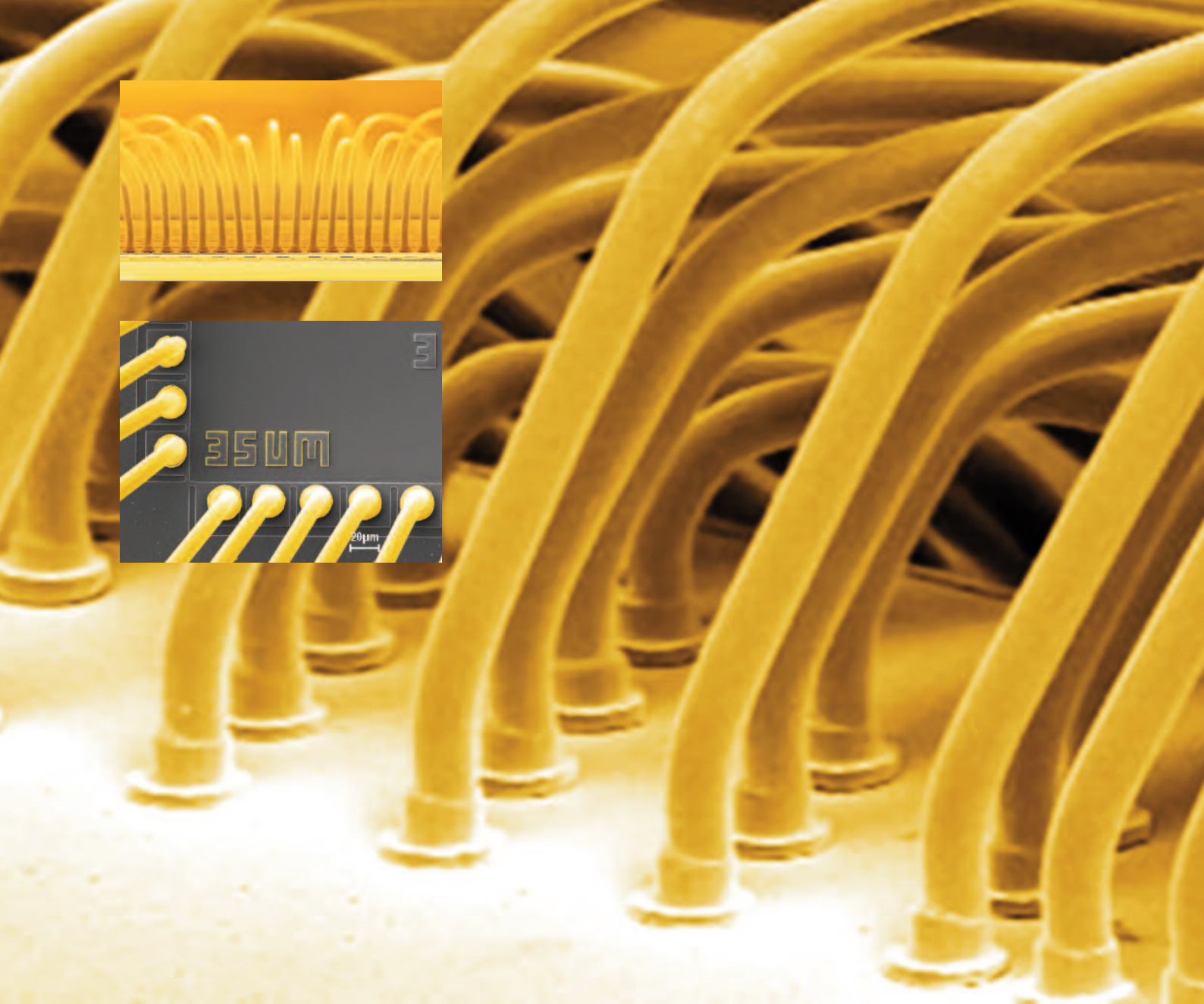


Heraeus



**RelMax**

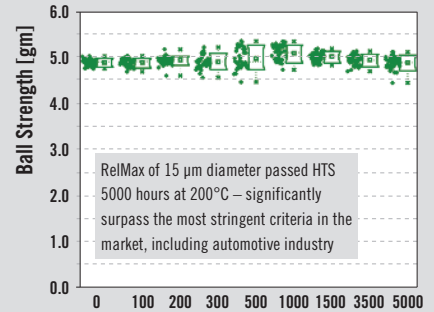
Reliability · Bondability · Ultra Fine Pitch

