From: Signals & Systems: Analysis Using Transform Methods and MATLAB, by M. J. Roberts, McGraw-Hill, 2012 (Second Edition)

$$\delta(t) \xleftrightarrow{\mathcal{F}} 1 \qquad 1 \xleftrightarrow{\mathcal{F}} \delta(f)$$

$$\operatorname{sgn}(t) \xleftrightarrow{\mathcal{F}} 1/j\pi f \qquad \mathrm{u}(t) \xleftrightarrow{\mathcal{F}} (1/2)\delta(f) + 1/j2\pi f$$

$$\operatorname{rect}(t) \xleftrightarrow{\mathcal{F}} \operatorname{sinc}(f) \qquad \operatorname{sinc}(t) \xleftrightarrow{\mathcal{F}} \operatorname{rect}(f)$$

$$\operatorname{tri}(t) \xleftrightarrow{\mathcal{F}} \operatorname{sinc}^2(f) \qquad \operatorname{sinc}^2(t) \xleftrightarrow{\mathcal{F}} \operatorname{tri}(f)$$

$$\delta_{T_0}(t) \xleftrightarrow{\mathcal{F}} f_0 \delta_{f_0}(f),\ f_0 = 1/T_0 \qquad T_0 \delta_{T_0}(t) \xleftrightarrow{\mathcal{F}} \delta_{f_0}(f),\ T_0 = 1/f_0$$

$$\cos(2\pi f_0 t) \xleftrightarrow{\mathcal{F}} (1/2)[\delta(f - f_0) + \delta(f + f_0)] \qquad \sin(2\pi f_0 t) \xleftrightarrow{\mathcal{F}} (j/2)[\delta(f + f_0) - \delta(f - f_0)]$$

$\omega = 2\pi f$

$$\delta(t) \xleftrightarrow{\mathcal{F}} 1$$

$$e^{-\alpha t}\mathrm{u}(t) \xleftrightarrow{\mathcal{F}} 1/(j\omega + \alpha)\ ,\ \alpha > 0 \qquad -e^{-\alpha t}\mathrm{u}(-t) \xleftrightarrow{\mathcal{F}} 1/(j\omega + \alpha)\ ,\ \alpha < 0$$

$$te^{-\alpha t}\mathrm{u}(t) \xleftrightarrow{\mathcal{F}} 1/(j\omega + \alpha)^2\ ,\ \alpha > 0 \qquad -te^{-\alpha t}\mathrm{u}(-t) \xleftrightarrow{\mathcal{F}} 1/(j\omega + \alpha)^2\ ,\ \alpha < 0$$

$$t^n e^{-\alpha t}\mathrm{u}(t) \xleftrightarrow{\mathcal{F}} \frac{n!}{(j\omega + \alpha)^{n+1}}\ ,\ \alpha > 0 \qquad -t^n e^{-\alpha t}\mathrm{u}(-t) \xleftrightarrow{\mathcal{F}} \frac{n!}{(j\omega + \alpha)^{n+1}}\ ,\ \alpha < 0$$

$$e^{-\alpha t}\sin(\omega_0 t)\mathrm{u}(t) \xleftrightarrow{\mathcal{F}} \frac{\omega_0}{(j\omega + \alpha)^2 + \omega_0^2}\ ,\ \alpha > 0 \qquad -e^{-\alpha t}\sin(\omega_0 t)\mathrm{u}(-t) \xleftrightarrow{\mathcal{F}} \frac{\omega_0}{(j\omega + \alpha)^2 + \omega_0^2}\ ,\ \alpha < 0$$

$$e^{-\alpha t}\cos(\omega_0 t)\mathrm{u}(t) \xleftrightarrow{\mathcal{F}} \frac{j\omega + \alpha}{(j\omega + \alpha)^2 + \omega_0^2}\ ,\ \alpha > 0 \qquad -e^{-\alpha t}\cos(\omega_0 t)\mathrm{u}(-t) \xleftrightarrow{\mathcal{F}} \frac{j\omega + \alpha}{(j\omega + \alpha)^2 + \omega_0^2}\ ,\ \alpha < 0$$

$$e^{-\alpha|t|} \xleftrightarrow{\mathcal{F}} \frac{2\alpha}{\omega^2 + \alpha^2}\ ,\ \alpha > 0$$