University Research Resource Journal
ISSN : 2581-3730
JAYOTI VIDYAPEETH WOMEN'S UNIVERSITY, JAIPUR
Volume 3, Issue 2: (April to June, 2020)

Designing of a Seat Belt with Heartbeat Sensor by Using FINFET

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Abstract

Engine vehicle mishaps have become significant reason for death and injury. In this research paper a seatbelt is designed with heartbeat sensor by using FinFET based SRAM. It monitors a passenger's heart rate and provides warning when seat belt is not weared. For simulation here used LT spice, it is a SPICE based analog electronic circuit simulator.

Keywords– Heartbeat Sensor, Load Sensor, Wheel Speed Sensor, Microcontroller, FinFET Based 6T SRAM.

Introduction

Wireless detection systems can be characterized as a widget system that can transmit data collected from fields viewed through remote connections. The information is transmitted through multiple outlets and with an access point the information is connected to different systems such as external Ethernet. [5] WSNs measure ecological conditions such as temperature, sound, pollution levels, adhesion, wind speed and humidity, weight and so on. It is generally assumed that energy is limited due to the node sensor. Remote sensing systems are systems of interconnected telephoto items implanted in a physical state to estimate the number of expansion spaces. These widgets worked on preparing, storing and visualizing sensors and obtaining wires. [6]

A person's heart beat is the sound of the valves in his heart contracting as they press blood from one area to another. Heart rate is the number of times heartbeats per minute. The heart rate sensor provides a simple way to learn about heart function. A heart rate sensor provides a simple method of thinking about the potential of the heart, which can be evaluated based on the principle of psychological flags used as an upgrade to a computer repair framework. As stated in our estimate, this framework can reduce by 70-80% in contrast to the current framework. The ABS system is fitted with an accelerometer, such as an "ABS sensor". [4] At the point where the brake is applied, the ABS control group reviews and sends the speed information. The correct weight on each wheel to continue sliding / sliding (wheel lock) and last here solving the memory storage problem means no leakage and no decrease power efficiency using SRAM using FinFET. [2]

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Fig.1: Generation of warning when seat belt is not weared and elimination of warning when seat belt is weared

Methodology

Here we are using three sensors first one is heartbeat sensor, second one is load sensor and third one is wheel sensor. [1]

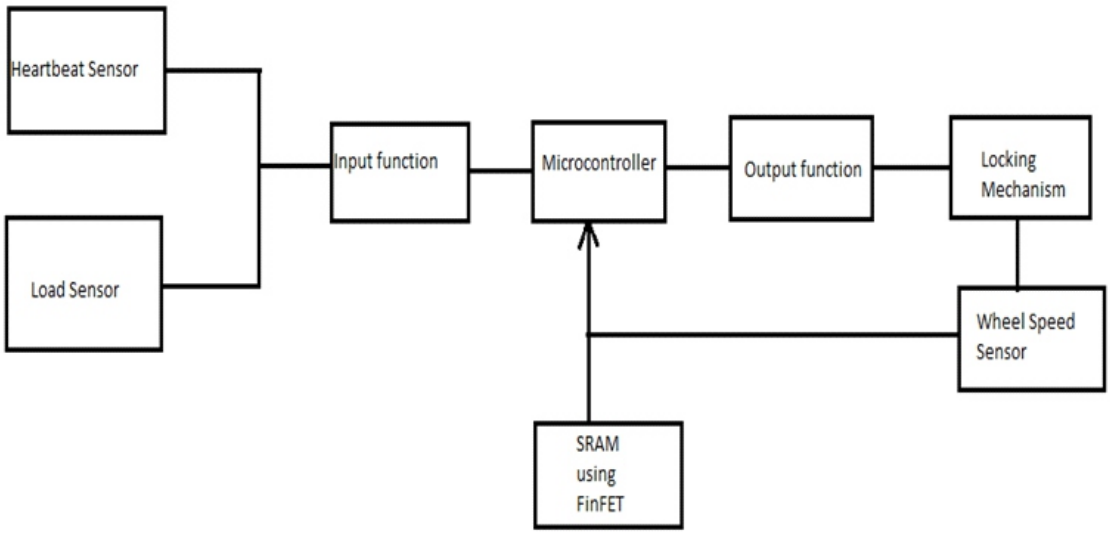

Fig.2: Block diagram of proposed system

Fig.2 shows the block diagram of proposed system. It consists Heartbeat sensor, Load sensor, Microcontroller, Wheel speed sensor and FinFET based SRAM. Heartbeat sensor detects heartbeats, Load sensor converts tension and compression forces into a corresponding electrical signal, and wheel speed sensor controls the wheel and it stops the wheel. The belt webbing is extended and clasped the separate sensor imparts sign to the small scale controller set under the seat, which passes flow to the wheel locking system. Because of which wheel lock is expelled, which prompts actuation of clasp lock and thus the safety belt clasp gets bolted. An electromagnetic wonder is utilized for locking

