$$\frac{e^{-\frac{z_c^2}{W^2}+\frac{2ik_0\pi z_0}{z_0-z_f}}\left(e^{\frac{1}{4}W^2\left(\frac{2z_c}{W^2}-2i\pi\left(k+\frac{k_0}{z_0-z_f}\right)\right)^2}+e^{\frac{4ik_0\pi z_0}{-z_0+z_f}+\frac{1}{4}W^2\left(\frac{2z_c}{W^2}-2i\pi\left(k+\frac{k_0}{-z_0+z_f}\right)\right)^2}\right)\sqrt{\pi}}{2\sqrt{\frac{1}{W^2}}}$$