DeltaQualifikationsMatrix

Allgemeines

Kurze Produkt- und Technologiezyklen elektronischer Bauelemente sowie neue Umweltauflagen führen häufig zu prozeß- und werkstofftechnischen Änderungen an Bauelementen, Leiterplatten, Verbindungstechnik und Schaltung, welche evaluiert werden müssen. Eine geeignete Methodik zur Handhabung von Änderungen an elektronischen Bauelementen beschreibt die ZVEI "Guideline for Customer Notifications of Product and /or Process Changes (PCN) of Electronic Components specified for Automotive Applications". Ein wesentlicher Teil dieser Guideline sind die hier vorliegenden Matrizen, welche sich als Empfehlungen für die Evaluierung von typischen Änderungen an elektronischen Bauelementen verstehen. Dies sollte Teil des offenen und risikobewussten Dialoges zwischen Lieferant und Kunden sein.
Diese DeltaQualifikationsMatrizen wurden durch den Industriearbeitskreis "PCN DeltaQualifikationsMatrix" und den Bauteilexperten des ZVEI Arbeitskreis "PCN-Methodik" erarbeitet. Der Inhalt wurde basierend auf dem aktuellen Stand der Technik erstellt und erhebt keinen Anspruch auf Vollständigkeit. Im Einzelfall ist ggf. ein abweichendes Vorgehen abzustimmen, da kundenspezifische Vereinbarungen zur Qualifikation zu berücksichtigen sind.

Anwendung der DeltaQualifikationsMatrix *(auszufüllen durch den Bauelementehersteller)*

a) Diese Tabelle ist nur bei Änderungen anzuwenden. Neuqualifikationen und Sonderqualifikation (z.B. Verguß von Modulen) sowie Information Notes bleiben von diesen Matrizen unberührt.
b) Ist eine Änderung in dieser Tabelle nicht aufgeführt, so ist der Qualifikationsumfang zwischen Kunde und Lieferant abzustimmen.
c) Die Matrix der Aktiven Bauelemente ist so aufgebaut, dass zwischen integrierten Halbleitern (AEC-Q100 Rev. H) und diskreten Halbleitern (AEC-Q101 Rev. D1) auszuwählen ist (Zelle D4).
Für passive Bauelemente gilt die AEC-Q200. Für LED's gilt die AEC-Q102.
Für Multi-Chip-Module gilt die AEC-Q104.
d) Alle Änderungen in der PCN sind in der Spalte B durch ein Kreuz (x) zu markieren und werden dadurch farblich hervorgehoben. Sofern dies geschehen ist, werden im Feld "Tests, which should be considered for the appropriate process change" alle in Betracht zu ziehenden Zuverlässigkeitstests angezeigt.
e) In "Tests, which should be considered for the appropriate process change after selection of condition table" wird die Anpassung der in Betracht zu ziehenden Tests in Folge der Relevanz bezüglich der Änderung berücksichtigt.
Dazu ist die Tabelle "Conditions" entsprechend der Auswahl (A/B/C) mit einem (x) zu bewerten.
f) In "Suppliers performed tests" dokumentiert der Bauelementehersteller die durchgeführten bzw. geplanten Tests.
g) Falls von der Testempfehlung abgewichen wird, so sollten diese Abweichungen vom Bauelementehersteller angezeigt und kommentiert werden. Hierzu ist der Bereich "Reason for exception of tests" zu verwenden. Werden die in Betracht zu ziehenden Tests durch generische Daten (G) belegt, ist dies ebenfalls hier anzuzeigen und zu begründen.

Die Einstufung des Untersuchungslevel erfolgt in folgende Kategorien

"C: Component level": Die Evaluierung der Änderung am Bauelement ist durch Untersuchungen ausschließlich am Bauelement beim Bauelementehersteller durchführbar. Zur Evaluierung der Änderung dürfen Ergebnisse aus bereits durchgeführten Untersuchungen herangezogen werden, wenn diese zu einem ähnlichen Bauelement bereits vorliegen **(Generische Daten).**

"B: Board level": Die beschriebene Änderung hat möglicherweise Einfluss auf die Verarbeitbarkeit des Bauelementes im Steuergerät. Die Evaluierung der Änderung wird wie unter C beim Bauelementehersteller durchgeführt. Zusätzlich ist durch den Kunden/Steuergerätehersteller die Verarbeitbarkeit zu prüfen, die z.B. abhängig von der Änderung, Zuverlässigkeitsuntersuchungen auf applikationsrelevanten Testbords erfordert.

"A: Application level": Die beschriebene Änderung hat möglicherweise Einfluss auf die Applikation/ das Steuergerät. Die Evaluierung der Änderung wird wie unter C oder B durchgeführt. Zusätzlich ist vom Kunden/Steuergerätehersteller der Einfluss der Änderung im Steuergerät durch geeignete Untersuchungen zu bewerten. Dieses Vorgehen ist mit dem OEM abzustimmen. Hierbei ist zu berücksichtigen, ob die Steuergeräte- / Baugruppenanforderungen durch andere Qualifikationen bereits hinreichend abgesichert sind **(applikationsspezifische Risikobetrachtung).**

" *: Not relevant for qualification matrix": Änderung(en), die nicht in A, B oder C eingestuft werden können und somit nicht relevant für die DeQuMa sind

Infomation Notes

Änderungen die nur eine Information Note benötigen (bei der Bewertung Risk on Supply Chain als "I" gekennzeichnet), dürfen nicht in der DeQuMa angekreuzt werden, da Sie ansonsten den erforderlichen Evaluierungslevel verfälschen. Für als "I" bewertete Änderungen ist das Information Note Formblatt zu verwenden.

Wichtige Hinweise

- Zur formgerechten Anwendung der DeltaQualifikationsMatrizen steht auf der Homepage des ZVEI AK ein Tutorial bereit (ZVEI-Tutorial).
- ID Nummer: ist eine eindeutige Identifikationsnummer für jede angegebene Änderung, die in den ZVEI PCN DeltaQualifikatiosMatrizen identifiziert ist. Die gleiche ID Nummer wird zur Identifizierung der Änderung im PCN Form Sheet verwendet.
- Die mittels Matrix identifizierten Tests sind in **Betracht zu ziehen**, d.h. es ist zu prüfen, ob der jeweilige Test für die spezifische Änderung in dieser Form notwendig ist. Abweichungen oder generische Daten sind im Detail zu begründen.
- Die Spalte "Further applicable conditions", Bemerkungen und Fußnoten sind unbedingt zu beachten, da sie wichtige Hinweise und Einschränkungen enthalten.
- Zur Nutzung aller Funktionen muss in Excel die Anwendung von Makros freigegeben sein.

DeltaQualificationMatrix

General

Short product and technology cycles as well as new environmental regulations frequently result in process and material changes of components, printed circuit boards, assembly techniques and circuit layout which have to be evaluated. The ZVEI "Guideline for Customer Notifications of Product and /or Process Changes (PCN) of Electronic Components specified for Automotive Applications" describes an appropriate methodology for dealing with changed electronic components. The qualification matrices in this guideline are recommendations for how to assess typical changes of electronic components. These recommendations promote an open risk-based discussion between supplier and customer regarding qualifications.
The DeltaQualificationMatrices were developed by the Industry Task Force Team "PCN DeltaQualificationMatrix" together with component experts from the ZVEI Working Group "PCN-Methodology". Actual content represents state-of-the-art technology and does not claim to be comprehensive. Deviation from proposed guideline should be mutually agreed as customer specific requirements have to be considered.

DeltaQualificationMatrix Application *(completion by component manufacturer)*

a) This table has to be used for changes only. The matrices are not applicable for new product, special qualifications (for instance for encapsulation of module) or Information Notes.
b) If a change is not listed in this table, the qualification plan has to be defined and agreed between customer and supplier.
c) The matrix for Active Components requires the user to choose between integrated circuits (AEC-Q100 Rev. H) and discrete semiconductors (AEC-Q101 Rev. D1) (cell D4).
For Passive Components AEC-Q200 is used. For LED'S the AEC-Q102 is used.
For Multi-Chip-Modules the AEC-Q104 is used.
d) All changes as listed in the PCN have to be marked by a cross (x) in column B and will appear colored. The relevant reliability tests are then shown in "Tests, which should be considered for the appropriate process change".
e) In "Tests, which should be considered for the appropriate process change after selection of condition table" is for modification of the found relevant tests under consideration of the weight of change.
Related table "Conditions" has to be assessed per proposed letters with an (x).
f) In "Suppliers performed tests" the component manufacturer documents the planned and performed tests.
g) In case of deviations from tests, which should be considered this should be notified and commented by the component manufacturer in the area "Reason for exception of tests". Test results in form of generic data (G) are allowed when notified and justified.

Evaluation Levels are categorized as follows

"C: Component level": The evaluation of a change at component level by the component manufacturer is sufficient. Generic data from other relevant evaluations can be used.

"B: Board level": The intended change described in the PCN may influence processability / manufacturability of the component at board level. Therefore additional evaluation by customer may be necessary, for example reliability tests on application relevant testboards, depending on change.

"A: Application level": The intended change described in the PCN may influence the properties of the application (e.g. Electronic Control Unit).
In addition to the evaluation under C or B the influence of the change in the application is evaluated by suitable investigations by the customer. The scope of the evaluation has to be aligned with the OEM. It has to be considered whether the application / assembly requirements are already sufficiently safeguarded by other qualifications **(application specific risk assessment).**

" *: Not relevant for qualification matrix": Changes which fulfill neither A,B nor C definitions

Infomation Notes

Changes indicated as "I" shall not be marked in the DeQuMa. For those changes the Information Note sheet shall be used. As the DeQuMa is desired for PCN only, a marking of "I"-changes would automatically influence evaluation level and test effort.

Important Notes

- To use the matrices in the right form the ZVEI working group provides a Tutorial on its homepage (ZVEI-Tutorial)
- ID number: is a unique identification number for each indicated change defined in the ZVEI PCN DeltaQualificationMatrices. The same ID number is used in the PCN Form sheet to identify the change.
- Tests identified by the matrix have **to be considered** and checked if they are necessary to assess the specific change. Test modifications or generic data have to be justified in detail.
- "Further applicable conditions", comments and notes need attention, as they provide important hints and limitations.
- In order to use all functions in EXCEL, macros have to be allowed.

Form provided by ZVEI - Revision 4.1 - November 2019

History of DeQuMa

Version	Remarks
2.0	Revised by ZVEI PCN Methodology Workgroup in March 2015
2.1	Released March 2015
2.1.1	Active Components - delete write protection in comments
2.2	Solved problems with some ActiveX configurations
2.2.2	Solved Problems in Active Components
2.2.3	Solved Problems ActiveX, Active Components SEM-DE-02 (Design changes in routing) error fixed
2.2.4	Minor fixes
3.0	General Revision by ZVEI PCN Methodology Workgroup in June 2016 Changes are indicated by underlining in the read only version named Changes_DeQuMa_rev3_vs_rev2.xlsx
3.0.4	Expert Release
3.0.5	Fixing of macro bugs
3.1	Final Release (orthographic and punctuation corrections)
4.0	General Revision by ZVEI PCN Methodology Workgroup in July 2019. Muliti Chip Modules newly added to DeQuMa LED Components now based on the AEC Q102 Further Changes see separate ~~PDF's~~ Excel-File, where changes are indicated by underlining
4.1	LED worksheet: Content of columns had been swapped due to rearrangement and omission of columns.

Worked on: (Name, Function)	Ryan Quintin, Reliability Engineer
Date:	21/10/2020
PCN number:	PCN 20_0295
Signature:	Ryan Quintin
For integrated circuits or discrete semiconductors select below:	AEC-Q100 Revision H

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Mark change with an "x"

Mark	ID	Type of change (Assessment of impact on Supply Chain regarding following aspects - contractual agreements - technical interface of processability/manufacturability of customer - form, fit, function, quality performance, reliability)	Remaining risks within Supply Chain? No	Yes	Understanding of semiconductors experts	Examples to explain	Evaluation level A / B / C (A: Application level B: Boardlevel C: Component level *: Not relevant for qualification matrix)	Further applicable conditions
		ANY						
	SEM-AN-01	Any change with impact on agreed upon technical contractual agreements	P	P	Intended to be used if no other type of change is applicable but the change affects agreed technical contractual agreements		*	
	SEM-AN-02	Any change with impact on processability/manufacturability at customer, which is not covered in the matrix below.	P	P	Any change which is not covered in the matrix below, but risk assessment at customer is recommended.		B	
		DATA SHEET						
	SEM-DS-01	Change of datasheet parameters/electrical specification (min./max./typ. values) and/or AC/DC specification	P	P	Update of data sheet because of technical change of the product.	e.g. recommendations for pull-up/pull-down or NC pins, MSL	A	
X	SEM-DS-02	Correction of data sheet or issue of errata	I	I	No technical change of product, process or test. New description of behavior which was not specified before or which is different from initial specification. Please indicate clearly, that Infonote contains this type of change! Assessment in application required!	e.g. Errata	A	
	SEM-DS-03	Specification of additional parameters	I	P	Description of a new not previously covered parameter. No technical change of the product. **(I):** Definition of new parameter which was not documented before. **(P):** Not known as single change. Only in combination with other changes.	**(I):** e.g. adding new tested parameter.	A	
		DESIGN						
	SEM-DE-01	Design changes in active elements. [1])	P	P	Any device relevant changes in design / layout of elements with effect on data sheet [1]) **Not included:** Modification to adjust product parameter within specified process window and design rules.	e.g. change of ESD structure e.g. add / remove a transistor in layout	A	Please check if data sheet is affected **(SEM-DS-01)**.
	SEM-DE-02	Design changes in routing . [2])	P	P	Any change of wiring between elements in chip design / layout with effect on data sheet. [2]) **Not included:** Modification to adjust product parameter within specified design rules.	e.g. mask changes in metal fix for corrective action (based on external 8D report)	C	**A:** Impact on EMC behavior cannot be evaluated / excluded on component level. **A:** If impact on electrical function is not excluded on component level. Please check if data sheet is affected **(SEM-DS-01).**
	SEM-DE-03	Die shrink [3])	P	P	Shrink of active area. [3]) **Not included:** sawing street/kerf/scribe line	Typical shrink of die.	A	Please check if change in process technology **(SEM-PW-09)** is also affected.
	SEM-DE-04	Firmware modification	I	P	Integrated software by design or memory as defined by supplier. **(I)**: Firmware modification or update without effect of functional performance at the customer (bug fix). **(P)**: Firmware modification or update with effect of functional performance at the customer.	**(I)**: e.g. addition of Firmware opportunities **(P)**: e.g. bug fix with impact on functional performance	A	
		PROCESS - WAFER PRODUCTION						
	SEM-PW-01	New / change of wafer substrate material	P	P	New wafer material.	e.g. different wafer material to currently released material (like change from EPI material into non-EPI material)	C	
	SEM-PW-02	New wafer diameter	P	P	Change of wafer diameter resulting in equipment and process changes.		C	Impact on changes in **SEM-PW-09** and/or **SEM-EQ-01**.
	SEM-PW-03	New final wafer thickness	P	P	Change in final wafer thickness.	e.g. change in final chip/die thickness	C	**A:** If thermal conductivity is affected (like MOSFET; IGBT, BGA package, stacked dies, …) **A:** If impact on EMC or ESD behavior cannot be evaluated / excluded on component level.
	SEM-PW-04	Change of electrically active doping/implantation element	P	P	Change in electrically active doping / implantation element resulting in a new technology.		A	
	SEM-PW-05	Change of gate material / dielectrics	P	P	Change of gate material and / or gate dielectric material.		A	
	SEM-PW-06	New / change of backside operation (grinding / metallization)	P	P	Change of bottom layer of die (between die and leadframe). Change in process, material, or dimensions necessary. Alternative see SEM-PW-09	e. g. change from Cr/NiV/Au to Cr/NiV/Ag	C	**A:** If thermal conductivity is affected (like MOSFET; IGBT, BGA package, stacked dies, …) **A:** If impact on EMC or ESD behavior cannot be evaluated / excluded on component level.
	SEM-PW-07	New / change of metallization / vias / contacts	P	P	Change in metallization of bondpads, material, layer thickness specifically for chip frontside and internal layers.	e. g. change from AlSiCu to AlCu e. g. change in over pad metallization	C	
	SEM-PW-08	New / change of passivation or die coating (without bare die)	P	P	Change of top layer on die (between mold compound and die).	e. g. addition of polyimide	C	A: If thermal conductivity is affected (like MOSFET; IGBT, BGA package, stacked dies, …) A: If impact on EMC or ESD behavior cannot be evaluated /
	SEM-PW-09	Change in process technology not covered by any other type of change	--	P	**(--)**: If the change in process technology does not influence the integrity of the final product. **(P)**: If the change in process technology can influence the integrity of the final product.	**(--):** e.g. change from wet to dry etching, e. g. change from horizontal to vertical oven for oxidation **(P):** e.g. change of layer thickness	A	Please also check changes described under **EQUIPMENT.** Please check if change is described by specific type of change in this matrix.
	SEM-PW-10	Process integrity: tuning within specification	--	P	Variation within process specification **(--):** If tuning within process specification does not influence the integrity of the final product. **(P):** If remaining risk on product specification is anticipated.	**(--):** e.g. process control	C	Please check if **DATA SHEET** is affected. Please check if **SEM-PW-09** is affected.
	SEM-PW-11	Change of wafer supplier.	--	P	**(--)**: If no remaining risk in supply chain exist **(P)**: If the change of wafer supplier can influence the integrity of the final product.	**(--):** e.g. change of wafer supplier with same material composition. e.g. same material composition and does not influence electrical behavior. **(P):** e.g. new supplier with impact on substrate material and / or electrical behavior.	C	Not on component, tested on test structure (typical for IC). Interaction on component level for discrete components expected. In case of SOI substrate HF properties have to be qualified. Please check if **SEM-PW-01** and **SEM-DS-01** is affected.
	SEM-PW-12	Change of specified wafer process sequence (deletion and/or additional process step)	--	P	Any change which is not covered by another type of change. Risk is to be assessed. **(--):** No Risk for Supply chain. **(P):** Risk for Supply chain (influence on product integrity)	**(--):** e.g. change of cleaning process in wafer production **(P):** e.g. additional sinker implantation after standard implantation (to protect circuit against interference impulses).	C	
	SEM-PW-13	Move all or parts of production to a different wafer fab site.	P	P	Wafer fab transition with additional changes (described above). Includes transfer as well as additional site.	e.g. dual source / fab strategy	A	Check if any other type of process change is applicable due to the transfer

Device evaluation

MATERIAL PERFORMANCE TEST RESULTS (on the basis of AEC-Q100 Revision H) includes integrated circuits (e.g. ASICs, µ-Controller, memories, voltage regulators, smart power devices, logic devices, analog devices,...)

