This study focuses on the effect of shoulder to pin diameter ratio on friction stir welding of magnesium alloy AZ31. Two pieces of AZ31 alloy with thickness of 2 mm were friction stir welded by using conventional milling machine. The shoulder to pin diameter ratio used in this experiment are 2.25, 2.5, 2.75, 3, 3.33, 3.66, 4.5, 5 and 5.5. The rotational speed and welding speed used in this study are 1000 rpm and 100 mm/min, respectively. Microstructure observation of welded area was studied by using optical microscope. Equiaxed grains were observed at the TMAZ and stir zone indicating fully plastic deformation. The grain size of stir zone increased with decreasing shoulder to pin ratio from ratio 3.33 to 5.5 due to higher heat input. It is observed that, surface galling and faying surface defect is produced when excessive heat input is applied. To evaluate the mechanical properties of this specimen, tensile test was used in this study. Shoulder to pin ratio 5.5 shows lowest tensile strength while shoulder to pin diameter ratio 3.33 shows highest tensile strength with weld efficiency 91 % from based metal.