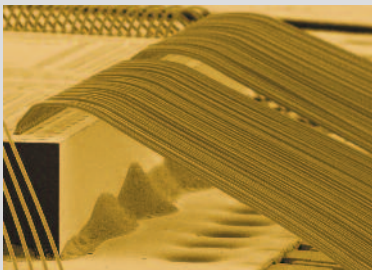


## AW-99

### Gold Bonding Wire for the Most Demanding Looping and Finest Pad Pitch



#### Application Data\*

First bond results on optimum setting

	Ball Diameter ( $\mu\text{m}$ )	Squash Height ( $\mu\text{m}$ )	Shear Force (g)	Shear Strength (g/mil)
Mean	31.8	10.2	12.4	7.0
Std Dev	0.4	0.6	0.5	0.3
Min	37.5	9.0	11.7	6.56
Max	38.8	11.2	13.3	7.72

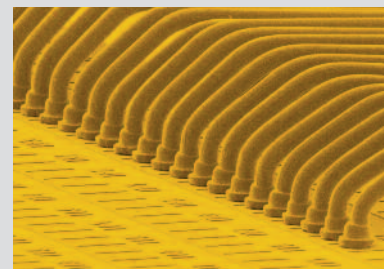
\*Results may vary with package and die configuration, as well as bond process.

AW-99 (99.99% pure) provides the highest strength and modulus 4N wire in the market today. This gold bonding wire is a broad performing alloy with mechanical properties comparable to leading 2N alloys while retaining the electrical properties of 4N wires. AW-99's large bonding window, excellent

resistance to sway and mold sweep coupled with robust looping characteristics makes it a preferred choice for multiple applications including those for the finest pad pitch (down to 35  $\mu\text{m}$ ) and the most rigorous looping. In addition, AW-99 is beryllium free and is compatible even to sensitive/thin pad structures.

#### AW-99 Benefits

- Large process windows with robust 1st and 2nd bonds for a wide range of applications and pad pitch (down to 35  $\mu\text{m}$ )
- Highest strength and modulus comparable to 2N (99%) Au alloy
- Robust looping and shortest HAZ length caters for demanding and ultra-low loops such as multi-stacked die and multi-tier BGA configurations
- High strength retention provides excellent resistance to sway and mold sweep
- Suitable for aggressive wire diameter reduction programs
- Delivers superior strength while retaining compatibility to sensitive/thin pad metallizations
- Environmental friendly – Beryllium free



**Bonding Conditions:** Wire diameter: 20  $\mu\text{m}$  (0.8 mils) · Wire bender: K&S 8028S · Package type: 320-Head PBGA · Die metallization: Au/Si (1%) Cu (0.5%) · Wire span: 3.5 - 4.5 mm · Loop Height Range: 150-165  $\mu\text{m}$  · Bonding temperature: 170°C · Capillary: 414FF-2021-R33, T = 2.8 mil, FA 11°

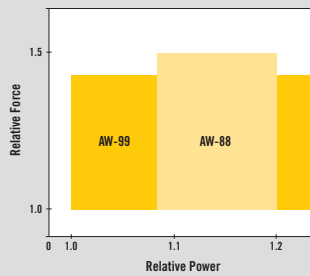
#### AW-99 Mechanical Properties

Diameter	Microns	15	18	20	23	25	28	30
	Mils	0.6	0.7	0.8	0.9	1.0	1.1	1.2
<b>Recommended Specs for Ball Bonding</b>								
Elongation (%)		2 – 5	2 – 6	2 – 6	2 – 6	2 – 6	2 – 6	2 – 7
Breaking Load (g)		3 – 7	5 – 9	7 – 11	9 – 15	11 – 18	14 – 22	17 – 25
<b>Typical Breaking Load (g)</b>								
Room Temp @ 4% EL		5.3	7.3	9.3	12.2	14.8	18.1	21.2
High Temp (250°C/20s)		5.0	6.9	8.8	11.6	14.1	17.2	20.1
<b>In-Line Pad Pitch (<math>\mu\text{m}</math>)</b>								
Min. In-Line Pad Pitch		35	45	50	60	65	70	80

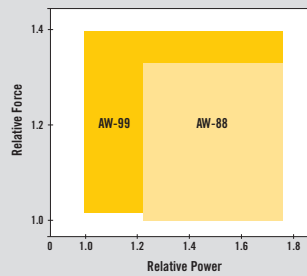
## AW-99 Characteristics (for 25 µm diameter wire)

Non-Gold Elements	< 100 ppm
Breaking Load @ Room Temperature	> 14 g at 4% EL
Breaking Load @ 250°C / 20 sec.	> 13 g
Elastic Modulus	> 95 GPa
Heat Affected Zone (HAZ)	~ 100 µm (for 50 µm ball diameter)
Neck Strength	~ 13 g (at 50 µm ball diameter)
Melting Point	1063°C
Density	19.32 g/cm <sup>3</sup>
Heat Conductivity	3.17 W/cm·K
Electrical Resistivity	2.36 µhm·cm
Coeff. of Linear Expansion (0 – 100°C)	14.2 ppm / K
Fusing Current for 30 µm, dia 10 mm length (in air)	0.5 A

### Parameter Window for 1st Bond

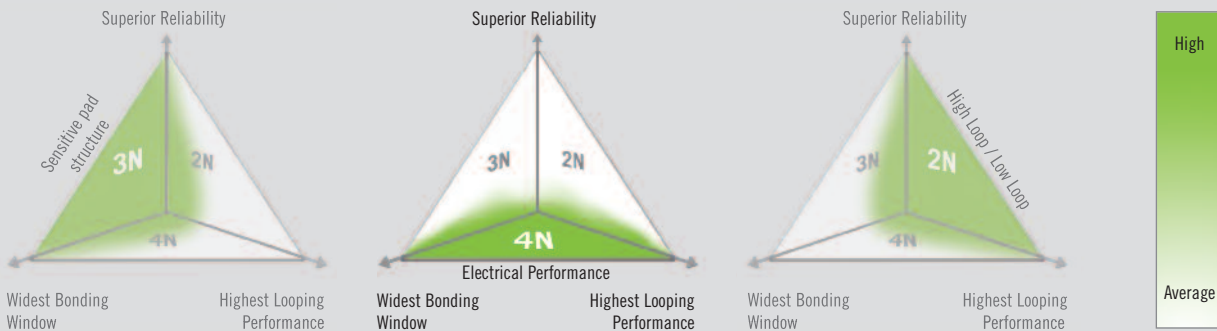


### Parameter Window for 2nd Bond



\*Results may vary with package and die configuration, as well as bond process.

## Gold Wire Segmentation by Properties



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