ID	Line evaluation (can be evaluated by data or audit/on site check)	AEC-Q100 Revision H	Check of specification (for raw material only)	Temperature Humidity Bias or biased HAST THB A2	Autoclave or Unbiased HAST AC A3	Temperature Cycling TC A4	Power Temperature Cycling PTC A5	High Temperature Storage Life HTSL A6	High Temperature Operating Life HTOL B1	Early Life Failure Rate ELFR B2	NVM Endurance, Data Retention, and Operational Life EDR B3	Wire Bond Shear WBS C1	Wire Bond Pull WBP C2	Solderability SD C3	Physical Dimensions PD C4	Solder Ball Shear SBS C5	Lead Integrity LI C6
SEM-AN-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-AN-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-DS-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-DS-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-DS-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-DE-01	-	•	-	-	•	•	M	-	•	•	D,J	-	-	-	-	-	-
SEM-DE-02	-	•	-	-	-	A	M	-	-	-	-	-	-	-	-	-	-
SEM-DE-03	-	•	-	•	•	-	M	-	•	•	D,J	-	-	-	-	-	-
SEM-DE-04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-PW-01	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-PW-02	•	•	-	-	-	E	M	-	•	•	-	E	E	-	-	-	-
SEM-PW-03	-	•	-	-	-	E	M	-	•	•	-	E	E	-	-	-	-
SEM-PW-04	-	•	-	-	-	-	M	-	•	#	-	-	-	-	-	-	-
SEM-PW-05	-	•	-	-	-	•	M	-	•	-	D,J	-	-	-	-	-	-
SEM-PW-06	-	•	-	-	-	•	M	-	•	-	-	-	-	-	-	-	-
SEM-PW-07	-	•	-	•	•	•	M	-	•	-	-	•	•	-	-	-	-
SEM-PW-08	-	•	-	•	•	•	M	-	•	#,N	D,J	•	•	-	-	-	-
SEM-PW-09	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-PW-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-PW-11	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-PW-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SEM-PW-13	•	•	-	•	•	•	M	-	•	•	J	•	•	-	-	-	-

ID	Electromigration EM D1	Time Depending Dielectric Breakdown TDDB D2	Hot Carrier Injection HCI D3	Negative Bias Temperature Instability NBTI D4	Stress Migration SM D5	Electronic Discharge Human Body Model HBM E2	Electronic Discharge Charged Device Model CDM E3	Latch up LU E4	Electrical Distribution ED E5	Characterisation CHAR E7	Electromagnetic Compatibility EMC E9	Short Circuit Characterization SC E10	Soft Error Rate SER E11	Lead free LF E12	Hermetic Package Test MECH G1-4	Package Drop DROP G5	Lid Torque LT G6	Die Shear DS G7	Internal Water Vapor IWV G8	additional to AEC-Q10x: Whisker test (IEC 60068-T2-82, JEDEC JESD201)	Parameter-Analysis: Comparison of current with changed device characterization, electrical distribution	For Cu Wire Products: Consider AEC-Q006	Remarks
SEM-AN-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-AN-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-DS-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-DS-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-DS-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-DE-01	D	D	D	D	D	•	•	•	•	•	•	•	•	-	-	F	-	-	-	-	•	-	
SEM-DE-02	-	-	-	-	-	•	•	•	•	•	•	•	-	-	-	-	-	-	-	-	•	-	
SEM-DE-03	•	•	•	•	•	•	•	•	•	•	•	•	•	-	-	-	-	-	-	-	•	•	
SEM-DE-04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-PW-01	-	-	-	-	-	-	-	-	•	•	-	-	-	-	-	-	-	-	-	-	•	•	Qualification effort acc. AEC-Q100: see diffusion/doping
SEM-PW-02	-	-	-	•	-	E	E	E	•	-	-	-	-	-	-	-	-	-	-	-	•	-	AEC-Q100: "For broad changes that involve multiple attributes (e.g., site, materials, processes), refer to section A1.3 of this appendix and section 2.3 of Q100, which allows for the selection of worst-case test vehicles to cover all the possible permutations."
SEM-PW-03	-	-	-	•	-	E	E	E	•	-	-	-	-	-	-	-	-	-	-	-	•	•	
SEM-PW-04	-	-	-	•	-	•	•	•	•	•	-	-	-	-	-	-	-	-	-	-	•	-	
SEM-PW-05	-	-	-	•	-	•	•	•	•	•	-	-	-	-	-	-	-	-	-	-	•	-	
SEM-PW-06	-	-	-	-	-	M	M	•	-	•	-	-	-	-	H	-	-	H	-	-	•	-	AEQ-Q100: Applicable to all smart power devices
SEM-PW-07	•	-	-	-	•	-	-	-	•	•	-	•	-	-	-	-	-	-	-	-	•	•	
SEM-PW-08	-	•	•	•	•	•	•	•	•	•	-	-	-	-	-	-	-	-	-	-	•	•	
SEM-PW-09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	Qualification effort depends on type of change.
SEM-PW-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	
SEM-PW-11	-	-	-	-	-	-	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	•	-	Qualification for IC & µ-Controller difficult on product level. Characterisation on wafer level only on test structure. Supplier should perform a risk assessment if there is a technology dependend risk requiring additional qualification effort. AEC-Q100: "For broad changes that involve multiple attributes (e.g., site, materials, processes), refer to section A1.3 of this appendix and section 2.3 ofQ100, which allows for the selection of worst-case test vehicles to cover all the possible permutations."
SEM-PW-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-PW-13	•	•	•	•	•	•	•	•	•	-	-	-	-	-	H	-	-	H	-	-	•	•	AEC-Q100: "For broad changes that involve multiple attributes (e.g., site, materials, processes), refer to section A1.3 of this appendix and section 2.3 of Q100, which allows for the selection of worst-case test vehicles to cover all the possible permutations."

SEM-PW-14	Lithography	--	P	Change in process technique for lithographic process and material **(--):** If the change in process technology does not influence the integrity of the final product. **(P):** If the change in process technology can influence the integrity of the final product.	**(--):** e.g. exchange of defect mask **(P):** e.g. change from E-beam process to X-ray process e.g. change from contact into projection mode	**C**	Please also check changes described under **EQUIPMENT**.	-	•	-	•	-	•	M	-	•	#	-	•	•	-	-	-	-	-	-	-	•	-	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	•	-	
SEM-PW-15	Oxide / Interlayer Dielectric	--	P	Change in process technique for oxide / interlayer dielectric process **(--):** If the change in process technology does not influence the integrity of the final product. **(P):** If the change in process technology can influence the integrity of the final product.		**A**	Please also check changes described under **EQUIPMENT**.	-	•	-	-	-	•	M	-	•	#,N	D,J	-	•	-	-	-	-	-	•	•	•	•	•	•	•	•	•	-	-	-	-	-	-	-	-	-	-	•	-	
	BARE DIE																																														
SEM-BD-01	New final wafer thickness	P	P	Change in final wafer thickness.	Change in final chip/die thickness	**A**		-	-	-	-	-	-	-	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	E	E	E	•	-	-	-	-	-	-	-	-	-	-	-	•	-	ELFR can only be performed on packaged test vehicles. NBTI was removed in deviation from the AEC-Q100 Matrix because there it is a combined type of change (Wafer Dimension/Thickness). NBTI is applicable for wafer dimension change only.
SEM-BD-02	Change of top metallization or bond pad stack	P	P	Change in bondpads (incl. stack below), material, pad pitch, surface changes, layer thickness	e. g. change from AlSiCu to AlCu e. g. change in over pad metalization	**B**		-	-	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	•	-	•	-	-	-	-	-	-	-	-	-	-	
SEM-BD-03	New / change of backside metallization	P	P	Change of bottom layer of die (between die and leadframe). Change in process, material, or dimensions.	e. g. change from Cr/NiV/Au to Cr/NiV/Ag	**A**		-	-	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	M	M	•	-	•	-	-	-	-	-	-	-	-	-	-	•	-	
SEM-BD-04	Change of wafer setup or number of possible good dies on wafer.	I	P	Needed information for pick & place machine. **(I):** amount of possible good dies on wafer **(P):** influence on wafer setup and wafer mapping	**(I):** e.g. change from 350 to 240 good dies on wafer **(P):** e.g. information change for pick & place machine.	**B**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-BD-05	Change of optical appearance of wafer edge region (like imide coverage or edge exclusion)	I	P	Selection of dies in wafer edge region which have full electrical functionality. **(I):** in case of wafer edge is affected only **(P):** in case of single die is affected	**(I):** e.g. appearance of wafer edge (rounded instead of square) **(P):** e.g. polyimide as new coating on die	**B**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	
SEM-BD-06	Die scribe or separation	I	P	Needed information for sawing and pick & place machine. **(I):** If the change in sawing process does not influence the integrity of the final product. **(P):** in case if product is delivered on wafer	**(I):** e.g. if product is delivered as known good die (in tape and reel) **(P):** e.g. information change for pick & place machine. e.g. information change for sawing machine.	**B**	Please check if **SEM-BD-04** is affected.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-BD-07	Die Preparation / Clean	--	P	Change in process technique for die preparation / cleaning **(--):** If the change in process does not influence the integrity of the final product. **(P):** If impact on product integrity is anticipated.	**(--):** e.g. change of cleaning time. **(P):** e.g. change in cleaning procedure after change of sawing equipment.	**B**	Please check if **SEM-BD-06** is affected.	-	-	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-BD-08	New / change of passivation or die coating	P	P	Change of top layer on die.	e.g. addition of polyimide e.g. change of polyimide thickness	**B**		-	-	-	-	-	-	-	-	•	#,N	D,J	-	-	-	-	-	-	-	•	•	•	•	•	•	•	•	•	-	-	-	-	-	-	-	-	-	-	•	-	
	PROCESS - ASSEMBLY																																														
SEM-PA-01	Change in critical dimensions of package	P	P	Change in dimensions of existing package.	e. g. changes in package dimensions (further development).	**B**		-	•	-	•	•	•	M	•	•	•	-	•	•	•	•	T	•	-	-	-	-	-	•	•	-	•	-	-	•	-	L	H	-	-	H	H	-	-	-	
SEM-PA-02	Change of leadframe base material	P	P	New leadframe material in new composition.	e. g. change from alloy42 to copper e. g. change between two different copper alloys	**B**		-	•	•	-	•	•	M	•	-	-	-	-	•	•	•	-	•	-	-	-	-	-	-	-	-	-	-	-	•	-	L	H	-	-	H	-	•	-	•	
SEM-PA-03	Change in leadframe dimensions	P	P	Change in leadframe dimensions which has impact to the specified electrical parameter acc. data sheet or specification (e.g. heat sink, pin dimensions, die paddle size, ...) **Not included:** Variation within specification.	e. g. change in lead frame geometry	**B**	ESD investigations are only necessary if internal ground and power supply connection of leadframe is affected. **A:** If impact on EMC behavior cannot be evaluated / excluded on component level.	-	•	-	-	•	•	M	-	-	-	-	-	-	•	•	-	•	-	-	-	-	-	-	-	-	-	-	-	•	-	L	H	-	-	-	-	-	-	•	
SEM-PA-04	Change of lead frame finishing material / area (internal)	P	P	Change of surface material of die attach pad and second bond area (e.g. influence in adhesion to mold compound, wedge bond reliability)	e. g. change from Ag flash to NiP protection layer e. g. change from Ag spot to Au spot e. g. increase of silver plating area	**C**		-	•	•	•	•	•	M	•	-	-	-	-	C	•	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	L	H	-	-	H	-	-	-	•	For wire bond strengh test: Pre- & Post-process change comparison to evaluate process change robustness (AEC-Q101).
SEM-PA-05	Change of lead and heat slug plating material/plating thickness (external)	P	P	Change in material and / or process resulting in a new technology (e.g. pure tin).	e.g. change in heat slug stack e.g. change from Sn into Ni/Pd/Au e.g. change of layer thickness	**B**		-	•	•	•	•	•	M	•	-	-	-	-	C	•	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	L	H	-	-	H	-	-	-	-	
SEM-PA-06	Bump Material / Metal System (internal)	P	P	Stack die or die to substrate (flip chip)	e. g. change to Pb-free material e. g. change of copper pillars	**C**		-	•	•	•	•	•	M	•	•	-	-	-	-	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	•	L	-	-	-	-	-	-	-	-	
SEM-PA-07	Die attach material	P	P	Change of die attach material and / or process resulting in a new technology (e.g. soft solder, epoxy, etc.)		**C**	**A:** If impact on EMC behavior cannot be evaluated / excluded on component level (if die attach has impact on electrical conductivity).	-	•	•	•	•	•	M	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	-	•	-	L	H	-	-	H	H	-	•	•	
SEM-PA-08	Change of wire bonding	P	P	Material, diameter, change in bonding diagram and / or change in process resulting in a new technology.	e.g. change from Au to Cu material e.g. change from 25µm to 23µm diameter e.g. change from single to double bond e.g. change from stich bond to stich on ball bond.	**C**	**A:** In case of bond diagram change and EMC cannot be evaluated on component level. Please also check changes described under **SEM-EQ-01**.	•	•	•	•	•	•	Q	•	-	-	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	M	-	-	•	-	-	H	-	-	-	-	-	•	•	Parameter Analysis: Strictly required only for Power devices. In general: Site audit for material change with impact on bondprocess (e.g. from Au to Cu) recommended. AEC-Q100: "For broad changes that involve multiple attributes (e.g., site, materials, processes), refer to section A1.3 of this appendix and section 2.3 of Q100, which allows for the selection of worst-case test vehicles to cover all the possible permutations."
SEM-PA-09	Substrate / Interposer	P	P	Change of BGA substrate	e.g. changes in routing	**B**	**A:** Impact on EMC behavior cannot be evaluated / excluded on component level. **A:** If impact on electrical function is not excluded on component level.	-	•	•	•	•	•	M	•	•	-	-	•	•	-	-	T	-	-	-	-	-	-	-	-	-	-	-	@•	-	-	L	H	-	-	H	H	-	-	•	
SEM-PA-10	Die Overcoat / Underfill	--	P	Supporting layers for complex packages like flip chip and / or change in process resulting in a new technology. **(--):** If change does not influence the integrity of the final product. **(P):** If impact on product integrity is anticipated.	**(--):** e.g. change of dispensing speed **(P):** e.g. change of underfill material	**C**		-	•	•	•	•	•	M	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	-	-	-	-	H	-	-	-	
SEM-PA-11	Change of mold compound / encapsulation material	P	P	Change of mold compound / encapsulation material.	e.g. change to green mold compound e.g. change of filler particles	**C**	B: impact on thermo-mechanical stress caused by mismatch of mold compound, interconnecting technology and carrier is anticipated (specific for Power Devices). B: for wave soldered devices A: in case of high frequency signals (> 3GHz) it should be assessed if possible changes in permeability of mold compound could affect signal behavior (e.g. digital signal processor).	-	•	•	•	•	•	M	•	•	•	-	-	-	•	•	-	•	-	-	-	-	-	-	-	-	-	-	-	-	•	L	-	-	-	-	-	-	-	•	
SEM-PA-12	Change of hermetic sealing	P	P	Affected areas are material and process of hermetic (e.g. ceramic) packages, capped die and sealed devices (e.g. pressure sensors)	e.g. change of sealing material for RoHS	**B**	**A:** impact on EMC behavior cannot be evaluated / excluded on component level (if encapsulation / sealing has impact on electrical conductivity).	-	•	•	-	•	•	-	•	-	-	-	-	-	-	•	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	•	-	•	-	-	-	
SEM-PA-13	Change of product marking	I	P	Change of marking on device and / or change in process resulting in a new technology.. **(I):** If change does not influence the integrity of the final product. **(P):** If impact on product integrity is anticipated.	**(I):** e.g. change of appearance (additional marking) **(P):** e.g. change from inked marking to laser marking e.g. marking of pin 1	**B**		-	•	-	-	-	-	-	-	-	-	-	-	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-PA-14	Change in process technology (e.g. trim and form, leadframe preparation …)	--	P	**(--):** If the change in process technology does not influence the integrity of the final product. **(P):** If the change in process technology can influence the integrity of the final product.	**(P):** e.g. change from punched to sawn QFN	**B**	Please also check changes described under **SEM-EQ-01**. Please check if change is described by specific type of change in this matrix.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-PA-15	Process integrity: tuning within specification	--	P	Variation within process specification **(--):** If tuning within process specification does not influence the integrity of the final product. **(P):** If impact on product specification is anticipated.	**(--):** e.g. process control	**C**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-PA-16	Change of direct material supplier	--	P	Change of suppliers for direct materials which are used in assembly process (BOM). **(--):** If change does not influence the integrity of the final product. **(P):** If impact on product integrity is anticipated.	**(--):** e.g. change of wire material supplier. **(P):** e.g. change to new mold compound supplier e.g. additional leadframe supplier with specific leadframe manufacturing technology	**C**	Please check if material is changed!	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	See change of material.
SEM-PA-17	Change of specified-assembly process sequence (deletion and/or additional process step)	--	P	**(--):** no influence in final product integrity or *specified sequence* **(P):** influence in final product integrity or *specified sequence*	**(--):** e.g. additional cleaning step e.g. deletion of optical inspection **(P):** e.g. change lead finishing pre trim & form to post trim & form	**C**		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Qualification depends on specific change.
SEM-PA-18	Move all or parts of production to a different assembly site.	P	P	Assembly transfer or relocation. Includes transfer as well as additional site.	e.g. dual source / fab strategy	**C**	**A** or **B**: impact on other type of changes described under **PROCESS ASSEMBLY** and **SEM-EQ-01**. Check if any other type of process change is applicable due to the transfer	•	•	-	•	•	•	M	-	•	•	-	•	•	•	•	T	•	-	-	-	-	-	-	-	-	•	-	-	-	-	L	H	-	-	H	H	•	•	•	Whisker tests have to be done on monitoring basis! AEC-Q100: "For broad changes that involve multiple attributes (e.g., site, materials, processes), refer to section A1.3 of this appendix and section 2.3 of Q100, which allows for the selection of worst-case test vehicles to cover all the possible permutations."

SEM-PA-19	Die scribe or separation	--	P	Separation process from single wafer to dies. (--): If the change in process does not influence the integrity of the final product. (P): If impact on product integrity is anticipated.	(--): e.g. change of kerf width (P): e.g. change from sawing to laser cut	C		-	•	-	•	•	•	M	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-PA-20	Die Preparation / Clean	--	P	Change in process technique for die preparation / cleaning (--): If the change in process does not influence the integrity of the final product. (P): If impact on product integrity is anticipated.	(--): e.g. change of cleaning time.	C		-	•	-	•	•	-	M	-	•	-	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	H	-	-	-	-	-	-	-	-	-	
SEM-PA-21	Molding / Encapsulation process	--	P	Change in process technique for molding / encapsulation. (--): If the change in process does not influence the integrity of the final product. (P): If impact on product integrity is anticipated.	(--): e.g. tuning within process specification	C		-	•	-	•	•	•	M	•	•	-	-	-	•	•	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	L	-	-	-	-	-	-	-	-	-	-	-	-	-	
	PACKING/SHIPPING																																																							
SEM-PS-01	Packing/shipping specification change	P	P	Packing/shipping specification change.		*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-PS-02	Dry pack requirements change	P	P	Change of dry pack requirements (e.g. change of MSL)		*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-PS-03	Change of carrier (tray, reel)	P	P	Change of carrier (tray, reel)		B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
SEM-PS-04	Change of labelling	I	P	Change of labelling also on reel. (I): Change of material label without impact on barcode. (P): Changes of material label information which affects data processing at customer.	(I) e.g. additional information (RoHS stamp) (P) e.g. change of defined nomenclature for data processing	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	EQUIPMENT																																																							
SEM-EQ-01	Production from a new equipment/tool which uses a different basic technology or which due to its unique form or function can be expected to influence the integrity of the final product	P	P	Change in process technique which is not already covered above.	Change from single wafer to batch process (e.g. over pad metallization) e.g. dambar cutting (mechanical to laser cutting)	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Affected process change is to check.
SEM-EQ-02	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool) without change of process.	--	P	PCN required for dedicated equipment for sensitive component production. (--): If change does not influence the integrity of the final product. (P): If impact on product integrity is anticipated.	(--): e.g. extension of existing equipment pool (P): e.g. extension of dedicated equipment in case basic technology still need to be proven	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	-	
SEM-EQ-03	Change in final test equipment type leading to a different test concept.	P	P	Change of tester platform with differences in HW or SW that makes a change in test concept necessary (only in case of bare die: final test means wafer test)		C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	-	Gage R&R / delta correlation
	TEST FLOW																																																							
SEM-TF-01	Move of all or part of electrical wafer test and/or final test to a different test site.	P	P	Tester transfer or relocation. Check impact on SEM-AN-01 Includes transfer as well as additional site.	Dual source strategy	C	Check if any other type of process change is applicable due to the transfer	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	-	Gage R&R / delta correlation
	Q-GATE																																																							
SEM-QG-01	Change of the test coverage/testing process flow used by the supplier to ensure data sheet compliance (e.g. elimination/addition of electrical measurement/test flow block; relaxation/enhancement of monitoring procedure or sampling)	--	P	e.g. test flow block, reduction from three temperature measurements to two temperature measurements, change in burn in / run in process. (--): If change does not influence the integrity of the final product. (P): If impact on product integrity is anticipated.	(--): e.g. test implemented without customer requirement (P): e.g. reduction from three temperature measurements to two temperature measurements e.g. change in burn in / run in process.	C		•	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	-	-	Parameter Analysis: Delta correlation * For "burn in" changes ELFR recommended
	Tests, which should be considered for the appropriate process change.					A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Tests, which should be considered for the appropriate process change after selection of condition table.							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Suppliers performed tests (mark with an 'X' for done or 'G' for generic)																																																						X		
	Reason for exception of tests and/or usage of generic data:																																																							

--	Not required.
I	Information Note required.
P	PCN required.

