In this thesis, we investigate the conductivity spectra of samples of weakly doped gallium arsenide in the terahertz region as a function of temperature. These are silicon-doped gallium arsenide of type N and zinc-doped gallium arsenide of type P. The temperature dependence in the terahertz region for these materials has not yet been described in the literature. We observe conductivity maxima corresponding to the admixture energies in the forbidden band. We use the Drude-Lorentz model to process the data. We achieve a good fit of the measured data. The carrier concentration at room temperature corresponds to the nominal value. The relaxation time and high-frequency permittivity match the tabulated values. The oscillator frequency for the N type approximately matches the admixture energy. For the P type, this value is outside the measured range and only the rise to this maximum is seen.