$$\frac{\delta}{\delta\chi(t)}\Phi[\chi]=\lim_{\varepsilon\to 0}\frac{\Phi[\chi+\varepsilon\delta(\Box-t)]-\Phi[\chi]}{\varepsilon}$$

$$=\lim_{\varepsilon\to 0}\frac{\exp\left(\frac{i\alpha}{\hbar}p\varepsilon\right)-1}{\varepsilon}\Phi[\chi]$$

$$=\frac{i\alpha}{\hbar}p\,\Phi[\chi]$$

$$\frac{i\hbar}{\alpha}\cdot\frac{\delta}{\delta\chi(t)}\Phi[\chi]=-p\,\Phi[\chi],\quad\left[-\frac{i\hbar}{\alpha}\cdot\frac{\delta}{\delta\chi(t)}\right]^2\Phi[\chi]=p^2\Phi[\chi]$$

$$\int_{-\infty}^{\infty}dt\left\{\frac{1}{2m}\left[-\frac{i\hbar}{\alpha}\cdot\frac{\delta}{\delta\chi(t)}\right]^2+\frac{i\hbar}{\alpha}\cdot\frac{d\chi(t)}{dt}\cdot\frac{\delta}{\delta\chi(t)}\right\}\Phi[\chi]$$

$$=\int_{-\infty}^{\infty}dt\left\{\frac{1}{2m}p^2-p\,\frac{d\chi(t)}{dt}\right\}\Phi[\chi]$$

$$=-p\int_{-\infty}^{\infty}dt\left\{\frac{d\chi(t)}{dt}-\frac{p}{2m}\right\}\Phi[\chi]$$

$$=-p\left(\lim_{b\to\infty}\lim_{a\to-\infty}\left[\chi(b)-\chi(a)-\frac{p}{2m}(b-a)\right]\right)\Phi[\chi]$$