A letter or "•" indicates that performance of that stress test should be considered for the appropriate process change.
A @ recommended additionally by ZVEI

	CONDITIONS	No
A	Only for peripheral routing	x
B	For symbol rework, new cure time, temp	x
C	If bond to leadfinger	x
D	Design rule change	x
E	Thickness only	x
F	MEMS element only	x
H	Hermetic only	x
J	EPROM or EEPROM	x
L	Lead free	x
M	For devices requiring PTC	x
N	Passivation and gate oxide	x
P	Passivation and interlevel dielectric	x
Q	Wire diameter decrease	x
T	Only for Solder Ball SMD	x
#	Only from non-100% burned-in parts	x
*	For "burn in" changes IOL or ELFR recommended	x

=> Please mark 'NO' with 'x', default is 'YES'

Worked on: (Name, Function)	Max Mustermann
Date:	
PCN number:	
Signature:	

Form provided by ZVEI - Revision 4.1 - November 2019

Mark change with an "x"

Device evaluation

MATERIAL PERFORMANCE TEST RESULTS (on the basis of AEC Q102 – Revision March15, 2017)

Assessment of impact on Supply Chain regarding following aspects
- contractual agreements
- technical interface of processability/manufacturability of customer
- form, fit, function, quality performance, reliability

Evaluation level A / B / C — A: Application level; B: Boardlevel; C: Component level; *: Not relevant for qualification matrix

ID	Type of change	Remaining risks within Supply Chain? No	Yes	Understanding of semiconductors experts	Examples to explain	Evaluation level A / B / C	Further applicable conditions	Line evaluation (can be evaluated by data or audit/on site check)	AEC Q102	Check of specification (for raw material only)	High Temperature Operating Life HTOL	Temperature Cycling TC	Wet High temperatur Operating Life WHTOL	Power Temperature Cycling PTC	ESD Characterization- Human Body Model ESD-HBM	ESD Characterization- CDM ESD-CDM	Physical Dimensions PD	Terminal Strength TS	Vibration Variable Frequency VVF	Mechanical Shock MS	Resist. to Solder Heat RSH	Solderability SD	Hydrogen Sulphide H2S	Pulse Life Test PLT	Dew Test DEW	Flow Mixed Gas FMG	Thermal Resistance TR	Wire Bond Pull WBP	Wire Bond Shear BS	Die Shear DS	Whisker Grows WG	Parameter-Analysis: Comparison of current with changed device characterization, electrical distribution	Remarks
	ANY																																
LED-AN-01	Any change with impact on agreed upon technical contractual agreements	P	P	Intended to be used if no other type of change i applicable but the change affects agreed technical contractual agreements.		*		-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
LED-AN-02	Any change with impact on technical interface or processability/manufacturabiliy of customer, which is not covered in the matrix below	P	P	See processability on board level technical interface means component terminals		B	Check if **LED-DS-01** is affected Processability should be assessed.	-	-	-	-	T	-	-	-	-	-	-	-	-	S,T	-	-	-	-	-	-	-	-	-	-	-	
	DATA SHEET																																
LED-DS-01	Change of datasheet parameters/electrical specification (min./max./typ. values) and/or Pulse/DC specification	P	P	Change of application relevant information (e.g. maximum pulse current) due to a technical product or process change.	e.g. change of die substrate material.	A		-	-	-	E	E	E	-	E	E	-	-	-	-	S	-	-	E	-	-	E	-	-	-	-	E	
LED-DS-02	Correction of data sheet or issue of errata	I	I	No technical change of product, process or test. New description of behaviorwhich was not specified before or whichis different from initial specification. Please indicate clearly, that Infonote contains this type of change! Assessment in application required	e.g. Errata e.g. change of typ. values due to new information about component behavior e.g. improved statistics. e.g. reduction of max. allowed forward voltage due to improved statistics.	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
LED-DS-03	Specification of additional parameters	I	P	**I:** Definition of an additional parameter which was not specified before **P**: If there is a risk on supply chain where at least one additional other PCN-relevant change category will apply.	I: e.g.: adding new tested parameter I: e.g.: additional temperature coefficient parameter	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	Formalism since this is not a product change, ony addtional information Classification: C
	DESIGN																																
LED-DE-01	Design changes in epitaxy.	P	P	Any device relevant changes in design / layout of epitaxial layers **Not included:** Changes within design rules and design specification without affecting specified functions, parameters and reliability.	e.g. change from Double-hetero to Quantum wells e.g. change of barrier thickness	C	**A:** change from Double hetero to Quantum wells --> spectrum is affected	-	•	-	•	-	•	•	•	•	-	-	-	-	-	-	-	•	H	-	-	-	-	-	-	•	
LED-DE-02	Design changes in routing/layout.	P	P	Any change in chip design / layout. **Not included:**- Changes within design rules and design specification without affecting specified functions, parameters and reliability.	e.g. change in layout of current spreader; thickness of current spreader e.g. reduction of bond pad size	C	**A:** change in layout of current spreader --> radiation pattern changes	-	•	-	•	•	•	•	-	-	-	-	-	-	•	-	M	•	M	M	-	B	B	D,M	-	•	TR might be considered for complex die bond technologies
LED-DE-03	Die shrink	P	P	Shrink of active area. **Not included:** sawing street/kerf/scribe line	Typical shrink of die.	A	Please check if change in process technology (LED-PW-08) is also affected.	-	•	-	•	•	•	•	•	•	-	-	-	-	•	-	-	•	-	-	•	B	B	•	-	•	
LED-DE-04	LED package (except leadframe)	P	P	any change in housing thickness any change in form or dimensions	e.g. change of dimensions e.g. change of x, y, or z dimension of the package	B	Check if **LED-DS-02** is affected which leads to a change of the elctrooptic parameters or distributions.	-	•	-	•	•	•	•	-	-	•	-	V	V	•	T	D	-	D	D	L	B	B	D	-	•	
LED-DE-05	Design of leadframe	P	P	any change of leadframe / carrier dimensions any change of outer dimensions	e.g. change in leadframe / carrier dimensions in x,y, or z direction e.g. change inner design of the leadfeame not affecting the e/o performance & reliability of the device	B	Check if **LED-DS-02** is affected which leads to a change of the elctrooptic parameters or distributions.	-	-	•	•	•	•	•	•	•	•	-	V	V	•	T	-	-	-	-	•	B	B	D	2	•	
	PROCESS - WAFER PRODUCTION																																
LED-PW-01	New / change of wafer substrate or carrier material	P	P	New wafer substrate material.	e.g. different wafer material to currently released material (change from Sapphire to Silicon)	C	Check if **LED-DS-02** is affected which leads to a change of the elctrooptic parameters or distributions.	-	•	•	•	P	P	•	P	P	-	-	-	-	•	-	P	•	P	P	•	-	-	•	-	•	
LED-PW-02	Wafer diameter	P	P	change of wafer diameter resulting in equipment and process changes	e.g. 4" to 6"	C	In case other type of changes are affected i.e equipment/process technology - they need to be identified in addition	•	•	•	•	-	•	-	P	P	-	-	-	-	•	-	-	•	-	-	•	-	-	-		•	
LED-PW-03	New final wafer thickness	P	P	Change in final wafer thickness	e.g. change in final chip/die thickness	C	Check if **LED-DS-02** is affected which leads to a change of the elctrooptic parameters or distributions.	-	•	-	•	•	P	•	P	P	-	-	-	-	-	-	-	•	-	-	•	B	B	•	-	•	
LED-PW-04	Change of electrically active doping/implantation element	P	P	Change in electrically active doping / implantation element resulting in a new technology.	e.g. change from Be to C as dopant	C		-	•	C	•	-	C	C	•	•	-	-	-	-	-	-	-	•	-	-	•	-	-	-	-	•	
LED-PW-05	Change of stacking	P	P	change in layer sequence or thickness	e.g. change of isolation layer thickness between n- and p-material	A	customer application needs to be checked due to potential system voltage differences	-	-	-	•	F	•	•	•	•	-	-	-	-	-	-	-	•	F	-	-	-	-	-	-	•	
LED-PW-06	New / change of metallization (specifically chip frontside)	P	P	Change in metallization of bondpads, material, layer thickness	e.g. change in bond pad metallization thickness	C		-	•	M	•	•	•	•	M,B	M,B	-	-	-	-	-	-	M	•	M	M	-	•	•	-	-	•	
LED-PW-07	New / change of metallization (specifically chip backside)	P	P	Change of bottom layer of die (between die and leadframe/carrier). Change in process, material, or dimensions necessary.	e.g. change from Au to Au/Ge	C	**A:** customer application needs to be checked due to potential system voltage differences	-	•	M	•	•	•	•	D,M	D,M	-	-	-	-	•	-	D,M	•	D,M	D,M	D,M	-	-	•	-	•	
LED-PW-08	Change in process technique (e.g. significant process changes like lithography, etch, oxide deposition, die back surface preparation/backgrind, ...)	--	P	Change from wet to dry etching, change from horizontal to vertical oven for oxidation, change from contact litho into stepper litho, …	e.g. change from wet etch to dry etch e.g. change from laser cutting (sawing) to plasma cutting (sawing) e.g. change from contact litho to stepper litho	C	**B:** change from CVD dep to sputter dep for backside/frontside metallization. In case of new equipment please check if **LED-PA-14** is also affected.	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Qualification effort depends on type of change.
LED-PW-09	Process Integrity: Tuning within specification	--	P	Variation within process specification	e.g. process control	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	_	
LED-PW-10	Change of material supplier with no impact on agreed specifications	--	P	Change of wafer supplier. Change of supplier for chemicals needed for wafer production.	e.g. Change of wafer supplier.	C		-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Qualification effort depends on type of change.
LED-PW-11	Change of specified wafer process sequence (deletion and/or additional process step)	--	P	Any change which is not covered by another type of change. Risk is to be assessed.	e.g. additional cleaning process in wafer production	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Qualification effort depends on type of change. PPAP has to be updated.
LED-PW-12	Change in die coating or passivaton	P	P	Change in material, thickness, and process for coating and passivation	e.g. change from SiO2 to SiN3	C		-	•	P	•	•	•	P	P	P	-	-	-	-	-	-	P	-	P	P	-	P	P	-	-	•	
LED-PW-13	New wafer production location or transfer of wafer production to a different not previously released location/site/subcontractor	P	P	New wafer propduction location or transfer of wafer production with possible additional changes.		C	**A** or **B**: Impact on other type of changes described under PROCESS - WAFER PRODUCTION and EQUIPMENT categories of this DeQuMa	•	•	-	•	•	•	-	•	•	-	-	-	-	•	-	-	•	-	-	J	•	•	•	-	•	
	BARE DIE DELIVERIES																																
LED-BD-01	New / change of front side metallization	P	P	Change in bondpads, material, pad pitch, surface changes, layer thickness	e.g. change from Au to Au alloy e.g. change in over pad metalization	B		-	-	M	•	•	•	•	M,B	M,B	-	-	-	-	-	-	•	•	•	•	•	•	•	-	-	-	
LED-BD-02	New / change of backside metallization	P	P	Change of bottom layer of die (between die and leadframe/carrier). Change in process, material, or dimensions.	e.g. change from Au to Au alloy	B	Check if LED-DS-02 is affected which leads to a change of the elctrooptic parameters or distributions.	-	-	M	•	•	•	•	D,M	D,M	-	-	-	-	•	-	•	•	•	•	•	-	-	•	-	-	customer application needs to be checked due to potential system voltage differences
LED-BD-03	Change of wafer setup or number of dies on wafer.	I	P	Needed information for pick & place machine. **I:** only additional number of chips **P:** change in spacing between chips and form of wafer	e.g. information change for pick & place machine.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
LED-BD-04	New final wafer thickness	P	P	Changes in final Chip height (including carrier); very rare and usually combined with a material change (change of carrier material)	e.g. change on converter thickness	B	Check if **LED-DS-01** is also affected.	-	-	P	•	•	P	•	P	P	•	-	-	-	•	-	-	•	-	-	•	B	B	•	-	•	
LED-BD-05	Change in die coating or passivation	P	P	Change in material, thickness, and process for coating and passivation	e.g. change from SiO2 to SiN3	B	Check if **LED-DS-01** is also affected.	-	•	P	•	•	•	P	P	P	-	-	-	-	•	-	P	-	P	P	-	P	P	-	-	•	
	PROCESS - ASSEMBLY																																
LED-PA-01	Change of leadframe/carrier base material	P	P	New leadframe/carrier material (new in composition)	e.g. change from copper alloy to bare copper	B	Check if **LED-DS-02** is affected which leads to a change of the elctrooptic parameters or distributions.	-	•	•	P	•	•	-	-	-	-	3	-	-	•	•	A	-	A	A	P,1	•	•	•	P	-	Explanation should be provided in case H2S test is not applicable Regarding applicable materials please refer to the Whisker standard.
LED-PA-02	Change of leadframe/carrier finishing material (internal)	P	P	Change of surface material of die attach pad and second bond area (e.g. influence in adhesion to mold compound, wedge bond reliability)	e.g. change from Ag flash to NiPd protection layer e.g. change from Ag spot to Au spot	A		-	•	•	P	•	•	•	-	-	-	-	-	-	•	•	A	-	A	A	P,1	•	•	•	-	-	H2S test should be considered for automotive exterrior applications. explanation should be provided in case H2S test is not applicable
LED-PA-03	Change of lead and heat slug plating material/plating thickness (external)	P	P	Change in material and process technique for final pin termination (e.g. pure tin). Herein package, processability and reliability on board level can be verified by generic data. Classification depends on impact of change	e.g. change in heat slug stack e.g. change from Sn into Ni/Pd/Au e.g. change of layer thickness	B		-	-	M	P	•	K	-	-	-	1	-	-	-	•	•	A	-	A	A	P,1	-	-	-	K	-	Explanation should be provided in case H2S test is not applicable Regarding applicable materials please refer to the Whisker standard.
LED-PA-04	Bump Material / Metall System (internal)	P	P	Stack die or die to substrate	e.g. change to Pb-free material	A		-	-	•	•	•	•	•	-	-	-	-	-	-	•	-	W	-	W	W	•	-	-	•	-	-	
LED-PA-05	Die attach material	P	P	Change of die attach material (e.g. soft solder, epoxy, etc). Thermal managment must be respected.	e.g. change of Ag glue to Au glue;	B		-	•	•	•	•	•	•	-	-	-	-	N	N	•	-	Q	-	N	Q	•	-	-	•	-	-	
LED-PA-06	Change of bond wire material	P	P	Material, wire diameter, change in process technique	e.g. change from 30µ to 25µ	A		-	•	•	•	•	P,D	•	-	-	-	-	D	D	•	-	P,D	•	-	P,D	-	•	•	-	-	-	Site audit for material change with impact on bondprocess (e.g. from Au to Cu) recommended.
LED-PA-07	Change in material for sub-components (excluding LED chip & LED package related items) with impact on agreed specifications	P	P	Change of sub-component supplier using different technology/materials **Note:** Jump start test at OEMs might be necessary	e.g. using a different ESD-diode in technology and material than previously	A	Check if **LED-DS-01** is also affected.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Qualification effort depends on type of change.
LED-PA-08	Die Overcoat / Underfill	--	P	Supporting layers for complex packages like flip chip. --: No change in product integrity P: change can influence the integrity of final product	P: e.g. change of underfill with change of thermal resistance	B	Check if **LED-DS-01** is also affected.	-	•	P	•	•	P	•	-	-	-	-	-	P	•	-	P	•	-	P	U	-	-	U	-	-	
LED-PA-09	Change of mold compound/encapsulation/sealing material	P	P	Change of mold compound, encapsulation, or sealing material might be affected optical function in case of package related effect (e.g. browning). Component assembly and board coating has to be assessed. MSL might be changed.	e.g. PPA mold compound	A	Check if **LED-DS-01** is also affected.	-	•	•	•	-	•	•	-	-	D	3	D	D	•	T	P	P	P	P	P	-	-	-	-	-	
LED-PA-10	Change of conversion material	P	P	Change of material class.	e.g. change from granats to nitrides	C	Check if **LED-DS-01** is affected for optical/photometric parameters	-	•	•	•	Y	•	•	-	-	-	-	Y	Y	•	-	P	P	P	P	Y	-	-	-	-	•	
LED-PA-11	Change of direct supplier for converter material	--	P	New supplier with same material specification		C		-	-	•	•	P	•	•	-	-	-	-	P	P	•	-	P	P	P	P	P	-	-	-	-	•	
LED-PA-12	Change of converter process technology	I	P	new technology for converter production **I:** no influence on e/o performance of product **P:** in case of impact on product integrity	e.g. change from volume conversion to layer conversion; e.g. change from stamping to printing of layer	C	Check if any change in electro-optical characteristics results in change of data sheet **LED-DS-01**	-	•	-	•	Y	•	•	-	-	-	-	Y	Y	•	-	Z	Z	Z	Z	Y	-	-	-	-	•	
LED-PA-13	Change of product marking	I	P	Marking on device. **I:** change in appearance; readability not affected **P:** change of content or change of appearance of data matrix code	e.g. marking of cathode;	B		-	-	-	-	O	-	-	-	-	-	-	-	-	T	T	-	-	-	-	-	-	-	-	-	-	
LED-PA-14	Change in process technique (e.g., die attach, bonding, moulding, plating, trim and form, …)	P	P	Any change in assembly process technique	e.g. change die attached from gluing to soldering;	B	**A** or **B:** Please check if **EQUIPMENT** and other type of changes of material **(LED-PA-04/05/06/07/08/09/10)** are affected	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Qualification effort depends on type of change.
LED-PA-15	Process Integrity: Tuning within specification	--	P	Variation within process specification	e.g. process control	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

LED-PA-04	Change of direct material supplier with no impact on specification	--	P	Change of suppliers e.g. for lead frames, wire material, die attach, electronical components ...	Change of suppliers e.g. for lead frames, wire material, ESD-Stcke ...	C	Assumption that change material specification remains unchanged. Otherwise see change of material.	-	-	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	See change of material.
LED-PA-07	Change of specified/essentiy process sequence (additional and/or deletion of process step)	I	P	Addition or deletion of a process step in assembly process sequence with potentially significant impact on the product performance **I:** no influence on product integrity **P:** influence on product integrity expected	e.g. additional or deletion plasma cleaning process	C	Single case assessment necessary to identify possible interactions or risk.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Qualification effort depends on type of change.
LED-PA-08	New assembly location or transfer of assembly to a different not previously released location/site/subcontractor.	P	P	New assembly location, assembly transfer or relocation. Transfer of known technology and equipment.	e.g. Dual source strategy	C	**A** or **B:** Impact on other type of changes described under **PROCESS ASSEMBLY** and **EQUIPMENT**	●	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Qualification effort depends on type of change.
PACKING/SHIPPING																																		
LED-PS-01	Inner Packing/shipping specification change	P	P	Dimension change of direct product packing.	e.g. SMT pocket in tape changes	B		-	-	P	-	-	-	-	P	P	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	-	
LED-PS-02	Outer Packing/shipping specification change	I	P	Dimension changes indirect product packing **I:** small changes in dimension or appearance **P:** number of reels in the packing are changing	e.g. pizza box	*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
LED-PS-03	Change of labelling	I	P	Change of labelling also on reel. **I:** additional information no change of previous information **P:** change in content of previous information	**(B)** e.g. additional information (RoHS-stamp) **(P)** e.g. change of customer specific information	B	Check if **LED-DS-01** is also affected.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
LED-PS-04	Dry pack requirement change	P	P	Change of dry pack requirements (change in MSL)	e.g. change from MSL3 to MSL1	*	Check if **LED-DS-02** is also affected.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EQUIPMENT																																		
LED-EQ-01	Production from a new equipment/tool which uses a different basic technology	P	P	Change in process technique which is not already covered above. **Note:** Major changes affecting the product not covered by the table should also a PCN.	e.g.change from single wafer to batch process e.g. over pad metallisation e.g. dashbar cutting (mechanical to laser cutting)	B	Check if **LED-DS-01** is also affected. Corrosion stability should be assessed.	-	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Qualification effort depends on type of change.
LED-EQ-02	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool) without change of process.	--	P	PCN required for dedicated equipment for sensitive component production	e.g. change from single-site to multi-site handler.	C		-	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Qualification effort depends on type of change.
LED-EQ-03	Change in final test equipment type that uses a different technology	I	P	Change of tester platform (e.g. major test program changes , new tester interface) **I:** product specification is not affected **P:** product specification is affected	e.g. change in test method from cd to lumen	B		-	●	-	-	-	-	-	●	●	-	-	-	-	T	-	-	-	-	-	-	-	-	-	-	-	●	Stage R&R / delta correlation
TEST FLOW																																		
LED-TF-01	Move of all or part of electrical wafer test and/or final test to a different location/site/subcontractor	P	P	Tester transfer or relocation.	e.g. Dual source strategy	C		●	-	-	B	●	●	B	●	●	-	-	-	-	●	T	-	B	-	-	-	B	B	B	-	●	Stage R&R / delta correlation, additional specification check It should be considered for Wafer testing
QUATE																																		
LED-QS-01	Change of the test coverage testing process flow used by the supplier to ensure data sheet compliance (e.g. elimination/addition of electrical measurements/test flow block, relaxation/enhancement of monitoring procedure or sampling)	--	P	Reduction or additional control steps, test coverage within the process flow	e.g. test flow block like Final test / final clearance	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	●	
Tests, which should be considered for the appropriate process change.									-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tests, which should be considered for the appropriate process change after selection of condition table.								-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Suppliers performed tests (mark with an 'X' for done or 'G' for generic)																																		
Reason for exception of tests and/or usage of generic data:																																		

--	Not required.
I	Information Note required.
p	PCN required.

