AS_SoPTM54AP
Thin-Device Test IC

American Semiconductor
Reliably Thin Electronics

AS_SoPTM54AP Test IC Overview

The AS_SoPTM54AP is a family of test chips that support development and characterization of new ultra-thin and/or flexible electronics assembly materials and processes. These ultra-thin chips include a 10um thick silicon layer, oxide ILD, single layer aluminum interconnects and pads, and oxide/nitride passivation. The chips are packaged in SoP-TM™ P-WLCSP which includes 6-sided polyimide encasement and ENIG bumps. The metal layer is routed across the die, across an edge, and around corners to enable easy open, short and resistances testing for a multitude of attachment point. The chips come in 4 versions with varying pad count, die size, routing and pad spacing.

AS_SoPTM54AP*

Metallization	8um ENIG bump on 1um aluminum
Total Package Thickness	25um
Flexible	Yes
Conformal	Yes
Package	Semiconductor-on-Polymer: SoP-TM

AS_SoPTM54AP_A

Package Size	3.84 x 3.88mm
Die Size	3.8 x 3.84mm
Pad Count	66
Pad Size	56 x 56um
Min. Pad Spacing	44um

AS_SoPTM54AP_B

Package Size	2.2mm x 2.32mm
Die Size	2.16mm x 2.28mm
Pad Count	53
Pad Size	60um x 70um
Min. Pad Spacing	16um–Same electrical node 43um–Isolated pads

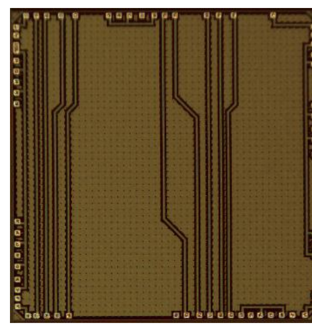


Figure 1: AS_SoPTM54AP_A

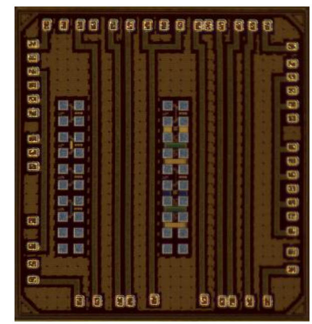


Figure 2: AS_SoPMM54AP_B

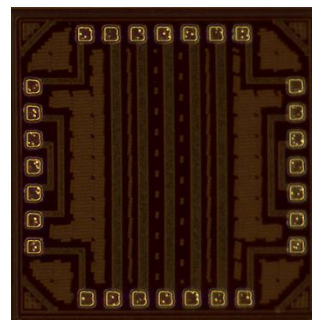


Figure 3: AS_SoPTM54AP_C

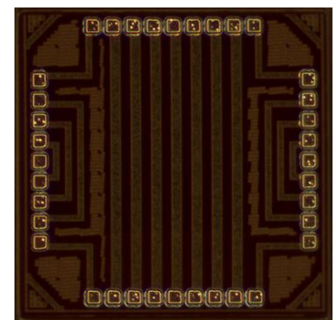


Figure 4: AS_SoPTM54AP_D

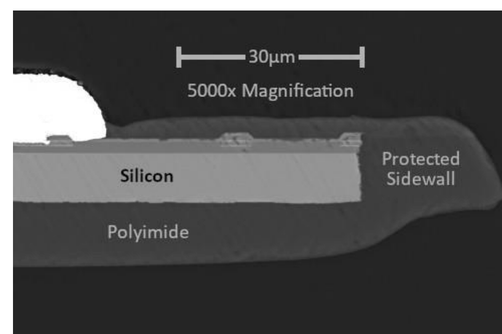


Figure 5: AS_SoPTM54AP Cross-Section

© 2023 American Semiconductor, Inc.

AS_SoPTM54AP_C

Package Size	1.15 x 1.15mm
Die Size	1.11 x 1.11mm
Pad Count	28
Pad Size	56 x 56um
Min. Pad Spacing	44um

AS_SoPTM54AP_D

Package Size	1.15mm x 1.15mm
Die Size	1.11mm x 1.11mm
Pad Count	36
Pad Size	56 x 56um
Min. Pad Spacing	19um

AS_SoPTM54AP Ordering Information

Part Number	Description
AS_SoPTM54_A.fxd	Test IC with 66 pads and test circuits
AS_SoPTM54_B.fxd	Test IC with 53 pads and test circuits
AS_SoPTM54_C.fxd	Test IC with 28 pads and test circuits
AS_SoPTM54_D.fxd	Test IC with 36 pads and test circuits

AS_SoPTM54AP_A Pin Connection List

Pin	Connection	Pin	Connection	Pin	Connection	Pin	Connection
1	66	18	17	35	36	52	28
2	-	19	65	36	35	53	27
3	5, 7, 9, 11, 13, 15	20	64	37	-	54	26
4	-	21	63	38	40, 42, 44, 46, 48	55	25
5	3, 7, 9, 11, 13, 15	22	62	39		56	24
6	-	23	-	40	38, 42, 44, 46, 48	57	59, 61
7	3, 5, 9, 11, 13, 15	24	56	41	-	58	-

© 2023 American Semiconductor, Inc.