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Mechanism. For storage we are using FinFET based SRAM. The FinFET based SRAM provides high efficiency, very little leakage current and low power consumption. [3]

Result

In above safety belt system utilizing sensor, miniaturized scale controller and locking component, where in the vehicle doesn't move until and except if safety belt is bolted. The locking system chips away at the standard of electro attraction. The wheel lock system is put close to the plate. At whatever point wheel lock will be initiated, it will hold the circle because of which vehicle won't push forward. Safety belt lock instrument is set inside the clasp of the safety belt.

At whatever point and flow is Passed the safety belt lock will be enacted and consequently the inhabitant won't have the option to pull back the safety belt from the clasp and there are also very easy to save power and leakage reduces and secures the data. The FinFET based SRAM provides high efficiency very little leakage current and low power consumption.

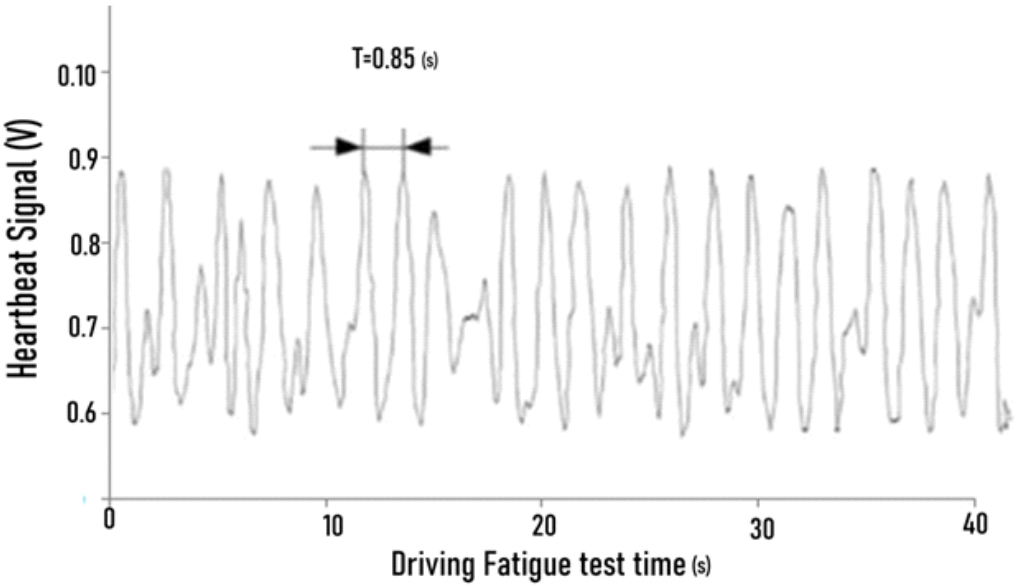

Fig.3: Relationship between heart beat signal and driving fatigue time

The figure 3 shows that Relationship between heart beat signal and driving fatigue time.

