# AlN - Aluminium Nitride

## Electrical properties

### Basic Parameter

**Wurtzite crystal structure**

| | | |
|---|---|---|
| Breakdown field | $1.2 \div 1.8 \times 10^6$ V cm$^{-1}$ | 300 K |
| Mobility electrons | 300 cm$^2$ V$^{-1}$ s$^{-1}$ | 300 K |
| Mobility holes | 14 cm$^2$ V$^{-1}$ s$^{-1}$ | 300 K |
| Diffusion coefficient electrons | 7 cm$^2$ s$^{-1}$ | 300 K |
| Diffusion coefficient holes | 0.3 cm$^2$ s$^{-1}$ | 300 K |
| Electron thermal velocity | $1.85 \times 10^5$ m s$^{-1}$ | 300 K |
| Hole thermal velocity | $0.41 \times 10^5$ m s$^{-1}$ | 300 K |

| | | | |
|---|---|---|---|
| Conductivity σ | $10^{-3} \div 10^{-5}$ Ω$^{-1}$ cm$^{-1}$ | 290 K ;<br>doped ($Al_2OC$) single *p*-type crystals (blue) | *Edwards et al. (1965)* |
| | $10^{-11} \div 10^{-13}$ Ω$^{-1}$ cm$^{-1}$ | 300 K ;<br>undoped single crystals (colorless or pale yellow)<br>see also ***Conductivity vs. reciprocal temperature***. | |
| Electron drift mobility $\mu_n$ | ~= 300 cm$^2$ V$^{-1}$ s$^{-1}$ | 300 K ; calculated | *Chin et al. (1994)* |
| Phonon-limited electron drift mobility $\mu_n$ | ~= 2000 cm$^2$ V$^{-1}$ s$^{-1}$ | 77 K ; calculated for very weak doped AlN | |
| Mobility holes $\mu_p$ | 14 cm$^2$ V$^{-1}$ s$^{-1}$ | 290 K ; doped single crystal,<br>the authors point out that this result must be viewed with some caution | *Edwards et al. (1965)* |