8	-	25	55	42	38, 40, 44, 46, 48	59	57, 61
9	3, 5, 7, 11, 13, 15	26	54	43	-	60	-
10	-	27	53	44	38, 40, 42, 46, 48	61	57, 59
11	3, 5, 7, 9, 13, 15	28	52	45	-	62	22
12	-	29	31, 33	46	38, 40, 42, 44, 48	63	21
13	3, 5, 7, 9, 11, 15	30	-	47	-	64	20
14	-	31	29, 33	48	38, 40, 42, 44, 46	65	19
15	3, 5, 7, 9, 11, 13	32	-	49	-	66	1
16	-	33	29, 31	50	51	-	
17	18	34	-	51	50	-	

AS_SoPTM54AP_B Pin Connection List

Pin	Connection	Pin	Connection	Pin	Connection	Pin	Connection
1	53	15	51	29	-	43	-
2	-	16	49	30	26, 28, 32, 34, 36	44	19
3	5, 7, 9, 11	17	48	31	-	45	18, 47
4	-	18	45, 47	32	26, 28, 30, 34, 36	46	-
5	3, 7, 9, 11	19	44	33	-	47	18, 45
6	-	20	42	34	26, 28, 30, 32, 36	48	17
7	3, 5, 9, 11	21	41	35	-	49	16
8	-	22	40	36	26, 28, 30, 32, 34	50	-
9	3, 5, 7, 11	23	24	37	-	51	15
10	-	24	23	38	39	52	-
11	3, 5, 7, 9	25	-	39	38	53	1
12	-	26	28, 30, 32, 34, 36	40	22	-	
13	14	27	-	41	21	-	
14	13	28	26, 30, 32, 34, 36	42	20	-	

AS_SoPTM54AP_C Pin Connection List

Pin	Connection	Pin	Connection	Pin	Connection	Pin	Connection
1	28	8	7	15	14	22	21
2	6	9	27	16	20	23	13
3	5	10	26	17	19	24	12
4	-	11	25	18	-	25	11
5	3	12	24	19	17	26	10
6	2	13	23	20	16	27	9
7	8	14	15	21	22	28	1

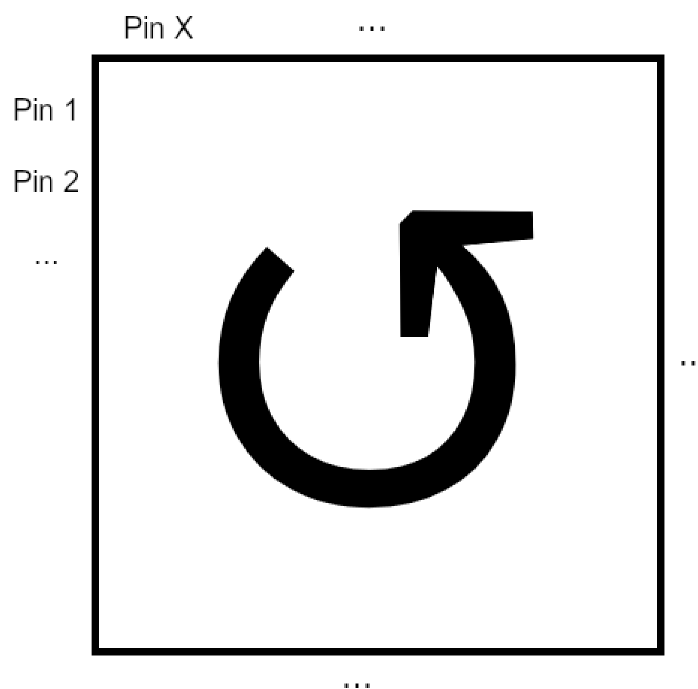
© 2023 American Semiconductor, Inc.

AS_SoPTM54AP_D Pin Connection List

Pin	Connection	Pin	Connection	Pin	Connection	Pin	Connection
1	36	10	9	19	18	28	27
2	8	11	35	20	26	29	17
3	7	12	34	21	25	30	16
4	6	13	33	22	24	31	15
5	-	14	32	23	-	32	14
6	4	15	31	24	22	33	13
7	3	16	30	25	21	34	12
8	2	17	29	26	20	35	11
9	10	18	19	27	28	36	1

Pad Numbering Information

Figure 2: Pin Numbering for a die with X number of pins



© 2023 American Semiconductor, Inc.

American Semiconductor
Reliably Thin Electronics

Preliminary Information

This product may be modified over time. Refer to most recent data sheet for changes to the design and specification.

Related Products and Services:

SoP-TM: Wafer level chip scale packaging is available for all foundry and IDM fabrication processes.

Chip-on-flex: Flip-chip assembly on flex is available from American Semiconductor for these test chips as well as all other SoP or FleX packaged ICs.

Design Services in support of SoP packaged ICs and flex circuit fabrication are available.

Contact Info

For more information or to purchase FleX products, please contact us at:
Email: sales@americansemi.com
Phone: 208.336.2773

American Semiconductor Inc., the American Semiconductor logo, FleX, FleX-BLE, SoP-TM, and Semiconductor-on-Polymer are trademarks of American Semiconductor, Inc.