The massless box diagram with two legs on shell, $p_3^2 = p_4^2 = 0$, and two legs off shell, $p_1^2, p_2^2 \neq 0$

$$B_{1100} = \mathrm{i}\pi^{d/2} \frac{\Gamma(a+\epsilon-2)}{\prod \Gamma(a_l)}$$

$$\times \int_0^\infty \ldots \int_0^\infty \left(\prod_{l=1}^{4} \alpha_l^{a_l-1} \mathrm{d}\alpha_l \right) \delta\left(\sum_{l=1}^{4} \alpha_l - 1 \right)$$

$$\times (-s\alpha_1\alpha_3 - t\alpha_2\alpha_4 - p_1^2\alpha_1\alpha_2 - p_2^2\alpha_2\alpha_3 - \mathrm{i}0)^{2-a-\epsilon}$$

Apply

$$\frac{1}{(X_1+\ldots+X_n)^\lambda} = \frac{1}{\Gamma(\lambda)}\frac{1}{(2\pi \mathrm{i})^{n-1}}\int_{-\mathrm{i}\infty}^{+\mathrm{i}\infty}\ldots\int_{-\mathrm{i}\infty}^{+\mathrm{i}\infty} \mathrm{d}z_2\ldots\mathrm{d}z_n \prod_{i=2}^{n} X_i^{z_i}$$

$$\times X_1^{-\lambda-z_2-\ldots-z_n}\Gamma(\lambda+z_2+\ldots+z_n)\prod_{i=2}^{n}\Gamma(-z_i)$$

Separate terms with p_1^2 and p_2^2, turn to new variables by

$$\alpha_1=\eta_1\xi_1,\ \alpha_2=\eta_1(1-\xi_1),\ \alpha_3=\eta_2\xi_2,\ \alpha_4=\eta_2(1-\xi_2)$$

and evaluate integrals over parameters to obtain a three fold MB representation

$$B_{1100} = \frac{\mathrm{i}\pi^{d/2}}{\Gamma(4-2\epsilon-a)\prod\Gamma(a_l)(-s)^{a+\epsilon-2}}$$

$$\times\frac{1}{(2\pi\mathrm{i})^3}\int_{-\mathrm{i}\infty}^{+\mathrm{i}\infty}\int_{-\mathrm{i}\infty}^{+\mathrm{i}\infty}\int_{-\mathrm{i}\infty}^{+\mathrm{i}\infty}\mathrm{d}z_2\mathrm{d}z_3\mathrm{d}z_4\frac{(-p_1^2)^{z_2}(-p_2^2)^{z_3}(-t)^{z_4}}{(-s)^{z_2+z_3+z_4}}$$

$$\times\Gamma(a+\epsilon-2+z_2+z_3+z_4)\Gamma(a_2+z_2+z_3+z_4)\Gamma(a_4+z_4)$$

$$\times\Gamma(2-\epsilon-a_{234}-z_3-z_4)\Gamma(2-\epsilon-a_{124}-z_2-z_4)$$

$$\times\Gamma(-z_2)\Gamma(-z_3)\Gamma(-z_4)\ .$$