A letter or "●" indicates that performance of that stress test should be considered for the appropriate process change.
A @ recommended additionally by ZVEI

	CONDITIONS	No
A	Not for Ag plated devices applicable (Ag intended to fail for this test)	
B	Only if Bondpads/Ainbond is changed/affected	
C	Only if dopant/implantation material is changed	
D	Only if Dimensions are changing	
E	Only if minimas Values are changing	
F	Sequence change only	
H	Non Epoxy Casted Devices only	
J	Only for chip technology using wafer bonding	
K	Not for Au plated devices	
L	Only if Leadframe/Substrate Dimensions are changed	
M	Only if metal composition is changed including sequence	
N	Only for glued chips	
O	Only if process is changing	
P	Only if material properties are changed	
Q	Only if glue components are changing	
R	Only if marking technology changes	
S	Only if Floor Life is affected	
T	Only if Board Reliability is affected	
U	Only if underfill is affected	
V	Only for non-hermetic devices	
W	Only if risk of corrosion is increasing	
Y	Only for layer technology	
Z	Only if conversion technology changes	
1	Only if data sheet parameters are affected	
2	Only if outer dimensions are critical	
3	Only for leaded parts	
	=> Please mark NO with 'x', default is 'YES'	

Worked on: (Name, Function)	Max Mustermann
Date:	
PCN number:	
Signature:	

Form provided by ZVEI - Revision 4.1 - November 2019

Mark change with an "x"

ID	Type of change	No	Yes	Understanding of semiconductors experts	Examples to explain	Evaluation level A / B / C	Further applicable conditions
	Assessment of impact on Supply Chain regarding following aspects - contractual agreements - technical interface of processability/manufacturability of customer - form, fit, function, quality performance, reliability	**Remaining risks within Supply Chain?**				A: Application level B: Boardlevel C: Component level *: Not relevant for qualification matrix	
	ANY						
MCM-AN-01	Any change with impact on agreed upon technical contractual agreements	P	P	Intended to be used if no other type of change is applicable but the change affects agreed technical contractual agreements		*	
MCM-AN-02	Any change with impact on processability/manufacturability at customer, which is not covered in the matrix below.	P	P	Any change which is not covered in the matrix below, but risk assessment at customer is recommended.		B	
	DATA SHEET						
MCM-DS-01	Change of datasheet parameters/electrical specification (min./max./typ. values) and/or AC/DC specification	P	P	Update of data sheet because of technical change of the product.	e.g. recommendations for pull-up/pull-down or NC pins, MSL	A	
MCM-DS-02	Correction of data sheet / errata	I	I	No technical change of product, process or test. New description of behaviour which was not specified before or which is different from initial specification. Please indicate clearly, that Info note contains this type of change! Assessment in application required!	e.g. Errata	A	
MCM-DS-03	Specification of additional parameters	I	P	Description of a new not previously covered parameter. No technical change of the product. **(I):** Definition of new parameter which was not documented before. **(P):** Not known as single change. Only in combination with other changes.	**(I):** e.g. adding new tested parameter.	A	
	DESIGN						
MCM-DE-01	Firmware modification	I	P	Integrated software by design or memory as defined by supplier. **(I)**: Firmware modification or update without effect of functional performance at the customer (bug fix). **(P)**: Firmware modification or update with effect of functional or reliability performance at the customer.	**(I)**: e.g. addition of Firmware opportunities **(P)**: e.g. bug fix with impact on functional performance	A	
MCM-DE-02	Change that adds or subtracts sub-components from the module BOM	P	P		e.g. addition of passive elements in filter circuit	A	
	PROCESS - ASSEMBLY - MATERIALS						
MCM-PA-01	Replacement of any sub-component by a Non-AEC qualified sub-component	P	P	Change from an AEC Qualified sub-component to a Non-AEC Qualified sub-component or Change from a Non-AEC Qualified sub-component to another Non-AEC Qualified sub-component		A	
MCM-PA-02	Replacement of any sub-component by an AEC qualified sub-component	P	P	Change from one AEC Qualified sub-component to another AEC Qualified sub-component Change from a Non-AEC Qualified sub-component to an AEC Qualified sub-component e.g. with impact on electrical robustness (ESD, latch up, …) electrical functionality, test coverage		A	Requires additional evidence that new sub-component is AEC qualified
MCM-PA-03	Replacement of any sub-component by an AEC qualified sub-component Critical characteristics of sub-component are **not** affected	I	P	e.g. with **no** impact on electrical robustness (ESD, latch up, …) electrical functionality, test coverage		C	Requires additional evidence that new sub-component is AEC qualified
MCM-PA-04	Change within a sub-component that has been requalified Critical characteristics of sub-component are affected	P	P	e.g. with impact on electrical robustness (ESD, latch up, …) electrical functionality, test coverage		A	Requires additional use of the appropriate ZVEI DeQuMa (e.g. active, passive component) for qualification of the changed sub-component
MCM-PA-05	Change within a sub-component that has been requalified Critical characteristics of sub-component are **not** affected	I	P	e.g. with **no** impact on electrical robustness (ESD, latch up, …) electrical functionality, test coverage		C	Requires additional use of the appropriate ZVEI DeQuMa (e.g. active, passive component) for qualification of the changed sub-component
MCM-PA-06	Substrate change affecting module schematic (Changes to the internal dimensions and / or schematics)	P	P	Design change and routing Change in substrate, leadframe dimensions which has impact to the specified electrical parameter acc. data sheet or specification (e.g. heat sink, pin dimensions, die paddle size, ...) Not included: Variation within specification.		A	
MCM-PA-07	Change to the processes used in module assembly (e.g., pick & place, die attach, bonding, reflow, encapsulation, singulation, die overcoat, underfill, die preparation, die clean)	-	P	(--): If the change in process technology does not influence the integrity of the final product. (P): If the change in process technology can influence the integrity of the final product.	**(--):** e.g. tuning within process specification	C	
MCM-PA-08	Process integrity: tuning within specification	-	P	Variation within process specification **(--):** If tuning within process specification does not influence the integrity of the final product. **(P):** If impact on product specification is anticipated.	**(--):** e.g. process control	C	
MCM-PA-09	Change to materials used in module assembly (e.g., adhesive, underfill, encapsulate, solder, epoxy, bump material, die attach material, bond wire, die overcoat, substrate, leadframe base material)	P	P	Change of used material (e.g. bump material, die attach material, soft solder, epoxy, etc.) Change of bond wire material, diameter, change in bonding diagram	e.g. Stack die or die to substrate (flip chip) e. g. change to Pb-free material e. g. change of copper pillars e.g. change from Sn into Ni/Pd/Au	C	B: impact on thermomechanical stress caused by mismatch of mold compound, interconnecting technology and carrier is anticipated B: external lead finishing material is affected
MCM-PA-10	Change of direct material supplier	-	P	Change of suppliers for direct materials which are used in assembly process (BOM). **(--):** If change does not influence the integrity of the final product. **(P):** If impact on product integrity is anticipated.	**(--):** e.g. change of wire material supplier. **(P):** e.g. change to new mold compound supplier e.g. additional leadframe supplier with specific leadframe manufacturing technology e.g. additional or new substrate supplier	C	Please check if material is changed!
MCM-PA-11	Change to assembly location (Move all or parts of production to a different assembly site)	P	P	Assembly transfer or relocation Includes transfer as well as additional site	e.g. dual source / fab strategy	C	A or B: impact on other type of changes described under PROCESS ASSEMBLY and SEM-EQ-01. In case of Cu wire product please consider AEC-Q006.
MCM-PA-12	Change of product marking	I	P	Change of marking on device and / or change in process resulting in a new technology.. **(I):** If change does not influence the integrity of the final product. **(P):** If impact on product integrity is anticipated.	**(I):** e.g. change of appearance (additional marking) **(P):** e.g. change from inked marking to laser marking e.g. marking of pin 1	B	
	PACKING/SHIPPING						
MCM-PS-01	Packing/shipping specification change	P	P	Packing/shipping specification change.		*	
MCM-PS-02	Dry pack requirements change	P	P	Change of dry pack requirements (e.g. change of MSL)		*	
MCM-PS-03	Change of carrier (tray, reel)	P	P	Change of carrier (tray, reel)		B	
MCM-PS-04	Change of labelling	I	P	Change of labelling also on reel. **(I):** Change of material label without impact on barcode. **(P):** Changes of material label information which affects data processing at customer.	**(I)** e.g. additional information (RoHS stamp) **(P)** e.g. change of defined nomenclature for data processing	B	
	EQUIPMENT						
MCM-EQ-01	Production from a new equipment/tool which uses a different basic technology or which due to its unique form or function can be expected to influence the integrity of the final product	P	P	Change in process technique which is not already covered above.	Change from single wafer to batch process (e.g. over pad metallization) e.g. dambar cutting (mechanical to laser cutting)	A	
MCM-EQ-02	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool) without change of process.	-	P	PCN required for dedicated equipment for sensitive component production. **(--):** If change does not influence the integrity of the final product. **(P):** If impact on product integrity is anticipated.	**(--):** e.g. extension of existing equipment pool **(P):** e.g. extension of dedicated equipment in case basic technology still need to be proven	C	
MCM-EQ-03	Change to testing platform (Change in final test equipment type leading to a different test concept)	P	P	Change of tester platform with differences in HW or SW that makes a change in test concept necessary	e. g. change tester equipment from LTX to Teradyne	C	
	TEST FLOW						

Device evaluation

MATERIAL PERFORMANCE TEST RESULTS on the basis of AEC-Q104 Revision -September 14, 2017 — additional to AEC-Q10x

ID	Line evaluation (can be evaluated by data or audit/on site check)	AEC-Q104 Revision September 14, 2017	Check of specification (for raw material and sub-component)	Temperature Humidity Bias or biased HAST THB A2	Autoclave or Unbiased HAST AC A3	Temperature Cycling TC A4	Power Temperature Cycling PTC A5	High Temperature Storage Life HTSL A6	High Temperature Operating Life HTOL B1	Early Life Failure Rate ELFR B2	NVM Endurance, Data Retention, and Operational Life EDR B3	Wire Bond Shear WBS C1	Wire Bond Pull WBP C2	Solderability SD C3	Physical Dimensions PD C4	Solder Ball Shear SBS C5	Lead Integrity LI C6	X-ray / CSAM XRAY C7	Electronic Discharge Human Body Model HBM E2	Electronic Discharge Charged Device Model CDM E3	Latch up LU E4	Electrical Distribution ED E5	Fault Grading FG E6	Characterisation CHAR E7	Electromagnetic Compatibility EMC E8	Soft Error Rate SER E9	Hermetic Package Test MECH G1-4	Package Drop DROP G5	Lid Torque LT G6	Die Shear DS G7	Internal Water Vapor IWV G8	Board Level Reliability BLR H1	Low Temperature Storage Life LTSL H2	Start Up and Temperature Steps STEP H3	MCM Drop Test MCM DROP H4	Destructive Physical Analysis DPA H5	X-ray XRAY H6	Acoustic Microscopy AM H7	Whisker test (IEC 60068-T2-82, JEDEC JESD201)	Parameter-Analysis: Comparison of current with changed device characterization, electrical distribution	Remarks
ANY																																									
MCM-AN-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MCM-AN-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DATA SHEET																																									
MCM-DS-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MCM-DS-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MCM-DS-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
DESIGN																																									
MCM-DE-01	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MCM-DE-02		•	•	@•	•	•	@•	@•	•	•	-	-	-	-	-	-	-	-	•	•	•	•	•	•	•	M	@ •,D	-	-	@ F	-	-	-	-	-	-	-	-	-	•	
PROCESS - ASSEMBLY - MATERIALS																																									
MCM-PA-01		•	•	•	•	•	•	•	•	•	•	-	-	-	-	-	-		•	•	•	•	•	•	•	M	@•,D	@•	-	@ F	-	-	-	-	-	@•	@•	@•	-	•	
MCM-PA-02		•	•	-	-	-	-	-	•	-	•	-	-	-	-	-	-		•	•	•	•	•	•	•	M	@•,D	@•	-	@ F	-	-	-	-	-	@•	@•	@•	-	•	
MCM-PA-03		•	•	-	-	-	-	-	@•	-	@•	-	-	-	-	-	-		@•	@•	@•	@•	@•	•	•	@ M	@•,D	@•	-	@ F	-	-	-	-	-	@•	@•	@•	-	•	
MCM-PA-04		•	•	-	-	-	-	-	•	-	•	-	-	-	-	-	-		•	•	•	•	•	•	•	M	@•,D	-	-	@ F	-	-	-	-	-	-	-	-	-	•	
MCM-PA-05		•	•	-	-	-	-	-	@•	-	@•	-	-	-	-	-	-		@•	@•	@•	•	@•	@•	•	@ M	@•,D	-	-	@ F	-	-	-	-	-	-	-	-	-	•	
MCM-PA-06		•	•	@•	•	•	@ K	-	•	•	-	@•	@•	-	-	-	-	-	•	•	•	•	•	•	•	M	-	-	-	-	-	-	-	-	-	@•	-	-	-	•	
MCM-PA-07		•	-	•	-	•	@ K	-	@ A	-	-	•	•	-	•	•	-	•	-	-	-	@ H	-	@•	-	-	-	-	-	-	-	-	-	-	-	@•	-	-	-	•	
MCM-PA-08	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MCM-PA-09		•	•	•	-	•	@ K	@•	@ E	@ E	-	•	•	•	•	•	•	-	-	-	-	•	-	@•	-	-	-	-	-	-	-	-	-	-	-	@•	-	-	-	•	
MCM-PA-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	See change of material.
MCM-PA-11	•	•	-	•	•	•	@ K	-	•	•	-	•	•	•	•	@ T	•		-	-	-	•	-	@•	-	-	-	-	-	-	-	-	-			@•		-	@•	•	Whisker tests have to be done on monitoring basis! AEC-Q100: "For broad changes that involve multiple attributes (e.g., site, materials, processes), refer to section A1.3 of this appendix and section 2.3 of Q100, which allows for the selection of worst-case test vehicles to cover all the possible permutations."
MCM-PA-12	-	-	-	-	-	-	-	-	-	-	-	-	-	B	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
PACKING/SHIPPING																																									
MCM-PS-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MCM-PS-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MCM-PS-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MCM-PS-04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EQUIPMENT																																									
MCM-EQ-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	•	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	Affected process change is to check.
MCM-EQ-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
MCM-EQ-03	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	•	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	Gage R&R / delta correlation
TEST FLOW																																									

MCM-TF-01	Change to testing location (Move of all or part of the final test to a different test site)	P	P	Tester transfer or relocation. Check impact on MCM-AN-01 Includes transfer as well as additional site	Dual source strategy	C		•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	•	-	@ •	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	Gage R&R / delta correlation
	Q-GATE																																															
MCM-QG-01	Change of the test coverage/testing process flow used by the supplier to ensure data sheet compliance (e.g. elimination/addition of electrical measurement/test flow block; relaxation/enhancement of monitoring procedure or sampling)	-	P	e.g. test flow block, reduction from three temperature measurements to two temperature measurements, change in burn in / run in process. **(--):** If change does not influence the integrity of the final product. **(P):** If impact on product integrity is anticipated.	**(--):** e.g. test implemented without customer requirement **(P):** e.g. reduction from three temperature measurements to two temperature measurements e.g. change in burn in / run in process.	C		•	-	-	-	-	-	-	-	-	*	-	-	-	-	-	-	-		-	-	-	•	-	@ •	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	•	Parameter Analysis: Delta correlation * For "burn in" changes ELFR recommended
	Tests, which should be considered for the appropriate process change.							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tests, which should be considered for the appropriate process change after selection of condition table.							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Suppliers performed tests (mark with an 'X' for done or 'G' for generic)																																															
	Reason for exception of tests and/or usage of generic data:																																															

–	Not required.
I	Information Note required.
P	PCN required.

A letter or "•" indicates that performance of that stress test should be considered for the appropriate process change.
A @ recommended additionally by ZVEI.

	CONDITIONS	No
A	die preparation and/or die clean	
B	For symbol rework, new cure time, temp	
C	If bond to leadfinger (requirement in Q100)	
D	G1 - G3; no G4	
E	only for bare die and change of mold compound	
F	bare die sub-component only	
H	processes for material in direct contact with die surfaces	
K	For devices requiring PTC (requirement in Q100)	
M	Applicable for subcomponents with > 1M SRAM or DRAM per AEC-Q100	
T	Only for Solder Ball SMD (requirement in Q100)	
*	For "burn in" changes IOL or ELFR recommended	

=> Please mark 'NO' with 'x', default is 'YES'

Worked on: (Name, Function)	Max Mustermann
Date:	
PCN number:	
Signature:	

Form provided by ZVEI - Revision 4.1 - November 2019

Mark change with an "x"

