The $S_1$ excited state vibrational dynamics of trans-4-dimethylamino-4'-nitrostilbene (DANS) in the 1000 cm$^{-1}$ to 1700 cm$^{-1}$ frequency range are probed in two polar solvents using fs/ps-CARS. The vibrational dynamics of excited state DANS are slower in propylene carbonate vs. acetonitrile, which could be attributed to the twice larger dielectric constant and larger viscosity of propylene carbonate. The dynamics of the $NO_2$ symmetric stretch band around 1300 cm$^{-1}$ are different from other bands, consistent with the current picture of twisted intramolecular charge transfer in DANS.