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(54) **TRANSVERSELY-EXCITED FILM BULK ACOUSTIC RESONATOR FABRICATION USING A PIEZOELECTRIC PLATE, SILICON SUBSTRATE AND HANDLE WAFER SANDWICH**

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(57) **ABSTRACT**

An acoustic resonator device is formed that reduces a thermal coefficient of expansion mismatch between a piezoelectric plate and a silicon substrate by bonding the front surface of the silicon substrate having a filled and planarized sacrificial tub to a piezoelectric substrate and thinning the silicon substrate by removing material from a back surface. That back surface is then bonded to a handle wafer having a thermal coefficient of expansion (TCE) closer to a TCE of the piezoelectric substrate than a TCE of the silicon substrate and thinning the piezoelectric substrate to a target piezoelectric membrane thickness to form a piezoelectric plate. A conductor pattern is formed on the thinned piezoelectric plate and the sacrificial tub is removed to form a cavity and release a membrane of the piezoelectric plate using an etchant introduced through holes in the piezoelectric plate.