A microchanneled asymmetric dual phase composite membrane of 70 vol % Gd0.1Ce0.9O1.95-δ-La0.6Sr0.4FeO3-δ and 30 vol % La0.6Sr0.4FeO3-δ was fabricated by a "one step" phase-inversion tape casting. The sample consists of a thin dense membrane (100 μm) and a porous substrate including "finger-like" microchannels. The oxygen permeation flux through the membrane with and without catalytic surface layers was investigated under a variety of oxygen partial pressure gradients. At 900 degrees C, the oxygen permeation flux of the bare membrane was 1.6 (STP) ml cm(-2) min(-1) for the air/He-case and 10.10 (STP) ml cm(-2) min(-1) for the air/CO-case. Oxygen flux measurements as well as electrical conductivity relaxation show that the oxygen flux through the bare membrane without catalyst is limited by the oxygen surface exchange. The surface exchange can be enhanced by introduction of catalyst on the membrane surface. An increase of the 50 150 oxygen flux of-4.49 (STP) mL cm(-2) min(-1) at 900 degrees C was observed when catalyst is added for the air/He-case. Mass transfer polarization through the finger-like support was confirmed to be negligible, which benefits the overall performance. A stable flux of 7.00 (STP) ml cm(-2) min(-1) was observed between air/CO/CO2 over 200 h at 850 degrees C. Partial surface decomposition was observed on the permeate side exposed to CO, in line with predictions from thermodynamic calculations. In a mixture of CO, CO2, H-2, and H2O at similar oxygen activity the material will according to the calculation not decompose. The microchanneled asymmetric CGO-LSF membranes show high oxygen permeability and chemical stability under a range of technologically relevant oxygen potential gradients.