

**Reltronix Ltd**

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MIL PRF 38534 CLASS K TRAVELLER

Customer:	Cust PO#:3802	Cust. Spec: Manufacturers datasheet
LQK #:0001	Bonding Diagram#: DBD0017	SO:20367
Device:2N2222A	Device IIL:3772	
Bond Wire:Au	Package Style:TO39	Package IIL:8053
Die Attach Type:Ag	Lid Style:TO30 Cap	Lid IIL:6316

SEQ	OPERATION/PS	CONDITIONS	QTY	ACCEPT	REJ.	DATE	SIG.	COMMENTS
1	100% Die Visual QS011	MIL STD 750 TM 2072	15	15	0	9/10/2023	SG	Equipment #:1
2	Die Attach PS0018	Cure Epoxy 1Hr @150°C Oven Temp Check:	15	15	0	10/10/2023	DPB	Equipment #:6
3	Wire Bond PS0020	Wire Type: Au Diameter: 1 Mils	15	15	0	10/10/2023	DPB	Equipment #:7
4	Internal Visual QS0029	MIL STD 750 TM 2072	15	15	0	11/10/2023	SE	Equipment #:1
5	Lid Seal PS0100	Compression Weld	15	15	0	12/10/2023	EQ	Equipment #: 25
6	Serialise Parts PS0026		10	10	0	23/10/2023	DPB	Equipment #:20
7	100% Electrical Test +25°C	Manufacturers Datasheet	10	10	0	23/10/2023	DPB	Equipment #:12 Program#2N2222A K LAT.tsf

ALL ELECTRICAL TEST RESULTS ARE SUPPLIED ELECTRONICALLY



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SEQ	OPERATION/PS	CONDITIONS	QTY	ACCEPT	REJ.	DATE	SIG.	COMMENTS
8	Temp Cycle PS0028	MIL STD 883 TM1010 10 cycles -65°C to 150°C	10	10	0	24/10/23	SR	Equipment #:11
9	Constant Acceleration PS0029	MIL STD 883 TM2001 Condition A 5000g	10	10	0	25/10/23	SR	Equipment #:19
10	Interim Electrical @ 25°C	Manufacturers Datasheet	10	10	0	25/10/23	DPB	Equipment #:12 Program#2N2222A K LAT.tsf
11	HTRB 48Hrs	MIL STD 750 TM1039 Condition A	10	10	0	ON:25/10/2023 OFF:27/10/2023	DPB	80% Min of VCB Equipment #:13 & 9
12	Post HTRB Electrical @ 25°C	Manufacturers Datasheet	10	10	0	27/10/23	DPB	Equipment #: Program#2N2222A K LAT.tsf
13	240hr Burn-In @ 125°C	MIL STD 883 TM1015	10	10	0	ON:27/10/2023 OFF:6/11/2023	DPB	Equipment #:9 & 13 Oven Temp Check#122°C
14	Post 240hr Burn-in Electrical @ 25°C	Manufacturers Datasheet	10	10	0	6/11/2023	DPB	Equipment #:12 Program#2N2222A K sf
15	Post 240hr Burn-in electrical @ 125°C	Manufacturers Datasheet	10	10	0	7/11/2023	DPB	Equipment #:12 Program#2N2222A K LAT.tsf
16	Post 240hr Burn-in electrical @ -55°C	Manufacturers Datasheet	10	10	0	7/11/2023	DPB	Equipment #:12 Program#2N2222A K LAT.tsf
17	Steady State Life 1000hr @ 125°C	MIL STD 883 TM1005	10	10	0	ON:8/11/2023 OFF:19/12/2023	DPB	Equipment #:9 & 13 Oven Temp Check#121°C

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SEQ	OPERATION/PS	CONDITIONS	QTY	ACCEPT	REJ.	DATE	SIG.	COMMENTS
18	Final Electrical Test @ 25°C	Manufacturers Datasheet	10	10	0	19/12/2023	DPB	Equipment #:12 Program#2N2222A K LAT.tsf
19	Final Electrical Test @ 125°C	Manufacturers Datasheet	10	10	0	20/12/2023	DPB	Equipment #:12 Program#2N2222A K LAT.tsf
20	Final Electrical Test @ -55°C	Manufacturers Datasheet	10	10	0	20/12/2023	DPB	Equipment #:12 Program#2N2222A K LAT.tsf
21	Bond Pull Test Bake PS0032	MIL STD 883 TM2011 1hr 300°C bake	5	5	0	21/12/2023	DPB	Equipment #:8 Oven Temp Check#301°C
22	Wire Bond Integrity PS0032	MIL STD 883 TM2011 10 wires from 5 devices	10	10	0	21/12/2023	DPB	Equipment #:15 DPR:0039
23	FINAL QA Sign Off QS0007		10	10	0	2/1/2024	DSB	
24	Dispatch goods and Electronic Records to customer		10	10	0	3/1/2024	RB	

ALL ELECTRICAL TEST RESULTS ARE SUPPLIED ELECTRONICALLY

Data

Device #	1.1 VCB0(BR)	2.1 VCE0(BR)	3.1 VEB0	4.1 ICB0	5.1 IEB0	6.1 hfe1(DC)	7.1 hfe1	8.1 hfe2	9.1 hfe3	10.1 hfe4	11.1 VCE(sat1)	12.1 VCE(sat2)	13.1 VBE(sat1)	14.1 VBE(sat2)	15.1 ICEX
Unit	V	V	mV	nA	nA						mV	mV	mV	mV	uA
Low limit	75.000	40.000	6000.000			100.000	35.000	50.000	75.000	40.000	0.000	0.000	600.000	0.000	
Upp. limit	250.000	200.000	12000.000	10.000	10.000	300.000	500.000	500.000	500.000	500.000	300.000	1000.000	1200.000	2000.000	0.010
1	133.37	54.65	11094.00	-0.36	0.17	193.89	176.28	175.89	177.54	94.25	157.84	474.55	895.02	1122.75	0.00
2	140.94	54.63	11125.50	-0.55	0.15	194.92	176.28	173.38	176.16	92.96	157.08	474.13	900.19	1132.97	0.00
3	140.76	54.58	11029.00	-0.57	0.22	192.72	176.27	173.37	175.55	94.60	152.13	458.14	901.55	1133.28	0.00
4	141.27	54.58	11082.00	-0.57	0.18	194.49	176.22	172.28	174.84	93.47	144.06	430.13	890.97	1098.35	0.00
5	141.11	54.64	11073.50	-0.52	0.15	193.92	176.28	172.24	176.28	94.16	153.58	461.38	899.05	1130.27	0.00
6	141.14	54.55	10983.13	-0.56	0.13	193.93	176.34	173.41	175.68	94.16	151.54	455.38	899.64	1127.77	0.00
7	141.08	54.57	11024.25	-0.54	0.12	192.92	176.26	173.40	176.31	94.68	148.28	444.07	895.30	1118.39	0.00
8	141.01	54.57	11058.75	-0.54	0.17	192.94	176.27	172.19	175.59	95.03	151.34	455.08	898.35	1124.49	0.00
9	141.08	54.62	11089.13	-0.56	0.22	193.92	176.24	172.28	175.43	94.16	151.14	454.03	898.45	1129.51	0.00
10	141.06	54.63	11006.88	-0.55	0.20	194.75	176.34	173.32	176.50	93.22	153.76	462.94	897.75	1127.63	0.00

Cust Spec :MAN. Data Sheet

LQK #:001

TEMP =25°C

DEVICE: 2N2222A

Initial Electrical



Data

Device #	1.1 VCB0(BR)	2.1 VCE0(BR)	3.1 VEB0	4.1 ICB0	5.1 IEB0	6.1 hfe1(DC)	7.1 hfe1	8.1 hfe2	9.1 hfe3	10.1 hfe4	11.1 VCE(sat1)	12.1 VCE(sat2)	13.1 VBE(sat1)	14.1 VBE(sat2)	15.1 IC EX
Unit	V	V	mV	nA	nA						mV	mV	mV	mV	uA
Low limit	75.000	40.000	6000.000			100.000	35.000	50.000	75.000	40.000	0.000	0.000	600.000	0.000	
Upp. limit	250.000	200.000	12000.000	10.000	10.000	300.000	500.000	500.000	500.000	500.000	300.000	1000.000	1200.000	2000.000	0.010
1	141.13	54.61	11032.75	-0.55	0.18	193.99	176.30	173.45	176.38	94.16	155.04	466.38	898.60	1128.33	0.00
2	140.82	54.55	11050.50	-0.56	0.21	193.27	176.43	173.45	175.88	94.16	153.68	462.27	900.28	1134.83	0.00
3	141.13	54.63	11031.50	-0.50	0.14	194.60	176.44	173.43	176.98	93.13	151.72	456.93	897.41	1126.31	0.00
4	141.16	54.60	11154.38	-0.52	0.16	195.03	176.40	175.86	177.04	93.13	153.28	461.12	897.42	1128.18	0.00
5	141.46	54.63	11236.88	-0.49	0.19	194.58	176.32	177.12	178.71	94.60	150.03	450.55	894.22	1123.60	0.00
6	141.24	54.65	11129.00	-0.48	0.14	195.20	176.40	175.82	177.77	90.82	155.42	467.48	897.99	1129.58	0.00
7	141.26	54.58	11045.88	-0.51	0.15	194.01	176.26	173.50	176.25	91.80	150.46	452.41	896.00	1119.83	0.00
8	141.10	54.58	11153.25	-0.55	0.15	194.76	176.39	172.23	175.90	92.80	152.55	458.41	892.94	1109.39	0.00
9	141.36	54.56	10723.38	-0.52	0.16	195.56	176.31	173.29	176.85	92.13	150.50	452.31	894.94	1119.41	0.00
10	141.04	54.56	11064.88	-0.57	0.16	193.08	176.39	172.24	175.45	94.16	146.16	438.26	894.21	1112.90	0.00

