DOCUMENT CHANGE REQUEST

DCR number 478	Changes required for: Qualification	Originator: J. Wong
Date: 2009/02/12	Date sent: 2009/02/12	Organisation: ESA/ESTEC
Status: IMPLEMENTED		

Title:	ESCC Qualified Manufacturers List REP006		
Number:	REP006	Issue:	1

Other documents affected:

Page:

5.2 Vishay Sfernice France, pages 12 to 14

Paragraph:

5.2 Vishay Sfernice France, pages 12 to 14

Original wording:

Proposed wording:

As per draft Issue 2

Justification:

New qualified manufacturer listing

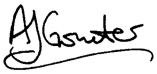
Attachments:

C166_rev1_VISHAY_Thin_Film_Technology_Flow.pdf, null

Modifications:

N/A

Approval signature:



Date signed:

2009-02-12

APPLICATION FOR ESCC TECHNOLOGY FLOW QUALIFICATION APPROVAL

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

Executive Member : **CNES** Date : **15/01/2009**

Technology Flow submitted for Qualification Approval [1]

SUMMARY DESCRIPTION	TEST STRUCTURES	COMPONENTS PROPOSED FOR QUALIFICATION
P : Single resistor 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 (**See Box 12**)	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. 01, 05 (*) ESCC4001023 var. 02, 06 (*) ESCC4001023 var. 03, 07 (*) ESCC4001023 var. 04, 08 (*) 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

Component Manufacturer [2]

VISHAY SA

Division Résistances de Très Haute Précision

Location of manufacturing plant(s) [3]

Nice (France)

ESCC specifications used for Qualification [4]

Generic : **ESCC 4001 Issue 2**

Detail/s : **ESCC 4001/023 Issue 4**
ESCC 4001/025 Issue 4

Basic/s : **ESCC 25400 Issue 2**
ESCC 2544001 Issue 1

Qualification Report Reference and date: [5]

Report ref. Mat/QML/07.02 dated 20/06/2007

Established Reliability Report ref. 0626102 dated 12/01/2008

PID used for manufacturing Qualification Lots [6]

PID includes Technology Flow and QM Plan

Ref. N°: **PID-TFD P PRA CNW**

Issue : **1**

Rev. : **0**

Date : **14/12/2006**

PID changes since start of qualification [7]

None ☐

Minor* ☐ *provide detail.

Major* ☒ **See Box 12**

Current **PID** Verified by **CNES** [8]

Ref. No. : **PID-TFD P PRA CNW** (Name **Executive** responsible)

Issue : **1**

Rev. : **2** Date **20.06.2007**

Date : **20/06/07**

Current Manufacturing facilities surveyed by : [9]

ESA & CNES on **13th and 14th of February 2007**

(Name **EXECUTIVE** responsible) (Date)

Satisfactory : Yes ☐ No ☒ Explain **See ESA Report QCS/LB/070301 dated 20/03/2007 and Corrective Actions Status given in Appendix**

Quality and Reliability Data [10]

Evaluation testing performed Yes ☒ No ☐

Report Ref. N°: **PAG/FBE/BAR/99.068** date 30/08/1999

N°: **JA/FMA/BAR/01.121** date 12/02/2002

Equivalent data:

(provide details)

Certification:

Failure analysis, DPA, NCCS: Yes ☒ No ☐

(supply data)

Ref. N°s and purpose

Report Mat/3H/07.02 – Evaluation of Third harmonic Control rejects on VISHAY Thin Film Wraparound Technology

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The undersigned hereby certifies on behalf of the Executive -- that the above information is correct; -- that the appropriate documentation has been evaluated; -- that full compliance to all E/SCC requirement is evidence except as stated in box 13; -- that the reports and data are available at the Executive and therefore applies on behalf of **CNES** as Executive member for ESCC qualification status to be given to the component(s) listed herein.

