single supply translating inverter
74AUP1T08	2-input single supply translating AND gate
74AUP1T14	single supply translating inverter
74AUP1T17	single supply translating buffer
74AUP1T32	2-input single supply translating OR gate
74AUP1T50	single supply translating buffer
74AUP1T86	2-input single supply translating X-OR gate
74AUP1T87	2-input single supply translating X-NOR gate

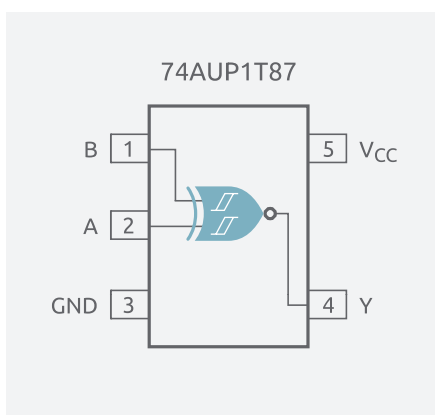
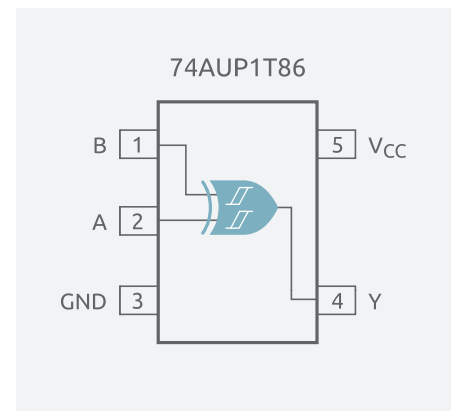
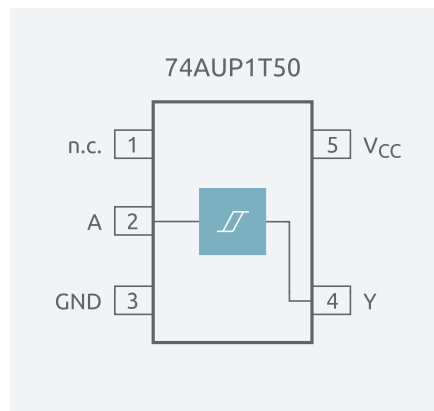
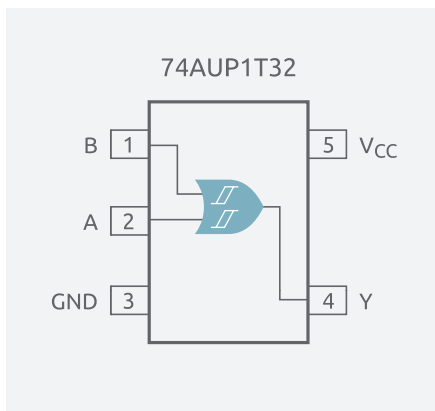
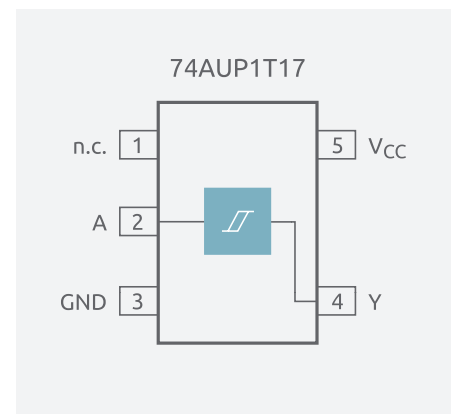
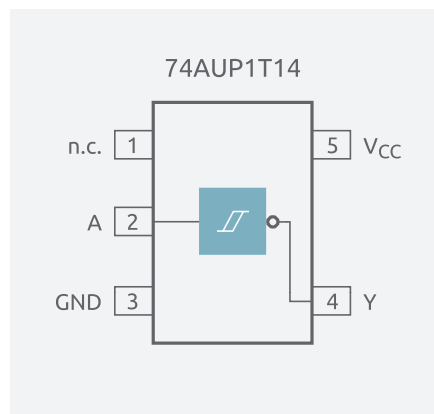
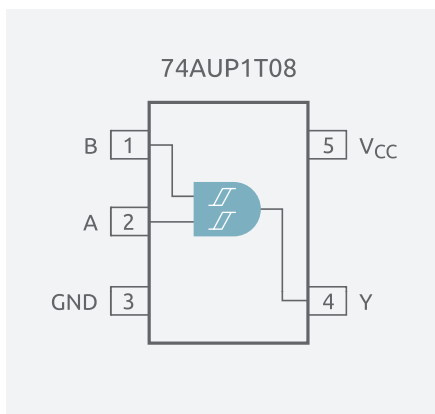
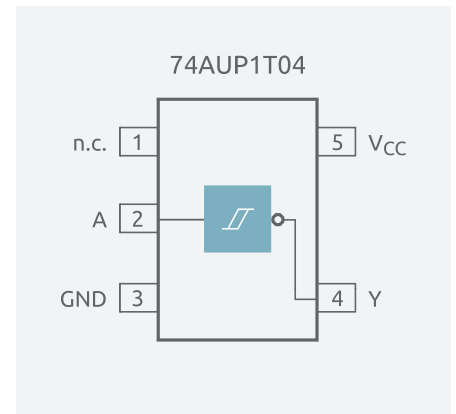
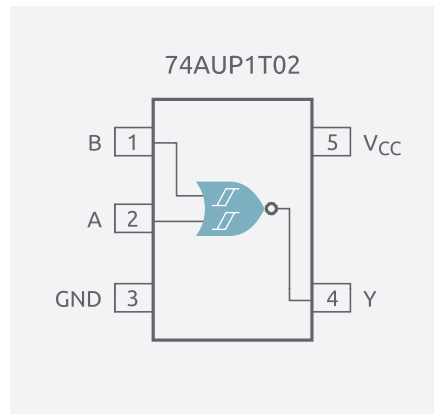
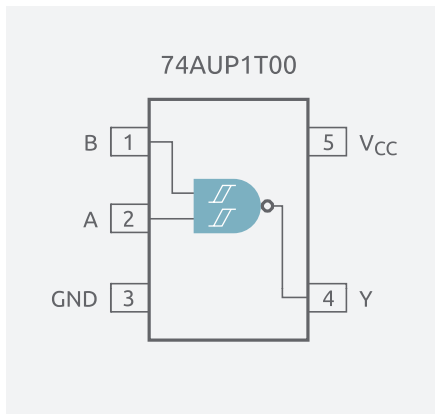
Parametrics

