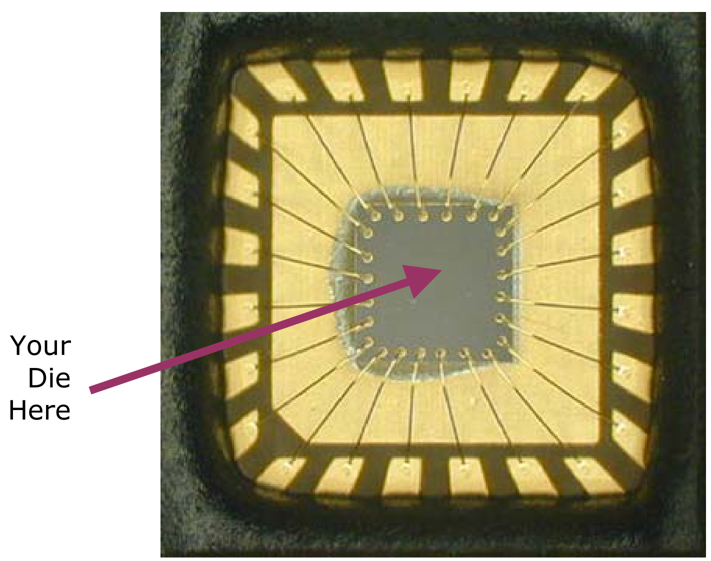
Organic

Air Cavity
Open Semiconductor
QFN Packages



Shown with Wire Bonding

- **Fabless**
- **Prototype**
- **Quick Turn**
- **Pre- Production**

- **RF**
- **MEMS**
- **Sensor**
- **Multi-Chip Module**

Bottom View

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About Us

About Mirror Semiconductor:

Mirror Semiconductor offers quick-to-market solutions for low cost, open cavity (air cavity) organic semiconductor packages. Use for fabless prototype, probing, pre-production, RF, MEMS and sensor applications. Open packages are excellent for R&D and laboratory projects where low volume, low cost is required.

Quick Delivery:

Mirror Semiconductor delivers open (air) cavity packages in days using semiconductor grade BT copper clad organic substrates. For RF and special applications Rogers RO4003C and other composites are available.

Applications:

Open cavity packages are used for wire-bondable fabless prototyping, probing and pre-production for semiconductors, RF, MEMS and sensors. Contact Mirror Semiconductor to discuss your special needs.

Form Factor:

Open Cavity packages are available singulated or in array formats for step-and-repeat assembly. Available with cavity wall, or bare substrates. Organic lids and air cavity caps available.

Advantages:

Our soft-tooled packages are quicker than developing LTCC ceramic packages or injection-molded packages from scratch. Organic substrates are made using microelectronic PC board fabrication techniques. Build-up dispensing of liquid encapsulation creates the cavity dam wall. Recommended for fabless prototyping and pre-production requirements. Customized versions are available.

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A- QFN
Air Cavity (Open Cavity)
Singulated Package

TOP VIEW SIDE VIEW BOTTOM VIEW

HEAT SPREADER

Die Cavity

Top

Bottom

Filled vias in pad (all places)

50μ-inch Gold Plating
Wire Bondable in Cavity

Cut-Away Side View

5μ-inch Gold on Bottom
RoHS SMT Mounting

Part Number System

A	-	QFN	28	W	.8	-	-
Cavity		Model	Pins	Packaging	Pitch	Substrate	Version
With Open Cavity: A = Air Cavity (Singulated) AH = 50mm Array (Partially Sawn) AW = 60mm Array (Requires Sawing) Substrate Without Cavity S = Singulated Substrate W = 60mm Array (Requires Sawing)		QFN=Quad DFN=Dual	8 ~ 80	W = 2" Waffle P = 4" Waffle T = JEDEC Tray	.4 .5 .65 .8 1.0 1.27	Standard: Blank = BT RF Grade: R = Rogers R04003	Blank = Standard Special = 1~9

