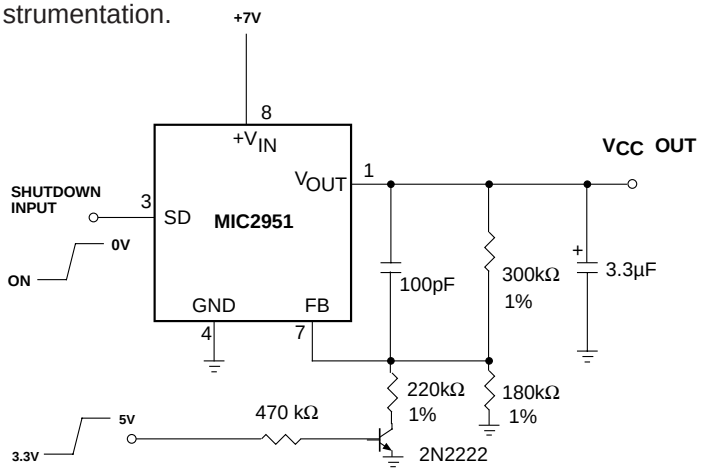
Application Hint 7

Using Low Current LDO Regulators

by Bob Wolbert

General Description

The MIC2951 brings the benefits of linear regulation to surface mountable packaging. High accuracy, high efficiency, very low ripple, and excellent protective features are combined into a useful device for laptop/notebook computers, communications equipment, and battery operated instrumentation.



MIC2951 Configured as a selectable 3.3V or 5.0V output regulator.

Features

- High accuracy +5V or adjustable output voltage
- Extremely small size; up to 150mA output current
- Low dropout voltage and quiescent curent
- Thermal and over-current protection
- Error flag warns of output dropout
- Logic-controlled electronic shutdown

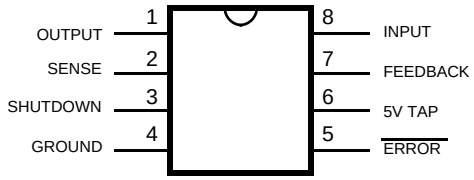
MIC Versus LP Benefits

- Lower dropout voltage
- 150mA output current vs. 100mA
- One-sixth the ground current
- Reverse battery protection for load
- Survives automotive "Load Dump" transient (60V)

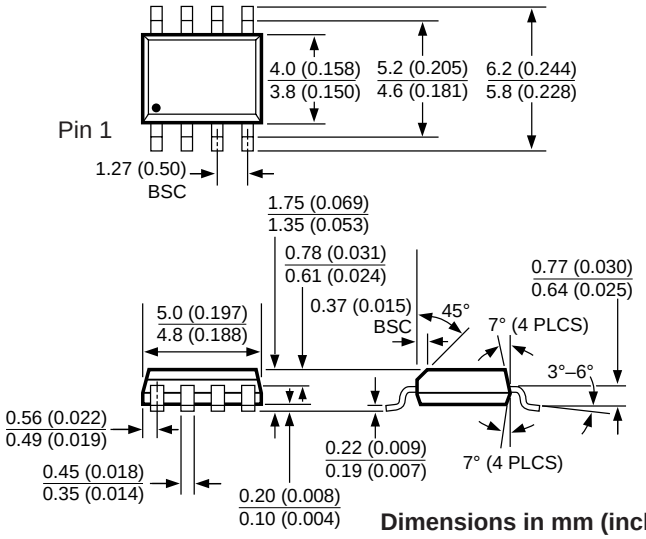
Ordering Information

Part Number	Temperature Range	Package	Accuracy
LP2951-02BM	–40°C to + 85°C	8-Pin SOIC	0.5%
LP2951-03BM	–40°C to + 85°C	8-Pin SOIC	1.0%
MIC2951-02BM	–40°C to + 85°C	8-Pin SOIC	0.5%
MIC2951-03BM	–40°C to + 85°C	8-Pin SOIC	1.0%

Pin Configuration



Package Dimensions



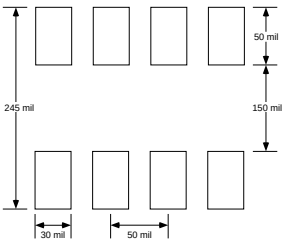
Dimensions in mm (inch)

Thermal Considerations

Part I. Layout

The MIC2951-02/03BM (8-pin surface mount package) has the following thermal characteristics when mounted on a single layer copper-clad printed circuit board.

PC Board Dielectric	θ_{JA}
FR4	160°C/W
Ceramic	120°C/W



Minimum recommended board pad size

Multi-layer boards having a ground plane, wide traces near the pads, and large supply bus lines provide better thermal conductivity.

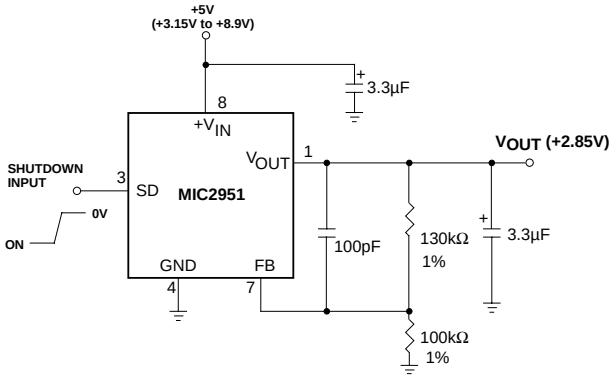
The "worst case" value of 160°C/W assumes no ground plane, minimum trace widths, and a FR4 material board.

