

Product / Process Change Notice

PCN No.: QA00-202510-001

Date: 2025-10-27

Change Title: <u>SOG R7 second source SX945K (Vender: PiBond)</u> Change Classification: Major Change item: Raw Material (Dielectric material change)			
Affected Product(s) : The affected product list as attached file.			
Description of Change(s) : CVD film dielectric SOG type# R7 (Vender: Resonac) change to SOG type# SX945K (Vender: PiBond)			
Reason for Change(s) : Vender Resonac inform SOG type# R7 will be discontinued in March 2026.			
Impact of Change(s) : (positive & negative) Form: No Change. Fit: No Change. Function: No Change. Reliability: No Change. HSF (Hazardous Substances Free): No Change.			
Qualification Plan/ Results : 1. WAT (Wafer Acceptance Test): Via RC all normal control. 2. CP (Chip Probe): PIBOND SX945K yield compared to Resonac R7 within -1.2% to +3.43%, normal. 3. EM (electromigration): reliability pass. (Please refer the Appendix A for detail data.)			
Implementation Plan : This PCN is the formal announcement of this change in process. And the original vender Resonac's SOG type# R7 will be stopped supplying in March 2026. ☐ Date Code: ☐ Lot No.: ☒ Implemented date: March 2026			
Originator:	H.Y. Lai / QA10	Approval:(QA Director)	A.Yoshida / QA00
Contact for Questions & Concerns	Name: <u>HYLai</u> TEL: <u>886-3-5770066 (ext. 21226)</u> Address: <u>No.4, Creation Rd. III Science-Based Industrial Park Hsinchu, Taiwan, R.O.C..</u> E-mail: <u>hylai0@nuvoton.com.</u>		

Customer Comments:

*Note: Please sign this notice, and return to **Nuvoton** contact within **30** days. If no response is received within **30** days, this Change Request will be assumed to meet your approval.*

☐ Approved ☐ Rejected ☐ Conditional Approval: _____.

Date: _____ Dept. name: _____ Person in charge: _____.

Appendix A: WAT and CP verification, and EM qualification

AI-Via AOI/WAT/CP table

	lot	WAT	CP
Normal	21	21	21
Abnormal	0	0	0
Total	21	21	21

lot	Route	Split condition	Split Wafer #	Standard Wafer #	AOI	WAT			CP		
						R7	SX945K	Difference	R7	SX945K	Difference
2412905C	P0419I	IMD1	#10~14	Long-term	Normal	0.448	0.418	Normal < 1 σ	93.488	92.497	Yield lose < 3%
2412905C	P0419I	IMD2	#10~14	Long-term	Normal	0.423	0.373	Normal < 1 σ	93.488	92.497	Yield lose < 3%
24482270	A0566I	IMD1	#9~16	#1~8,17~25	Normal	0.326	0.315	Normal < 1 σ	98.709	98.601	Yield lose < 3%
24482360	C056GI	IMD1	#9~16	#1~8,17~25	Normal	0.305	0.298	Normal < 1 σ	95.618	95.444	Yield lose < 3%
24482390	C056GI	IMD1	#9~16	#1~8,17~25	Normal	0.316	0.303	Normal < 1 σ	95.115	95.489	Yield lose < 3%
24482420	C056GI	IMD1	#9~16	#1~8,17~25	Normal	0.34	0.33	Normal < 1 σ	95.786	95.408	Yield lose < 3%
24490070	A061TI	IMD1	#9~16	#1~8,17~25	Normal	0.499	0.496	Normal < 1 σ	98.964	99.031	Yield lose < 3%
24490070	A061TI	IMD2	#9~16	#1~8,17~25	Normal	0.482	0.446	Normal < 1 σ	98.964	99.031	Yield lose < 3%
24490270	A061TI	IMD1	#9~16	#1~8,17~25	Normal	0.521	0.516	Normal < 1 σ	98.905	99.107	Yield lose < 3%
24490270	A061TI	IMD2	#9~16	#1~8,17~25	Normal	0.434	0.413	Normal < 1 σ	98.905	99.107	Yield lose < 3%
24491040	C0355I	IMD2	#9~16	#1~8,17~25	Normal	0.403	0.355	Normal < 1 σ	82.723	83.656	Yield lose < 3%
24513840	G0414I	IMD2	#9~16	#1~8,17~25	Normal	0.449	0.404	Normal < 1 σ	95.142	95.453	Yield lose < 3%
25071230	A0412I	IMD2	#9~16	#1~8,17~25	Normal	0.464	0.427	Normal < 1 σ	97.668	97.529	Yield lose < 3%
25071360	L041SI	IMD1	#9~16	#1~8,17~25	Normal	0.445	0.412	Normal < 1 σ	96.535	96.645	Yield lose < 3%
25080720	D0463I	IMD1	#9~16	#1~8,17~25	Normal	0.431	0.389	Normal < 1 σ	99.892	99.882	Yield lose < 3%
25090470	L0517I	IMD2	#9~16	#1~8,17~25	Normal	0.547	0.509	Normal < 1 σ	96.138	96.031	Yield lose < 3%
25094550	A061TI	IMD1	#9~16	#1~8,17~25	Normal	0.523	0.506	Normal < 1 σ	96.717	97.445	Yield lose < 3%
25095370	C051MI	IMD2	#9~16	#1~8,17~25	Normal	0.546	0.48	Normal < 1 σ	99.178	99.057	Yield lose < 3%
25102280	G061AI	IMD1	#9~16	#1~8,17~25	Normal	0.453	0.459	Normal < 1 σ	98.889	99.035	Yield lose < 3%
S3099590	C0456I	IMD1	#21~25	#1~2	Normal	0.323	0.32	Normal < 1 σ	91.878	93.084	Yield lose < 3%
S3099590	C0456I	IMD2	#21~25	#1~2	Normal	0.514	0.465	Normal < 1 σ	91.878	93.084	Yield lose < 3%

