

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2024/0178814 A1 Goto et al.

May 30, 2024 (43) **Pub. Date:**

(54) SURFACE ACOUSTIC WAVE DEVICE WITH INTERDIGITAL TRANSDUCER ELECTRODE POSITIONED AT LEAST PARTIALLY IN A PIEZOELECTRIC LAYER

- (71) Applicant: Skyworks Solutions, Inc., Irvine, CA
- (72) Inventors: Rei Goto, Osaka-Shi (JP); Hironori Fukuhara, Ibaraki-Shi (JP); Shoji Okamoto, Hirakata-Shi (JP)
- (21) Appl. No.: 18/430,047
- (22) Filed: Feb. 1, 2024

Related U.S. Application Data

- (63) Continuation-in-part of application No. 18/229,590, filed on Aug. 2, 2023.
- (60) Provisional application No. 63/394,813, filed on Aug. 3, 2022.

Publication Classification

(51) Int. Cl. H03H 9/02 H03H 9/64

(2006.01)(2006.01)

(52)U.S. Cl.

(2013.01); H03H 9/6453 (2013.01)

CPC H03H 9/02952 (2013.01); H03H 9/02574

(57)**ABSTRACT**

A surface acoustic wave device is disclosed. The surface acoustic wave device can include a multilayer piezoelectric substrate having a support substrate and a piezoelectric layer over the support substrate. The piezoelectric layer has a first surface facing the support substrate and a second surface opposite the first surface. The surface acoustic wave device can include an interdigital transducer electrode having a first portion and a second portion. The first portion is positioned below the second surface of the piezoelectric layer and the second portion is positioned above the second surface. The first portion has a first sidewall and a second portion has a second sidewall angled relative to the first sidewall.

