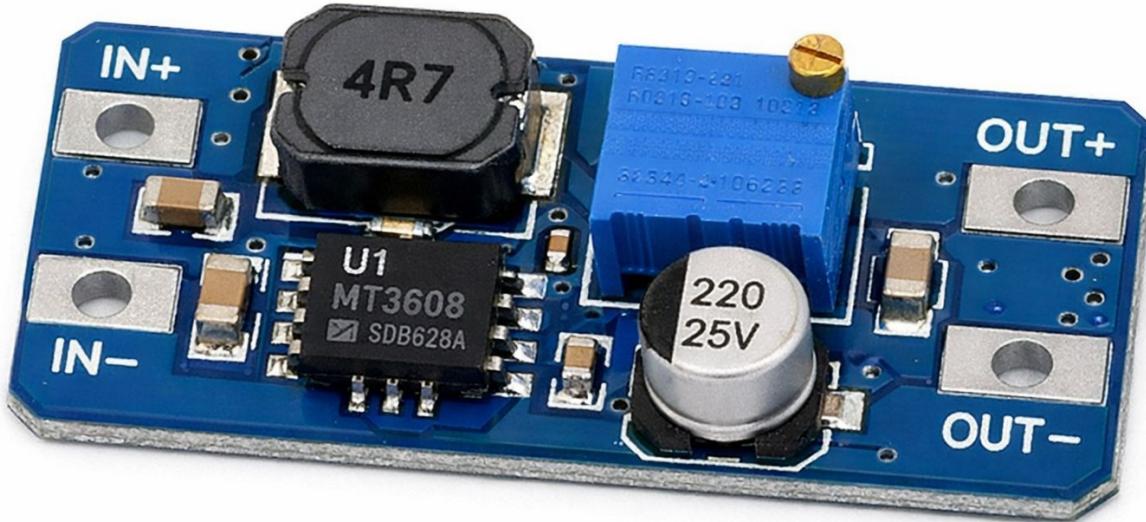


MT3608 DC Voltage Regulator Module



MT3608 Boost Converter Overview

The MT3608 is a 6-pin SOT-23, constant-frequency step-up regulator designed for compact, low-power applications. It switches at **1.2 MHz**, which permits the use of tiny, inexpensive inductors and capacitors (≤ 2 mm tall). An internal soft-start limits inrush current, extending battery life.

Key functions include:

- **Automatic shift to PWM mode** at light loads for higher efficiency
- **Under-voltage lockout, current limiting, and thermal overload protection** to guard against overloads
- **Peak-current mode, fixed-frequency architecture** that regulates voltage via the feedback (FB) pin

During each oscillator cycle the control circuit turns the power MOSFET on. A stabilizing ramp added to the current-sense amplifier output prevents sub-harmonic oscillations when the duty cycle exceeds 50 %. When this ramp-adjusted voltage equals the error-amplifier output (which amplifies the difference between the 0.6 V band-gap reference and the FB voltage), the MOSFET turns off, maintaining regulation. If the output voltage falls, the error-amplifier output rises, increasing MOSFET current and restoring the output level. The soft-start also curbs startup surge and output overshoot.

Component Selection Guidelines

Component	Recommended Specs	Reason
Inductor	4.7 μ H–22 μ H, low DCR, low core loss at 1.2 MHz	Small size, high efficiency; choose a current rating above the peak inductor current to avoid saturation
Capacitors	22 μ F ceramic (X5R or X7R), low ESR	Provides good filtering and wide voltage/temperature range
Diode	Schottky, low forward drop, fast reverse recovery, reverse voltage $>V_{OUT}$	Improves efficiency at high switching frequency; RMS current rating must satisfy $I_{PEAK} \approx 1.8 \times I_{OUT, RMS}$
Feedback Divider	Resistors R1 and R2 set V_{OUT} via $V_{OUT} = V_{REF} \times (1 + R1/R2)$	Allows precise voltage adjustment; many modules include a 25-turn trimpot for fine tuning

Typical Performance

- **Input range:** 2V–24V
- **Adjustable output:** 0.6V–28V (set with the feedback divider)
- **Maximum output current:** up to 2A (dependent on input voltage and inductor choice)
- **Efficiency:** often $>90\%$ thanks to the high switching frequency and Schottky diode

The MT3608's compact size, built-in protections, and ability to operate with very small passive components make it ideal for portable devices, LED drivers, and other battery-powered systems where space and efficiency are critical.