Anodic dissolution of p-Si is studied in diluted fluoride solution (HF 0.05M+NH4F 0.05 M, pH 3), with special focus on the physico-chemical parameters which govern the morphology of pore formation (crystallographic orientation, applied potential, and etching time). The effect of potential has been investigated in the transition region between macropore formation and electropolishing.Upon increasing the anodization potential, the pore cross-section changes from circular to square shape, and the bottom of the pores changes from a rounded to a V-shaped profile. Prolonged etching of the contour of (1 1 0) p-Si disks in the regime of porous silicon formation allows for a comparison of the etching characteristics of the (1^{-}1x) orientations. SEM observation indicates indeed different morphologies as a function of the crystal orientation, and the formation of fractal-like structures is obtained for some orientations. In the same geometry and at a potential just above the onset of the electropolishing regime, prolonged anodization allows for a direct measurement of the Si thickness removed as a function of the crystallographic orientation. We clearly observe the etching anisotropy, with etch depth (111) < (110) < (1 0 0). This sequence, similar to that observed for current density in more concentrated HF, differs from that observed for the chemical etching of Si in an alkaline solution