Linear Regulator Series

BDxxSD2, BDxxSD5, BDxxTD3 Series PCB Layout

The basic terminal configuration of a linear regulator IC consists of four parts: input, output, GND, and feedback* (* is for the output voltage adjustable type only). The only external components are input/output capacitors and a feedback resistor. Even a linear regulator that facilitates power generation will not operate correctly if its layout is improperly written. Therefore, PCB layout is as important as circuit design. The primary problems likely to occur due to improper layout are ineffective regulation and instability. Adoption of a proper layout will prevent the occurrence of these problems.

A VCC pin, also used as a power supply for internal amplifiers, must shunt the signal to ground via a low ESR ceramic capacitor (A). It is recommended to place a bypass capacitor within 5 mm of the VCC pin on the same surface. Although it is also preferable to place the input bulk capacitor on the same surface, it may have to be placed on the underside due to lack of layout space or for other reason. If this happens, the requirements of the bypass capacitor must be satisfied (B).

Since an output capacitor is one of the phase compensation components of an error amplifier, connect it to ground and locate 2 cm or less from the IC (C). To further add bulk capacity, the bulk capacitor can be placed farther away.

When using an electrolytic capacitor, its service-life may be shortened by high temperature. To restrain heat conductivity from the IC, it is recommended to connect the electrolytic capacitor using the minimum wiring width for the allowable current.

It is recommended to lay out VIN, VO and GND wirings on the same surface as the IC. Be sure to set the wiring width more than the current capacity of copper wiring (F). If these wiring paths have to be placed on another layer because of limited PCB area, provide multiple vias to ensure current capacity.

For an IC provided with an exposed pad (underside heatsink pad), it is required to solder the pad to ground. Also, for an operation subject to large power loss, the upper layer ground section must have a sufficient heatsink area. If sufficient area cannot be secured on the upper layer, use the ground plane of the inner layer or underside and provide multiple vias directly under or near the IC so as to improve heatsink performance.

It is recommended to connect N.C. pins to ground for the purpose of securing a heatsink area.

Figure List

SSOP5

With Diode: Figures 1 to 3

Without Diode Figures 4 to 6

SSOP5 (with Diode)

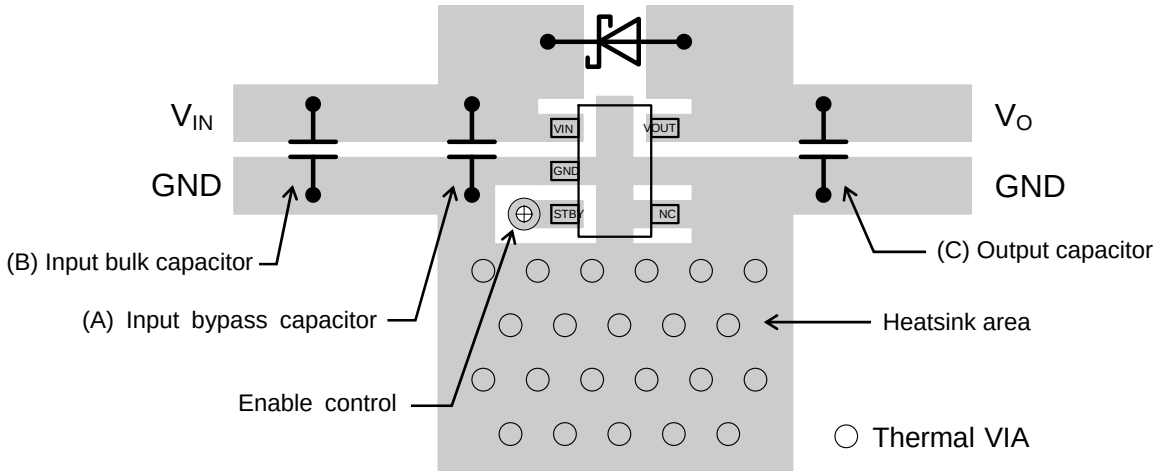

Figure 1. PCB Layout (SSOP5 Package)

