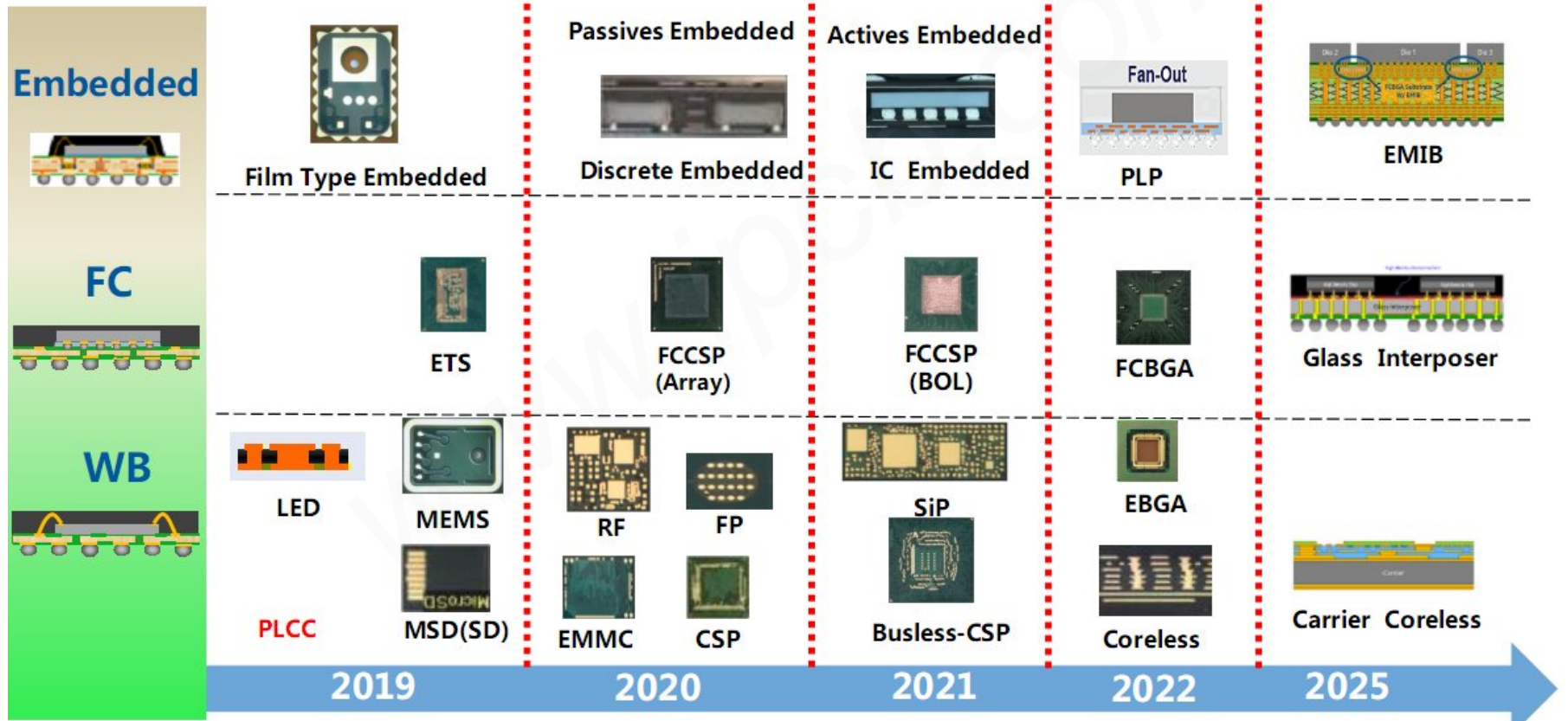


IC Substrate Design Rule

Editor: Dag, Qinnig
Date: 2022/7/15

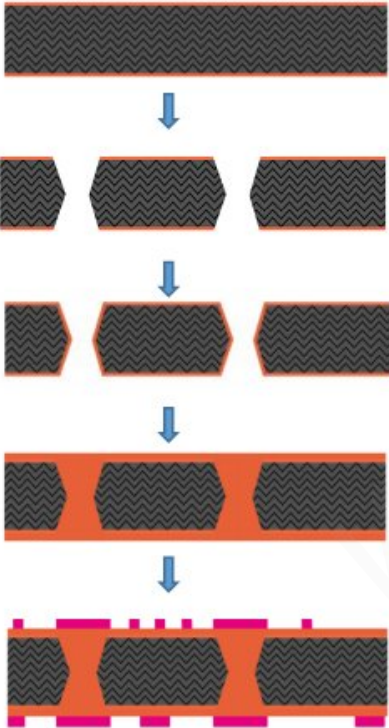
Substrate Products Roadmap



Substrate manufacturing

Substrative

-Via drill,E'less Cu,Panel Plating,Tent'n'Etch



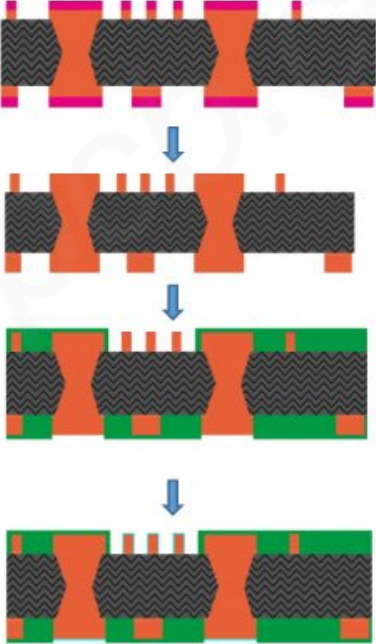
1.Material release

2.Laser drilling(X-via)

3.E'less Cu plating

4.Cu plating

5.PR image transfer



6.Cu etching

7.PR striping

9.SM process

10.Routing

11.OSP

Substrate manufacturing

MSAP (Modified Semi Additive Process)

-Via drill,E'less Cu,Pattern Plating,Flash Etch



1. Material release



2. Laser drilling (X-via)



3. E'less Cu plating



