APPLICATION FOR EXTENSION OF ESCC TECHNOLOGY FLOW APPROVAL

Page 1

Component Title: **Thin Film Technology for Chip, Wraparound, Single and Network Resistors, Fixed**

Appl. No. **287J**

Executive Member: **CNES** Date: **07/03/2025**

1 Technology Flow submitted for Extension of Qualification Approval:

SUMMARY DESCRIPTION	TEST STRUCTURES	COMPONENTS PROPOSED FOR QUALIFICATION
P : Single resistor 0402, 0603, 0805, 1206, 2010 chip PRA : 2 to 8 resistors of similar value, based on 0603 (PRA 100), 0805 (PRA135) or 1206 (PRA182) units CNW : 2 to 8 resistors with at least two different values with the same form factor as PRA Substrate : Alumina Resistive layer : Nickel Chromium Protection : Silicium nitride Termination : Nickel Barrier Processes : Thin Film deposition Finish : SnPbAg or Au	P0402, P0603, P0805, P1206 and P2010 with min., critical resistance and max. values, PRA100, PRA135, PRA182 with min., critical resistance and max. values.	By form factor : ESCC4001023 var. 15 and 13, 14(*) ESCC4001023 var. 01, 05 (*) and 09 ESCC4001023 var. 02, 06 (*) and 10 ESCC4001023 var. 03, 07 (*) and 11 ESCC4001023 var. 04, 08 (*) and 12 ESCC4001025 var. 01 to 07, 22 to 28 ESCC4001025 var. 08 to 14, 29 to 35 ESCC4001025 var. 15 to 21, 36 to 42 (*) Note that gold finish variants are not intended for de-golding and tinning

2 Component Manufacturer

VISHAY SA
Division Résistances de Très Haute Précision

3 Location of Manufacturing Plant(s)

Nice (France)

4 Date of original qualification approval:

Date: **15/02/2009**

Certificate Ref No. **287**

5 ESCC Specifications used for Maintenance testing:

Generic: 4001 Issue: 5

Detail(s): 4001/023 Issue: 12

4001/025 Issue: 8

6 Deviations to LVT testing and Detail Specification used:

No ☐ Yes ☒ (supply details in Box 15)

Deviation from current Specifications:

No ☒ Yes ☐ (Supply details)

7 Qualification Extension Report reference and date:

QML Quality Synthesis reports :

QML Synthesis 2024, 09/01/2025
QML Synthesis 2023 complet, 19/01/2024

8 Summary of procurement or equivalent test results during current validity period in support of this application (those to ESCC listed first)

Customer	Component	LVT	Date code	Quantity Delivered
TAS AVNET ALTER ECOMAL TTI …	PHR			2023 : 115 226 2024 : 205 596
TTI TAS ALTER	PRA / CNW			2023 : 2459 2024 : 1385
AVNET ECOMAL TTI Charcorft Electronics Limited	PFRR			2023 : 13 166 2024 : 20 709

9 **PID** changes since last maintenance of qualification

None ☐

Minor* ☒

Major* ☐ *Provide details in box:

19

10 Current **PID** Verified by: **CNES**

Name of Excutive Representative

Ref No: **PID-TFD P PRA CNW**

Issue: **15** Date: **15/10/2024**

Rev.:

Date: **15/10/2024**

11 Current Manufacturing facilities surveyed by: **CNES** on **16/02/2023**

(Name of Executive Representative) (Date)

Satisfactory: Yes ☐ No ☐ Explain

Report Reference: 2023.0003306-CR-Fontaine-Visite -Vishay-Fevrier-2023

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Failure Analysis, DPA, NCCS available: Yes ☐ No ☒ (Supply data)

Ref. No's and purposes:

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The undersigned hereby certifies on behalf of the ESCC Executive - that the above information is correct; - that the appropriate documentation has been evaluated; - that full compliance to all ESCC requirements is evidence (except as stated in box 15;) - that the reports and data are available at the ESCC Executive and therefore applies on behalf of CNES as the responsible Executive Member for ESCC qualification status to be extended to the component(s) listed herein.

