AgGaS$_2$(Se$_2$) single crystals are promising materials for the construction of X-ray detectors, laser radiation converters of the intermediate IR range, and parametric quantum generators, which may find application in nonlinear optics, spectroscopy, and the communications industry. The aim of this study was to obtain optically homogeneous based AgGaS$_2$(Se$_2$) single crystals with high X-ray sensitivity at room temperature. AgGaS$_{2x}$Se$_{2-2x}$ ($x = 0, 0.5$ and $1.0$) were grown by using the method of chemical transport reactions. The X-ray sensitivity ($A \times \text{min})/(V \times R)$ of a single crystals was calculated by the following equation: $K = \Delta I_e / (U \times E)$; where $\Delta I_e = I_e - I_0$; $I_e$ is the current strength in the sample at an X-ray dose rate of $E$ (R/min), $I_0$ is the dark current, and $U$ is the external voltage applied to the sample. The X-ray sensitivity coefficients of AgGaS$_{2x}$Se$_{2-2x}$ single crystals were determined at various accelerating potentials ($V_a$) applied to the roentgen tube and the corresponding X-ray doses. It was established that AgGaS$_{2x}$Se$_{2-2x}$ single crystals are characterized by high values of X-ray sensitivity coefficients ($K$) at room temperature. The roentgendosimetric characteristics of AgGaS$_{2x}$Se$_{2-2x}$ single crystals of different composition are compared. Of all the compositions studied, AgGaSe$_2$ single crystals had the highest X-ray sensitivity. For example, at an effective radiation hardness $V_a = 30$ keV and a dose rate of $E = 10$ R/min $K = 5.4 \times 10^{-13}$ (A × min)/(V × R) for AgGaS$_2$ and $K = 15 \times 10^{-13}$ (A × min)/(V × R) for AgGaSe$_2$. The dependence of the stationary roentgencurrent on the dose of X-ray radiation in the studied single crystals of AgGaS$_{2x}$Se$_{2-2x}$ has a power-law character. The obtained single crystals can be recommended as active materials for the creation on their basis of uncooled and practically non-inertial X-ray recording devices.