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(19) **United States**(12) **Patent Application Publication**  
LIU(10) **Pub. No.: US 2023/0231468 A1**(43) **Pub. Date: Jul. 20, 2023**(54) **IN-CIRCUIT DETECTION OF EARLY  
FAILURE OF POWER SWITCH  
TRANSISTORS IN SWITCHING POWER  
CONVERTERS***H02M 3/335* (2006.01)*H02M 1/44* (2006.01)(52) **U.S. Cl.**CPC ..... *H02M 1/32* (2013.01); *H02M 1/08*  
(2013.01); *H02M 3/33507* (2013.01); *H02M*  
*1/44* (2013.01)(71) Applicant: **DIALOG SEMICONDUCTOR INC.**,  
Campbell, CA (US)(72) Inventor: **Wenduo LIU**, Campbell, CA (US)(21) Appl. No.: **17/579,308**(22) Filed: **Jan. 19, 2022****Publication Classification**(51) **Int. Cl.***H02M 1/32* (2006.01)*H02M 1/08* (2006.01)(57) **ABSTRACT**

A failure detection circuit for a power switch transistor in a power switching converter is provided that compares a drive voltage for driving a gate of the power switch transistor to a plurality of thresholds. Based upon when the drive voltage crosses each threshold in the plurality of thresholds, a logic circuit determines whether a fault condition exists for the power switch transistor.