Type	V _{CC} Range	Output Drive	Prop Delay (t _{PD})	Temperature Range	Static Current (I _{CC})
AUP1Txx	2.3 - 3.6 V	+/- 4 mA	< 2.4 ns	-40 ~125 °C	0.1 µA (typ.)

Packages

Suffix	Package version	Package name	Dimensions (L x W x H, pitch - in mm)	
GW	SOT353-1	TSSOP5	2.0 x 2.1 x 1.0, 0.65	
GX	SOT1226	X2SON5	0.8 x 0.8 x 0.35, 0.48	

Functional diagrams

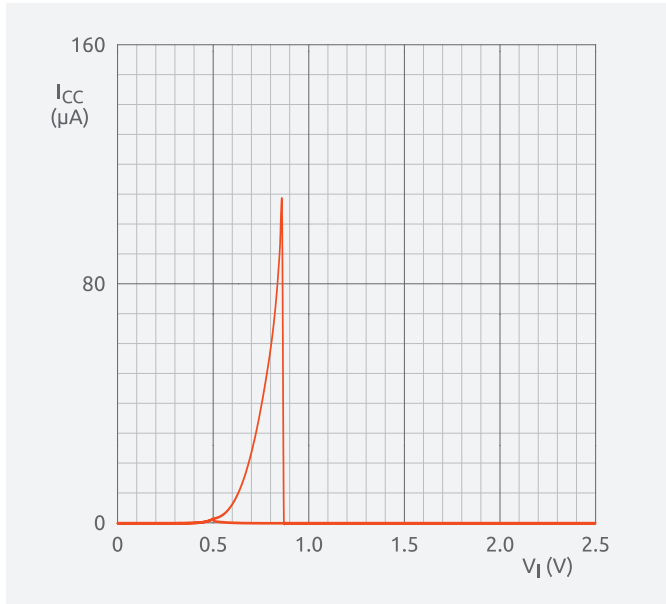


Overvoltage tolerant inputs

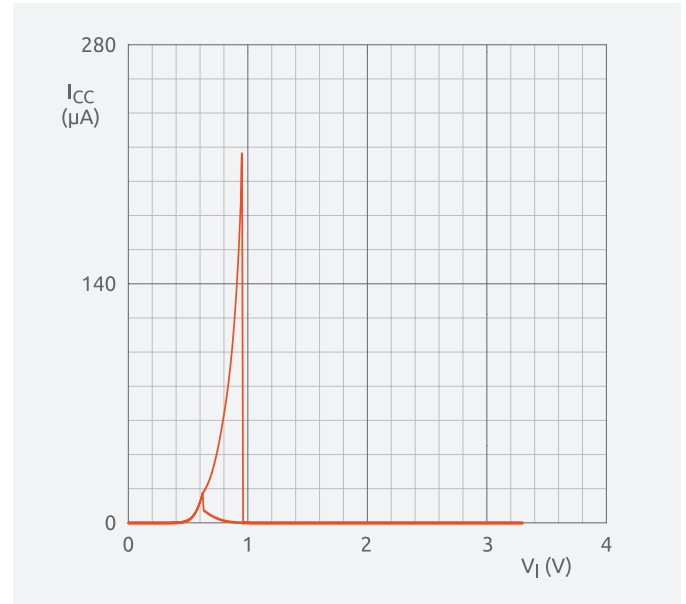
74AUP1Txx series has overvoltage tolerant inputs, which do not have input clamp diodes to V_{CC} and can be used to interface to higher-voltage systems without using external current-limiting resistors, effectively reducing BOM and cost.

Input characteristics

These devices have input-switching thresholds lower than the typical $V_{CC}/2$ value of CMOS and can be used for low-to-high voltage level translation. Schmitt-trigger is included to provide hysteresis, preventing false switching and ensuring well-defined outputs when driven by slowly transitioning signals.