Date: **07/03/2025**

L. FONTAINE, CNES

(Signature of the Executive Coordinator)

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Continuation of Boxes above:

Box 6: Periodic Testing is defined in paragraph 6 of the Technology Flow PID (See page 3)

Fontaine Lya

Signature numérique de Fontaine Lya
Date : 2025.03.07 16:30:26 +01'00'

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Non compliance to ESCC requirements:

No.:	Specification	Paragraph	Non compliance
1	**4001**	**Chart F4**	**Chart F4 testing replaced with the implementation of periodic testing as described in PID paragraph 6.3**

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Additional tasks required to achieve full compliance for ESCC qualification or rationale for acceptability of noncompliance:

None

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Executive Manager Disposition

Application Approval: Yes ☒ No ☐

Action / Remarks:

Date:

Ali Zadeh Digitally signed by Ali Zadeh Date: 2025.03.20 14:23:32 +01'00'

A. Zadeh: Head of the Avionics & EEE Division, Electrical Department

ANNEX 1: LIST OF TESTS DONE TO SUPPORT EXTENSION OF QUALIFICATION 18

Tests conducted in compliance with:

- ESCC 4001 generic specification; Chart F4 (for ESCC/QPL parts);
- or PID-TFD **P PRA CNW Issue 12** (for ESCC/QML parts)

Tests vehicle identification/description:

PHR 0603 : DC 2109 / 2235 / 2309 / 2326 / 2403 PHR 0805 : DC 2213 / 2221 / 2245 / 2309 / 2402 PHR 1206 : DC 2444 / 2309 / 2319 / 2341 PHR 0402 : DC 2315 / 2346 / 2401 PHR 2010 : DC 2345	
PRAHR : DC 2340 / 2329	

Detail Specification reference: **4001/023 & 4001/025**

Extracted from 2023 & 2024 QML Synthesis

Chart F4	Test	Tick when done	Conditions	Date Code	Tested Qty	N° of Rejects	Comments if not performed. Comments on Rejection
Environmental /Mechanical Subgroup (1)	Mounting	☒	IEC 60115-1 clause 4.31	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2340 2329 2346 2341 2345 2401 2403 2402	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0	
	Rapid Change Of Temperature	☒	IEC 60068-2-14	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2340 2329 2346 2341 2345 2401 2403 2402	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0	
	Vibration	☐	IEC 60068-2-6				NA

	Climatic test Sequence	☒	ESCC 4001, Para 8.10	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2346 2341 2345 2401 2403 2402	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0	
	Seal Test	☐	IEC 60068-2-17				NA
Environmental /Mechanical Subgroup (2)	Mounting	☒	IEC 60115-1 clause 4.31	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2346 2341 2345 2401 2403 2402	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0	
	Robustness of Terminations	☒	IEC 60068-2-21	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2346 2341 2345 2401 2403 2402	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0	Adhesion followed with Substrate bending
	Climatic test Sequence	☒	ESCC 4001, Para 8.10	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2346 2341 2345 2401 2403 2402	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0	
	Seal Test	☐	IEC 60068-2-17				NA

Environmental /Mechanical Subgroup (3)	Resistance to Soldering Heat	☒	IEC 60068-2-20	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2340 2329 2346 2341 2345 2401 2403 2402	2 2 2 2 2 2 2 2 2 2 2 5 5 2 2 2 2 2 2	0	
	Mounting	☐	IEC 60115-1 clause 4.31	2109 2213 2221	2 2 2		
	Climatic test Sequence	☒	ESCC 4001, Para 8.10	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2346 2341 2345 2401 2403 2402	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	0	
	Seal Test	☐	IEC 60068-2-17				NA
Environmental /Mechanical Subgroup (4)	Mounting	☐	IEC 60115-1 clause 4.31	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319	5 5 5 5 5 5 5 5 5 5 5		
	Insulation Resistance	☒	ESCC 4001, Para 8.3.1.2	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2340 2329 2346 2341 2345 2401 2403 2402	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0	

	Voltage Proof	☒	ESCC 4001, Para 8.3.1.3	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2346 2341 2345 2401 2403 2402	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	0	
Endurance Subgroup	Mounting	☒	IEC 60115-1 clause 4.31	2109 2213 2221	5 5 5	0	(*) performed after Solderability / Permanence of Marking Sequence
	Operating Life	☒	ESCC 4001, Para 8.13	2221 2340 2329	5 10 10	0	PRAHR135 CNWHR2195 PHR Low Ohmic value PRAHR100 PRAHR135 PRAHR182
	Seal Test	☐	IEC 60068-2-17				NA
Assembly Capability Subgroup	Solderability	☒	IEC 60068-2-20	2109 2213 2221 2235 2245 2244 2309 2309 2315 2326 2319 2340 2329 2346 2341 2345 2401 2403 2402	2 2 2 2 2 2 2 2 2 2 2 5 5 2 2 2 2 2 2	0	
	Permanence of marking	☒	ESCC 24800	2340 2329	5 5	0	PRA / CNW
Failure Rate Endurance Subgroup	Operating Life	☒	ESCC 4001, Para 8.13	2221	5		2 000H 4 000H 6 000H 8 000H – 2000H 4000H 6000H 8000H
	Seal Test	☐	IEC 60068-2-17				NA
Additional Tests	High & Low Temp (Temperature Coefficient)	☒	ESCC 4001			0	(*) performed before Rapid Change of Temperature
		☐					
		☐					

