$$
\begin{aligned}
Var(\hat{f}(x_0)) &= E\left[\left(\hat{f}(x_0) - E[\hat{f}(x_0)]\right)^2\right] \\
&= E\left[\left(\frac{1}{k}\sum_{l=1}^{k} y_{(l)} - \frac{1}{k}\sum_{l=1}^{k} f(x_{(l)})\right)^2\right] \\
&= E\left[\left(\frac{1}{k}\sum_{l=1}^{k}\left(y_{(l)} - f(x_{(l)})\right)\right)^2\right] \\
&= E\left[\left(\frac{1}{k}\sum_{l=1}^{k} \varepsilon_{(l)}\right)^2\right] \\
&= \frac{1}{k^2}\sum_{l=1}^{k} E[\varepsilon_{(l)}^2] \qquad \text{(because } E[\varepsilon_{(i)}\varepsilon_{(j)}] = 0 \because \text{ indept. training pts} \\
&= \frac{1}{k^2}\sum_{l=1}^{k} \sigma_\varepsilon^2 = \frac{\sigma_\varepsilon^2}{k}
\end{aligned}
$$