Control Oriented Thrust Force Of Wire Saw Machining

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ABSTRACT

Silicon Carbide (SiC) is an important material for the production of a wide variety of electronic components including blue and green LEDs, high power semiconductors. [1]. As compared to Si, SiC has better thermal conductivity and higher breakdown field, making it a near ideal material for high voltage and high temperature applications. The traditional method for manufacturing silicon and SiC wafers utilizes an inner diameter saw, which suffers from low efficiency and large kerf loss due to its physical limitations. [2]. To improve efficiency and avoid large kerf loss, wire saw machining was developed. [3]. To improve efficiency, silicon and SiC wafers are becoming larger and more prevalent in an increasing number of products, thus creating a tremendous need to greatly enhance the operation productivity and quality of wire saw machining process. However, until now no thrust model of wire saw machining has been established. In this paper, the contribution is to establish a thrust force model and validate it.