Device evaluation

Selection of component	ID	Type of change (Assessment of impact on Supply Chain regarding following aspects - contractual agreements - technical interface of processability/manufacturability of customer - form, fit, function, quality performance, reliability)	Remaining risks within Supply Chain? No	Yes	Understanding of component experts	Examples to explain	Evaluation level A / B / C (A: Application level B: Boardlevel C: Component level *: Not relevant for qualification matrix)	Further applicable conditions	Remarks
NETWORKS & RESISTORS		**NETWORKS & RESISTORS**							
NETWORKS & RESISTORS		**ANY**							
NETWORKS & RESISTORS	PAS-RES-AN-01	Any change with impact on agreed upon technical contractual agreements	P	P	Intended to be used if no other type of change is applicable but the change affects agreed technical contractual agreements	Not relevant for technical evaluation.	*		
NETWORKS & RESISTORS	PAS-RES-AN-02	Any change with impact on processability/manufacturabiliy at customer, which is not covered in the matrix below.	P	P		Technical interface means component terminals.	B		
NETWORKS & RESISTORS		**DATASHEET**							
NETWORKS & RESISTORS	PAS-RES-DS-01	Change of datasheet parameters/electrical specification (min./max./typ. values) and / or AC/DC specification	P	P	Change of application relevant information **Not included:** Editorial changes.	e.g. tighten of electrical parameter distribution	A	Risk assessment depending on change for each application.	
NETWORKS & RESISTORS	PAS-RES-DS-02	Correction of data sheet or issue of errata	I	I	No technical change of product, process or test. New description of behavior which was not specified before or which is different from initial specification. Please indicate clearly, that Infonote contains this type of change! Assessment in application required!!	e.g. data sheet correction because of new information about component behavior	A		
NETWORKS & RESISTORS	PAS-RES-DS-03	Specification of additional parameters	I	P	Description of a new not previously covered parameter. No technical change of the product. **(I):** no influence **(P):** Risk assessment depending on change for each application to provide evidence of additional parametes (stat. evaluation)	e.g. adding new (tested) parameter.	A		
NETWORKS & RESISTORS		**MATERIAL**							
NETWORKS & RESISTORS	PAS-RES-MA-01	Change of material composition - Ink/Wire material of Resistor element	P	P	Change of Ink / Wire material	e.g. resistor paste, NiCr, resistor wire	C		
NETWORKS & RESISTORS	PAS-RES-MA-02	Change of material composition - Ink/Wire material of Terminal element	P	P	Change of Ink / Wire material	e.g. AgPd paste, Ag paste, lead wire , NiCr for side termination	B		
NETWORKS & RESISTORS	PAS-RES-MA-03	Change of material composition - Package/ Mold	P	P	Change of Package	e.g. for chip res.: final coating, epoxy	B		Check whether AOI at tier 1 can be affected.
NETWORKS & RESISTORS	PAS-RES-MA-04	Change of material composition - Passivation	P	P	Change of Passivation /Inner protection	e.g. change of glass	C		
NETWORKS & RESISTORS	PAS-RES-MA-05	Change of material composition - Substrate material	P	P	Change of substrate material		C		
NETWORKS & RESISTORS	PAS-RES-MA-06	Change of supplier of material	-	P	Change to a new or additional material supplier at component manufacturer.	e.g. for 2nd source purpose	C		Assumption material specification remains unchanged. Otherwise see change of material.
NETWORKS & RESISTORS		**DESIGN**							
NETWORKS & RESISTORS	PAS-RES-DE-01	Changes of termination, surface finish, shape, color, appearance or dimension structure	I	P	Change of package		B		
NETWORKS & RESISTORS	PAS-RES-DE-02	Changes of inner construction - Passivation	-	P	Change of passivation/Inner protection	e.g. change of glass, laquer, epoxy, ...	C		
NETWORKS & RESISTORS		**PROCESS**							
NETWORKS & RESISTORS	PAS-RES-PR-01	Changes in process technology or manufacturing methods - Ink Fire	-	P	Change of ink fire process	e.g. change of firing profile e.g. change from normal atmospher to nitrogen atmospher	C		
NETWORKS & RESISTORS	PAS-RES-PR-02	Changes in process technology or manufacturing methods - Ink Print	-	P	Change of ink print process		C		
NETWORKS & RESISTORS	PAS-RES-PR-03	Changes in process technology or manufacturing methods - Trim	-	P	Change of trim process	e.g. change from mill trimming to laser trimming	C		
NETWORKS & RESISTORS	PAS-RES-PR-04	Changes in process technology or manufacturing methods - Lead Form	-	P	Change of lead form process	e.g. change from bending to punching	B		
NETWORKS & RESISTORS	PAS-RES-PR-05	Changes in process technology or manufacturing methods - Termination Attach	-	P	Change of termination attach process	e.g. chip resistors: electroplating process e.g. welding of leads for through put devices.	B		
NETWORKS & RESISTORS	PAS-RES-PR-06	Changes in process technology or manufacturing methods - Marking	-	P	Change of marking process	e.g. change from tampon printing to laser marking	B		
NETWORKS & RESISTORS	PAS-RES-PR-07	Changes in process technology or manufacturing methods - Molding	-	P	Change of molding process		B		
NETWORKS & RESISTORS	PAS-RES-PR-08	Process integrity: tuning within specification	-	P	Variation within process specification.	e.g. process control	C		
NETWORKS & RESISTORS		**PACKING / SHIPPING - NEW MATERIAL, CRITICAL DIMENSIONS**							
NETWORKS & RESISTORS	PAS-RES-PN-01	Packing / shipping specification change (loosening of tolerances)	P	P	Change of packing specification.	e.g. number of pieces on reel.	B		
NETWORKS & RESISTORS	PAS-RES-PN-02	Dry pack requirements change	P	P	Change of dry pack requirements.	e.g. change of MSL e.g. change in dry pack assurance (HIC, MBB)	B		
NETWORKS & RESISTORS	PAS-RES-PN-03	Change of carrier (tray, reel)	P	P	Change of carrier	e.g. change by material e.g. change by geometry.	B		
NETWORKS & RESISTORS		**PACKING / SHIPPING - VISUAL INSPECTION**							
NETWORKS & RESISTORS	PAS-RES-PV-01	Change of labelling	I	P	Change of labelling, also on reel.	**(I)** e.g. additional information (RoHS stamp) **(P)** e.g. change of customer specific information	B		
NETWORKS & RESISTORS	PAS-RES-PV-02	Change of product marking	I	P	Marking on device.	e.g. change of content of marking e.g. change of method of marking e.g. change of appearance of marking	B		
NETWORKS & RESISTORS	PAS-RES-PV-03	Change of packing/shipping specification	P	P	Change in packing specification which does not described a change of dimensions or material of the packing.	e.g. change of documentation in packing specification	*		
NETWORKS & RESISTORS		**LOGISTICS / CAPACITY / TESTING - EQUIPMEMENT**							
NETWORKS & RESISTORS	PAS-RES-EQ-01	Production from a new equipment/tool which uses a different technology or which due to its unique form or function can be expected to influence the integrity of the final product	P	P	Change in process technique which is not already covered above. **Note:** Changes affecting the product not covered by the table require also a PCN.	e.g. new equipment supplier with different process concept	C		Test effort depends on final risk assessment. Performance test according to affected process change.
NETWORKS & RESISTORS	PAS-RES-EQ-02	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool)	-	P	PCN required for dedicated equipment for sensitive component production.	e.g. additional equipment to increase production capacity e.g. replacement of same equipment	C		Test effort depends on final risk assessment. Performance test according to affected process change.
NETWORKS & RESISTORS	PAS-RES-EQ-03	Change in final test equipment type that uses a different technology	P	P	Change of final test equipment which use different technology. PCN required for dedicated equipment for sensitive parameters.	e.g. change of tester platform	C		Gage R&R / delta correlation
NETWORKS & RESISTORS		**LOGISTICS / CAPACITY / TESTING - PROCESS FLOW**							
NETWORKS & RESISTORS	PAS-RES-PF-01	Manufacturing site transfer or movement of a part of production process to a different location/site	P	P	Change of manufacturing site. Includes transfer as well as additional site. **Note**: Reorganization inside one plant/site is not affected!	e.g. movement or transfer of manufacturing site or process step(s) to a different location/site. e.g. dual source / fab strategy	B		
NETWORKS & RESISTORS	PAS-RES-PF-02	Elimination or addition of a manufacturing process step	-	P	Change of manufacturing process sequence.	e.g. washing / cleaning process e.g. change of order of processes	C		Characterisation depends on impact of production flow.
NETWORKS & RESISTORS		**LOGISTICS / CAPACITY / TESTING - Q-GATE**							
NETWORKS & RESISTORS	PAS-RES-QG-01	Change of test coverage used by the supplier to ensure data sheet compliance (e.g., elimination/addition of electrical measurement/test flow block, relaxation/enhancement of monitoring procedure or sampling)	-	P	Change of test coverage.	e.g. change from 100% to sample inspection e. g. test flow block, reduction from three to two temperature measurements e.g. change in burn in/run in process.	C		R (electr. funct.): test coverage. R (reliability) only for change in burn in process.
INDUCTORS		**INDUCTORS**							
INDUCTORS		**ANY**							
INDUCTORS	PAS-IND-AN-01	Any change with impact on agreed upon technical contractual agreements	P	P	Intended to be used if no other type of change is applicable but the change affects agreed technical contractual agreements	Not relevant for technical evaluation.	*		
INDUCTORS	PAS-IND-AN-02	Any change with impact on processability/manufacturabiliy at customer, which is not covered in the matrix below.	P	P		Technical interface means component terminals.	B		
INDUCTORS		**DATASHEET**							
INDUCTORS	PAS-IND-DS-01	Change of datasheet parameters/electrical specification (min./max./typ. values) and / or AC/DC specification	P	P	Change of application relevant information **Not included:** Editorial changes.	e.g. tighten of electrical parameter distribution	A	Risk assessment depending on change for each application.	
INDUCTORS	PAS-IND-DS-02	Correction of data sheet or issue of errata	I	I	No technical change of product, process or test. New description of behavior which was not specified before or which is different from initial specification. Please indicate clearly, that Infonote contains this type of change! Assessment in application required!!	e.g. data sheet correction because of new information about component behavior	A		

MATERIAL PERFORMANCE TEST RESULTS (on the basis of AEC-Q200 Revision D) / additional to AEC-Q200

