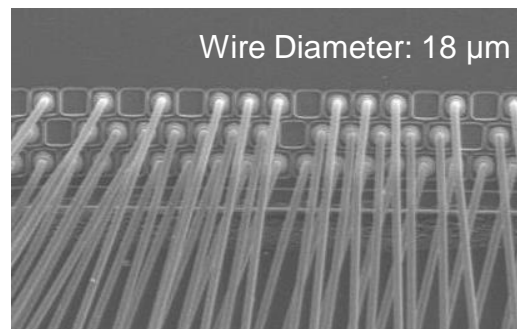
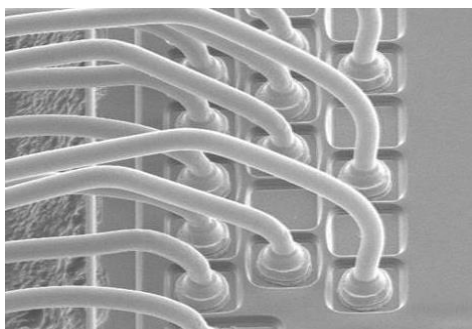


Copper Wire Benefits

J-Devices has extensive experience in Cu wire products dating back to 2007, resulting in mature and capable Cu wire bonding capability.

J-Devices' Cu wire products have excellent quality and reliability on par with Au wire. Customers receive the same or better quality, reliability and electrical performance at an attractive price.

Wire Diameter (μm)	3D Electrical Parasitic Parameters					
	Wire Length = 1 mm					
	R11 (m Ω) @ 1 GHz		C11 (pF)		L11 (nH)	
	Au wire	Cu wire	Au wire	Cu wire	Au wire	Cu wire
50	78.7	67.2	0.125	0.125	0.523	0.523
30	116.7	99.3	0.091	0.091	0.632	0.632
25	136.8	116.1	0.083	0.083	0.668	0.668
20	166.9	141.4	0.076	0.076	0.716	0.716
18	184.0	155.8	0.072	0.072	0.736	0.736
15	218.6	184.9	0.068	0.068	0.773	0.773
13	250.9	212.0	0.064	0.064	0.802	0.802



Minimum Bond Pad Size by Wire Diameter (T = Bond Pad Metal Thickness)

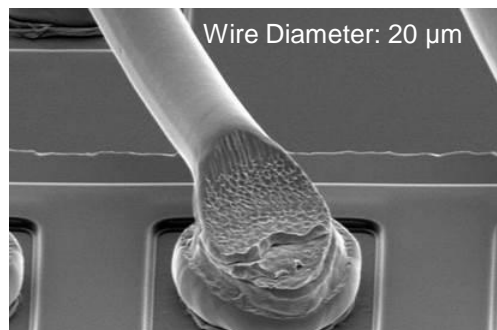
Wire Diameter (μm)		1.0 \leq T \leq 1.5 μm		1.6 \leq T \leq 2.0 μm		2.1 \leq T \leq 3.0 μm	
		BPO	BPP	BPO	BPP	BPO	BPP
Recommended	13	> 33	> 40	> 38	> 45	> 38	> 45
	15	> 38	> 45	> 38	> 45	> 43	> 50
	18	> 38	> 45	> 43	> 50	> 53	> 60
	20	> 53	> 60	> 64	> 80	> 64	> 80

Wafer Technology Node and Cu Wire Readiness

Wafer Technology Node	> 65 nm	65/55 nm	40/32 nm	28 nm
Non-Low-K or Low-K	Low-K	Low-K	Ultra Low-K	Ultra Low-K
Reliability Status	Customer Qualified	Customer Qualified	Customer Qualified	Customer Qualified
Production Status	HVM	HVM	HVM	HVM

Package Family and Wire Diameter

Package Family	Wire Diameter
QFN	18, 20, 25, 30 μm
LQFP	18, 20, 23, 30 μm
FBGA	15, 18, 20, 23 μm
PBGA	18, 20, 23 μm
HZIP	35, 50 μm



Reliability Qualification

Evaluation Category	FBGA 121-pin/6 mm Pkg Pad Pitch: 45 μm Cu Wire (PCC) ϕ 18 μm		FBGA 177-pin/13 mm Pkg Pad Pitch: 45 μm Cu Wire (PCC) ϕ 18 μm		LQFP 100-pin/14 mm Pkg Pad Pitch: 60 μm Cu Wire (PCC) ϕ 20 μm	
	Conditions	# Failure	Conditions	# Failure	Conditions	# Failure
MSL	JEDEC Level 3		JEDEC Level 3		JEDEC Level 3	
TC	-65/175°C	0/231 pcs (3 Lot)	-55/125°C	0/165 pcs (3 Lot)	-65/175°C	0/231 pcs (3 Lot)
	500 cycles		500 cycles		500 cycles	
HTSL	150°C	0/45 pcs (1 Lot)	150°C	0/100 pcs (3 Lot)	150°C	0/45 pcs (1 Lot)
	2000 hours		1000 hours		2000 hours	
	175°C	0/45 pcs (1 Lot)	-	-	175°C	0/45 pcs (1 Lot)
HAST	110°C/85%/Bias	0/231 pcs (3 Lot)	-	-	110°C/85%/Bias	0/231 pcs (3 Lot)
	264 hours		264 hours			
PCT	121°C/2.0 atm/100%	0/231 pcs (3 Lot)	110°C/1.2 atm/85%	0/165 pcs (3 Lot)	121°C/2.0 atm/100%	0/231 pcs (3 Lot)
	96 hours		500 hours		96 hours	
THB	-	-	85°C/85%/bias	0/100 pcs (3 Lot)	-	-
	-		1000 hours		-	



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