

MIC4575

200kHz Simple 1A Buck Voltage Regulator

Advance Information—Production Q2 '94

General Description

The MIC4575 is a series of easy to use fixed and adjustable BiCMOS step-down (buck) switching voltage regulators. The 200kHz MIC4575 duplicate the pinout and function of the 52kHz LM1575 and LM2575, while the higher switching frequency can result in nearly a 4 to 1 reduction in output filter inductor and capacitor values, reducing circuit board space requirements.

The MIC4575 is available as a 3.3V, 5V, 12V, or 15V fixed output version or an adjustable output version with an output voltage range from 1.23V to 37V. Both versions are capable of driving a 1A load with excellent line and load regulation.

The MIC4575 can be used as a high efficiency replacement for popular three-terminal adjustable linear regulators. It substantially reduces the size of the heat sink, and in many cases no heat sink is required.

These regulators are simple to use because they require a minimum number of external components and include internal frequency compensation and a fixed-frequency oscillator. A standard series of inductors available from several different manufacturers are ideal for use with the MIC4575 series. This feature greatly simplifies the design of switch-mode power supplies.

The feedback voltage is guaranteed to $\pm 2\%$ tolerance for adjustable versions, and the output voltage is guaranteed to $\pm 3\%$ for fixed versions, within specified input voltages and output load conditions. The oscillator frequency is guaranteed to $\pm 10\%$. External shutdown is included, featuring less than 200 μ A standby current. The output switch includes cycle-by-cycle current limiting and thermal shutdown for full protection under fault conditions.

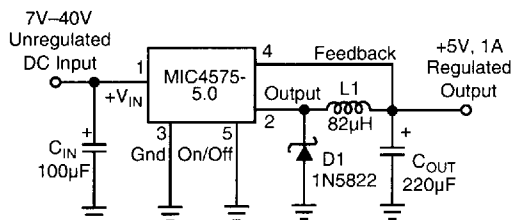
Features

- Fixed 200kHz operation
- Pin compatible with industry standard LM2575
- 3.3V, 5V, 12V, 15V, and adjustable output versions
- Voltage over specified line and load conditions:
 - Fixed version: $\pm 3\%$ max. output voltage
 - Adjustable version: $\pm 2\%$ max. feedback voltage
- Guaranteed 1A output current
- Wide input voltage range: 4V to 40V
- Wide output voltage range: 1.23V to 37V
- Requires only 4 external components
- Low power standby mode I_Q typically < 200 μ A
- 80% efficiency (adjustable version typically > 80%)
- Uses readily available standard inductors
- Thermal shutdown and current limit protection
- 100% electrical thermal limit burn-in

Applications

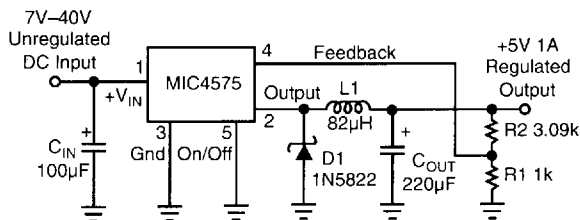
- Simple high-efficiency step-down (buck) regulator
- Efficient pre-regulator for linear regulators
- On-card switching regulators
- Positive to negative converter (inverting buck-boost)
- Isolated flyback converter using minimum number of external components
- Negative boost converter

Typical Applications



Note: Pin numbers are for TO-220 Package

Fixed Regulator in Typical Application



Note: Pin numbers are for TO-220 Package

$$V_{OUT} = 1.23 \left(1 + \frac{R_2}{R_1} \right)$$

Adjustable Regulator in Fixed Output Application

Ordering Information

Part Number	Temperature Range	Package
MIC4575AK*	-55°C to +125°C	4-pin TO-3
MIC4575-5.0AK	-55°C to +125°C	4-pin TO-3
MIC4575BN	-40°C to +85 °C	16-pin Plastic DIP
MIC4575-3.3BN	-40°C to +85 °C	16-pin Plastic DIP
MIC4575-5.0BN	-40°C to +85 °C	16-pin Plastic DIP
MIC4575-12BN	-40°C to +85 °C	16-pin Plastic DIP
MIC4575-15BN	-40°C to +85 °C	16-pin Plastic DIP
MIC4575BWM*	-40°C to +85°C	24-pin Wide SOIC
MIC4575-3.3BWM	-40°C to +85°C	24-pin Wide SOIC
MIC4575-5.0BWM	-40°C to +85°C	24-pin Wide SOIC
MIC4575-12BWM	-40°C to +85°C	24-pin Wide SOIC
MIC4575-15BWM	-40°C to +85°C	24-pin Wide SOIC
MIC4575BT*†	-40°C to +85°C	5-lead TO-220
MIC4575-3.3BT†	-40°C to +85°C	5-lead TO-220
MIC4575-5.0BT†	-40°C to +85°C	5-lead TO-220
MIC4575-12BT†	-40°C to +85°C	5-lead TO-220
MIC4575-15BT†	-40°C to +85°C	5-lead TO-220
MIC4575BU*	-40°C to +85°C	5-lead TO-263
MIC4575-3.3BU	-40°C to +85°C	5-lead TO-263
MIC4575-5.0BU	-40°C to +85°C	5-lead TO-263
MIC4575-12BU	-40°C to +85°C	5-lead TO-263
MIC4575-15BU	-40°C to +85°C	5-lead TO-263

* Adjustable output regulators.

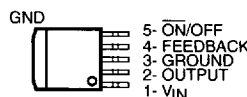
† Contact factory for bent or staggered leads option.

Pin Configurations

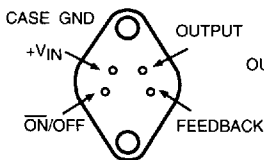
5-LEAD TO-220 (T)



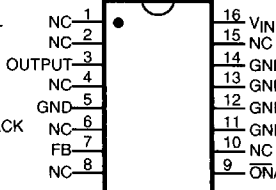
5-LEAD TO-263 (U)



4-LEAD TO-3 (K)



16-LEAD DIP (N)



24-LEAD SOIC (WM)