Date: **15/01/2009**

JP.BUSSENOT
(Signature of the **Executive Representative**)

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Continuation of Boxes above:

Box 1

The Technology flow characteristics pertinent to the users information are fully described in ESCC detail specifications 4001/023 and 4001/025. Design is defined in VISHAY documents HP-BE/001 (Maitrise de la conception) and HP-BE/004 (Données technologiques, Règles d'implantation, Performances). Critical design characteristics are identified in the PID as follows :

- Minimal metal width : 10µm

- Power dissipation lower than 250 mW/mm2

- Current density lower than 7000 A/mm2

- Electrical field lower than 5V/µm

The information note on gold finish variant (P type only) has been introduced in ESCC 4001/023 Issue 4 : "Variants 05 to 08 are not suitable for solder assembly methods. They shall be assembled using glue or wire bond techniques".

Box 7

Corrections resulting from the ESCC Audit performed on the 13th and 14th of February 2007.

Box 10

Report PAG/FBE/BAR/99.068 and its Addendum 2 dated 30th of August 1999 covers full ESCC Evaluation of P chips

Report JA/FMA/Bar/01.121 and its Addendum 1 dated 12th of February 2002 covers full ESCC Evaluation of PRA and CNW surface mount resistors networks

Report MAT/3H/07.02 revision 3 dated 20th of June 2007 has been prepared to justify the deletion of Third Harmonic Control requirement from ESCC 4001/023 and 4001/025 for VISHAY thin film wraparound technology. At the same time the efficiency of the Overload test is increased with the implementation of a resistance change rejection criteria of 500 ppm. This proposal has been approved by the TRB meeting held on the 4th of April 2007.

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Non compliance to ESCC requirements:

No.	Specification	Paragraph	Non compliance
			None

14

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

None

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Executive **D**isposition:

Application Approval: Yes ☐ No ☐

Action/Remarks:

Date: _____

_____

(**EXECUTIVE** Manager Signature)

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

GENERAL

Whenever possible, all entries should be typed and in any case be suitable for legible reproduction by normal means.

ENTRIES

Form heading shall indicate:— the title of the technology Flow as given in the PID ; — the Executive member ; — the entering date; — the serial number and the suffix of the form.

Box 1 shall provide details given in table; in particular there shall be listed – the range of components by using the ESCC code for values tolerances, etc.; the designation given in detail specification as 'based on'; — under Test Vehicle enter the specific characteristic capable to identify the component tested.

Box 2 and 3 Manufacturer's name and location of plant(s) where the components were manufactured and tested.

Box 4 Generic and detail specifications used during qualification program.

Box 5 Reference to test report(s) submitted in support of application.

Box 6 Enter details to identify the PID that was applicable at the time the qualification lot was manufactured.

Box 7 If the PID was evolved after qualification lot manufacture, adequate details of such evolution shall be provided together with reasons for changes. Major changes shall be clearly marked.

Box 8 The box serves to identify the current PID and the Executive member that has verified it together with the date of this occurrence.

Box 9 This box can be completed only after a physical visit to the plant to confirm that the practices, procedures, materials, 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 10 Details entered shall be sufficient to evidence that an evaluation program according to ESCC Basic Specification No. 22600 has been performed and that the results thereof are summarized in the survey and test reports. If the evaluation program has not been carried out according to established ESCC documents, the applicant Executive member shall provide alternative data and declare its assessed degree of satisfactory compliance with the ESCC basic requirements. Reference shall be made to the reports on Destructive Physical Analysis (DPA), Failure Analysis and Non conformance (NCCS) issued during the Evaluation and/or Qualification Phase.

Box 11 Enter the name of the Executive Member (CNES, DLR, ESTEC, etc.) and the signature.

Box 12 To be used when there is a need to expand any of the boxes from 1 through 10. Identify box affected and reference the Box 12 in the relevant Box. Box 12 can be broken into 12a, 12b, etc. if several Boxes have to be expanded.

Box 13 State noncompliance with reference to specification(s) and paragraph(s). To simplify reference in Box 14 each nonconformance shall be sequentially numbered. If relevant state 'None'.

Box 14 Any additional action deemed necessary by the Executive member to bring the submitted data to a standard likely to be accepted by the ESA Executive manager should be listed herein or the reason(s) to accept the non conformance.