ID	Line evaluation (can be evaluated by data or audit/on site check)	AEC-Q200 Revision D	Check of specification (for raw material only)	High Temp Exposure (Storage) 3	Temperature Cycling 4	Destructive Physical Analysis 5	Moisture Resistance 6	Biased Humidity 7	Operational Life 8	External Visual 9	Physical Dimension 10	Terminal Strength (Leaded) 11	Resistance to Solvents 12	Mechanical Shock 13	Vibration 14	Resistance to Soldering Heat 15	Thermal Shock 16	Electrostatic Discharge (ESD) 17	Solderability 18	Electrical Characterization 19	Flammability 20	Board Flex 21	Terminal Strength (SMD) 22	Beam Load Test 23	Flame Retardance 24	Rotation Life 25	Surge Voltage 27	Salt Spray 29	Electrical Transient Conduction 30	Shear Strength 31	Fault Current Durability 32	End-of-Life Mode Verification 33	Jump Start Endurance 34	Load Dump Endurance 35	Whisker Test (IEC 60068-T2-82, JEDEC JESD201)	Parameter-Analysis: Comparison of current with changed device characterization, electrical distribution
PAS-RES-AN-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAS-RES-AN-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	-
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PAS-RES-DS-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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PAS-RES-MA-06	-	•	•	-	•	-	•	-	-	-	•	•	•	-	-	•	•	•	-	B	•	-	-	-	R	-	-	N	-	-	-	-	-	-	-	@•
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PAS-RES-PR-08	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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PAS-IND-AN-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAS-IND-AN-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	-
PAS-IND-DS-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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INDUCTORS	PAS-IND-DS-03	Specification of additional parameters	I	P	Description of a new not previously covered parameter. No technical change of the product. **(I)**: no influence **(P)**: Risk assessment depending on change for each application to provide evidence of additional parametes (stat. evaluation)	e.g. adding new (tested) parameter.	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	**MATERIAL**																																												
INDUCTORS	PAS-IND-MA-01	Change of material composition - Bobbin Material	P	P	Material without magnetic function ("Spulenkörper") typically made by plastic material	e.g. change from Thermoset to Thermoplastic	B		-	●	●	●	●	-	-	●	●	●	@●	-	-	●	-	-	●	-	-	-	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-MA-02	Change of core material, which is material with magnetic function	P	P	Change of core material, which is material with magnetic function	e.g. change from NiZn into MnZn	A		-	●	●	@●	●	-	-	-	●	●	-	-	-	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●
INDUCTORS	PAS-IND-MA-03	Change of material composition - Insulation Material	P	P	Change of insulation material	e.g. wire insulation, insulation tapes, e.g. change from Polyurethane to Polyamide	C		-	●	●	●	●	●	●	●	-	-	●	-	-	●	●	A	-	B	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-MA-04	Change of material composition - Lead Material	P	P	Change of lead material	e.g. change from tin-coared to non-coared lead material	B		-	●	-	-	-	-	-	-	●	●	-	●	-	-	●	●	-	-	●	-	-	●	●	-	-	-	-	-	-	-	-	-	-	@●	-
INDUCTORS	PAS-IND-MA-05	Change of material composition - Mold Compound	P	P	Change of mold compound material	e.g. change to green mold	B		-	●	●	●	●	-	●	●	●	●	-	-	●	●	-	-	●	-	-	B	●	-	-	-	-	-	-	-	-	-	-	-	-	@●	Electrical function affected if mechanical stress distribution changes. ACI, wave soldering and board coating has to be assessed. MSL might change.
INDUCTORS	PAS-IND-MA-06	Change of material composition - Solder Material	P	P	Change of solder material at internal connection.	e.g. change of SnAgCu composition	B		-	●	●	-	●	-	-	-	-	●	-	●	-	●	●	@●	●	-	●	-	-	●	●	-	-	-	-	-	-	-	-	-	@●	-	
INDUCTORS	PAS-IND-MA-07	Change of material composition - Wire / Foil Material	P	P	Wire for wounded inductors, Foil for multilayer inductors (inner electrode).	e.g. change of Cu composition	B		-	●	●	@●	-	-	●	●	●	●	-	-	-	-	-	-	-	●	-	B	-	●	●	-	-	-	-	-	-	-	-	-	-	@●	
INDUCTORS	PAS-IND-MA-08	Change of material composition - Glue	P	P	Change of glue material	e.g. change from glue A into glue B	C		-	●	●	-	@●	-	-	@●	-	@●	-	-	-	-	@●	@●	-	-	@●	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Considere in case of core-core glue the air gap.
INDUCTORS	PAS-IND-MA-09	Change of supplier of material	-	P	Change to a new or additional material supplier at component manufacturer.	e.g. for 2nd source purpose	C		-	●	●	-	●	-	●	@●	-	●	●	●	-	-	-	-	●	-	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Assumption material specification remains unchanged. Otherwise see change of material.
INDUCTORS	PAS-IND-MA-10	Change of material composition - Potting Material	P	P	Change of potting material	e.g. change from epoxy resin to silicon	C	**A**: If influence on other connections on PCB or laquer expected.	-	-	●	-	@●	-	-	@●	-	@●	@●	-	-	-	@●	@●	-	-	@●	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	
INDUCTORS	**DESIGN**																																												
INDUCTORS	PAS-IND-DE-01	Changes of termination, surface finish, shape, color, appearance or dimension structure - Bobbin	I	P	Material without magnetic function ("Spulenkörper") typically made by plastic material	e.g. construction / dimension change of bobbin	B		-	●	-	-	●	-	-	-	-	●	●	-	-	●	-	-	●	●	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	
INDUCTORS	PAS-IND-DE-02	Changes of termination, surface finish, shape, color, appearance or dimension structure - Lead/Terminals	I	P	Change of lead/terminals	e.g. change from PTH terminals to SMD terminals	A		-	●	-	-	-	-	-	-	-	●	●	●	-	-	●	●	-	●	●	-	-	●	●	-	-	-	-	-	-	-	-	-	@●	@●	Effect regarding EMC relevant for high frequency only.
INDUCTORS	PAS-IND-DE-03	Changes of termination, surface finish, shape, color, appearance or dimension structure - Mold	I	P	Change of mold	e.g. new mold material with different color	B		-	●	-	-	●	@●	-	●	●	-	●	●	-	-	●	-	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Parameter Analysis only for components where mold material has magnetic function
INDUCTORS	PAS-IND-DE-04	Changes of inner construction - Core Construction	-	P	Change of core construction, which is material with magnetic function	e.g. change from/from core & shield core into pot core & cover plate core	A		-	●	-	-	●	-	-	-	-	●	●	-	-	●	-	-	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	
INDUCTORS	PAS-IND-DE-05	Changes of inner construction - Insulation System	-	P	Change of insulation system	e.g. wire insulation, insulation tapes, ... e.g. change from Polyurethane to PTFE (Teflon).	C		-	●	-	@●	-	-	-	●	●	●	●	-	●	-	-	●	-	A	-	B	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-DE-06	Changes of inner construction - Wire / Foil Construction	-	P	Change of wire / foil dimensions	e.g. change from round cross section to rectangular cross section e.g. from single wire to litz wire	B		-	●	-	-	-	-	-	-	-	●	●	-	-	-	@●	-	●	-	-	B	-	●	●	-	-	-	-	-	-	-	-	-	-	-	@●	
INDUCTORS	PAS-IND-DE-07	Changes of termination, surface finish, shape, color, appearance or dimension structure - Potting Material	I	P	Change of potting dimension	e.g. change of potting (filling) height	C	If data sheet is affected (**PAS-IND-DS-01**)	-	-	-	-	@●	-	-	-	-	@●	@●	-	-	-	@●	@●	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	
INDUCTORS	**PROCESS**																																												
INDUCTORS	PAS-IND-PR-01	Changes in process technology or manufacturing methods - Insulation Strip	-	P	(Mechanical) removal of insulation.	e.g. change from mechanical removal to laser removal	B		●	●	-	-	-	-	●	-	-	●	-	-	●	-	-	-	@●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Mechanical damage of wire, impact on solderability in case of stripping process is affecting soldering area.
INDUCTORS	PAS-IND-PR-02	Changes in process technology or manufacturing methods - Lead Prep. / Plating	-	P	Change of lead prep. / plating	e.g. change from hot dip tinning to electroplating	B		●	●	-	-	●	-	-	-	●	●	●	-	-	●	●	●	-	●	-	-	●	●	-	-	-	-	-	-	-	-	-	@●	-	Influence regarding reliability of solder joint.
INDUCTORS	PAS-IND-PR-03	Changes in process technology or manufacturing methods - Terminal Attach	-	P	Connection of wire terminal and / or connection of termination to core/bobbin.	e.g. chaefe from Manual winding to Semi-automtic winding (winding of wire on terminal)	C		●	●	-	-	●	@●	-	●	●	-	●	●	-	●	●	A	●	-	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	-	Increase of contact resistance.
INDUCTORS	PAS-IND-PR-04	Changes in process technology or manufacturing methods - Marking	-	P	Change of marking process	e.g. change from ink marking to laser marking	B		●	●	-	-	-	-	-	-	-	●	-	-	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-PR-05	Changes in process technology or manufacturing methods - Molding	-	P	Change of molding process	e.g. change from one component molding to two component molding (other technology needed)	B		●	●	-	●	●	●	●	●	●	●	●	-	-	●	-	-	-	B	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-PR-06	Changes in process technology or manufacturing methods - Soldering Internal Connections	-	P	Change of soldering internal connection	e.g. change from hot tip tinning to resistance welding	B		●	●	-	-	●	-	-	-	-	●	-	●	-	●	-	-	●	-	-	-	-	●	●	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-PR-07	Changes in process technology or manufacturing methods - Winding Insulation	-	P	Change of winding - insulation	e.g. change from manual to automatic process	B		●	●	-	@●	-	-	-	●	●	@●	-	-	●	-	-	●	-	A	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-PR-08	Changes in process technology or manufacturing methods - Winding Wire	-	P	Change of winding - wire	e.g. change from semi-automatic winding to full automatic winding	C		●	●	-	@●	-	-	●	-	●	●	-	-	-	-	-	-	-	-	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	
INDUCTORS	PAS-IND-PR-09	Process integrity: tuning within specification	-	P	Variation within process specification.	e.g. process control	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-PR-10	Changes in process technology or manufacturing methods - Potting	-	P	Change of potting process	e.g. change from manual potting process to automatic potting process	C		●	-	-	-	@●	-	-	@●	-	@●	@●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	**PACKING / SHIPPING - NEW MATERIAL, CRITICAL DIMENSIONS**																																												
INDUCTORS	PAS-IND-PN-01	Packing / shipping specification change (loosening of tolerances)	P	P	Change of packing specification.	e.g. number of pieces on reel.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-PN-02	Dry pack requirements change	P	P	Change of drypack requirements.	e.g. change of MSL e.g. change in dry pack assurance (HIC, MBB)	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-PN-03	Change of carrier (tray, reel)	P	P	Change of carrier	e.g. change by material e.g. change by geometry	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	**PACKING / SHIPPING - VISUAL INSPECTION**																																												
INDUCTORS	PAS-IND-PV-01	Change of labelling	I	P	Change of labelling, also on reel.	**(I)** e.g. additional information (RoHS stamp) **(P)** e.g. change of customer specific information	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-PV-02	Change of product marking	I	P	Marking on device.	e.g. change of content of marking e.g. change of method marking e.g. change of appearance of marking	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	PAS-IND-PV-03	Change of packing/shipping specification	P	P	Change in packing specification which does not described a change of dimensions or material of the packing.	e.g. change of documentation in packing specification	*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
INDUCTORS	**LOGISTICS / CAPACITY / TESTING - EQUIPMENET**																																												
INDUCTORS	PAS-IND-EQ-01	Production from a new equipment/tool which uses a different technology or which due to its unique form or function can be expected to influence the integrity of the final product	P	P	Change in process technique which is not already covered above. **Note**: Changes affecting the product not covered by the table require also a PCN.	e.g. introduction of potting process	C		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Test effort depends on final risk assessment. Performance test according to affected process change.
INDUCTORS	PAS-IND-EQ-02	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool)	-	P	PCN required for dedicated equipment for sensitive component production.	e.g. duplication of existing winding machine	C		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Test effort depends on final risk assessment. Performance test according to affected process change.
INDUCTORS	PAS-IND-EQ-03	Change in final test equipment type that uses a different technology	P	P	Change of final test equipment which use different technology. PCN required for dedicated equipment for sensitive parameters.	e.g. change of tester platform	C		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Gage R&R / delta correlation
INDUCTORS	**LOGISTICS / CAPACITY / TESTING - PROCESS FLOW**																																												
INDUCTORS	PAS-IND-PF-01	Manufacturing site transfer or movement of a part of production process to a different location/site	P	P	Change of manufacturing site. Includes transfer as well as additional site. **Note**: Reorganization inside one plant/site is not affected.	e.g. movement or transfer of manufacturing site or process step(s) to a different location/site. e.g. dual source / fab strategy	B		●	●	-	●	●	@●	●	@●	-	●	-	-	-	●	●	-	-	B	-	-	●	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	@●	
INDUCTORS	PAS-IND-PF-02	Elimination or addition of a manufacturing process step	-	P	Change of manufacturing process sequence.	e.g. washing / cleaning process e.g. change of order of processes	C		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Characterisation depends on impact of production flow.
INDUCTORS	PAS-IND-PF-03	Elimination of final electrical measurement / test flow block	I	P	Reduction of final testing. PCN required for dedicated final test reductions for sensitive parameters.	e. g. elimination of High-voltage measurement	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Characterisation depends on impact of final test flow.
INDUCTORS	**LOGISTICS / CAPACITY / TESTING - Q-GATE**																																												
INDUCTORS	PAS-IND-QG-01	Change of test coverage used by the supplier to ensure data sheet compliance (e.g., elimination/addition of electrical measurement/test flow block, relaxation/enhancement of monitoring procedure or sampling)	-	P	Change of test coverage.	e.g. change from 100% to sample inspection e. g. test flow block, reduction from three to two temperature measurements e.g. change in burn in/run in process.	C		-	●	-	-	-	-	-	-	●	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R (elect. func.): test coverage. R (reliability): only for change in burn in process.
CERAMIC / TANTALUM	**CERAMIC / TANTALUM**																																												
CERAMIC / TANTALUM	**ANY**																																												
CERAMIC / TANTALUM	PAS-CER-AN-01	Any change with impact on agreed upon technical contractual agreements	P	P	Intended to be used if no other type of change is applicable but the change affects agreed technical contractual agreements	Not relevant for technical evaluation.	*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CERAMIC / TANTALUM	PAS-CER-AN-02	Any change with impact on processability/manufacturability at customer, which is not covered in the matrix below.	P	P		Technical interface means component terminals.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	-	
CERAMIC / TANTALUM	**DATASHEET**																																												
CERAMIC / TANTALUM	PAS-CER-DS-01	Change of datasheet parameters/electrical specification (min./max./typ. values) and / or AC/DC specification	P	P	Change of application relevant information **Not included**: Editorial changes.	e.g. tighten of electrical parameter distribution	A	Risk assessment depending on change for each application.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CERAMIC / TANTALUM	PAS-CER-DS-02	Correction of data sheet or issue of errats	I	I	No technical change of product, process or test. New description of behavior which was not specified before or which is different from initial specification. Please indicate clearly, that Infoncle contains this type of change! Assessment in application required!	e.g. data sheet correction because of new information about component behavior	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CERAMIC / TANTALUM	PAS-CER-DS-03	Specification of additional parameters	I	P	Description of a new not previously covered parameter. No technical change of the product. **(I)**: no influence **(P)**: Risk assessment depending on change for each application to provide evidence of additional parametes (stat. evaluation)	e.g. adding new (tested) parameter.	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CERAMIC / TANTALUM		**MATERIAL**																																											
CERAMIC / TANTALUM	PAS-CER-MA-01	Change of material composition - Ceramic Binder	P	P	Binder material (ceramic)		C		-	•	•	-	•	•	-	-	-	-	-	-	-	-	•	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-MA-02	Change of material composition - Tantalum Binder	P	P	Binder material (tantal)	e.g. change from wax 1 to wax 2	C		-	•	•	-	•	•	-	-	-	-	-	-	-	-	•	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-MA-03	Change of material composition - Dielectric	P	P	Dielectric change (ceramic only)	e.g. change from ceramic A into ceramic B	C		-	•	•	•	•	•	-	•	•	-	-	•	•	•	•	-	•	•	-	B	-	C	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-MA-04	Change of material composition - Electrode Attach	P	P	Electrode attach (only tantal, glue, carbon, Ag)	e.g. change of Ag particle size in conductive adhesive	C		-	•	•	•	•	-	-	-	•	-	-	-	-	-	-	C	•	-	-	B	-	C	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-MA-05	Change of material composition - Electrode Material	P	P	Electrode Material (only ceramic, inner elctrode)	e.g. change from spehric to flake shape (Ni paste)	C		-	•	•	•	•	•	-	•	•	-	-	•	•	-	•	-	•	•	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-MA-06	Change of material composition - Encapsulation	P	P	Encapsulation	e.g. change from epoxy1 into epoxy2	C		-	•	•	-	•	-	•	•	-	•	•	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Check whether AOI at Tier 1 can be affected
CERAMIC / TANTALUM	PAS-CER-MA-07	Change of material composition - Lead material / Termination	P	P	Lead material / Termination	e.g. change from SnPb to pure Sn	C		-	•	•	-	•	•	-	-	•	•	-	•	-	-	•	•	-	-	•	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-MA-08	Change of supplier of material	-	P	Change to a new or additional material supplier at component manufacturer.	e.g. for 2nd source purpose	C		-	•	•	•	•	•	•	•	•	-	-	•	•	•	•	•	•	•	•	B	-	•	•	C	-	-	-	-	-	-	-	-	-	-	-	-	@•	Assumption material specification remains unchanged. Otherwise see change of material.
CERAMIC / TANTALUM		**DESIGN**																																											
CERAMIC / TANTALUM	PAS-CER-DE-01	Changes of termination, surface finish, shape, color, appearance or dimension structure - Lead Diameter	I	P	Lead diameter	e.g. change from 0.8mm into 0.6mm	B		-	•	-	-	•	-	•	•	•	•	•	•	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-DE-02	Changes of termination, surface finish, shape, color, appearance or dimension structure - Termination Area	I	P	Termination area	e.g. change in width of termination from 0.1 -0.3mm into 0.2 - 0.4 mm	B		-	•	-	•	-	-	•	-	-	•	•	-	-	-	•	-	-	-	-	-	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-DE-03	Changes of termination, surface finish, shape, color, appearance or dimension structure - Termination Interface	I	P	Terminal interface	e.g. additional layer in termination	B		-	•	-	•	•	•	•	•	•	-	-	•	-	•	•	•	-	-	-	B	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-DE-04	Changes of inner construction - Electrode Thickness	-	P	Electrode thickness (ceramic only)	e.g. Ni layer change from 2.5µm into 3.5µm	C		-	•	-	•	•	•	-	-	•	-	•	-	-	•	•	-	•	•	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-DE-05	Changes of inner construction - Layer Thickness	-	P	Layer thickness (dielectric thickness)	e.g. Ceramic layer thickness changes from 3µm into 5µm.	C		-	•	-	•	•	•	-	•	•	-	•	•	-	•	-	-	•	•	-	B	-	-	-	C	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-DE-06	Changes of inner construction - Number of Layers	-	P	Number of layers (ceramic only). Allways in combination with PAS-CER-DE-05.	see also layer thickness	C		-	•	-	-	C	C	-	C	C	-	C	-	-	C	-	-	C	C	-	B,C	-	-	-	C	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM		**PROCESS**																																											
CERAMIC / TANTALUM	PAS-CER-PR-01	Changes in process technology or manufacturing methods - Dicing	-	P	Change of dicing	e.g. change from cutting to sawing	C		•	•	-	•	•	-	•	•	-	•	•	-	•	•	-	-	-	-	-	B	-	-	-	C	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PR-02	Changes in process technology or manufacturing methods - Electrode apply	-	P	Electrode apply (dielectric layer process)	e.g. change from wet to dry process	C		•	•	-	C	-	-	-	C	-	-	-	-	-	-	-	C	C	C	-	B,C	-	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PR-03	Changes in process technology or manufacturing methods - Firing	-	P	Change of firing profile	e.g. seperation of decarbonization and firing profile.	C		•	•	-	-	•	•	-	-	•	-	-	-	-	-	-	-	•	•	-	B	-	-	-	C	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PR-04	Changes in process technology or manufacturing methods - Lamination	-	P	Change of lamination / press techinque	e.g. standard pressing to iso static pressing.	C		•	•	-	-	-	•	-	•	-	-	-	-	-	-	-	•	•	-	-	B	-	•	-	C	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PR-05	Changes in process technology or manufacturing methods - Particle Size	-	P	Change of powder particle size. Allways in combination with PAS-CER-MA-03.	e.g. change D50 from 0.5µm into 0.4µm	C		•	•	-	-	•	-	-	•	-	-	-	-	-	-	-	•	-	•	-	B	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PR-06	Changes in process technology or manufacturing methods - Screening/Printing	-	P	Change of screening / printing	e.g. change from screen printing into offset printing	C		•	•	-	-	-	-	-	-	C	-	-	-	-	C	-	-	-	C	-	B,C	-	-	-	C	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PR-07	Changes in process technology or manufacturing methods - Termination	-	P	Change for termination preparation like plating or apply of termination base layer.	e.g. change in plating technology (final termination) e.g. change from dip in paste to platimg (apply)	B		•	•	-	•	•	•	•	•	•	•	•	•	•	•	•	•	-	-	•	B	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PR-08	Process integrity: tuning within specification	-	P	Variation within process specification.	e.g. process control	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM		**PACKING / SHIPPING - NEW MATERIAL, CRITICAL DIMENSIONS**																																											
CERAMIC / TANTALUM	PAS-CER-PN-01	Packing / shipping specification change (loosening of tolerances)	P	P	Change of packing specification.	e.g. number of pieces on reel.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PN-02	Dry pack requirements change	P	P	Change of drypack requirements.	e.g. change of MSL e.g. change in dry pack assurance (HIC, MBB)	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PN-03	Change of carrier (tray, reel)	P	P	Change of carrier	e.g. change by material e.g. change by geometry.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM		**PACKING / SHIPPING - VISUAL INSPECTION**																																											
CERAMIC / TANTALUM	PAS-CER-PV-01	Change of labelling	I	P	Change of labelling, also on reel.	**(I)** e.g. additional information (RoHS stamp) **(P)** e.g. change of customer specific information	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PV-02	Change of product marking	I	P	Marking on device.	e.g. change of content of marking e.g. change of method of marking e.g. change of appearance of marking	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM	PAS-CER-PV-03	Change of packing/shipping specification	P	P	Change in packing specification which does not described a change of dimensions or material of the packing.	e.g. change of documentation in packing specification	*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
CERAMIC / TANTALUM		**LOGISTICS / CAPACITY / TESTING - EQUIPMEMENT**																																											
CERAMIC / TANTALUM	PAS-CER-EQ-01	Production from a new equipment/tool which uses a different technology or which due to its unique form or function can be expected to influence the integrity of the final product	P	P	Change in process technique which is not already covered above. **Note:** Changes affecting the product not covered by the table require also a PCN.	e.g. change from wet to dry technology.	C		•	•	-	-	•	-	•	•	•	-	•	A	-	-	•	-	-	•	•	B	-	-	-	C	-	-	-	-	-	-	-	-	-	-	-	-	@•	Test effort depends on final risk assessment. Performance test according to affected process change.
CERAMIC / TANTALUM	PAS-CER-EQ-02	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool)	-	P	PCN required for dedicated equipment for sensitive component production.	e.g. elimination of manual handling processes	C		•	•	-	-	•	-	•	•	•	-	•	A	-	-	•	-	-	•	•	B	-	-	-	C	-	-	-	-	-	-	-	-	-	-	-	-	@•	Test effort depends on final risk assessment. Performance test according to affected process change.
CERAMIC / TANTALUM	PAS-CER-EQ-03	Change in final test equipment type that uses a different technology	P	P	Change of final test equipment which use different technology. PCN required for dedicated equipment for sensitive parameters.	e.g. change of tester platform	C		•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	Gage R&R / delta correlation
CERAMIC / TANTALUM		**LOGISTICS / CAPACITY / TESTING - PROCESS FLOW**																																											
CERAMIC / TANTALUM	PAS-CER-PF-01	Manufacturing site transfer or movement of a part of production process to a different location/site	P	P	Change of manufacturing site. Includes transfer as well as additional site. **Note**: Reorganization inside one plant/site is not affected!	e.g. movement or transfer of manufacturing site or process step(s) to a different location/site. e.g. dual source / fab strategy	B		•	•	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	B	-	•	•	C	-	-	-	-	-	-	-	-	-	-	-	@•	@•	
CERAMIC / TANTALUM	PAS-CER-PF-02	Elimination or addition of a manufacturing process step	-	P	Change of manufacturing process sequence.	e.g. washing / cleaning process e.g. change of order of processes	C		•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	Characterisation depends on impact of production flow.
CERAMIC / TANTALUM		**LOGISTICS / CAPACITY / TESTING - Q-GATE**																																											
CERAMIC / TANTALUM	PAS-CER-QG-01	Change of test coverage used by the supplier to ensure data sheet compliance (e.g., elimination/addition of electrical measurement/test flow block, relaxation/enhancement of monitoring procedure or sampling)	-	P	Change of test coverage.	e.g. change from 100% to sample inspection e. g. test flow block, reduction from three to two temperature measurements e.g. change in burn in/run in process.	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R (electr. funct.): test coverage. R (reliability) only for change in burn in process.
Film capacitors		**FILM CAPACITORS**																																											
Film capacitors		**ANY**																																											
Film capacitors	PAS-FLM-AN-01	Any change with impact on agreed upon technical contractual agreements	P	P	Intended to be used if no other type of change is applicable but the change affects agreed technical contractual agreements.	Not relevant for technical evaluation.	*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-AN-02	Any change with impact on processability/manufacturabiliy at customer, which is not covered in the matrix below.	P	P		Technical interface means component terminals.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	-	
Film capacitors		**DATASHEET**																																											
Film capacitors	PAS-FLM-DS-01	Change of datasheet parameters/electrical specification (min./max./typ. values) and / or AC/DC specification	P	P	Change of application relevant information **Not included:** Editorial changes.	e.g. tighten of electrical parameter distribution	A	Risk assessment depending on change for each application.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-DS-02	Correction of data sheet or issue of errata	I	I	No technical change of product, process or test. New description of behavior which was not specified before or which is different from initial specification. Please indicate clearly, that Infonote contains this type of change! Assessment in application required!!	e.g. data sheet correction because of new information about component behavior	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-DS-03	Specification of additional parameters	I	P	Description of a new not previously covered parameter. No technical change of the product. **(I):** no influence **(P):** Risk assessment depending on change for each application to provide evidence of additional parametes (stat. evaluation)	e.g. adding new (tested) parameter.	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors		**MATERIAL**																																											
Film capacitors	PAS-FLM-MA-01	Change of material composition - Sealing Compound	P	P	Typicaly change within epoxy **or** PU sealing without effect to mechanical properties. **Note:** Change from epoxy sealing into PU sealing (both direction) will lead to generate a new product.	e.g. change of epoxy or PU composition	C	**A:** in combination with **PAS-FLM-DS-01** or if change of sealing compound with effect to mechanical properties.	-	•	•	•	•	-	•	•	•	•	•	@•	•	•	•	-	•	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Consider vibration in application
Film capacitors	PAS-FLM-MA-02	Change of material composition - Package	P	P	Change material of package	Change material of package, e.g. change from PBT to PPS e.g. change of glas fiber ratio	B		-	•	•	-	•	-	-	•	•	•	•	•	@•	•	•	-	-	-	•	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Consider AOI and processability
Film capacitors	PAS-FLM-MA-03	Change of material composition - Lead/Termination	P	P	Change of Lead/Termination **Note:** If change of lead frame material leads to an ESR change, than change of data sheet (PAS-FLM-DS-01) has to be respected.	e.g. change of basis material from Cu to Fe e.g. change of finishing from SnPb to Sn	B	**A:** in combination with **PAS-FLM-DS-01**	-	•	•	-	-	-	•	-	-	-	•	•	-	•	-	•	-	-	•	B	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	@•	-	Change of base material: Consider ESR, high frequency parameter
Film capacitors	PAS-FLM-MA-04	Change of material composition - Metal Spray (Schoop)	P	P	Change of Metal Spray (Schoop): Use different material for metal spray process for boxed and naked types	e.g. from Zn to Al	C	**B**: for naked SMD	-	•	•	-	@•	-	@•	-	@•	-	-	@•	-	@•	@•	-	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Consider ESR. Solderability Test for naked SMD components.
Film capacitors	PAS-FLM-MA-05	Change of material composition - Film	P	P	Change of film material for boxed and naked types	e.g. change of additives (<1%) of film composition (same raw material)	C	**B**: for naked SMD	-	•	•	-	@•	-	-	@•	@•	@•	@•	-	-	-	-	@•	-	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	
Film capacitors	PAS-FLM-MA-06	Change of material composition - Metal Foil	P	P	Change of metal foil for inner electrode	e.g. change from Al to Al-Zn alloy	C		-	•	•	-	@•	-	-	@•	@•	@•	-	-	-	-	-	-	-	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	
Film capacitors	PAS-FLM-MA-07	Change of supplier of material	-	P	Change to a new or additional material supplier at component manufacturer which are described above.	e.g. for 2nd source purpose	C	Check if other **PAS-FLM-MA** is affected	-	•	•	•	•	-	•	-	•	-	-	•	•	-	•	•	•	-	•	-	•	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	Assumption material specification remains unchanged. Otherwise see change of material.
Film capacitors		**DESIGN**																																											
Film capacitors	PAS-FLM-DE-01	Changes of termination, surface finish, shape, color, appearance or dimension structure - Lead Diameter / Thickness	I	P	Change of lead diameter thickness	e.g. change lead diameter from 0.5 to 0.4 mm e.g. change of thickness of terminal	B		-	•	-	-	@•	-	-	-	-	@•	@•	@•	-	@•	@•	-	-	-	-	@B	-	@•	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-DE-02	Changes of termination, surface finish, shape, color, appearance or dimension structure - Termination Area	I	P	Changes of termination area are changes which are affecting the area for connection of component and PCB	e.g. change of termination layer thickness e.g. change in termination dimensions / shape	B		-	•	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	-	-	@•	@•	-	-	-	-	-	-	-	-	-	-	-	-	@•	-	
Film capacitors	PAS-FLM-DE-03	Changes of inner construction - Inner Connection	-	P	Change of inner connection	e.g. change from soldered connection to welded connection	C		-	•	-	-	@•	-	-	-	@•	@•	-	@•	-	@•	@•	@•	-	-	-	@•	-	@•	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-DE-04	Changes of termination, surface finish, shape, color, appearance or dimension structure - Appearance	I	P	Change of appearance. **(I):** Change in appearance without impact on product integrity. **(P):** Change in appearance with impact on product integrity. **Note:** Marking on device is defined as seperate change (PAS-FLM-PV-02).	e.g. change or adding of color on component	B	Check if **MATERIAL** is affected.	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-DE-05	Changes of inner construction - Film/Foil	-	P	Change of film or foil design	e.g. change to a different foil supplier.	C	**A:** in combination with **PAS-FLM-DS-01**	-	•	-	-	•	-	-	@•	•	-	-	-	-	-	-	-	-	•	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	

