This Letter describes an experimental realization of a double-pass amplifier using rod-type fiber. In this device, the gain reaches 26 dB amplifying a 300 mW, 20 ps, 20 MHz seed up to 120 W, with an optical-to-optical efficiency of 50% and excellent beam quality. In addition, by design the output of the amplifier has a polarization extinction ratio of 33 dB. Besides these good performances, we report a marginal degradation of mode quality and degree of polarization followed by the so-called transverse mode instability which occurs at 120 W signal power. The first degradation is static, and by analyzing its two polarizations, we conclude it is caused by a coupling between modes due to the formation of a static thermal long-period grating, which in turn initiates the dynamic instability.