

Comparison of Rise Times across Different Optocouplers and Pull-Up Resistors for Designing a Level Shifter

Abstract





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Discussion				
IC	\$/100ct (1)	# of channels	RT @ 1KΩ (µs)	Value (\$*µs)
H11L1 (A)	0.498	1	0.84	0.41832
VO0631T (A)	1.87	2	0.87	0.81345
TLP2301 (B)	0.261	1	39	10.179
FODM611 (B)	0.929	1	12	11.148
6N138 (C)	0.724	1	125	90.5
HCPL0701 (C)	1.42	1	75	106.5





The results of the rise time tests split the ICs into three different classes, which we will call class A, B, and C. The technology used inside of both chips within each class are coincidentally the same. The class A ICs, which use Schmitt Triggers perform the best, the class B ICs use a single diode variation and transistor and perform well, while class C ICs using a regular diode and photodarlington transistor fall behind.^{9,10,11,12} In the table above, a value rating was calculated for each IC using the following equation:

Unit $Price(\$) \times Rise Time(\mu s) \div \# of Channels$

The class C chips are not competitive, but class A and B chips are somewhat comparable. Class A chips sport the fastest speeds by far — and, in the case of the VO0631T, dual channels — and the class B TLP2301 is performant enough to work for many projects, while being dirt cheap.

References & Acknowledgements

Scan for all References

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10K

6N138

140

140