Film capacitors	PAS-FLM-DE-06	Changes of inner construction - Insulation System	-	P	Change of inner insulation to protect winding element against housing.	e.g. change of potting material e.g. change of number of inner insulation layers (depending of insulation material thickness)	C		-	•	-	-	•	-	-	-	•	-	-	-	-	-	-	-	-	•	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	
Film capacitors	PAS-FLM-DE-07	Changes of termination, surface finish, shape, color, appearance or dimension structure - Package	I	P	Change of packaging	e.g. change of dimension or shape e.g. change of surface	B		-	•	-	-	@•	-	@•	-	-	@•	@•	-	@•	@•	@•	-	-	-	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors		**PROCESS**																																											
Film capacitors	PAS-FLM-PR-01	Changes in process technology or manufacturing methods - Package	-	P	Change of resin filling or hardening process (relevant for boxed types only)	e.g. change in resin filling process (mixing, sequences, potting, …) e.g. change in hardening process (temperature, time, …)	C		•	•	-	•	•	-	-	•	•	•	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-PR-02	Changes in process technology or manufacturing methods - Terminal Attach	-	P	Change Terminal Attach Process to winding element for boxed and nacked types	e.g. spraying and / or galvanic process, e.g. welding / soldering	C	**B**: for naked SMD	•	•	-	-	•	-	•	-	•	-	-	•	•	-	-	-	-	-	-	B	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	Consider ESR. Solderability Test for naked SMD components.
Film capacitors	PAS-FLM-PR-03	Changes in process technology or manufacturing methods - Winding	-	P	Change of winding, flattening or tempering process	e.g. change of tempering temperature	C		•	•	-	•	-	-	-	@•	•	-	-	-	-	-	-	-	-	•	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-PR-04	Process integrity: tuning within specification	-	P	Variation within process specification.	e.g. process control	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors		**PACKING / SHIPPING - NEW MATERIAL, CRITICAL DIMENSIONS**																																											
Film capacitors	PAS-FLM-PN-01	Packing / shipping specification change (loosening of tolerances)	P	P	Change of packing specification.	e.g. number of pieces on reel.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-PN-02	Dry pack requirements change	P	P	Change of drypack requirements.	e.g. change of MSL e.g. change in dry pack assurance (HIC, MBB)	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-PN-03	Change of carrier (tray, reel)	P	P	Change of carrier	e.g. change by material e.g. change by geometry.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors		**PACKING / SHIPPING - VISUAL INSPECTION**																																											
Film capacitors	PAS-FLM-PV-01	Change of labelling	I	P	Change of labelling, also on reel.	**(I)** e.g. additional information (RoHS stamp) **(P)** e.g. change of customer specific information	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-PV-02	Change of product marking	I	P	Marking on device.	e.g. change of content of marking e.g. change of method of marking e.g. change of appearance of marking	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors	PAS-FLM-PV-03	Change of packing/shipping specification	P	P	Change in packing specification which does not described a change of dimensions or material of the packing.	e.g. change of documentation in packing specification	*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Film capacitors		**LOGISTICS / CAPACITY / TESTING - EQUIPEMEMENT**																																											
Film capacitors	PAS-FLM-EQ-01	Production from a new equipment/tool which uses a different technology or which due to its unique form or function can be expected to influence the integrity of the final product	P	P	Change in process technique which is not already covered above. **Note:** Changes affecting the product not covered by the table require also a PCN.	e.g. implementation of new machines	C		•	•	-	-	•	-	•	@•	•	@•	@•	•	-	-	-	-	•	•	-	B	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	@•	Test effort depends on final risk assessment. Performance test according to affected process change.
Film capacitors	PAS-FLM-EQ-02	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool)	-	P	PCN required for dedicated equipment for sensitive component production.	e.g. extension of existing machine capacity	C		•	•	-	-	•	-	•	@•	•	@•	@•	•	-	-	-	-	•	•	-	B	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	@•	Test effort depends on final risk assessment. Performance test according to affected process change.
Film capacitors	PAS-FLM-EQ-03	Change in final test equipment type that uses a different technology	P	P	Change of final test equipment which use different technology. PCN required for dedicated equipment for sensitive parameters.	e.g. change of tester platform	C		•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	Gage R&R / delta correlation
Film capacitors		**LOGISTICS / CAPACITY / TESTING - PROCESS FLOW**																																											
Film capacitors	PAS-FLM-PF-01	Manufacturing site transfer or movement of a part of production process to a different location/site	P	P	Change of manufacturing site. Includes transfer as well as additional site. **Note**: Reorganization inside one plant/site is not affected!	e.g. movement or transfer of manufacturing site or process step(s) to a different location/site. e.g. dual source / fab strategy	B		•	•	-	•	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	B	•	•	•	-	-	-	-	-	-	-	-	-	-	-	@•	@•	
Film capacitors	PAS-FLM-PF-02	Elimination or addition of a manufacturing process step	-	P	Change of manufacturing process sequence.	e.g. washing / cleaning process e.g. change of order of processes	C		•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	Characterisation depends on impact of production flow.
Film capacitors		**LOGISTICS / CAPACITY / TESTING - Q-GATE**																																											
Film capacitors	PAS-FLM-QG-01	Change of test coverage used by the supplier to ensure data sheet compliance (e.g., elimination/addition of electrical measurement/test flow block, relaxation/enhancement of monitoring procedure or sampling)	-	P	Change of test coverage.	e.g. change from 100% to sample inspection e.g. test flow block, reduction from three to two temperature measurements e.g. change in burn in/run in process.	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R (electr. funct.): test coverage. R (reliability) only for change in burn in process.
QUARTZ CRYSTAL / SAW		**QUARTZ CRYSTAL / SAW**																																											
QUARTZ CRYSTAL / SAW		**ANY**																																											
QUARTZ CRYSTAL / SAW	PAS-QUA-AN-01	Any change with impact on agreed upon technical contractual agreements	P	P	Intended to be used if no other type of change is applicable but the change affects agreed technical contractual agreements	Not relevant for technical evaluation.	*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-AN-02	Any change with impact on processability/manufacturabiliy at customer, which is not covered in the matrix below.	P	P		Technical interface means component terminals.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	-	
QUARTZ CRYSTAL / SAW		**DATASHEET**																																											
QUARTZ CRYSTAL / SAW	PAS-QUA-DS-01	Change of datasheet parameters/electrical specification (min./max./typ. values) and / or AC/DC specification	P	P	Change of application relevant information **Not included:** Editorial changes.	e.g. tighten of electrical parameter distribution	A	Risk assessment depending on change for each application.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-DS-02	Correction of data sheet or issue of errata	I	I	No technical change of product, process or test. New description of behavior which was not specified before or which is different from initial specification. Please indicate clearly, that Infonote contains this type of change! Assessment in application required!!	e.g. data sheet correction because of new information about component behavior	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-DS-03	Specification of additional parameters	I	P	Description of a new not previously covered parameter. No technical change of the product. **(I):** no influence **(P):** Risk assessment depending on change for each application to provide evidence of additional parametes (stat. evaluation)	e.g. adding new (tested) parameter.	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW		**MATERIAL**																																											
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-01	Change of material composition - Quartz Blank	P	P	A change of Quartz Blank is a very rare case. Mainly for SAW-Filter		A		-	•	•	•	•	-	-	-	•	-	-	-	-	•	•	-	•	-	-	B	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-02	Change of material composition - Base	P	P	Changing of the material of the base.	e.g. change from ceramic to epoxy	A		-	•	•	-	•	-	@•	•	-	•	•	-	•	•	•	@•	@•	-	-	-	@•	•	•	-	-	-	-	-	-	-	@•	-	-	-	-	-	-	-	C0 may be influenced Temperature expansion coefficient may change
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-03	Change of material composition - Lead / Termination	P	P	Change of Lead/Termination	e.g. change of plating finish. (eg:Au, AgPd,Sn)	B		-	•	•	-	•	-	-	-	-	•	•	•	•	-	•	•	-	-	•	B	-	•	•	-	-	-	-	@•	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-04	Change of material composition - Sealing	P	P	Change of Glass Seal	e.g. change to lead free glass	B		-	•	•	•	•	@•	•	•	•	•	-	•	•	•	•	•	•	-	-	B	-	•	•	-	-	-	-	@•	-	-	-	-	-	-	-	-	X-Ray inspection may be influenced when sealing is containing Pb
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-05	Change of material composition - Can / Cap	P	P	Changing of the material of the can/cap	e.g. change from metal to ceramic material	A		-	•	•	@•	•	-	@•	•	@•	•	•	-	•	•	•	@•	@•	-	-	@B	-	•	-	-	-	-	-	@•	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-06	Change of material composition - Blank Support	P	P	Change of Blank Support	e.g. change of glue (Silicone to Epoxy) e.g. change metal holders (old types)	C		-	•	•	@•	•	-	@Y	@Y	•	-	-	-	-	•	•	@•	•	-	-	B	-	•	-	-	-	-	-	@Y	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-07	Change of material composition - Overmold	P	P	Change of Overmold	e.g. change to green mold compound e.g. change of filler particles	B		-	•	•	•	•	@•	•	@•	@•	•	•	-	•	•	•	•	•	-	-	@B	•	•	•	-	-	-	-	@•	-	-	-	-	-	-	-	-	Electrical function affected in case of mechanical stress distribution change. AOI, wave soldering and board coating has to be assessed. MSL might be changed.
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-08	Change of material composition - Case Sealing	P	P	Change of Case Sealing. Change of material for seam welding Relevant for components with ceramic base and metall cap.	e.g. change from solder paste to adhesive glue	C -		-	•	•	•	•	-	@Y	•	-	•	-	-	•	•	•	•	•	-	-	B	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Impedance my be influenced.
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-09	Change of material composition - Electrode	P	P	Change of Electrode material on crystal blank.	e.g. change from Au to Ag	C		-	•	•	•	•	-	@Y	@Y	•	-	-	-	@Y	-	•	@•	•	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-10	Change of material composition - Insulator	P	P	Change of Insulator. Only for leaded types Not relevant for typical SMD.	e.g. Insulating plate under crystal e.g. Glass sealing for leads	B		-	•	•	•	•	@•	•	-	@•	•	•	-	•	-	•	•	•	-	-	B	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-11	Change of material composition - Marking	P	P	Change of marking material	e.g. change of ink e.g. chemical to environmental friendly	B		-	•	•	-	-	-	-	-	-	@•	-	-	@•	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	AOI check necessary!
QUARTZ CRYSTAL / SAW	PAS-QUA-MA-12	Change of supplier of material	-	P	Change to a new or additional material supplier at component manufacturer.	e.g. for 2nd source purpose	C		-	•	•	-	•	-	•	-	•	•	•	•	•	•	•	-	•	-	•	B	•	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	Assumption material specification remains unchanged. Otherwise see change of material.
QUARTZ CRYSTAL / SAW		**DESIGN**																																											
QUARTZ CRYSTAL / SAW	PAS-QUA-DE-01	Changes of termination, surface finish, shape, color, appearance or dimension structure - Base	I	P	Change of Base design	e.g. due to miniaturization purpose.	B		-	•	-	•	•	-	@•	•	-	•	•	•	@•	•	•	@•	•	-	-	-	@•	•	•	-	-	-	-	-	-	-	@•	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-DE-02	Changes of termination, surface finish, shape, color, appearance or dimension structure - Lead / Termination	I	P	Change of Lead/Termination design. Change geometry or terminal pad or lead form	e.g. change lead design to improve reliability.	B		-	•	-	-	•	-	-	-	-	•	•	•	-	•	•	•	•	-	•	B	-	•	•	-	-	-	-	@•	-	-	-	-	-	-	-	-	C0 may be influenced Reliabiliy of solder joints may be affected
QUARTZ CRYSTAL / SAW	PAS-QUA-DE-03	Changes of termination, surface finish, shape, color, appearance or dimension structure - Can / Cap	I	P	Change of Can/Cap design	e.g. due to miniaturization purpose.	A		-	•	-	@•	•	@•	•	•	-	•	•	-	@•	•	•	@•	•	-	-	B	-	•	-	-	-	-	-	@•	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-DE-04	Changes of termination, surface finish, shape, color, appearance or dimension structure - Package	I	P	Change of Package (Molded). Change the design of the package. Not relevant for typical SMD.	e.g. change from welded device to glued device (case sealing)	B		-	•	-	@•	•	@•	•	@•	@•	•	•	•	•	•	•	•	•	-	-	B	•	•	•	-	-	-	-	@•	-	-	-	-	-	-	-	-	Electrical function affected in case of mechanical stress distribution change. AOI, wave soldering and board coating has to be assessed. MSL might be changed.
QUARTZ CRYSTAL / SAW	PAS-QUA-DE-05	Changes of termination, surface finish, shape, color, appearance or dimension structure - Insulator	I	P	Change of Insulator design. Only for leaded types (old technology) Not relevant for typical SMD.		B		-	•	-	@•	@•	@•	@•	-	@•	•	•	-	•	-	@•	@•	@•	-	-	@B	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-DE-06	Changes of inner construction - Quartz Blank	-	P	Change of Quartz Blank design	e.g. change dimension of blank, add phase, electrode design, …	C		-	•	-	-	•	-	-	-	@•	-	-	-	-	•	•	-	@•	-	-	B	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-DE-07	Changes of inner construction - Blank Support	-	P	Change of Blank Support design	e.g. change design of glue shape e.g. change design of metall supporter	C		-	•	-	@•	•	-	@Y	@Y	•	-	-	-	-	•	•	@•	•	-	-	B	-	•	-	-	-	-	-	@Y	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW		**PROCESS**																																											
QUARTZ CRYSTAL / SAW	PAS-QUA-PR-01	Changes in process technology or manufacturing methods - Quartz Blank	-	P	Change of Quartz Blank process	e.g. change of cutting or lapping technology	C		•	•	-	-	•	-	-	-	•	-	-	-	-	•	•	-	•	-	-	B	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PR-02	Changes in process technology or manufacturing methods - Blank Etching / Cleaning	-	P	Change of Blank Etch/Clean process Using different / new technology	e.g. change from liquid etching to plasma etching	C		•	•	-	-	-	-	-	-	-	-	-	-	-	-	@•	-	@•	-	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PR-03	Changes in process technology or manufacturing methods - Electrode Formation	-	P	Change of Electrode Formation process	e.g. change from evaporation to sputtering	C		•	•	-	-	•	-	-	-	•	-	-	-	-	-	•	-	@•	-	-	B	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PR-04	Changes in process technology or manufacturing methods - Trimming	-	P	Change of Auto Trim process (Method of final frequency tuning)	e.g. change from evaporation to ion beam	C		•	•	-	-	-	-	-	-	-	-	-	-	-	•	•	-	@•	-	-	B	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PR-05	Changes in process technology or manufacturing methods - Bonding / Annealing	-	P	Change of Blank bonding / annealing process. Change of method how apply conductive material to base or blank		C		•	•	-	•	•	@•	@Y	@Y	•	-	-	-	-	•	•	-	•	-	-	B	-	•	-	-	-	-	-	@Y	-	-	-	-	-	-	-	-	

QUARTZ CRYSTAL / SAW	PAS-QUA-PR-06	Changes in process technology or manufacturing methods - Can / Cap Attaching	-	P	Change of Cap/Can attaching process	e.g. change of the sealing method e.g. change from batch oven to reflow oven	C		•	•	-	•	•	@•	@Y	•	•	•	•	-	-	•	•	-	•	-	-	B	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PR-07	Changes in process technology or manufacturing methods - Molding	-	P	Change of Overmolding process. Not relevant for typical SMD.	e.g. change of overmold process parameter	C		•	•	-	@•	•	@•	•	@•	@•	•	•	@•	-	•	•	-	•	-	-	B	•	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PR-08	Changes in process technology or manufacturing methods - Marking	-	P	Change of Marking process	e.g. change from inked marking to laser marking e.g. marking of pin 1 e.g. change of appearance (additional marking)	B		•	•	-	-	-	-	-	-	-	•	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	-	-	-	-	-	-	-	-	AOI check necessary!
QUARTZ CRYSTAL / SAW	PAS-QUA-PR-09	Changes in process technology or manufacturing methods - Aging	-	P	Change of Aging process. Typically no aging done on quartz crystals.	If aging is done: e.g. change of times or temperatures	C		•	•	-	@•	-	-	-	-	-	-	-	-	-	•	•	-	•	-	-	B	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PR-10	Process integrity: tuning within specification	-	P	Variation within process specification.	e.g. process control	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW		**PACKING / SHIPPING - NEW MATERIAL, CRITICAL DIMENSIONS**																																											
QUARTZ CRYSTAL / SAW	PAS-QUA-PN-01	Packing / shipping specification change (loosening of tolerances)	P	P	Change of packing specification.	e.g. number of pieces on reel.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PN-02	Dry pack requirements change	P	P	Change of drypack requirements.	e.g. change of MSL e.g. change in dry pack assurance (HIC, MBB)	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PN-03	Change of carrier (tray, reel)	P	P	Change of carrier	e.g. change by material e.g. change by geometry.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW		**PACKING / SHIPPING - VISUAL INSPECTION**																																											
QUARTZ CRYSTAL / SAW	PAS-QUA-PV-01	Change of labelling	I	P	Change of labelling, also on reel.	**(I)** e.g. additional information (RoHS stamp) **(P)** e.g. change of customer specific information	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PV-02	Change of product marking	I	P	Marking on device.	e.g. change of content of marking e.g. change of method of marking e.g. change of appearance of marking	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW	PAS-QUA-PV-03	Change of packing/shipping specification	P	P	Change in packing specification which does not described a change of dimensions or material of the packing.	e.g. change of documentation in packing specification	*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
QUARTZ CRYSTAL / SAW		**LOGISTICS / CAPACITY / TESTING - EQUIPMEMENT**																																											
QUARTZ CRYSTAL / SAW	PAS-QUA-EQ-01	Production from a new equipment/tool which uses a different technology or which due to its unique form or function can be expected to influence the integrity of the final product	P	P	Change in process technique which is not already covered above. **Note:** Changes affecting the product not covered by the table require also a PCN.	e. g. new equipment supplier with different process concept	C		•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	Test effort depends on final risk assessment. Performance test according to affected process change.
QUARTZ CRYSTAL / SAW	PAS-QUA-EQ-02	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool)	-	P	PCN required for dedicated equipment for sensitive component production.	e.g. additional equipment to increase production capacity e.g. replacement of same equipment	C		•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	Test effort depends on final risk assessment. Performance test according to affected process change.
QUARTZ CRYSTAL / SAW	PAS-QUA-EQ-03	Change in final test equipment type that uses a different technology	P	P	Change of final test equipment which use different technology. PCN required for dedicated equipment for sensitive parameters.	e.g. change of tester platform	C		•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	Gage R&R / delta correlation
QUARTZ CRYSTAL / SAW		**LOGISTICS / CAPACITY / TESTING - PROCESS FLOW**																																											
QUARTZ CRYSTAL / SAW	PAS-QUA-PF-01	Manufacturing site transfer or movement of a part of production process to a different location/site	P	P	Change of manufacturing site. Includes transfer as well as additional site. **Note**: Reorganization inside one plant/site is not affected!	e.g. movement or transfer of manufacturing site or process step(s) to a different location/site. e.g. dual source / fab strategy	B		•	•	-	•	•	-	•	•	•	•	•	•	•	•	•	•	-	•	B	•	•	•	-	-	-	-	-	-	-	-	-	-	-	@•	@•	
QUARTZ CRYSTAL / SAW	PAS-QUA-PF-02	Elimination or addition of a manufacturing process step	-	P	Change of manufacturing process sequence.	e.g. washing / cleaning process e.g. change of order of processes	C		•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	Characterisation depends on impact of production flow.
QUARTZ CRYSTAL / SAW		**LOGISTICS / CAPACITY / TESTING - Q-GATE**																																											
QUARTZ CRYSTAL / SAW	QUA-QG-01	Change of test coverage used by the supplier to ensure data sheet compliance (e.g., elimination/addition of electrical measurement/test flow block, relaxation/enhancement of monitoring procedure or sampling)	-	P	Change of test coverage.	e.g. change from 100% to sample inspection e. g. test flow block, reduction from three to two temperature measurements e.g. change in burn in/run in process.	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		R (electr. funct.): test coverage. R (reliability) only for change in burn in process.
Al-Cap		**ALUMIUM ELECTROLYTIC CAPACITORS**																																											
Al-Cap		**ANY**																																											
Al-Cap	PAS-ALU-AN-01	Any change with impact on agreed upon technical contractual agreements	P	P	Intended to be used if no other type of change is applicable but the change affects agreed technical contractual agreements	Not relevant for technical evaluation.	*		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-AN-02	Any change with impact on processability/manufacturabiliy at customer, which is not covered in the matrix below.	P	P		Technical interface means component terminals. See *processability on board level.*	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	-	
Al-Cap		**DATASHEET**																																											
Al-Cap	PAS-ALU-DS-01	Change of datasheet parameters/electrical specification (min./max./typ. values) and / or AC/DC specification	P	P	Change of application relevant information **Not included:** Editorial changes.	e.g. tighten of electrical parameter distribution	A	Risk assessment depending on change for each application.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-DS-02	Correction of data sheet or issue of errata	I	I	No technical change of product, process or test. New description of behavior which was not specified before or which is different from initial specification. Please indicate clearly, that Infonote contains this type of change! Assessment in application required!!	e.g. data sheet correction because of new information about component behavior	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-DS-03	Specification of additional parameters	I	P	Description of a new not previously covered parameter. No technical change of the product. **(I):** no influence **(P):** Risk assessment depending on change for each application to provide evidence of additional parametes (stat. evaluation)	e.g. adding new (tested) parameter.	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap		**MATERIAL**																																											
Al-Cap	PAS-ALU-MA-01	Change of material composition - Housing	P	P	Change of housing	e.g. change Al alloy for housing	C	**B:** only if a cap holder holds the Capacitor body by pressing.	-	•	•	-	•	-	•	-	-	-	•	-	-	•	@•	-	•	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-MA-02	Change of material composition - Sealing	P	P	Change of sealing	e.g. change of rubber compound e.g. change of sealing disc material (axial, Snap in)	C	**B:** in case of external surface of sealing is changed. Evaluation only, if capacitor is glued	-	•	•	-	•	-	•	•	•	•	•	-	•	-	@•	@S	•	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-MA-03	Change of material composition - External Insulation	P	P	Change of external insulation / sleeving	e.g. change from PVC into PET e.g. change of color	C	**B:** Only for glued capacitors.	-	•	•	@•	•	-	•	@•	•	•	•	-	•	-	-	@S	•	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Biased Humidity test can be done without applying voltage.
Al-Cap	PAS-ALU-MA-04	Change of material composition - Lead / Termination	P	P	Change of lead or outer termination.	e.g. change of leadframe from iron into copper e.g. change of leadframe finish from tin/lead into tin	B		-	•	•	-	-	-	-	-	-	-	-	•	-	-	•	•	-	-	•	B	-	•	•	-	-	-	-	-	-	-	-	-	-	-	@•	-	
Al-Cap	PAS-ALU-MA-05	Change of material composition - Internal Insulation / Paper	P	P	Change of paper type / internal insulation	e.g. change of paper thickness 50 µm to 40µm	C	**A:** Only if impedance increase (delta characterization). Check if datasheet is affected (**PAS-ALU-DS-01**).	-	•	•	-	•	-	-	-	•	-	-	-	-	-	-	-	-	•	-	B	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	@•	
Al-Cap	PAS-ALU-MA-06	Change of material composition - Electrolyte	P	P	Change of electrolyte	e.g. change in formulation	C	**A:** Only if impedance increase (delta characterization). Check if datasheet is affected (**PAS-ALU-DS-01**).	-	•	•	•	•	-	-	-	•	-	-	-	-	-	-	-	•	•	-	B	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	@•	
Al-Cap	PAS-ALU-MA-07	Change of material composition - Tape Material	P	P	Change of closing tape material	e.g. change of glue or basis material	C		-	•	•	-	@•	-	-	-	@•	-	-	-	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-MA-08	Change of material composition - Base Plate	P	P	Change of base plate material	e.g. change of used plastic material	B		-	•	•	-	@•	-	-	-	-	-	-	-	-	-	@•	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-MA-09	Change of supplier of material	-	P	Change to a new or additional material supplier at component manufacturer.	e.g. for 2nd source purpose	C		-	•	•	•	•	-	•	•	-	-	-	•	•	•	•	•	•	-	•	B	•	•	•	-	-	-	-	-	-	-	-	-	-	-	-	@•	Test effort depends on final risk assessment. Performance test according to affected material. Assumption material specification remains unchanged. Otherwise see change of material.
Al-Cap		**DESIGN**																																											
Al-Cap	PAS-ALU-DE-01	Changes of termination, surface finish, shape, color, appearance or dimension structure - Wire Diameter	I	P	Change of wire diameter	e.g. change from 0.8 into 0.6 mm wire diameter.	B		-	•	-	-	-	-	-	-	-	-	-	•	-	-	•	-	-	-	•	B	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-DE-02	Changes of termination, surface finish, shape, color, appearance or dimension structure - Termination	I	P	Change of termination appearance For welded Al capacitors only.	e.g. change from matt tin into bright tin.	B		-	•	-	-	-	-	-	-	-	-	-	•	-	-	•	-	-	-	•	B	-	•	•	-	-	-	-	-	-	-	-	-	-	-	@•	-	
Al-Cap	PAS-ALU-DE-03	Changes of termination, surface finish, shape, color, appearance or dimension structure - Appearance	I	P	Change of appearance **Note:** Marking on device is defined as seperate change (PAS-ALU-PV-02).	e.g. change of color/appearance e.g. change of safety vent shape	B		-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-DE-04	Changes of termination, surface finish, shape, color, appearance or dimension structure - Rubber Sealing	I	P	Change of rubber sealing stand-off shape (for radial)	e.g. change of profile / design	A		-	•	-	-	-	-	-	-	-	-	@•	-	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-DE-05	Changes of inner construction - Aluminum Foil	-	P	Change of Al foil width	e.g. change of width	C		-	•	-	-	•	-	-	-	•	-	-	-	-	-	@•	-	-	•	-	B	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	@•	
Al-Cap	PAS-ALU-DE-06	Changes of inner construction - Seperator	-	P	Change of seperator width	e.g. change of width	C		-	•	-	-	•	-	-	-	•	-	-	-	-	-	@•	-	-	•	-	B	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-DE-07	Changes of inner construction - Seperator Density	-	P	Change of seperator density	e.g. change of seperator density/resistivity	C		-	•	-	-	•	-	-	-	•	-	-	-	-	-	-	-	-	•	-	B	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	@•	
Al-Cap	PAS-ALU-DE-08	Changes of inner construction - Inner Connection	-	P	Change of inner connection	e.g. change of shape/dimension	C		-	•	-	-	@•	-	-	-	-	-	-	@•	-	@•	@•	@•	-	-	-	@B	-	@•	@•	-	-	-	@•	-	-	-	-	-	-	-	-	-	Terminal Strength (11) not for axial components without paddle tabs.
Al-Cap	PAS-ALU-DE-09	Changes of inner construction - Closing Tape	-	P	Change of closing tape	e.g. change of dimension	C		-	•	-	@•	-	@•	-	-	-	-	-	-	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-DE-10	Changes of inner construction - Foil	-	P	Change of foil type	e.g. change of etching level e.g. change of thickness	C		-	•	-	@•	•	-	-	-	•	-	-	-	-	-	-	-	-	-	-	B	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	@•	
Al-Cap		**PROCESS**																																											
Al-Cap	PAS-ALU-PR-01	Changes in process technology or manufacturing methods - Terminal Attach	-	P	Change of terminal attach process	e.g. change of stitching / welding layout	C		•	•	-	-	•	-	-	-	-	-	-	•	-	•	@•	•	@-	-	-	B	-	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	Terminal Strength (11) and Vibration (14) not for axial components without paddle tabs.
Al-Cap	PAS-ALU-PR-02	Changes in process technology or manufacturing methods - Winding	-	P	Change of winding process	e.g. change of material disposition	B	**A:** only for HV application	•	•	-	-	•	-	-	-	•	-	-	-	-	-	•	-	-	-	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	
Al-Cap	PAS-ALU-PR-03	Changes in process technology or manufacturing methods - Impregnation	-	P	Change of impregantion	e.g. change of bulk process into individual impregnation	C		•	•	-	•	•	-	-	-	•	-	-	-	-	-	-	-	-	•	-	B	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	@•	Surge voltage test for high voltage components only.
Al-Cap	PAS-ALU-PR-04	Changes in process technology or manufacturing methods - Assembly	-	P	Change of assembly process	e.g. change of sealing method e.g. change of assembly process sequence	C		•	•	-	-	@•	-	-	-	-	-	@•	-	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R: Depends on process change
Al-Cap	PAS-ALU-PR-05	Changes in process technology or manufacturing methods - Aging / Testing	-	P	Change of aging/testing process	e.g. change of timing, voltage or temperature of process	C		•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@•	R: Depends on process change
Al-Cap	PAS-ALU-PR-06	Changes in process technology or manufacturing methods - Trim & Form Leaded	-	P	Change of trim & form process (leaded)	e.g. change of tooling shape or bending procedure	B		•	•	-	-	-	-	-	-	-	-	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Solderability may be influenced
Al-Cap	PAS-ALU-PR-07	Changes in process technology or manufacturing methods - Trim & Form SMD	-	P	Change of trim & form process (SMD)	e.g. change of tooling shape or bending procedure	B		•	•	-	-	-	-	-	-	-	-	@•	-	-	-	@•	-	-	-	@•	-	-	@•	@•	-	-	-	-	-	-	-	-	-	-	-	-	-	Solderability may be influenced
Al-Cap	PAS-ALU-PR-08	Process integrity: tuning within specification	-	P	Variation within process specification.	e.g. process control	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap		**PACKING / SHIPPING - NEW MATERIAL, CRITICAL DIMENSIONS**																																											
Al-Cap	PAS-ALU-PN-01	Packing / shipping specification change (loosening of tolerances)	P	P	Change of packing specification.	e.g. number of pieces on reel.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-PN-02	Dry pack requirements change	P	P	Change of drypack requirements.	e.g. change of MSL e.g. change in dry pack assurance (HIC, MBB)	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap	PAS-ALU-PN-03	Change of carrier (tray, reel)	P	P	Change of carrier	e.g. change by material e.g. change by geometry.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Al-Cap		**PACKING / SHIPPING - VISUAL INSPECTION**																																											
Al-Cap	PAS-ALU-PV-01	Change of labelling	I	P	Change of labelling, also on reel.	**(I)** e.g. additional information (RoHS stamp) **(P)** e.g. change of customer specific information	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