NOTES ON THE COMPLETION OF THE APPLICATION FORM FOR ESCC QUALIFICATION EXTENSION APPROVAL

ENTRIES

Form heading	shall indicate: - the title of the component as given in its detail specification or the name of the series, family; - the Executive Member; - the entering date; - the certificate number and its sequential suffix.
Box 1	shall provide details given in the table; in particular there shall be listed: - the variants or range of variants; - the range of components (the ESCC code is recommended to indicate the values or values range, the tolerance, the voltage, etc); the designation given in the detail specification as 'base on'; - under Test Vehicle enter either an ESCC code or the specific characteristic capable of identifying the component tested (e.g., voltage of coil for a relay); - under component similar enter a cross if relevant.
Box 2; 3 and 4	As per QPL entry; otherwise, an explanation of the changes must be supplied.
Box 5	Will show the ESCC Generic and Detail specifications, including issue number and revision letter, current at the time the tests reported were performed. If the specifications are different from those current on the date of the application, see Box 6.
Box 6	Will show the deviations from the Generic and Detail Specifications listed in Box 5, in particular deviations from testing. In case of deviations this must be listed in Box 15. In case the referenced specification in Box 5 have currently a different issue and/or revision indicate also whether the test data deviates or not from such current documents.
Box 7	Must reference the report(s) supplied in support of the application.
Box 8	Should provide the details of procurement to the full ESCC System, documentation of all of which should already have been delivered to the ESCC Executive under the terms of the relevant Generic Specification. An appropriate table has been drawn in this box.
Box 9	If the PID evolved after the Original Qualification or after the last Extension of Qualification, adequate details of such evolution shall be provided together with the reasons for the changes. Major changes shall be clearly marked.
Box 10	Identify the current PID issue status, date and actual date of verification. The date of verification of the current PID should be arranged as close as possible to the required date of extension.
Box 11	This box can be completed only after a physical visit to the plant to confirm that no unexplained changes occurred and that the practices, procedures, material, etc. used in manufacturing the components are as described in the PID. This survey shall be carried out in accordance with the requirements of ESCC Basic Specification No. 20200 and its findings shall be recorded.
Box 12	Provide details of, or reference to, any Destructive Physical Analysis (DPA) and Failure Analysis reports as well as any Nonconformance(s) (NCCS) occurred during the qualification validity period, stating if established corrective action have produced satisfactory results.
Box 13	Enter only the name of the Executive Member (i.e., CNES, DLR, ESTEC, etc.) and the signature of the responsible Executive Coordinator.
Box 14	To be used when there is a need to expand any of the boxes from 1 through 12. Identify box affected and reference the Box 14 in the relevant Box. Box 14 can be broken into 14a, 14b, etc. if several boxes have to be expanded.
Box 15	Fill in Table as requested.
Box 16	Any additional action deemed necessary by the Executive Member to bring the submitted data to a standard likely to be accepted by the ESCC Executive should be listed herein or the reason(s) to accept the noncompliance.
Box 17	All Executive Manager recommendations on the application itself, special conditions or restrictions, modifications of the QPL or QML entry, letters to the manufacturer, etc. shall be entered clearly in Box 19, signed by the representative for ESA, and dated.
Box 18	Fill in Table as requested.
Box 19	Confidential Details of PID changes including those of a confidential nature, shall be provided.
Box 20	State noncompliance with reference to specification(s) and paragraph(s). To simplify reference in Box 16 each nonconformance shall be sequentially numbered. If relevant state 'None'.
Box 21	Any additional action deemed necessary by the Executive Member to bring the submitted data to a standard likely to be accepted by the ESCC Executive should be listed herein or the reason(s) to accept the noncompliance.
Box 22	Additional Comments.