Cust Spec :MAN. Data Sheet

LQK #:001

TEMP =25°C

DEVICE: 2N2222A

Interim Electrical



Data

Device #	1.1 VCB0(BR)	2.1 VCE0(BR)	3.1 VEB0	4.1 ICB0	5.1 IEB0	6.1 hfe1(DC)	7.1 hfe1	8.1 hfe2	9.1 hfe3	10.1 hfe4	11.1 VCE(sat1)	12.1 VCE(sat2)	13.1 VBE(sat1)	14.1 VBE(sat2)	15.1 IC EX
Unit	V	V	mV	nA	nA						mV	mV	mV	mV	uA
Low limit	75.000	40.000	6000.000			100.000	35.000	50.000	75.000	40.000	0.000	0.000	600.000	0.000	
Upp. limit	250.000	200.000	12000.000	10.000	10.000	300.000	500.000	500.000	500.000	500.000	300.000	1000.000	1200.000	2000.000	0.010
1	141.27	54.58	11082.00	-0.57	0.18	194.49	176.22	172.28	174.84	93.47	144.06	430.13	890.97	1098.35	0.00
2	141.11	54.64	11073.50	-0.52	0.15	193.92	176.28	172.24	176.28	94.16	153.58	461.38	899.05	1130.27	0.00
3	141.14	54.55	10983.13	-0.56	0.13	193.93	176.34	173.41	175.68	94.16	151.54	455.38	899.64	1127.77	0.00
4	141.08	54.57	11024.25	-0.54	0.12	192.92	176.26	173.40	176.31	94.68	148.28	444.07	895.30	1118.39	0.00
5	141.13	54.61	11032.75	-0.55	0.18	193.99	176.30	173.45	176.38	94.16	155.04	466.38	898.60	1128.33	0.00
6	140.82	54.55	11050.50	-0.56	0.21	193.27	176.43	173.45	175.88	94.16	153.68	462.27	900.28	1134.83	0.00
7	141.13	54.63	11031.50	-0.50	0.14	194.60	176.44	173.43	176.98	93.13	151.72	456.93	897.41	1126.31	0.00
8	141.16	54.60	11154.38	-0.52	0.16	195.03	176.40	175.86	177.04	93.13	153.28	461.12	897.42	1128.18	0.00
9	141.08	54.62	11089.13	-0.56	0.22	193.92	176.24	172.28	175.43	94.16	151.14	454.03	898.45	1129.51	0.00
10	141.06	54.63	11006.88	-0.55	0.20	194.75	176.34	173.32	176.50	93.22	153.76	462.94	897.75	1127.63	0.00

Cust Spec :MAN. Data Sheet

LQK #:001

TEMP =25°C

DEVICE: 2N2222A

POST HTRB Electrical



Data

Device #	1.1 VCB0	2.1 VCE0	3.1 VEB0	4.1 ICB0	5.1 IEB0	6.1 hfe1	7.1 hfe2	8.1 hfe3	9.1 hfe4	10.1 hfe5	1.1 VCE(sat1)	2.1 VCE(sat2)	3.1 VBE(sat1)	4.1 VBE(sat2)	15.1 ICEX
Unit	V	V	mV	nA	nA						mV	mV	mV	mV	uA
Low limit	75.000	40.000	6000.000			100.000	35.000	50.000	75.000	40.000	0.000	0.000	600.000	0.000	
Upp limit	250.000	200.000	12000.000	10.000	10.000	300.000	500.000	500.000	500.000	500.000	300.000	1000.000	1200.000	2000.000	0.010
1	141.21	54.65	11116.25	0.30	0.13	195.08	175.93	173.30	177.71	94.16	153.04	459.19	896.21	1128.50	0.00
2	141.66	54.72	11117.88	0.36	0.12	195.69	175.97	177.06	180.31	93.22	152.61	457.96	893.11	1126.35	0.00
3	141.45	54.67	11095.13	0.36	0.11	195.50	175.84	175.85	179.82	94.16	154.64	465.27	892.90	1125.15	0.00
4	141.21	54.77	11125.13	0.34	0.20	194.58	175.92	175.72	178.91	93.47	156.49	471.17	897.29	1137.29	0.00
5	141.50	54.74	11116.50	0.37	0.16	195.88	175.99	177.12	179.72	92.80	151.73	453.47	891.63	1121.86	0.00
6	141.32	54.67	11162.63	0.33	0.08	195.83	175.90	175.80	178.59	92.80	154.16	463.66	894.41	1125.34	0.00
7	141.35	54.64	11038.00	0.34	0.15	194.34	175.93	175.76	179.11	94.16	152.30	457.42	893.37	1129.07	0.00
8	141.37	54.70	11030.75	0.33	0.24	194.55	164.65	172.10	177.63	94.16	151.85	454.89	893.07	1121.63	0.00
9	141.52	54.69	11108.75	0.39	0.15	195.10	175.94	177.10	180.41	94.16	150.79	452.42	890.34	1121.10	0.00
10	141.44	54.73	11104.38	0.38	0.17	194.69	176.05	177.23	180.08	94.16	148.53	443.81	887.16	1112.65	0.00

Cust Spec :MAN. Data Sheet

LQK #:001

TEMP =25°C DEVICE: 2N2222A

Post 240 Hrs



Data

Device #	1.1 VCB0	2.1 VCE0	3.1 VEB0	4.1 ICB0	5.1 IEB0	6.1 hfe1	7.1 hfe2	8.1 hfe3	9.1 hfe4	10.1 hfe4	11.1 VCE(sat1)	12.1 VCE(sat2)	13.1 VBE(sat1)	14.1 VBE(sat2)	15.1 ICEX
Unit	V	V	mV	nA	nA						mV	mV	mV	mV	uA
Low limit	75.000	40.000	6000.000			100.000	35.000	50.000	75.000	40.000	0.000	0.000	600.000	0.000	
Upp limit	250.000	200.000	12000.000	10.000	10.000	300.000	500.000	500.000	500.000	500.000	300.000	1000.000	1200.000	2000.000	0.010
1	142.74	66.76	11060.75	3.05	0.52	167.35	190.46	186.40	189.27	90.50	162.77	490.72	885.44	1133.45	0.00
2	142.71	66.77	11114.25	3.48	1.18	166.56	190.19	186.29	189.62	90.18	163.13	491.50	885.28	1132.50	0.00
3	148.25	59.47	11556.00	-54.10	5.11	223.77	305.57	234.98	234.07	74.45	187.76	567.22	828.71	1120.76	0.00
4	148.31	59.41	11521.88	-53.47	3.70	224.11	265.38	235.52	234.63	74.23	188.63	571.65	828.11	1123.62	0.00
5	149.24	66.32	11548.50	-44.59	3.56	226.86	295.47	244.89	239.86	73.38	187.68	565.93	819.64	1115.74	0.00
6	149.38	66.22	11563.38	-34.12	0.02	227.07	297.83	244.84	239.70	73.27	187.95	566.72	820.30	1115.95	0.00
7	148.54	65.94	11520.63	-40.56	1.97	225.03	306.96	241.74	236.11	73.17	215.95	666.00	851.50	1209.81	0.00
8	148.48	65.89	11521.25	-32.05	0.99	225.31	305.15	242.10	236.13	73.12	215.88	666.44	851.35	1208.98	0.00
9	147.19	64.05	11496.38	-46.92	1.69	219.84	276.14	229.04	225.83	75.88	247.56	816.93	900.25	1372.92	0.00
10	147.24	64.03	11384.13	-41.78	3.50	219.95	274.13	231.33	226.57	75.77	247.44	815.15	898.41	1368.09	0.00

Cust Spec :MAN. Data Sheet

LQK #:001

TEMP =125°C DEVICE: 2N2222A

POST 240HR Electrical



Data

Device #	1.1 VCB0	2.1 VCE0	3.1 VEB0	4.1 ICB0	5.1 IEB0	6.1 hfe1	7.1 hfe2	8.1 hfe3	9.1 hfe4	10.1 hfe5	1.1 VCE(sat1)	12.1 VCE(sat2)	13.1 VBE(sat1)	14.1 VBE(sat2)	15.1 ICEx
Unit	V	V	mV	nA	nA						mV	mV	mV	mV	uA
Low limit	75.000	40.000	6000.000			100.000	35.000	50.000	75.000	40.000	0.000	0.000	600.000	0.000	
Upp limit	250.000	200.000	12000.000	10.000	10.000	300.000	500.000	500.000	500.000	500.000	300.000	1000.000	1200.000	2000.000	0.010
1	139.90	54.51	11035.63	-0.18	1.76	156.21	176.33	163.24	164.29	100.05	187.39	609.58	951.00	1296.55	0.00
2	138.53	63.90	10859.38	-0.25	1.08	147.32	145.84	149.63	152.12	100.05	150.52	457.03	930.46	1155.89	0.00
3	137.49	67.69	10788.75	-0.28	0.52	129.34	137.64	144.42	146.46	101.34	183.64	585.78	970.76	1289.89	0.00
4	135.33	64.97	10699.38	-0.21	0.88	114.40	123.95	118.43	118.75	106.28	144.97	442.99	970.32	1189.58	0.00
5	135.61	67.95	10603.38	-0.11	0.35	135.02	112.78	117.85	120.97	104.54	157.12	485.38	979.43	1217.25	0.00
6	135.12	63.69	10665.13	-0.19	0.85	133.26	130.93	123.70	125.83	104.54	159.27	490.38	963.64	1179.17	0.00
7	138.32	67.09	10803.75	-0.27	2.02	139.94	137.27	144.28	145.71	101.84	193.63	692.39	979.74	1389.68	0.00
8	137.87	67.08	10924.88	-0.23	0.44	129.34	146.18	144.44	146.03	101.94	191.59	669.22	977.67	1365.89	0.00
9	138.36	66.58	10877.38	0.01	0.41	130.43	137.35	146.09	149.00	101.14	151.54	458.64	935.83	1164.07	0.00
10	138.10	66.57	10789.75	-0.21	0.69	130.99	137.50	146.05	149.36	101.04	151.49	459.38	934.89	1163.98	0.00

