Let $G$ be the fundamental group of a compact nonpositively curved cube complex $Y$. With respect to a basepoint $x$, one obtains an integer-valued length function on $G$ by counting the number of edges in a minimal length edge-path representing each group element. The growth series of $G$ with respect to $x$ is then defined to be the power series $G_x(t) = \sum g t^{|g|}$ where $|g|$ denotes the length of $g$. Using the fact that $G$ admits a suitable automatic structure, $G_x(t)$ can be shown to be a rational function. We prove that if $Y$ is a manifold of dimension $n$, then this rational function satisfies the reciprocity formula $G_x(t^{-1}) = (-1)^n G_x(t)$. We prove the formula in a more general setting, replacing the group with the fundamental groupoid, replacing the growth series with the characteristic series for a suitable regular language, and only assuming $Y$ is Eulerian. (Received September 10, 2013)