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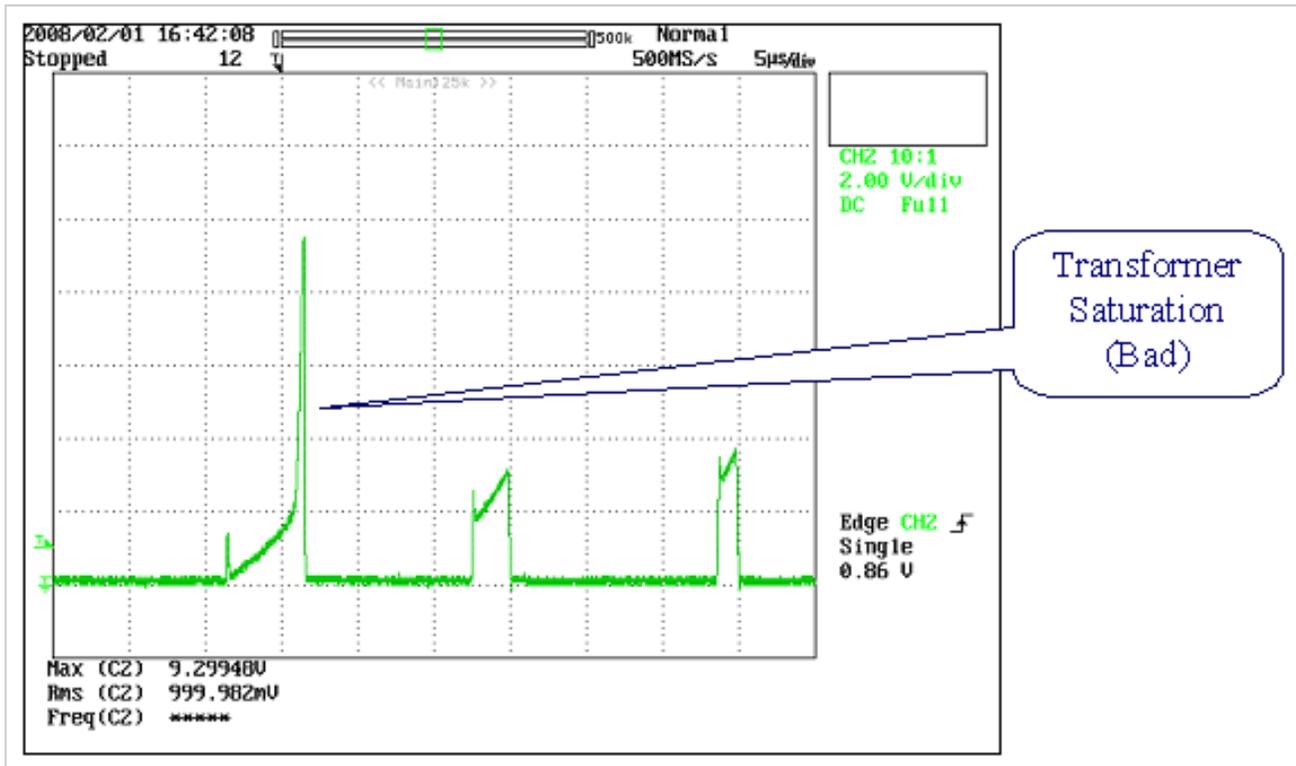
Did my power supply fail or just wear out?

A true power supply failure is a rare occurrence provided the following occurs:

- The manufacturer has taken the appropriate steps on component evaluation, component derating and has utilized sound design techniques.
- The user is operating the product in accordance with the manufacturer's instructions.

TDK-Lambda, for example, puts many components through a myriad of stress tests including voltage testing under extreme humidity and atmospheric pressures, beyond the manufacturer's specified maximum ratings. Only upon passing those tests is the component supplier added to the approved vendor's list.

Monitoring primary switching currents at high line and high ambient temperatures during transient loading can reveal how much design margin the power supply has. Below you can see that our competitor's power transformer is inadequately sized and is drawing a huge increase in current as it saturates.



So, when I hear "My power supply failed after just three years in the field" from potential customers, I review their application and often have to deliver the bad news. Their power supply has just worn out.

Recently a manufacturer of semiconductor fabrication equipment called me. They were using a one-year warranty power supply and were running it at the full rated power level.

I asked the Engineer how long was their equipment typically operated in the field. "Our equipment is usually running 24/7 (24 hours a day, 7 days a week)" was the reply and "our customers expect to use the machine for at least ten years."

In a power supply, the most frequent wear-out component is the electrolytic capacitors. Capacitor life has improved greatly with reasonably priced electrolytics, now typically rated for 10,000 hours at 105°C. Even then, that is only 1.14 years when used 24 hours a day in a very harsh environment.

The solution is quite simple, choose a suitable grade of power supply and apply sufficient deratings. I always ask about the application, the expected field life, the cost impact of their customer's equipment being out of service, and the cost impact of having to service the equipment. If the application is in a

remote application or would require a service person to drive or fly out to the location, paying an extra \$50 or even \$100 more for an rugged, industrial grade power supply will be more economical than paying for a \$500 field service call, perhaps 3 years times.

I often equate power supply life to that of buying a cheap set of brake pads for one's car. Yes, it costs less initially, but you will probably be back for another set of pads (and spending time in the repair shop) in less than half the time that a higher quality set of pads would last.

Posted by [Power Guy](#)