4. PR image transfer



5. Cu pattern plating



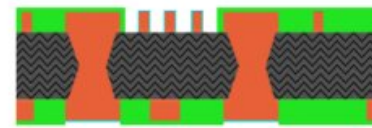
6. PR stripping



7. Flash etching



9. SM process



10. Routing
11. OSP

Substrate manufacturing

SAP (Semi Additive Process)

-Via drill,E'less Cu,Pattern Plating,Flash Etch



Core board



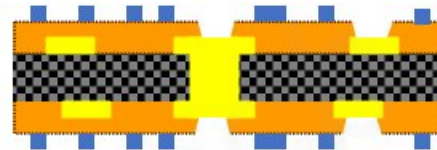
Insulation resin lamination



Via formation by laser



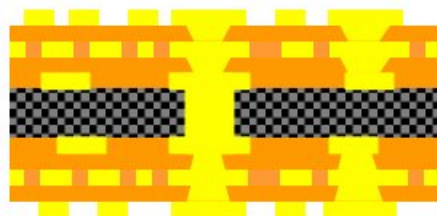
Desmear
Els Cu plating



DFR lamination
Exposure
Development



E-Cu plating
DFR remove
Flash etching

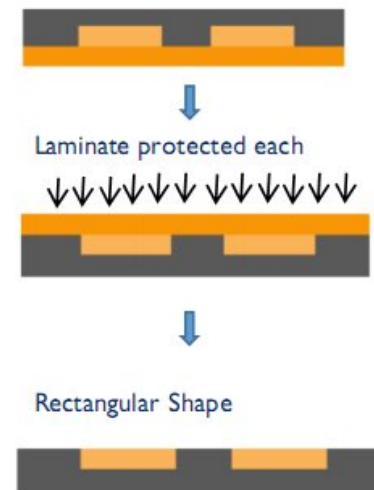
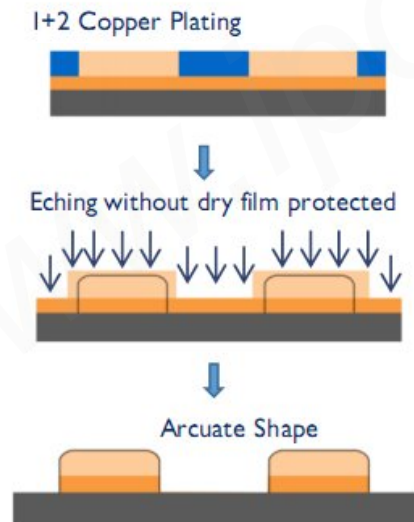
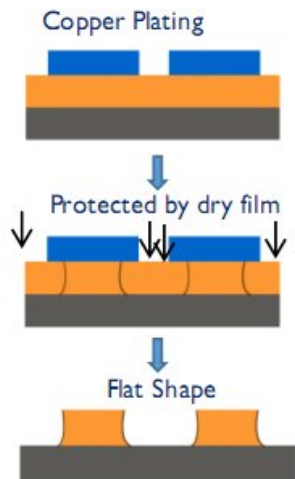


