

Application: Power Switching Pericom Device: PI5A4625: Analog Switch with Low R-on

Overview

Many small systems and handset devices need a power switch for small power current switching. By using a PI5A4625 analog CMOS switch, instead of a traditional mechanical switch, customers will reduce their cost, ease the PCB layout and space, and obtain a faster switching times. The switch can then be controlled by a digital signal instead of manually toggling.

PI5A4625 is used in this example, but any PI5Axx and PI3Axx switch with low R-on is suitable for the power switch application. PI5A4625 is an analog switch for video, audio, and other analog applications. PI5A4625 has low On-resistance (0.8-ohm typical) and fast switching time (15ns to 40ns). It is housed in low cost space saving 6-pin SOT-23.

The power switching circuit using PI5A4625

The PI5A4625 switch can tolerate a surge in current up to 2A at 50ms duration. This surge current is the bypass capacitance charging-current, from C3 and C4 during power-up. The capacitance of C3 and C4 needs to be limited in order to ensure that the charging surge current will not exceed 2A at 50ms duration. In order to provide sufficient power de-coupling, a larger capacitor C1 at 47uf is located before the input of the switch, as close to the switch pin as possible. Therefore the high charging current of C1 will not pass through the switch, while the Vcc output at COM pin has sufficient bypass capacitance from C1 for the de-coupling of the low frequency and high current ripples in the Vcc output.

The load at the Vcc output “COM” pin needs to also be as close to the switch as possible. Thus, the C1 will not be too far away from the load for better de-coupling result.

The main reason that PI5A4625 can tolerate a high surge current is because the R-on is low, 0.8-ohm typical, so the voltage drop will be much smaller. Thus, the thermal heat generated by the surge current on the switch die will be much less than a normal switch with higher R-on.

The low R-on of the PI5A4625 switch will also generate a very low Vcc drop, less than 0.1V when the current is below 100mA. This is an advantage when compared to the application using a transistor as the power switch.

A normal CMOS transistor usually has the R-on higher than 10ohm, therefore has much higher Vcc drop at the same current. A MOSFET with low R-on can also be used for power switching, but the package of MOSFET is much bigger than the PI5A4625’s SOTiny SOT-23 package.

Pericom provides a full line of analog switches with low R-on and fast switching time, suitable for small power systems and handset devices. These switches can tolerate the surge changing current from bypass capacitance when power up.

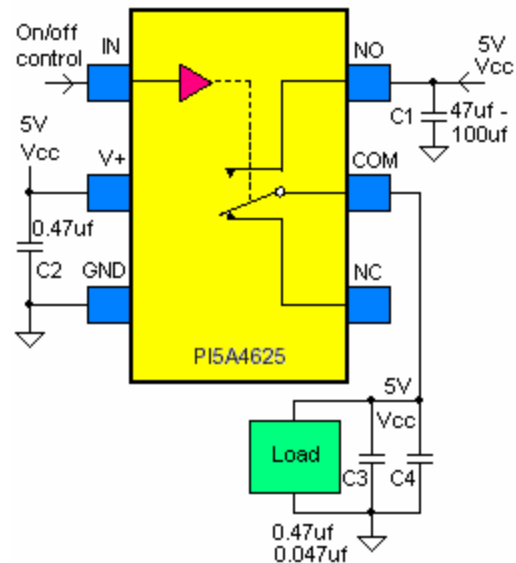


Figure 1: The circuit of the power switch application using PI5A4625

Key Features & Specifications

- Single Device
- SPDT Mux/Demux Switching
- SOTiny SOT-23 package
- Low On-Resistance for maximum signal transfer and low distortion
 - 0.8-ohms
 - 0.15-ohm On-Resistance flatness
- Operating Voltage: 5.0V +/-10%
- Near-Zero Propagation Delay: 250ps
- Switching Speed: 15ns to 40ns
- Channel On-Capacitance: 130pF
- Channel Off-Capacitance: 43pF
- For Video, audio, analog and small power switching application

Key Benefits

- High surge current
- Lower Cost Solution
- Easy layout

Product Status

- Samples: Available Today
- Production: Available Today

Budgetary Pricing

PI5A4625: \$0.43 per 500 pieces

Contact Information

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