Cust Spec :MAN. Data Sheet

LQK #:001

TEMP =-55°C DEVICE: 2N2222A

POST 240HR Electrical



Data

Device #	1.1 VCB0	2.1 VCE0	3.1 VEB0	4.1 ICB0	5.1 IEB0	6.1 hfe1	7.1 hfe2	8.1 hfe3	9.1 hfe4	10.1 hfe5	11.1 VCE(sat1)	12.1 VCE(sat2)	13.1 VBE(sat1)	14.1 VBE(sat2)	15.1 ICEX
Unit	V	V	mV	nA	nA						mV	mV	mV	mV	uA
Low limit	75.000	40.000	6000.000			100.000	35.000	50.000	75.000	40.000	0.000	0.000	600.000	0.000	
Upp limit	250.000	200.000	12000.000	10.000	10.000	300.000	500.000	500.000	500.000	500.000	300.000	1000.000	1200.000	2000.000	0.010
1	140.94	54.68	11017.75	0.21	0.09	191.05	175.76	170.94	173.35	96.29	148.11	444.53	898.37	1124.74	0.00
2	141.26	54.71	11104.75	0.31	0.40	193.84	189.59	176.96	178.18	94.16	155.39	467.75	896.29	1133.66	0.00
3	141.92	54.77	11085.13	0.32	0.10	193.62	189.68	173.30	177.05	94.60	151.28	454.87	895.27	1126.86	0.00
4	141.12	54.76	11008.25	0.33	0.14	193.01	189.39	175.66	177.49	94.68	148.52	444.62	890.85	1115.36	0.00
5	141.17	54.73	11179.25	0.33	0.12	193.30	189.49	177.07	177.99	94.51	152.31	457.41	894.72	1128.90	0.00
6	141.70	54.76	11103.38	0.35	0.04	195.42	189.51	178.24	179.43	93.13	154.86	464.77	893.88	1127.22	0.00
7	141.65	54.76	11022.50	0.34	0.41	194.60	189.83	177.03	178.35	93.47	155.44	467.80	893.26	1124.72	0.00
8	141.69	54.74	11115.75	0.38	0.01	195.58	189.46	178.18	179.72	94.16	154.58	465.55	891.84	1123.64	0.00
9	141.78	54.75	11058.00	0.33	0.18	195.38	189.44	178.25	178.91	94.16	154.48	464.05	893.60	1125.72	0.00
10	142.61	54.71	11183.63	0.37	0.22	196.27	189.67	176.97	179.05	92.13	160.21	484.21	884.89	1095.66	0.00

Cust Spec :MAN. Data Sheet

LQK #:001

TEMP =25°C

DEVICE: 2N2222A

Final Electrical



Data

Device #	1.1 VCB0	2.1 VCE0	3.1 VEB0	4.1 ICB0	5.1 IEB0	6.1 hfe1	7.1 hfe2	8.1 hfe3	9.1 hfe4	10.1 hfe5	11.1 VCE(sat1)	12.1 VCE(sat2)	13.1 VBE(sat1)	14.1 VBE(sat2)	15.1 ICEX
Unit	V	V	mV	nA	nA						mV	mV	mV	mV	uA
Low limit	75.000	40.000	6000.000			100.000	35.000	50.000	75.000	40.000	0.000	0.000	600.000	0.000	
Upp limit	250.000	200.000	12000.000	10.000	10.000	300.000	500.000	500.000	500.000	500.000	300.000	1000.000	1200.000	2000.000	0.010
1	150.18	65.98	11598.75	-13.65	0.02	229.83	295.67	246.42	243.82	69.26	183.49	550.08	798.49	1076.71	0.00
2	151.09	65.77	11635.13	-7.70	0.65	234.11	322.69	258.28	252.27	66.64	192.26	577.82	788.45	1074.05	0.00
3	151.44	62.98	11622.38	-9.18	1.71	232.17	337.79	256.70	248.78	66.64	191.21	577.80	783.81	1039.22	0.00
4	151.14	56.41	11705.00	-15.87	0.62	234.45	342.99	259.37	253.25	66.34	231.33	725.99	827.60	1227.41	0.00
5	151.02	56.27	11691.00	-1.33	0.68	234.40	345.98	259.67	253.56	66.34	231.44	726.04	827.29	1227.78	0.00
6	150.54	63.49	11660.88	0.72	2.27	231.76	339.85	254.14	248.90	69.03	186.06	558.35	795.57	1083.77	0.00
7	151.00	63.14	11647.88	-3.27	1.92	233.85	323.12	258.24	251.66	66.64	188.89	567.86	788.86	1073.07	0.00
8	151.03	62.76	11721.38	-0.82	2.07	234.09	331.84	258.72	253.17	66.64	188.28	564.58	781.76	1056.44	0.00
9	151.40	62.33	11663.00	5.84	2.10	233.91	335.21	259.02	251.76	66.64	187.41	562.24	790.40	1080.11	0.00
10	150.99	62.58	11672.25	-17.02	1.49	233.78	370.16	261.38	252.17	66.64	189.76	570.57	790.76	1083.54	0.00

Cust Spec :MAN. Data Sheet

LQK #:001

TEMP =125°C DEVICE: 2N2222A

Final Electrical



Data

Device #	1.1 VCB0	2.1 VCE0(3.1 VEB0	4.1 ICB0	5.1 IEB0	6.1 hfe1	7.1 hfe2	8.1 hfe3	9.1 hfe4	10.1 hfe4	11.1 VCE(sat1)	12.1 VCE(sat2)	13.1 VBE(sat1)	4.1 VBE(sat2)	15.1 ICEX
Unit	V	V	mV	nA	nA						mV	mV	mV	mV	uA
Low limit	75.000	40.000	6000.000			100.000	35.000	50.000	75.000	40.000	0.000	0.000	600.000	0.000	
Upp limit	250.000	200.000	12000.000	10.000	10.000	300.000	500.000	500.000	500.000	500.000	300.000	1000.000	1200.000	2000.000	0.010
1	137.91	59.07	10882.13	0.02	0.03	180.51	137.09	135.70	138.42	101.54	157.01	482.39	939.79	1142.41	0.00
2	134.94	54.42	10602.13	0.05	0.27	168.19	107.67	114.50	117.21	105.30	141.65	432.60	969.72	1177.05	0.00
3	134.78	54.43	10542.13	0.83	0.06	165.00	107.64	109.99	113.28	105.95	142.66	436.93	974.62	1181.14	0.00
4	134.50	54.41	10610.38	0.51	0.21	167.81	112.47	115.08	117.48	106.06	144.61	443.30	971.67	1185.08	0.00
5	135.96	54.47	10611.88	0.49	0.10	161.44	103.12	107.61	111.37	106.61	140.98	432.33	978.60	1185.21	0.00
6	133.88	54.45	10686.63	0.43	0.11	163.59	103.04	107.19	110.89	106.28	142.07	436.04	978.66	1185.89	0.00
7	135.50	54.43	10509.75	1.01	0.37	161.43	103.12	107.60	111.37	107.06	136.36	417.12	974.87	1175.70	0.00
8	134.75	54.44	10518.38	0.52	0.31	163.59	107.76	109.04	112.19	106.50	142.14	436.72	978.67	1188.45	0.00
9	135.59	54.51	10609.50	0.60	0.41	163.61	103.16	108.56	111.75	106.39	141.48	432.50	976.19	1181.86	0.00
10	135.32	54.45	10698.00	0.66	0.30	169.59	123.70	120.63	123.34	105.95	139.43	424.07	960.27	1168.14	0.00

: :MAN. Data Sheet

LQK #:001

TEMP =-55°C

DEVICE: 2N2222A

Final Electrical



Part #	2N2222A	Date	3 rd January 2023
Sample Qty	5	Bond Type	Ball
Wire Size	25μ	Wire Type	Au
Min allowable strength	2.5gm	BPR	0039
Customer	Sierra	Customer PO- SO	PO3802_20367
Batch #	LQK0001	Equipment	XYZTEC

SN: 21			SN: 20			SN: 19			SN:18			SN:17					
#	F	C	#	F	C	#	F	C	#	F	C	#	F	C	#	F	C
1	4.31	8	3	4.09	8	5	4.61	8	7	7.01	8	9	5.81	8			
2	8.76	8	4	5.71	8	6	5.94	8	8	4.56	8	10	4.78	8			

F=Pull Strength in gms C=Failure Code

CODES

1. No Wire Break
2. Bond lift from Die
3. Bond lift from Post
4. Wire breaks at Heal
5. Die Metallisation delaminates
6. No Connection
7. Wire Breaks from Die
8. Bond Breaks at span



SEM Analysis Report

Part Number: 2N2222A

Doc Ref: L.1690
Status: Issue 1
Date: 16 Jan 2024
Originator: Nathan Waterhouse
Page: 1 of 13
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SEM ANALYSIS REPORT

Report No: L.1918

**Part Number: 2N2222A
Diffusion Run: 8AHP-1047 W-2
Customer: Die Devices**

Report Prepared by:

SPUR ELECTRON Ltd. - LABORATORY SERVICES

DISCLAIMER

The Information contained herein is presented for guidance of both the procuring agency and the final end product user. It may be altered, revised or rescinded due to subsequent developments or additional test results. Notification of any such changes will be at the discretion of Spur Electron's primary customer. Notice is therefore given that this document should be used in an advisory nature only and that neither Spur Electron nor any person acting on behalf of Spur Electron will assume any liability resulting from the use of the information contained herein. All measuring equipment used is calibrated and traceable to National Standards.




SEM Analysis Report

Part Number: 2N2222A

CUSTOMER	Die Devices	PART DESCRIPTION	Die	PO NUMBER	SP492
DIFFUSION RUN	8AHP-1047 W-2	PART NO.	2N2222A	LOT NUMBER	-
PROCUREMENT SPECIFICATION		MIL-STD-883		MANUFACTURER	Microchip Technology
GRN NO.	A001734-001A	SERIAL NO.	1-4	DATE CODE	0 / 24

ITEM	SPECIFICATION/ METHOD/ CONDITION	CONCLUSION
EXTERNAL OPTICAL	Standard Laboratory Procedures	Satisfactory
MECHANICAL	N/A	N/A
FINE LEAK	N/A	N/A
GROSS LEAK	N/A	N/A
PIND	N/A	N/A
RADIOGRAPHIC	N/A	N/A
MARKING PERMANENCE	N/A	N/A
SOLDERABILITY	N/A	N/A
TERMINAL STRENGTH	N/A	N/A
INTERNAL VISUAL	N/A	N/A
SEM A	MIL-STD-883L Method 2018.6	Satisfactory
WIRE BOND STRENGTH	N/A	N/A
SEM B	MIL-STD-883L Method 2018.6	Satisfactory
DIE SHEAR STRENGTH	N/A	N/A
MISCELLANEOUS	N/A	N/A

COMMENTS	Die received unserialised. Serial numbers allocated by Spur Electron.
CONCLUSION	No batch related faults have been identified therefore results are satisfactory.

Analysed and Prepared By:	Adrian West	Signature: 	Date & QC Stamp:	16/01/2024	N/A
Approved By:	Nathan Waterhouse	Signature: 	Date & QC Stamp:	16/01/2024	

Analysis

In order to generally check the condition of the die on delivery, visual inspection was performed using normal optical microscopy methods. All die inspected were satisfactory. Plates 1 – 4 are representative of die condition.

Samples were then prepared with a silver sputter coating and mounted onto an inspection stub using conductive adhesive ready for SEM analysis. The viewing angle used was 45° for overall images and 60° degrees for all detailed images. Magnification used is as described in each photographic plate.

A preliminary, pre glassivation removal, 100% SEM inspection was performed on all die.

