Since, $f(x) = e^{-ax}$ **so** $f''(x) = a^2 e^{-ax}$**, This implies,**

$$F_c[f''(x)] = F_c[a^2 e^{-ax}] = a^2 F_c[e^{-ax}] = a^2 F_c[f(x)]$$

Thus,

$$F_c[f''(x)] = -w^2 F_c[f(x)] - \sqrt{\frac{2}{\pi}} f'(0)$$

$$a^2 F_c[f(x)] = -w^2 F_c[f(x)] - \sqrt{\frac{2}{\pi}} f'(0)$$

$$(a^2 + w^2) F_c[f(x)] = -\sqrt{\frac{2}{\pi}}(-a)$$

$$F_c[f(x)] = \sqrt{\frac{2}{\pi}}\left[\frac{a}{a^2 + w^2}\right].$$