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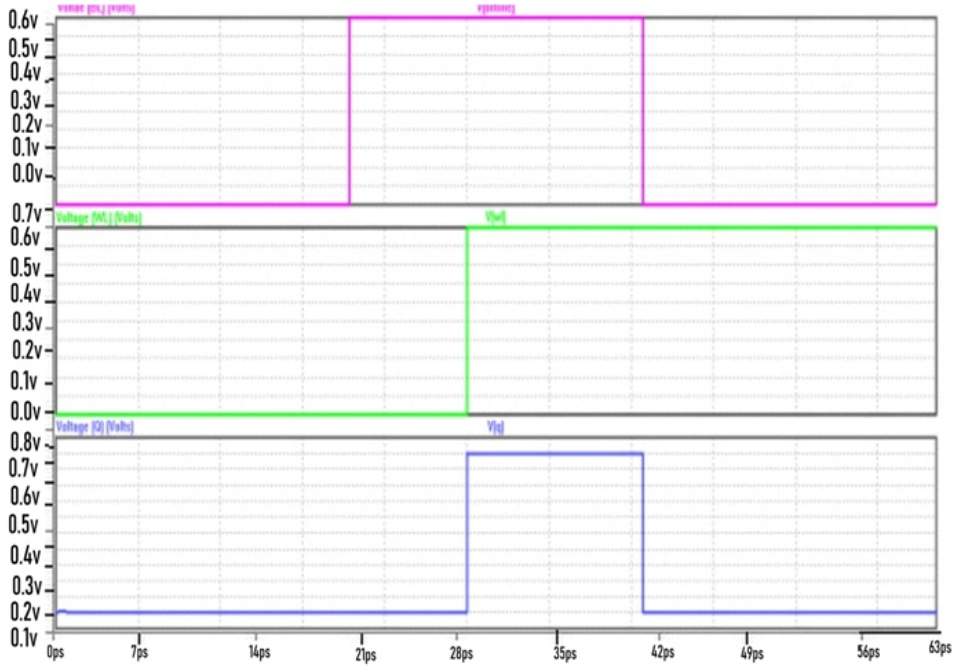
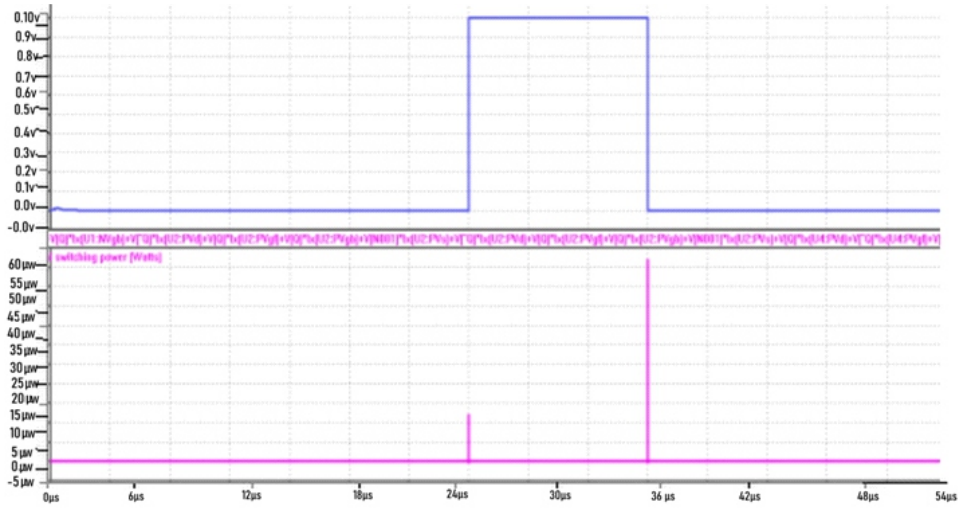


Fig.4: Write operation on FINFET SRAM

The figure 4 shows SRAM script operations using FinFET respectively. Modeling is performed over a period of 80 hours. The bit line (BL) first gets high. Then after a while the word string (WL) is made high. So here see that at this moment (40 µs) the spare part (Q) will be high. Thus, writing 1 function is achieved.



The figure 5 shows the power dissipation of these two SRAM circuits during a write operation. It shows the total power of all four transistors forming two inverters, with a switch on this clover. In both images, the first graph is V (Q), that is, the voltage at the storage node Q. The moment when Q becomes 1 is the recording period 1 (40 µs), and the moment when Q becomes 0, the recording time is 0 (60 µs).

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It can be seen that in each of these two cases, the dissipation of electricity occurs. The sum of the four transistors is a total FinFET dissipation power of 9.98 µw.

