$$g(x) = \int_{-\infty}^{\infty} s_0(y)s_0(y+x)dy = \begin{cases} \int_{-3}^{3-x} \sin(2\pi y)\sin\big(2\pi(x+y)\big)\,dy, & for\ x \in [0,6] \\ \int_{-3-x}^{3} \sin(2\pi y)\sin\big(2\pi(x+y)\big)\,dy, & for\ x \in [-6,0) \\ 0 & otherwise \end{cases}$$

$$\int_{-3}^{3-x} \sin(2\pi y)\sin\big(2\pi(x+y)\big)\,dy$$
$$= \int_{-3}^{3-x} \sin(2\pi y)\,[\sin(2\pi x)\cos(2\pi y) + \cos(2\pi x)\sin(2\pi y)]dy$$
$$= \int_{-3}^{3-x} \sin(2\pi x)\sin(2\pi y)\cos(2\pi y) + \cos(2\pi x)\sin^2(2\pi y)dy$$
$$= \int_{-3}^{3-x} \frac{1}{2}\sin(2\pi x)\sin(4\pi y) + \frac{1}{2}\cos(2\pi x)\,(1-\cos(4\pi y))dy$$
$$= \frac{-1}{8\pi}\sin(2\pi x)\,[\cos(4\pi y)]_{-3}^{3-x} + \frac{1}{8\pi}\cos(2\pi x)\,[4\pi y - \sin(4\pi y)]_{-3}^{3-x}$$
$$= \frac{-1}{8\pi}\sin(2\pi x)\,[\cos(4\pi x) - 1] + \frac{1}{8\pi}\cos(2\pi x)\,[24\pi - 4\pi x + \sin(4\pi x)]$$
$$= \frac{1}{8\pi}[\sin(4\pi x)\cos(2\pi x) - \sin(2\pi x)\cos(4\pi x) + \sin(2\pi x) + 24\pi\cos(2\pi x) - 4\pi x\cos(2\pi x)]$$
$$= \frac{1}{8\pi}[2\sin(2\pi x) + 24\pi\cos(2\pi x) - 4\pi x\cos(2\pi x)]$$
$$= \frac{1}{4\pi}\sin(2\pi x) + 3\cos(2\pi x) - \frac{1}{2}x\cos(2\pi x)$$

Similarly,

$$\int_{-3-x}^{3} \sin(2\pi y)\sin\big(2\pi(x+y)\big)\,dy$$
$$= \frac{-1}{8\pi}\sin(2\pi x)\,[\cos(4\pi y)]_{-3-x}^{3} + \frac{1}{8\pi}\cos(2\pi x)\,[4\pi y - \sin(4\pi y)]_{-3-x}^{3}$$
$$= \frac{-1}{8\pi}\sin(2\pi x)\,[1 - \cos(4\pi x)] + \frac{1}{8\pi}\cos(2\pi x)\,[24\pi + 4\pi x - \sin(4\pi x)]$$
$$= \frac{1}{8\pi}[\sin(2\pi x)\cos(4\pi x) - \sin(4\pi x)\cos(2\pi x) - \sin(2\pi x) + 24\pi\cos(2\pi x) + 4\pi x\cos(2\pi x)]$$
$$= \frac{1}{8\pi}[-2\sin(2\pi x) + 24\pi\cos(2\pi x) + 4\pi x\cos(2\pi x)]$$
$$= \frac{-1}{4\pi}\sin(2\pi x) + 3\cos(2\pi x) + \frac{1}{2}x\cos(2\pi x)$$

Hence, we obtain:

$$g(x) = \int_{-\infty}^{\infty} s_0(y)s_0(y+x)dy$$
$$= \begin{cases} \frac{1}{4\pi}\sin(2\pi|x|) + 3\cos(2\pi x) - \frac{1}{2}|x|\cos(2\pi x), & for\ x \in [-6,6] \\ 0 & otherwise \end{cases}$$