2/2/2 structure
Build-up PWB

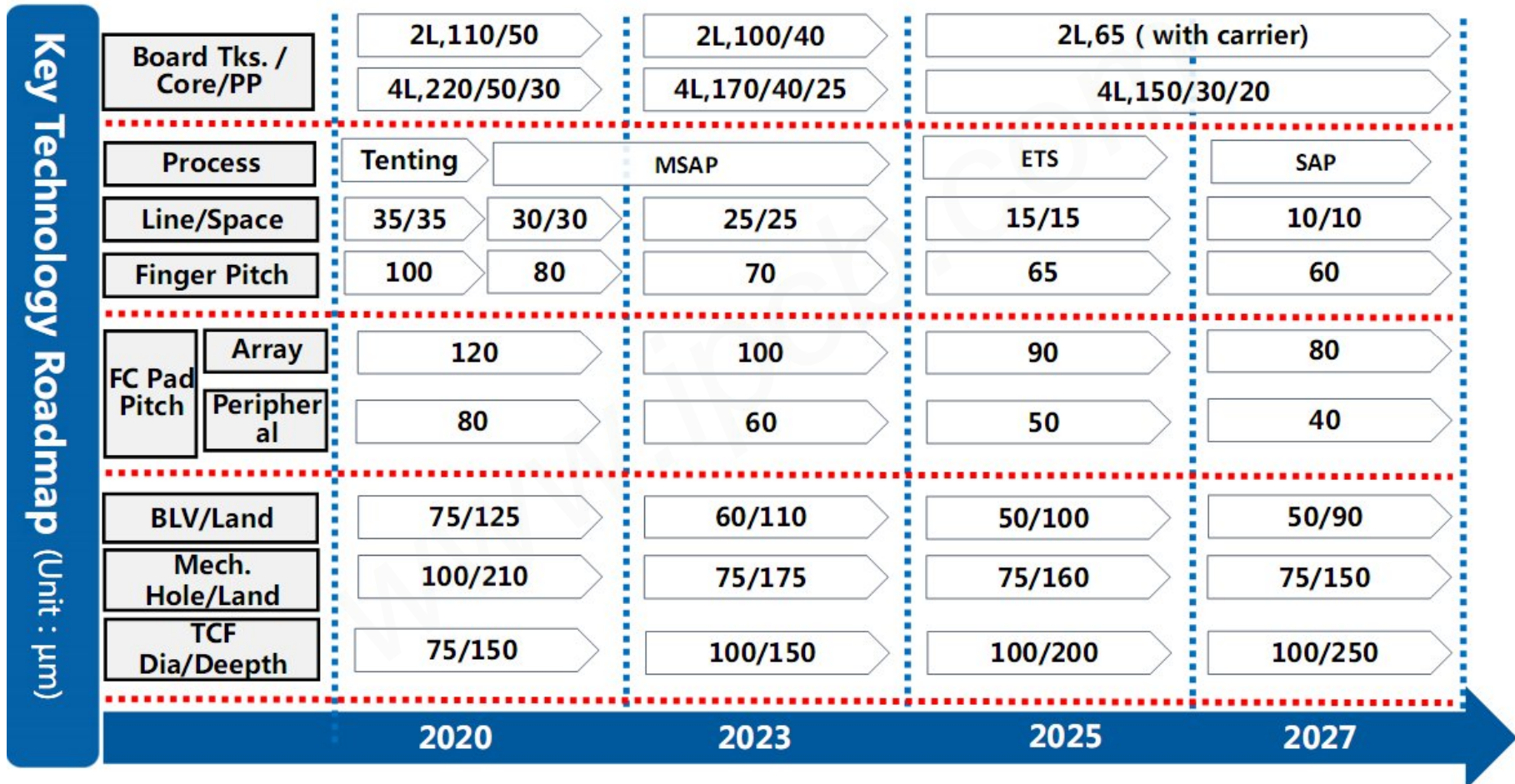
Substrate manufacturing

Substractive vs. MSAP vs. SAP vs. EPP

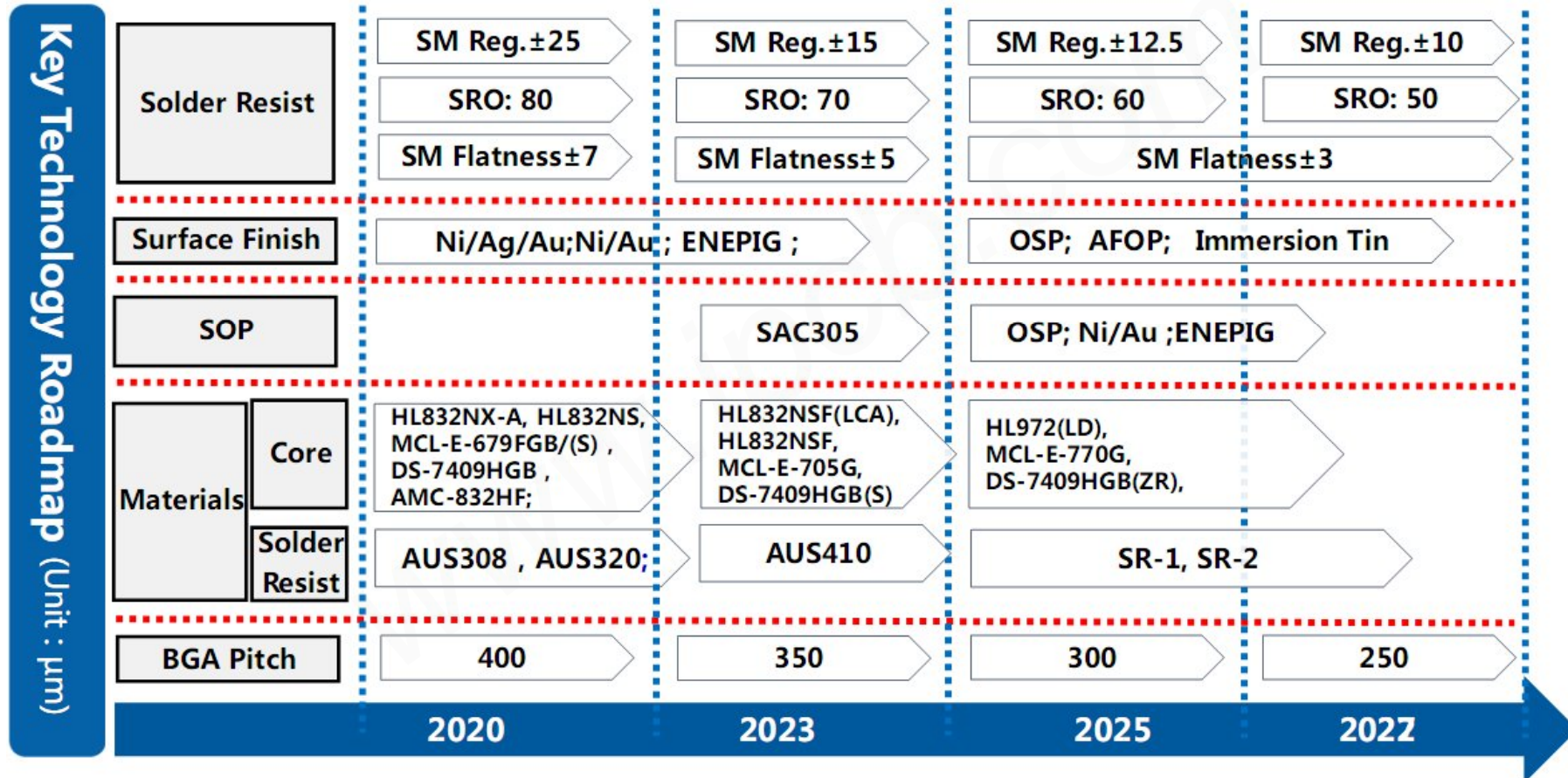
Process	Substractive	MSAP	SAP	EPP
L/S, Pitch	50/50, 100	25/25, 50	10/10, 20	15/15, 30
TOP	Flat	Round	Round	Flat
Head Foot Ratio	(1-(2/3Cut)):1	1:1	1:1	1:1



