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Short-Circuit Biasing of Transistors

By Charles Douglas Wehner

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When a fundamental law of nature is revealed, the best inventions arise.

Here, the author heard of a mysterious unexplained oscillation in silicon bipolar transistors, and upon investigating discovered that it related to the band-gap energy of silicon.

With the phenomenon fully explained, it became possible to design electronic circuits of exquisite simplicity, reliability and performance.

Unfortunately, the author suffers from an untreated Addison's disease. It is one thing to have the knowledge of progress – quite another to implement progress when one is half dead through metabolic disturbance.

The industrial climate was also not conducive to success. The whole of British industry collapsed – and the German economy is currently (2003) in recession.

There is no point in keeping good ideas secret until one dies. If one cannot use it – SHARE IT. And hope, perhaps, that those who gain benefit from it will reward you in the future.

During the thirty years that this concept was kept secret, millions of radios, televisions and portable telephones were manufactured. In many cases, enormous savings could have been made on each item. The economic value of the concept can be reckoned in billions of dollars worldwide.

see <http://wehner.org/electro/short>

Charles Douglas Wehner

Charles Douglas Wehner was born in 1944. He was a technical draughtsman in computer manufacture in 1962, and became a technical author (radars of Concorde and Harrier as well as nucleonics), design engineer and factory manager. Further experience was in measurement-and-control systems,

photoelectrics and ultrasonics. Charles Wehner was professionally active in Britain and Germany.

Vacation Break for Electrical Machines

By Thomas Yoon

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Are you overloaded? Have you become a part of the highly stressed modern working environment? You may need a break – a vacation, a change in environment, a change of pace...

Similarly, machines can be overloaded too. Those that were designed for a particular system are often pushed to their limits when new requirements emerge.

Just like the final straw that breaks the camel's back, electrical machines too, can reach their breaking point. If there is no vacation for them, they will burn.

Fuses and circuit breakers are designed to stop the current in a circuit before any damage can occur – create a vacation or a break for them.

A circuit breaker is one of the ways to prevent motors (or other electrical machines) from burning due to overloading. All electrical motors produce heat when running. At the time of a fault, this heat builds up at a much higher rate than it can be dissipated. This can result in damaged equipment, fire or even explosion.

The electrical protective device like the circuit breaker is designed to de-energize the circuit before this heat level becomes dangerous.

There are basically 2 means of activating a break – thermally (heat) or magnetically.

Thermal circuit breakers make use of bimetallic strips that will bend due to the different expansion rates of each of the metals in the strip. The bending of the strip will move a tripping mechanism latch that will then open up the contacts of the circuit breaker.

Because bimetallic strips take time to heat up and bend, this type of tripping device is used for tripping prolonged overloaded

situations. The setting for breaking the circuit at a particular overload value can be adjusted.

Magnetic circuit breakers make use of the field strength of

magnetic coils to trip a latch that will then open up the contacts of the circuit breaker. This method is used for high current faults, like in a short circuit. This method is designed to trip instantly.

A thermal-magnetic circuit breaker incorporates both a thermal strip and a magnetic coil. This type of circuit breaker is able to protect against momentary overloads as well as high or short circuit current faults.

What happens if the circuit breaker is placed in a high temperature environment? The thermal bimetallic strip bends on high temperature. In this case, the current is not causing the high temperature in the bimetallic strip, but the ambient air is! The current may still be below the safe operating rated value for the motor.

In this case, a compensating bimetallic strip may be incorporated into the circuit breaker to eliminate this type of error. These circuit breakers are often used in hot areas like furnace, oven, and boiler rooms.

Circuit breakers can be reset very quickly, once they have tripped. Can your break or vacation be reset very quickly too? Don't reset. Take a long break!

Until next time...

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Learn Electro-Technology Calculations for 1st Class Marine
Engineers Competency License Exams at

e-book. Applicable for all electrical

installations both on ships and at shore.

Many years of working experience in Marine, Facilities, Construction has given the author material for writing e-books and articles related to engineering, and management.

More information at

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