$$C_n = V \frac{2\pi}{\hbar} g W_{\mathrm{if}}^2 \sum_m \omega_m \sum_n |\langle \chi_{\mathrm{i}m} | Q - Q_0 | \chi_{\mathrm{f}n} \rangle|^2 \times (\Delta E + m\hbar\Omega_{\mathrm{i}} - n\hbar\Omega_{\mathrm{f}})$$