After initial SEM inspection, diluted nitric acid was used to remove the silver sputter coat and glassivation was removed using plasma etch/wet etch method. The sample was again silver coated and 100% SEM inspection was performed in accordance with MIL-STD-883L Method 2018.6.

The table below describes all inspection criteria and summarises results obtained.

SEM Inspection Results Summary

Inspection Criteria	S/No and Results
MIL-STD-883L Method 2018.6	1-4
Oxide steps - oxide steps are defined as metallisation on all four directional edges of every type of oxide step. The metallisation shall be unacceptable if thinning and one or more damages such as voids, separations, notches, cracks, depressions, or tunnels reduce the cross sectional area of the metal at the directional edge to less than 50% of the metal cross sectional area on either side of the directional edge.	Pass
General metallisation - general metallisation is defined as metallization at all locations except at oxide steps, and shall include metallisation (stripes) in the actual contact window regions. Any metallisation pulling or lifting (lack of adhesion) shall be unacceptable.	Pass
General metallisation - any damages such as voids which reduce the cross sectional of the metallisation (stripe) by more than 50% shall be unacceptable.	Pass

The photographic plates contained within this report represent either worst case die inspected, or where die are of a similar standard, the plates are representative of general condition.

Analysis (Cont.)

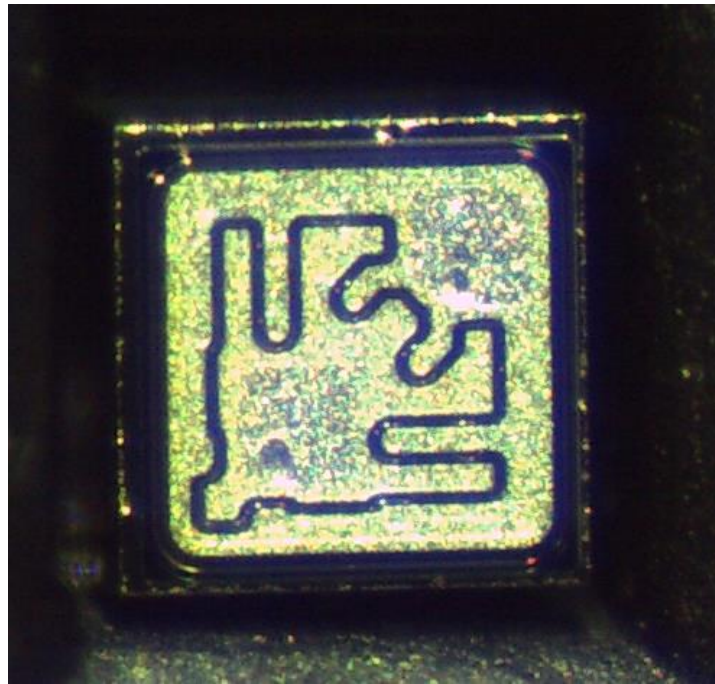


Plate	1	Initial Optical Inspection
Magnification	X64	Showing component overall
Serial No.	1	-

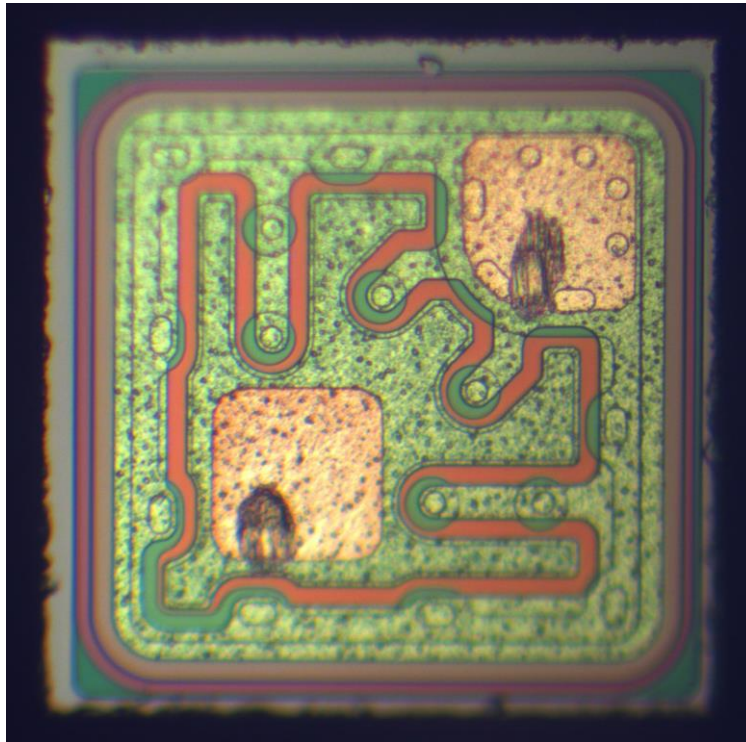


Plate	2	Initial Optical Inspection
Magnification	X200	Showing component overall
Serial No.	1	-

Analysis (Cont.)

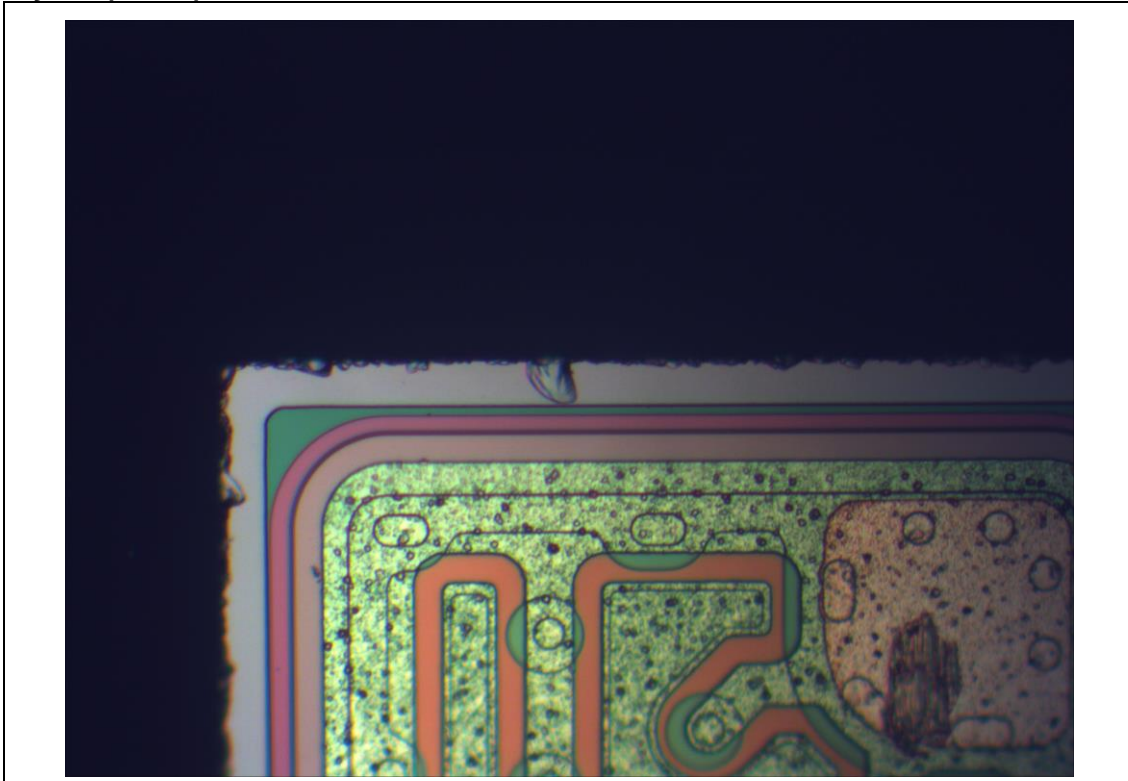


Plate	3	Visual Inspection
Magnification	X400	Showing general metallisation present on die
Serial No.	4	-

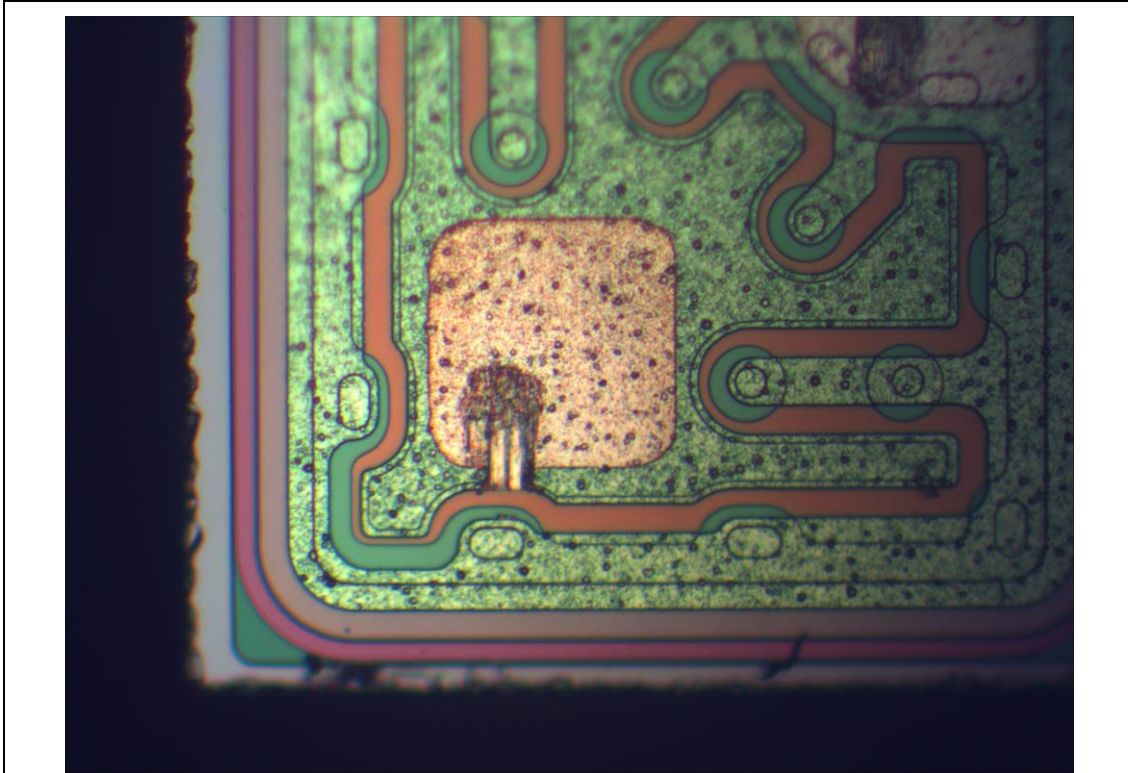


Plate	4	Visual Inspection
Magnification	X400	Showing general metallisation present on die
Serial No.	2	

Analysis (Cont.)