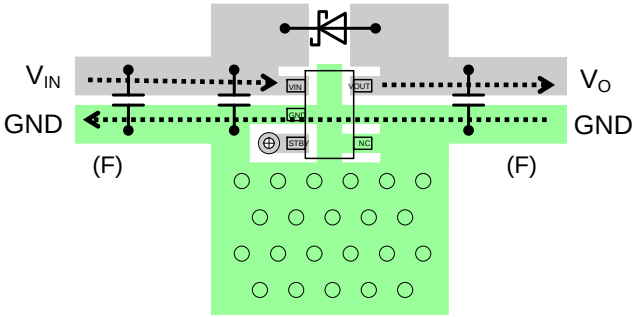

Figure 2. Large Current Ground Wiring

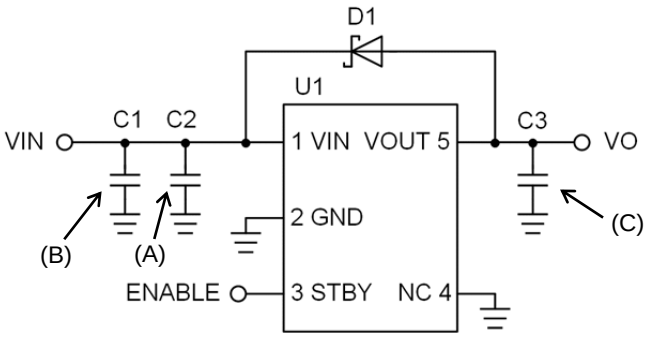

Figure 3. Circuit Diagram

SSOP5 (without Diode)

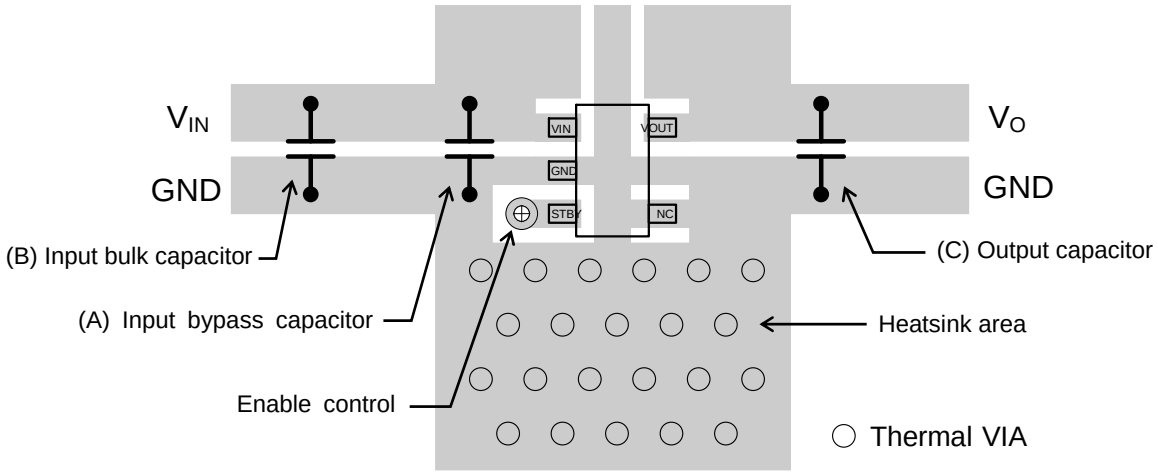

Figure 4. PCB Layout (SSOP5 Package)

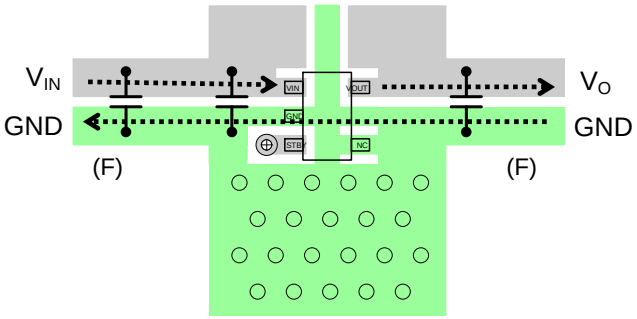

Figure 5. Large Current Ground Wiring

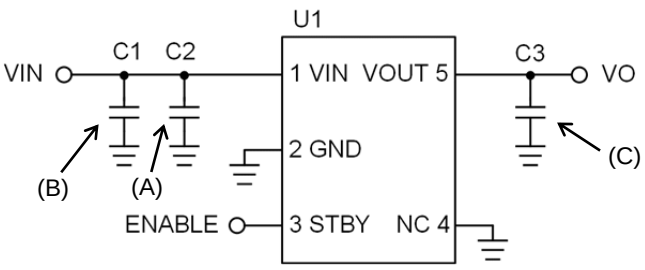

Figure 6. Circuit Diagram

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