

## ***TMCM-110, TMCM-013, TMCM-111, TMCM-112, TMCM-160 integrated motor driver module hardware life expectancy***

*Which MTTF can be estimated for a TMCM module?*

### **1. TMCM-110, TMCM-013, TMCM-111, TMCM-112, TMCM-160 module**

**Q: Which life expectancy does a TMCM-110 have, what are the critical parameters?**

A: The most critical parts on the TMCM-110 are the electrolytic capacitors, because of the self-heating these power driver units have.

The Flash / EEPROM memories are specified for 20 years without data loss, as a conservative estimation.

Thus life expectancy of the modules mainly depends upon the capacitors. Capacitor life depends on the temperature and voltage, as well as on the ripple current, which depends on the a) motor current and b) resistance (length) of power supply cables. An estimation for the TMCM-110 is a minimum (worst case) life of about 3000 hours at 55°C environment temperature (capacitor core temperature for 85°C type at 105°C) with continuously maximum motor current. This time doubles with each temperature reduction of 10°C.

For these power devices, MTBF is increased if air flow is allowed, due to reduced temperature of the parts. For a long operation life, make sure, that the unit is not overheated by the motor!

With 30°C environment temperature the following MTTF are calculated based on a temperature measurement of the TMCM-110 module:

1.5A: 17000 hours (2 years)

1A: 50000 hours (5 years)

0.5A: > 20 years

### **2. Other modules**

The same is valid for the other integrated power modules, like TMCM-035, TMCM-160, TMCM-163, TMCM-310 and TMCM-610, Sixpack, Quadpack and Monopack.