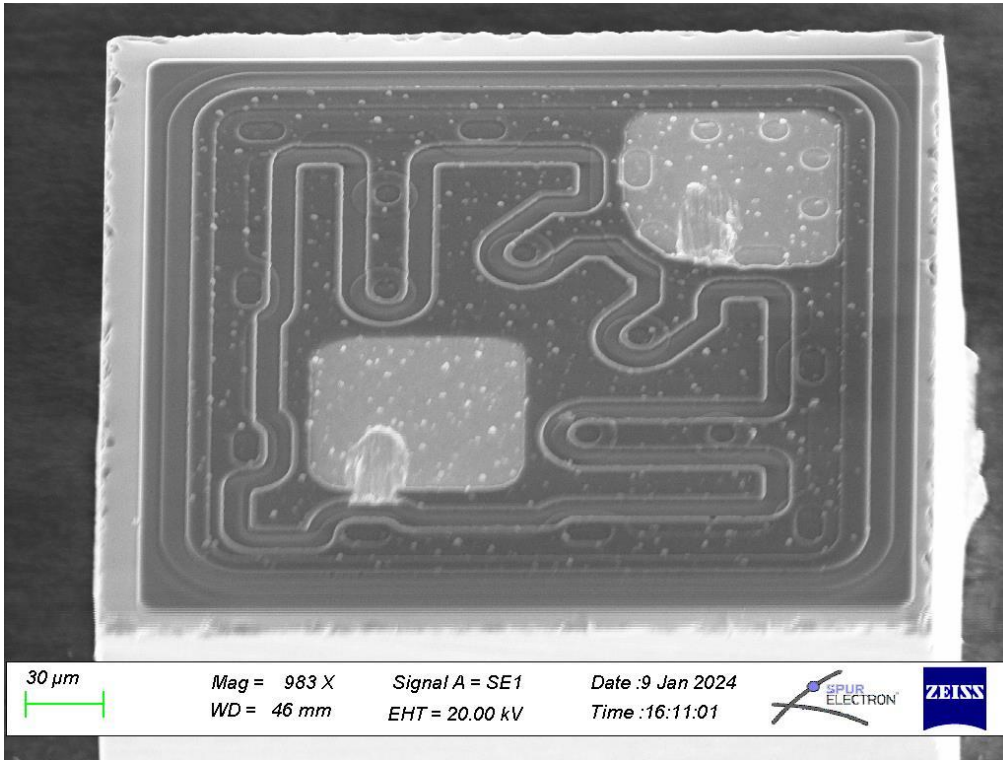


Plate	5	SEM Inspection
SEM Magnification	X983	Overall view of die
Serial No.	2	-

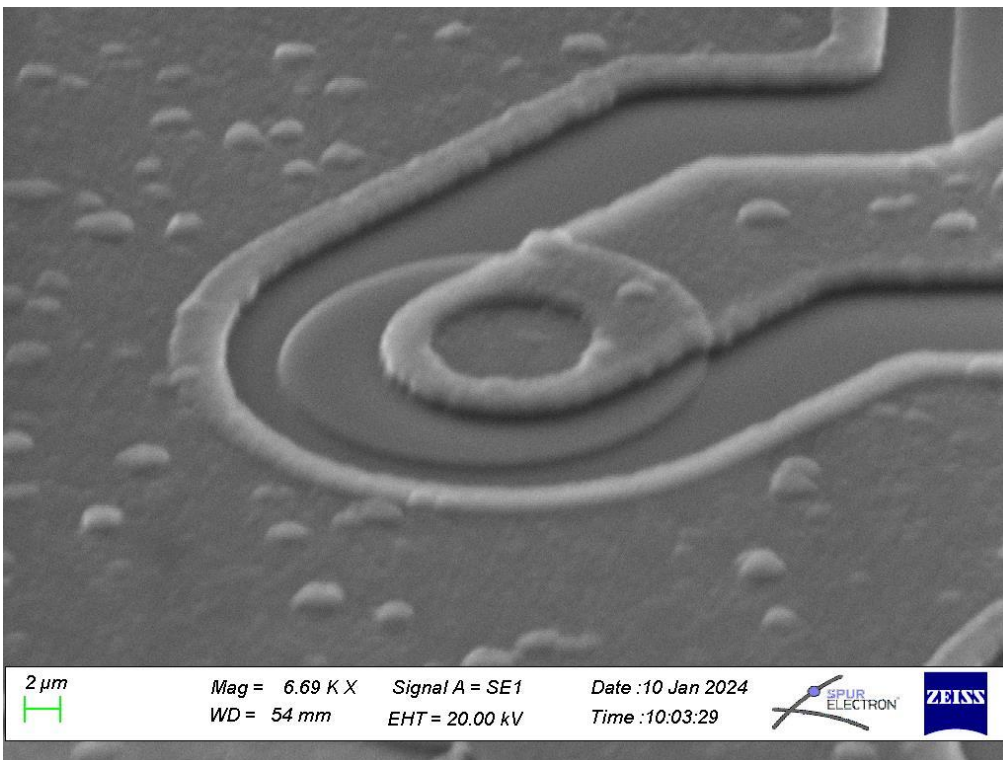


Plate	6	SEM Inspection
SEM Magnification	X6.69K	Showing detailed view of contact window
Serial No.	1	-

Analysis (Cont.)

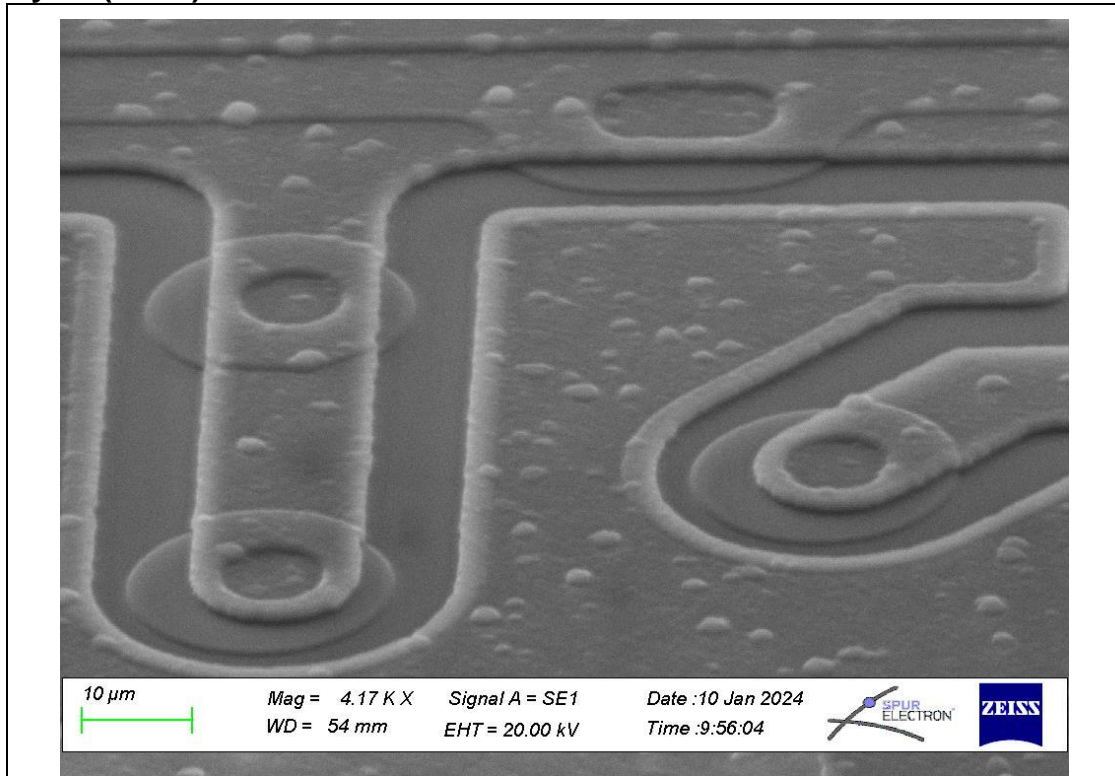


Plate	7	SEM Inspection
SEM Magnification	X4.17K	Showing detailed view of die metallisation
Serial No.	1	

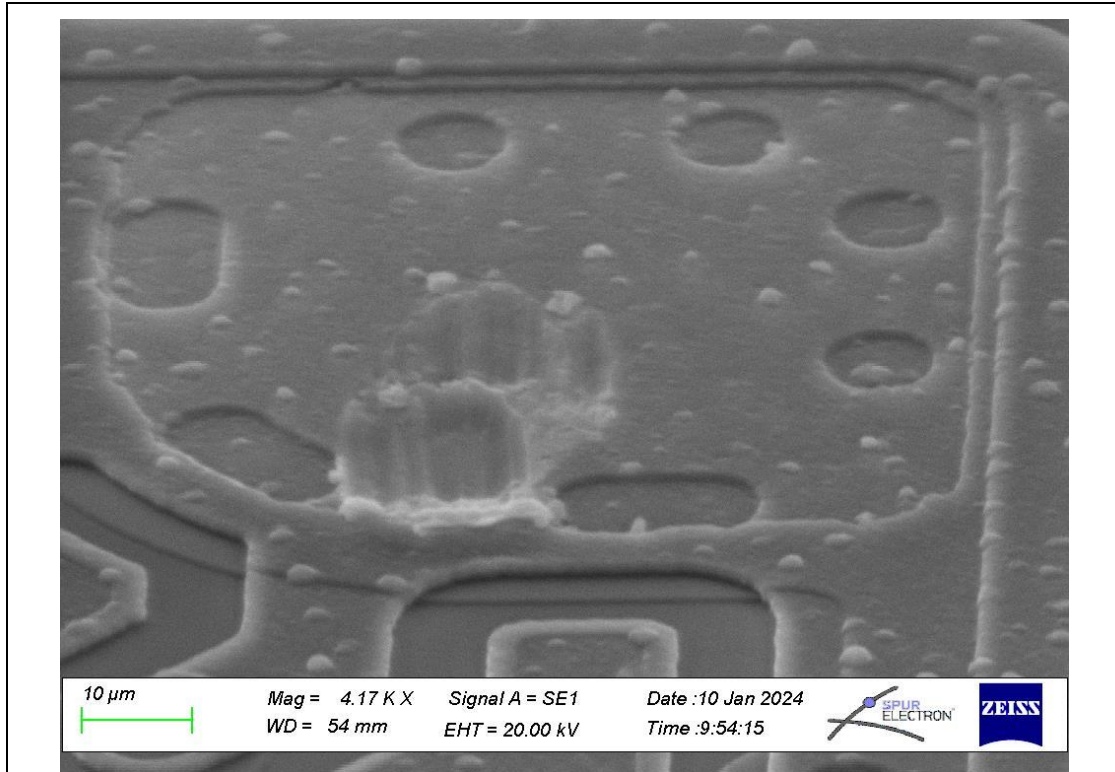


Plate	8	SEM Inspection
SEM Magnification	X4.17K	Showing detailed view of die metallisation
Serial No.	3	

Analysis (Cont.)