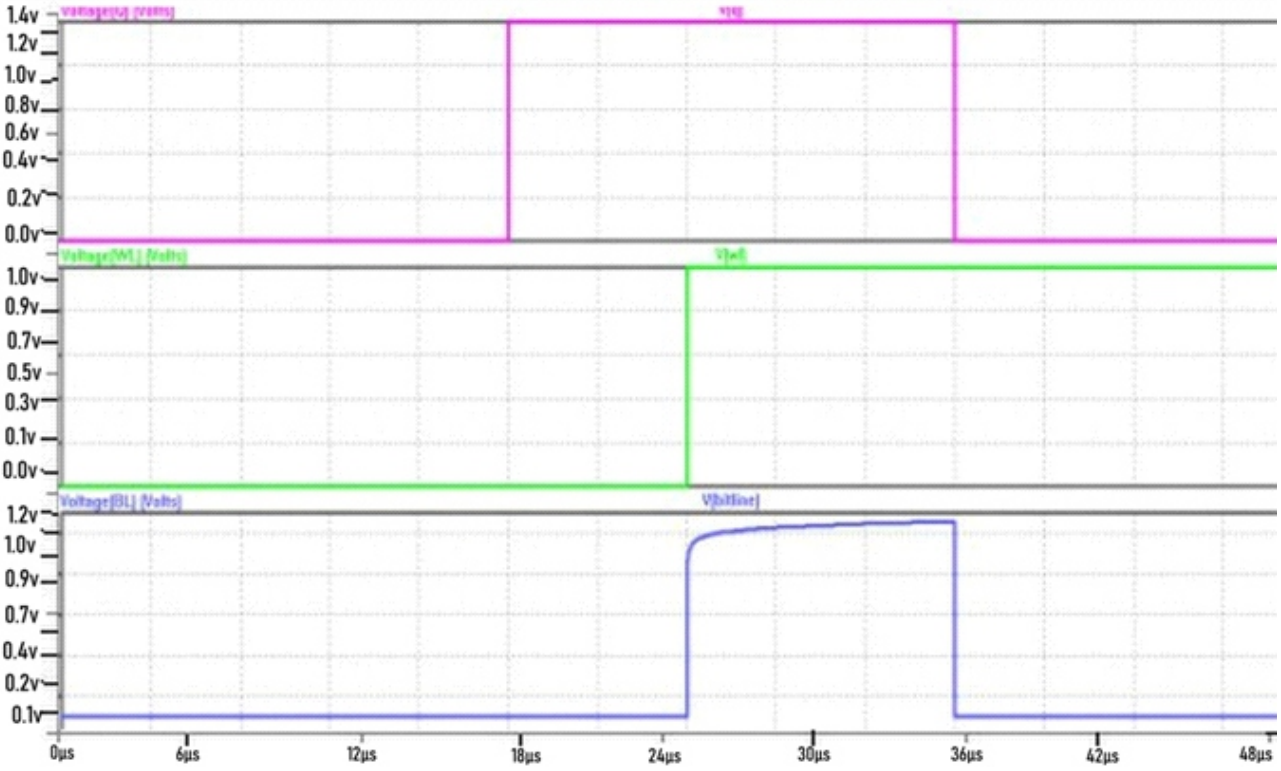

Fig.6: Read operation of FINFET SRAM

The Figure 6 shows read operations of FinFET SRAMs respectively. It can be seen that equivalent performance is obtained using FinFET instead of write and read operation.

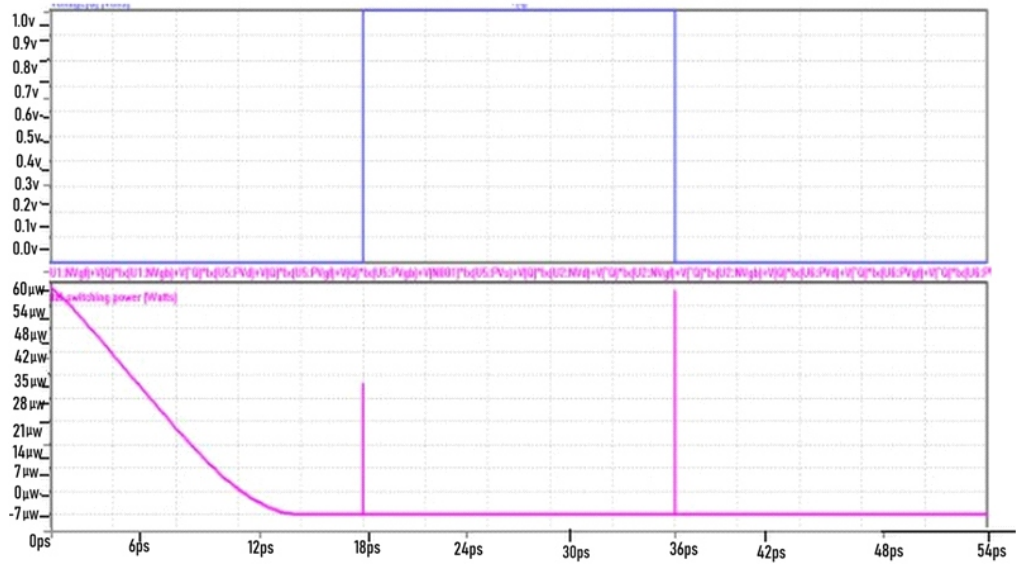

Fig.7: Total switching power in FINFET SRAM during read operation

The Figure 7 shows the power dissipation of FinFET SRAM respectively during read operation.

Conclusion

Now a days, security is the primary concern. Safety belt is one of the essential wellbeing highlight utilized in vehicle to maintain a strategic distance from significant wounds to the driver driving the vehicle. In this paper, we are explaining that how a vehicle won't push a head till driver won't wear the seat strap. Here we recommended that in the wake of identifying the heartbeat, speed is more than zero and seat strap is bolted then vehicle will push forward on the off chance that this condition isn't followed, at that point our vehicles won't push ahead. This lessens the danger of casualty to the driver and the inhabitants. By this, we can likewise lessen the mishap rate and can be protected from the cops pay off. There are big change is increases efficiency.

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