NXP 74LVC2G66 demo board

Demonstrate fast switching of HF signals with a dual SPST analog switch

This compact demo board makes it easy to evaluate the 74LVC2G66, a dual SPST analog switch that supports high-frequency bandwidth and has control inputs tolerant to over-supply voltage.

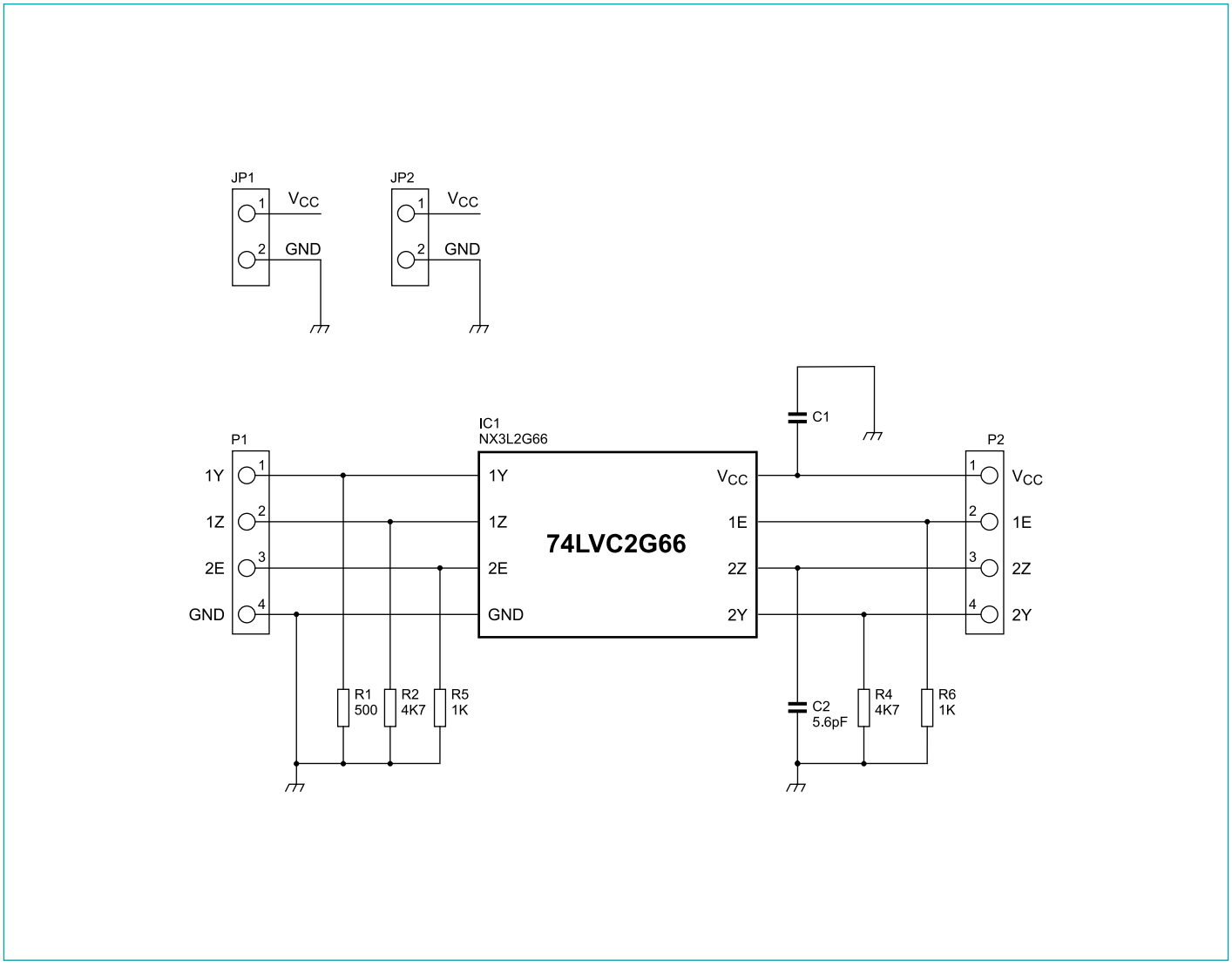
Key features and benefits

- Wide supply voltage range (1.65 to 5.5 V) and low Ron (5 Ω typ) for design flexibility
- High bandwidth (up to 500 MHz) for data-rich applications
- High speed with lower propagation delay of 0.4 ns typ
- Ability to monitor input and output rise/fall times, plus propagation delays with different loads (capacitors and resistors)
- Over-supply voltage tolerance up to 5.5 V for enable inputs
- Low ON state capacitance (9.5 pF typ) for better signal integrity
- Fully specified for use in harsh conditions (-40 to 85 and -40 to 125 °C)
- Excellent ESD performance (7.5 kV HBM), suitable for consumer applications
- Switch current capability of 32 mA
- Available in very small leadless packages for PCB savings

The 74LVC2G66 provides two single-pole, single-throw (SPST) analog switch functions. Each switch has two input/output terminals (nY and nZ) and one active HIGH enable input (nE). When nE is LOW, the analog switch is turned off. Schmitt-trigger action at the enable inputs makes the circuit tolerant of slower input rise and fall times across the entire V_{CC} range, from 1.65 to 5.5 V.

Schematics of the 74LVC2G66 demo board are shown in the figure below. A supply voltage of 1.65 to 5.5 V can be used for the board. Signals in the range of 0 V to V_{CC} can be connected to the nY pins and switched to output to the nZ pins (and vice versa) with minimal loss. There are two channels in the 74LVC2G66 switch. The maximum input frequency for each channel can be as high as 500 MHz at a load of 50 Ω and 5 pF. A decoupling capacitor of 0.1 µF is connected between the V_{CC} and GND pins to smooth out the power rail. By default, 1 kΩ pull-down resistors are connected between the 1E, 2E lines and GND to avoid floating Enable pins. Both switches are OFF/ open.

