

# How to Avoid the Wrong Power Supply



**FOCUS:**

## ENVIRONMENTAL CONDITIONS

### 1 DERATING & SHUTDOWN POINT

#### *What to Remember*

- Derating is the process of decreasing output power below maximum capacity so supply can operate at other necessary levels (voltage, current, temperature etc.)
- The derating point of a supply allows you to know the capacity your supply can operate under certain conditions
- Make sure your supply can still operate properly for your application once the derating point is hit
- The shutdown point is simply the level where your supply will shut down once hit. The shutdown point will differ from supply to supply and could be temperature, over current, under voltage at input etc.
- Pay attention to these points on the data sheet

### 2 HIGH ALTITUDE

#### *What to Remember*

- High altitude means air that is less dense which results in poor insulation and poor thermal conduction through air
- Adding a bigger heatsink can compensate for the air's inability to transfer heat
- Fluid heat transfer can also transfer heat from the supply, but circulating liquid is necessary for it to be possible
- Isolating internal conductors can help prevent sparking in the supply
- If intending to place conductors further apart, make sure enough space is allotted

### 4 SHOCK AND VIBRATION

#### *How it Affects Your Supply*

- Shock and vibration are usually a result of an environment that moves
- Even the smallest amount of shock and vibration can cause stress on component parts
- Flexible wires should be used to connect supply to PCB load in order to avoid breakage
- If cables are used, tie them down so they do not move, weaken, or break
- Coating your PCB can help absorb shock and vibration
- Attaching parts with epoxy offers better stabilization
- Placing an isolator between the PCB and the enclosure helps prevent damage to supply, but will add cost and make the assembly more complicated

### 3 HIGH TEMPERATURE

#### *What to Remember*

- High temperature can cause the supply to over heat, decrease reliability, and shorten the life of the supply
- Attaching a heatsink helps with thermal management, but adds weight & size to the supply
- Using parts at lower voltage and lower current level than rated for can generate less heat, increase reliability, and prevent overheating
- The trace that the current flows on should be made larger to lower resistance and prevent conductive loss
- High temperature can be beneficial in some cases:
  - › If IGBT or bipolar diodes are used, they can get better conduction loss
  - › Better magnetic core loss can result from high temperature environment