

ABSTRACT

**ULTRASONIC TRANSDUCER OPERABLE AT MULTIPLE
RESONANT FREQUENCIES**

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10 An ultrasonic transducer that is configured to selectively operate at first or second
resonant frequency during wire bonding operations includes an elongated transducer
body an aperture for mounting a piezoelectric driver stack for driving the ultrasonic
transducer to operate at the first or second resonant frequency and a mounting flange
connected to the transducer body at a first nodal vibration region of the transducer
body when the ultrasonic transducer is operated at the first resonant frequency. The
elongated transducer has a length substantially equal to two wavelengths of a first
oscillatory wave that is transmitted along the length of the transducer body when the
15 transducer is operated at the first resonant frequency, and substantially equal to a half
wavelength of a second oscillatory wave that is transmitted along the length of the
transducer body when the transducer is operated at the second resonant frequency.

[FIG. 2A]

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