To turn a switch ON (close the contact), a logic HIGH signal needs to be connected to the respective Enable pin. To connect the Enable pins and GND leads of an oscilloscope probe to the board, additional connectors (JP1 and JP2) with VCC and GND pins are provided. Also, loads of R1 = 500 Ω, R2 = R4 = 4.7 kΩ and C2 = 5.6 pF are provided so designers can see variations in the output rise and fall times at resistive and capacitive loads.



Circuit schematic of 74LVC2G66 demo board

Test results

Results of testing done on the 74LVC2G66 evaluation board are shown in the figures below. In Figure 1, the purple waveform is a 500 kHz square wave input with an amplitude of 3 V applied at the 1Z pin, and the green waveform is the switch output at the 1Y pin with a load of 500 Ω when the Enable pin (1E) is pulled high to 3 V and the switch is ON. The supply voltage V_{CC} for the switch is 3 V. In Figure 2, the green waveform shows the output at the 1Y pin when Enable pin (1E) is connected to GND and the switch is OFF. The supply voltage V_{CC} for the switch is still 3 V, and the purple input signal at the 1Z pin is 3 V. In Figure 3, the purple waveform shows a 5 MHz input signal of 3 V at the 1Z input, and the green waveform is the output of approx. 2.84 V at the 1Y output when the supply voltage VCC is 3 V and the1E pin is at a logic HIGH level of 3 V. In Figure 4, the purple waveform is a 3 V input signal with a 5 MHz frequency at the1Z input of the switch, and the green waveform is an approx. 97 mV signal at the 1Y output when the V_{CC} is 3 V and the 1E pin is pulled LOW to GND.

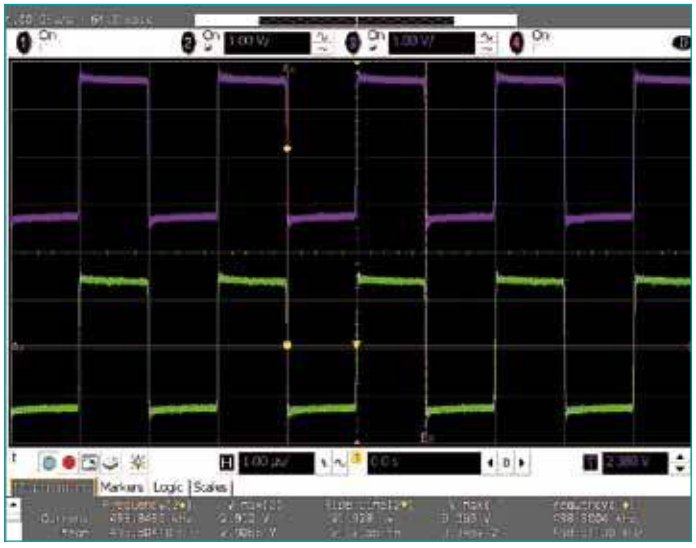


Figure 1

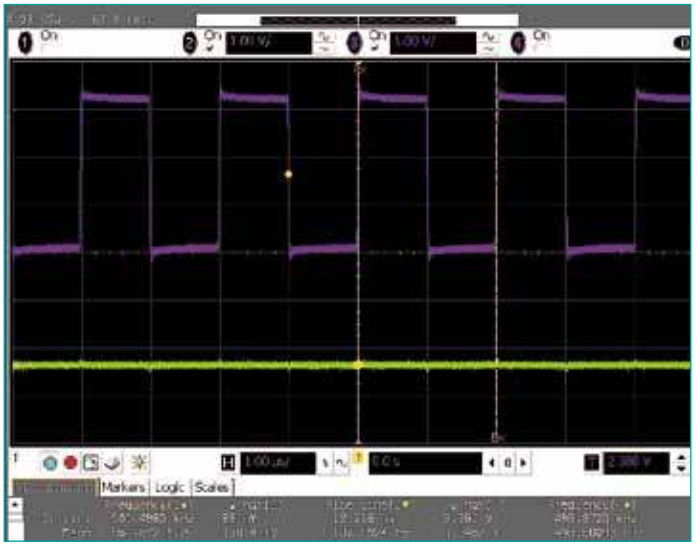


Figure 2

Figure 3

Figure 4

Packages

The 74LVC2G66 is available in leadless 8-pin XSON, XSONU, and XQFN packages and in standard 8-pin TSSOP and VSSOP packages.

Package suffix	DP	GD	GT	GM	DC
					
	SOT505-2	SOT996-2	SOT833-1	SOT902-1	SOT765-1
	8-pin	8-pin	8-pin	8-pin	8-pin
Width (mm)	3	2	2	1.65	2
Length (mm)	3	3	1.05	1.65	2.3
Height (mm)	1.1	0.5	0.5	0.5	1
Pitch (mm)	0.65	0.5	0.5	0.5	0.5

Ordering information

Part number	Package				
	Temp. range	Name	Type	Marking	Material
74LVC2G66DP	-40 to 125 °C	TSSOP8	Thin shrink small outline package	V66	Plastic
74LVC2G66GD	-40 to 125 °C	XSON8U	Extremely thin small outline package; no leads	V66	Plastic
74LVC2G66DC	-40 to 125 °C	VSSOP8	Very thin shrink small outline package	V66	Plastic
74LVC2G66GT	-40 to 125 °C	XSON8	Extremely thin small outline package; no leads	V66	Plastic
74LVC2G66GM	-40 to 125 °C	XQFN8U	Extremely thin quad flat package; no leads	V66	Plastic

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