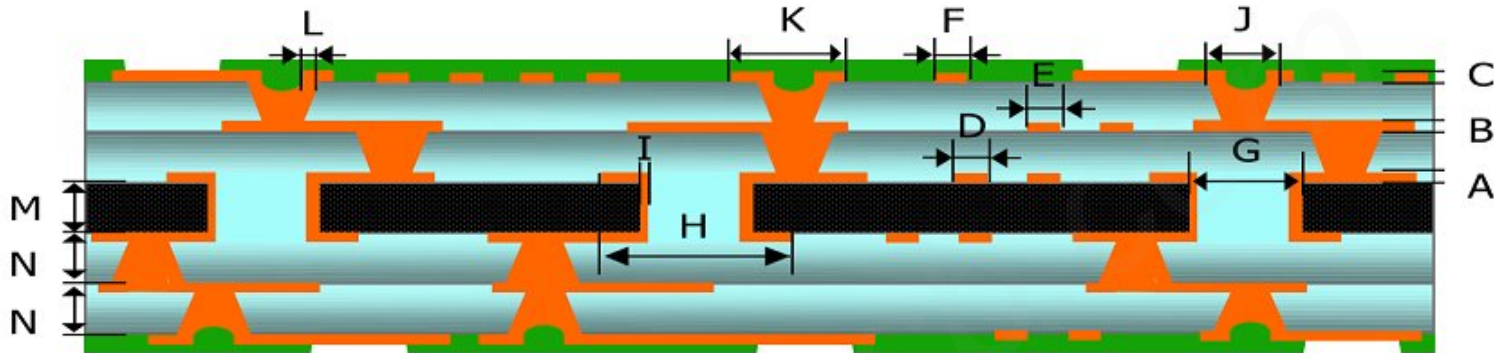
Substrate Technology Roadmap-I



Substrate Technology Roadmap-II



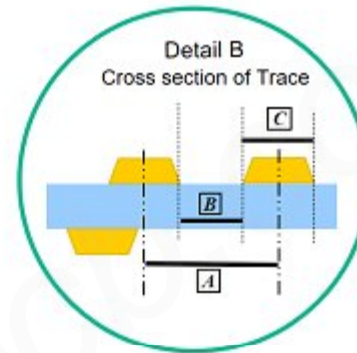
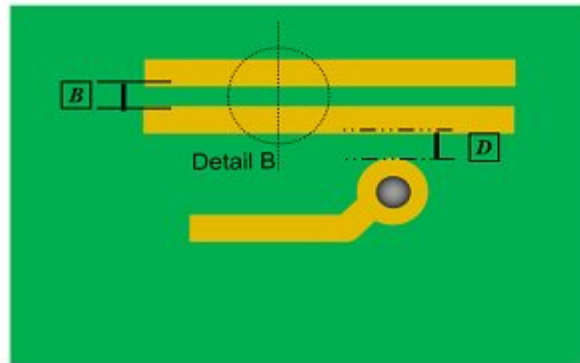
Design Rule



2022

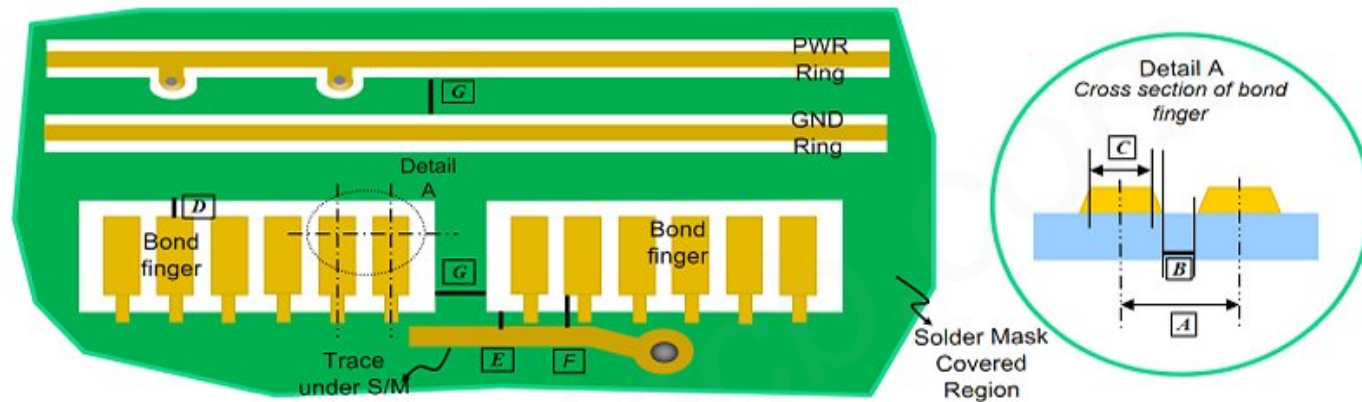
Design Feature (um)	Subtractive Process	Modified-Semi-additive Process		
		HVM	LVM	FAI
A Inner layer Cu thickness (L3/L4)	Min 12		Min 12 *	
B Inner layer Cu thickness (L2/L5)	Min 12		Min 12 *	
C Outer layer Cu thickness	Min 12		Min 12 *	
D Trace width / Space for inner layer (L3/L4)	35/35	30/30	25/25	20/20
E Trace width / Space for inner layer (L2/L5)	35/35	30/30	25/25	20/20
F Trace width / Space for outer layer	35/35	30/30	25/25	20/20
G Min buried via diameter	75	75	75	75
H Min buried via capture pad	195	175	150	125
I Copper thickness for buried via	Min 10		Min 10 *	
J Min micro via diameter	75	75	75	50
K Min micro via capture pad	200	180	165	100
L Copper thickness for micro via (L1/L6)	Min 10		Min 10	
M Core material thickness		200/150/100/60/50		
N Dielectric material thickness	40/30	40/30	25	20

