

TABLE 3.1
Short Table of Fourier Transforms

	$\mathbf{g(t)}$	$\mathbf{G(f)}$	Condition
1	$e^{-at}u(t)$	$\frac{1}{a+j2\pi f}$	$a > 0$
2	$e^{at}u(-t)$	$\frac{1}{a-j2\pi f}$	$a > 0$
3	$e^{-a t }$	$\frac{2a}{a^2 + (2\pi f)^2}$	$a > 0$
4	$te^{-at}u(t)$	$\frac{1}{(a+j2\pi f)^2}$	$a > 0$
5	$t^n e^{-at}u(t)$	$\frac{n!}{(a+j2\pi f)^{n+1}}$	$a > 0$
6	$\delta(t)$	1	
7	1	$\delta(f)$	
8	$e^{j2\pi f_0 t}$	$\delta(f - f_0)$	
9	$\cos 2\pi f_0 t$	$0.5[\delta(f + f_0) + \delta(f - f_0)]$	
10	$\sin 2\pi f_0 t$	$j0.5[\delta(f + f_0) - \delta(f - f_0)]$	
11	$u(t)$	$\frac{1}{2}\delta(f) + \frac{1}{j2\pi f}$	
12	$\text{sgn } t$	$\frac{2}{j2\pi f}$	
13	$\cos 2\pi f_0 t u(t)$	$\frac{1}{4}[\delta(f - f_0) + \delta(f + f_0)] + \frac{j2\pi f}{(2\pi f_0)^2 - (2\pi f)^2}$	
14	$\sin 2\pi f_0 t u(t)$	$\frac{1}{4j}[\delta(f - f_0) - \delta(f + f_0)] + \frac{2\pi f_0}{(2\pi f_0)^2 - (2\pi f)^2}$	
15	$e^{-at} \sin 2\pi f_0 t u(t)$	$\frac{2\pi f_0}{(a+j2\pi f)^2 + 4\pi^2 f_0^2}$	$a > 0$
16	$e^{-at} \cos 2\pi f_0 t u(t)$	$\frac{a+j2\pi f}{(a+j2\pi f)^2 + 4\pi^2 f_0^2}$	$a > 0$
17	$\Pi\left(\frac{t}{\tau}\right)$	$\tau \text{sinc}(\pi f \tau)$	
18	$2B \text{sinc}(2\pi Bt)$	$\Pi\left(\frac{f}{2B}\right)$	
19	$\Delta\left(\frac{t}{\tau}\right)$	$\frac{\tau}{2} \text{sinc}^2\left(\frac{\pi f \tau}{2}\right)$	
20	$B \text{sinc}^2(\pi Bt)$	$\Delta\left(\frac{f}{2B}\right)$	
21	$\sum_{n=-\infty}^{\infty} \delta(t - nT)$	$f_0 \sum_{n=-\infty}^{\infty} \delta(f - nf_0)$	$f_0 = \frac{1}{T}$
22	$e^{-t^2/2\sigma^2}$	$\sigma \sqrt{2\pi} e^{-2(\sigma\pi f)^2}$	