W-Via AOI/WAT/CP table

	lot	WAT	CP
Normal	11	11	11
Abnormal	0	0	0
Total	11	11	11

lot	Route	Split condition	Split Wafer #	Standard Wafer #	AOI	WAT			CP		
						R7	SX945K	Difference	R7	SX945K	Difference
24129070	A0319I	IMD1	#1~5	Long-term	Normal	0.983	0.939	Normal < 1 σ	92.723	92.102	Yield lose < 3%
24129070	A0319I	IMD2	#1~5	Long-term	Normal	1.167	1.494	Normal < 1 σ	92.723	92.102	Yield lose < 3%
24490950	A0319I	IMD2	#9~16	#1~8,17~25	Normal	0.884	0.872	Normal < 1 σ	91.815	92.041	Yield lose < 3%
24490960	A0319I	IMD2	#9~16	#1~8,17~25	Normal	0.901	0.912	Normal < 1 σ	91.351	92.605	Yield lose < 3%
24491640	C031RI	IMD1	#9~16	#1~8,17~25	Normal	1.021	0.97	Normal < 1 σ	98.893	98.801	Yield lose < 3%
2404100B	M0343I	IMD1	#9~16	#3~8,17~20	Normal	0.781	0.793	Normal < 1 σ	88.112	88.975	Yield lose < 3%
2422113B	M034KI	IMD1	#9~16	#3~8,17~21	Normal	1.205	1.157	Normal < 1 σ	80.585	80.934	Yield lose < 3%
25043660	M034AI	IMD1	#9~16	#1~8,17~25	Normal	1.18	1.163	Normal < 1 σ	85.857	84.655	Yield lose < 3%
25090940	C031JI	IMD2	#9~16	#1~8,17~25	Normal	0.914	0.975	Normal < 1 σ	84.746	88.179	Yield lose < 3%
25094840	C031CI	IMD2	#9~16	#1~8,17~25	Normal	0.863	0.897	Normal < 1 σ	96.457	96.478	Yield lose < 3%
25095240	C031CI	IMD1	#9~16	#1~8,17~25	Normal	1.051	1.046	Normal < 1 σ	81.569	82.197	Yield lose < 3%

Nuvoton product EM

Nuvoton product EM (electromigration) test lifetime is as below :

(1) Metal2 : 6.46E+03hrs

(2) Metal3 : 7.22E+02hrs

(3) Via2 : 1.47E+03hrs

(4) Via3 : 1.33E+03hrs

The test result is pass (Pass criteria is > 100Khrs)

Summary							
Product No	Lot No	Layer	Dimension (um)	Stress Current (mA)	Stress at 235 C	Life Time at 130 C (K hrs)	Result >100K hrs => PASS <100K hrs => FAIL
					Tau (0.1%)		
NTC product	24129070#05	M2	T=0.45 W=0.6	5.4	138.349 hrs	6.46E+03	PASS
NTC product	24129070#05	M3	T=3.0 W=2.6	78	247.362 hrs	7.22E+02	PASS
NTC product	24129070#01	V2	(0.5/2)*(0.5/2)*3.14	1.96	126.135 hrs	1.47E+03	PASS
NTC product	24129070#01	V3	(0.5/2)*(0.5/2)*3.14	1.96	113.838 hrs	1.33E+03	PASS