



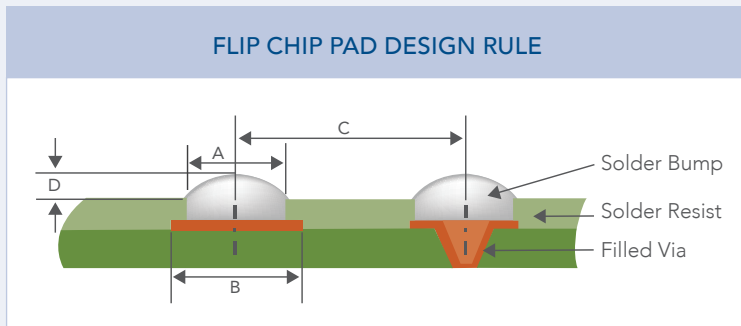
# FLIP CHIP & UNDERFILL

## DESIGN RULES & GUIDELINES

### NOTE

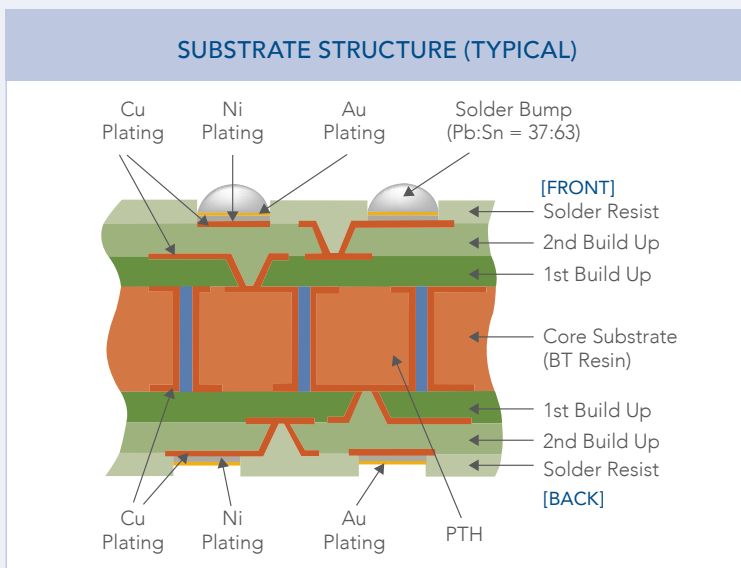
These dimensions are guidelines designed to help release product to manufacturing as quickly as possible. Full capabilities are not limited to the specifications included in this document. Please contact [SME@samtec.com](mailto:SME@samtec.com) for applications with tighter requirements.

PACKAGE SIZE	FLUX	SUBSTRATE BGA SOLDER BALL	SUBSTRATE BGA PAD
Min: 10 mm x 10 mm Max: 63 mm x 63 mm	No-clean fluxes Water-soluble fluxes RMA-based fluxes	Approx Min Size: 0.018" dia Approx Max Size: 0.025" dia Material: Eutectic Pb:Sn (37:63) or Pb-Free	Shortest BGA Ball Pitch: 0.80 mm x 0.80 mm Furthest Pitch: No constraint Pad Layout: Any configuration is acceptable



#### LAYER THICKNESS (TYPICAL)

	ITEM	STANDARD	CUSTOM
A	Flip Chip Pad Diameter (Solder Resist Opening)	100 $\mu\text{m}$	75 $\mu\text{m}$
B	Flip Chip Pad Metal Land Dia.	145 $\mu\text{m}$	100 $\mu\text{m}$
C	Flip Chip Pad Pitch	225 $\mu\text{m}$	130 $\mu\text{m}$
D	Solder Bump Height	32 $\mu\text{m} \pm 5 \mu\text{m}$	



#### LAYER THICKNESS (TYPICAL)

LOCATION	STANDARD ( $\mu\text{m}$ )	CUSTOM ( $\mu\text{m}$ )
Core Substrate	800	400*
Core Cu	25	21
Build-up Cu	14.5	2
Insulation Layer	33	12
Solder Resist Layer	21	18
Nickel Plating	3 - 7	
Gold Plating	0.03 ~ 0.12	

No. of Build Up Layers: 1, 2, 3, 4 / side;  
No. of Core Layers: 2, 4; \*Coreless also available

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# PRECISION DIE ATTACH

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#### TYPICAL DIE ATTACH STRUCTURE & SPECIFICATIONS

Minimum distance between surrounding square of fiducial and neighboring objects must be 0.048 mm

Gray level contrast between background and fiducial must be a minimum of 100 gray levels out of 256

Background of fiducial must not have a structure and background must be single-colored gray level

Maximum die size for dipping: 50 mm x 50 mm

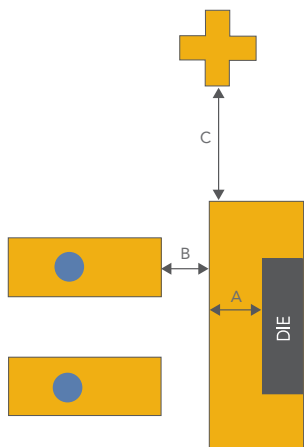
No waffle-pack handling for die < 1 mm<sup>2</sup>

