Abstract: American put options are among the most frequently traded single stock options, and their calibration is computationally challenging since no closed-form expression is available. Due to the higher flexibility in comparison to European options, the mathematical model involves additional constraints, and a variational inequality is obtained. We use the Heston stochastic volatility model to describe the price of a single stock option. In order to speed up the calibration process, we apply two model reduction strategies. Firstly, a reduced basis method (RBM) is used to define a suitable low-dimensional basis for the numerical approximation of the parameter-dependent partial differential equation (μPDE) model. By doing so the computational complexity for solving the μPDE is drastically reduced, and applications of standard minimization algorithms for the calibration are significantly faster than working with a high-dimensional finite element basis. Secondly, so-called de-Americanization strategies are applied. Here, the main idea is to reformulate the calibration problem for American options as a problem for European options and to exploit closed-form solutions. Both reduction techniques are systematically compared and tested for both synthetic and market data sets.