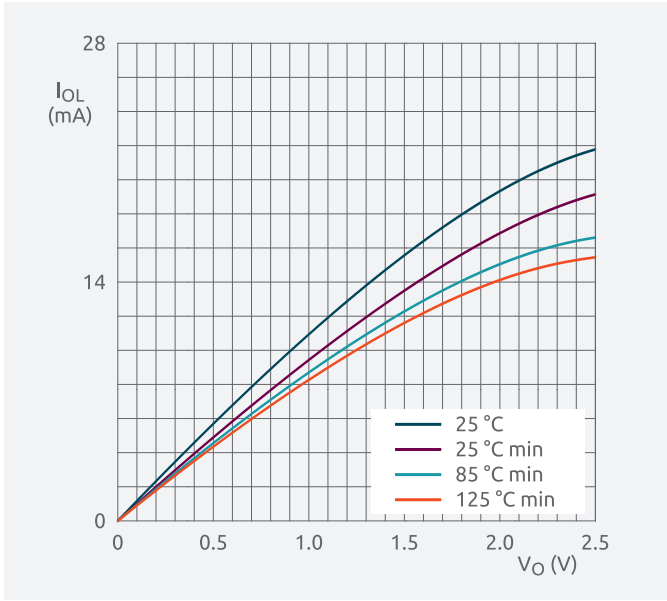


$V_{CC} = 2.5$ V, low threshold input

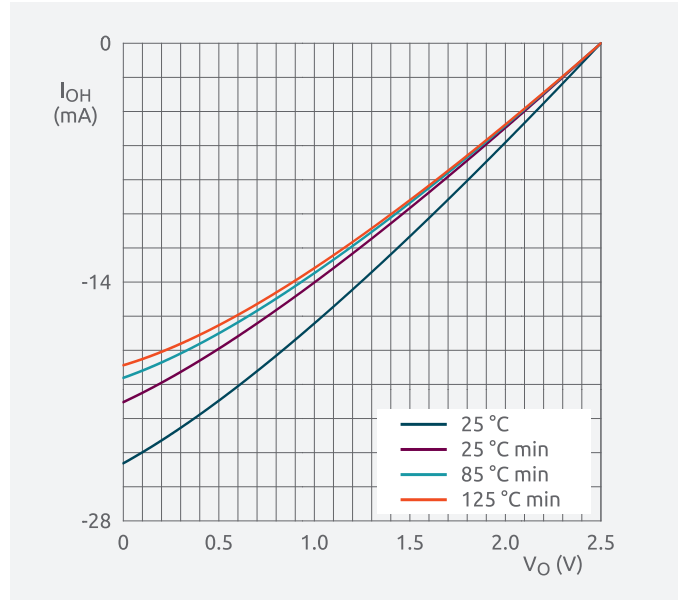


$V_{CC} = 3.3$ V, low threshold input

Output characteristics

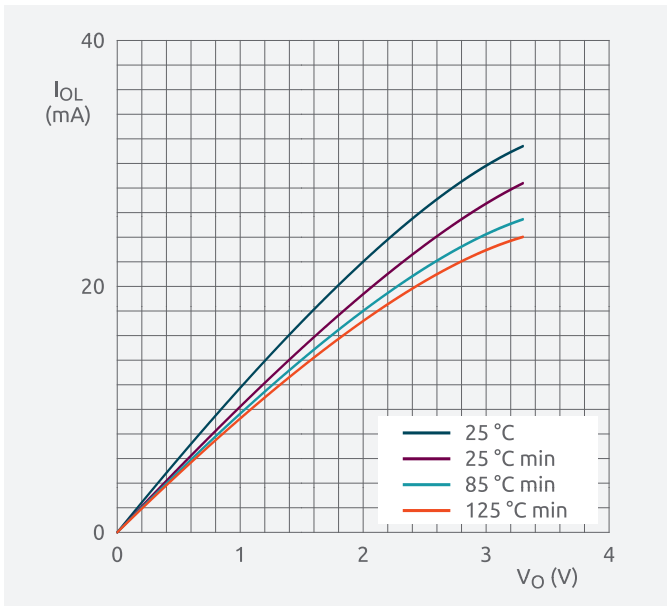


$V_{CC} = 2.5 \text{ V}$, output driving LOW

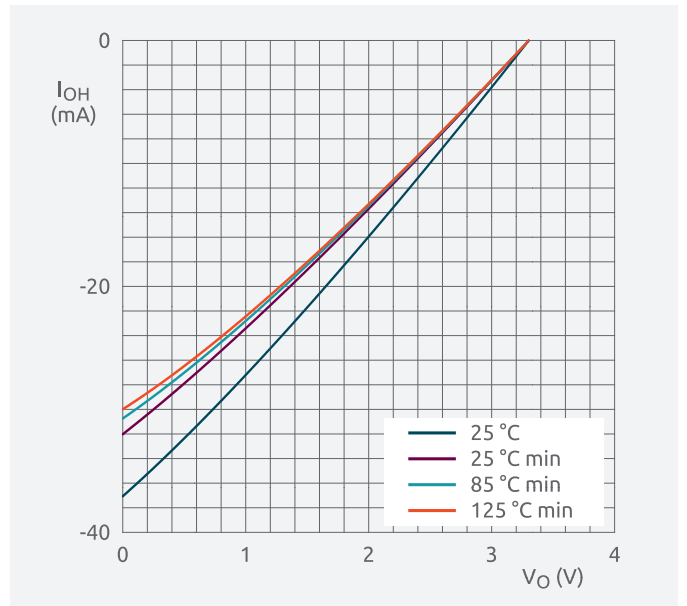


$V_{CC} = 2.5 \text{ V}$, output driving HIGH

Output characteristics



$V_{CC} = 3.3 \text{ V}$, output driving LOW



$V_{CC} = 3.3 \text{ V}$, output driving HIGH