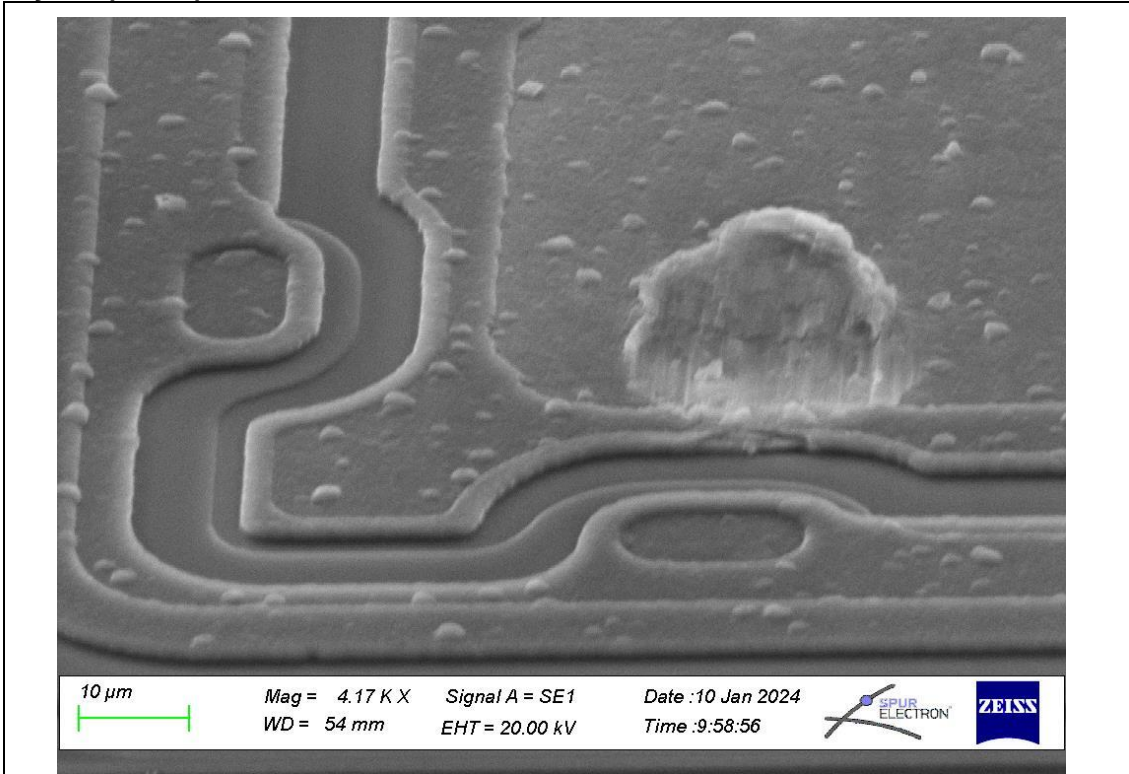


Plate	9	SEM Inspection
SEM Magnification	X4.17K	Showing detailed view of die metallisation
Serial No.	4	Pre-glassivation removal, no anomalies or batch related faults observed

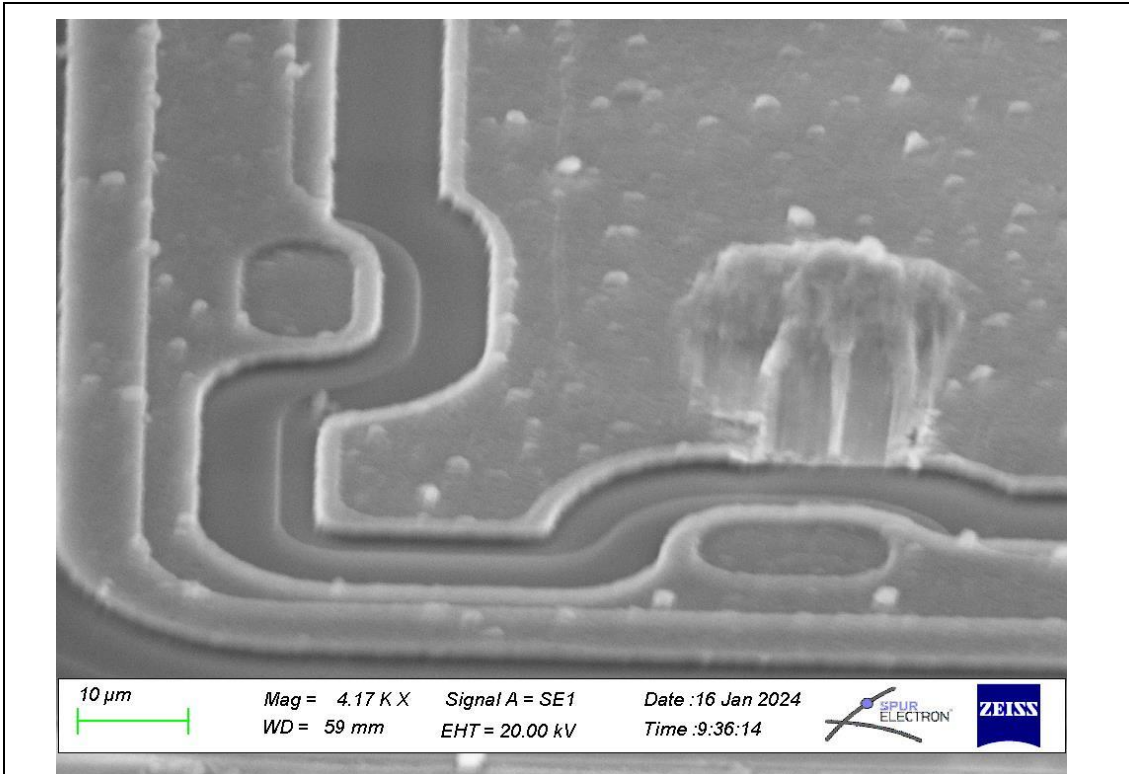


Plate	10	SEM Inspection
SEM Magnification	X4.17K	Showing detailed view of die metallisation
Serial No.	4	Post-glassivation removal, no reduction in metallisation thickness observed

Analysis (Cont.)

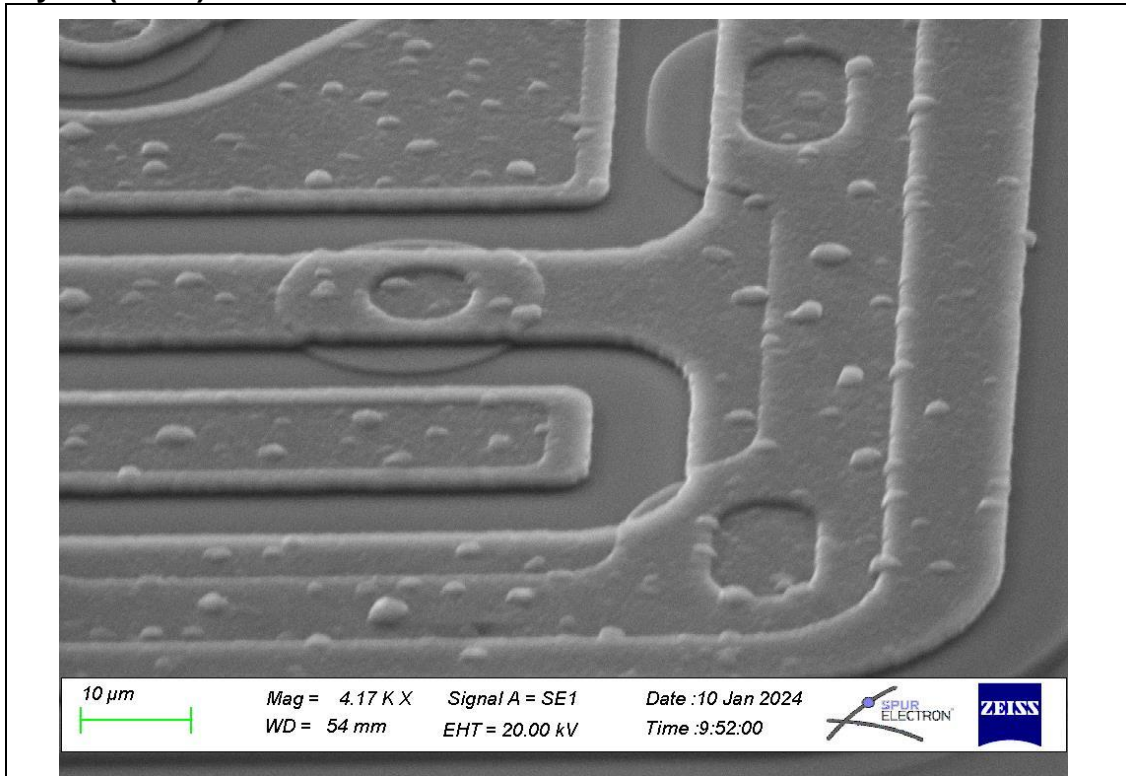


Plate	11	SEM Inspection
SEM Magnification	X4.17K	Showing detailed view of die metallisation
Serial No.	2	Pre-glassivation removal, no anomalies or batch related faults observed

