HFO-1234yf (2,3,3,3-tetrafluoropropene) is a promising alternative to HFC-134a for the air-conditioning system of an automobile car. In this work, thermodynamic properties of HFO-1234yf at saturated conditions were measured. Critical properties, i.e., critical temperature $T_C$, critical density $\rho_C$, and critical pressure $P_C$, were determined by visual observation of the meniscus disappearance. The critical temperature, the critical density and the critical pressure were determined to be $367.85 \pm 0.01 \text{ K}$, $478 \pm 3 \text{ kg/m}^3$, $3382 \pm 3 \text{ kPa}$, respectively. Vapor pressures were measured by a batch-type calorimeter with a metal-bellows in the temperature range from $310 \text{ K}$ to $360 \text{ K}$. The present data of the vapor pressure were correlated by the Wagner-type equation. Surface tensions were measured by the differential capillary-rise method in the temperature range from $273 \text{ K}$ to $340 \text{ K}$. The data of the surface tension were correlated by the van der-Waals type equation. The acentric factor was determined to be $0.280$ by the vapor-pressure correlation. Based on the critical parameters and acentric factor, saturated vapor and liquid densities were estimated by the Peng-Robinson equation and the Hankinson-Thomson equation, respectively. The heat of vaporization was also calculated from the Clausius-Clapeyron equation.