A-QFN Dimension Table

Dimension in mm

N Leads	P Pitch	D/E Size	D1/E1 Die Pad	D2/E2 Bond Pad	D3/E3 Cavity	D4 E4	L	L1 Ld Length	W Ld Width	Outline Dwg
8	0.65	3	1	1.3	2	0.65	0.5	0.45	0.325	460810
12	0.5	3	1	1.3	2	1.0	0.5	0.45	0.25	451210
12	0.65	4	2	2.3	3	1.6	0.5	0.45	0.325	461210
12	0.8	4	2	2.3	3	1.6	0.5	0.45	0.40	481210
16	0.5	3	1	1.3	2	1.5	0.5	0.45	0.25	451610
16	0.65	4	2	2.3	3	1.95	0.5	0.45	0.325	461610
16	0.8	5	3	3.3	4	2.4	0.5	0.45	0.40	481610
20	0.5	4	2	2.3	3	2.0	0.5	0.45	0.25	452010
20	0.65	5	3	3.3	4	2.6	0.5	0.45	0.325	462010
20	0.8	5	3	3.3	4	3.2	0.5	0.45	0.40	482010
24	0.5	4	2	2.3	3	2.5	0.5	0.45	0.25	452410
24	0.65	5	3	3.3	4	3.25	0.5	0.45	0.325	462410
24	0.8	6	4	4.3	5	4.0	0.5	0.45	0.40	482410
28	0.5	5	3	3.3	4	3.0	0.5	0.45	0.25	452810
28	0.65	6	4	4.3	5	3.9	0.5	0.45	0.325	462810
28	0.8	7	5	5.3	6	4.8	0.5	0.45	0.40	482810
32	0.5	5	3	3.3	4	3.5	0.5	0.45	0.25	453210
32	0.65	7	5	5.3	6	4.55	0.5	0.45	0.325	463210
32	0.8	8	6	6.3	7	5.6	0.5	0.45	0.40	483210
36	0.5	6	4	4.3	5	4.0	0.5	0.45	0.25	453610
40	0.5	6	4	4.3	5	4.5	0.5	0.45	0.25	454010
40	0.65	8	6	6.3	7	5.85	0.5	0.45	0.325	464010
44	0.5	7	5	5.3	6	5.0	0.5	0.45	0.25	454410
44	0.65	8	6	6.3	7	6.5	0.5	0.45	0.325	464410
48	0.5	7	5	5.3	6	5.5	0.5	0.45	0.25	454810
52	0.5	8	6	6.3	7	6.0	0.5	0.45	0.25	455210
56	0.5	8	6	6.3	7	6.5	0.5	0.45	0.25	455610
64	0.5	9	7	7.3	8	7.5	0.5	0.45	0.25	456410
68	0.5	10	8	8.3	9	8.0	0.5	0.45	0.25	456810
72	0.5	10	8	8.3	9	8.5	0.5	0.45	0.25	457210
80	0.5	12	10	10.3	11	9.5	0.5	0.45	0.25	458010

Packaging Codes:

QFN D/E Size	Singulated Device			Panel Array
	W 2″ Waffle Quantity	**P** 4″ Waffle Quantity	**T** JEDEC Tray Quantity	**T** JEDEC Tray **P** 4″ Waffle Quantity each Array
3mm	100	306	490	256
4mm	64	225	490	144
5mm	36	144	490	81
6mm	25	121	490	64
7mm	25	81	260	49
8mm	16	64	260	36
9mm	16	49	260	25
10mm	9	49	168	25
12mm	9	36	189	16