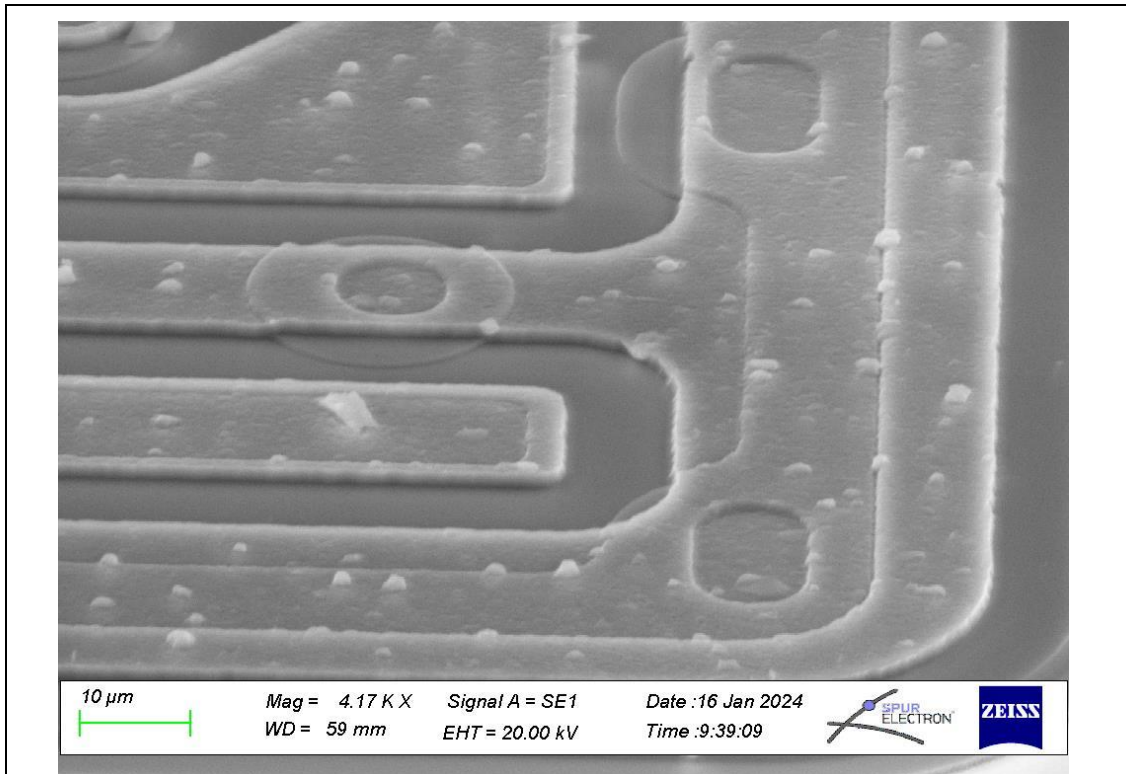


Plate	12	SEM Inspection
SEM Magnification	X4.17K	Showing detailed view of die metallisation
Serial No.	2	Post-glassivation removal, no reduction in metallisation thickness observed

Analysis (Cont.)



Plate	13	SEM Inspection
SEM Magnification	X9.65K	Showing detailed view of contact window
Serial No.	1	Pre-glassivation removal, no anomalies or batch related faults observed

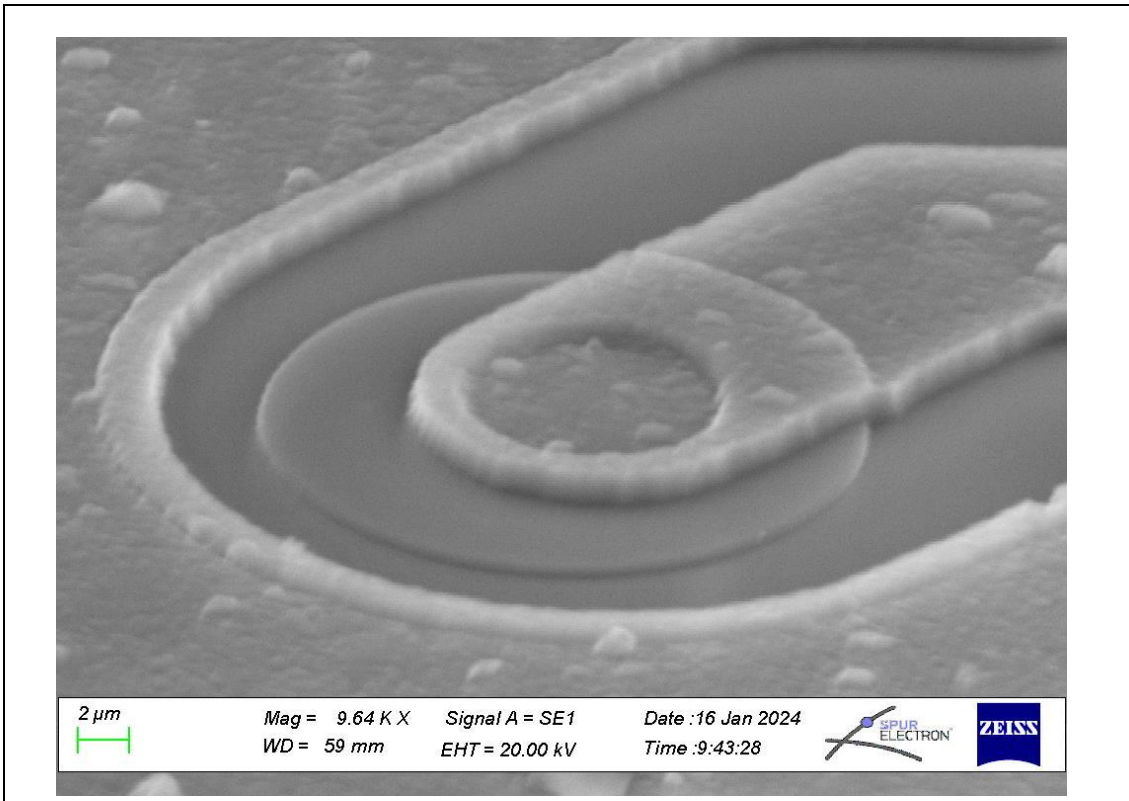


Plate	14	SEM Inspection
SEM Magnification	X9.64K	Showing detailed view of contact window
Serial No.	1	Post-glassivation removal, no reduction in metallisation thickness observed

Analysis (Cont.)



Plate	15	SEM Inspection
SEM Magnification	X10.17K	Showing detailed view of contact window
Serial No.	4	Pre-glassivation removal, no anomalies or batch related faults observed

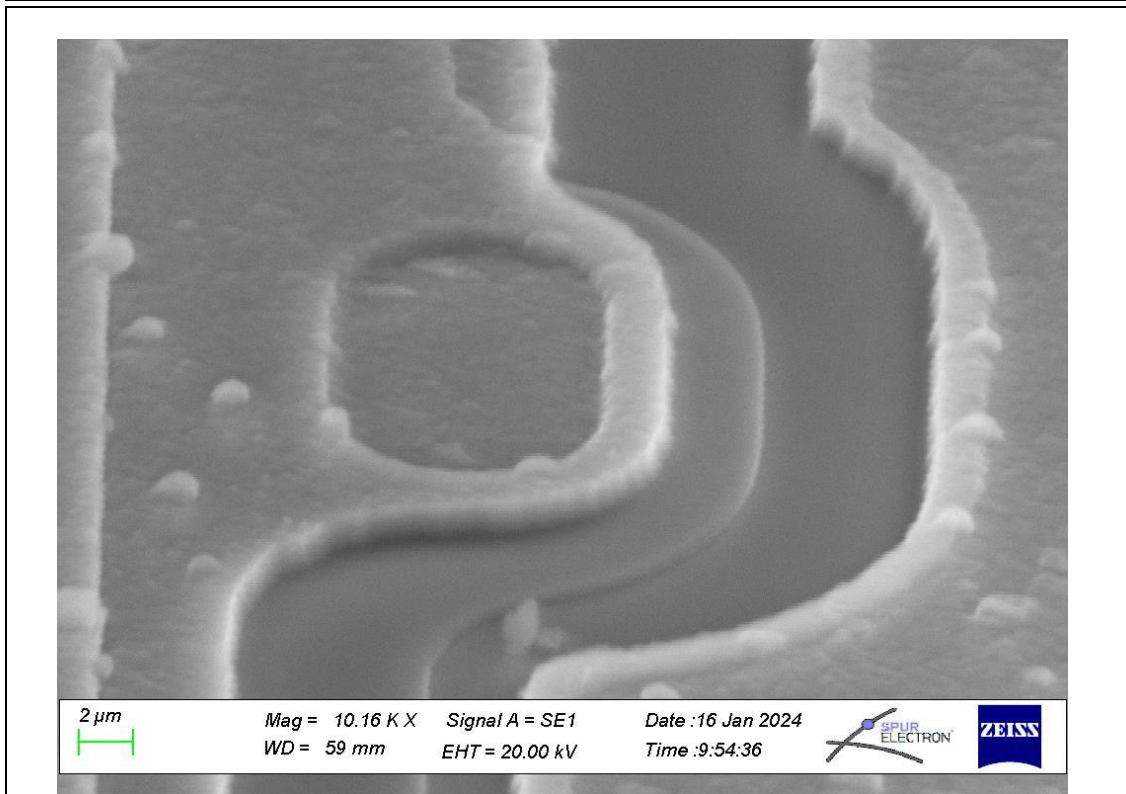


Plate	16	SEM Inspection
SEM Magnification	X10.16K	Showing detailed view of contact window
Serial No.	4	Post-glassivation removal, no reduction in metallisation thickness observed

Analysis (Cont.)

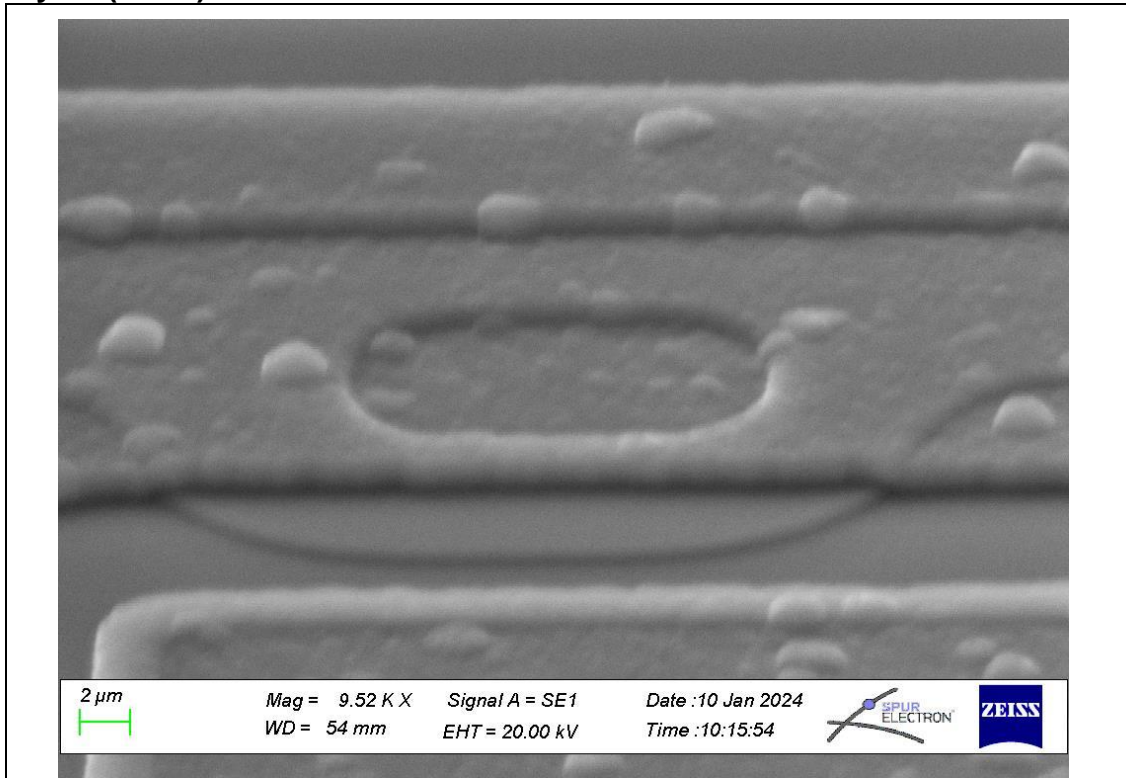


Plate	17	SEM Inspection
SEM Magnification	X9.52K	Showing detailed view of metallisation step and contact window
Serial No.	3	Pre-glassivation removal, no anomalies or batch related faults observed