Maximum length to width ratio for components: 5:1

Saw kerfs must be at least 25 μm and into the dicing tape (through the entire wafer thickness)

Die attach materials can be non-conductive, conductive, die-attach-films (DAF) and solder preforms; other processes can be discussed per customer requirements

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#### DIE ATTACH REQUIREMENTS (TYPICAL)

	DESCRIPTION	ORGANIC (min) INCHES (μm)	CERAMIC (min) INCHES (μm)
	Minimum Die Size	0.010" (250)	0.010" (250)
A	Overlap of Die Attach Ground Plane to Die Edge	0.020" (500)	0.020" (500)
B	Space Between Die Attach Ground Plane to Wirebond Pad	0.020" (500)	0.020" (500)
C	Space Between Fiducial Edge to Die Attach Ground Plane Edge	0.010" (250)	0.006" (150)



# FINE PITCH WIREBOND

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#### TYPICAL STRUCTURE & SPECIFICATIONS FOR WIRING & SUBSTRATE PAD DESIGN

Plating and layout requirements for substrate pad design, as well as wire parameters:

Wedge Bond - ENIG plating is acceptable; typical wire types include Al, Au and Pt

Ball Bond - ENEPIG plating is recommended; typical wire types include Au and Cu

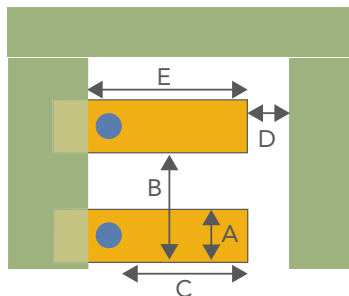
Processes that use Au ball bond, require Gold plate per MIL-G-45204, Type III, Grade A, Class 1:

99.9% purity minimum

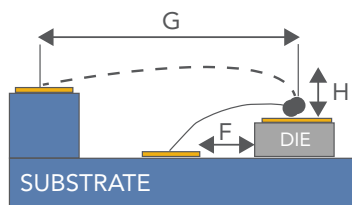
< 90 Knoop hardness

50  $\mu$ " thick, minimum

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#### SIDE PROFILE



#### TYPICAL WIREBOND SPECIFICATIONS

	DESCRIPTION	ORGANIC (min) INCHES ( $\mu$ m)	CERAMIC (min) INCHES ( $\mu$ m)
A	Wirebond Pad	0.004" (100)	0.003" (75)
B	Wirebond Pad Pitch	0.008" (200)	0.006" (150)
C	Overlap of Wirebond Lead Edge to Via	0.008" (200)	0.007" (175)
D	Space Solder Mask to Wirebond Lead Edge	0.004" (100)	-
E	Overlap of Wirebond Lead Edge to Solder Mask	0.008" (200)	-
F	Space of Die Edge to Wirebond Lead Edge*	0.015" (375) or 2x Die Thickness (whichever is greater)	
G	Maximum Wire Length	0.250" (6350)	
H	Maximum Wire Height	0.100" (2540)	

\*Assumes no ground plane for die attach

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# PACKAGE ENCAPSULATION

## DESIGN RULES & GUIDELINES

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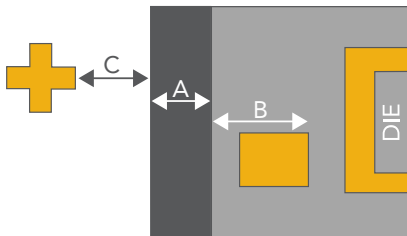
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#### TYPICAL STRUCTURE & SPECIFICATIONS FOR PACKAGE ENCAPSULATION

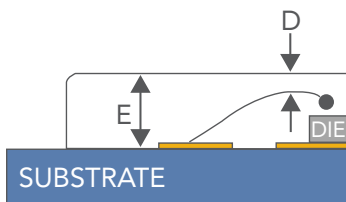
Maximum encapsulation thickness (board surface to top of encapsulation): 0.024" (600)  
 Automated dispense tool heated work area: 12" x 16"

Total work area: 20" x 30"  
 Machine positioning accuracy and repeatability: +/- 0.001"

#### TOP DOWN



#### SIDE PROFILE



#### TYPICAL PACKAGE DESIGN RULES

	DESCRIPTION	ORGANIC (min) INCHES (µm)
A	Dam Width	0.012" (300)
B	Space of Dam to Wirebond Lead Edge	0.012" (300)
C	Space of Fiducial to Dam*	0.007" (175)
D	Overlap of Encapsulation to Top of Wirebond Loop	0.007" (175)
E	Height of Encapsulation**	= A / 2

\*Must be outside encapsulated region. \*\*Board surface to top of encapsulation