# State-of-the-Art 2N Gold Wire with Ultimate Reliability and Bondability

## RelMax Features

- Ultimate high reliability of 1st bond
- Hassle-free bondability in both 1st and 2nd bond, suitable for both laminate and leadframe devices
- Significantly improved 2nd bond stitch pull value
- Robust 2nd bond at lower parameters
- Improved concentricity of FAB for ultrafine wire bonding
- Soft free air ball, applicable for low-k and sensitive die
- Higher MTBA as compared to other 2N gold wires

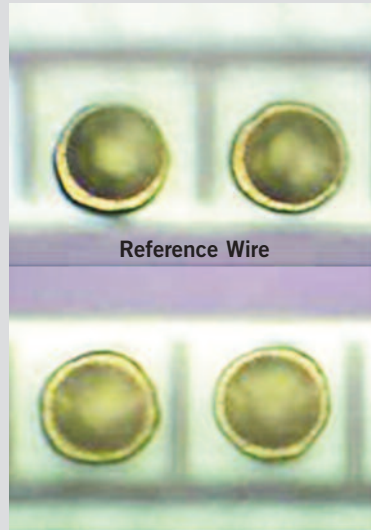
## Ultimate High Reliability Performance



### Isothermal Aging @ 200°C in Air [hrs]

Bonder: K&S Maxum · Capillary: K&S E18CJ-2010-R33  
 Device: K&S PBGA test device (35 µm PPB) · Bonded ball diameter: 27 µm · Gold wire: 15 µm

## Improved Bonded Ball Concentricity



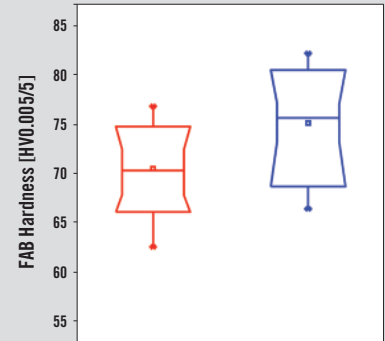
Ultra-fine pitch ball bond concentricity

Wire bonder: K&S Maxum Ultra · Capillary: K&S M18CK-2013-R33 (H15 CD20 T40 OR5 FA08 ICA50°) · Device: K&S PBGA 4x4 test device · Bonded ball diameter: 23 µm · Gold wire: 12.2 µm

Stable intermetallic growth at elevated storage temperature



## Soft Free Air Ball



Wire bonder: K&S Maxum · EFO current: 20 mA  
 FAB size: 25 µm · Gold wire: 15 µm

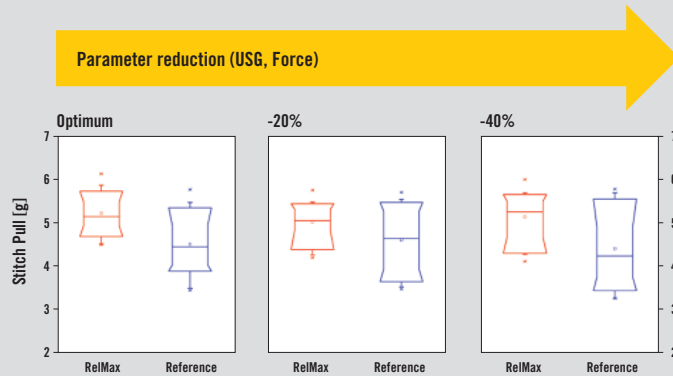
## Recommended Technical Data of RelMax

Diameter	Microns	15	18	20	23	25	28	30	33
	Mils	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3
Elongation (%)		2 – 6	2 – 7	3 – 7	3 – 7	3 – 7	3 – 8	3 – 8	3 – 8
Breaking Load (g)		3 – 7	4 – 9	5 – 11	8 – 14	10 – 16	13 – 19	15 – 20	18 – 25