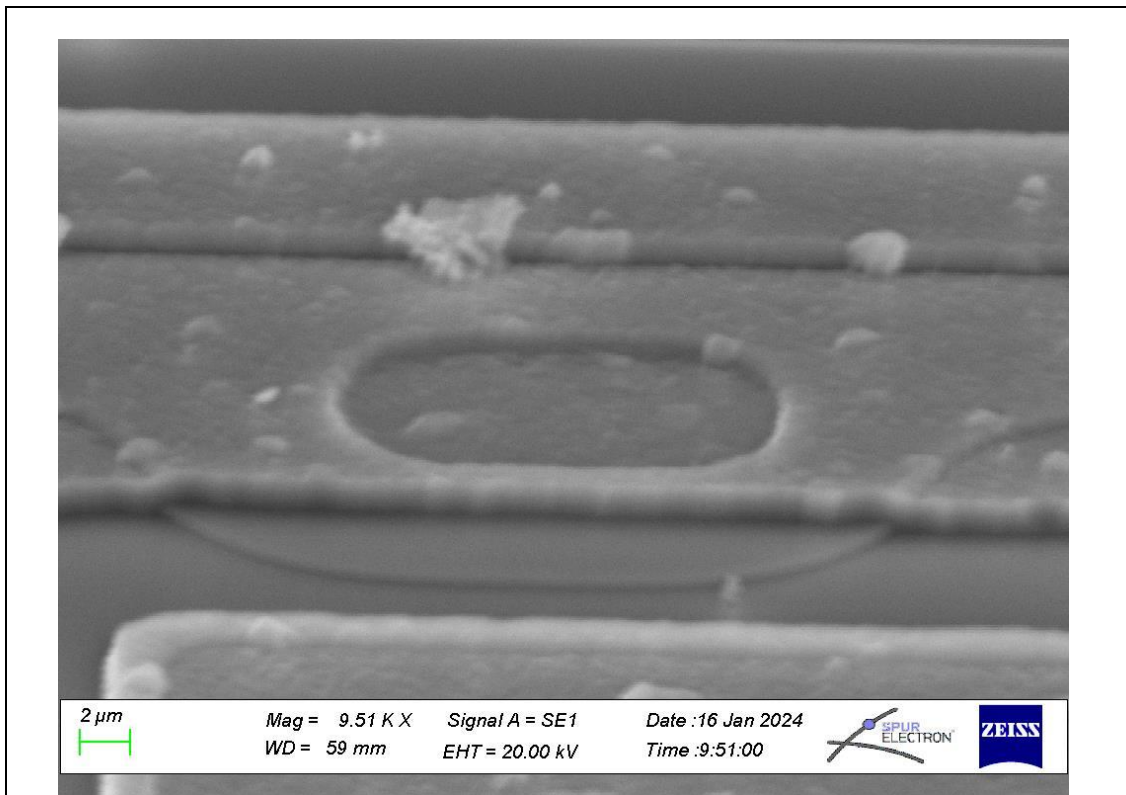


Plate	18	SEM Inspection
SEM Magnification	X9.51K	Showing detailed view of metallisation step and contact window
Serial No.	3	Post-glassivation removal, no reduction in metallisation thickness observed

Analysis (Cont.)

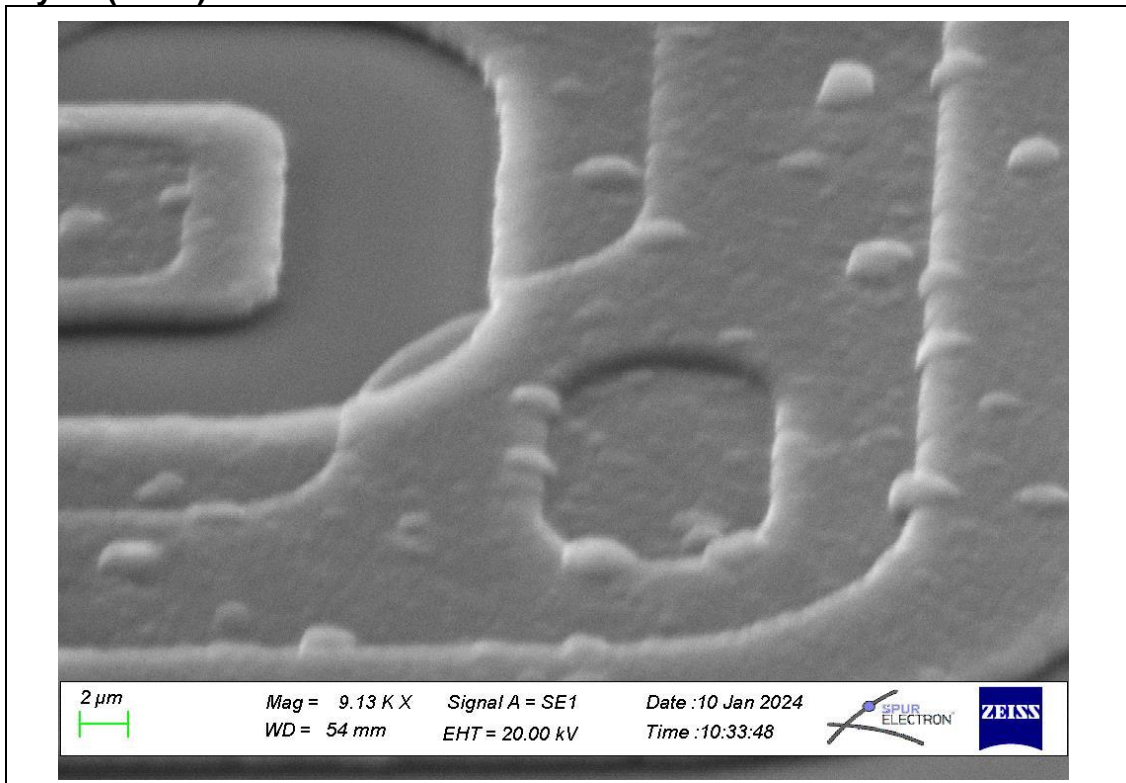


Plate	19	SEM Inspection
SEM Magnification	X9.13K	Showing detailed view of contact window
Serial No.	1	Pre-glassivation removal, no anomalies or batch related faults observed

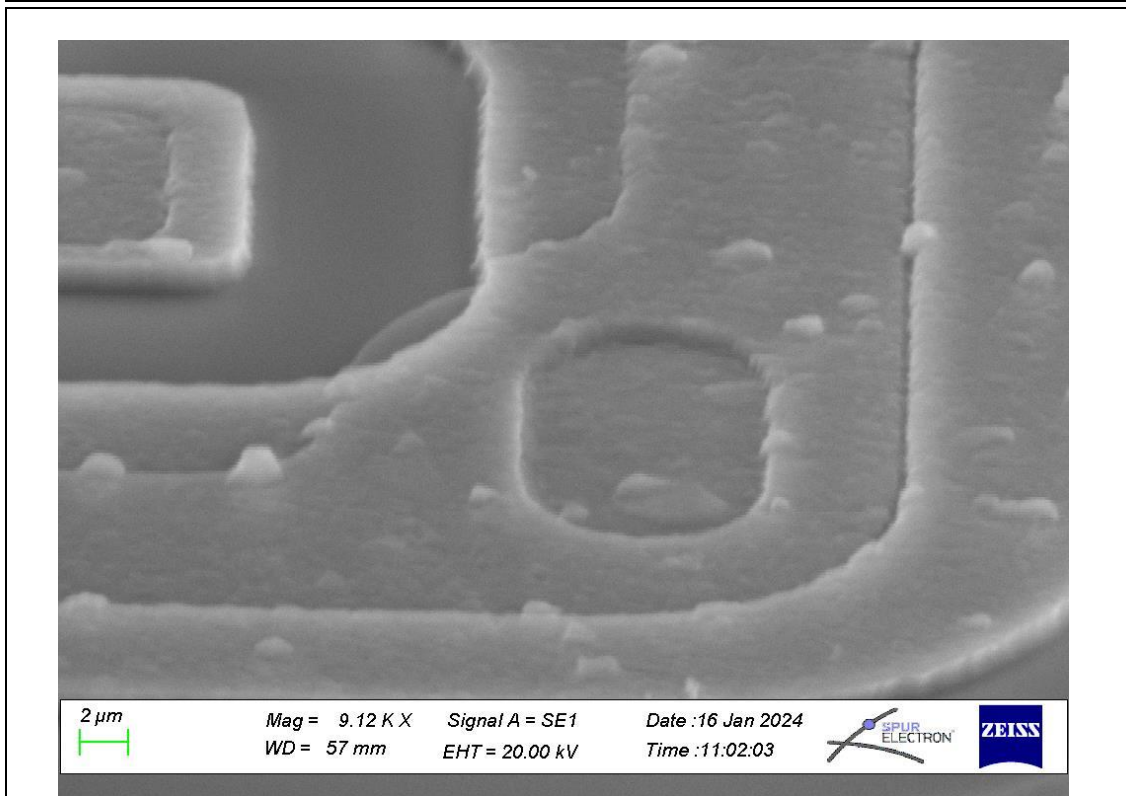


Plate	20	SEM Inspection
SEM Magnification	X9.12K	Showing detailed view of contact window
Serial No.	1	Post-glassivation removal, no reduction in metallisation thickness observed