types of tables in engineering drawing such as title block, bill of quantity/materials, revision number and so on.

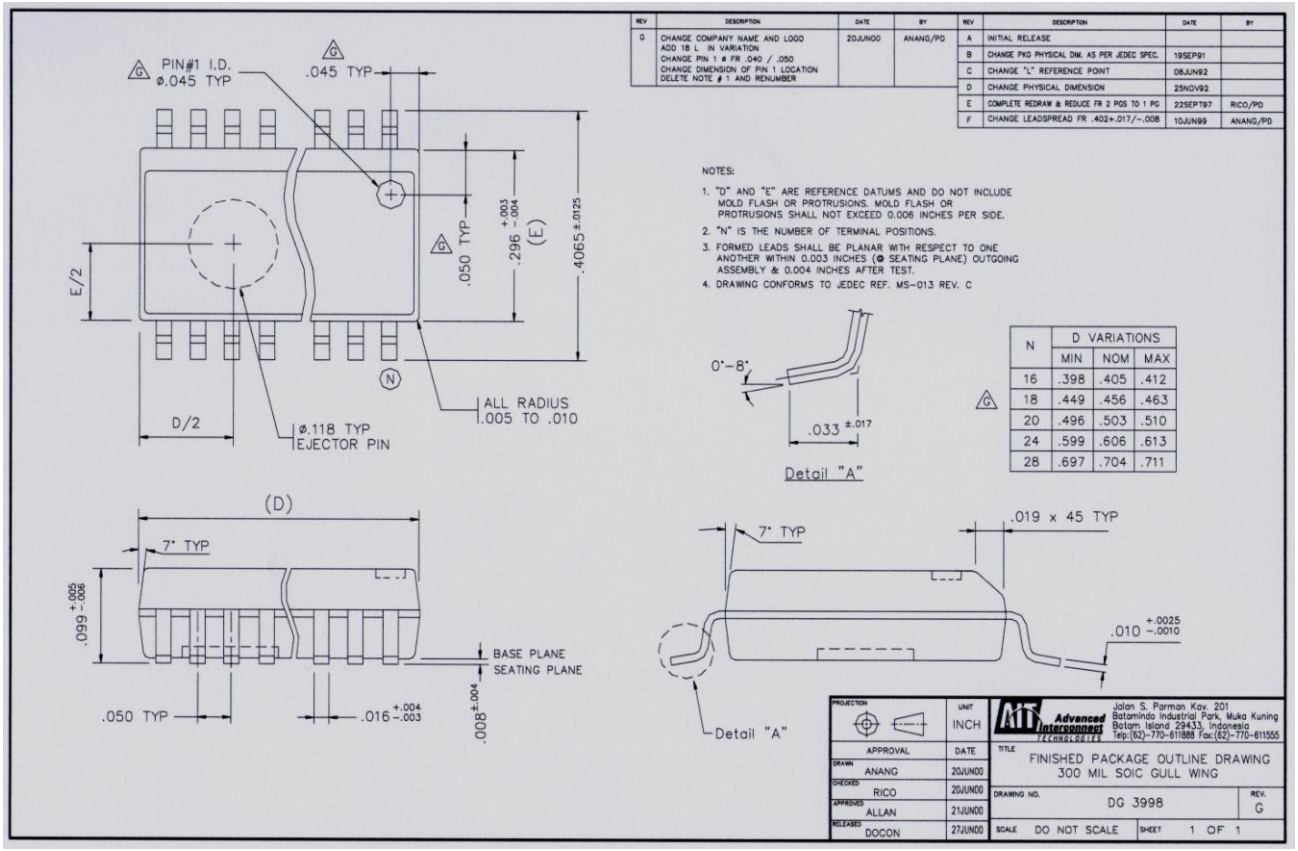

Fig 1: Example of engineering drawing

3. CHALLENGES ON TABLE EXTRACTION METHOD

As mentioned in [3] and [7], new methods are needed because of the great differences between engineering tables in engineering drawings and other documents. The first challenge to be resolved is to extract the information needed in engineering drawings that contain geometry and non-geometry information. This introduces the challenge of information extraction. These challenges are due to the various information such as the text, graphical primitive symbols and dimension located within tables in engineering drawings. Secondly, the problem is the recognition physical structure of tables. There are more than one table exist in engineering drawings, hence it creates the need to distinguish between a tables with another tables. For example, one engineering table describes section data of some engineering objects, while another gives their evaluation data [3]. Another challenge is the structure of the table. Many research focusing on detecting the intersections with regards of searching a set of perpendicular and parallel lines [7] and find all the enclosed rectangular regions [8], [9]. As one of the information type exist in tables is text, searching by text itself can be done to find the related information in engineering drawing tables. However, by searching information available in the tables using text based, it expose to time consuming because text field on a drawing composed of an abundance of line and text object [10]. Figure 1 shows example of engineering drawing.

4. RELATED WORKS

There are few researches particularly focusing on the extraction of information from engineering drawing tables. For example, [9] suggested an application in indexing engineering drawings whereby the method needs the design of the model. This research is using the rectangular detection algorithm which detects the existence of any rectangular which contains several dots. However, the algorithm used has several weaknesses, it only focuses on the extraction of the title block and not on other tables existed in the drawings. It recognizes the title block based on the starting registration point, which referring to the bottom-right corner of the drawing frame. Based on this registration point, the algorithm then detect the rest set of rectangular.

A research by [11] presented an application that helps an extraction of information from drawings obtained from a telecommunication company. The application is focusing on the location of the title block. It is used by handler to help in correcting the title of a drawing. The first step taken by this application is by extracting the straight lines of the petite regions in the drawings by using the FAST method. The box with the biggest region that fulfilled certain criteria of the width-to-height ratio will be chosen as the title field. Since this research suggested a specific conclusion regarding problems they had to overcome such as telephones, the approaches could not be implemented to other problems.

Najman et al (2001) [12] suggested a method to identify automatically a location of a title block in a scanned technical drawing. It is based on a signal measurement which is being