Design Rule for Trace



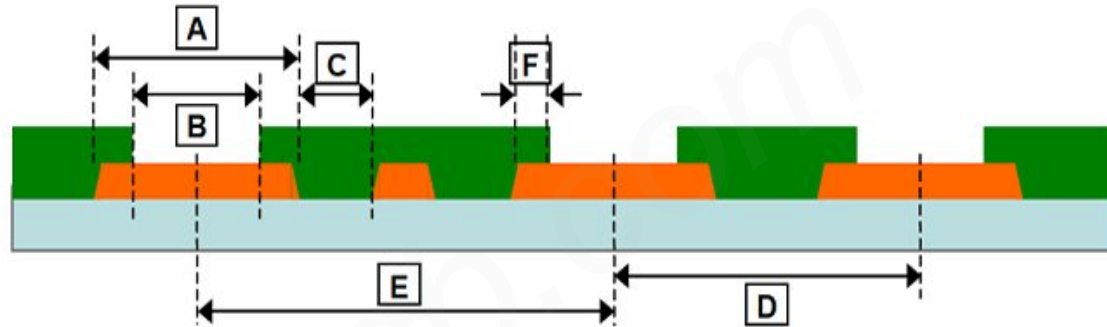
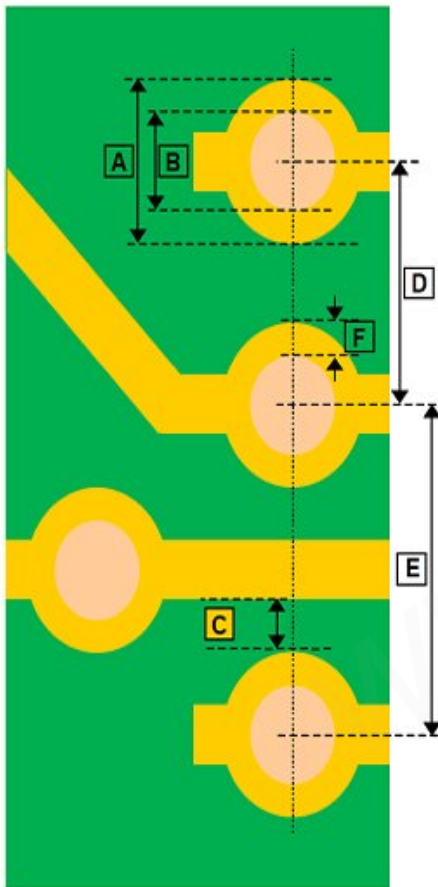
Design Feature (Unit : um)	Subtractive	Modified-Semi-additive Process
	A Min. Trace Pitch	80
B Min. Space from Trace to Trace (design)	35	25
C Min. Trace width (Bottom)	35	25
D Min. distance from Trace to via pad(design)	35	30

