Input Capacitance Comparison GX414, GX414A and GX434

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INFORMATION NOTE

A Comparison of Values of Input Capacitance for the GX414, GX414A and GX434 Video Crosspoint Switches in Dual Inline Plastic Packages (DIP).

INTRODUCTION

The following Information Note looks at the variation of input capacitance, C_{IN} over frequency for various 4 x 1 video multiplexer ICs.

These include the GX414, the GX414A and the GX434. The comparison was done for devices in DIP packaging only.

An HP 4195A Network Analyzer, in conjunction with a test jig developed in the lab at Gennum, was used to measure the input capacitance. A program was written for the 4195A which normalized the test jig. In turn, each of the crosspoint devices was installed in the jig and measurements were taken.

In addition, the capacitance was measured at a fixed frequency of 40 MHz under varying values of DC input bias. The results showed no measureable variation and are not included in this Information Note.

Tests were performed on all four inputs of each device. Even though the absolute values of C_{IN} were different from one input to another, the variations over frequency were the same for all inputs.

The power supply was set to ±8 volts and the tests were done at room temperature.

Figures 1 to 3 are the resultant plots of Input Capacitance versus Frequency for input 0 (pin 1) of the three devices under the following conditions.

Condition 1. The devices were DISABLED.
(pin 11 = logic 1, pin 12 and 13 were *don't care)*

Condition 2. The devices were ENABLED with no (external output) load capacitance on pin 10.
(pin 11, 12 and 13 = logic 0)

Condition 3. The devices were ENABLED with an (external output) load capacitance of 33 pF connected to pin 10. (Pin 11, 12 and 13 = logic 0)

The frequency was swept from 1.000000 MHz to 200.000000 MHz.

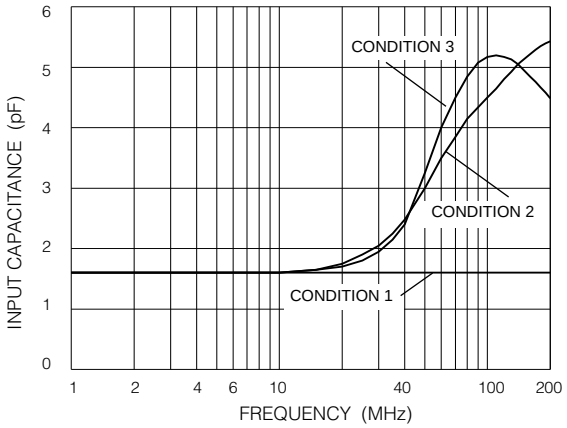

Fig. 1. Input Capacitance versus Frequency - GX414

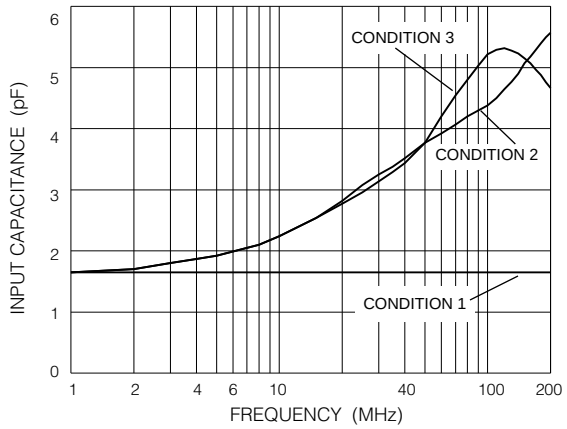

Fig. 2. Input Capacitance versus Frequency - GX414A

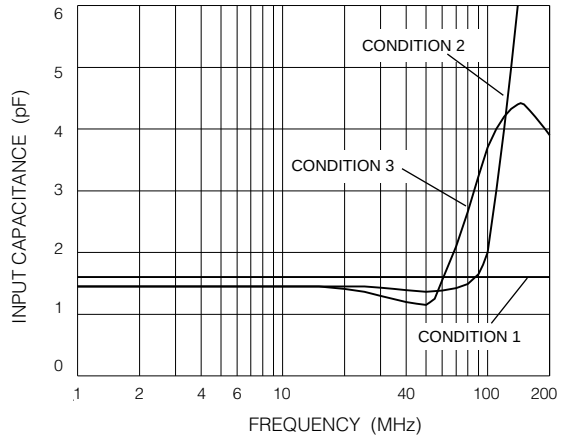

Fig. 3. Input Capacitance versus Frequency - GX434

Signal Input No.	0	1	2	3
Device Pin No.	1	3	5	7
Input Capacitance Relative to Input 1 (pin 3) in pF	+0.4	0	0	+0.4

Table 1 Comparison of relative values of C_{IN} for the GX414, GX414A and GX434

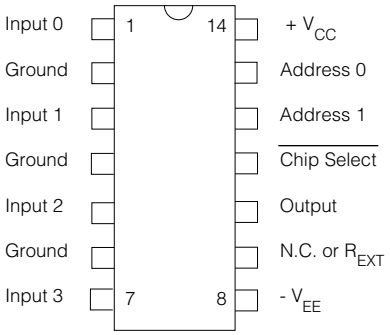

Fig. 4 Shows the pin-outs for the three crosspoint devices in a typical 14 pin DIP

Table 1 highlights the relative values of C_{IN} for the four signal inputs and shows that the relative value of the input capacitance is package related.

Input 0 (pin 1) and Input 3 (pin 7) are symmetrically placed at the far end of the lead frame. Input 1 (pin 3) and Input 2 (pin 5) are also symmetrically placed but now in the middle of the lead frame, see Figure 4.

The curves and data presented in this Information Note should assist the video designer in calculating and compensating for the variations in input capacitance over frequency, as well as between the enabled and disabled states of the crosspoint devices.

It is clear from the results that the GX434 exhibits the smallest variation of input capacitance over frequency for frequencies up to 60 MHz.

Furthermore, there is negligible change in C_{IN} between the enabled and disabled states.

The GX414 exhibits only a 1 pF increase in input capacitance at 40 MHz between the enabled and disabled states. The GX414A shows a rather large variation above 10 MHz. In bussed multi-input routers this will present a loading variation to the input driving stage.

It is recommended that the GX434 be used for new wide router applications in order to minimize input loading variations. The GX414A is recommended for smaller systems requiring a minimum amount of external frequency compensation.