document abstract We report the discovery of a new gravitational lens system from the CLASS survey. Radio observations with the VLA, the WSRT and MERLIN show that the radio source B0850+054 is comprised of two compact components with identical spectra, a separation of 0.7 arcsec and a flux density ratio of 6:1. VLBA observations at 5 GHz reveal structures that are consistent with the gravitational lens hypothesis. The brighter of the two images is resolved into a linear string of at least six sub-components whilst the weaker image is radially stretched towards the lens galaxy. UKIRT $K$-band imaging detects an 18.7 mag extended object, but the resolution of the observations is not sufficient to resolve the lensed images and the lens galaxy. Mass modelling has not been possible with the present data and the acquisition of high-resolution optical data is a priority for this system.