Box 15 All Executive recommendations on the application itself, special conditions or restrictions, modifications of the QPL entry, letters to the manufacturer, etc. shall be entered clearly in Box 15, signed by the Executive Manager, and dated with the date of the ratification by the ESA Executive Manager.

Audit Status performed with VISHAY on the 29th of April 2008

Sn	Ref.	F/O/C	Domain	Description	VISHAY comment / Status
1		C	Quality Management System	Vishay Div. Sfernice has been granted the following certifications: - ISO9001:2000 - TS16949 for 3 years - EN9100 (renewal in preparation)	
2	VI-AC/001	C	Management of Suppliers and Subcontractors	This internal specification provides a detailed description of the supplier management including the qualification criteria, the evaluation flow, the management of process changes and non-conformances.	
3	PID-TFD P PRA CNW – 14/12/06	O	Management of Suppliers and Subcontractors	No supplier list is included in the PID.	"Include the list on revision 1 of the PID. Done" *PID-TFD P PRA CNW revision 1, 18/04/2007* *Action **Closed**.*
4	PID-TFD P PRA CNW – 14/12/06	F	Management of Suppliers and Subcontractors	"Val de Loire", the subcontractor in charge of the final packing is not listed in the PID. .	"Include "Val de Loire" on revision 1 of the PID. Done" *PID-TFD P PRA CNW revision 1, 18/04/2007* *Action **Closed**.*
5	PID-TFD P PRA CNW – 14/12/06	C	Management of Suppliers and Subcontractors	Only one subcontractor is used by the Sfernice Thin Film Division. In the event of new subcontractors being selected and used, this will have to be reflected in the PID.	
6	PID-TFD P PRA CNW – 14/12/06	F	Reference Specifications	ESCC basic specifications 24600 and 25400 have to be referenced in the PID as this document is also used as a WRAP technology space control plan.	"Reference these basic Specifications on revision 1 of the PID. Done" *PID-TFD P PRA CNW revision 1, 18/04/2007* *Action **Closed**.*
7	PID-TFD P PRA CNW – 14/12/06	F	Non-conformance Management	ESCC 22800 has to be referred to in the paragraph dedicated to non-conformance management.	"Reference this specification in the non-conformance paragraph on revision 1 of the PID. Done" *PID-TFD P PRA CNW revision 1, 18/04/2007* *Action **Closed**.*
8	PID-TFD P PRA CNW – 14/12/06 § Parts Descriptions	F	Design rules	Current density and electrical field values have to be corrected to be in agreement with HPBE004	"Modify good values of current density and electrical field on revision 1 of the PID. Done" *PID-TFD P PRA CNW revision 1, 18/04/2007* *Action **Closed**.*

Audit Status performed with VISHAY on the 29th of April 2008

Sn	Ref.	F/O/C	Domain	Description	VISHAY comment / Status
9		C	Raw materials	Alumina substrates used for a specific resistor lot may come from several batches but traceability is maintained through the software based management system.	
10	PID-TFD P PRA CNW – 14/12/06	O	Raw materials	Contrary to subsequent operations, no physical traveller is used to control the metallised alumina substrates, the latter being only recorded in and followed through the software based control tool. A screen print would clarify the organization and appearance of this control tool.	"Creation of an appendix in the specification of deposit. W21 Y07" *"Formulaire Pulverisation" up-dated in GPAO to better record the pre- and post-stabilization resistivity for the characterization wafer as a wafer lot qualification and wafer selection tool.* *Up-dating of the "Procedure d'identification et de traçabilité des produits de la Division Couches Minces" ed. 8 dated 01/06/2007, paragraphs 1 & 2 and appendix 19 "Impression d'écran GPAO et Guide d'utilisation"* *Action* ***Closed***
11	PID-TFD P PRA CNW – 14/12/06 § 6 Test Vehicles	O	Test	The notion of "critical value" should be clarified and/or replaced by "critical resistance".	"Include the modification on revision 1 of the PID. Done" *"critical value" replaced with "critical resistance" in PID-TFD P PRA CNW revision 1, 18/04/2007* *Action* ***Closed***
12	PID-TFD P PRA CNW – 14/12/06	F	"Dossier Produit"	The "dossier produit" provided in an appendix to the PID has to be updated since new travellers will be used.	"Update of the "dossier produit" will be done. W21 Y07" *Completed on the 4th of June 2007.* *These dossiers are referenced in the PID. ESA requested a copy (Company Confidential).* *- Dossier Produit PHR ed. 3 dated 06/06/2007* *- Dossier Produit PRAHR ed. 2 dated 06/06/2007* *Action* ***Closed***
13	VI-DO/004	O	PID Management	This procedure detailing PID management for various resistor types will have to be updated to take into account the new thin film "technology flow " qualification and PID, and avoid inconsistencies between the two co-existing systems.	"Update of the VI-DO/004. W21 Y07" *Procedure VI-DO/004 edition 2 dated 20/06/2007 implemented on the 30th of June 2007..* *Action* ***Closed.***
14	CM-IO/06105	F	Tin plating - Control of Documentation	This document describing the reinforced control criteria for tin plating is not referenced in the PID nor in specification CM/SF09120 dedicated to tin plating and not mentioned on the travellers.	"Update of CM-SF/09120. W21 Y07" *The tin plating control described in CM-IO/06105 is referenced in CM-SF/09120 edition 5, 10/05/2007.* *Action* ***Closed****.*

