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(54) **METHODS FOR FABRICATION OF BONDED WAFERS AND SURFACE ACOUSTIC WAVE DEVICES USING SAME**

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(57) **ABSTRACT**

A method of fabricating a bonded wafer with low carrier lifetime in silicon comprises providing a silicon substrate having opposing top and bottom surfaces, modifying a top portion of the silicon substrate to reduce carrier lifetime in the top portion relative to the carrier lifetime in portions of the silicon substrate other than the top portion, bonding a piezoelectric layer having opposing top and bottom surfaces separated by a distance T over the top surface of the silicon substrate, and providing a pair of electrodes having fingers that are inter-digitally dispersed on a top surface of the piezoelectric layer, the electrodes comprising a portion of a Surface Acoustic Wave (SAW) device. The modifying and bonding steps may be performed in any order. The modified top portion of the silicon substrate prevents the creation of a parasitic conductance within that portion during operation of the SAW device.