All-Cap	PAS-ALU-PV-02	Change of product marking	I	P	Marking on device.	e.g. change of content of marking e.g. change of method of marking e.g. change of appearance of marking	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
All-Cap	PAS-ALU-PV-03	Change of packing/shipping specification	P	P	Change in packing specification which does not described a change of dimensions or material of the packing.	e.g. change of documentation in packing specification	+		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
All-Cap	**LOGISTICS / CAPACITY / TESTING - EQUIPEMENT**																																												
All-Cap	PAS-ALU-EQ-01	Production from a new equipment/tool which uses the same basic technology or which due to its unique form or function can be expected to influence the integrity of the final product	P	P	Change in process technique which is not already covered above. **Note**: Changes affecting the product not covered by the table require also a PCN.	e. g. new equipment supplier with different process concept	C		●	●	-	-	●	-	-	●	-	●	●	-	●	●	-	-	●	-	B	-	-	-	-	-	●	-	-	-	-	-	-	-	-	-	@●	Test effort depends on final risk assessment. Performance test according to affected process change.
All-Cap	PAS-ALU-EQ-02	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool)	-	P	PCN required for dedicated equipment for sensitive component production.	e.g. additional equipment to increase production capacity e.g. replacement of same equipment	C		●	●	-	-	●	-	-	●	-	●	●	-	●	●	-	-	●	-	B	-	-	-	-	-	●	-	-	-	-	-	-	-	-	-	@●	Test effort depends on final risk assessment. Performance test according to affected process change.
All-Cap	PAS-ALU-EQ-03	Change in final test equipment type that uses a different technology	P	P	Change of final test equipment which use different technology. PCN required for dedicated equipment for sensitive parameters.	e.g. change of tester platform	C		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Gage R&R / delta correlation
All-Cap	**LOGISTICS / CAPACITY / TESTING - PROCESS FLOW**																																												
All-Cap	PAS-ALU-PF-01	Manufacturing site transfer or movement of a part of production process to a different location/site	P	P	Change of manufacturing site. Includes transfer as well as additional site. **Note**: Reorganization inside one plant/site is not affected.	e.g. movement or transfer of manufacturing site or process step(s) to a different location/site. e.g. dual source / lab strategy	B		●	●	-	●	●	@●	●	●	●	●	●	●	●	●	●	●	●	●	B	●	●	●	-	-	-	-	●	-	-	-	-	-	-	-	@●	@●	
All-Cap	PAS-ALU-PF-02	Elimination or addition of a manufacturing process step	-	P	Change of manufacturing process sequence.	e.g. washing / cleaning process e.g. change of order of processes	C		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Characterisation depends on impact of production flow.
All-Cap	PAS-ALU-PF-03	Elimination of final electrical measurement / test flow block	I	P	Reduction of final testing. PCN required for dedicated final test equipment for sensitive parameters.	e.g. elimination of additional impedance control	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Characterisation depends on impact of final test flow.
All-Cap	**LOGISTICS / CAPACITY / TESTING - Q-GATE**																																												
All-Cap	PAS-ALU-QG-01	Change of test coverage used by the supplier to ensure data sheet compliance (e.g., elimination/addition of electrical measurement/test flow block, relaxation/enhancement of monitoring procedure or sampling)	-	P	Change of test coverage.	e.g. change from 100% to sample inspection e. g. test flow block, reduction from three to two temperature measurements e.g. change in burn in/run in process.	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	R (elect. funct.): test coverage. R (reliability): only for change in burn in process.
NTC	**NTC**																																												
NTC	**ANY**																																												
NTC	PAS-NTC-AN-01	Any change with impact on agreed upon technical contractual agreements	P	P	Intended to be used if no other type of change is applicable but the change affects agreed technical contractual agreements.	Not relevant for technical evaluation.	+		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-AN-02	Any change with impact on processability/manufacturability at customer, which is not covered in the matrix below.	P	P		Technical interface means component terminals.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	-	
NTC	**DATASHEET**																																												
NTC	PAS-NTC-DS-01	Change of datasheet parameters/electrical specification (min./max./typ. values) and / or AC/DC specification	P	P	Change of application relevant information **Not included**: Editorial changes.	e.g. tighten of electrical parameter distribution	A	Risk assessment depending on change for each application	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-DS-02	Correction of data sheet or issue of errats	I	I	No technical change of product, process or test. New description of behavior which was not specified before or which is different from initial specification. Please indicate clearly, that Infineon contains this type of change! Assessment in application required!	e.g. data sheet correction because of new information about component behavior	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-DS-03	Specification of additional parameters	I	P	Description of a new not previously covered parameter. No technical change of the product. (I): no influence (P): Risk assessment depending on change for each application to provide evidence of additional parameter (stat. evaluation)	e.g. adding new (tested) parameter.	A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	**MATERIAL**																																												
NTC	PAS-NTC-MA-01	Change of material composition - Ceramic Binder	P	P	Change of Binder Material to bind ceramics.		C		-	●	●	-	-	-	-	-	-	-	-	-	@●	-	@●	@●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-MA-02	Change of material composition - Ceramic	P	P	Change of ceramic composition	e.g. changes in additives amount	C		-	●	●	-	-	-	-	-	-	-	-	-	●	-	●	●	-	●	@B	●	@S	-	-	-	-	-	-	-	-	-	-	-	-	@●	Parameter analyse only necessary if an anticipated impact on electrical performance. S = SMD device only
NTC	PAS-NTC-MA-03	Change of material composition - Inner Electrode	P	P	Change of inner electrode material (ink material). Valid in case of multilayer structures only.	e.g. change from AgPt material to AgPd material	C		-	●	●	●	●	-	-	●	●	-	-	-	-	-	-	-	●	-	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	
NTC	PAS-NTC-MA-04	Change of material composition - Encapsulation	P	P	Change of encapsulation material.	e.g. change of coating e.g. change of additives in an insulation.	B	A: Risk assessment on application level, if interaction with other material expected.	-	●	●	●	●	-	●	-	-	-	-	-	-	-	@●	●	-	-	@B	@●	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Parameter analyse only necessary if an anticipated impact on electrical performance.
NTC	PAS-NTC-MA-05	Change of material composition - Lead material / Termination	P	P	Change of lead or outer termination. Change of lead (finish) material, termination material or attachment material.	e.g. change from SnPb to pure Sn	B	Risk assessment needed to evaluate compatibility of soldering process.	-	●	●	-	-	-	@●	@●	@●	-	-	@●	-	@●	-	-	-	@●	@●	@B	-	@●	@●	-	-	-	-	-	-	-	-	-	-	@●	
NTC	PAS-NTC-MA-06	Change of supplier of material	-	P	Change to a new or additional material supplier at component manufacturer.	e.g. for 2nd source purpose	C		-	●	●	-	●	-	●	-	●	●	-	-	●	●	-	●	B	●	●	●	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Assumption material specification remains unchanged. Otherwise see change of material.
NTC	**DESIGN**																																												
NTC	PAS-NTC-DE-01	Changes of termination, surface finish, shape, color, appearance or dimension structure - Lead Diameter	I	P	Change of lead diameter	e.g. change lead diameter from 0.5 to 0.4 mm	B		-	●	-	-	-	-	@●	-	-	@●	@●	@●	-	-	-	-	-	-	@B	-	@●	@●	-	-	-	-	-	-	-	-	-	-	-	@●	
NTC	PAS-NTC-DE-02	Changes of termination, surface finish, shape, color, appearance or dimension structure - Termination Area	I	P	Change of termination area	e.g. change of termination layer thickness e.g. change in termination dimensions	B		-	●	-	-	-	-	@●	-	-	@●	@●	-	-	-	-	-	-	@●	@B	-	@●	@●	-	-	-	-	-	-	-	-	-	-	-	@●	SMD components only!
NTC	PAS-NTC-DE-03	Changes of termination, surface finish, shape, color, appearance or dimension structure - Internal Connection	I	P	Change of inner connection	e.g. change from soldered connection to welded connection	C		-	●	-	-	-	-	@●	@●	@●	-	-	@●	-	@●	-	-	-	@●	@●	@B	-	@●	@●	-	-	-	-	-	-	-	-	-	-	@●	
NTC	PAS-NTC-DE-04	Changes of termination, surface finish, shape, color, appearance or dimension structure - Appearance	I	P	Change of appearance. **Note**: Marking on device is defined as separate change (PAS-FLM-PV-02).	e.g. change or adding of color on component mainly in combination with other changes!	B		-	●	-	-	-	-	-	-	@●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-DE-05	Changes of inner construction - Electrode	-	P	Change of electrode layer thickness or geometry. For multi-layer technology only.	e.g. change of electrode design	C		-	●	-	-	@●	@●	-	-	-	-	@●	-	-	-	-	@●	@●	-	-	-	-	@●	@●	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-DE-06	Changes of inner construction - Layer Thickness	-	P	Change of ceramic layer thickness. For multi-layer technology only.	e.g. change from 1.5µm into 1.0µm	C		-	●	-	-	@●	@●	-	-	-	-	@●	-	-	-	-	@●	@●	-	-	-	-	@●	@●	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-DE-07	Changes of inner construction - Number of Layers	-	P	Change of number of ceramic or electrode layers. For multi-layer technology only. Always in combination with PAS-NTC-DE-06.	see also layer thickness	C		-	●	-	-	@●	@●	-	-	-	-	@●	-	-	-	-	@●	@●	-	-	-	-	@●	@●	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	**PROCESS**																																												
NTC	PAS-NTC-PR-01	Changes in process technology or manufacturing methods - Lamination	-	P	Change of lamination / press technique technology.	e.g. stamp press to isostatic press	C		●	●	-	-	-	@●	-	@●	-	-	-	-	-	-	-	@●	@●	-	-	@B	-	@●	-	-	-	-	-	-	-	-	-	-	-	-	@●	
NTC	PAS-NTC-PR-02	Changes in process technology or manufacturing methods - Firing	-	P	Change of firing / sintering profile	e.g. temperature and / or time and / or atmosphere. e.g. from tunnel to batch kiln.	C		●	●	-	-	@●	@●	-	-	@●	-	@●	-	-	-	-	-	@●	@●	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	
NTC	PAS-NTC-PR-03	Changes in process technology or manufacturing methods - Dicing	-	P	Change of dicing / slicing	e.g. change from cutting to sawing.	C		●	●	-	@●	@●	@●	-	@●	@●	-	@●	@●	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	
NTC	PAS-NTC-PR-04	Changes in process technology or manufacturing methods - Termination	-	P	Change for termination preparation like plating or apply of termination base layer.	e.g. change in plating technology (final termination) e.g. change from dip in paste to plating (apply)	B		●	●	-	-	-	-	●	●	●	-	-	●	-	●	-	-	-	●	●	B	-	●	●	-	-	-	-	-	-	-	-	-	-	-	@●	
NTC	PAS-NTC-PR-05	Changes in process technology or manufacturing methods - Electrode apply	-	P	Change of electrode apply. For multi layer technology only.	e.g. change of inner electrode lay down method.	C		●	●	-	@●	-	-	-	@●	-	-	-	-	-	-	-	@●	@●	@●	-	@B	-	@●	-	-	-	-	-	-	-	-	-	-	-	-	@●	
NTC	PAS-NTC-PR-06	Changes in process technology or manufacturing methods - Assembly	-	P	Change in assembly process for leaded or encapsulated devices.	e.g. soldering method for lead attach to element or coating / encapsulation process	B		●	●	-	●	●	-	●	●	-	●	-	●	●	-	-	-	-	●	-	-	●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-PR-07	Process integrity: tuning within specification	-	P	Variation within process specification.	e.g. process control	C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	**PACKING / SHIPPING - NEW MATERIAL, CRITICAL DIMENSIONS**																																												
NTC	PAS-NTC-PN-01	Packing / shipping specification change (loosening of tolerances)	P	P	Change of packing specification.	e.g. number of pieces on reel.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-PN-02	Dry pack requirements change	P	P	Change of drypack requirements.	e.g. change of MSL. e.g. change in dry pack assurance (HIC, MBB)	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-PN-03	Change of carrier (tray, reel)	P	P	Change of carrier	e.g. change by material e.g. change by geometry.	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	**PACKING / SHIPPING - VISUAL INSPECTION**																																												
NTC	PAS-NTC-PV-01	Change of labelling	I	P	Change of labelling, also on reel.	(I) e.g. additional information (RoHS stamp) (P) e.g. change of customer specific information	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-PV-02	Change of product marking	I	P	Marking on device.	e.g. change of content of marking e.g. change of method of marking e.g. change of appearance of marking	B		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	PAS-NTC-PV-03	Change of packing/shipping specification	P	P	Change in packing specification which does not described a change of dimensions or material of the packing.	e.g. change of documentation in packing specification	+		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NTC	**LOGISTICS / CAPACITY / TESTING - EQUIPEMENT**																																												
NTC	PAS-NTC-EQ-01	Production from a new equipment/tool which uses a different technology or which due to its unique form or function can be expected to influence the integrity of the final product	P	P	Change in process technique which is not already covered above. **Note**: Changes affecting the product not covered by the table require also a PCN.	e. g. change from wet to dry technology.	C		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Test effort depends on final risk assessment. Performance test according to affected process change.
NTC	PAS-NTC-EQ-02	Production from a new equipment/tool which uses the same basic technology (replacement equipment or extension of existing equipment pool)	-	P	PCN required for dedicated equipment for sensitive component production.	e.g. elimination of manual handling processes	C		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Test effort depends on final risk assessment. Performance test according to affected process change.
NTC	PAS-NTC-EQ-03	Change in final test equipment type that uses a different technology	P	P	Change of final test equipment which use different technology. PCN required for dedicated equipment for sensitive parameters.	e.g. change of tester platform	C		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	Gage R&R / delta correlation
NTC	**LOGISTICS / CAPACITY / TESTING - PROCESS FLOW**																																												
NTC	PAS-NTC-PF-01	Manufacturing site transfer or movement of a part of production process to a different location/site	P	P	Change of manufacturing site. Includes transfer as well as additional site. **Note**: Reorganization inside one plant/site is not affected.	e.g. movement or transfer of manufacturing site or process step(s) to a different location/site. e.g. dual source / lab strategy	B		●	●	-	●	●	-	●	●	●	●	●	●	●	●	●	●	●	●	B	●	●	●	-	-	-	-	-	-	-	-	-	-	-	-	@●	@●	
NTC	PAS-NTC-PF-02	Elimination or addition of a manufacturing process step	-	P	Change of manufacturing process sequence.	e.g. washing / cleaning process e.g. change of order of processes	C		●	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	@●	
NTC	**LOGISTICS / CAPACITY / TESTING - Q-GATE**																																												