PRECISION DIE ATTACH
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 for applications with tighter requirements.

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 mm2

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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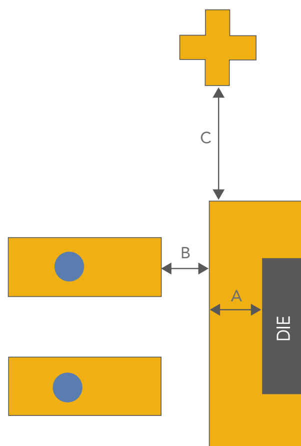

DIE ATTACH REQUIREMENTS (TYPICAL)

	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 Wire Bond Pad	0.020" (500)	0.020" (500)
C	Space Between Fiducial Edge to Die Attach Ground Plane Edge	0.010" (250)	0.006" (150)

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FINE PITCH WIRE BOND
DESIGN RULES & GUIDELINES

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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

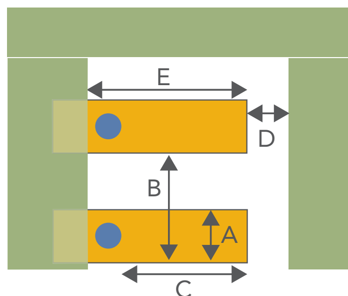
Processes that use Au ball bond, require Gold plate per MIL-G–45204, Type III, Grade A, Class 1:

99.9% purity minimum

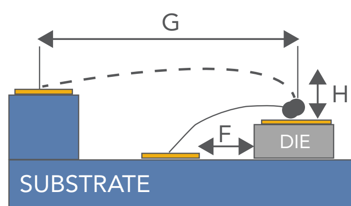
< 90 Knoop hardness

50 μ" thick, minimum

TOP DOWN



SIDE PROFILE



TYPICAL WIRE BOND SPECIFICATIONS

	DESCRIPTION	ORGANIC (min) INCHES (μm)	CERAMIC (min) INCHES (μm)
A	Wire Bond Pad	0.004" (100)	0.003" (75)
B	Wire Bond Pad Pitch	0.008" (200)	0.006" (150)
C	Overlap of Wire Bond Lead Edge to Via	0.008" (200)	0.007" (175)
D	Space Solder Mask to Wire Bond Lead Edge	0.004" (100)	-
E	Overlap of Wire Bond Lead Edge to Solder Mask	0.008" (200)	-
F	Space of Die Edge to Wire Bond 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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FLIP CHIP & UNDERFILL
DESIGN RULES & GUIDELINES

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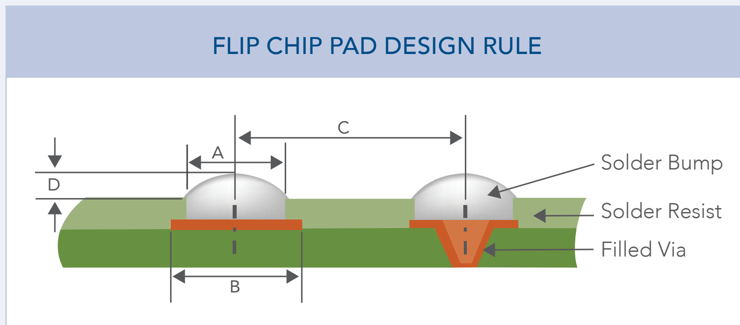
PACKAGE SIZE	FLUX	SUBSTRATE BGA SOLDER BALL	SUBSTRATE BGA PAD
Min: 10 mm x 10 mm Max: 63 mm x 63 mm	No-clean fluxes Water-soluble fluxes RMA-based fluxes	Approx Min Size: 0.018" dia Approx Max Size: 0.025" dia Material: Eutectic Pb:Sn (37:63) or Pb-Free	Shortest BGA Ball Pitch: 0.80 mm x 0.80 mm Furthest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

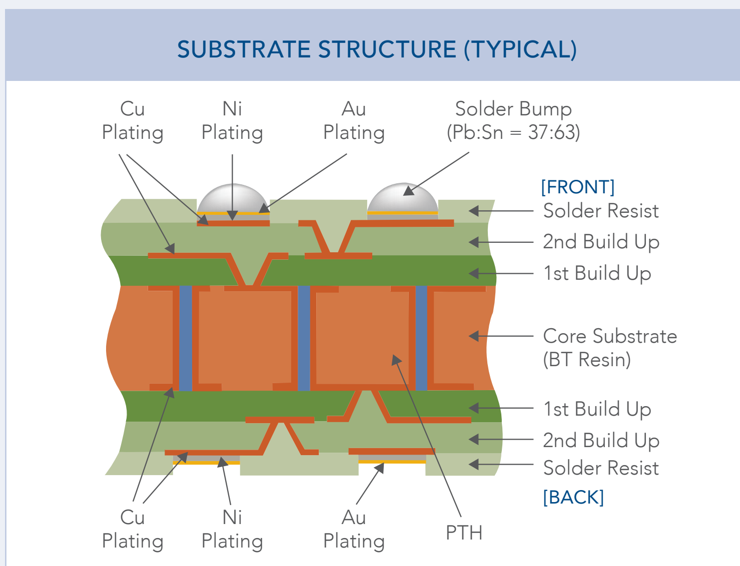
FLIP CHIP PAD DESIGN RULE



LAYER THICKNESS (TYPICAL)

	ITEM	STANDARD	CUSTOM
A	Flip Chip Pad Diameter (Solder Resist Opening)	100 μm	75 μm
B	Flip Chip Pad Metal Land Dia.	145 μm	100 μm
C	Flip Chip Pad Pitch	225 μm	130 μm
D	Solder Bump Height	32 μm ± 5 μm	

SUBSTRATE STRUCTURE (TYPICAL)



LAYER THICKNESS (TYPICAL)

LOCATION	STANDARD (μm)	CUSTOM (μm)
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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PACKAGE ENCAPSULATION
DESIGN RULES & GUIDELINES

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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"

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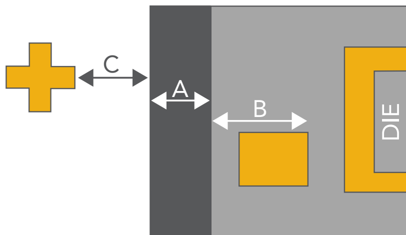
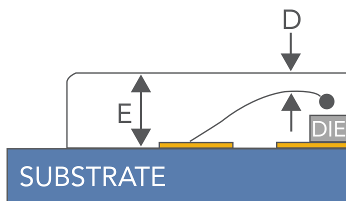


SIDE PROFILE



TYPICAL PACKAGE DESIGN RULES

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

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

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