A general condition is derived for the reduction of stator vibrations in multiphase switched-reluctance motors (SRMs) through current regulation in a low-torque and low-speed region. By exploring a wider space of solutions than had previously been examined, optimized solutions are found which simultaneously minimize acoustic noise and vibration, and also minimize qualities such as copper loss, peak current, or torque ripple. In particular, the current profile is represented as a Fourier sum of three harmonics and the phase shift of these harmonics is examined. Experiments show a reduction of motor losses by 10% to 20% relative to previous attempts at proposed waveforms, while achieving a similar reduction in acoustic noise and vibration. In general, current profiling for noise reduction resulted in reduced efficiency; however, in this paper, it was found that motor efficiency can be enhanced relative to conventional square waveform current regulation, while reducing acoustic noise and vibration significantly.