



WTC3243: Calculating the Safe Operating Area

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To determine if the operating parameters fall within the safe operating area (SOA) of the device, the maximum voltage drop across the controller and the maximum current must be plotted on the SOA curves.

These values are used for the example SOA determination:

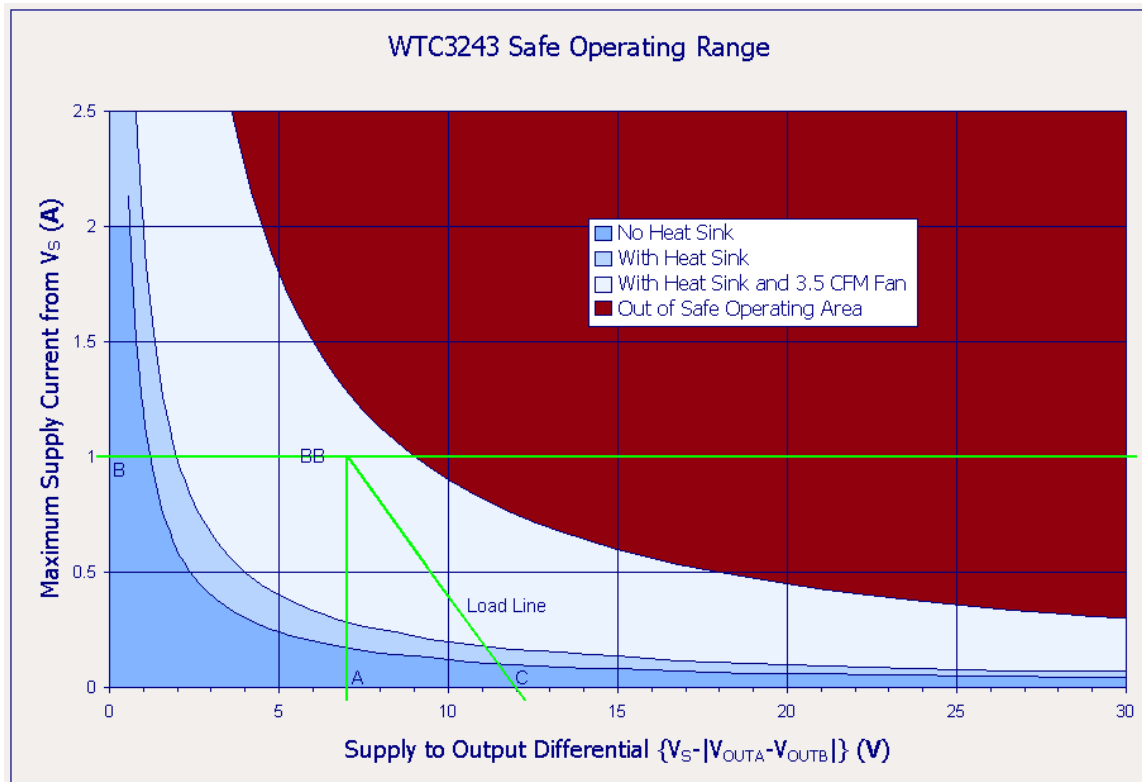
(Vload and Iload are determined from the specifications of the thermoelectric cooler (TEC) or resistive heater.)

Voltage of TEC supply	Vs= 12V
Voltage drop across load	Vload = 5V
Current flowing through load	Iload = 1A

Follow these steps:

1. Determine the maximum voltage drop across the controller, $V_s - V_{load}$, and mark on the X-axis. ($12V - 5V = 7V$, Point A)
2. Determine the maximum current, Iload, through the controller and mark on the Y-axis: (1A, Point B)
3. Draw a horizontal line through Point B across the chart. (Line BB)
4. Draw a vertical line from Point A to the maximum current line indicated by Line BB.
5. Mark V_s on the X-axis. (Point C)
6. Draw the Load Line from where the vertical line from point A intersects Line BB down to Point C.

Refer to the chart shown below and note that the Load Line is not in the Safe Operating Areas for use without a heatsink (dark blue) or the heatsink alone (lighter blue), but is in the Safe Operating Area for use with heatsink and fan (lightest blue).



Two charts are provided below for your use in determining the SOA for your application.