Design Rule for Bond Finger



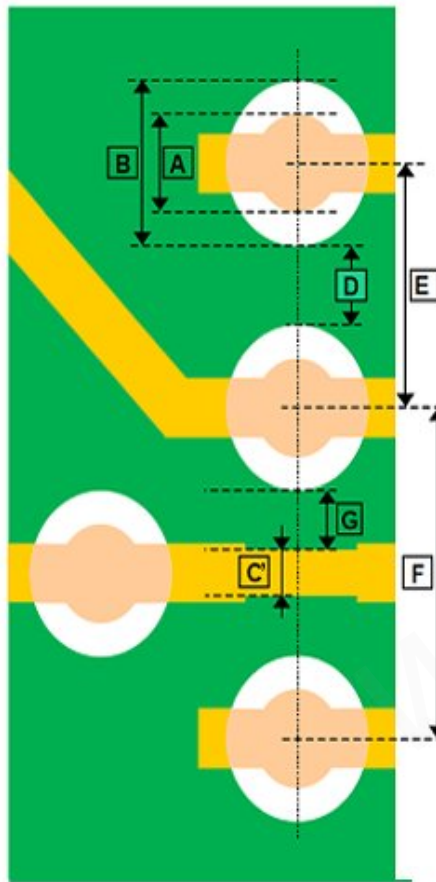
Design Feature (Unit : um)		Subtractive		Modified-Semi-additive Process		
		STD	ADV	STD	ADV	
A	Bond Finger Pitch	105	100	80	70	
B	Min. Bond Finger Space	25	25	25	20	
C	Min. Bond Finger width (Top Flat)	A - B(customer requirement) - X				
D	Min. S/M Clearance for Bond Finger	50	40	50	40	
E	Min. Finger S/M extension to Trace	50	40	40	40	No copper exposed in finished
F	Min. Bond Finger to metal edge separation	100	80	90	80	
G	Min. Solder Mask Dam width	Length > 500	100	100	100	100
		Length <= 500	80	80/50	80/50	80/50

Design Rule for Bump Pad - SMD

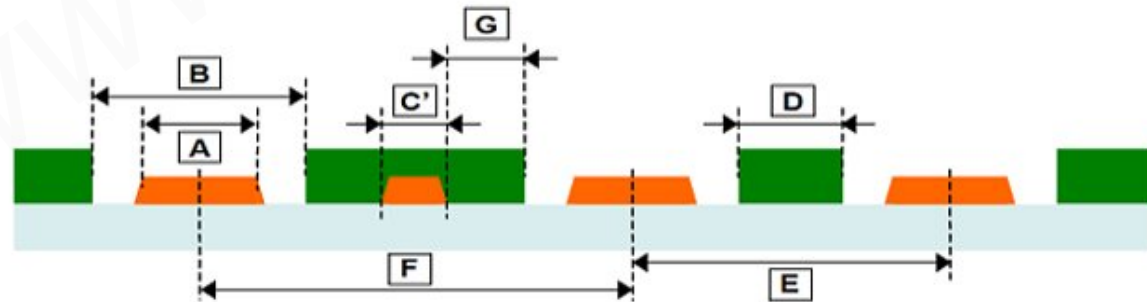


Design Feature (um)	Subtractive Process	Modified-Semi-additive Process		
		HVM	LVM	FAI
A Min bump pad width	100	100	90	80
B Nominal bump pad opening	60	60	60	50
B' Bump pad opening tolerance	+/-10	+/-10	+/-10	+/-10
C Min trace width between bump pad	40	35	30	25
D Bump pitch (no trace between bump pad)	180	175	150	105
E Bump pitch (one trace between bump pad)	220	205	180	155
F Solder mask registration	20	25	15	15

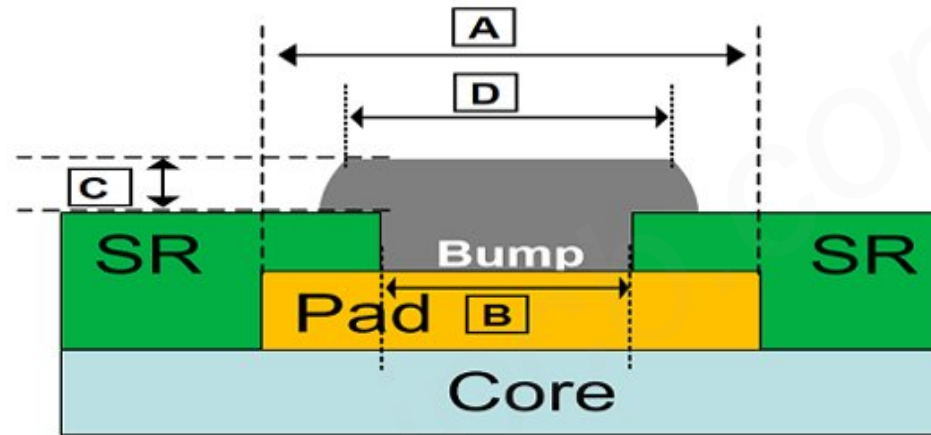
Design Rule for Bump Pad - NSMD



Design Feature (um)	Subtractive Process	Modified-Semi-additive Process		
		HVM	LVM	FAI
A Finished bump pad width (TOP)	50	50	40	40
B Bump pad solder mask opening	110	100	80	70
C' Finished trace width (min)	25	25	25	20
D Solder mask dam width between opening	50	50	50	50
E Bump pitch (no trace between bump pad)	160	150	130	120
F Bump pitch (one trace between bump pad)	230	205	170	145
G Space between opening and trace	40	35	30	25
H Solder mask registration	30	25	20	20