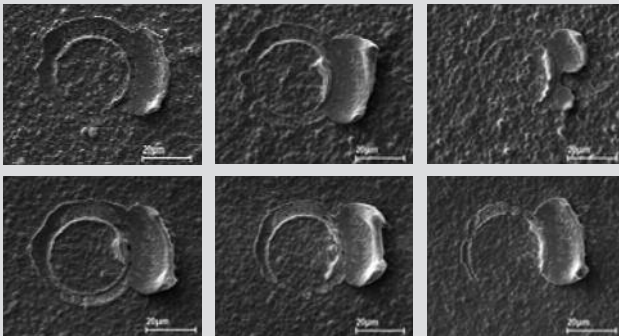
## Characteristics

	Diameter at 25 µm	Diameter at 15 µm
Breaking Load @ Room Temperature	> 11 g at 5% EL	> 4 g at 3.5% EL
Breaking Load @ 250°C / 20 sec.	> 10 g	> 3 g
Elastic Modulus	> 85 GPa	> 85 GPa
Heat Affected Zone (HAZ) at BSR 1.7	70 – 90 µm	30 – 40 µm
Heat Affected Zone (HAZ) at BSR 1.7	95 – 105 µm	50 – 60 µm
FAB Hardness at BSR 1.7	60 – 70 HV	60 – 70 HV
Neck Strength	> 11 g (at 55 µm ball dia.)	> 4 g (at 27 µm ball dia.)
Fusing Current measured at 10 mm length (in-air)	0.51 A	0.26 A
Non-Gold Elements	< 1%	< 1%
Density	19.3 g/cm <sup>3</sup>	19.3 g/cm <sup>3</sup>
Heat Conductivity	2.3 W/cm-K	2.3 W/cm-K
Electrical Resistivity	3.3 µWcm	3.3 µWcm
Coeff. of Linear Expansion	14.2 ppm / K	14.2 ppm / K

## Maintaining Stitch Pull at Lower Bonding Parameter Setting



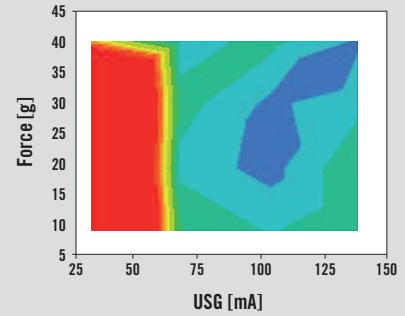
Bonder: K&S Maxum Ultra · Capillary: CIC Duracap 488CG-2156-A33 · (H9.5, CD.12.5, T24, OR3, F011) · Device: K&S PBGA test device · Gold wire: 20 µm



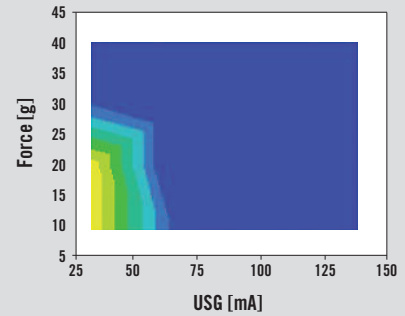
## Larger 2nd Bond Window

with Improved Stitch Pull Value

Stitch pull reference 2N wire

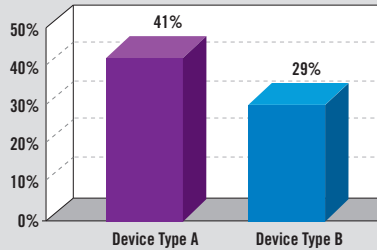


Stitch pull reference RelMax



Wire bonder: K&S Maxum · Capillary: K&S 2CA5768L (H9.5 CD12.5 T24 OR3 F011) · Device: K&S PBGA test device · Gold wire: 20 µm

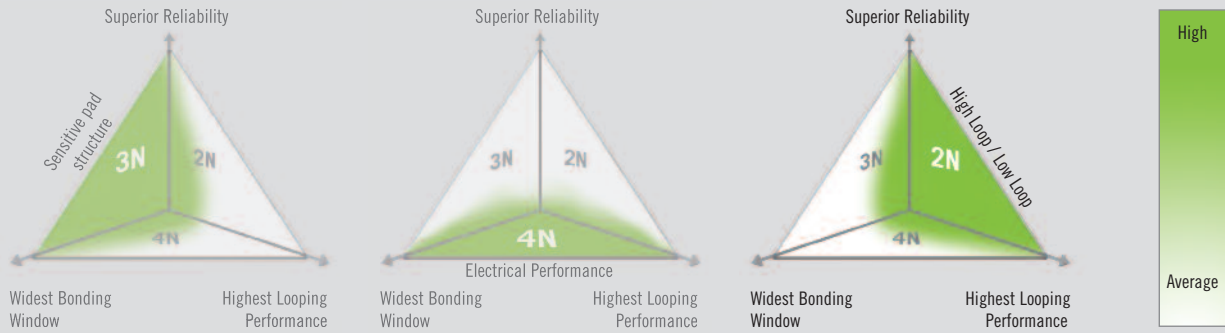
## MTBA Improvement over Ref. 2N Wire



■ Device: BGA  
 Wire bonder: ASM Eagle 60 AP  
 Capillary: K&S SI-24060-302F  
 Gold wire: 20 µm

■ Device: BGA  
 Wire bonder: K&S Maxum Plus  
 Capillary: K&S 488CF-3454-R33  
 Gold wire: 23 µm

## Gold Wire Segmentation by Properties



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