A step function normalized to Q

$$g(t) = \frac{Q}{t_2 - t_1} \times (u(t - t_1) - u(t - t_2))$$

$$G(s) = \frac{Q}{t_2 - t_1} \times \frac{(e^{-t_1 s} - e^{-t_2 s})}{s}$$

$$L[g(t) \otimes f(t)] = G(s) \cdot F(s)$$

The integral of the convolution will be

$$\lim_{s \to 0} G(s) \cdot F(s) = Q \times \frac{G}{p(\alpha^2 + \beta^2)(a^2 + b^2)}$$

$$= g(mV / fc) * Q(fc) * T_{shp}(\mu s) * 1.25399$$

This is independent of the pulse g(t) shape (width or start).