Sn	Ref.	F/O/C	Domain	Description	VISHAY comment / Status
15		O	Control of Documentation	No provisions seem to be established to ensure that new or updated specifications are properly referenced in the documentation system and their impact on existing specifications analysed.	"Installation of the new specifications in a common form including a history of the modifications and a paragraph "experience feedback". Done" *Mode Opératoire "Contrôle Visuel des pièces nues" edition 7, 10/04/2007 reviewed as an example on the 22nd of May 2007..* *During the review it has been suggested to VISHAY to add a clear reference to the affected documents.* *The reference has been added to the format available on VISHAY network and its implementation checked on :* *« Spécification de Fabrication : Protection par sérigraphie des plaques de pavés Wraps, PRA, CNW, SIL et CHP » CN-SF-09010 ed. 12 dated 25/05/2007.* *Action **Closed.***
16		O	Control of Documentation	The 8D forms used to report to customers in the case of non-conformance are prepared and dealt with during the weekly meeting in place at Vishay, but no formal close-out mechanism appears to be in place. ("Rapport d'Expertise" n°060704 refers)	"Include the mention "encloses 8D" in the weekly report (Annexe 7 à HP-FA/001). Done" *Practical implementation of the 8D status ias per appendix 7 of HP-FA/001 checked on the latest 8D status dated 31st of March 2008. Opening and closure dates of actions implemented.* *Action **Closed.***
17		C	Control of Documentation	Each Vishay division controls its own documentation which is integrated with a set of corporate specifications.	
18		O	Detail Specification	Vishay must clearly determine if Au terminations will remain available for these "WRAP" thin film resistors and networks even if application conditions and/or further processes have to be clarified.	"Add the precautions of use of the parts with AU termination on ESCC 4001/023 and on the datasheet. W21 Y07" *Implemented for P (ESCC 4001/023 draft D issue 3 at PSWG) and Non-applicable to PRA / CNW (no gold finish proposed)* *Action **Closed*** *It has been suggested that the same warning be introduced in VISHAY P HR "Data Sheet" which will be modified when ESCC QML and relevant specification up-dating are approved by ESCC.*
19	HP-BE001/004	C	Design	A significant effort has been provided by Vishay to clarify and update these design related procedures.	

Sn	Ref.	F/O/C	Domain	Description	VISHAY comment / Status
20		C	TRB	Composition, responsibilities, organisation and roles of the TRB are described in the "WRAP technology "PID (Ref. PID-TFD P CRA CNW).	
21		O	TRB	A formal check of the operation of the TRB will be performed by the ESCC Executive when it is operating in "nominal mode".	"A annual report will be sent to ESCC Executive. W48 Y07" *ESCC Executive will be invited to witness a TRB meeting when a major item is on the agenda* *Action to be completed when a major change / implementation occurs (none yet)..*