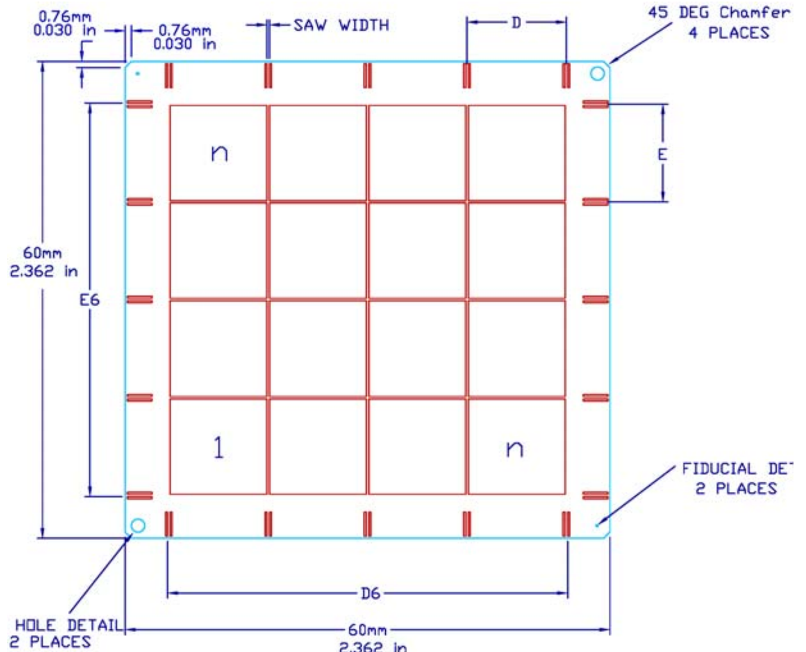
Height Table

	C1	C2	A
Standard	0.63	0.27	0.90
Low Profile	0.38	0.27	0.65
Tolerance	+/- 0.10	+/- 0.05	+/- 0.15

Other sizes.

See page 6~7 for panel array.

Air Cavity (Open Cavity)
Panel Array Type



Panel Array Dimensions

D E	n matrix	QFN per Array	D6 E6 (mm)
3mm	16x16	256	52.56
4mm	12x12	144	51.34
5mm	9x9	81	47.43
6mm	8x8	64	50.13
7mm	7x7	49	50.82
8mm	6x6	36	49.52
9mm	5x5	25	46.22
10mm	5x5	25	51.22
12mm	4x4	16	48.91

Saw width dicing blade 0.304mm (12mil)

Applications At-A-Glance

Description	AH-QFN Snap Apart By Hand	AW-QFN Use Wafer Dicing Saw	W-QFN Use Wafer Dicing Saw	A-QFN Singulated	S-QFN Singulated
Singulated	-	-	-	✓	✓
Array– Step & Repeat Assembly	✓	✓	✓	-	-
Wire Bonding	✓	✓	✓	✓	✓
Dam Wall Cavity	✓	✓	-	✓	-
Saw with 12mil dicing blade	-	✓	✓	-	-
Singulate by hand with knife	✓	-	-	-	-
Outline bur after singulation	✓	-	-	-	-
Saw targets & fiducials	-	✓	✓	-	-
BT substrate standard	✓	✓	✓	✓	✓
Rogers RO4003C for RF	✓	✓	✓	✓	✓
Lid System:					
Flat Lid	✓ SH-LID	✓ W-LID	-	✓ S-LID	-
Air Cavity Cap (cup)	-	-	✓ AH-CAP AW-CAP	-	✓ A-CAP
Optional fill with encapsulation	✓	✓	-	✓	-

60x60mm Panel Array
Saw/Dicing

D/E = 3x3mm

D/E = 4x4mm

D/E = 5x5mm

D/E = 6x6mm

D/E = 7x7mm

D/E = 8x8mm

D/E = 9x9mm

D/E = 10x10mm

D/E = 12x12mm

Other sizes available

Options and Custom Designs

Side View of Die Pad, Heat Spreader, Die Cavity

Multiple Chip Cavity (Multi Chip Module):

Substrate Materials:

Standard Version: BT
Semiconductor Grade

RF Version:
Rogers RO4003C
Other types available

Other Custom Options

- **Large die sizes up to 25mm x 25mm available.**
- RF optimization EM modeling using CST or Ansoft available.

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