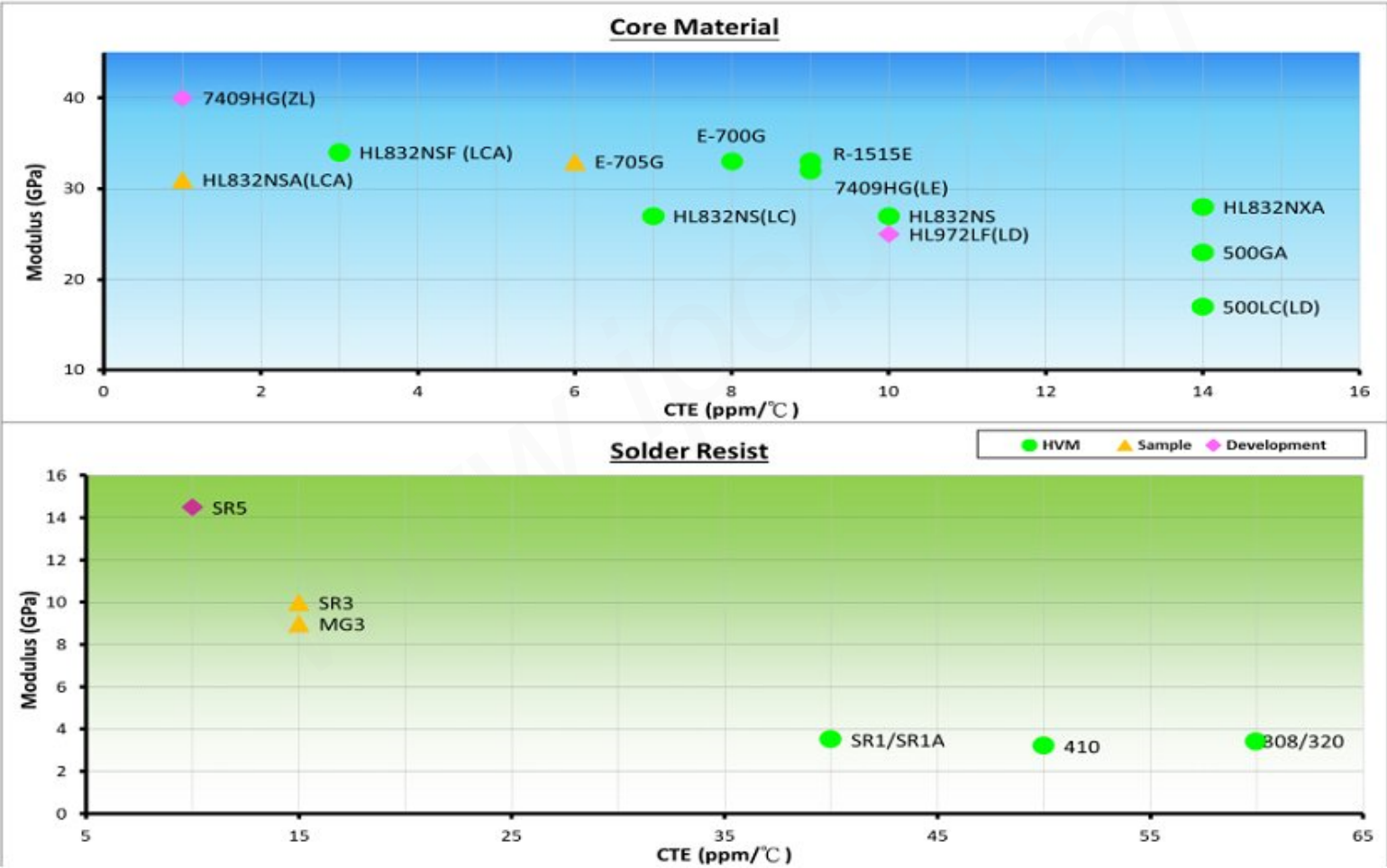


Design Rule for SOP



Design Feature (um)	Modified-Semi-additive Process	
	HVM	LVM
A Pad Diameter (A)	110±15	80±10
B SRO Opening Diameter (B)	60±15	50±15
C Flat Bump Height (C)	Min10	Min10
D Flat Bump Diameter (D)	Min40	Min30
Ball Pitch	140	100
SOP Solder Material	SAC305	SAC305

Raw Material Roadmap



iPCB

Thank you!

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