Part II. Nominal Power Dissipation and Die Temperature

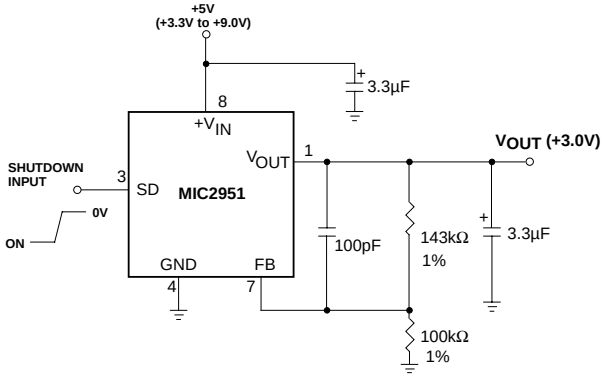
The MIC2951-02/-03BM at a 25°C ambient temperature will operate reliably at up to 625mW power dissipation when mounted in the "worst case" manner described above. At an ambient temperature of 55°C, the device may safely dissipate 440mW. These power levels are equivalent to a die temperature of 125°C, the recommended maximum temperature for non-military grade silicon integrated circuits.

Typical Applications

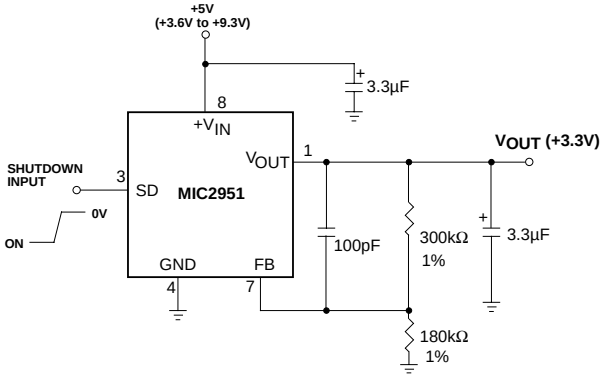
MIC2951-02/-03BM common voltage applications. Calculations assume 100mA of output current, 25°C ambient temperature, 100% duty cycle, and 160°C/W mounting. The Shutdown Input may be left floating if it is not used.



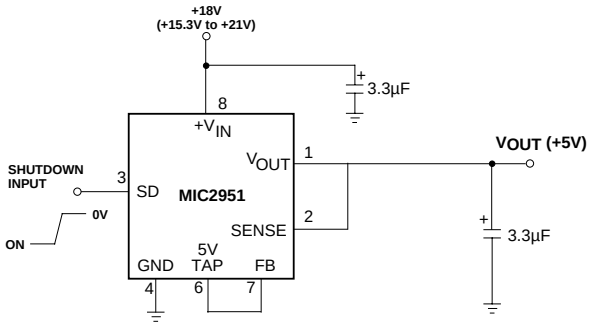
MIC2951 +2.85V Regulator



MIC2951 +3.0V Regulator

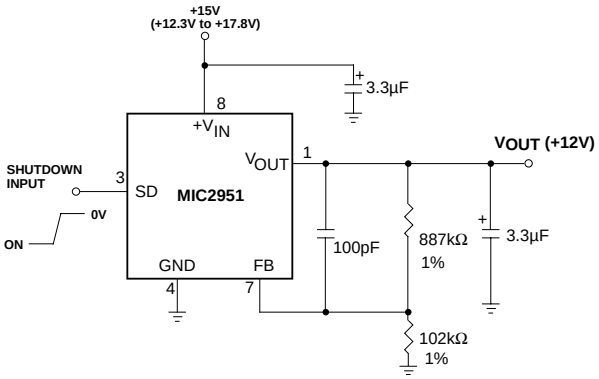


MIC2951 +3.3V Regulator

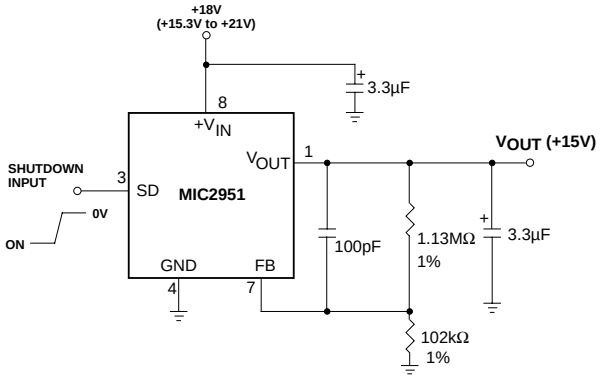


(Note: no external resistors are necessary)

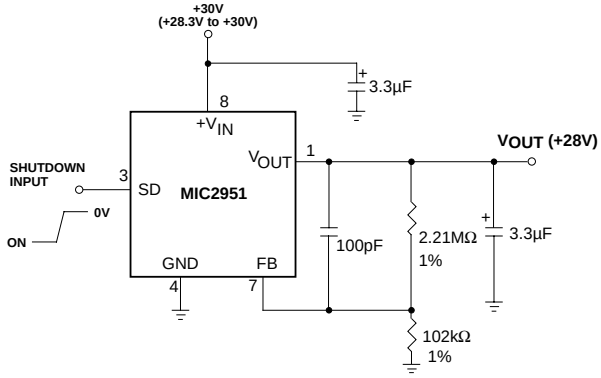
MIC2951 +5.0V Regulator



MIC2951 +12.0V Regulator



MIC2951 +15.0V



MIC2951 +28.0V Regulator